297-8981-021

DMS-100 Family

Location Routing Number - Local Number Portability

Service Implementation Guide

NA015 Standard 09.01 March 2001

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DMS-100 Family

Location Routing Number - Local Number Portability

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Publication history

March 2001

09.01 adds customer group option BRITONUN to Table CUSTSTN; option STRIPNPA to Table LCASCRCN and Table LCAINFO; option ACG 10D TRMT to Table LNPOPTS; and SOC LNP00202.

August 2000

08.01 adds log LNP306 for SR 50328328.

March 2000

07.01 is the first standard issue of *Location Routing Number - Local Number Portability Product Specification* for Release NA013 Gate 2. A new chapter has been added for Number Pooling Evolution. Minor changes have also been made in response to items arising from customer comments.

October 1999

06.01 is the first standard issue of *Location Routing Number - Local Number Portability Product Specification* for Release NA012 Gate 3. Only minor changes were made for this release of the document. There was no Gate 2 release of this NTP because there was no core development work.

May 1999

05.02 is the second Standard issue of *Location Routing Number - Local Number Portability Product Specification* for Release NA011 Gate 3. Only minor changes were made for this release of the document.

February 1999

05.01 is the first standard issue of *Location Routing Number - Local Number Portability Product Specification* for Release NA011. This issue was prepared for Gate 2. The following changes have been made in response to action items arising from customer comments:

- The development summary now includes SOC information.
- The development summary now includes bridgeback information.
- The feature interactions chapter now has cross references from the list of features to the content of the chapter.
- The index has been reconstituted.
- A “roadmap” is included. This navigation tool maps the information requirements of various job types to the content of this document.
- The requirements sections are removed from the document.
- Numerous editorial changes have been completed.
- A number of TRAVER examples have been updated.
- The section on CompuCALL/SCAI has been updated.
- The section on Virtual Facility Groups has been updated and its title has been changed from “Virtual Facility Groups and Virtual Facility Group Look Ahead”.
- A new section on Virtual Facility Group Look Ahead has been created.
- A section on LINE logs has been added.
- Some work has been completed to address the action items arising from the Customer Conference of June 1998.

December 1998

05.01 is the first issue of *Location Routing Number - Local Number Portability Product Specification* for Release NA011. This issue was prepared for Gate 1A. The following changes have been made:

October 1998

04.03 is the third issue of *Location Routing Number - Local Number Portability Product Specification* for Release NA010. This issue was prepared for Gate 3. The following changes have been made:

- A number of TRAVERS have been updated.
- Various editorial and technical changes have been made.

July 1998

04.02 is the second issue of *Location Routing Number - Local Number Portability Product Specification* for Release NA010. This issue was prepared for Gate 2. The following changes have been made:

- All references to Query on Release (QOR) have been removed.
- A number of TRAVERS have been updated.
- All maintenance information is now included. A chapter titled, “Maintenance overview” and another new chapter, “Trouble locating for LRN-LNP” have been added.
- The order of the “Call walkthrough” and “Messaging requirements” have been interchanged.
- The order of the “Translation and routing” chapter and, “Provisioning overview” chapter have been interchanged.
- The order of the “Service orders” chapter and the, “Test call” chapter have been interchanged.
- A section on 800Plus has been added.
- A section on Network management has been added.
- Various editorial and technical changes have been made.

February 1998

04.01 is the first issue of *Location Routing Number - Local Number Portability Product Specification* for Release NA010. This issue was prepared for Gate 1.

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03.01 is the first issue of *Location Routing Number - Local Number Portability Product Specification* for Release NA009. This issue was prepared for Gate 1A.

November 1997

02.02 is the second issue of *Location Routing Number - Local Number Portability Product Specification* for Release NA008. This issue was prepared for Gate 3.

July 1997

02.01 is the first issue of *Location Routing Number - Local Number Portability Product Specification* for Release NA008. This issue was prepared for Gate 1A.

May 1997

01.07 is the seventh issue of *Location Routing Number - Local Number Portability Product Specification* for Release NA007. This issue was prepared for Gate 3.

April 1997

01.06 is the sixth issue of *Location Routing Number - Local Number Portability Product Specification* for Release NA007. This issue was prepared for pre-Gate 3.

April 1997

01.05 is the fifth issue of *Location Routing Number - Local Number Portability Product Specification* for Release NA007. This issue was prepared as an interim release.

April 1997

01.04 is the fourth issue of *Location Routing Number - Local Number Portability Product Specification* for Release NA007. This issue was prepared as an interim release.

March 1997

01.03 is the third issue of *Location Routing Number - Local Number Portability Product Specification* for Release NA007. This issue was prepared for Gate 2.

Contents

About this document

This document describes the technical requirements and functionality of the Nortel Networks product that provides Location Routing Number-Local Number Portability (LRN-LNP), as implemented on a service switching point (SSP).

This document applies to Service Provider Portability within a rate center. To understand this document the reader must be familiar with AIN Essentials functionality.

Structure of this document

The document is structured as follows:

Part: Introduction. This part provides an overview of the LRN-LNP product, the development summary, the call model, and agents supported by the NA010 release.

Part: Functional description. This part describes the LRN-LNP trigger and response processing. Error handling and limitations and restrictions are also discussed.

Part: Interactions. This part provides a list of DMS features that are supported by LRN-LNP, and interactions with other features.

Part: Planning and engineering. This part describes LRN-LNP hardware requirements and software components for this release, outlines the technical specifications such as standards, performance measurements, and capacity allocation, and messaging requirements.

Part: Provisioning. This part contains the provisioning information. The chapters in this section provide examples of trigger, response, and post-response translations datafill.

Part: Billing. This part describes Automatic Message Accounting as it applies to LRN-LNP and illustrates the modules codes.

Part: OAMP. This part describes the service order procedures and maintenance tools that are supported by the LRN-LNP NA010 release.

Part: Requirements. This part presents the mapping of LRN-LNP to the Nortel specifications.

How to check the version and issue of this document

The version and issue of the document are indicated by numbers, for example, 01.01.

The first two digits indicate the version. The version number increases each time the document is updated to support a new software release. For example, the first release of a document is 01.01. In the next software release cycle, the first release of the same document is 02.01.

The second two digits indicate the issue. The issue number increases each time the document is revised but rereleased in the same software release cycle. For example, the second release of a document in the same software release cycle is 01.02.

To determine which version of this document applies to the software in your office and how documentation for your product is organized, check the release information in *Product Documentation Directory*, 297-8991-001.

References in this document

This product is based on the requirements that are outlined in the following documents:

- *Illinois Number Portability Workshop - Generic Switching and Signaling Requirements for Number Portability*, Issue 1.01, April 3, 1996.
- *Local Number Portability DMS-100/200 Service Switching Point Commercial Specifications*, Version 3c, June 24, 1996.
- *Query on Release Draft Requirements*, Issue 0.4, April 17, 1996.

The following are documents referenced in this book, as well as related documents:

- *DMS-10 and DMS-100 Product Documentation Directory*, 297-8991-001
- *DMS-100 Family Basic Translations Tools Guide*, 297-1001-360
- *DMS-100 Family Glossary of Terms and Abbreviations Reference Manual*, 297-1001-825
- *DMS-100 Family Advanced Intelligent Network Essentials Service Implementation Guide*, 297-5161-021

- *DMS-100 Family Advanced Intelligent Network Service Enablers Service Implementation Guide*, 297-5161-022
- *DMS-100 Family AIN and LRN-LNP Maintenance Guide*, 297-5161-510
- *TOPS LNP User's Guide*, 297-8403-902

What precautionary messages mean

The types of precautionary messages used in NT documents include attention boxes and danger, warning, and caution messages.

An attention box identifies information that is necessary for the proper performance of a procedure or task or the correct interpretation of information or data. Danger, warning, and caution messages indicate possible risks.

Examples of the precautionary messages follow.

ATTENTION Information needed to perform a task

If the unused DS-3 ports are not deprovisioned before a DS-1/VT Mapper is installed, the DS-1 traffic will not be carried through the DS-1/VT
Mapper, even though the DS-1/VT Mapper is properly provisioned

CAUTION Possibility of service interruption or degradation

DANGER
Possible loss of service
Before continuing, confirm that you are removing the card from the inactive unit of the peripheral module. Subscriber service will be lost if you remove a card from the active unit.

CAUTION Possibility of equipment damage

DANGER
Damage to the backplane connector pins
Align the card before seating it, to avoid bending the backplane connector pins. Use light thumb pressure to align the card with the connectors. Next, use the levers on the card to seat the card into the connectors.

DANGER Possibility of personal injury

DANGER
Risk of electrocution
Do not open the front panel of the inverter unless fuses F1, F2, and F3 have been removed. The inverter contains high voltage lines. Until the fuses are removed, the high voltage lines are active, and you risk being electrocuted.

How commands, parameters, and responses are represented

Commands, parameters, and responses in this document conform to the following conventions.

Input prompt (>)

An input prompt (>) indicates that the information that follows is a command:

>BSY

Commands and fixed parameters

Commands and fixed parameters that are entered at a MAP terminal are shown in uppercase letters:

>BSY CTRL

Variables

Variables are shown in lowercase letters:

>BSY CTRL ctrl_no

The letters or numbers that the variable represents must be entered. Each variable is explained in a list that follows the command string.

Responses

Responses correspond to the MAP display and are shown in a different type:

```
FP 3 Busy CTRL 0: Command request has been submitted.

FP 3 Busy CTRL 0: Command passed.
```

The following excerpt from a procedure shows the command syntax used in this document:

Manually busy the CTRL on the inactive plane by typing:

>BSY CTRL ctrl_no

and pressing the enter key.

where

ctrl_no is the number of the CTRL (0 or 1)

Example of a MAP response:

```
FP 3 Busy CTRL 0: Command request has been submitted.

FP 3 Busy CTRL 0: Command passed.
```

Part I
Introduction

This part consists of the following chapters:

“Chapter 1: Roadmap”

“Chapter 2: Overview”

“Chapter 3: Development summary”

“Chapter 4: Call Model”

“Chapter 5: Agent Support”

1 Roadmap

This section maps the information requirements of various job types to the content of this document.

This section is included in response to customer requests for a guide to the content of this document that is organized by job type.

To use the roadmap to find the parts of the document that are most important to you:

- Identify your job type in the first column.
- The most significant topics for each job type are listed in the middle column.
- Find information for each topic as listed in the last column.

1.1 Information requirements

The following table maps the information requirements of various job types to the content of this document.

Table 1-1 Information requirements mapped to job type (Sheet 1 of 4)

Job Type	Topics	Content
Planning	This group requires information on the following topics: • New features • Software Optionality Control (SOC)	Please see the following chapters: • Chapter 3, “Development summary” • Chapter 16, “System engineering” • Chapter 14, “Hardware description” • Chapter 15, “Software description” • Chapter 24, “Software optionality control”

Table 1-1 Information requirements mapped to job type (Continued) (Sheet 2 of 4)

Job Type	Topics	Content
Engineering	This group requires information on the following topics: • Hardware requirements • Software requirements • General office datafill • Capacity / Office parameters • Software Optionality Control (SOC)	Please see the following chapters: • Chapter 14, “Hardware description” • Chapter 15, “Software description” • Chapter 16, “System engineering” • Chapter 17, “Signaling requirements” • Chapter 18, “Messaging requirements” • Chapter 19, “Call walkthrough” • Chapter 20, “Provisioning overview” • Chapter 23, “General Office” • Chapter 24, “Software optionality control”
Implementation /Installation, or Network/Switch specific Translations Planning	This group requires information on the following topics: • Provisioning • General office datafill • Capacity / Office parameters • General office translation • Other datafill	Please see the following chapters: • Chapter 19, “Call walkthrough” • Chapter 20, “Provisioning overview” • Chapter 21, “Translation and routing overview” • Chapter 22, “Data schema” • Chapter 23, “General Office” • Chapter 24, “Software optionality control” • Chapter 25, “Datafilling for triggers” • Chapter 26, “SS7 datafill” • Chapter 27, “LNP trigger provisioning” • Chapter 28, “Datafilling for responses” • Chapter 29, “Porting” • Chapter 30, “Trigger administration” • Chapter 31, “Datafilling by call scenario”

Table 1-1 Information requirements mapped to job type (Continued) (Sheet 3 of 4)

Job Type	Topics	Content
Maintenance	This group requires information on the following topics: • Translations • Alarm clearing • 1st level maintenance • Troubleshooting	Please see the following chapters: • Chapter 19, "Call walkthrough" • Chapter 20, "Provisioning overview" • Chapter 21, "Translation and routing overview" • Chapter 22, "Data schema" • Chapter 23, "General Office" • Chapter 24, "Software optionality control" • Chapter 25, "Datafilling for triggers" • Chapter 26, "SS7 datafill" • Chapter 27, "LNP trigger provisioning" • Chapter 28, "Datafilling for responses" • Chapter 29, "Porting" • Chapter 30, "Trigger administration" • Chapter 34, "Maintenance overview" • Chapter 37, "Operational measurements for LRN-LNP" • Chapter 38, "Translation verification tool for LRN-LNP" • Chapter 39, "Other CI commands for LRN-LNP" ***Note:*** This chapter contains information on QPDN, TstQuery and AINTRACE. • Chapter 40, "Trouble locating for LRN-LNP" • Chapter 41, "Logs for LRN-LNP"
Service Order Group	This group requires information service orders (SERVORD)	Please see Chapter 35, "Service orders"

Table 1-1 Information requirements mapped to job type (Continued) (Sheet 4 of 4)

Job Type	Topics	Content
SS7 Control Group	This group requires information on the following topics: • A-link maintenance • SS7 datafill • Sub-system alarms	Please see the following chapters: • Chapter 26, “SS7 datafill” • Chapter 40, “Trouble locating for LRN-LNP”
AMA Group	This group requires information on AMA.	Please see the following chapters: • Chapter 32, “Automated message accounting” • Chapter 33, “Billing structures and modules”

2 Overview

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see the section "References in this document" on page xxiv.

2.1 Scope

This document covers the Nortel LRN-LNP product on a Service Switching Point, which includes both end-office and tandem switches (that is, DMS-100 or 200). This does not include interexchange carrier switches (DMS-250, DMS-10), or TOPS switches. As well, this document discusses only Service Provider Portability within a rate center. This document does not cover Service Portability, Location Portability, and Service Provider Portability outside of a rate center.

Nortel has chosen the public office dial plan (PODP)-based solution to LRN-LNP.

2.2 Introduction to Local Number Portability

LNP provides the capability for customers to retain their geographic or nongeographic directory numbers (DN) when they change their location, service provider, or service.

Three types of LNP services exist:

- **Service Provider Portability** allows customers to keep their current directory number when changing from one service provider to another.
- **Location Portability** allows customers of a service provider to keep their directory numbers when changing locations.
- **Service Portability** allows customers to retain their directory number after changing service types, for example, from wireline to wireless service.

This document applies only to Service Provider Portability within a rate center. This document does not apply to Location Portability, Service Portability, or portability outside of a rate center. These services are currently under study.

LRN-LNP on the SSP forms an integral part of the overall network LNP solution. It promotes fair competition between the incumbent local exchange carriers (ILEC) that currently provide local service, and the competitive local exchange carriers (CLEC) that are new entrants to the local service market.

The Nortel LRN-LNP product for Service Provider Portability enables customers to change their service provider without having to change their DN. Callers can connect to ported directory numbers without having to change their dialing procedures. This capability removes the major deterrent for most customers when deciding whether or not to switch local service providers.

Individual lines or entire customer families are portable, but not individual members (that is, customer groups belonging to these families, their extensions and attendant consoles). Stand-alone customer groups are portable as a whole group, with all the members included. In order to port a customer group that has a family dependency, the whole group must first be converted into a stand-alone customer group and then ported.

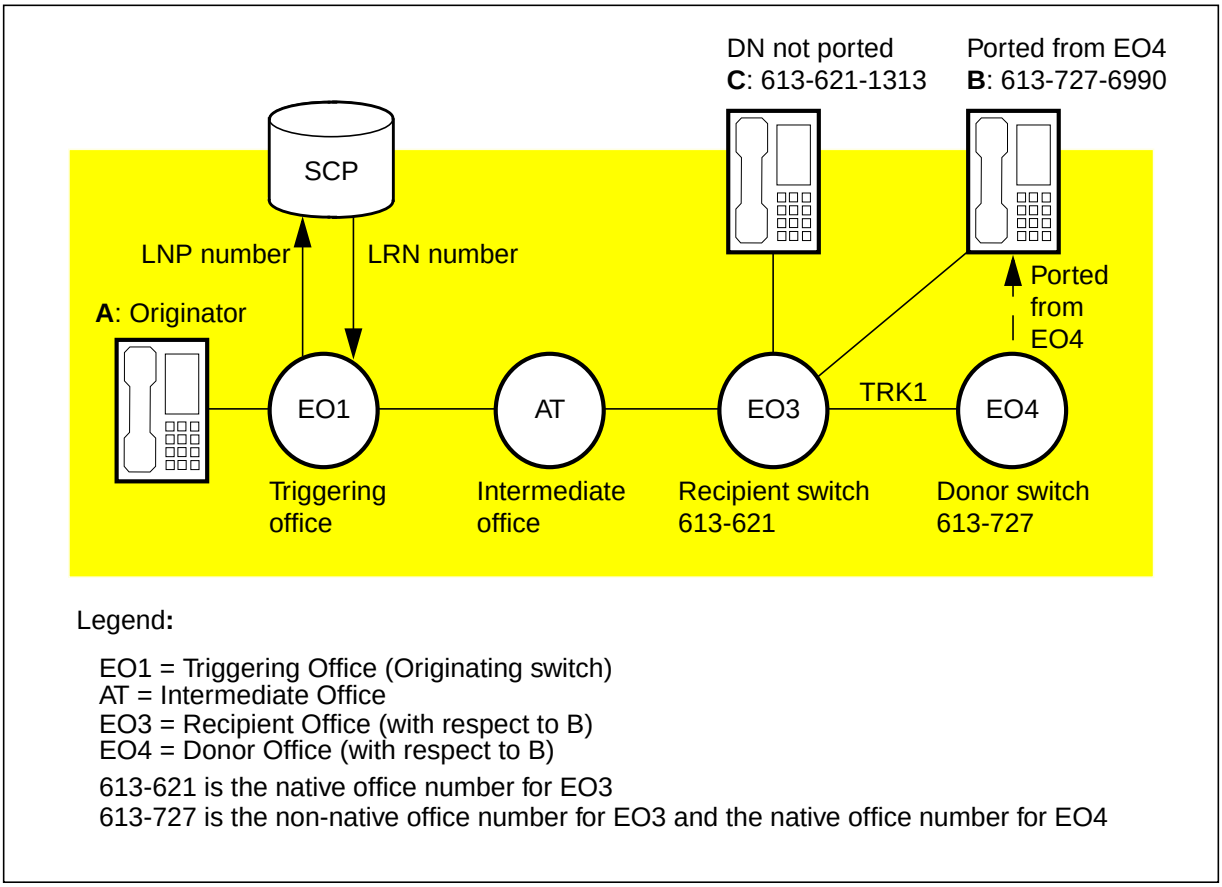
2.3 Terminology

Unless otherwise specified, the following terminology is used in this document:

- Donor Switch or Donor Office: The switch from which a DN was initially ported.
- Recipient Switch or Recipient Office: The switch to which a DN is ported as defined by the LRN for the ported subscriber.
- Triggering Switch or Triggering Office: The switch where LNP triggering occurs.
- Intermediate Switch or Intermediate Office: The switch that routes an LNP call to its destination after triggering.
- TOFCNO: Terminating Office Number
- Terminating Office Number: NPA-NXX pattern
- Native Office Number: The office number that was historically owned by an office before the introduction of LNP.
- Nonnative Office Number: The office number for an imported ported DN at the recipient office.
- Portable Office Number: An office number (NPA-NXX pattern) in which one or more DNs have been ported.

- Nonportable Office Number: The office number that is not opened for porting.
- Ported DN: A DN that has been moved from one office (donor office) to another office (recipient office).

Figure 2-1 Terminology used in LRN LNP



Legend**:**

EO1 = Triggering Office (Originating switch)
AT = Intermediate Office
EO3 = Recipient Office (with respect to B)
EO4 = Donor Office (with respect to B)

613-621 is the native office number for EO3
613-727 is the non-native office number for EO3 and the native office number for EO4

3 Development summary

This section describes the DMS software activities established for the development of the LRN-LNP SSP software. LRN-LNP development is phased over several releases.

3.1 NA015 development

The following table lists the features under development in NA015:

Table 3-1 Feature listing for NA015

Feature number	Feature title	SOC Information	Feature description
A59022782	Sourcing of Patches LNP40 and NPA03, and 10-digit automatic call gapping (10D ACG) Enhancement	SOC Code: LNP00202	This feature also provides functionality to activity trigger A59022792. The sourcing of patch LNP40 eliminates conflict between ISDN BRI translations and advanced intelligent network / local number portablility (AIN/LNP) translations. This conflict is eliminated by the optional disabling of type of number (TON)-based routing. The sourcing of patch NPA03 provides the optional removal of the numbering plan area (NPA) in the called number returned by the service control point (SCP). This is desirable in areas where 1+10-digit dialing is mandatory. 10-digit automatic call gapping (10D ACG) Enhancement allows the customer the option of routing to provisioned treatment LNP calls encountering 10D ACG control.
A59022792	See A59022782 above		

3.2 NA011 development

The following table lists the features under development in NA011.

Table 3-2 Feature listing for NA011 (Sheet 1 of 2)

Feature number	Feature title	SOC Information	Feature description
AU3215	LNPSSP: LNP/VFG Interworking Enhancements	SOC Code: LNP00100 Activation: The passing of LNP information through a VFG during call processing is not controlled by SOC. However, TRAVER will not display LNP information if the LNP00100 option is idle. To suppress the LNP 719 and 720 module codes when the LNP00100 SOC option is active, datafill the option NOLNPAMA in table VIRTGRPS.	When a call to a ported number queries the LNP database at an originating switch and routes over an ISDN user part (ISUP) trunk to an access tandem switch, LNP information is signalled. Prior to this design activity, when a call encounters a VFG at the intermediate switch, LNP information (such as the fact that a query was done and the directory number of the called party) was lost. The ISUP IAM message exiting the switch after encountering VFG retained the LRN (in the CalledPartyID parameter) that was in the incoming ISUP IAM, but the FCI bit was reset and the GAP information was removed. As a result, the call routed to the recipient switch and was sent to treatment or terminated to the wrong DN. This activity addresses the need to allow LNP information to pass through VFGs under certain conditions. An LNP call which encounters a VFG on a non-terminating switch is: • allowed to continue through the VFG (with LNP information unchanged) if there is no digit manipulation applicable to the call. • blocked if there is digit manipulation applicable to the call. A new LNP log, LNP304, is used to flag the occurrence of digit manipulation on an LNP call routing to a VFG on a non-terminating switch. TRAVER tool is updated to reflect this behavior. A new option in table VIRTGRPS, option NOLNPAMA, is introduced. This option can prevent the 719/720 module code from appending to billing records after a VFG.

Table 3-2 Feature listing for NA011 (Continued) (Sheet 2 of 2)

Feature number	Feature title	SOC Information	Feature description
AU3214	LNPSSP: LNP/CompuCALL Interworking	SOC Code: LNP00100 Activation: This feature activates automatically with the LNP00100 SOC and the standard LNP datafill.	This activity enables LNP processing for calls that are made using CompuCall services such as: • third party agent control • coordinated voice and data • third party call control • RouteCall and CallRedirect functionality Switch-computer-application interface (SCAI) messages are also supported. CompuCALL treats ported, non-portable, and portable-non-ported agents seamlessly.
AU3216	LNPSSP: LNP/COT Interworking	SOC Code: LNP00200 Activation: This feature activates automatically with the LNP00200 SOC and the standard LNP datafill. ***Note:*** Datafill option SITE in table HOMELRN.	This activity is concerned with modifying the Customer-Originated Trace (COT) feature to accommodate Local Number Portability (LNP). With LNP a service provider cannot always be identified by an NPA-NXX. However, the Jurisdiction Information Parameter (JIP), used for billing, uniquely identifies the serving switch. COT is a Custom Local Area Signaling Service (CLASS) feature. COT allows a customer to trace back the originator of the previous call. The logs generated, either LINE150 (that is, full trace obtained) or LINE151 (that is, partial trace obtained) are viewable by personnel on the serving switch.

3.3 NA010 development

The following table lists the features under development in NA010.

Table 3-3 Feature listing for NA010 (Sheet 1 of 3)

Feature number	Feature title	SOC Information	Feature description
AJ5071	LNP/800Plus Interworking	SOC Code: LNP00300 Activation: This feature activates automatically with the LNP00300 SOC and the standard LNP datafill.	Makes the 800Plus (Canadian market) interwork with Local Number Portability (LNP)
AU2908	LNP/AIN Realtime Optimizations	SOC Code: AIN00008 Activation: This feature activates automatically with the AIN008 SOC.	This feature work is a continuation of the realtime capacity initiatives that have taken place in NA008 and NA009.
AU3035	DCR interworking	SOC Code: LNP00200 Activation: This feature activates automatically with the LNP00200 SOC and the standard LNP and DCR datafill.	Provides the capability to dynamically re-route overflowed calls through a new route that is separated by one or two links from an originating switch

Table 3-3 Feature listing for NA010 (Continued) (Sheet 2 of 3)

Feature number	Feature title	SOC Information	Feature description
AU3086	Foreign LRN Enhancement	SOC Code: LNP00100 Activation: This feature activates automatically with the LNP00100 SOC and the standard LNP datafill and LNP response datafill.	The functionality provided by this activity enables Operating Companies to correctly route and bill calls to subscribers ported to switches that service multiple RCs with one LRN. TRAVER has been modified to reflect the changes.
AJ5070	Preset Conference Support	SOC Code: LNP00100 Activation: This feature activates automatically with the LNP00100 SOC and the standard LNP datafill.	This is a feature interaction activity between Local Number Portability (LNP) and Preset Conference.
AU2779	LNP Query Enhancement	SOC Code: LNP00200 Activation: This feature activates automatically with the LNP00200 SOC and the standard LNP datafill. This feature also requires the activation of options LNPTCT and BLOCKLNP in table LNPOPTS.	Adds a new AIN Trigger Criteria Type for LNP queries; adds analysis of 10D ACG controls; adds throttling of internetwork calls that have not performed an LNP query.

Table 3-3 Feature listing for NA010 (Continued) (Sheet 3 of 3)

Feature number	Feature title	SOC Information	Feature description
BY79470	LNP00300 Software Optionality Control (SOC) Implementation	SOC Code: LNP00300 Activation: This feature activates automatically with the LNP00300 SOC.	Implementation of the LNP00300 - LNP Canadian Requirements SOC option
90031481	LNP Avoid Retranslations Enhancements	SOC Code: LNP00100 Activation: This feature activates automatically with the LNP00100 SOC and the standard LNP datafill.	Bypass AIN 0.1 response translations for all LNP calls to portable non ported numbers.

3.4 NA009 development

The following table lists the features that were developed in NA009.

Table 3-4 Feature listing for NA009 (Sheet 1 of 5)

Feature number	Feature title	SOC Information	Feature description
AU2545 AU2544 AU2548	LNPSSP: 10 Digit Unconditional Trigger Enhancements	SOC Code: LNP00200 Activation: This feature activates automatically with the LNP00200 SOC and the standard LNP datafill.	Expands the list of DNs to which the PORT option may be assigned.

Table 3-4 Feature listing for NA009 (Continued) (Sheet 2 of 5)

Feature number	Feature title	SOC Information	Feature description
AU2549 AU2548 AU2548	LNP: Ported Out DN Marking	SOC Code: LNP00200 Activation: This feature activates automatically with the LNP00200 SOC and the standard LNP datafill.	Allows marking of ported out directory numbers.
AU2547 AU2546 AU2546	LNPSSP: LNP VFG Support	SOC Code: LNP00100 Activation: This feature activates automatically with the LNP00100 SOC, the appropriate datafill in table LNPCODE, and the standard LNP datafill.	Addresses the interaction issues between VFG and LNP translations and provides the capability to use VFG to throttle calls attempting to terminate on a resident DN
AU2570 AU2571 AU2661 AU2525 AU2525	LNP: STDPRTCT CLSVSCRC Call Control	SOC Code: LNP00100 Activation: This feature activates automatically with the LNP00100 SOC, datafill in table LNPRTE, and the standard LNP datafill.	Allows customer selected calls that are routed directly out of pre-translations or class of service screening to perform LNP criteria checking

Table 3-4 Feature listing for NA009 (Continued) (Sheet 3 of 5)

Feature number	Feature title	SOC Information	Feature description
AU2592 AU2539 AU2539	LNPSSP: LNP AMA Call Codes 721 and 722	SOC Code: LNP00200 Activation: This feature activates automatically with the LNP00200 SOC, datafill in table AMAOPTS, and the standard LNP datafill.	Introduces the Call Type Codes (CTC) 721 and 722 as defined in the Switch Feature Requirements section of Bellcore GR2936, Issue 2, December 1996
AU2591 AU2538 AU2538	LNPSSP: Module Enhancement	SOC Code: LNP00100 and LNP00200 Activation: SOC option LNP00100 controls appending the LNP Module to an expanded range of call type codes. SOC option LNP00200 controls LNP Module Code 719, and LNP Last Resort Routing Supporting Information Indicator. This activity also requires datafill in table AMAOPTS and the standard LNP datafill	Supports LNP billing according to requirements described in Bellcore GR2936, issue 2, December 1996

Table 3-4 Feature listing for NA009 (Continued) (Sheet 4 of 5)

Feature number	Feature title	SOC Information	Feature description
AU2588 AU2588	LNPSSP: LNP AMAOPTS Additions	SOC Code: LNP00200 Activation: Additions to table AMAOPTS are not activated until the LNP00200 SOC is activated.	Introduces the Call Type Codes (CTC) 721 and 722 as defined in switch feature AU2539 and the LNP00200 portion of the module code enhancements as defined in switch feature AU2538.
AU2679 AU2678 AU2678	LNP RT Query Parameter Reduction	SOC Code: LNP00200 Activation: This feature activates automatically with the LNP00200 SOC, datafill option QPARMS in table LNPOPTS, and the standard LNP datafill.	Provides an interface for selecting optional query parameters in LNP queries
AU2673 AU2674 AU2675 AU2673	LNP Code Straightening and TDP Optimizations	SOC Code: AIN00009 Activation: This feature activates automatically with the AIN00009 SOC.	Implements compiler level enhancements to provide an increased degree of optimization by the software compiler

Table 3-4 Feature listing for NA009 (Continued) (Sheet 5 of 5)

Feature number	Feature title	SOC Information	Feature description
AU2678 AU2679 AU2676	LNP HDB RT Optimizations	SOC Code: AIN00009 Activation: This feature activates automatically with the AIN00009 SOC.	Optimizes History Data Blocks for AIN and LNP

3.5 LNP Software Bridgebacks

In addition to the feature development detailed in the previous tables, there are several bridgebacks of LNP software into the NA007 to NA009 releases. The following table provides an overview of LNP feature bridgebacks.

Table 3-5 LNP Software Bridgebacks (Sheet 1 of 2)

Release bridged	Patch IDs	Feature delivered	Feature delivered for release
NA007 - NA009	LNP14/15/16/17/18 *	AU3086 - Foreign LRN Enhancements	NA010
NA007 - NA008	LNP 01/02/03	AU2525 - STDPRTCT/CLSVSCRC Call Control	NA009
NA008 - NA009	FPC00	AU3035 - LNP/DCR Interworking	NA010
NA007	VII05/06	Attendant Console BLDN Workaround**	NA008
NA007	LNP 04/05/06/07/08	ACD Nightservice, DISA, LOD, KSHOD, ONI, Reorigination Interactions with LNP***	NA008
NA007	JLG49	STDPRTCT/TOPS BLV Support****	NA008
NA007	SBA41	AU2444 - QLRN Test Tool	NA008
NA008 - NA009	FPC 02/03	AJ5070 - LNP Interactions with Preset Conference	NA010
NA008 - NA009	FPC 09/10	AU2779 - LNP Query Parameter Enhancements	NA010

Table 3-5 LNP Software Bridgebacks (Sheet 2 of 2)

Release bridged	Patch IDs	Feature delivered	Feature delivered for release
NA008 - NA010	FPC08	AU3214 - LNP/ CompuCall Interworking	NA011
NA008	SBA 36/37/38	AU2548 - Ported Out DN Marking	NA009
* Patch LNP18 is propagated to NA010, but is not part of activity AU3086			
** This functionality is replaced in NA008 by activity AJ4091.			
*** This functionality was sourced in the NA008 release.			
**** This functionality was sourced in the NA008 release			

4 Call Model

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see “About this document”.

AIN Essentials SSP basic call model (BCM) is illustrated in the following figures.

The BCM defines the stages of the call where call processing is performed and where the SSP may suspend the call, and query an off-board processor. The originating BCM (OCM) describes the call processing required to set up a call by the originating party. The terminating BCM (TCM) describes the processing required by the terminating party to terminate processing of an incoming call.

Figure 4-1 Originating basic call mode

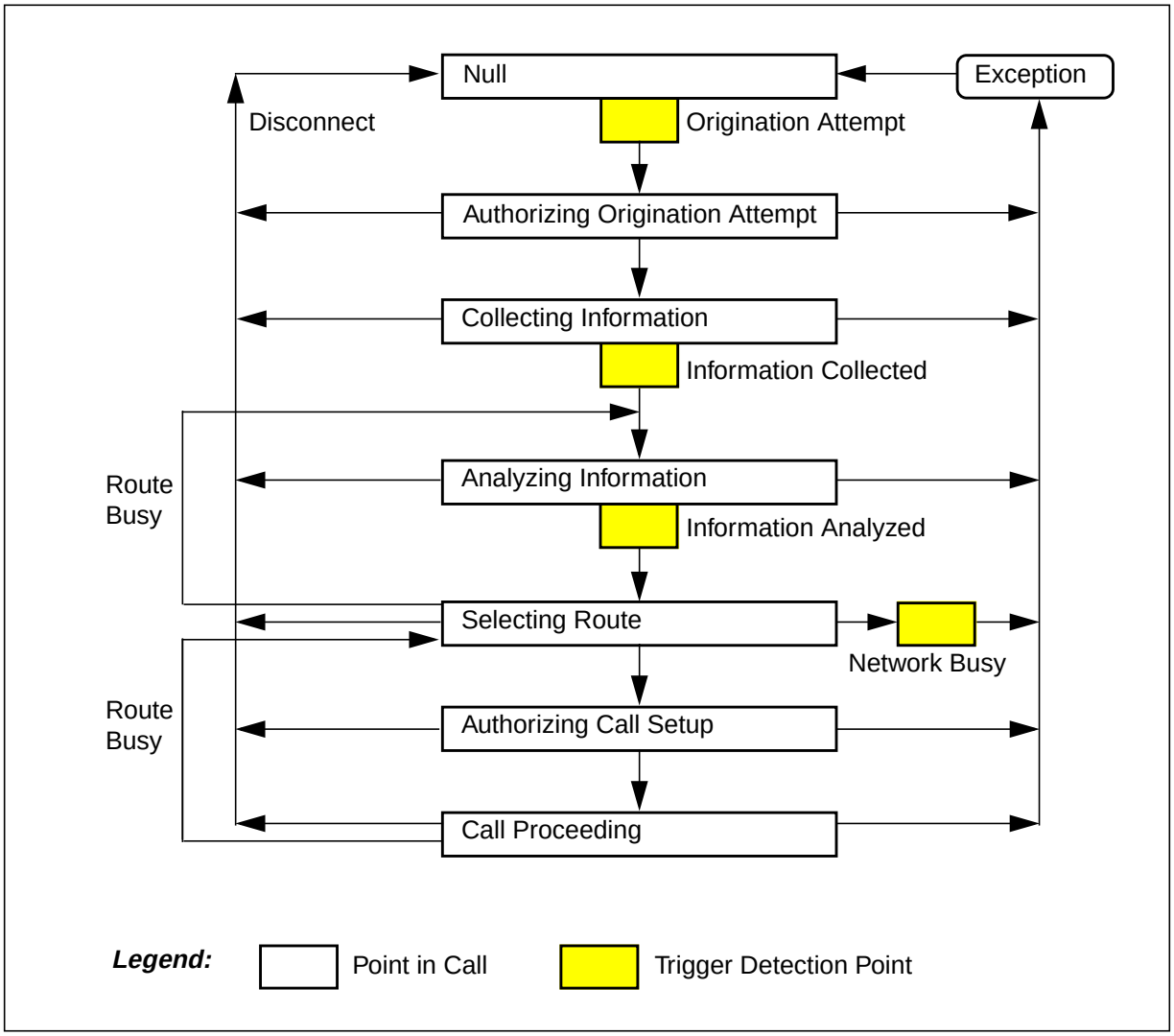
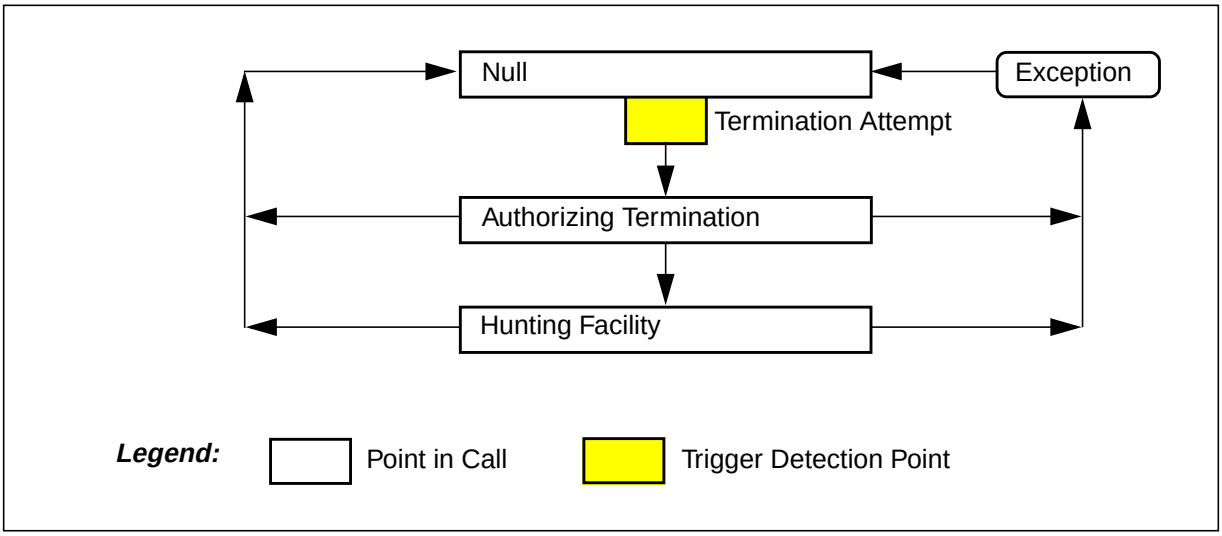


Figure 4-2 Terminating basic call model



4.1 Points in call

The BCM is partitioned into blocks that are termed points in call (PIC). A PIC describes what part of call processing is performed at this stage of the call and what information about the call has been gathered. Table 6 describes the PICs in the OCM and TCM. Applicable trigger detection points (TDP) are also given.

Table 4-1 Originating BCM points in call

Point in call	Description	Applicable TDP
Null	The call is idle and no connection exists.The agent goes off hook and attempts to originate a call.	Origination Attempt
Authorizing origination attempt	The authority of the originating agent to place a call is verified.	N/A
Collecting information	Complete initial address information is collected from the originating agent, for example, access code, dialed digits.	Information Collected
Analyzing information	Digits collected are translated according to the agent's dial plan. CalledPartyID, type of call and carrier are determined.	Information Analyzed
Selecting route	The SSP attempts to route the call to the route specified in routing procedures.	Network Busy
Authorizing call setup	The SSP verifies the authority of the calling party to place the call, for example, toll denied.	N/A
Call proceeding	The SSP sends a message to the terminating resource indicating a desire to set up the call.	N/A

Table 7 describes the PICs in the OCM and TCM for terminating BCMs.

Table 4-2 Terminating BCM points in call

Point in call	Description	Applicable TDP
Null	The call is idle and no connection exists.	Termination Attempt
Authorizing termination	The SSP verifies the authority to route the call to the terminating resource.	N/A
Hunting facility	The busy/idle status of the terminating agent is determined.	N/A

LNP extends the Analyzing Information PIC of the OCM. At this PIC the information from the Analyze_Route response is analyzed and a decision made whether to route the call using standard local exchange routing guide (LERG) or LNP routing procedures.

4.2 Trigger detection points

The BCM also shows the trigger detection points that are stages in the call when the SSP determines if it needs to query an off-board processor. If no query needs to be performed, call processing resumes to the next PIC. AIN Essentials SSP TDPs, triggers, and criteria types are summarized in Table 8.

Table 4-3 AIN Essentials SSP TDPs and triggers (Sheet 1 of 2)

TDP	Trigger	Criteria	Subscription
Origination attempt	Off-Hook Immediate	Call Type	line
Information collected	Off-Hook Delay	Call Type Escape Code (M)	line trunk group
	Shared Interoffice Trunk	Call Type Digits Dialed (M) Escape Code	trunk group

Table 4-3 AIN Essentials SSP TDPs and triggers (Sheet 2 of 2)

TDP	Trigger	Criteria	Subscription
Information analyzed	Customized Dialing Plan	Call Type Digits Dialed (M)	customer group
	N11	Call Type Digits Dialed (M)	office
	PODP Feature Code	Call Type Digits Dialed (M)	RES line
	3 to 10 Digit Public Office Dial Plan	Call Type Digits Dialed (M)	office
	3 to 10 Digit LNP	Call Type Digits Dialed (M) Escape Criteria	office
Network busy	AFR	Call Type	line trunk group customer group office
Termination attempt	Termination Attempt	Call Type	DN

The LNP trigger may be encountered at the Information Analyzed TDP located in the originating BCM as shown in the 3- to 10-digit LNP entry under Information Analyzed in Table 8.

5 Agent Support

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see “About this document”.

A general consideration for LRN-LNP is to support all the DMS-100 switch agents as defined by class and line class code (LCC) or trunk type.

Any NPA NXX combination on a switch can be marked as portable, so any DN in an NPA NXX becomes a portable agent. This includes the DNs used for the following purposes:

- subscriber lines - RES, POTS, CTX, CLASS
- multiparty agents such as 2FR and 4FR
- attendant console
- ISDN B channel voice and circuit-switched data

5.1 Agent support for LRN-LNP

The originating agent support for LRN-LNP is a subset of agents that is supported for the AIN Essentials PODP trigger, as detailed in the following table.

Table 5-1 LNP agent support

Line type		Line class code
POTS	basic	1FR/1MR
	coin	all
	WATS	all
	PBX	PBX/PBM
	data	PDATA
	party	2FR/4FR
RES	basic	1FR/1MR
	coin	all
	WATS	all
IBN	IBN	IBN
		M5009
		M5209
		M5112
		M5212
		PSET
		DATA
ISDN lines	ISDNKSET	MFT
		BRI-NI1

5.2 Trunk types

Supported trunk types are:

- ATC
- CELL
- IBNTI/IBNT2

- IT/T1/T2
- OP/OC/OI/SC
- PRI
- PS/PX
- VAPN

5.3 Unsupported agents

The following agents are not supported:

- attendant consoles (there is a work-around that allows support for attendant consoles)
- 8- and 10-party lines

5.4 Non LNP-applicable agents

The following DMS-100/200 trunk types are not applicable to LNP-triggering scenarios:

- AI
- AN
- DA
- DS0
- E911
- ES
- IBNTO
- IR
- IS
- LOOPA
- LPBK
- MAINT
- NFA
- NU
- RC
- RONI
- ROTL
- SOCKT
- T0

- T101
- T105
- TD
- TL
- TTL2
- TOPSARU
- TOPSVL
- VR
- X75

5.5 Obsolete agents

The following DMS-100/200 line agents are obsolete.

- BRI Stimulus
- CSD
- TWX

The following DMS-100/200 trunk agents are obsolete.

- AMR5
- CA
- ITPL
- OS
- SD
- TDD0
- UT
- ZI

Part II
Functional description

This part consists of the following chapters:

“Chapter 6: Functional overview”

“Chapter 7: Query Processing”

“Chapter 8: Response Processing”

“Chapter 9: Error Handling”

“Chapter 10: Limitations and Restrictions”

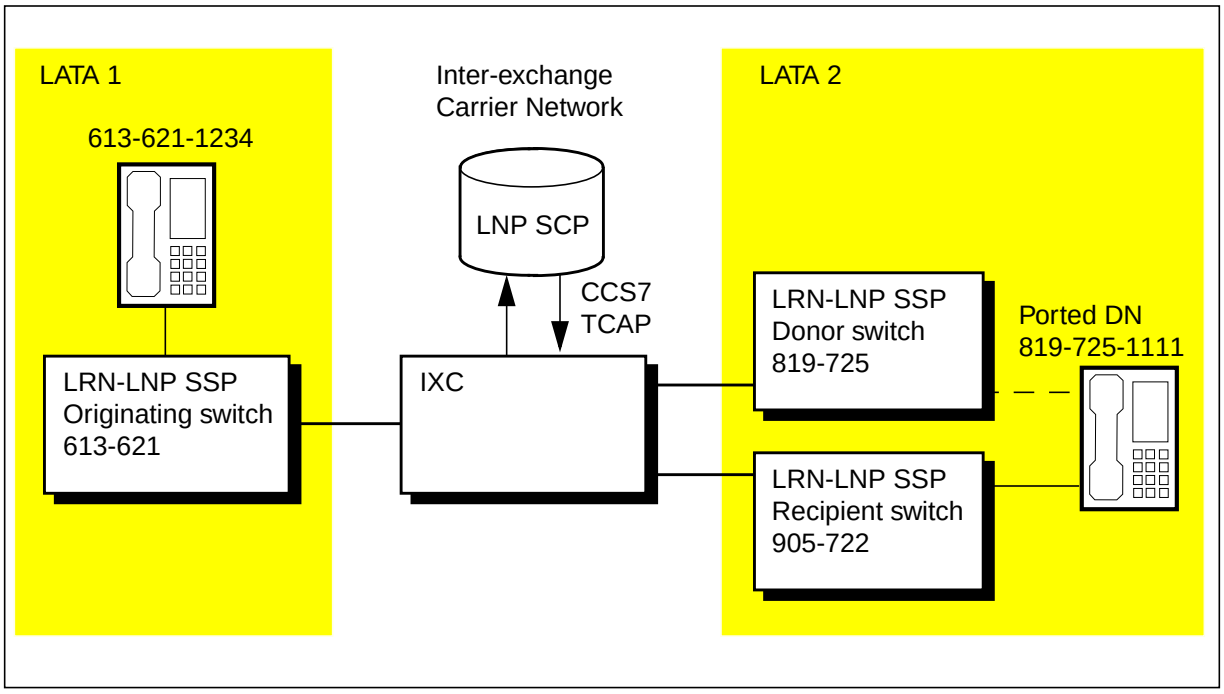
6 Functional overview

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see “About this document”.

6.1 System architecture

The LRN-LNP SSP is a network node in the overall LNP architecture. The following figure illustrates the relationship between the LRN-LNP SSP and the other nodes in the LNP network.

Figure 6-1 LRN-LNP network architecture



The figure also illustrates the LNP triggering model for the LNP network, which specifies that the next-to-last carrier in a call (that is, the N-1 carrier)

performs the LNP database query. The figure interexchange carrier (IXC) is the next-to-last carrier, and therefore must perform the LNP query in order to route the call to the correct service provider (the 905-722 SSP, in this case).

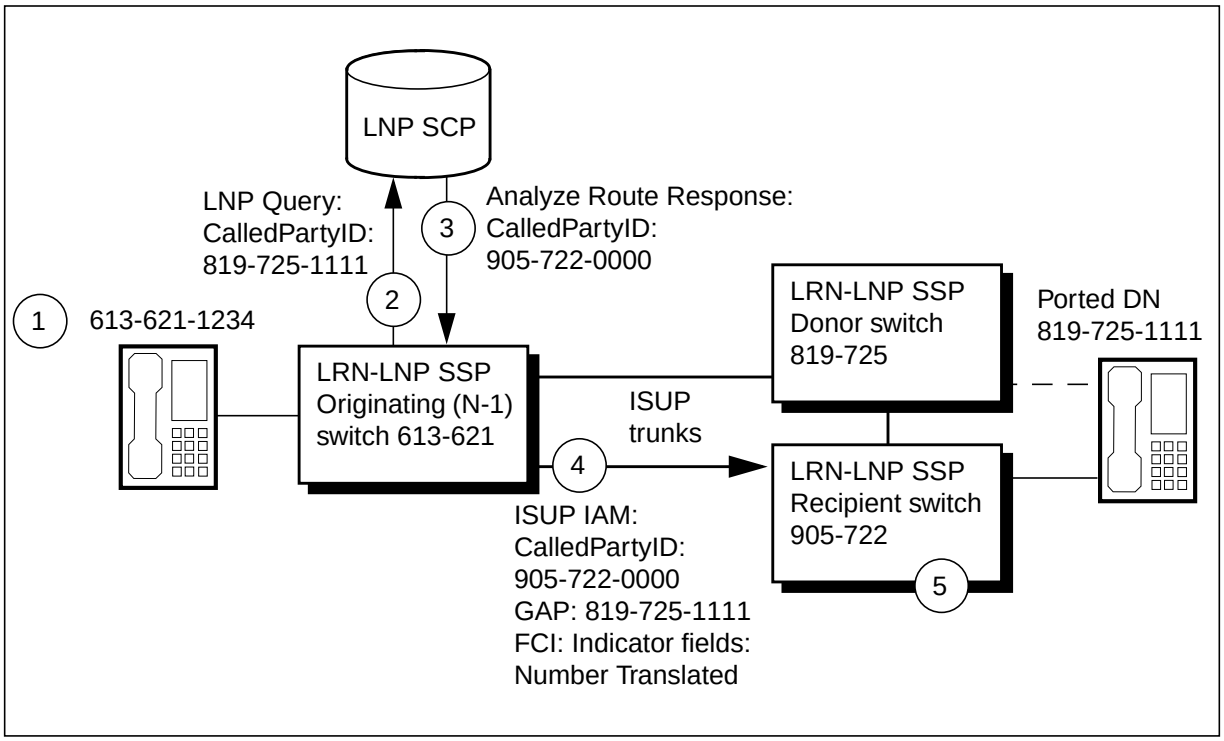
6.2 Location Routing Number-Local Number Portability

The Nortel LRN-LNP solution is built upon the Advanced Intelligent Network (AIN) 0.1 as defined by Bellcore's TR-NWT-001284 and TR-NWT-001285.

LRN-LNP uses a new public office dialing plan (PODP)-like trigger located at the Information Analyzed trigger detection point in the AIN Essentials basic call model to query the LNP Service Control Point (SCP) for routing information. This new trigger, known as the **LNP trigger**, is encountered on calls to DNs in designated NPA-NXX codes.

The following figure depicts the basic steps involved in a call to a DN that has changed service providers.

Figure 6-2 Call to a ported DN



In step 1, the originator (613-621-1234) dials 819-725-1111, which is an intra-LATA LEC call. Translation of this number determines that the DN is not resident on the originator's SSP and that 819-725 is a **portable NPA-NXX** (and therefore may contain DNs that have been ported). In this scenario, the

originator's service provider is the next-to-last, or **N-1 carrier**, and therefore performs the LNP query (step 2), with the dialed DN that is populated as the CalledPartyID in the LNP query.

In step 3, the LNP-SCP determines if the dialed DN has been ported: in this case, 819-725-1111 has moved from the original or **donor switch** to the **recipient switch**. The LNP-SCP therefore responds with an Analyze_Route message that contains a CalledPartyID with a ten-digit Location Routing Number that identifies the recipient switch (905-722-0000).

After receiving the Analyze_Route message with this parameter, the originating SSP continues translating the call using the LRN that is contained in the CalledPartyID to choose a route to the recipient switch. The dialed numbers are now placed in the GAP. (If translations were made with the dialed DN it would lead to the donor switch where the directory number is no longer located.)

In step 4, if a route over an ISUP trunk is chosen then the following steps occur:

- the LRN is populated in the initial address message (IAM) called party number parameter,
- the ported (dialed) DN is populated in the IAM generic address parameter (GAP), and
- the IAM ForwardCall Indicator (FCI) is populated with Number Translated in the translated called number indicator field.

  Note: The translated called number indicator field indicates the next switch in the call on which an LNP query has already been performed.

In step 5, the recipient switch receives this IAM and examines the contents to determine if the LRN is the switch's home LRN (HLRN), that is, if the recipient switch owns the LRN. In this case, the recipient SSP owns 905-722-0000 and swaps the incoming Called Party Number containing the LRN with the generic address parameter (which contains the customer's DN). The call terminates to the ported DN.

A number of variations are possible in the call scenario presented in Figure 6-2. The following section explains these call scenarios.

6.2.1 Nonported number in a portable NPA-NXX

In step 3, the LNP-SCP does the following:

- returns the dialed DN (instead of the LRN) in the CalledPartyID
- sets the FCI Translated Called Number Indicator (TCNI) field to Number Translated, and
- routes the call to the terminating DN's switch based on the CalledPartyID

Note: The FCI TCNI field indicates to any intermediate switches that an LNP query has already been performed.

6.2.2 Per trunk signaling interworking

In step 4, if the N-1 switch (that is, the SSP that launched the LNP query) chooses a route over a per trunk signaling (PTS) trunk, then only one of the LRN and the dialed DN can be signaled to the next switch. In this case, only the dialed DN can be sent (in the Called Party Number parameter), and any knowledge of an LNP query is lost, which may result in subsequent LNP queries later in the call progression.

6.2.3 Interworking with a nonLNP-capable switch

In step 4, if the SSP that launched the LNP query chooses a route to a non-LNP-capable switch, then the nonLNP switch cannot process the dialed DN that is contained in the GAP.

Only the dialed DN in the Called Party Number parameter can be processed, and the LNP information is lost. The signal ported number (SPN) option controls whether or not the LRN and GAP parameters are signaled. If the SPN option is not provisioned, then these parameters are sent even if the next switch is not LNP-capable.

6.2.4 Intermediate switches, nonLNP capable

If the N-1 switch is an intermediate nonLNP switch, it signals all the information in the IAM message to the recipient switch.

6.2.5 Intermediate switches, LNP capable

In Figure 6-2 on page 2 the N-1 switch chooses a route and builds an ISUP IAM, that is based on the Analyze_Route response, and sends the IAM over the route to the next switch, which may or may not own the LRN contained in the IAM. If the LRN is not the HLRN of the next switch, that is, it is an intermediate switch, then the intermediate switch simply translates the call based on the LRN that is contained in the IAM Called Party Number. It routes the call out of the office by appending the received IAM GAP and FCI onto the outgoing GAP and FCI.

6.2.6 intra-LATA, nonLEC intra-LATA calls

If a caller makes either an intra-LATA call or an intra-LATA call that is not carried by the caller's LEC, then the originating switch shown in Figure 6-2 on page 2 is not the N-1 carrier. Therefore, the originating switch does not perform the LNP query. In this case, standard feature group D (FGD) signaling applies between the originating switch and the interexchange carrier of the call, which now performs the LNP query.

6.3 Foreign LRN translation enhancement

This section describes default FLRN functionality.

In LNP capable networks that support Local Service Provider Portability (LSPP) it is necessary to provide functionality that would allow an End Office (EO) to serve subscribers from more than one RC.

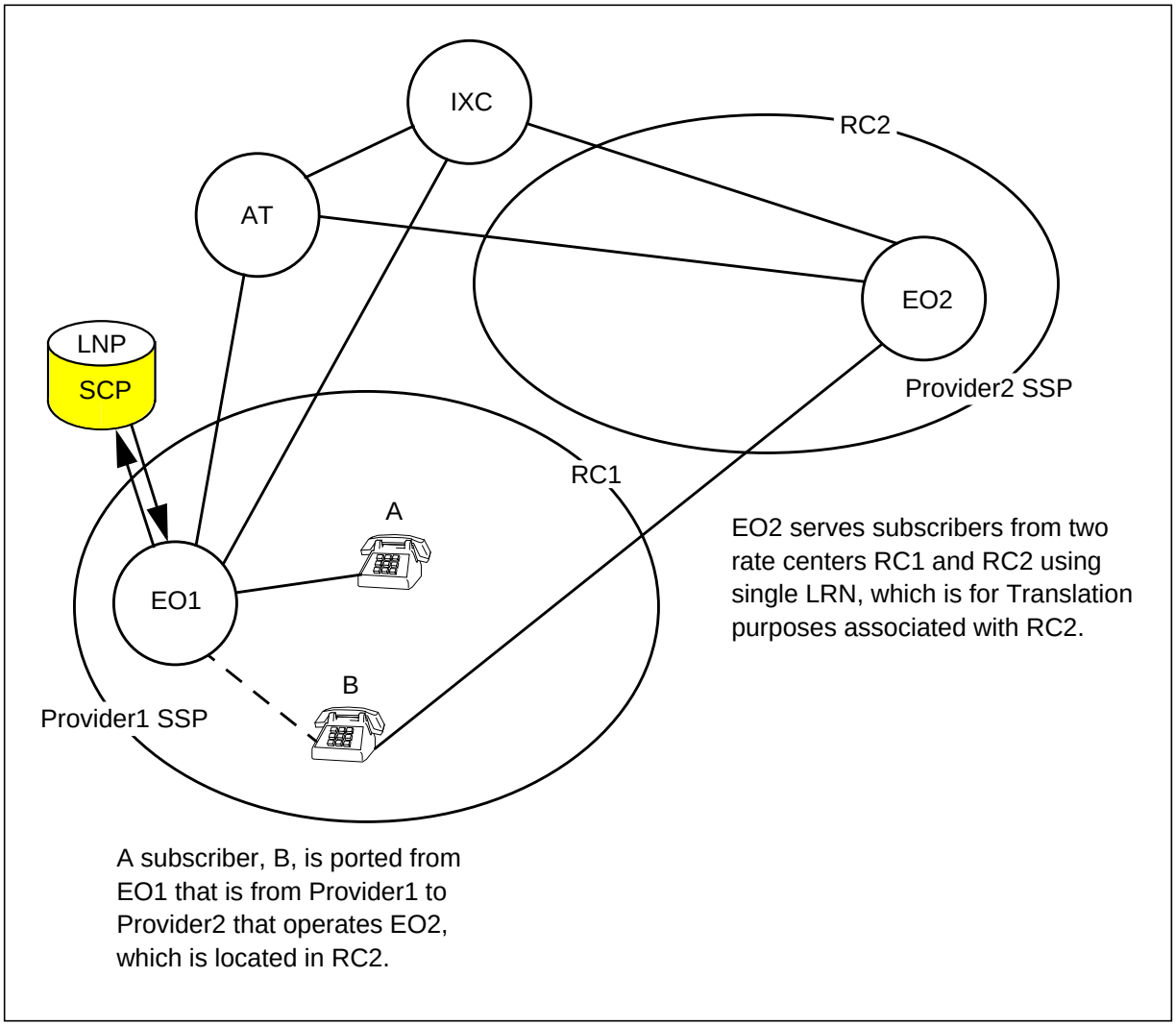
When only one LRN is allowed to be assigned per EO, several problems may arise when a subscriber is ported from one service provider to another.

The problems are encountered when the LRN returned from SCP is located in a different RC than the called DN. This type of network is presented in Figure 6-3 on page 6.

The following conditions are applicable to the network in Figure 6-3 on page 6:

- The subscriber B was initially connected to EO1. All the calls made to it from the subscriber A were treated as local calls.
- Currently the subscriber B is connected to EO2, but it should continue to be billed as an RC1 subscriber, that is, all the calls made from the subscriber A to it should be treated as local calls.
- EO2 has an LRN assigned to it. It is used to serve RC1 and RC2. For the purpose of call type determination for routing and billing purposes, within the telecommunication network Figure 6-3 on page 6, this LRN can be associated only with one RC. In this case it is RC2. Since this LRN is associated with a different RC than the originating agent A, standard translations done in EO1 mark the call placed to the subscriber B as a toll call. This is a problem since the pre-LNP trigger translations mark the call as a local one.
- The EO2 LRN is considered being Foreign LRN (FLRN) to the EO1 office. All the calls routed from EO1 using EO2 FLRN are treated as toll calls.

Figure 6-3 Subscriber B is ported from a Provider 1 to a Provider 2



For the network shown in Figure 30 to route and bill the described calls properly, the following enhancements are made to the standard translations system:

- a call type value determined by the pre-LNP trigger translations is used as the call type value during FLRN translations for routing and billing purposes, regardless of which call type value is determined during the FLRN translations
- for the calls originated by the calling party that has the LCABILL option assigned, the call type (local or toll) determined based on the pre-LNP trigger LCA screening is used. The standard LCA screening is cancelled during FLRN translations. The FLRN translations use the LCA screening result obtained by the pre-LNP trigger screening based on the Called Party DN.

6.3.1 Foreign LRN Enhancements: Source of Patch LNP18

This enhancement provides an instream source of Patch LNP18.

Patch LNP18 provides an alternative to the implementation of AU3086 by marking all Foreing LRN translations as no_prefix_local calls for the purpose of post-LNP query billing generation.

7 Query Processing

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see “About this document”.

The new LNP trigger is a PODP-like trigger at the Information Analyzed trigger detection point (TDP) of the AIN originating call model. The digits criteria for this trigger are the same as the existing AIN Public Office Dialing Plan (PODP) trigger.

The following table summarizes how the new LNP trigger fits into the existing AIN Essentials triggers at the Information Analyzed trigger detection point in the AIN originating call model

Table 7-1 Information Analized trigger processing summary and precedence

Type	Assigned to	Criteria
Individual	NonISDN Lines BRI TSPs ISDN BRI Lines Private Fac. Tk. Groups	Vertical Service Code plus digits (must subscribe to trigger on all codes)
Group	All lines and trunks assigned to a customized dialing plan	Access code plus digits 1 - 7 digit intercom code
Office	All calls using a public dialing plan	3-10 digits (most specific has precedence)
	All calls using a public dialing plan	N11
	All calls using a public dialing plan	3-10 digits (most specific has precedence)

Trigger precedence of existing AIN Essentials triggers is not enforced. Trigger precedence is in the order in which these triggers are datafilled in table TRIGGRP. For example, if an N11 trigger group is datafilled before a PODP trigger group, all N11 triggers in that trigger group have precedence over all PODP triggers in the PODP trigger group.

However, for LNP triggers, checking is performed to ensure that it always follows any of the other AIN Essentials triggers that are allowed at the Information Analyzed trigger detection point.

Any AIN-supported line or trunk call can encounter LNP at an originating, intermediate, or terminating switch.

Note: LNP triggering and DN residency checking are not performed for ARS originators (identified by the presence of the ARS option in table HNPACONT).

7.1 LNP trigger criteria checking

The following figure shows a flowchart summary of the checks that are performed to determine whether to encounter an LNP trigger and send an LNP query to the SCP. The steps and decision boxes are discussed in the sections that follow the flowchart.

Figure 7-1 LNP trigger criteria checking

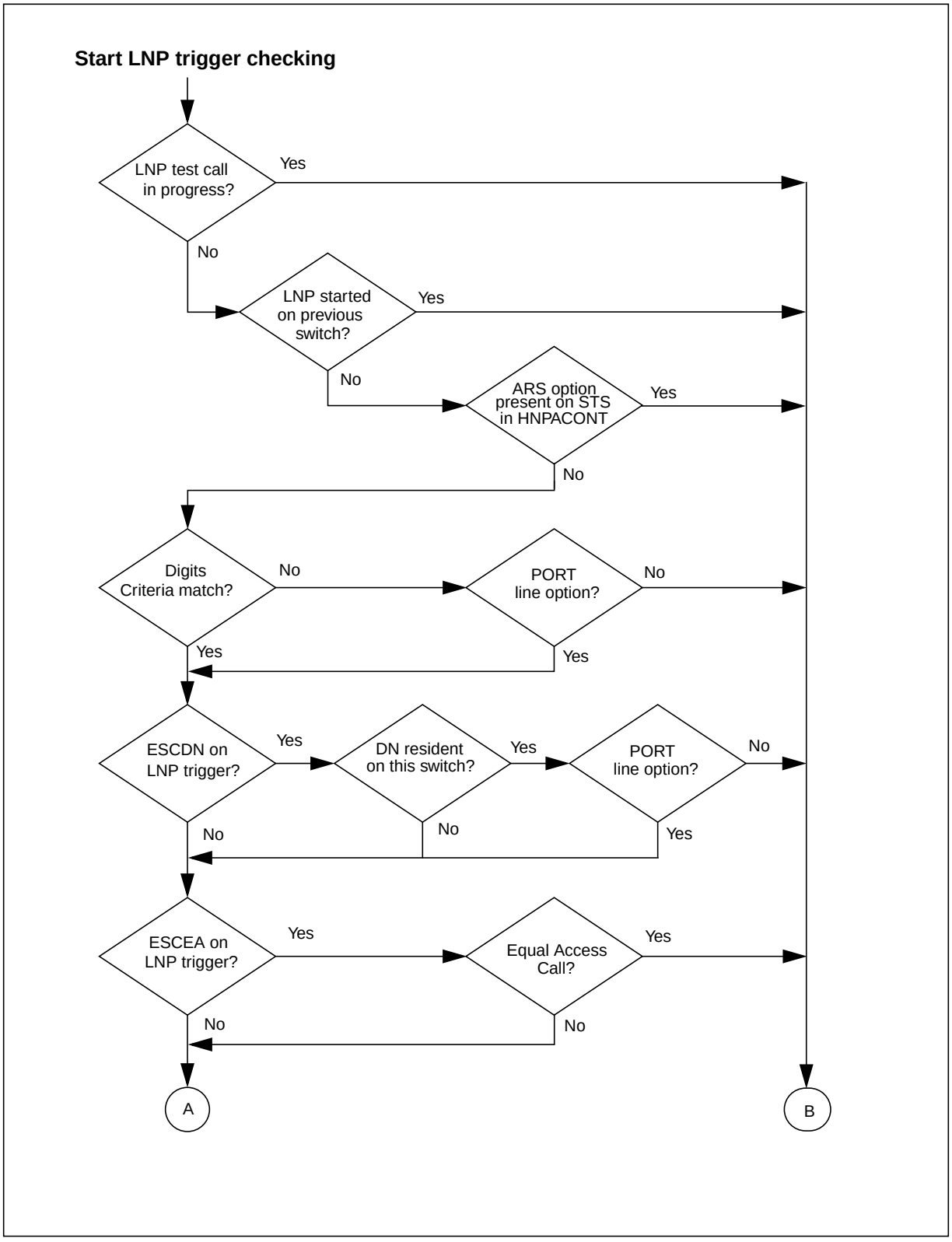
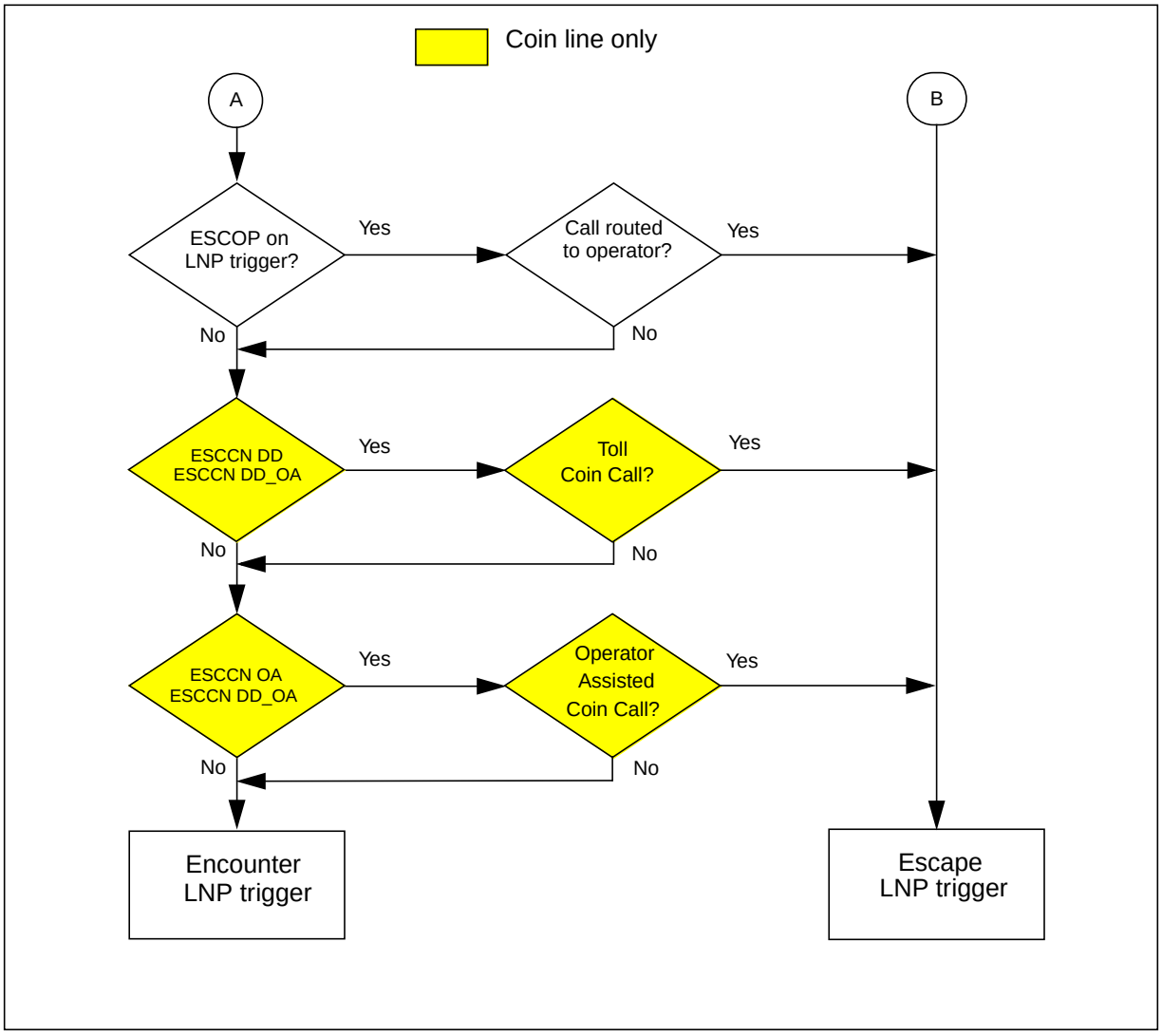


Figure 7-1 LNP trigger criteria checking



7.2 LNP test call check

The decision box labelled “LNP Test Call in progress?” in Figure 7 refers to a check that determines if an LNP test call is in progress.

On an ISUP trunk origination, if the Test Call Indicator bit in the GAP parameter of the ISUP initial address message (IAM) is set, then an LNP test call is in progress.

If the originating agency is a non-ISUP trunk, this check is not performed.

On a line origination, if the line option LNPTST is set against the line and the LNP test call feature is activated using the LNP test call feature access code, then an LNP test call is in progress.

For more information see the OA&M chapter for the section “Test Call”.

7.2.1 LNP started on previous switch

The decision box labelled “LNP Started on Previous Switch” in Figure 7-1 on page 4 refers to a check to determine if an LNP trigger was encountered and an LNP query or response occurred on a previous switch.

If this is a line origination or if the originating agency is a non-ISUP trunk, then this check is not performed.

If the originating agency is an ISUP trunk, then LNP that was started on the previous switch is determined by checking the state of the Translated Called Number Indicator (TCNI) bit in the FCI parameter of the incoming ISUP IAM. If the TCNI bit is set to Number Translated, LNP triggering is not applied.

If the TCNI bit is set to Number Not Translated, LNP trigger criteria checking continues.

7.2.2 10-digit unconditional LNP trigger check

The decision box labelled “PORT line option?” in Figure 7-1 on page 4 refers to a check to determine if the PORT line option is assigned to the line corresponding to the called party number. In all cases, if the PORT option is not assigned to the line, the LNP trigger is not applied. If it is assigned, the PORT option overrides the current criterion (DN residency) that are being checked and enables the LNP trigger to be encountered.

For more information, refer to Section 7.4 , “10-digit unconditional LNP trigger,” on page 11.

7.2.3 Digits criteria check

The decision box labelled “Digits criteria match?” in Figure 7-1 on page 5 refers to a check to determine how many of the called party numbers match the digits criteria of an LNP trigger that is datafilled in table TRIGDIG. The range of matched digits depends on the number of matches. If there are three matches the range is NPA, for four matches NPA-N, for five matches NPA-NX, for six matches NPA-NXX, for seven matches NPA-NXX-X, for eight matches NPA-NXX-XX, for nine matches NPA-NXX-XXX, and for ten matches is NPA-NXX-XXXX.

On a line origination, the called party number is the dialed number. On certain agencies, manipulation of the dialed digits takes place to generate the called party number in the form NPA-NXX-XXXX, which is then used for the digits criteria check. For example, on an IBN agent, the dialed digits might be in the form 9+7 digits (for example, 9+663-4321). The 9 prefix is dropped, the NPA

is derived, and the ten digit called party number (for example, 613-663-4321) is used for the digits criteria check.

Note: There is no mechanism for encountering an LNP trigger that is based on the Location Routing Number (LRN).

On an ISUP trunk origination, if a ported number generic address (GAP) parameter is not present, the digits in the CalledPartyNumber parameter are used for digits criterion checking.

If the digits criteria do not match, the LNP trigger is not applied. If there is a match, LNP trigger criteria checking continues.

7.2.4 DN residency check

The decision box labelled “DN resident on this switch?” in Figure 7-1 on page 5refers to a check to determine if the Called Party Number exists in table, DNINV.

The Called Party Number that is checked is the same as that used for the digits criteria check.

If the DN exists in the DN Inventory table and the ESCDN escape criterion is set against the LNP trigger, the LNP trigger is escaped. If the ESCDN escape criterion is not set against the LNP trigger, LNP trigger criteria checking continues. If the DN exists in the DN Inventory table but is marked as PODN, UNDN, VACT, or BLDN, then DN is regarded as non-resident. The ESCDN escape criteria is not checked when triggering on calls routed directly out of STDPRTCT using table LNPRTE.

If the STS of the originating party has the ‘ARS’ option in table HNPACONT, the DN residency check is bypassed.

7.2.5 Equal access check

The decision box labelled “Equal access call?” in Figure 7-1 on page 5 refers to a check to determine if the call type is equal access. All calls that find a carrier through the LATA and OCC tables are considered equal access calls.

A call can be given a call type of equal access by datafilling the EA selector in table STDPRTCT.

If the call is deemed to be an equal access call and the ESCEA escape criteria are set against the LNP trigger, the LNP trigger is not applied. If the ESCEA escape criteria are not set against the LNP trigger, LNP trigger criteria checking continues.

7.2.6 Operator call check

The decision box labelled “Call routed to operator?” in Figure 7-1 on page 5 refers to a check to determine if the call is designated for an operator.

For the ESCOP criteria to escape the LNP trigger, an operator call must either

- have the call type datafilled as OA in table STDPRTCT, or
- reach an operator through table POSITION

If it is determined that the call is to routed to an operator and the ESCOP escape criteria are set against the LNP trigger, the LNP trigger is not applied. If the ESCOP escape criteria are not set against the LNP trigger, LNP trigger criteria checking continues.

7.2.7 Coin call checks

Coin call checks on an LNP trigger are identical to those of an AIN Essentials PODP trigger. These checks are only applicable to line originations on POTS coin or RES coin lines. If the originating agency is not one of these lines or if the originating agency is a trunk, then LNP criteria checking skips all of the coin call criteria checks.

7.2.7.1 Local coin calls

Any of the following options block all local coin calls: ESCCN NP, ESCCN DD_NP, ESCDN OA_NP and ESCCN ALL. No error message is generated if those options are assigned to an LNP trigger.

7.2.7.2 Toll coin call check

The decision box labelled “Toll coin call?” in Figure 7-1 on page 5 refers to a check to determine if the call is a direct dial toll coin call.

In order for a call type to be set to direct dialed (DD), the pretranslator must mark the call as DD due to datafill in table STDPRTCT.

If the call type is direct dialed and options ESCCN DD or ESCCN DD_OA escape criteria are set against the LNP trigger, the LNP trigger is not applied. If the call type is something other than direct dialed, then trigger criteria checking continues at the Local Coin Call Check.

7.2.7.3 Operator-assisted coin call check

The decision box labelled “Operator assisted coin call?” in Figure 7-1 on page 5 refers to a check to determine if the call is an operator-assisted coin call.

In order for a call type to be set to Operator Assisted (OA), the pretranslator must mark the call as OA due to datafill in table STDPRTCT.

If the call type is Operator Assisted and either of the options ESCCN OA or ESCCN DD_OA is set against the LNP trigger, then the LNP trigger is not applied.

If the call type is something other than Operator Assisted, then trigger criteria checking continues.

7.2.8 ARS check

If the STS of the originating party has the ‘ARS’ option in table HNPACONT, the LNP trigger is bypassed.

7.2.9 Summary of escape criteria

Escape criteria can be administered against LNP to prevent a query from taking place when the LNP trigger is encountered. The following criteria are used to defer an LNP trigger:

- DN Resident - if the DN resides on this switch
- Equal Access - if the call is destined for an IXC
- Operator Assisted - if the call is destined for an operator
- Coin Call - if an operator assisted or toll coin call is in progress
- ESCGP escape criteria
- If the STS of the originating party has the ‘ARS’ option in table HNPACONT, the LNP trigger is bypassed

7.3 ESCGP escape criteria

This escape criterion can only be applied to a PODP trigger at the Information Analyzed TDP and is only effective on an intermediate switch.

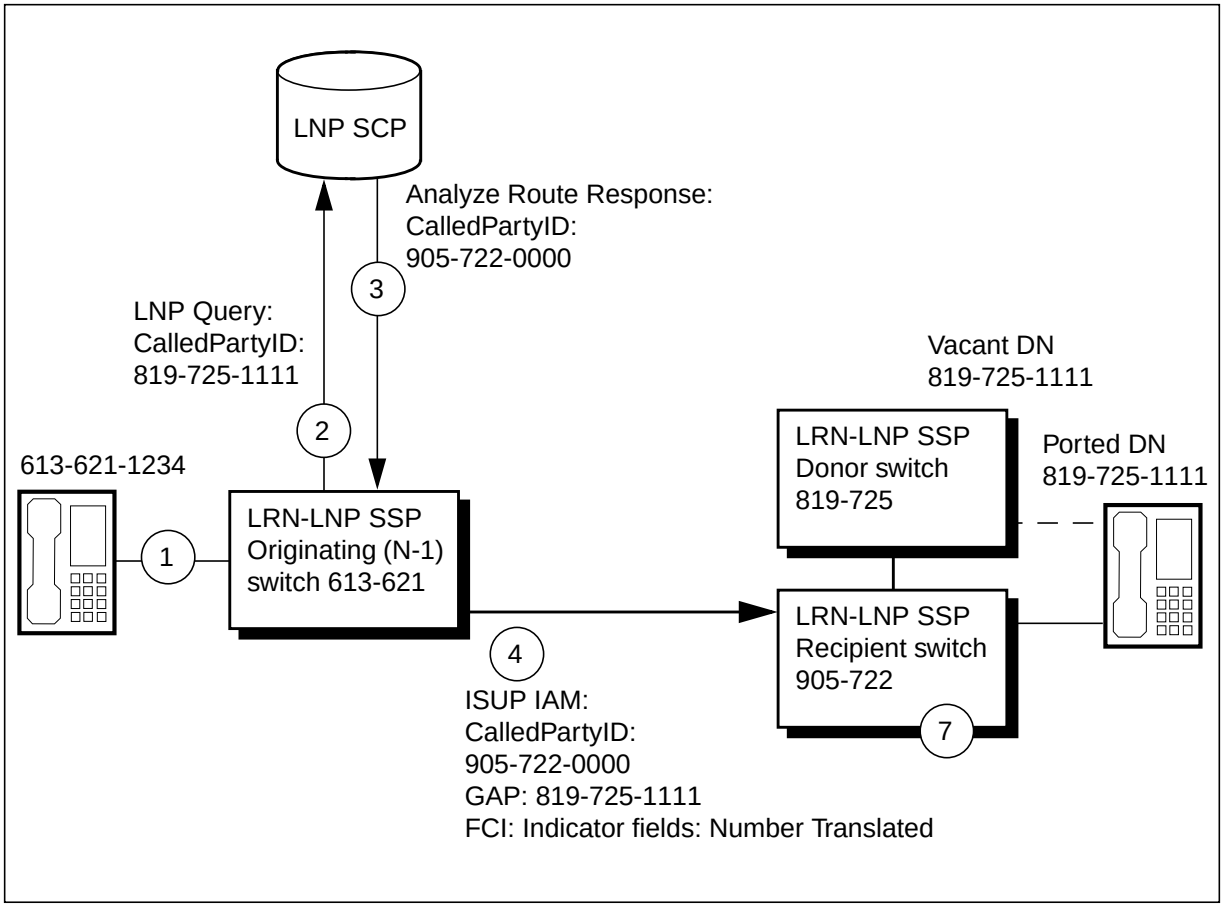
If an LNP trigger is encountered and an LNP query/response occurs on a previous switch, an ISUP IAM is received on the current switch (if the two switches are connected by an ISUP trunk). There may or may not be a Ported Number GAP parameter. If a Ported Number GAP parameter is present, it contains the Ported Called Party Number, and the CalledPartyNumber parameter contains the Location Routing Number (LRN). If there is no Ported Number GAP parameter, then there is no LRN and the CalledPartyNumber parameter actually contains the Called Party Number.

In either case, the Called Party Number is always used for AIN Essentials PODP digits criterion checking upon receiving a ISUP IAM, whether it is in the CalledPartyNumber parameter or the Ported Number GAP parameter.

However, it may sometimes be desirable to escape the AIN Essentials PODP trigger when the Called Party Number is received in a Ported Number GAP

parameter. If this occurs and the ESCGP escape criterion is set against the PODP trigger, the PODP trigger is escaped.

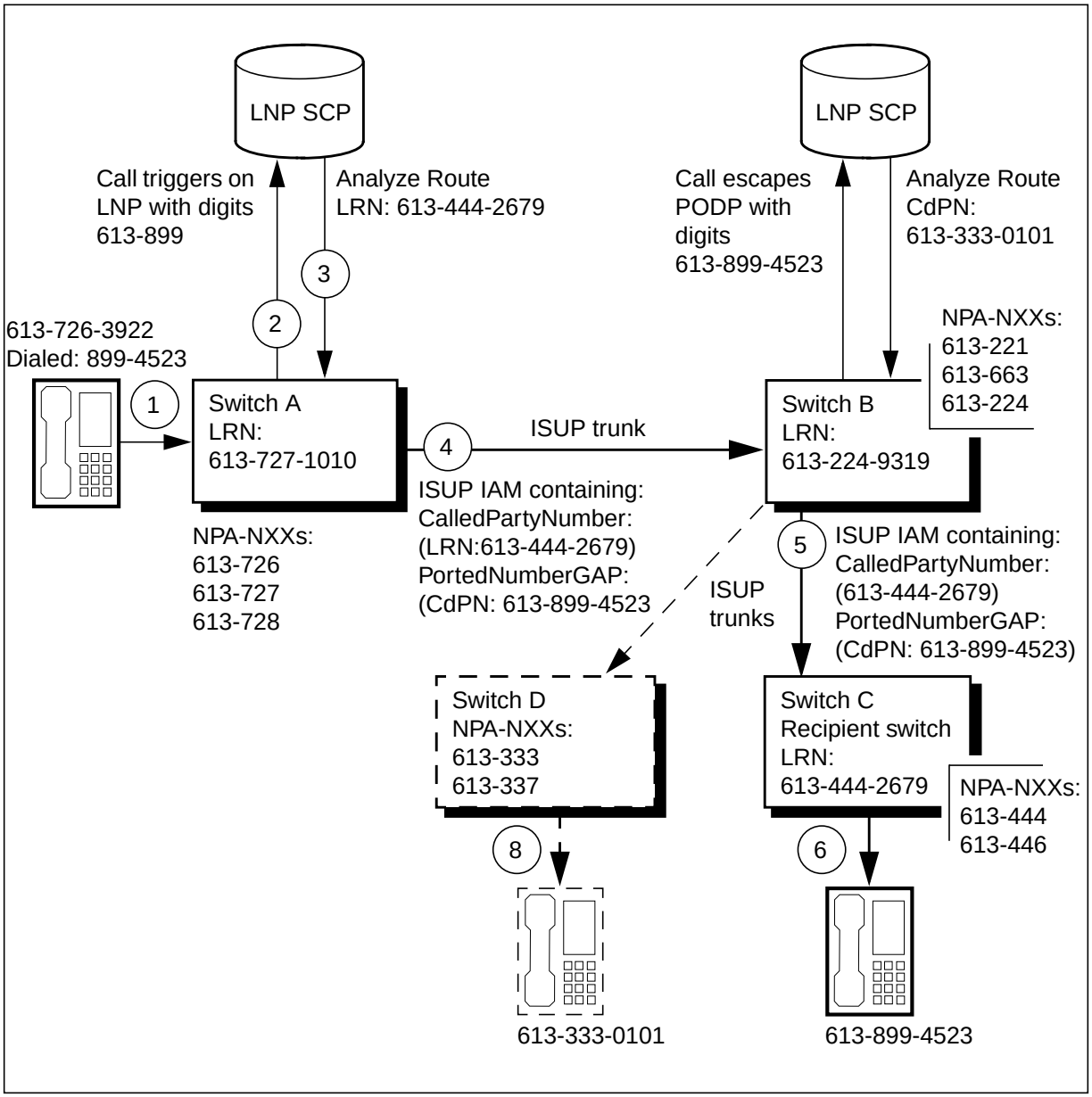
Figure 7-2 Call Without ESCGP on AIN Essentials PODP Trigger



The figure above shows an example of behavior when an AIN Essentials PODP trigger is encountered on an intermediate switch. In this example, encountering the AIN Essentials PODP trigger causes the call to be re-routed to a different DN. If this behavior is undesirable because the call should be routed to the dialed DN, the ESCGP criteria should be set against the AIN Essentials PODP trigger on the intermediate switch.

The figure below shows the behavior of the same call when the ESCGP criterion is set against the PODP trigger. In that case, the AIN Essentials PODP trigger is escaped, and the call continues to the dialed DN on the recipient switch.

Figure 7-3 Call With ESCGP on AIN



7.4 10-digit unconditional LNP trigger

LNP deployment implies that numbers from one switch (donor switch) can be ported to another switch (recipient switch). During the porting of one such number, it is possible that during the transition period, the number exists on both the donor and recipient switch at the same time.

The PORT option is Nortel's implementation of the 10-digit Unconditional LNP trigger. The 10-digit Unconditional LNP trigger is an option that is assigned to a directory number (DN) on a donor or recipient switch during this

transition period to cause calls to the porting DN to trigger LNP and query the SCP for information on where to route the call. If a call is made to a DN with PORT assigned to it and the call matches LNP trigger criteria, the ESCDN trigger escape criteria is bypassed and the LNP SCP is queried. The PORT option is supported for assignment on the Recipient switch.

After the switch-over point when a porting DN should officially belong to the recipient switch, but the datafill or wiring changes required to remove the DN from the donor have not yet been finished, the PORT option can be used at the donor switch to ensure that the Service Control Point (SCP) is queried and the call is routed to the recipient switch.

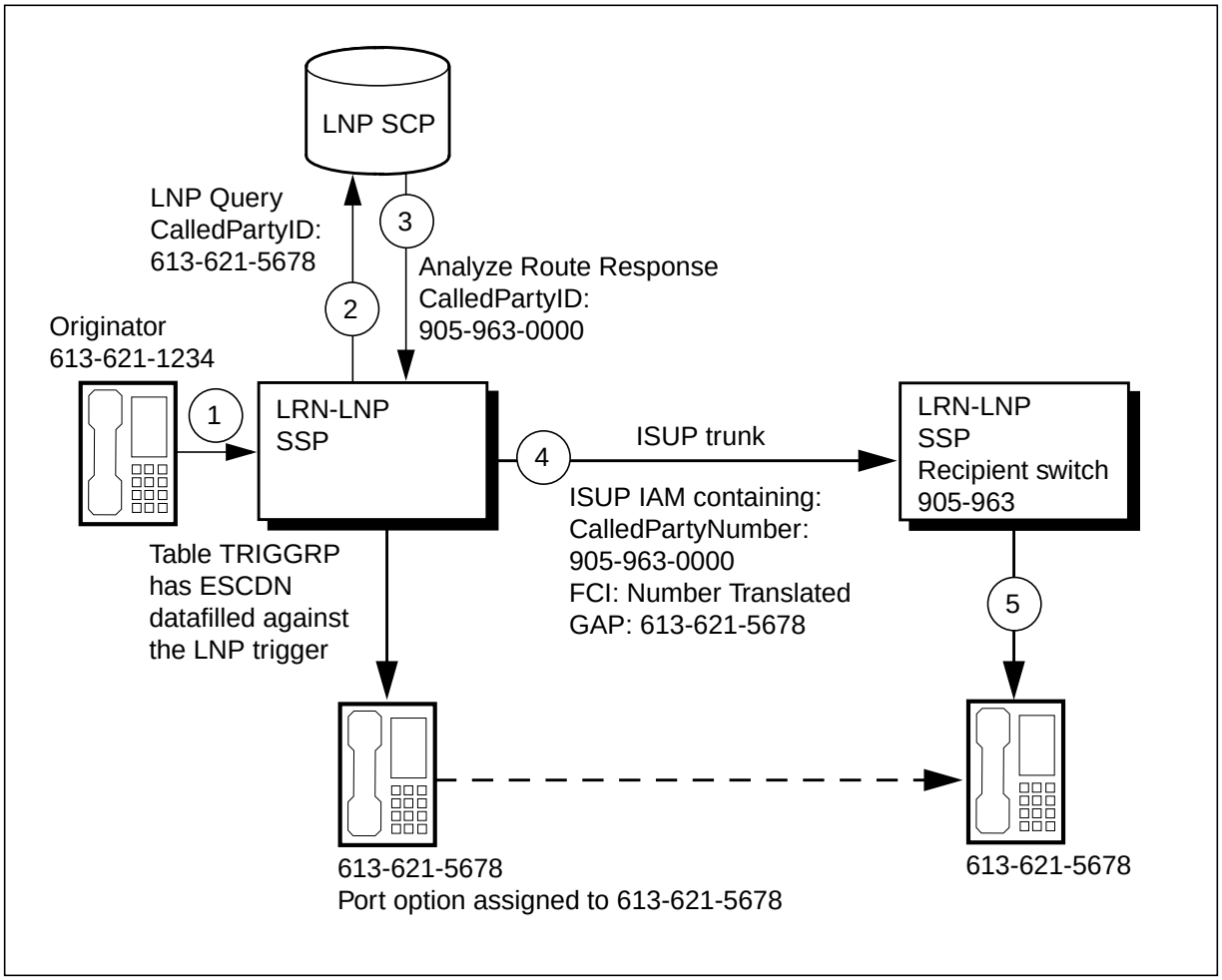
Before the switch-over point, the datafill or wiring changes for the DN porting in can be done at the recipient switch ahead of time, using the PORT option on the DN to ensure that the SCP is queried and the call is still routed to the donor switch until the switch-over date.

All LNP calls to portable non ported DNs bypass AIN Essentials response translations except in the event where the call queried LNP because the PORT option is assigned to the called DN.

7.4.1 10-digit unconditional trigger at the donor switch

The following figure shows a 10-digit unconditional trigger at the donor switch with ESCDN criteria. In this case, the DN 613-621-5678 has ported onto the recipient switch.

Figure 7-4 10-digit unconditional trigger at the donor switch with ESCDN



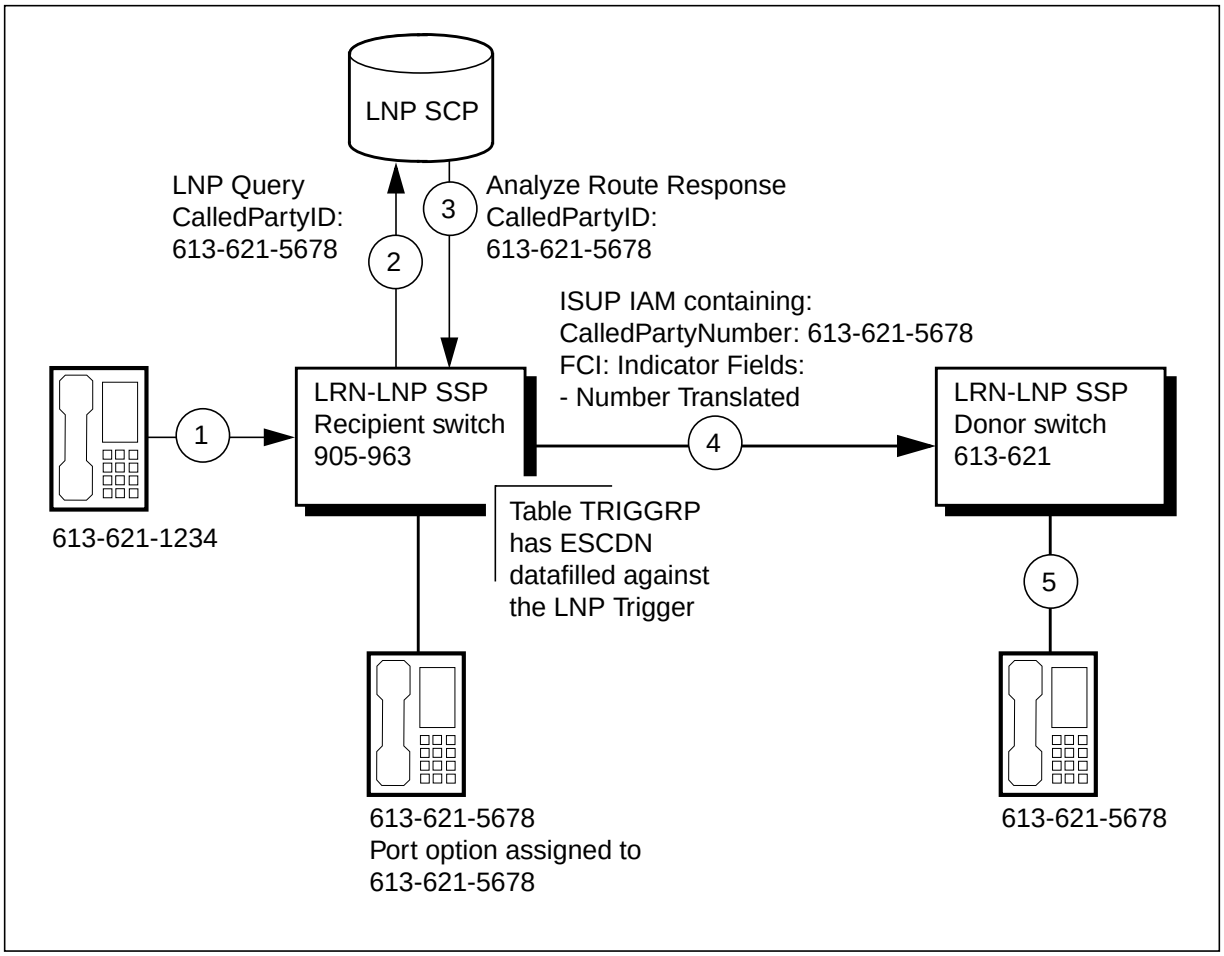
The steps in the figure are as follows:

1. the originator dials 613-621-5678.
2. since the PORT option is assigned to 613-621-5678, the ESCDN criteria are overridden (DN residency is ignored) and the LNP trigger is encountered. The SCP is sent an LNP Query.
3. the AnalyzeRoute response from the SCP contains the LRN of the switch to which 613-621-5678 has ported.
4. if the route chosen is over an ISUP trunk, then the Initial Address Message (IAM) is populated with the appropriate CalledPartyID, Generic Address Parameter (GAP), and Forward Call Indicator (FCI) fields.
5. the recipient switch receives this IAM, determines the Location Routing Number (LRN) is the switch's Home LRN, and terminates the call using GAP which contains the original dialed DN 613-621-5678.

7.4.2 10-digit unconditional trigger at the recipient switch

The following figure shows a 10-digit unconditional trigger on the recipient switch with ESCDN criteria. In this case, the DN 613-621-5678 has been pre-loaded onto the recipient switch prior to the switch-over time when the DN is to be ported from the donor to the recipient switch.

Figure 7-5 10-digit unconditional trigger at the recipient switch with ESCDN



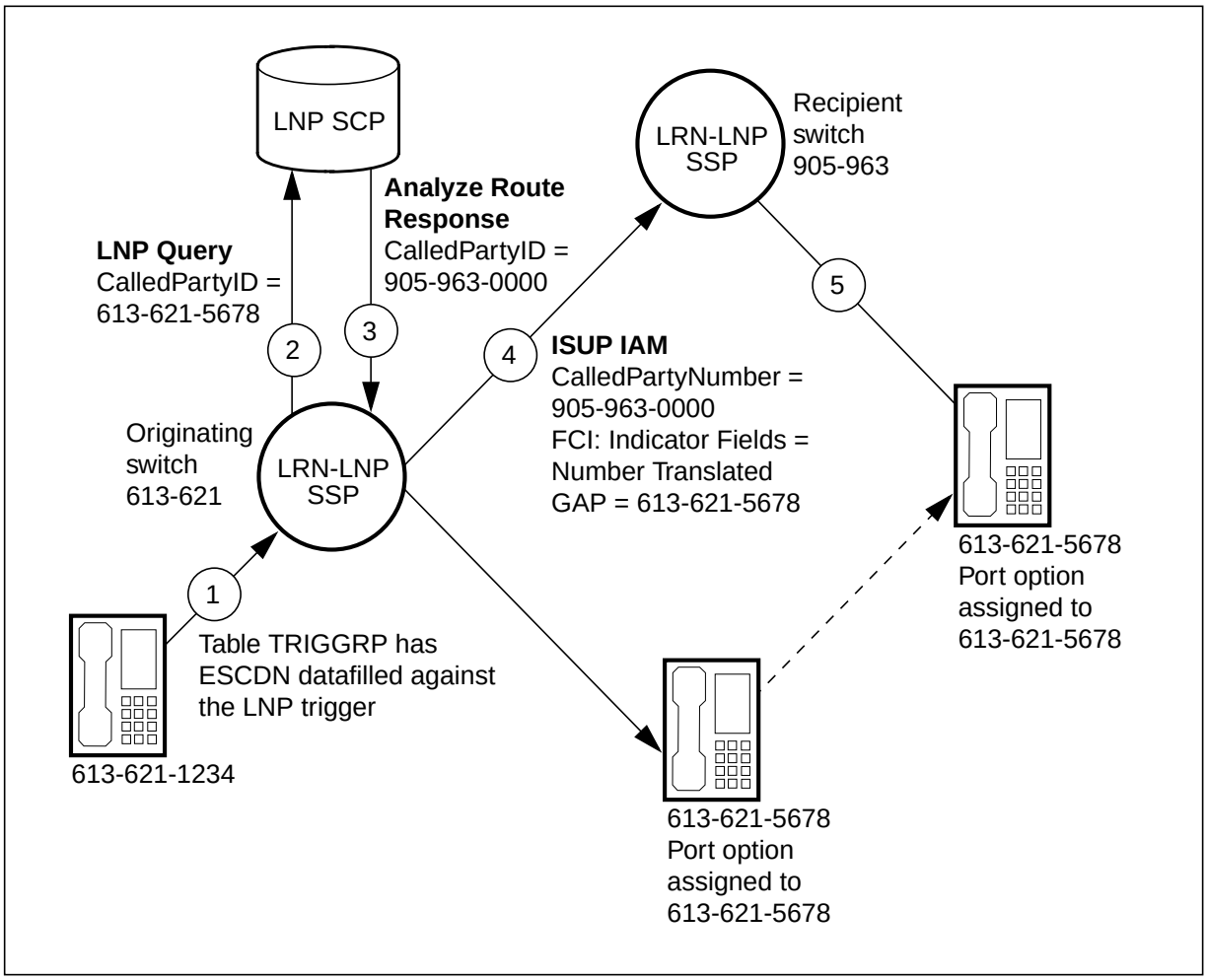
The steps in the figure are as follows:

1. the originator dials 613-621-5678.
2. since the PORT option is assigned to 613-621-5678, the ESCDN criteria are overridden (DN residency is ignored) and the LNP trigger is encountered. The SCP is sent an LNP Query.
3. the Analyze Route response from the SCP contains the original Called Party ID since the donor switch still owns the DN 613-621-5678.

4. if the route chosen is over an ISUP trunk, then the Initial Address Message (IAM) is populated with the appropriate CalledPartyID and Forward Call Indicator (FCI) fields.
5. the donor switch receives this IAM, and terminates the call using the original dialed DN 613-621-5678.

Figure 7-6 illustrates the behavior of the 10-digit unconditional trigger when assigned on both the donor switch and recipient switch. In this case, the DN 613-621-5678 has ported onto the recipient switch.

Figure 7-6 10 Digit unconditional trigger on both donor and recipient switch with ESCDN



The steps illustrated in Figure 7-6 are:

1. the originator dials 613-621-5678
2. since the PORT option is assigned to 613-621-5678, the ESCDN criterion is overridden (DN residency is bypassed) and the LNP trigger is

encountered. The SCP is sent an LNP Query (Query on Release (QoR) is not active in this scenario)

3. the Analyze Route response from the SCP contains the LRN of the switch to which 613-621-5678 has ported.
4. if the route chosen is over an ISUP trunk, the Initial Address Message (IAM) is populated with the appropriate CalledPartyID, Generic Address Parameter (GAP), and Forward Call Indicator (FCI) fields.
5. the recipient switch receives this IAM, determines the Location Routing Number (LRN) is the switch's Home LRN and terminates the call using the GAP (which contains the original dialed DN 613-621-5678). Even though the PORT option has been assigned to the 613-621-5678 DN at the Recipient switch, an LNP query does not occur since the FCI indicated that a query had already occurred on a previous switch.

7.4.3 Specifying a 10-digit unconditional LNP trigger

The PORT option is assigned to a DN using the utility SERVORD.

For DN types which are provisionable by SERVORD (that is, can be created using SERVORD), the PORT option may be assigned to the DN at the time of DN creation since options are prompted for. The ADO command can be used to add PORT to an existing DN and the DEO command can be used to delete PORT from a DN. When the DN definition is deleted by SERVORD, the corresponding PORT option assignment in table DNFEAT is also deleted.

For DN types which are not provisionable by SERVORD (that is, cannot be created through SERVORD), the PORT option may be assigned to the DN using the ADO command and deleted using the DEO command.

Figure 7-7 on page 17 illustrates an example of using SERVORD to assign the PORT option to the DN 613-663-1001. Also shown is the output of a QDN after the assignment.

Line Class Codes, Feature DNs, and DN Selectors which were supported in the NA009 software release may not be provisioned with the PORT option if SOC option LNP00200 is IDLE. Please refer to the chapter "Software Optionality Control" for a list of agents supported under LNP00200 and a description of the LNP00200 SOC option.

Figure 7-7 Using SERVORD to assign the PORT option to a DN

```
>servord
SO:
>ado $ 6631001
OPTION:
>port
OPTION:
>$
COMMAND AS ENTERED:
ADO NOW 97 5 7 PM 6631001 ( PORT ) $
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>y
MACHINES ARE OUT OF SYNC, SERVICE ORDERS NOT ALLOWED
JOURNAL FILE IS INACTIVE, SERVICE ORDERS NOT ALLOWED
SHOULD ORDER BE DONE ANYWAY? (Y OR N)
>y

>qdn 6631001
----------------------------------------------------
DN: 6631001
TYPE: SINGLE PARTY LINE
SNPA: 613 SIG: DT LNATTIDX: 200
LINE EQUIPMENT NUMBER: HOST 05 0 06 24
LINE CLASS CODE: 1FR
IBN TYPE: STATION
CUSTGRP: RESG200 SUBGRP: 0 NCOS: 0
CARDCODE: 6X17AC GND: N PADGRP: NPDGP BNV: NL MNO: N
PM NODE NUMBER : 131
PM TERMINAL NUMBER : 217
OPTIONS:
DGT PORT
RES OPTIONS:
ACB NOAMA
OFFICE OPTIONS:
U3WC
----------------------------------------------------
```

7.4.4 Behavior of 10-digit unconditional LNP trigger

When the PORT option is assigned to a directory number at least one tuple in table TRIGGRP must have a trigger type of LNP and at least one tuple in table TRIGDIG (referenced by that tuple in table TRIGGRP) must have a digits criteria match that occurs for that directory number. From three to ten digits are allowed. If several tuples are specified, the digits criterion match occurs in the tuple with the most specific digits.

The escape criteria in the TRIGGRP tuple are used during the processing of a 10-digit unconditional LNP trigger. If ESCEA is a value in the tuple, then an LNP query is not sent to the SCP if the call is an equal access call. Similarly, if values ESCOP and ESCCN are present, then an LNP query is not sent to the SCP if those escape criteria are met. However, if present, the escape criterion

ESCDN is handled differently. (See Section 7.2.2 on page 6.) This escape criterion is bypassed in the case of the PORT option.

The following four scenarios are possible with the example datafill. The PORT option is assigned to directory number 613-387-4040, and the following is datafilled in table TRIGGRP (the order of provisioning the escape criteria in this example realizes a real-time saving):

```
 KEY
                                        TRIGDATA

------------------------------------------------------------
OFFTRIG INFOANAL

(PODP (DG PODPDIG) $ NIL)

(N11 (DG N11TRIG1) $ NIL)

(LNP   (DG LNPDIG)  (ESCDN)  (ESCEA)  (ESCOP)   (ESCCN DD) $

NIL ) $
```

and the following is datafilled in table TRIGDIG:

```
 KEY                    TRIGGER ACTION                    OPTIONS

 ------------------------------------------------------------------

 LNPDIG    LNP       613387  LNP EVENT TCAP R01   SS7 LNPSCP1 DFLT $

 LNPDIG    LNP       6133879 LNP EVENT TCAP R01   SS7 LNPSCP2 DFLT $

 LNPDIG    LNP       613386  LNP EVENT TCAP R01   SS7 LNPSCP3 DFLT $

 LNPDIG    LNP       61338   LNP EVENT TCAP R01   SS7 LNPSCP4 DFLT $
```

1. The PORT line option results in the sending of an LNP query to LNPSCP1 if all the escape criteria are met.
2. The PORT option is assigned to directory number 613-387-9040, the LNP query is sent to LNPSCP2.

3. The PORT option is assigned to directory number 613-383-4040, the LNP query is sent to LNPSCP4.
4. If no tuple is present in table TRIGDIG that assigns a digit criterion match pattern, then the LNP query cannot be sent because LNP cannot determine to which SCP to send the LNP query. The LNP call is routed to treatment.

7.5 LNP query message

The LNP trigger uses existing AIN Essentials protocol. No changes or additions to the query message TCAP parameters are required. The query message contains a subset of the optional parameters that are defined for the InfoAnalyzed query. The SSP attempts to send only the following parameters in the query message:

- UserID (mandatory)
- BearerCapability (mandatory)
- CalledPartyID
- TriggerCriteriaType
- ChargeNumber
- CallingPartyID
- ChargePartyStationType
- ACGEncountered (when applicable ACG controls have been applied)

7.5.1 LNPTCT option for table LNPOPTS

A new option LNPTCT is added to table LNPOPTS with the default value set to PODP. When this option is set to LNP, for all LNP calls the new value LocalNumberPortability is assigned in the Trigger Criteria Type field of Info_Analyzed messages.

This new trigger criteria type represents an evolution of messaging for LNP. Not all customers may be ready to support this new type so it is implemented as an office-wide option, controlled in table LNPOPTS.

7.6 LNP query blocking

This functionality comprises market-specific requirements. Markets without these requirements should not use LNP query blocking.

BLOCKLNP is the name of the option datafillable against trunk CLLIs in table TRKOPTS. With this option on incoming inter-network ISUP trunks, customers can send undipped calls either to treatment or to default routing instead of allowing them to query LNP at their switch. This saves the customer from having to perform queries for calls coming in from other networks which should have already performed the query.

Calls received over a trunk with the BLOCKLNP option which are redirected by a switch-based service (for example, CFW, AIN) prior to encountering the LNP trigger are not blocked.

BLOCKLNP is supported on the following ISUP trunk types: TI, IT, T2, and ATC.

Three conditions must be true for inter-network calls to escape querying. They are listed here and explained below.

- BLOCKLNP is present as an option on the trunk
- The Translated Called Number Indicator is set to “Number not translated”
- The Called Number’s NPANXX matches against an LNP trigger on this switch, and performs a query.

The first condition is that the call is coming in to the current switch on a trunk that has the BLOCKLNP option. The second condition is that the TCNI bit in the FCI (Forward Call Indicator) field is not set to “Number Translated” (this field is contained in the Initial Address Message carried by the incoming trunk). This represents the fact that this call has not had a query performed on it. The third condition is that the call should have already queried, since it is hitting the LNP trigger here.

If all of the above three conditions occur, the call does not trigger and query the SCP. Instead, the query is blocked in one of two ways: either it escapes the trigger and is sent to default routing, or it is blocked completely by being sent to treatment. What determines this is the BLOCKLNP option against the trunk in table TRKOPTS. This option has two settings: TREAT or DFLTRT. At the point in call when we know to not trigger, this setting is checked to see what should happen to the call.

Note 1: For trunks coming in to donor switches the default route option of BLOCKLNP is not applicable. The selector used on the DN in table HNPACONT identifies the donor switch.

Note 2: Do not use the RX selector in table FNPACONT to terminate to a DN. This method of DN termination for donor switches is not supported by the BLOCKLNP DFLTRT option.

If the call is sent to treatment, the treatment type is determined by the customer, through an entry in table LNPOPTS. That entry is explained later.

Performing the check for the BLOCKLNP option during Call Processing is expensive in terms of Real Time, and is wasteful in markets where this functionality is not part of the regulatory requirements. If this functionality is not part of the regulatory requirements for a particular market, it should not be

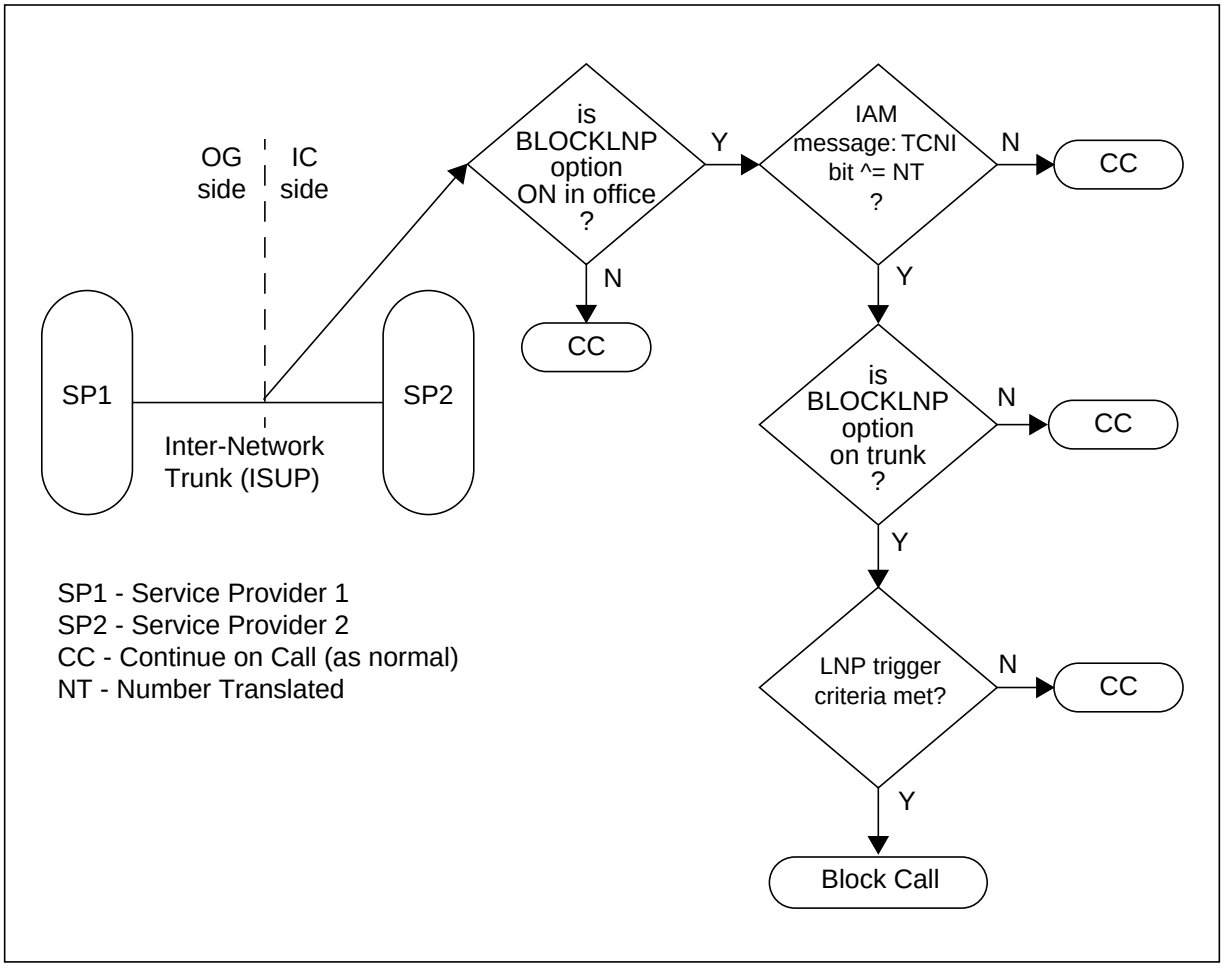
encountered for that market. To make this possible, an office-wide option is used.

Table LNPOPTS contains an option, also named BLOCKLNP, which has the default value of “INACTIVE”. Markets that wish to utilize this blocking feature must change the value to “ACTIVE” in their offices.

It is this entry that the customer datafills the type of treatment they want to apply to the call should the call be sent to treatment instead of querying. The BLOCKLNP option has a mandatory subfield of type treatment that allows the customer to choose from the full range of treatments possible. The customer must ensure that the chosen treatment is properly mapped.

To be properly mapped, the treatment selected in the BLOCKLNP option must also be datafilled in table TMTMAP or table TMTCNTL, depending on how the customer wishes to apply treatment to the call.

Figure 7-8 Condition Checking Logic Flow during CallP



The following figure shows the modified TRAVER output when the BLOCKLNP options are active and applicable.

Figure 7-9 TRAVER output when BLOCKLNP options are active and applicable

```
traver tr c1c0_isupitic 4164638003 b
TABLE TRKGRP
C1C0_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 PUB NSCR 613 000 N Y $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HNPACONT
613 Y 932 2 ( 422) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 416 416 HNPA 0
 . 463 463 DN 416 463
TABLE TOFCNAME
416 463 $
TABLE DNINV
416 463 8003 D BLDN
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE TMTCNTL
ITTRKGRP ( 2)
 . SUBTABLE TREAT
KEY NOT FOUND
DEFAULT OFFTREAT IS USED
```

Figure 7-9 TRAVER output when BLOCKLNP options are active and applicable

```
TABLE TMTCNTL
OFFTREAT ( 39)
 . SUBTABLE TREAT
 . BLDN Y T OFRT 26
 . TABLE OFRT
 .   26 S D VDN
 .      S D *FRA0
 . EXIT TABLE OFRT
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
AIN Info Collected TDP: no subscribed trigger.
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
Checking AIN LNP Trigger Items as LNP is compatible with current call
 .  . TABLE OFCTIID
 .  . 4 L416463 ON
 .  . TABLE TRIGITM
 .  . 4 L416463 LNP (DG 416463) (ESCEA ) (ESCOP ) (ESCDN ) $ ULK EVENT
R01 SS7 AINPOP
 .  .     $
 .  .  . TABLE C7GTTYPE
 .  .  . AINPOP ANSI7 6 $
 .  .  . TABLE C7GTT
 .  .  . AINPOP 4164638003 4164638003 PCSSN (SIMTOOL_RTESET SIMTOOL3 0)
$ SSN
AIN Info Analyzed TDP: trigger criteria blocked.
TABLE TRKOPTS
C1C0_ISUPITIC BLOCKLNP BLOCKLNP TREAT
LNP Info: Query blocking active.
LNP Info: Escaping the trigger.
LNP Info: Sending the call to treatment.
TABLE TMTCNTL
ITTRKGRP ( 2)
 . SUBTABLE TREAT
 . AINF Y S 120T0

+++ TRAVER: SUCCESSFUL CALL TRACE +++



TREATMENT ROUTES.  TREATMENT IS: AINF
1 120T0

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

The following figure shows TRAVER output when default routing is used.

Figure 7-10 TRAVER output of default call routing

```
traver tr c1c0_isupitic 9059631001 b
TABLE TRKGRP
C1C0_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 PUB NSCR 613 000 N Y $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HNPACONT
613 Y 932 2 ( 422) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 9059631001 9059631087 FRTE 747
 . SUBTABLE RTEREF
 .  747 T OFRT 747
 .  . TABLE OFRT
 .  .  747 S D C1S1_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
AIN Info Collected TDP: no subscribed trigger.
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
Checking AIN LNP Trigger Items as LNP is compatible with current call
 .  . TABLE OFCTIID
 .  . 4 L905963 ON
 .  . TABLE TRIGITM
 .  . 4 L905963 LNP (DG 905963) (ESCEA ) (ESCOP ) (ESCDN ) $ ULK EVENT
R01 SS7 AINPOP
 .  .     $
 .  .  . TABLE C7GTTYPE
 .  .  . AINPOP ANSI7 6 $
 .  .  . TABLE C7GTT
 .  .  . AINPOP 9059631001 9059631001 PCSSN (SIMTOOL_RTESET SIMTOOL3 0)
$ SSN
```

Figure 7-10 TRAVER output of default call routing

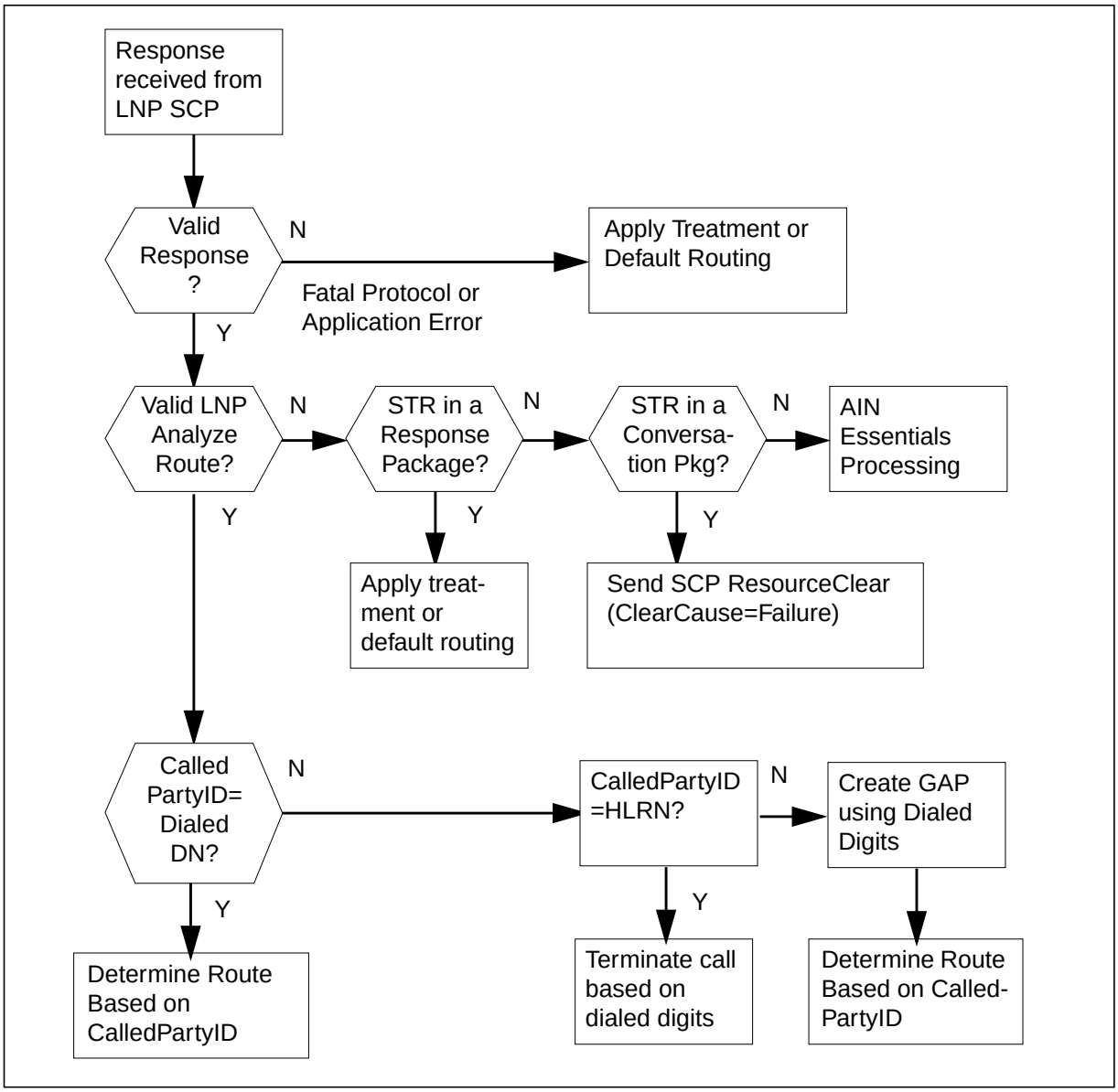
```
AIN Info Analyzed TDP: trigger criteria not met.
TABLE TRKOPTS
C1C0_ISUPITIC BLOCKLNP BLOCKLNP DFLTRT
LNP Info: Query blocking active.
LNP Info: Escaping the trigger.
LNP Info: Sending the call to default routing.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 C1S1_ISUPITOG         9059631001         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

8 Response Processing

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see “About this document”.

The SSP receives and processes response messages from an off-board processor. Following an LNP query, the SSP expects to receive either an AIN Essentials Analyze Route or Disconnect response from the SCP. Continue and Send_To_Resource (STR) response and conversation messages are not expected in response to an LNP query,. A continue message is accepted and processed using existing AIN Essentials procedures. If the SCP returns an STR conversation, the SSP sends back a Resource Clear message with a clear cause of ‘Failure’. If the SCP then sends an Analyze Route message, it undergoes LNP processing. A flow chart for response processing is shown in the following figure.

Figure 8-1 Response processing flowchart



The LNP SCP may include additional requests in the Analyze_Route message including

- Send_Notification
- ACG -handled using existing AIN Essentials procedures

8.1 Analyze_Route

On receipt of an LNP query message, the LNP SCP returns an Analyze_Route message. No changes to the Analyze_Route message are necessary to facilitate

LNP. When an LNP Analyze_Route response is received following an LNP query, processing of the new leg begins at the Analyzing Information PIC.

- The AIN application accepts a RedirectingPartyID parameter in the Analyze_Route message. The AIN application updates the appropriate redirection parameters only if a RedirectingPartyID parameter is returned in the Analyze_Route message.
- If carrier or trunk group parameters are returned in the Analyze_Route message, the AIN application attempts to route the called PartyID over the specified carrier or trunk group, using existing AIN Essentials procedures.

Whenever an LNP agent dials a portable number and an LNP query is launched, and LNP response processing determines that the dialed number DN (terminator) is not ported, then AIN response translations are avoided. The prequery translations result is still valid and is used.

AIN 0.1 response translation (re-translations) are avoided only whenever the terminator status is found to be not ported. This is determined when the dialed digits are identical to the CalledPartyID parameter in the Analyze_Route response.

In cases where the called (terminator) DN is resident on the same switch her an LNP query is launched, LNP response processing invokes AIN 0.1 response translations and retranslates the call. The prequery translations result is not used.

In cases where a DMS feature is active on the same call leg where an LNP query is launched, LNP response processing invokes AIN 0.1 response translations and retranslates the call. The prequery translations result is not used.

8.2 Retriggering

Retriggering at LNP does not occur. When translations occur on the LRN or on a ported number GAP that has replaced the LRN, then the FCI is set to Number Translated to prevent retriggering.

8.3 TCAP messages from the LRN-LNP SSP

Upon encountering the LNP trigger, the SSP launches an Info_ANAlyzed LNP query message. The population of the query message follows AIN Essentials parameter population procedures. However, the parameters included in the query are specified by Table LNPOPTS, tuple QPARMS. The QPARMS tuple provides the customer the ability to select which optional parameters are to be included in the query message.

The mandatory parameters included in the LNP query are:

- UserID
- BearerCapability
- CalledPartyID
- TriggerCriteriaType

The option parameters the customer may select from are:

- ChargeNumber
- LATA
- CallingPartyID
- CallingPartyBGID
- ChargePartyStationType
- Primary Carrier
- TCM
- OriginalCalledPartyID
- RedirectingPartyID
- RedirectionInformation

Please refer to the chapter “Data Schema” for further information on Table LNPOPTS, tuple QPARMS.

8.4 ACG

Automatic Code Gapping (ACG) is a network management mechanism that is used in the control of network congestion. If a service control point (SCP) becomes congested with queries, it can request that a service switching point (SSP) slow down or stop sending queries for a specified time.

Code gapping can be initiated from the SCP in two ways:

- automatically with SCP initiated code control
- manually with service management system (SMS) originated code control (SOCC)

The manual SOCC method complements the automatic SCP method. When ACG gaps a 10-digit LNP call through SOCC or SCP initiated control, the call is routed to AINF regardless of having provisioned the default routing. All other LNP calls with ACG controls (3-, 6-, 7-, 8-, and 9-digits) are routed to default routing if provisioned.

9 Error Handling

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

LNP error handling is in line with that of AIN Essentials PODP as specified in this document.

9.1 LNP default routing

Default routing allows the call to continue in the event that the LNP SCP is unavailable or a fatal error occurs. Such cases include SCCP return on error, T1 timer expiry messages, ACG gapped calls, and non-national numbers.

LNP uses default routing as defined by AIN Essentials in which the default routing can be assigned to LNP. If the default routing feature is assigned, when either the LNP SCP is unavailable or the LNP SCP response has a fatal error in it, then the call routes as if an LNP Analyze_Route response message was received from the LNP SCP. This retranslates the dialed DN using the LERG routing procedures, regardless of whether the switch had a valid route prior to the query.

For default routing, the FCI is set to Number Not Translated and the Ported Number GAP is not created. Default routing may be datafilled to provide routing to

- the dialed DN
- another DN
- an announcement
- an announcement followed by routing to a DN

10 Limitations and Restrictions

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

The following limitations and restrictions apply to the LRN-LNP SSP:

- LRN-LNP supports only Service Provider Portability within a rate center. Location Portability, Service Portability, and portability outside a rate center are not supported.
- Unallocated numbers (DNs that are not provisioned in table DNINV) cannot be ported.
- Limitations and restrictions in the AIN Essentials SSP product are also present in the LRN-LNP SSP product.
- The Test Call feature LNPTST is only compatible with the Digitone (DGT) option.
- No other feature except DGT can be assigned to a 1FR RES line while the LNPTST option is present on that line.
- In addition, all office wide and customer-based features and options are blocked at run time for a 1FR RES line with LNPTST option while input collection is in progress for an LNP Test Call originating from that line.
- For incoming local and FGC trunks the originating trunk's translations are based on the 10-digit translation format. If 7-digit translation is used, 10-digit translation datafill must exist in the local trunk's exception pretranslator. This must be true if existing trunk translation datafill is to be reused.
- The TRNSLVF subcommand of the TTP (Trunk Test Position) MAP level is not supported at this time to handle LNP Response Translations. The TRAVER interface should only be used to verify translation within LNP environment.

10.1 Feature interaction limitations

For more detailed feature interactions, please see the chapter “Chapter 11: Feature interactions”.

In addition, note that under the current functionality, all calls routing to a non-native and resident DN terminate directly onto the DN regardless of the actual datafill in table HNPACONT/FNPACONT. Therefore, routing features like Conditional Routing (CND) are not encountered since routing features are only encountered when the call is routed out of the office.

Looparound trunks datafilled in table HNPACONT are not encountered when the routing number corresponds to a resident, non-native DN since the terminating switch has no knowledge of whether the route is a looparound or not. The way to work around this issue is to set up the looparound either in table STDPRTCT or in table CLSVSCRC (Class Of Service Screening).When a subscriber casually dials a carrier access code (CAC) on a local call, LNP trigger is not encountered. If causal access to local call is allowed, the call is routed to the dialed carrier to complete the call. Otherwise, the call is blocked and sent to the No dial Access Code (NACD) treatment.

Features that operate within the private environment are considered to be independent of LNP interaction since the LNP trigger is not encountered in the private dial plan. Also, public features that operate intraswitch only are considered to be independent of LNP interaction since the LNP trigger is escaped on intraswitch calls. Individual members of a customer group may not port; the entire customer group must port. A customer group that is part of a customer group family must be converted to a stand-alone customer group before it can be ported, unless the entire family is ported.

10.1.1 Duplicate NXX

NA009 support for Duplicate NXX includes all DMS CM functionality with the exception of remote peripherals. However, for example, 519-333-1111 may exist on a remote and 416-333-1212 may be on a different remote or directly on the switch.

Part III
Feature interactions

This part consists of the following chapters:

11 Feature interactions

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see “About this document”.

This chapter addresses interactions between LNP processing and switch-based features. Interactions with other AIN capabilities, such as serial triggering, are addressed in the AIN chapter of this document.

This chapter describes features that require special interaction. If no requirement exists for a specific feature interaction with LNP, it operates according to existing Bellcore generic requirements.

In general, LNP processing is transparent to calls that involve existing features.

Furthermore, calls that involve a number that belongs to a portable NPA-NXX, but the number has not ported, interact with features in the same way as a non-LNP calls. An LNP query that returns the called number in the response (as opposed to an LRN) is transparent to the call.

11.1 List of features

For compatibility of feature DNs with the PORT option, please refer to the Section "7.4.3. Specifying a 10-digit unconditional LNP trigger" on page 16”.

Note: For unsupported features please refer to Section "11.4.7. Unsupported LNP feature interactions" on page 96.

The following features are supported:

- ACD Night Service (ACD NGTSRVCE), Section "11.3.1. ACD Night Service" on page 11
- AIN Primer, Section "11.3.2.1. AIN Primer" on page 12

- AIN Service Enablers Next Event Lists and Extended Transactions, Section "11.3.2.2. AIN Service Enablers Next Event Lists and Extended Transactions" on page 15
- AMA Test Call (AMATEST), Section "11.3.4. AMA Test Call (AMATEST)" on page 17
- AT&T Line Study (SDY), Section "11.3.5. AT&T Line Study" on page 17
- Authorization and Account Codes (AUTH/ACCT), Section "11.3.6. Authorization and Account Codes" on page 18
- Automatic Dialing (AUD) Section "11.3.7. Automatic Dialing" on page 18
- Automatic Display (AUTODISP), Section "11.3.8. Automatic Display" on page 18
- Automatic Line (AUL), Section "11.3.9. Automatic Line" on page 18
- Basic 911 and Enhanced 911 features, Section "11.3.10. Basic 911 and Enhanced 911 features" on page 18
- Bearer Capability (BC), Section "11.3.11. Bearer Capability" on page 19
- Blind Transfer Recall & Identification (CXRRCL), Section "11.3.12. Blind Transfer Recall & Identification" on page 19
- Call Completion with Trunk Optimization (CCIO), Section "11.3.14. Call Completion with Trunk Optimization" on page 20
- Call Covering (CCV), Section "11.3.15. Call Covering" on page 20
- Call Forwarding, Section "11.3.16. Call Forwarding features" on page 20
  - — Call Forwarding All Calls (CFW)
  - — Call Forwarding Busy (CFB)
  - — Call Forwarding Busy Block Intragroup (CBI)
  - — Call Forwarding Busy Intragroup Deny Unrestricted (CBICBU
  - — Call Forwarding Busy Line (CFBL)
  - — Call Forwarding Call Waiting (CFCW)
  - — Call Forwarding Don’t Answer for IBN (CFD)
  - — Call Forwarding Don’t Answer Exclude Intergroup (CDE)
  - — Call Forwarding Don’t Answer Exclude Intragroup (CDI)
  - — Call Forwarding Don’t Answer for POTS and RES (CFDA)
  - — Call Forwarding Don’t Answer Intragroup Deny Unrestricted (CDICDU)
  - — Call Forwarding Fixed (CFF)

- Call Forwarding Group Don’t Answer (CFGD, CFGDA)
- Call Forwarding Intragroup (CFI)
- Call Forwarding on a Per Key Basis (CFK)
- Call Forwarding Programming with Courtesy Call (CFWP) for POTS
- Call Forwarding Remote Access (CFRA)
- Call Forwarding Timed (CFT)
- Call Forwarding Universal (CFU)
- Call Forwarding Usage Sensitive Dial (CUSD)
- Call Forwarding Validation (CFWVAL)
- CFB Exclude External Originators/Unrestricted Forwarding (CBECBU)
- CFB Exclude Intergroup (CBE)
- CFD Exclude External Originators/Unrestricted Forwarding (CDECDU)
- CFD Variable Timer (CFDVT)
- Controlled Multiple Call Forwarding (CMCF)
- Deny Call Forwarding (DCF)
- IBN Call Forwarding Busy Unrestricted (CBU)
- IBN Call Forwarding Don’t Answer Unrestricted (CDU)
- IBN Call Forwarding Simultaneous/Screening (CFS)
- Inhibit Ring Reminder (IRR)
- Internal External Call Forwarding Busy Denied (IECFB)
- Internal External Call Forwarding Busy Unrestricted (IECFBCBU)
- Internal External Call Forwarding Don’t Answer Denied (IECFD)
- Internal External Call Forwarding Don’t Answer Unrestricted (IECFD CDU)
- Multiple Call Forwarding for CFU/CFI (MULTICFA)
- Multiple Call Forwarding Don’t Answer (MULTICFD)
- Multiple Call Forwarding Busy (MULTICFB)
- Personal Communications Service (PCS) of Call Forwarding
- Remote Call Forwarding (RCF)
- Remote Call Forwarding Enhancement (RCFE)
- Remote Call Forward without Unique PIN

  - — Subscriber Programmable Ringing for CFRA on RES (SPRING)
  - — Universal Access to Call Forwarding on RES (CFXU)
- Call Hold (MDC), Section "11.3.24. Call Hold" on page 29
- Calling Line Identification with Flash (CLF), Section "11.3.26. Calling Line Identification with Flash" on page 29
- Calling Line Identification Display (CLIDSP), Section "11.3.25. Calling Line Identification Display" on page 29
- Calling Number Announcement (CNA), Section "11.3.27. Calling Number Announcement" on page 29
- Call Logging (CALLOG), Section "11.3.17. Call Logging" on page 26
- Call Messenger for RES (CMSG), Section "11.3.18. Call Messenger for RES" on page 26
  - — Intentional Call Messenger
  - — Standard Call Messenger
- Call Party Hold (CPH), Section "11.3.19. Call Party Hold" on page 26
- Call Screening, Monitoring and Intercept (CSMI), Section "11.3.20. Call Screening, Monitoring and Intercept" on page 27
- Call Transfer, Section "11.3.21. Call Transfer" on page 27
- Call Transfer Warning (CTW), Section "11.3.22. Call Transfer Warning" on page 27
- Call Waiting, Section "11.3.23. Call Waiting features" on page 27
  - — Call Waiting (CWT)
  - — Call Waiting Auto-suppression
  - — Call Waiting Chaining (CWC)
  - — Call Waiting Exempt (CWX)
  - — Call Waiting Intragroup
  - — Call Waiting Originating (CWO)
  - — Cancel Call Waiting (CCW)
  - — Distinctive Call Waiting Ringback (CWR)
  - — Dial Call Waiting (CWD)
- Charge Option BRAFS (CHG), Section "11.3.28. Charge Option BRAFS" on page 29

- CLASS features (Residential by default), Section "11.3.29. CLASS features" on page 30
  - — ACB with USP billing (ACBAMA)
  - — ACB/AR Scans Entire Hunt Group
  - — AR with USP billing (ARAMA)
  - — Automatic Callback/Automatic Recall (ACB/AR)
  - — Automatic Recall Back Limited to One (AROO)
  - — Automatic Recall Blocking of Private Calls (CABOP)
  - — Anonymous Caller Rejection (ACRJ)
  - — Bulk Calling Line Identification (BCLID)
  - — Calling Name and Number Blocking (CNNB)
  - — Calling Name and Number Display (CNND)
  - — Calling Name Delivery (CNAMD) - TR1188
  - — Calling Name Delivery (CNAMD) - Nodal
  - — Calling Name Delivery Blocking (CNAB)
  - — Calling Name Delivery Blocking Override (CNDBO)
  - — Calling Number Blocking (CNB)
  - — Calling Number Delivery (CND)
  - — Calling Number Delivery Blocking (CNDB)
  - — CLASS Message Waiting Indicator
  - — CMS Network Access Control (NAC) Interface
  - — CMS Screening of Private Calls (CASOP)
  - — COT with USP billing (COTAMA)
  - — Customer Originated Trace (COT) - MDC
  - — Dialable Directory Number (DDN)
  - — Distinctive Ringing / Call Waiting (DRCW)
  - — Long Distance Indicator Enhancement (LDI)
  - — Screen List Editing
    - – Selective Call Acceptance (SCA)
    - – Selective Call Rejection (SCR)
    - – Selective Call Forwarding (SCF)
    - – Distinctive Ringing Call Waiting (DRCW)

- CLID Screening per Trunk Group (CLID), Section "11.3.31. CLID Screening per Trunk Group" on page 36
- Code Call Access (CDCL), Section "11.3.32. Code Call Access" on page 36
- Code Restrictions (CRL), Section "11.3.33. Code Restrictions" on page 37
- CompuCALL, Section "11.3.34. CompuCall/SCAI" on page 37
- Conference features, Section "11.3.30. Conference features" on page 36
  - — Add-on/Consultation Hold Incoming Only
  - — Executive Conference
  - — Meet-me Conference
  - — Six-Port Conference (CONF6)
  - — Station-Controlled Conference
  - — Super Conferencing
  - — Preset Conference
- Critical Path Restoration (CPR), Section "11.3.35. Critical Path Restoration" on page 41
- Customer Dialed Account Recording (CDAR), Section "11.3.36. Customer Dialed Account Recording (CDAR)" on page 42
- Datapath Closed User Group, Section "11.3.37. Datapath - Closed User Group" on page 42
- Deluxe Spontaneous Call Waiting Identification (DSCWID), Section "11.3.38. Deluxe Spontaneous Call Waiting Identification" on page 42
- Denied Incoming (DIN), Section "11.3.39. Denied Incoming" on page 42
- Direct Inward System Access (DISA), Section "11.3.40. Direct Inward System Access" on page 43
- DISA Reorigination, Section "11.3.41. DISA Reorigination" on page 43
- DISA Reset Dialing, Section "11.3.42. DISA Reset Dialing" on page 43
- Distinctive Ringing (DRING), Section "11.3.43. Distinctive Ringing" on page 43
- Dynamically Controlled Routing (DCR), Section "11.3.44. Dynamically Controlled Routing" on page 44
- E800, Section "11.3.49. Enhanced 800" on page 47
- 800Plus, Section "11.3.50. 800Plus" on page 47
- EBS Display, Section "11.3.51. EBS Display" on page 50

- End Office Display (EOD), Section "11.3.52. End Office Display" on page 50
- E911 features
  - E911 Auto Location Identification (ALI), Section "11.3.45. E911 Automatic Location Identification" on page 46
  - E911 Line-Ended PSAP (LINEPSAP), Section "11.3.46. E911 Line-Ended PSAP" on page 46
  - E911 Local Access /Ringback to E911 Callers (RBACK), Section "11.3.47. E911 Local Access / Ringback to E911 Callers (RBACK)" on page 46
- Emergency Stand Alone (ESA), Section "11.3.48. Emergency Stand Alone" on page 46
- Executive Message Waiting (EMW), Section "11.3.53. Executive Message Waiting" on page 50
- Fax-Thru Service (FTS) (partially supported), Section "11.3.54. Fax-Thru Service" on page 50
- Feature Group A
- Feature Group B
- Feature Group C
- Feature Group D
- Flexible ANI (FANI), Section "11.3.55. Flexible ANI" on page 50
- Free Number Terminating (FNT), Section "11.3.56. Free Number Terminating" on page 50
- H/M Register Pulsing (RMP), Section "11.3.57. H/M Register Pulsing (RMP)" on page 51
- Hotel/Motel (HOT), Section "11.3.58. Hotel/Motel (HOT)" on page 51
- Hunt Groups, Section "11.3.59. Hunt-based services" on page 51
  - Bridged Night Number
  - Directory Number Hunt (DNH)
  - Distributed Line Hunt (DLH)
  - Keyshort Hunt (KSH)
  - Keyshort Hunt Overflow to DN
  - Keyshort Hunt Overflow to Route
  - Line Overflow to DN
  - Line Overflow to Route

- Make Busy Key (MBK), Section 11.3.76 on page 58
- MBS Interactive Displays, Section 11.3.79 on page 58
- MBS Individual Business Line (PBL), Section 11.3.78 on page 58
- MBS Malicious Call Hold (MCH), Section 11.3.80 on page 58
- MultiParty Bridge (MPB), Section 11.3.82 on page 59
- Network Access Registers (NARS) (partially supported), Section 11.3.84 on page 59
- Network Resource Selector (NRS), Section 11.3.85 on page 60
- Network ACD (partially supported), Section 11.3.83 on page 59
- Operator Number Identification (ONI), Section 11.3.88 on page 63
- Overflow Call Routing (OCR), Section 11.3.89 on page 63
- Permanent Hold (PHOLD), Section 11.3.90 on page 63
- Plug Up (Trouble Intercept) (PLP), Section 11.3.91 on page 63
- Primary intra-LATA Carrier (PIC)
- Primary intra-LATA Carrier (LPIC)
- Release Line Trunk (RLT), Section 11.3.93 on page 68
- Residential Call Hold, Section 11.3.94 on page 69
- Restricted Sent Paid (RSP), Section 11.3.95 on page 69
- Ring Again features, Section 11.3.96 on page 69
  - — Network Ring Again (NRAG)
  - — Ring Again (RAG)
- SDS Enhanced Bus Call Return (SDS-ECBR), Section 11.3.98 on page 70
- Security Code (SEC), Section 11.3.99 on page 70
- Selective Call Messaging (SCM), Section 11.3.100 on page 71
- Series Completion (SCMP), Section 11.3.101 on page 71
- Service Analysis (SA), Section 11.3.102 on page 71
- Single Button Transfer/Quick Conference Key (QCK), Section 11.3.104 on page 72
- Single Line Queuing (Overflow to DN), Section 11.3.105 on page 72
- Single Line Variety Package for RES (SLVP), Section 11.3.106 on page 72
- Single Party Revertive Calling (INT), Section 11.3.107 on page 73
- Softkey display (SKDISP), Section 11.3.108 on page 73
- Special Billing (SPB), Section 11.3.109 on page 73

- Toll Restrictions, Section 11.3.124 on page 80
  - — Carrier Toll Denied (CTD)
  - — Toll Denied (TDN)
  - — Toll Diversion (TDIV)
- Trunk Verification From Designated Station (TVDS), Section 11.3.125 on page 82
- Universal Access (DENY), Section 11.3.130 on page 93
- Universal Speech Activate Intelligent Dialling features (USAID), Section 11.3.126 on page 82
- Universal Voice Messaging (UVM), Section 11.3.131 on page 94
- Virtual Facility Group Lookahead (VFGLA), Section 11.3.129 on page 93
- Virtual Facility Groups (VFGs), Section 11.3.128 on page 82
- Voice Mail Easy Access, Section 11.3.132 on page 94
- Wake-up Call Reminder (WUCR), Section 11.3.133 on page 94
- Warm Line for POTS (WML), Section 11.3.134 on page 94
- Warm Line for MDC (WML), Section 11.3.135 on page 95

The Multi Location Business Group feature is an LNP feature interaction exception. For more information see Section "11.4. Restrictions and Limitations" on page 95.

11.2 TOPS BLV interactions

TOPS BLV incoming trunks marked with the BLV traffic class modify the behavior of LNP to allow the incoming trunks to perform LNP Trigger Criteria Checking from STDPRTCT express routing on a DN and route to a loop-around OI trunk. For more information on TOPS BLV interactions with LNP see NA DMS-100 Translations Guide LETB007.

11.3 Feature descriptions

The following sections provide descriptions of the various features and where appropriate provide references to the associated requirements.

11.3.1 ACD Night Service

ACD Night Service (ACD NGTSRVCE) enables an ACD supervisor to place all ACD agents belonging to an ACD group into Night Service mode by pressing a Night Service key. ACD calls arriving after Night Service has been activated are routed to a specified treatment or a DN (as datafilled in table ACDGRP).

An ACD Night Service DN can be a ported number. Intra- and inter-office calls that are routed to a ported ACD Night Service DN, or to a Night Service treatment followed by a Night Service DN can all encounter LNP triggering. In additional, an ACD group can belong to a portable NPA-NXX and receive incoming intra- and inter-office calls with LNP trigger processing.

11.3.2 Advanced intelligent network

This section explains the feature interactions with the advanced intelligent network (AIN).

11.3.2.1 AIN Primer

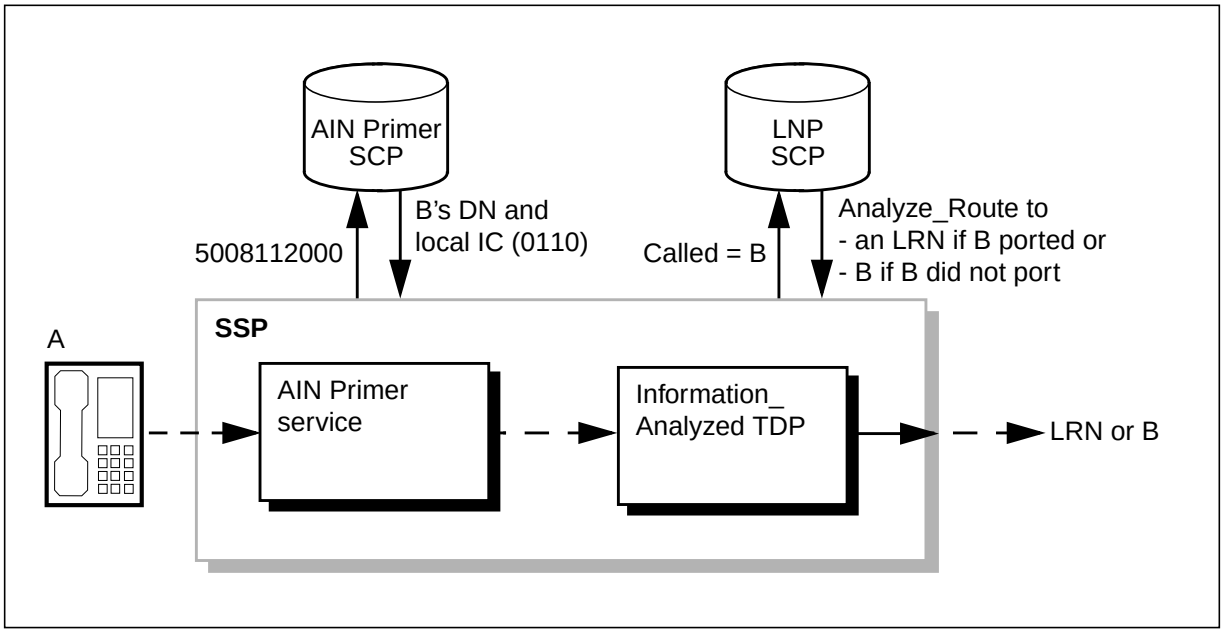
AIN Primer is an Intelligent Network service platform.This feature supports interactions between AIN Primer and LNP.

The AIN Primer PODP trigger is encountered in translations prior to the Info_Analyzed TDP. This means that a call triggers at AIN Primer PODP if subscribed, before determining if the called number is portable (prior to initiating LNP).

The AIN Primer DN trigger is a virtual DN which is datafilled in table DNROUTE. A call encounters LNP before it encounters the AIN Primer DN trigger.

An AIN Primer response can route calls to a portable number.

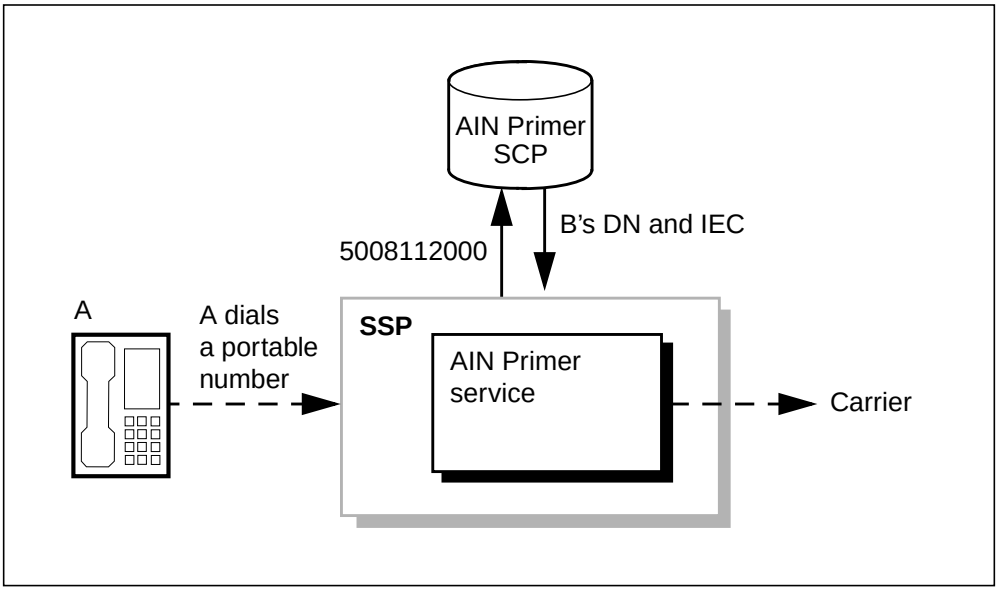
Figure 11-1 AIN Primer response routes call to a portable number



If the AIN Primer response specifies an Interexchange Carrier (IEC) and a portable number, then the call is routed to the IEC. The IEC is responsible for handling the LNP processing.

In the figure, the AIN Primer PODP trigger takes place because it is subscribed and encountered first. The call is routed according to the AIN Primer response to an IEC.

Figure 11-2 AIN Primer encountered before LNP



The following addresses the case where the AIN Primer response specifies a Local Exchange Carrier (LEC).

11.3.2.1.1 Interactions with LNP If the AIN Primer response specifies a portable number which did not port, then the LNP Analyze_Route response echoes back the called number. The call is routed as though LNP did not take place on the call.

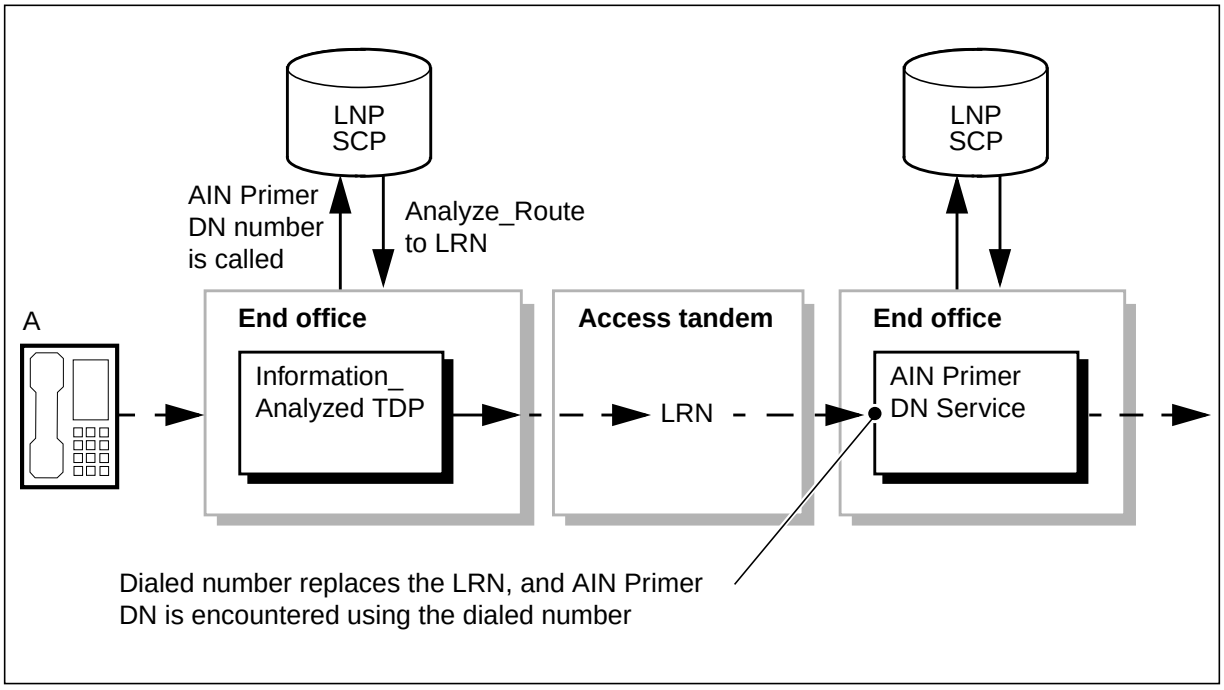
If the AIN Primer response specifies a ported number, then the LNP response returns an LRN in the Analyze_Route response. The call is routed according to the LRN.

An AIN Primer trigger cannot take place in the access tandem when the called number is an LRN. An LRN should not be provisioned as an AIN Primer number. In the access tandem, an AIN Primer trigger cannot be encountered based on the GAP digits. In case an LRN is provisioned in the access tandem as an AIN Primer number, the call is blocked and it is sent to treatment. This behavior is reflected in the appropriate TRAVER enhancements.

When the call routes to the recipient office, the ported number is replaced as the called party. The call is routed based on the ported number. Only the AIN Primer DN trigger can be encountered in the recipient office after LNP takes place.

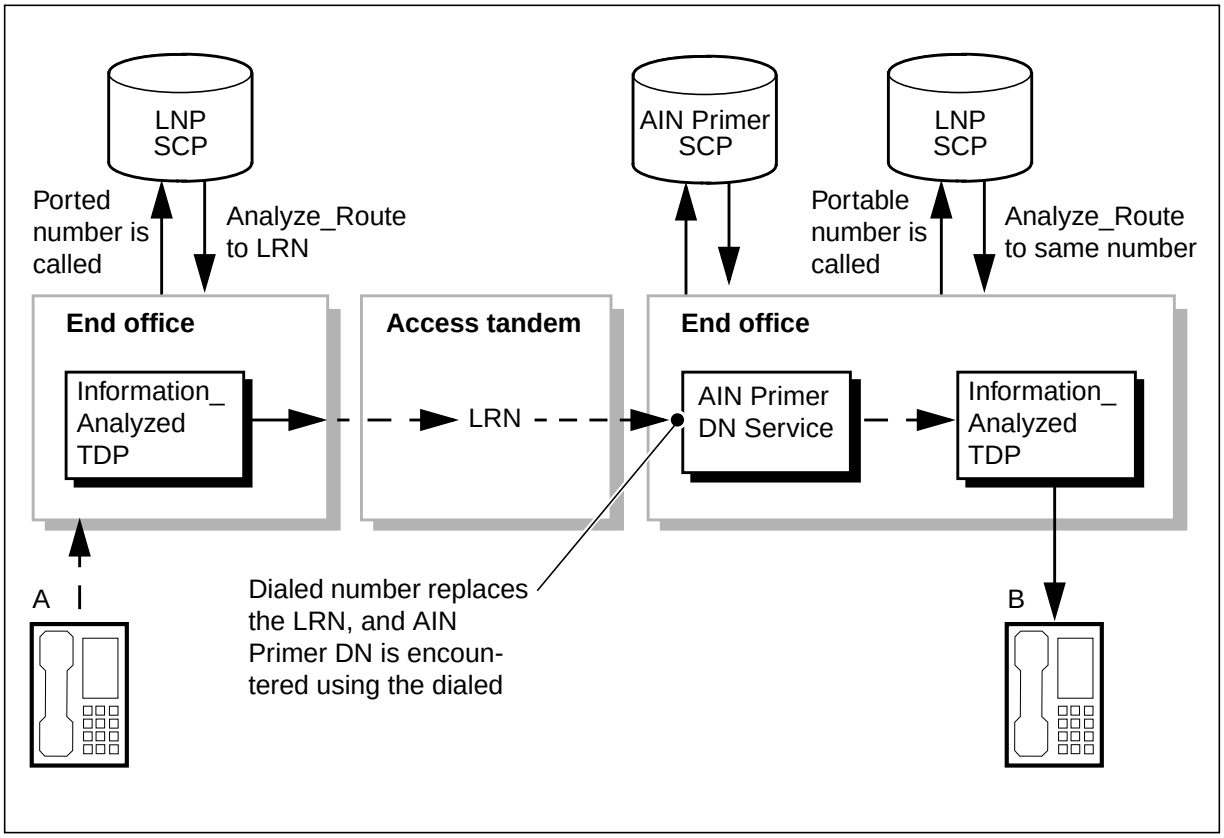
This means that only an AIN Primer DN number can port. An AIN Primer PODP number cannot port. If an AIN Primer PODP number ports, then in the recipient switch, the DN residency check fails and the call is routed to LNP misrouting treatment (LNPM).

Figure 11-3 AIN Primer DN number ports



When AIN Primer takes place, the FCI is reset. This allows the post AIN Primer call handling to route the call to a portable number, even if LNP was encountered prior to AIN Primer. If an AIN Primer response specifies a ported number, LNP querying out of table CLSVSCRC (due to datafill of table LNPRTE) does not occur since AIN Primer response processing does not encounter CLSVSCRC.

Figure 11-4 AIN Primer DN number ports and routes the call to a portable number



After an AIN Primer PODP or DN trigger, the actual originator is outpulsed rather than the PODP or DN number. However, the AIN Primer AMA record indicates the PODP or DN number in the originating field of the AMA record. This means that AIN Primer signalling and billing are inconsistent with each other. The LNP signalling information is kept consistent with the AIN Primer signalling information - the originator's LRN is outpulsed rather than the LRN of the PODP or DN number.

11.3.2.2 AIN Service Enablers Next Event Lists and Extended Transactions

Persistent transactions are transactions that include Conversation messages in addition to the Query and Response message pair. Note that in AIN Service Enablers there are only two types of persistent transactions: those involving a SendToResource operation, and those involving Next Event Lists (NELs).

The introduction of NELs in AIN Service Enablers introduced the extended transaction, which is a persistent transaction that has an associated active NEL associated with it.

While an AIN Service Enablers Extended Transaction is open, it is possible to encounter the AIN Essentials-based LNP trigger and launch a query to the LNP database. If the SCP response from the LNP database

- is an AnalyzeRoute message (expected response), the AnalyzeRoute is processed according to LNP response processing procedures;
- contains a SendtoResource response message, default routing is used if applicable; if default routing does not apply a treatment is applied;
- contains a SendtoResource conversation message, a ResourceClear message is sent to the SCP;
- contains a NEL, it is treated as a fatal error in accordance with existing AIN Essentials procedures, and is routed to final treatment.

In the first and third cases the previously opened AIN Service Enablers transaction remains open and the AIN Service Enablers service continues to operate.

Note that it is not possible to encounter a second trigger during a Send To Resource operation. This is compliant with AIN response processing procedures.

11.3.3 Attendant Console Features

The Attendant Console (AC) is an agent of Meridian Digital Centrex (MDC). A console works with the controlling DMS-100 switch to perform a full range of call answering, handling, and tracking features that allow one to provide various services for the phones associated with an Attendant Console.

The Attendant Console is associated with a customer group, which is an entity on a switch in which individuals can request special MDC services, such as the ability to dial four digits instead of seven to call another member of the group. An attendant can handle queries, intercept and route calls. This is done from an Attendant Console. Also, there can be more than one console per customer group.

The other typical application of the Attendant Console is an agent of an information or message center.

Attendant Console support is provided in the NA008 release, and enables features activated on calls involving an Attendant Console to fully support LRN-LNP functionality.

The Attendant Console is a unique agent compared to other DMS agents:

- The SERVORD utility can not be used for programming features and options against an Attendant Console. The programming of the Attendant

Console features is done using table control to datafill the following tables: FNMAP, ICIDATA, ATTCONS, CUSTCONS and CUSTHEAD.

- The Attendant Console can not use feature codes to invoke features (* Feature Code).
- Only the so called Attendant Console Features may be assigned to the Attendant Console. They are exclusively developed to support the Attendant Console functionality. These features can be only invoked by the Attendant Console keys.
- DMS features other than the Attendant Console Features can not be assigned for the Attendant Console. Some of them may be active on calls involving the Attendant Console, since they are applicable and activated by the other agents active on the same call.

Please refer to NTP documentation for a list of Attendant features.

With the following call scenarios there is an inconsistency with the AC and all other MDC agents. For MDC originations, the VFG is used for response translations. For the AC, the VFG is not used for response translations but rather the AC agent.

- MDC agent->POTS VFG->LNP->FLRN: an MDC agent routes through a POTS VFG and encounters an LNP trigger. A foreign LRN is returned from the SCP and the call routes to the ported DN. Response translations for the response uses the VFG as the originator.
- AC->POTS VFG->LNP->FLRN: an attendant console originates a call through a POTS VFG. The call encounters the LNP trigger and receives a foreign LRN from the SCP. The call routes to the ported DN using response translations from the attendant console.

For restrictions and limitations on attendant console please refer to Section "11.4.2. Attendant console features" on page 95.

For information on how attendant console is affected by Number Pooling Evolution please refer to Section "13.4.3. Network Attendant Console" on page 45.

11.3.4 AMA Test Call (AMATEST)

AMAB subsystem generates an AMAB200 log when a billable call is made from a line that has the AMATEST option. The record will only be generated if LOGTEST in table AMAOPTS is turned on.

11.3.5 AT&T Line Study

This feature is assigned to DN instances that require the generation of an AMA record for compliant observing (OBS) or Line Usage Studies (LUS), or both. The AT&T Local AMA (LAMA) code checks for these options in conjunction

with the AMAOPTS tuple OBSERVED, LUSORIG and LUSTERM when determining if LAMA processing is required for a particular call.

11.3.6 Authorization and Account Codes

The Authorization and Account Codes (AUTH/ACCT) feature is used to identify callers for billing purposes, to assign an NCOS, and to control network access. An MDC subscriber can dial an authorization or account code before dialing the called party number, or be prompted to dial the code after the called party number.

A ported DN may subscribe to the Authorization and Account Codes feature, and calls to portable DNs may be made using the Authorization and Account Codes feature.

11.3.7 Automatic Dialing

The Automatic Dialing (AUD) feature allows a Meridian Business Set (MBS) station user to call a frequently dialed number by pressing the assigned feature key.

The Automatic Dial feature may be assigned to ported DNs, and the Automatic Dial feature may be used to originate calls to portable DNs.

11.3.8 Automatic Display

The Automatic Display (AUTODISP) option automatically displays information on incoming calls to a Meridian Business Set (MBS) even when the Primary DN of the MBS is already active on a call. Calls incoming to other keys on the set are displayed for a fixed period of time.

Ported DNs can subscribe to the AUTODISP feature, and incoming calls from ported DNs can have their DNs appropriately displayed on a terminator's MBS using the AUTODISP feature.

11.3.9 Automatic Line

MBS Automatic Line (AUL) is a DN feature that can be assigned to individual DN appearances on a Meridian business set (MBS), including the primary directory number (PDN). When an off-hook condition is reported from a DN appearance with MBS AUL assigned, a connection is automatically made to a predetermined location

Ported DNs may subscribe to the Automatic Line feature.The Automatic Line feature may be used to originate calls to portable DNs.

11.3.10 Basic 911 and Enhanced 911 features

With Basic 911 (B911) and Enhanced 911 (E911) Emergency Services a switch receives 911 calls and routes them to a public safety answering point (PSAP). Enhanced 911 service allows a switch with E911 software to become

an E911 tandem, thus overcoming the drawbacks of basic 911 service which is constrained by a wire center boundary.

911 PSAP groups cannot port. Porting of a PSAP is not prevented, although it is not recommended according to the Feature Interactions requirements.

A portable/ported DN is able to dial 911 or any other emergency access number and connect to the emergency service bureau (ESB). A portable/ported DN behaves the same way when calling a E911 number as a non-portable/non-ported DN always has.

A portable/ported DN successfully completes a E911 call. A PSAP is able to retrieve appropriate information about a portable/ported DN from the ALI database.

A portable/ported DN is able to connect to a Line-ended PSAP.

If E911 Local Access is assigned to a E911 VFG and the originator hold option is turned on for the VFG group, then a portable/ported Originator that hangs up is held by the attendant. The E911 attendant may re-ring a portable/ported subscriber that went onhook by entering the Ringback feature access code.

A portable/ported DN should be able to connect to a LTD Public Safety Answer Point (LDTPSAP).

Requirements: REQ-A.234, REQ-A.235, REQ-A.236, REQ-A.237, REQ-A.238, REQ-A.239, REQ-A.240 and REQ-A.241

11.3.11 Bearer Capability

Bearer Capability (BC) is a characteristic associated with a directory number (DN) to indicate the type of call (voice or data) and the rate of transmission that is allowed.

Through the use of Bearer Capability call screening provided by the network, the terminator is alerted only if the incoming and terminating BCs are compatible. If the BC of the terminator is incompatible with the BC of the incoming call, the call is routed to treatment and the terminator is not alerted to the incoming call.

The BC option may be assigned to a portable DN. LNP is transparent to BC transmission and screening.

11.3.12 Blind Transfer Recall & Identification

Blind Transfer Recall (CXRRCL) allows calls that have been transferred to a third party to return, or recall, to the party who transferred the call if the third party does not answer within a certain amount of time.

Blind Transfer Recall Identification, which works in conjunction with the Blind Transfer Recall feature, allows the end user of a Meridian business set (MBS) with display to be alerted to a call transfer recall by a reason message on the display. A reason message on the bottom line of the display is shown to notify the transferring party that a transferred call is being recalled.

The LNP trigger is not encountered on transfer nor recall.

11.3.13 Bridged Night Number

The Bridged Night Number (BNN) option can be assigned to a Directory Number Huntgroup (DNH), MultiLine Huntgroup (MLH), or Distributed Line Huntgroup (DLH). The BNN option allows a huntgroup to advertise a different number for night service without requiring a third wire.

A Bridged Night Number can be assigned to a ported DN (the entire huntgroup must port as a group). Since the BNN is considered part of the huntgroup, LNP processing is encountered on call setup to the huntgroup's pilot DN, but not upon termination to the Bridged Night Number.

11.3.14 Call Completion with Trunk Optimization

This feature removes redundant ISUP trunks during call transfer or a change in direction on ISUP to a simplified message desk interface (SMDI) data link. This removal can occur on ISUP to MDC line calls.

11.3.15 Call Covering

The Call Covering (CCV) feature allows a Secondary Member of a Multiple Appearance Directory Number (MADN) group to answer an incoming call and leave a message for the Primary Member and to turn on the set's EMW lamp on behalf of the calling party.

The Call Covering feature may be used by members of a ported MADN group. Note that individual members of a MADN group are not allowed to port; the entire MADN group must port together.

11.3.16 Call Forwarding features

Call forwarding features allow a subscriber to forward incoming calls to another directory number.

A ported number is able to subscribe to call forwarding. Similarly, it is possible to forward incoming calls to a ported number. When a call is forwarded to a ported number, the GAP and FCI values are not preserved.

Only the variants of call forwarding which operate on inter-group/public calls have interactions with LNP and are supported to interwork with LNP. Variants which operate on intra-group calls only do not have an interaction with LNP, because individual customer group members are not permitted to change

service providers - the customer group must port collectively. Call forwarding features supported by LNP are as follows:

Table 11-1 Call Forwarding features to be supported by LNP (Sheet 1 of 2)

Call forwarding (CFX) features	Inter- or Intra-group?
Call Forwarding on a Per Key Basis (CFK)	Inter-group
Call Forwarding All Calls (CFW)	Inter-group
Call Forwarding Busy (CFB)	Inter-group (Note 1)
Call Forwarding Busy Block Intragroup (CBI)	Intra-group
CFB Exclude External Originators/Unrestricted Forwarding (CBECBU)	Inter-group
CFB Exclude Intragroup (CBE)	Intra-group
Call Forwarding Busy Line (CFBL)	Inter-group
Call Forwarding Busy Intragroup Deny Unrestricted (CBICBU)	
Call Forwarding Call Waiting (CFCW)	Inter-group
Call Forwarding Don't Answer for IBN (CFD)	Inter-group (Note 2)
CFD Exclude External Originators/Unrestricted Forwarding (CDECDU)	Inter-group
Call Forwarding Don’t Answer Intragroup Deny Unrestricted (CDICDU)	Inter-group
Call Forwarding Don’t Answer Exclude Intragroup (CDI)	Inter-group
Call Forwarding Don't Answer Exclude Intergroup (CDE)	Intra-group
Call Forwarding Don’t Answer Exclude External	Intra-group
Call Forwarding Don't Answer for POTS and RES (CFDA)	Inter-group
Call Forwarding Fixed (CFF)	Inter-group
Call Forwarding Group Don't Answer (CFGD, CFGDA)	Inter-group
Call Forwarding Intragroup (CFI)	Intra-group
Call Forwarding Programming with Courtesy Call (CFWP) for POTS	Inter-group
Call Forwarding Remote Access (CFRA)	Inter-group
Call Forwarding Universal (CFU)	Inter-group
Call Forwarding Validation (CFWVAL)	Inter-group
Controlled Multiple Call Forwarding (CMCF)	Inter-group
IBN Call Forwarding Busy Unrestricted (CBU)	Inter-group
IBN Call Forwarding Don't Answer Unrestricted (CDU)	Inter-group

Table 11-1 Call Forwarding features to be supported by LNP (Continued) (Sheet 2 of 2)

Call forwarding (CFX) features	Inter- or Intra-group?
IBN Call Forwarding Simultaneous/Screening (CFS)	Intra-group
Internal External Call Forwarding Busy Denied (IECFB)	Intra-group
Internal External Call Forwarding Busy Unrestricted (IECFBCBU)	Inter-group
Internal External Call Forwarding Don't Answer Denied (IECFD)	Intra-group
Internal External Call Forwarding Don't Answer Unrestricted (IECFDCDU)	Inter-group
Multiple Call Forwarding for CFU/CFI (MULTICFA)	Inter-group
Multiple Call Forwarding Don't Answer (MULTICFD)	Intra-group
Multiple Call Forwarding Busy (MULTICFB)	Intra-group
Personal Communications Service (PCS) of Call Forwarding	Inter-group
Remote Call Forwarding (RCF)	Inter-group
Remote Call Forwarding Enhancement (RCFE)	Inter-group
Subscriber Programmable Ringing for CFRA on RES (SPRING)	Inter-group
Universal Access to Call Forwarding on RES (CFXU)	Inter-group
Deny Call Forwarding (DCF)	Intra-group
Inhibit Ring Reminder (IRR)	Inter-group
Remote Call Forward without Unique PIN	Inter-group
Call Forwarding Timed (CFT)	Inter-group
CFD Variable Timer (CFDVT)	Inter-group
Call Forwarding Usage Sensitive Dial (CUSD)	Inter-group
Note 1: This is true only with the CBU option.	
Note 2: This is true only with the CDU option.	

11.3.16.1 Ported number originations

A ported number can originate a call to a call forwarding subscriber, and if the call forwarding conditions are met, then the incoming call is forwarded to the forward-to number.

The forwarding number appears as the originator of the call, in terms of the feature operation, and the AMA records.

There are two call legs with separate AMA records, and LNP processing may take place on either one or both call legs. The LNP module is attached to the AMA record for the call leg on which LNP processing takes place.

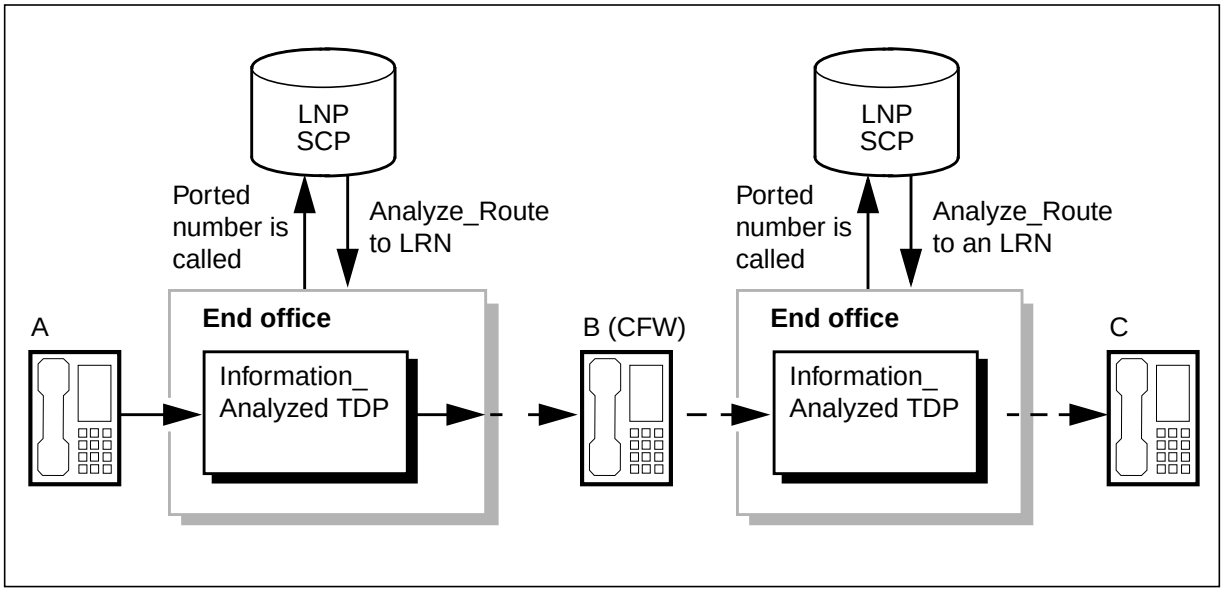
11.3.16.2 Ported number terminations

A portable or ported number shall be able to subscribe to the appropriate call forwarding variants. Incoming calls to the portable/ported number are redirected according to the call forwarding variant subscribed.

When call forwarding is encountered, the FCI is reset to allow future LNP processing to take place on the call. Calls can be forwarded to a portable or ported number.

DCF applies to IBN call forwarding on intra-group extension calls only. Since individual members of customer groups cannot port, DCF does not deny call forwarding of calls to a ported number.

Figure 11-5 LNP invocation on the first and second legs of call forwarding



11.3.16.3 Call forward programming

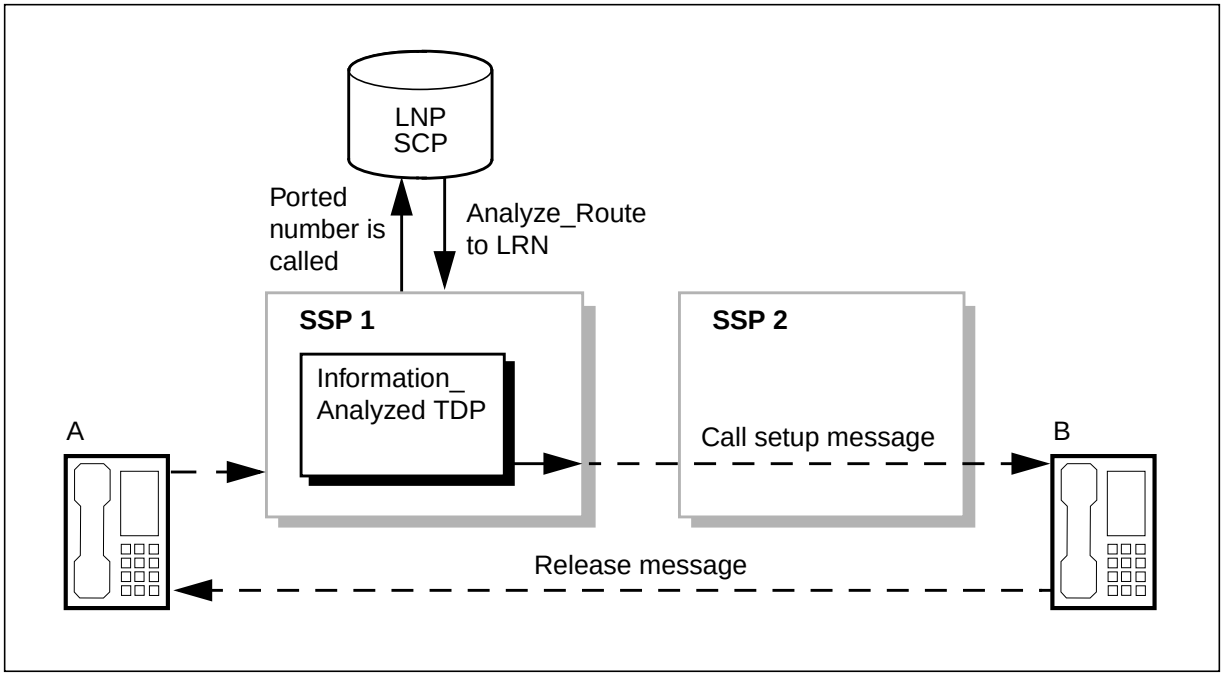
There are two types of call forward programming. The courtesy call variants of call forward programming set up a call to the forwarding number as validation of the call forward programming. The other types of validation do not actually set up a call.

11.3.16.4 LNP interactions

If the forward-to number belongs to a portable NPA-NXX then LNP processing takes place and the call is routed using the LRN. If the call fails to terminate, then a release message is propagated backwards which contains an

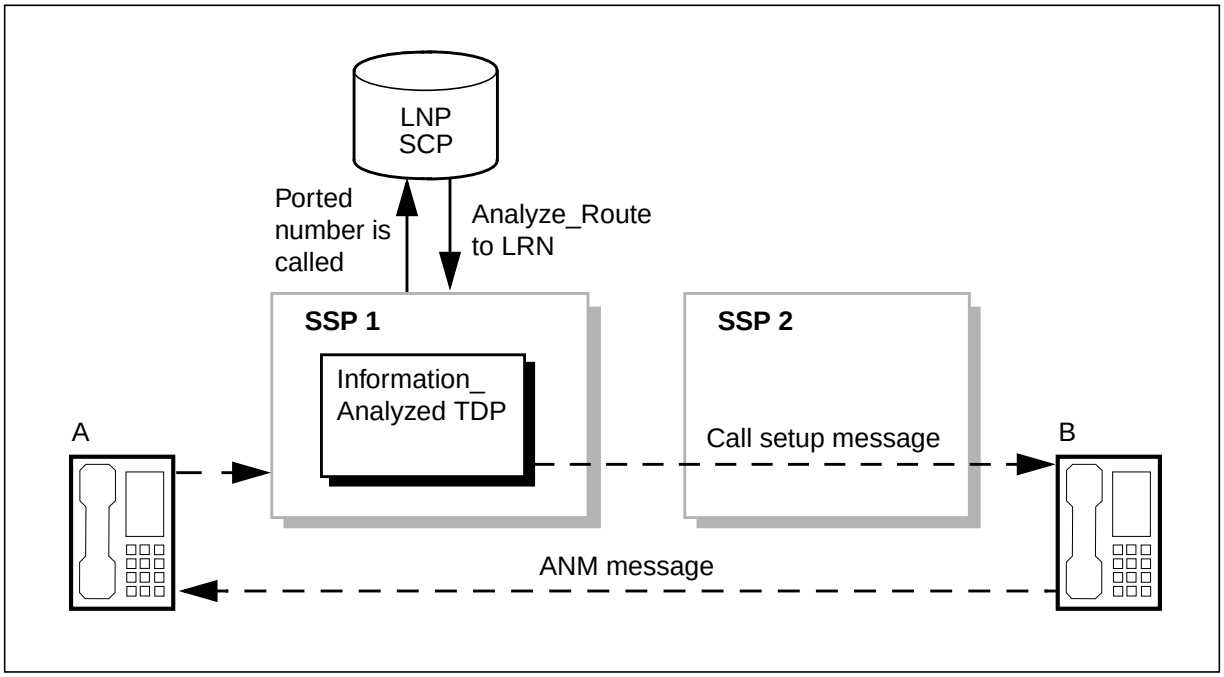
appropriate cause value. Call forward validation and the call forward programming fail in this case. This is illustrated in the following figure.

Figure 11-6 Call cannot route using LRN - Call forward programming fails



Otherwise, if the call successfully routes using the LRN and is answered, then an ANM message is propagated backwards, and call forward validation is deemed to be successful. This is illustrated in the following figure.

Figure 11-7 Call successfully routes using LRN - Call forward programming passes

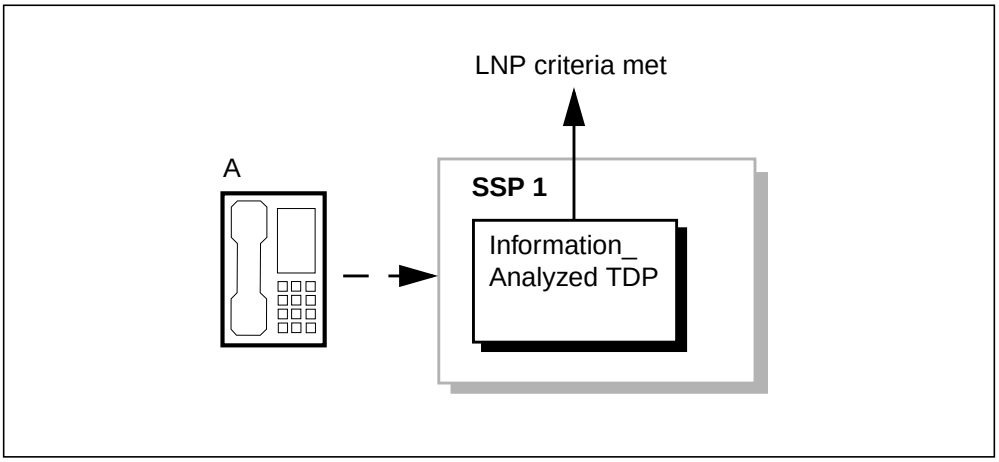


If the call successfully routes using the LRN and terminates but is not answered, then an ACM message is propagated backwards. However, call forwarding validation fails since the call is not answered. If the same call is attempted a second time, this forces validation to be successful.

11.3.16.5 Routing validation without termination

When a call is forwarded to a number belonging to a portable NPA-NXX, then when criteria for the LNP processing are met, the validation is deemed to be successful. LNP query processing is not initiated.

Figure 11-8 Call successfully routes using switch data - Call forward programming passes



If the LNP trigger criteria are not met, then call forward validation continues as if LNP were not involved in the call.

11.3.17 Call Logging

Call Logging (CALLOG) provides a switch based Incoming Callers List (ICL) to CLASSPLUS customers. This feature is accessed by dialing an activation code, and then viewed using softkeys on the subscriber set. This service can log the caller's name and or number, time and date, the number of times the caller has called, whether the call was unanswered, forwarded, or busy, and whether this call has been viewed by the subscriber.

Callog functionality with ported numbers is the same as with non-ported numbers.

11.3.18 Call Messenger for RES

Standard Call Messenger for RES (CMSG) allows one to leave a message with the last dialed number. Typically if one receives busy treatment, or the call was not answered one activates the SCMSG feature code and leaves a message.

Intentional Call Messenger (ICMSG) for RES allows a subscriber to activate the feature activation code, enter the DN to which the message is directed after which the message is captured.

Once the initiator of CMSG hangs up, the TOPS position periodically rings the DN it received from the subscriber. Eventually the terminator answers and the message is delivered.

A portable or nonportable DN is able to subscribe and activate the CMSG feature code, and leave a message with either portable or nonportable DNs.

> ***Note:*** CMSG interworking is only supported on the SSP. TOPS interworking with LNP must be available for CMSG to work correctly with LNP as a whole.

For restrictions and limitations on Call Messenger for RES please refer to Section "11.4.1. Call Messenger for RES" on page 95.

11.3.19 Call Party Hold

The Call Party Hold (CPH) option allows a subscriber control over holding and disconnecting a call. The CPH option applies to PBM lines. Intraswitch calls to or from PBM lines with CPH can only be disconnected by the PBM line.

Calls to and from portable numbers may be held or disconnected by a PBM line using CPH.

11.3.20 Call Screening, Monitoring and Intercept

The Call Screening, Monitoring and Intercept (CSMI) feature provides subscribers of a Network Based Answering Service (NBAS) with a means of monitoring and intercepting calls that are being handled by the NBAS. The goal of the feature is to enhance the functionality of the NBAS to bring it closer to the functionality that is currently provided with a Telephone Answering Device (TAD). With CSMI, the NBAS subscriber is able to monitor a call that has been forwarded to their voice mailbox in the NBAS. The NBAS subscriber is notified by a ring splash that a call has been forwarded to the NBAS and can be monitored. Call monitoring enables the NBAS subscriber to listen to a message as it is being recorded, without the calling party being aware that their message is being monitored. The NBAS subscriber can then connect to a monitored call so that they and the calling party can converse.

CSMI feature can be activated when the subscriber's NBAS is a ported number or belongs to a portable NPA-NXX native to the subscriber switch. The CSMI functions correctly after LNP triggering is encountered. A CSMI subscriber can be a ported number and screen calls originated from ported DNs.

11.3.21 Call Transfer

Call Transfer allows the subscriber to redirect a call to another party.

Single Button Transfer is currently not supported by LNP.

A Call Transfer (CXR) subscriber can be a portable or ported number, and can transfer calls to another DN, which may or may not be ported.

A user is able to transfer incoming calls to a portable or ported number. If the DN is not resident, the SSP shall employ standard LNP processing. A portable or ported number is able to complete a call that encounters Call Transfer.

11.3.22 Call Transfer Warning

The Call Transfer Warning (CTW) option, assigned on customer group basis or individual line basis, provides lines assigned to the customer group with a series of distinct warning tones to alert conferees in a three-way call or call transfer that the controlling (transferring) party is still connected to the call. This prevents a situation where the controlling party can monitor a conversation without the knowledge of the other two parties.

CTW is supported on calls made to and from portable DNs.

11.3.23 Call Waiting features

Call waiting allows a user to be in a conversation, and to receive a second incoming call. The user is notified that there is a second incoming call.

If a DN has been ported or is not ported, but belongs to a portable NPA/NXX, it is able to:

- if busy, accept calls through call waiting
- chain together and to non-ported DNs using CWC (Call Waiting Chaining)
- impose call waiting on a busy member of its customer group unless that busy member subscribes to CWX (Call Waiting Exempt)
- if busy, have Call Waiting imposed on it by another member of its customer group (Ported or Unported) unless it subscribes to CWX
- if busy, cancel Call Waiting for the duration of the call that CCW was activated
- impose Call Waiting on a busy member of its customer group unless that busy member subscribes to CWX
- if busy, have Call Waiting imposed on it by another member of its customer group unless it subscribes to CWX
- if busy, block call waiting attempts from originators subscribing to Dial Call Waiting and Call Waiting Originating
- if the call waiting controller hangs up while there is another call waiting, the controller receives a reminder ringing tone that there is a call. (Distinctive Call Waiting Ringback - CWR).

Note: Intra-group call waiting and Distinctive Call Waiting Ringback do not have any interactions with LNP. Only features involved with call setup in the public network have interactions with LNP.

Call Waiting features supported by LNP are as follows:

- Call Waiting (CWT)
- Call Waiting Chaining (CWC)
- Call Waiting Exempt (CWX)
- Call Waiting Originating (CWO)
- Cancel Call Waiting (CCW)
- Distinctive Call Waiting Ringback (CWR)
- Dial Call Waiting (CWD)
- Call Waiting Intragroup
- Call Waiting Auto-Suppression

11.3.24 Call Hold

A station with Call Hold assigned cal hold a single call for any length of time, as long as neither party goes on-hook. This allows the station with Call Hold to perform other tasks (such as speed call programming, call forward activation, or call pickup) while a call is being held. To return to the held call, the station with this feature must reactivate Call Hold.

11.3.25 Calling Line Identification Display

Calling Line Identification Display (CLIDSP) provides flexibility in defining the format of the calling line address for display on business sets equipped with a display.

LNP processing is transparent to the operation of Calling Line Identification Display (CLIDSP). Calls from ported DNs which terminate on CLIDSP subscribers result in the correct calling party information being displayed to the CLIDSP subscriber. The CLIDSP subscriber may be ported without affecting CLIDSP functionality.

11.3.26 Calling Line Identification with Flash

The Calling Line Identification with Flash (CLF) option allows a subscriber to hold an incoming intraswitch call by flashing the hook switch and staying off-hook. The DMS-100 generates an alarm at the central office and a log report after receiving the hook switch flash. The log report contains the originating DN (for line to line calls) or the CLLI of the incoming trunk (for trunk to line calls). The CLF option enables the operating company to trace the call back to the originating party.

Intraswitch calls made to and from portable DNs may be held and logged by the CLF feature. Interswitch calls to and from portable DNs may be logged by the CLF feature. LNP processing does not impact the operation of the CLF feature.

11.3.27 Calling Number Announcement

The Calling Number Announcement (CNA) feature allows operating company personnel to dial an access code from a line in order to hear the DN associated with that line.

CNA can be used on ported DN.

11.3.28 Charge Option BRAFS

The Charge Option BRAFS (CHG) option allows the operating company to provide the charge number as the calling number when the latter is not available for delivery to the enhanced service provider.

CHG functionality is supported on calls made to and from portable DNs.

11.3.29 CLASS features

Some CLASS features require global title routing changes in the STP for ported out numbers.

Note: It is strongly recommended that 10-digit Global Title Translations be used for Class DN validation.

11.3.29.1 ACB/AR Scans Entire Hunt Group

The ACB/AR Scans Entire Hunt Group feature allows ACB/AR feature activations to work with multiline hunt (MLH) groups, distributed line hunt (DLH) groups, and directory number hunt (DNH) groups. The LOD and LOR options are not considered while scanning the Hunt group for a Idle member.

ACB/AR Scans Entire Hunt Group behaves the same with ported numbers as with non-ported numbers.

11.3.29.2 Anonymous Caller Rejection

The Anonymous Caller Rejection (ACRJ) feature allows a subscriber to reject calls from callers who suppress the display of their name or directory number. Instead of reaching the subscriber, anonymous calls are routed to an announcement.

Calls with a suppressed name or directory number which encounter LNP and route to an ACRJ subscriber are rejected.

If the ACRJ subscriber previously used the privilege of a full ISUP trunking office before porting, and ports to a PTS/ISUP office, then calls which would be rejected before porting may not be rejected now. This depends on whether the call originated from an ISUP or PTS trunk.

11.3.29.3 Automatic Callback

Automatic callback (ACB) is a CLASS feature that allows a subscriber to monitor, terminate, or both on the previous called DN when they achieve idle status. ACB utilizes CCS7 signaling to monitor the idle status of an agent when that agent resides on a foreign switch.

Intra-switch calls do not launch an LNP Query for ported or non-ported DNs as the DN acted upon by ACB/AR is resident. Intra-switch calls do not make use of the ACB look ahead. Normal intra-switch ACB call processing is performed on the applicable Call memory block DN.

Inter-switch ACB calls launch an LNP query if the DN is non-resident or resident with the PORT option assigned.

ACB look-ahead does not trigger at LNP, instead it is up to the CLASS network to perform 10 digit Global Title Translations to determine the host switch for the DN to be monitored by ACB.

Regardless if the SOC option AIN00018 “AIN ACB/AR Premium” is on or idle, LNP queries shall be launched for ACB initiations.

If SOC option AIN00018 AIN ACB/AR Premium is set to on, all origination triggers and TAT triggers are allowed to occur on the same switch.

ACB works as expected when the ACB number is a ported number that results in an LNP trigger at the switch where the ACB user is located.

When usage sensitive ACB is invoked, a standard Automatic Call Back AMA record with a call code of 330 is generated.

11.3.29.4 Automatic Recall

Intra-switch AR calls do not launch an LNP Query for ported or nonported DNs as the DN acted upon by AR is resident. Intra-switch calls do not make use of the AR look ahead. Normal intra-switch AR call processing is performed on the applicable Call memory block DN.

Inter-switch AR calls launch an LNP query if and only if the DN is non-resident or resident with the PORT option assigned.

AR look-ahead does not trigger at LNP, instead it is up to the CLASS network to perform 10 digit Global Title Translations to determine the host switch for the DN to be monitored by AR.

Regardless if the SOC option AIN00018 “AIN ACB/AR Premium” is on or idle, LNP queries shall be launched for AR initiations.

AR utilizes CCS7 signaling to monitor the idle status of an agent when that agent resides on a foreign switch.

Current AIN Essentials requirements specify that calls originated by the Automatic Recall feature cannot successfully encounter a PODP or TAT trigger on the same switch. AR interworks smoothly with the LNP trigger. This requirement is satisfied regardless of the status of the SOC option AIN00018 AIN ACB/AR Premium.This requirement is satisfied regardless of the status of SOC option AIN00018 AIN ACB/AR Premium.

AR works as expected when the number being recalled is a ported number that results in an LNP trigger at the switch where the AR user is located.

When usage sensitive AR is invoked a standard Automatic Recall AMA record with a call code of 330 is generated.

11.3.29.5 Automatic Recall Limited to 1

When the Automatic Recall Limited to 1 (AROO) feature is in effect one can only use AR once to terminate on the last caller. When a termination occurs,

subsequent termination attempts have treatment applied. Whether the originator is ported or non-ported, AROO allows only one AR termination to a portable DN. See also Section 11.3.29.4 , “Automatic Recall,” on page 31.

11.3.29.6 Automatic Recall Blocking of Private Calls

The CLASS Automatic Recall Blocking of Private Calls (CABOP) feature gives the functionality to prevent the disclosure of a private directory number (DN) upon an Automatic Recall activation attempt. A private call is considered to be a call originated from a station that disallows the disclosure of the calling number to a connected party. All AR activated calls that would generate a record of the private number on the AR subscriber’s AMA Billing record are blocked, that is, they are sent to treatment. The set of AR subscribers equipment can include both RES lines and Centrex lines.

The AR originator is sent to treatment on activation of an AR attempt that would generate an AMA record containing the DN of any private DN found in the incoming memory block. This holds true even if the incoming DN is routed to a portable agent by an LNP query.

11.3.29.7 Bulk Calling Line Identification

The Bulk Calling Line Identification (BCLI) feature allows service providers to deliver key information about incoming calls to the premises of individuals (or groups of subscribers) for immediate use, or for storage and later retrieval.

Data provided includes the following:

- the date and time the call was received
- the calling and called directory numbers
- the busy/idle status of the called line
- the calling line type

The information is sent to the customer’s printer, computer, or other computer premises equipment on a BCLID data link that uses CLASS Modem Resource (CMR) technology.

Calls triggering on LNP before being routed to a portable number have the BCLID information captured on some sort of print device if BCLID is assigned to that ported number. The Calling and Called Directory number appear in the information. LRN info does not appear in the BCLID output.

11.3.29.8 Calling Name and Number Blocking

The Calling Name and Number Blocking (CNNB) feature suppresses an originator’s name and number to the terminator.

An originator call, ported or nonported, that activated CNNB and encounters an LNP query, does not have its name and number displayed on the portable terminator.

11.3.29.9 Calling Name and Number Display

The Calling Name and Number Display (CNND) feature provides a subscriber to this feature with the calling name and number of incoming calls to their set. This functionality may override group restrictions but not network restrictions.

If an originator, ported or nonported, encounters an LNP query and terminates on a portable DN, then the originator's name and DN are available to the terminating set as long as there are no presentation restrictions applicable to the originators DN.

11.3.29.10 Calling Name Delivery

A node contains a Residential Centralized Data Base that contains name and number information. When an originator on a node subscribes to Calling Name Delivery (CNAMD) - TR1188, a terminator on that same node may retrieve that information.

An Originator, ported or non-ported, is allowed to have its name and DN information stored in the residential centralized data base, so that after an LNP query a ported terminator is able to retrieve the data base information on the originator.

Note that TR1188 is intra-nodal. Once a DN ports to another service provider there is no reasonable way to allow interaction between the donor and the recipient switch's database.

11.3.29.11 Calling Name Delivery - Nodal

Calling Name Delivery (CNAMD) Nodal is similar to CNAMD - TR1188 except that it is internodal since the database is not centralized to a specific node.

An Originator, ported or non-ported, can have its name delivered to a portable DN after an LNP query.

11.3.29.12 Calling Name Delivery Blocking

Network suppression always takes precedence over the Calling Name Delivery Blocking (CNAB) feature. Network suppression is enabled by datafilling option SUPPRESS in table NETNAMES.

If the SUPPRESS_NAME refinement is set to Yes (Y) in either of tables DNGRPS or DNATTRS, and assigned to either a line or customer group, then a DN's name is unsuppressed by invoking CNAB. If SUPPRESS is not assigned, then a DN name is suppressed by invoking CNAB.

If the SUPPRESS_DN refinement is set to Y and assigned to either a line or customer group, then a DN number is able to be unsuppressed by invoking CNAB. If SUPPRESS is not assigned, a DN number is able to be suppressed by invoking CNAB.

Depending on how CNAB is set, following an LNP query the ported terminator may or may not be able to obtain the originators name and number depending on how the information described above.

11.3.29.13 Calling Number Blocking

The Calling Number Blocking (CNB) feature is activated when originating a call, thus preventing the terminating set from receiving its DN.

A portable terminator on a call that encountered an LNP query and where the originator activated CNB does not have access to the originator's DN.

11.3.29.14 Calling Number Delivery

DNs subscribing to Calling Number Delivery (CND) are able to receive a Calling Parties DN.

A portable terminator subscribing to CND is able to receive the originator's DN, even if the call routed to the terminator by an LNP query.

11.3.29.15 Calling Number Delivery Blocking

If a DN activates Calling Number Delivery Blocking (CNDB), then its number follows the same rules for display as Calling Name Delivery Blocking (CNAB).

A terminating agent that has a portable DN is not able to display the DN of an originator with CNDB activated, even though it was routed through an LNP query.

When usage-sensitive CNDB is invoked, a standard CNDB AMA record with a call code of 330 is generated.

11.3.29.16 Customer Originated Trace - MDC

When a subscriber activates Customer Originated Trace (COT) the operating company is allowed to capture the calling DN, and information on whether the call was out of area for an incoming call.

If a ported or nonported DN is originating a call to a portable DN that has activated COT, then the directory number of the DN and information on whether the call was out of area is captured by the operating company even though the call was routed to the terminator by an LNP query.

In the case of a ported originator, the number is uniquely identified by a new COT log field that displays the JIP of the originator. JIP information is

displayed for all originators, ported or non-ported, as long as the LNP00200 SOC is active. If the SOC is inactive the JIP information does not apply.

If the COT subscriber ports to a switch that is fed only by PTS incoming trunks, calling information may not be retrieved.

When usage-sensitive COT is invoked, a standard COT AMA record with a call code of 330 is generated.

11.3.29.17 Dialable Directory Number Delivery

DNs subscribing to Dialable Directory Number Delivery (DDN) are able to have numbers displayed in a dialable format.

Ported and nonported DNs have their numbers displayed on portable terminating set in a dialable format, even though the call was routed by an LNP query.

11.3.29.18 CLASS Message Waiting Indicator

Any ported and non-ported DN subscribing to CLASS Message Waiting Indicator (CMWI) has its message waiting indicator activated when a message has been queued against it.

When a ported or non-ported DN queues a message on a set that subscribes to CMWI then that set has its message waiting lamp activated.

11.3.29.19 CMS Network Access Control Interface

CMS Network Access Control Interface (CMS-NAC) allows DMS subscribers to receive CMS messages from SPC switches.

SPC switches are unable to interact with LNP properly, as SPC switches do not have the capability to provide LNP processing. An SPC switch also lacks the ability to process an LRN, therefore porting numbers to an SPC would add some level of complication.

Any ported or non-ported DN within a CMS (Call Management Services) network from a DMS-100 CMS/CLASS central office to that same office or to another DMS-100 CMS/CLASS central office is still able to subscribe to CMS services. A DN ported from a SPC (Stored Program Control) switch to a DMS-100 CMS/CLASS central office within a CMS network is able to subscribe to CMS services.

11.3.29.20 Long Distance Indicator Enhancement

If it is necessary to prefix dial 1+10 digits to get back to an incoming DN, then the Long Distance Indicator (LDI) field in the incoming call memory block is updated as a long distance call for an incoming portable DN.

A ported DN that receives an incoming call from a DN that would require 1+10 digits to be dialed has its Long Distance Indicator field in the ICM updated, even though an LNP query was launched before the call was routed to the terminator.

11.3.30 Conference features

Conference features allow end users to initiate a conference call. Once established, users can be added to or dropped from the conference call.

For the following conference features, a subscriber with a ported DN can initiate, add to or drop from the conference call using existing conferencing procedures and standard LNP processing:

- Three-Way Calling (3WC) - Maximum 3 parties
- Universal Three-Way Calling (U3WC)
- Six-Port Conference (CONF6) - Maximum 6 parties
- Add-on/Consultation Hold Incoming Only
- Executive Conference
- Meet-me Conference
- Super Conferencing - Maximum 30 parties
- Station-Controlled Conference
- Preset Conference

11.3.31 CLID Screening per Trunk Group

CLID Screening per Trunk Group (CLID) enhances the DMS-100 Primary Rate Interface (PRI) Calling Number Delivery (CND) service by providing the capability to suppress or override the presentation of the calling party number on all incoming call types on a PRI trunk.

Calling Party Number presentation on calls to and from portable DNs is suppressed or overridden subject to CLID Screening per Trunk Group. The operation of CLID Screening per Trunk Group (CLID) is unaffected by LNP processing.

11.3.32 Code Call Access

Code Call Access (CDCL) is an intra-customer group feature which allows stations to gain access to end user-provided code call equipment by dialing an access code and a called party code. The called party code is sent to the code-call equipment. The code-call equipment activates an end user-provided visual/audible signaling device to alert the called party. The called party can be connected to the calling party by dialing a code-call pickup code from any MDC subscriber in the same customer group.

Since Code Call Access is an intra- customer group feature only, there is no interaction with LNP. Stations belonging to a portable customer group can use Code Calling Access to access code call equipment.

11.3.33 Code Restrictions

The Code Restriction (CRL) feature denies or allows selected station lines and network access trunks the ability to complete outgoing exchange network calls to selected office codes or area codes. The restricted calls are routed to the attendant, an announcement, or a tone on an individual end user basis.

Calls to and from portable DNs are subject to Code Restrictions.

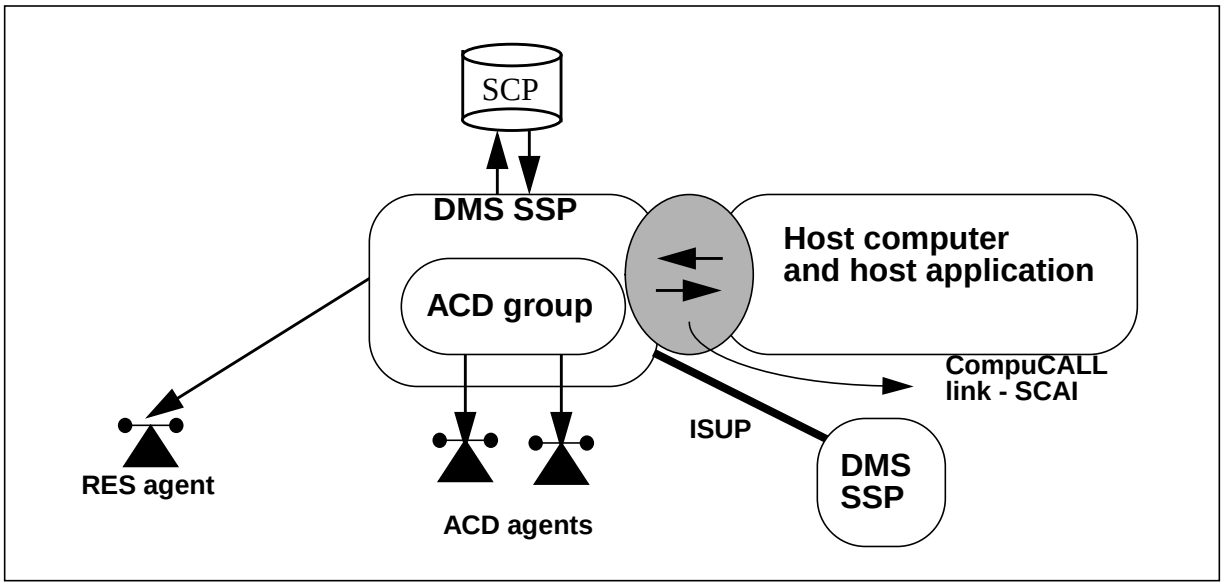
11.3.34 CompuCall/SCAI

CompuCall provides an intelligent link between an end user's host computer and a DMS-100 switch. This link makes it possible for an operating company to coordinate information with incoming and outgoing telephone calls, allowing a subscriber to receive a telephone call and simultaneously receive related information on a data screen. This is accomplished through switch-to-host messages providing information about the call and caller.

CompuCALL performs functions on behalf of resident directory numbers only. If agents or an entire customer group port to a recipient switch, CompuCALL on the recipient switch must be equipped similarly to that on the donor switch. Ported, non-portable, and portable-non-ported agents are all treated seamlessly by CompuCALL.

The following figure shows an overview of the CompuCALL and LNP configuration.

Figure 11-9 CompuCALL and LNP configuration overview



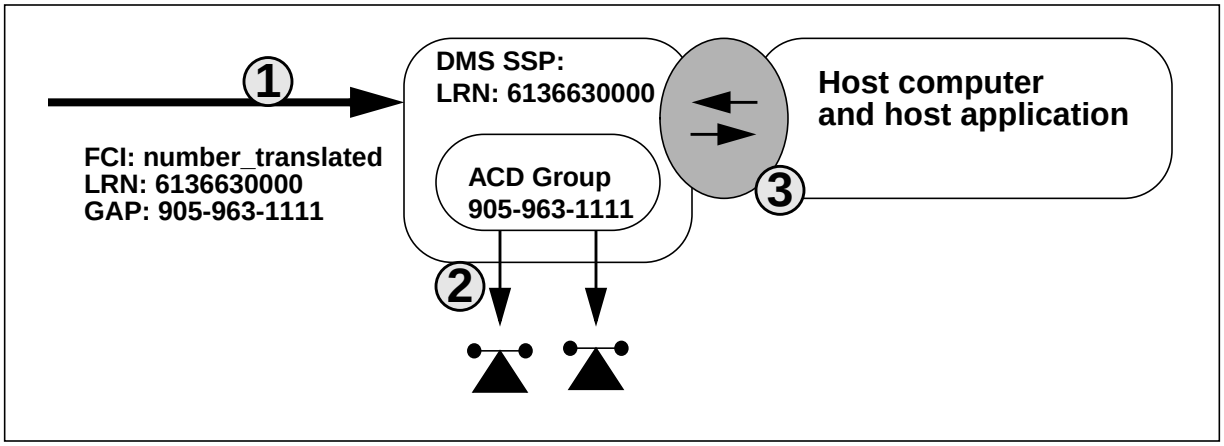
11.3.34.1 Third Party Agent Control

ACD agents controlled by CompuCALL TPAC can be ported, non-portable, portable-non-ported.

11.3.34.2 Coordinated Voice and Data

The following figure shows the call flow for a call to a ported number in an ACD group.

Figure 11-10 Call to a ported in ACD group



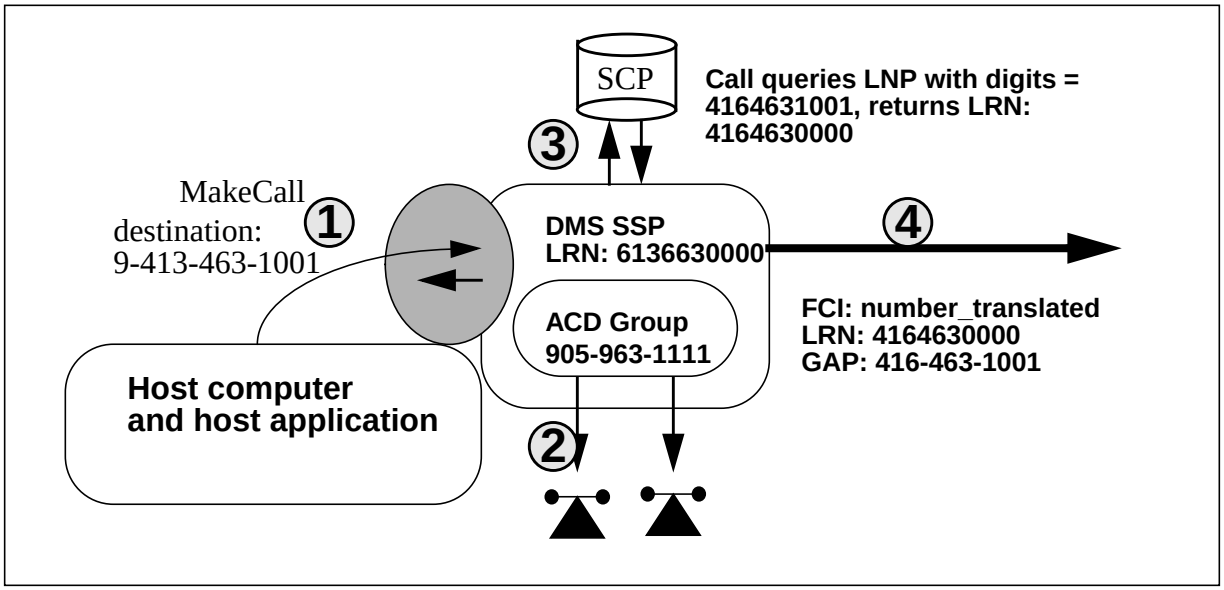
Incoming calls to an ACD group may or may not have LNP information. The call flows as follows:

1. LNP information is removed through Ported-DN-termination translations.
2. Call completes to the ACD group.
3. A SCAI message is then sent to the host computer. Once a call is received by the ACD group, the call is presented to the first available agent, or queued if no agent is available.

11.3.34.3 Third party call control

The following figure shows the call flow for third party call control.

Figure 11-11 MakeCall or AddParty to a public LNP number



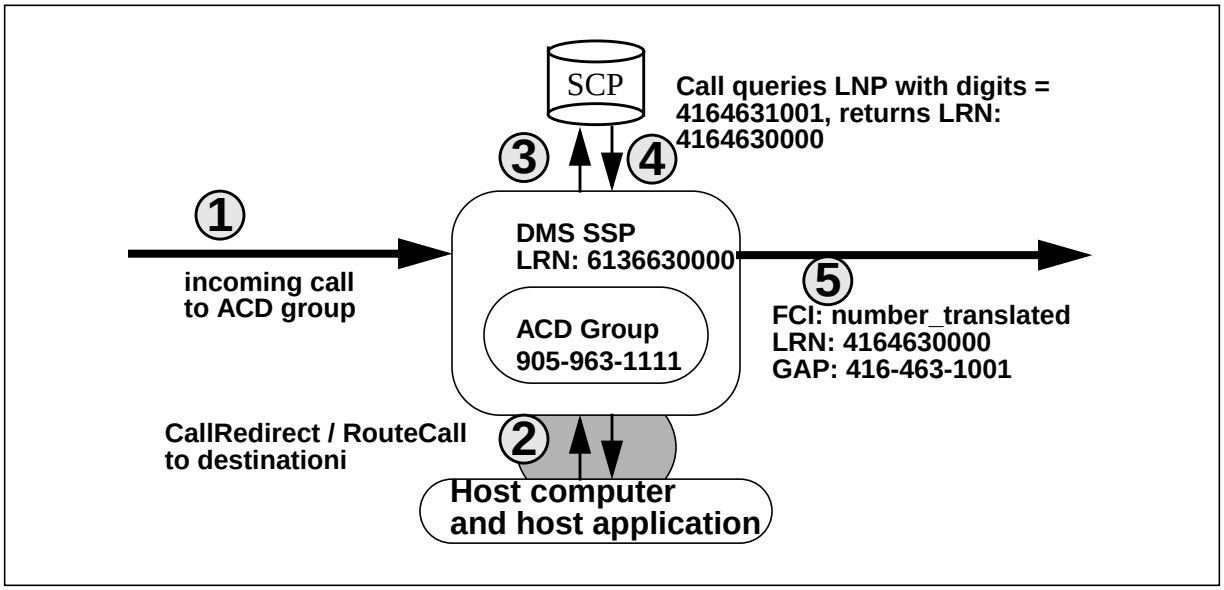
Outbound calls made by CompuCALL on behalf of an agent to the public network can now encounter LNP. This is consistent with the same agents dialling the number manually. The call flows as follows:

1. MakeCall is initiated on behalf of an agent, the digits are translated and determined to query LNP.
2. The agent receives ringback.
3. If the agent goes off-hook, the call is made, queries LNP
4. Call is routed to the recipient switch.

11.3.34.4 CallRedirect and RouteCall

The following figure shows the call flow for CallRedirect and RouteCall.

Figure 11-12 CallRedirect and RouteCall



CompuCALL can also redirect calls using CallRedirect and RouteCall. Redirected calls made to the public network can now encounter LNP.

RouteCall routes calls that are waiting in a queue to be answered, although CallRedirect redirects an incoming call once it is received by the ACD group. The call flows as follows:

- An incoming call to an ACD group is redirected (using CallRedirect) by the host computer. (Step 1 and 2)
- Translations are performed and the call queries LNP, the LRN is returned. (Step 3 and 4)
- Call is routed to the recipient switch. (Step 5)

This activity does not change the current methods or rules of parameter population of the CallRedirect or RouteCall messages.

The LNP query parameters are populated as follows:

- Userid: ACD number
- Charge Number: ACD number
- Calling Party Number: True originator
- Charge Party Station Type: 00, Identified Line

In the case of CallRedirect, LNP billing does not use the BILLDN field of option SCAIREDIR in table ACDGRP.

11.3.34.4.1 Billing considerations

Current SMDR billing for CallRedirect is unaffected. CompuCALL, CallRedirect and RouteCall do not create any redirection information in any ISUP messages.

11.3.34.5 Interaction between CompuCALL and LNP

The following table shows the SCAI messages and the interaction with LNP.

Table 11-2 CompuCALL interaction with LNP

SCAI message	Interaction with LNP
DV-CALL-OFFERED-U	None
DV-CALL-ANSWERED-U	None
DV-CALL-RELEASED-U	None
DV-CALL-QUEUED-U	None
DV-MAKE-CALL	Yes
DV-ADD-PARTY	Yes
DV-CONFERENCE-PARTY	None
DV-TRANSFER-PARTY	None
DV-DROP-PARTY	None
DV-ROUTE-CALL	Yes
DV-REDIRECT-CALL	Yes

11.3.34.6 TRAVER and CompuCALL

TRAVER is not aware of CompuCALL. As a result, it cannot distinguish between calls made manually or calls made on behalf of an agent using CompuCALL.

> ***Note:*** As a result of this, TRAVER displays the encountering of all applicable AIN triggers for a given CompuCALL agent.

TRAVER displays the correct output as if the CompuCALL agent had an outcalls DN, went off hook, and dialled the number manually without the use of CompuCALL.

11.3.35 Critical Path Restoration

Critical Path Restoration (CPR) provides the ability for a datapath call to be re-established automatically if it is disconnected due to power loss, switch

reset in the customer premises equipment (CPE), or other inadvertent network disruption.

CPR is automatically re-established calls to and from portable Data Units (DUs) if they are inadvertently disconnected.

11.3.36 Customer Dialed Account Recording (CDAR)

This feature is identical to the IBN Account Code feature and requies only that CDAR data be added to the normal AMA data generated for a call. When CDR data is added, for any call type, the first digit of the structure code is modified to account for CDAR functionality.

11.3.37 Datapath - Closed User Group

A Closed User Group (CUG) provides a measure of security for circuit-switched data subscribers, implementing a virtual “private network”, by restricting access into and out of a predefined group of data lines while allowing members of the group to communicate with each other. The groups are established and the restrictions are imposed by the network supplier at the request of subscribers.

The Datapath User Group feature is based on the CUG facility provided with the Circuit Switched Digital Data Service(CSDDS)1. In that implementation, each data line is a member of one CUG. For each CUG, a list of “compatible” CUGs, or groups which it may communicate with, is maintained. During call set-up the DMS-100 switch checks the CUG numbers of the originator and terminator, and decides if the call should be allowed to proceed.

Inter- and intra-office LNP calls to a ported number complete normally without affecting CUG functionality.

11.3.38 Deluxe Spontaneous Call Waiting Identification

The Deluxe Spontaneous Call Waiting Identification (DSCWID) feature allows a subscriber to receive caller identification information for a Call Waited (CWT) call. DSCWID allows the subscriber to control the disposition applied to incoming calls while an off-hook stable call exists.

LNP processing is transparent to the operation of DSCWID. Calls from ported numbers are displayed in the same manner as calls from non-ported numbers. A ported DSCWID subscriber can control the disposition of an incoming call from a ported DN. A DSCWID subscriber can port without affecting DSCWID functionality.

11.3.39 Denied Incoming

The Denied Incoming (DIN) feature prevents a customer group member from receiving calls originating from outside the user’s customer group. The

incoming calls that are denied include all calls incoming through trunks except those calls incoming through trunk groups that are flagged as intragroup only.

Calls from outside the customer group cannot terminate on a DIN subscriber belonging to a portable customer group. Calls from ported DNs cannot terminate on a DIN subscriber unless the originator belongs to the same customer group.

11.3.40 Direct Inward System Access

The Direct Inward System Access (DISA) feature gives an outside caller (POTS or other customer group) complete access to the facilities of an IBN customer group. Typically, the outside caller dials an authorization code to provide identification. The Network Class of Service (NCOS) associated with the authorization code is then assigned to the call, and the caller is limited to the customer group facilities that are associated with that NCOS.

A DISA DN can be ported as long as the customer group it belongs to also ports. If the DISA number is portable, the user can reach it by standard LNP processing. After terminating to a DISA number, the user can reach portable public DNs through standard LNP processing. Destination digits that do not access the public network do not encounter LNP processing.

11.3.41 DISA Reorigination

DISA Reorigination allows users to place multiple calls through DISA without having to redial the DISA DN and the Authorization Code each time. After each call made through DISA, the user can press the Reorigination key, and again receive dial tone in order to place another call.

DISA Reorigination to ported numbers encounter LNP triggering both at first and subsequent reoriginations. If a call is made to a DN belonging to a portable NPA-NXX and native to the terminating switch through DISA, then no further reoriginations are allowed.

11.3.42 DISA Reset Dialing

The DISA Reset Dialing feature is provided after accessing the switch through DISA while dialing the Authorization/Account Code digits, or the destination digits. When a DISA user enters an incorrect digit, the Reset key can be used to begin dialing again without having to redial the DISA DN.

DISA Reset Dialing may be invoked when using DISA to dial a portable DN.

11.3.43 Distinctive Ringing

The Distinctive Ringing (DRING) feature is used to identify certain call types by applying a distinctive ringing cadence to calls terminating on an MDC station. The call types that can be identified include Intragroup, Intergroup, Interswitch Intragroup, and Other.

Calls to and from portable DNs are subject to identification by the Distinctive Ringing feature.

11.3.44 Dynamically Controlled Routing

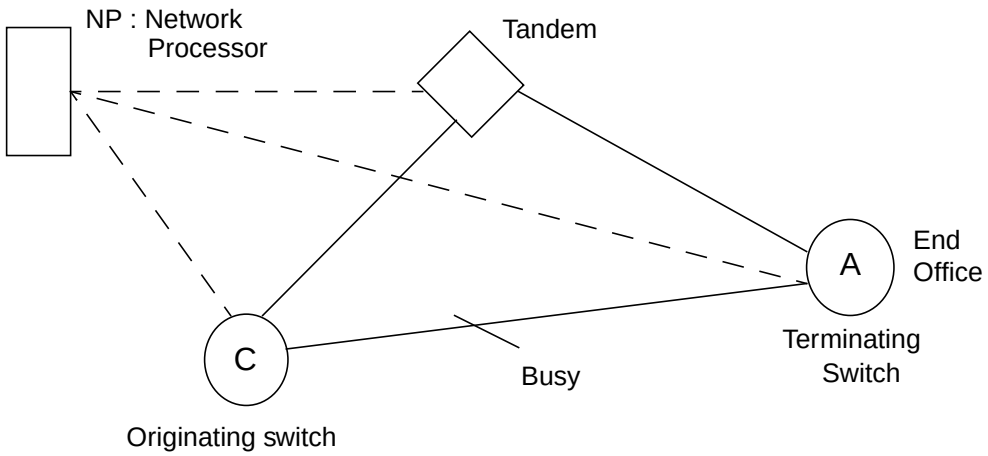
The Dynamically Controlled Routing (DCR) feature provides the capability to dynamically re-route overflowed calls through a new route that is separated by one or two links form an originating switch. The new route is determined by an external node named “Network Processor” (NP). This processor monitors the traffic on the trunk groups and updates table TKTONODE with possible DCR routes. Figure "11-13. A possible DCR network setup" on page 45 displays a sample DCR network. In this network, the direct route between the originating and terminating switch is busy, and a Tandem route is taken based on table TKTONODE.

The DCR blocks the calls from taking routes with more than two links by applying a “HANDICAP”. When a call to a ported number encounters a LNP trigger at the donor or Tandem switch this “HANDICAP” must be removed, otherwise the call may fail based on the available routes. If the call has arrived at the querying switch using a direct link from the originating switch then without this “HANDICAP” removal it is allowed to take only the direct route to the recipient switch (Figure 11-14 on page 45) and if it had arrived at the querying switch using a tandem route, it cannot to be re-routed to the recipient switch.

When a LNP database returns a Foreign Location Routing Number(FLRN) indicating the number has been ported, it must be re-routed based on that number and its pre LNP query routing history shall not limit its usage of DCR tandem routes. This feature removes the “DCR HANDICAP” on these calls and allow them to utilize any available tandem routes.

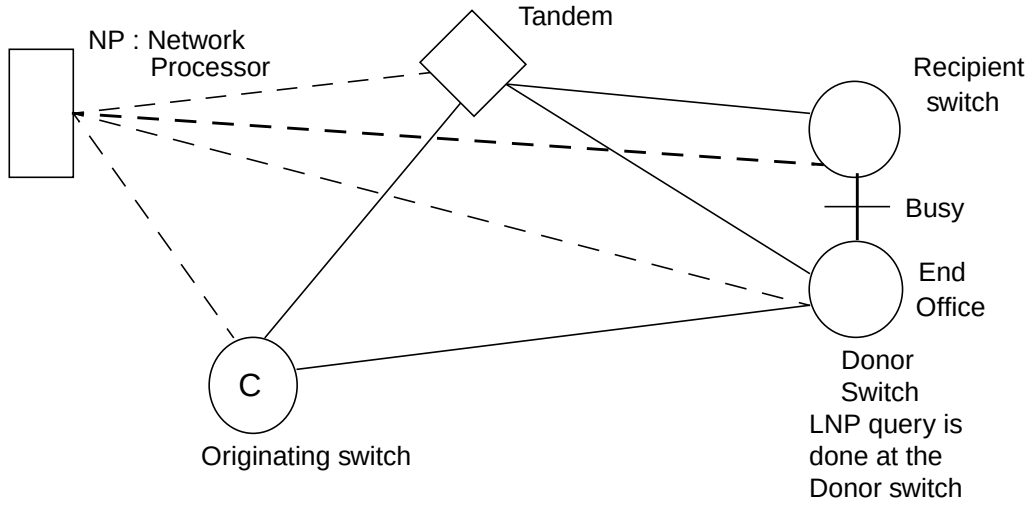
The LNP00200 SOC controls this functionality.

Figure 11-13 A possible DCR network setup



DCR re-routes the call over Tandem switch, since direct link between A to C is Busy or Overflowed.

Figure 11-14 DCR interaction with LNP with Handicap removal



This call is send to treatment, since the direct link between the donor switch and the recipient switch is busy**.**

11.3.45 E911 Automatic Location Identification

The Automatic Line Identification (ALI) option specifies a public safety answering point (PSAP) group member as a position. This position receives subscriber information from an ALI database during 911 calls. The position number must correspond to the position number that the ALI database management system uses.

11.3.46 E911 Line-Ended PSAP

The Line Ended Public Safety Answering Point (LINEPSAP) option allows an MLH, DLH, or DNH group of IBN or MBS lines to connect to an E911 Tandem. These lines connect to an E911 Tandem through a line. The LINEPSAP option is assigned to the Pilot DN of the Hunt Group.

11.3.47 E911 Local Access / Ringback to E911 Callers (RBACK)

E911 Local Access is a line-ended or Line Public Safety Answering Point (PSAP). A Virtual Facility Group is utilized to throttle the amount of calls that terminate at the PSAP instead of using loop around trunks. If a Meridian Business Set with a display is used for the PSAP, the originating DN is displayed. The PSAP may have more than one phone. The PSAP phones are assigned in SERVORD as a IBN HUNT group with the LINEPSAP option.

The ORIGHOLD feature will be activated when an E911 caller goes on-hook before the PSAP operator. The call stays connected and the PSAP operator hears a steady tone. The E911 caller may not disconnect the call, the PSAP operator must go on-hook to terminate the call. This is controlled by the datafill in table VIRTGRPS.

When the ORIGHOLD feature is activated, the PSAP operator may activate the RING-BACK feature (NTXN59AA). If the E911 caller goes on-hook, the PSAP operator presses a Call Transfer Key or hook-flash and then dials the Ring-Back feature activation code. This rings the E911 callers phone until they answer or until the PSAP operator terminates the call. If the E911 caller is not responding to the PSAP operator and the phone is off the hook, the PSAP operator may press a call transfer key or hook-flash and dial the ring-back feature activation code. This sends a Receiver Off Hook (ROH) tone to the E911 callers phone.

11.3.48 Emergency Stand Alone

Emergency Stand Alone (ESA) is an optional emergency service feature which permits local calling within an RLCM/RCC in the event of loss of communication with the host peripheral module (LGC, LTC, or RSC).

While in ESA mode, LNP processing is not encountered and no LNP query is launched since all calls made while in ESA mode are switched within the RLCM/RCC only. Intra-RLCM/RCC calls to and ported DNs can be made during ESA mode.

11.3.49 Enhanced 800

Enhanced 800 (E800) is the U.S. variant of toll-free service. E800 is supported by LNP. The E800 toll-free service is not supported by LNP. See Section 11.3.50 for details of 800Plus interconnecting with LNP.

An E800 response can route a call to a portable number. When a call encounters the E800 toll-free service, the GAP and FCI values are not preserved.

If the E800 response specifies a LEC with a portable number, then standard LNP processing takes place.

If the E800 response specifies an IEC, the call is routed to the IEC. The call does not encounter LNP processing in this office.

If the PRETRAN option is subscribed by E800 in table NSCDEFS for this call type, and the E800 response returns a portable number, then LNP response processing uses the pretranslator subscribed in NSCDEFS if the call type is appropriate.

For example, the PRETRAN option can be subscribed for coin-originated calls or all calls. If LNP response processing is handling a coin-originated call, the subscribed pretranslator is used. The E800 pretranslator is used when an Analyze_Route response is translated in response to an LNP trigger following E800 on the same call leg. During LNP routing, LATA screening is not enforced.

See also Section 11.3.124.4 , “Interactions Between E800/800Plus and Toll Restrictions,” on page 81.

For restrictions and limitations on E800 please refer to Section "11.4.3. E800" on page 96.

11.3.50 800Plus

Additional support for the following 800Plus unique features are provided under the Software Optionality Control option LNP00300 “LNP Canadian Requirements”:

- Enhanced Southbound - Toll-free calls can originate in Canada and terminate in the United States.
- Call Prompter - Toll-free callers can select specific answering locations using interactive prompts.
- Courtesy Response - Plays a voice announcement to Toll-free number callers and receives voice messages from callers.

- Overflow Call Routing (OCR) - Allows up to four alternate terminating DNs, which can be selected based on either Busy or NoAnswer of a DN currently being terminated to.
- End Office Display (EOD) - End Office Display includes DNID (Dialled Number Identification), which provides the subscriber with a display of the Toll-free dialed number ID, and CID (Calling Number Identification), which provides the terminator with the originating DN.

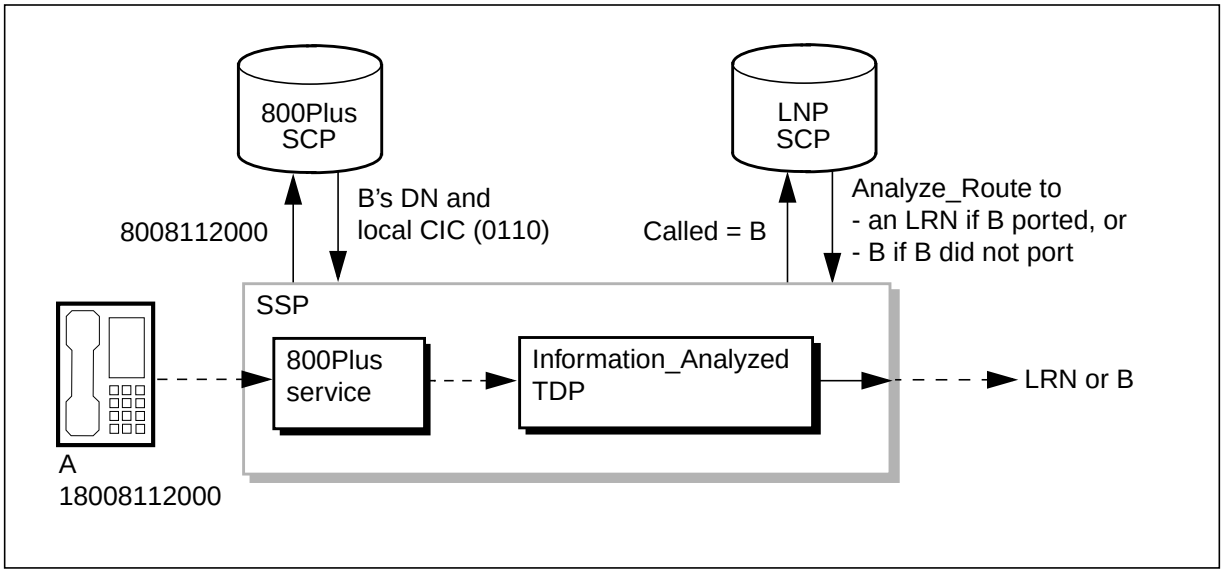
The E800 Service includes the feature 800 Northbound Service, which does the same as Enhanced Southbound in the other direction. This is supported also.

All of these features continue to behave as they currently do, with LNP querying being allowed to occur on the routing number(s). In the case of OCR, the final 800Plus AMA record contains LNP billing information only for the last OCR DN attempted.

In the case of call prompter if CCTO_COMB_Bill is on the billing record does not contain terminating LNP information associated with the DN returned from the 800+ SCP. The terminating LNP information associated with the CCTO DN returned in the ISUP REL GAP is contained in the billing record.

800Plus is encountered in a call prior to the Information_Analyzed TDP where LNP may be engaged. This means that an 800Plus database response can route calls to a portable number as illustrated in the following figure.

Figure 11-15 800Plus response routes call to a portable number



This feature does not make any changes for LNP database queries on a different switch than that used for the toll-free query. Once the response to the

toll-free query has been routed to another switch, the toll-free service is no longer connected to the call, and the call proceeds like a non-toll-free call.

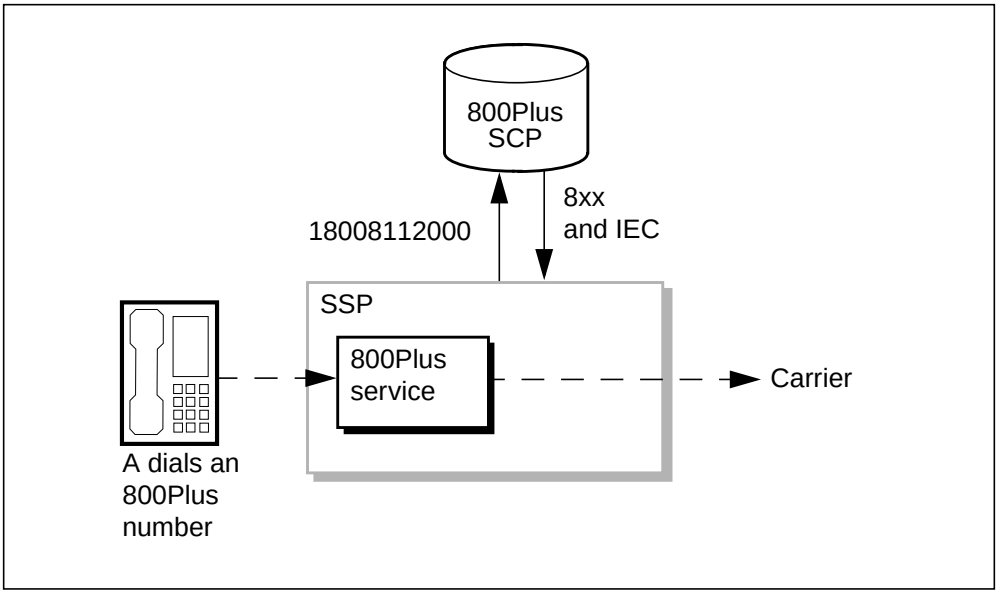
If the 800Plus response specifies a Local Exchange Carrier (LEC) and a portable number, then standard LNP processing is used to route the call.

When the 800Plus query takes place, the Forward Call Indicator is reset. This allows the post-800Plus call handling to route the call to a portable number. This meets requirement for all redirection scenarios.

If the 800Plus response specifies an Interexchange Carrier (IEC) or Originating Toll Center (OTC), the 800Plus SCP normally echoes back the dialed 800 number so that the IEC can perform the 800Plus query. This is what occurs for Southbound calls. The local CIC of 110 is the only value accepted for an LEC call. OTC is always long distance in Canada.

Note in the figure below that the 800Plus trigger takes place and the 800Plus response specifies an IEC. The call is routed according to the 800Plus response to the specified IEC, and the call does not encounter LNP processing in this office.

Figure 11-16 Southbound toll-free calls: 800Plus SCP returns a portable number and an IEC



For restrictions and limitations on 800Plus please refer to Section "11.4.4. 800Plus" on page 96.

11.3.51 EBS Display

EBS Display provides address information pertaining to the parties involved in the call for the purposes of displaying that information to the end user via an Electronic Business Set.

11.3.52 End Office Display

See Section 11.3.50 on page 47

11.3.53 Executive Message Waiting

The Executive Message Waiting (EMW) allows a list of messages to be stored against a subscriber's set. When a calling party attempts to reach a station and hears busy or ringing, or if the call is connected, the EMW function can be used to leave a message on the terminating party's station. This causes the EMW lamp on the terminating party's station to light. The messages can be retrieved by pressing the EMW key. After the message is retrieved, the user is given the option of automatically redialing the caller.

Network Executive Message Waiting provides the same functionality as EMW except that the called and calling parties are resident on different switches while EMW supports intraswitch calls only.

A ported subscriber can leave a message against a portable DN using EMW/NEMW.

11.3.54 Fax-Thru Service

The DMS-100 Fax-Thu Service (FTS) feature is a FAX messaging service which allows the routing of a FAX call, upon detection of a busy or no-answer condition, to an FAX Messaging Platform (FMP).

FTS behaves the same with ported numbers as with non-ported numbers.

11.3.55 Flexible ANI

Flexible Automatic Number Identification allows a subscriber to define the AIN II dgitis that identify a specified type of station. The standard AIN II definition does not cover this type of station. The switch can use the FANI model to fill ChargePartyStationType or CalledPartyStationType when a caller subscribes the FANI option.

11.3.56 Free Number Terminating

The Free Terminating Number option does not allow the system to return a charge that starts a local call. The call must terminate to a line that has this option.

11.3.57 H/M Register Pulsing (RMP)

This feature is assigned to a line that requires meter pulsing to pulse HOT/MOT remote registers. When an offhook occurs, a number of pulses are sent to the meter which represents the surcharge for the call.

11.3.58 Hotel/Motel (HOT)

The HOT option causes an ID digit to be sent to a TOPS OPRERATOR to identify the call as HOTEL originated.

11.3.59 Hunt-based services

Hunt groups provide the ability to determine to complete the call to the first idle member in the hunt group.

Hunt groups are intranodal, that is, all hunt group members must exist on the same switch. The entire hunt group may port, however the members may not port individually and still retain hunting functionality.

When a user dials a portable hunt group pilot or hunt group member, LNP processing is used to route the call. Since hunting is intranodal, once hunting begins, no further LNP processing takes place.

The following hunt group features are supported by LNP:

- Directory Number Hunt (DNH)
- Multiline Hunt (MLH)
- Distributed Line Hunt (DLH)
- Multiposition Hunt (MPH)
- Keyshort Hunt (KSH)
- Preferential Hunting
- Bridged Night Number
- Keyshort Hunt Overflow to Route
- Line Overflow to Route
- Terminating Billing on a Hunt Group (TRMBOPT)

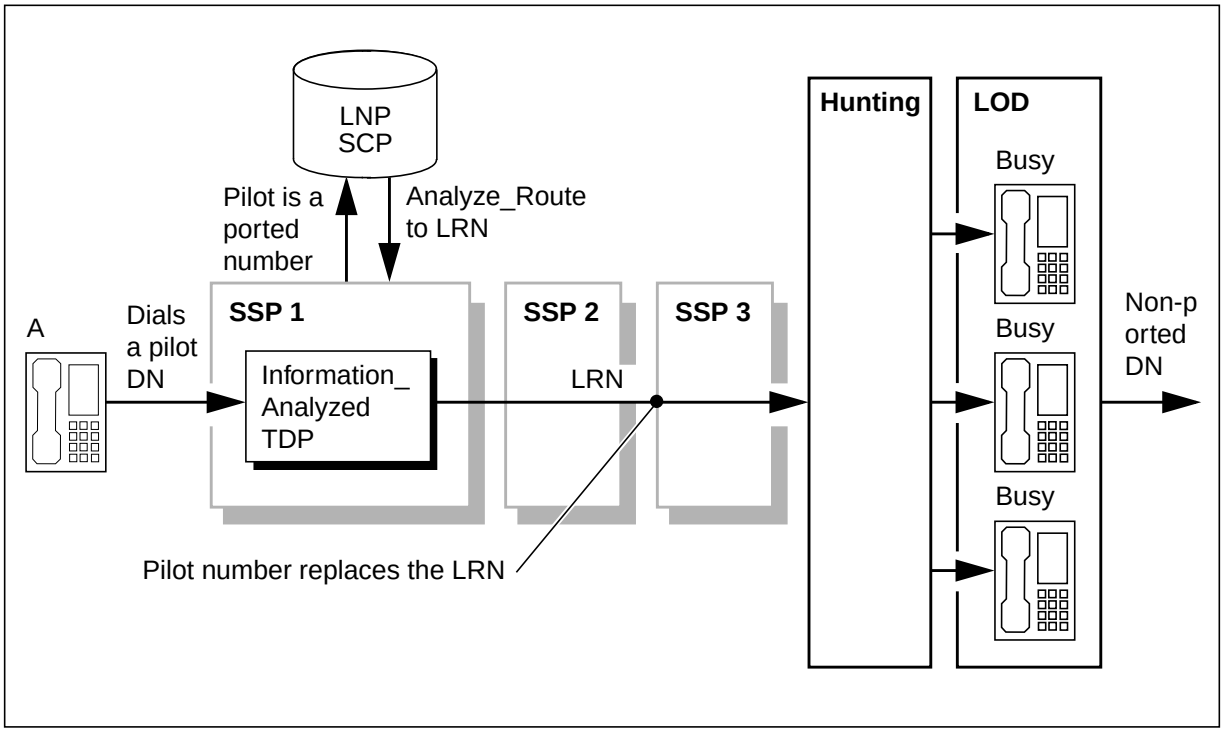
If the user dials a portable hunt group pilot or hunt group member, then standard LNP processing takes place to route the call. Once hunting begins, since hunting is intra-nodal, it is known that the other hunt group members exist on the same switch. LNP does not take place once hunting begins.

When overflow takes place, the LRN information is reset, including the FCI. This prevents the LNP information on the call from being outpulsed.

When overflow to a route takes place, calls are typically routed either to treatment or to an attendant. The call should be routed without encountering LNP processing. This is deemed to be the correct behavior. The FCI and terminating LRN information, if present, are associated with the call to the hunt group pilot number. This information is reset to prevent it from being outpulsed. This is deemed to be the correct behavior.

For overflow to a DN, LNP trigger processing takes place if the DN is a ported number.

Figure 11-17 Ported hunt group pilot and ported LOD number



11.3.59.1 Preferential Hunting

The Preferential Hunting (PRH) feature is one of several types of hunting available. A PRH group of up to 19 members can be assigned within a directory number hunt (DNH) group. Each PRH group member must also be a DNH group member. With PRH, calls made directly to a busy directory number(DN) of a PRH group member hunt over the members of the PRH group before returning to a search of the DNH group. PRH occurs only when the pilot DN of the PRH group is busy.

The PRH feature can be assigned to a ported number which is a member of a hunt group that has been ported. PRH functionality involving ported numbers as its members is the same as with non-ported numbers.

11.3.59.2 Keyshort Hunt Overflow to DN

Keyshort Hunt provides the capability for incoming calls to hunt up over a set of directory number appearances (DNs) on a Business Set/ISDN in search of an idle DN to terminate on.

In the case that no idle DN in the keyset is found, the incoming call is routed to an optional overflow DN or overflow route. If no overflow DN or route is specified, or the overflow route or DN is not idle, busy treatment is returned to the originator.

Keyshort Hunt overflow to a ported DN encounters LNP triggering in both intra- and inter-office calls. The overflow DNs can belong to a portable NPA-NXX native to the keyshort hunt group's switch.

11.3.60 IBN Translations NET Selector

Calls that encounter the NET selector are routed to the public environment. The calls can encounter the LNP trigger and terminate to ported numbers.

NET selector allows access to the following public features:

- Direct Outward Dial (DOD)
- General Network Selector (GEN)

The NET selector also allows calls to route over a dedicated OUTWATS (Outbound Wide Area Telephone Service) facility through the OUTWATS feature. In this case the LNP query is bypassed and the call is routed over an OUTWATS route instead of a public route through LNP query. If a query is required, it is made at the connecting end office.

The NET selector also enables calls in the private environment to use public translations and still remain private. Calls that encounter the following features will not encounter the LNP trigger in public translations:

- Electronic Switched Network (ESN)
- Private Network (PVT)
- Multiswitch Business Group (MBG)
- MBG with Location (LOC)

Also, please note that there is currently an inconsistency for OUTWATS calls: while TRAVER may sometimes show that the LNP trigger is encountered, the actual call does not trigger.

For information on how the NET Selector is affected by Number Pooling Evolution please refer to Section "13.2.2. IBNXLA" on page 3.

11.3.61 Inhibit Line Busy

Inhibit Line Busy (ILB) is assigned to a line in conjunction with Make Busy Key (MBK). When MBK is active, and the line is busy, incoming calls are not forwarded, but receive busy tone instead.

Calls from ported DNs to a busy line with ILB subscribed are forwarded to the specified CFB/CFBL DN. Calls to a busy portable DN with ILB subscribed are forwarded to the specified CFB/CFBL DN.

11.3.62 Inhibit Make Busy

Inhibit Make Busy (IMB) is assigned to a line in conjunction with Make Busy Key (MBK). MBK can only be subscribed to lines which also subscribe to Call Forward Busy (CFB or CFBL). When MBK and IMB are active, an incoming call to that line is not forwarded, but receives busy tone. If MBK is not activated, all incoming calls are forwarded according to normal CFB or CFBL operation.

IMB behaves the same with ported numbers as with non-ported numbers.

11.3.63 Interswitch Voice Messaging, Network Message Waiting Indicator, and Message Waiting Indicator

This feature allows an end user with Station Message Waiting (MWT) to leave a message for another MWT end user on another switch that has a Transaction Capability Application Part (TCAP) communication link. The subscriber is notified of the message either by a Message Waiting Indicator (MWI) lamp or by a stutter dialtone.

Network Message Waiting Indicator is the same as (MWI) but uses TCAP to sent the activate deactivate command to an end user’s set on another switch. When invoked, the DMS determines whether the destination is on the same switch or not and starts MWI or NMWI accordingly. This functionality is not affected by portable numbers, the DMS determines correctly whether to launch MWI or NMWI to reach portable numbers.

For restrictions and limitations on MWI refer to Section "11.4.5. PRI Message Waiting Indicator" on page 96.

All ported numbers subscribing to a message service shall be able to receive notification when a message has been queued for it.

If the ported number exists on the same switch as the message service, then this feature shall be treated as an intra-switch message waiting.

This feature includes the following features:

- Network Leave Message (NLVM)
- Message Waiting Indicator (MWI)
- Network Message Service (NMS)
- Simplified Message Desk Interface (SMDI)

Whenever possible, SMDI should be set up to provide 10 digits when requesting MWI.

11.3.64 ISDN Additional Call Offering Unconditional

Single-call capability on a DN supported by a BRI functional terminal is known as Single Functional Call (SFC). A call appearance is automatically assigned the SFC option when it is first added to a logical terminal. Multiple call capacity is added to the SFC DN by assigning Additional Functional Call (AFC) members. Calls can be originated from each of the SFC and AFC members, although only one can be active at a time (the rest are held). If the Additional Call Offering Unrestricted (ACOU) option is also present on the SFC DN, the terminal is notified of incoming calls even though no channel can be allocated for the call. These calls can be answered using the AFC members. Again, only one call is active at any time.

A BRI set belonging to a portable NPA-NXX can subscribe to ACOU and receive additional calls through ACOU. Calls from ported DNs can terminate on a BRI set through ACOU.

11.3.65 ISDN Additional Functional Call

Single-call capability on a DN supported by a functional terminal is known as Single Functional Call (SFC). A call appearance is automatically assigned the SFC option when it is first added to a logical terminal. Multiple call capacity is added to the SFC DN by assigning Additional Functional Call (AFC) members. Calls can be originated from each of the SFC and AFC members, although only one can be active at a time (the rest are held). If the Additional Call Offering Unrestricted (ACOU) option is also present on the SFC DN, the terminal is notified of incoming calls even though no channel can be allocated for the call. These calls can be answered using the AFC members. Again, only one call is active at any time.

An AFC member can originate calls to a portable DN; the LNP trigger is encountered and subsequent LNP processing takes place. AFC members may be assigned to a ported BRI SFC DN.

11.3.66 ISDN Flexible Calling

Flexible Calling (FC) allows an ISDN subscriber to establish two or more concurrent calls and to join them in a conference. If the ISDN subscriber also

subscribes to the DROP option, the subscriber may drop the last call added to the conference call. If the ISDN subscriber also subscribes to the XFER option, the ISDN subscriber may transfer a conference call with more than two members.

Flexible Calling can be used to originate and receive calls from portable DNs. Calls to portable DNs originated using Flexible Calling encounter LNP processing and an LNP query is launched if the called DN is not resident on the originator's switch.

11.3.67 Last Number Redial

Last Number Redial (LNR) allows a user to redial the last number dialed by pressing a single key rather than the entire number again.

A ported DN can subscribe to the LNR feature. Calls to portable DNs originated by Last Number Redial encounter LNP processing and an LNP query is launched if the called DN is not resident on the originator's switch.

11.3.68 Last Number Redial Associated with Set

Last Number Redial Associated with Set (LNRA) allows the end user to have the last number that was called from an MBS automatically redialed on any DN, regardless of the DN previously used to place the call.

A ported DN can subscribe to the LNRA feature. Calls to portable DNs originated by Last Number Redial Associated with Set encounter LNP processing and an LNP query is launched if the called DN is not resident on the originator's switch.

11.3.69 LATA Equal Access System

The LEAS adds many capabilities of the Equal Access End Office (EAEO) to a non-EAEO. It proivdes the capability of routing incoming calls from a non-EAEO to the DMS-200 access tandem (AT) switch for completion to carriers. It performs screening and translations functions like an EAEO. With a LEAS, non-EAEO subscribers can access an InterExchange Carrier (IXC) or InterNational Carrier (INC) by selecting one primary inter-LATA carrier (PIC) or dialing the carrier access code (CAC).

11.3.70 Line Screening Codes

Line Screening Codes (LSC) allow the operating company to block access to certain facilities (IBN Trunks, VFGs, and Meet-Me Conference Ports), depending upon the LSC of the party wishing to use the facility.

LSC involving ported numbers behaves the same as with non-ported numbers.

11.3.71 Local Call Detail Recording

The Local Call Detail Recording option allows billing for local calls to correspond to conversation time. These calls are local seven-digit extended area service (EAS) calls. The same tape records toll and local calls. Toll calls use the Automatic Message Accounting (AMA) system.

11.3.72 Local Coin Overtime

Local Coin Overtime (LCO) provides for an overtime charge on local calls made from Coin, Coin First and Dial-Tone First Coin stations. LCO splits the call into charging periods based on an initial period followed by subsequent overtime periods; a coin deposit is required for each period. The call is allowed to continue if the correct coin is deposited for the overtime period; the call is disconnected if the correct coin is not deposited.

Calls to and from portable DNs are subject to Local Coin Overtime processing.

11.3.73 Long Distance Signal/Toll Alert

The Long Distance Signal (LDS) or Toll Alert (TA) feature provides end-users with an indication of an incoming toll call by providing distinctive ringing or distinctive call waiting tones to the called party. End-users generally place a higher priority on incoming toll calls than they do on local calls. Normally, they are not able to make the distinction between incoming local or toll calls. LDS notifies the end-user whether or not an incoming call is a toll call.

A ported user can subscribe to LDS.A ported DN with LDS subscribed receives distinctive ringing/call waiting tone when an incoming toll call is received.

11.3.74 Long Distance Signal/Toll Alert - US Compliance

The US Compliance version of Long Distance Signal introduced a method where individual users could subscribe to LDS. Feature functionality and interaction with LNP is identical to Long Distance Signal/Toll Alert. Please refer to the Long Distance Signal/Toll Alert feature.

11.3.75 Long Distance Alert Enhancement

Long Distance Alert Enhancement (LDAE) enhances the Long Distance Signal (LDS) feature by providing the ability

- to provide LDA as a ring, tone or ring and tone line option
- to specify the duration of the time-out for call-waited calls, and
- to specify whether distinctive alerting is provided when no Calling Line ID (CLID) is delivered.

Feature functionality and interaction with LNP is identical to Long Distance Signal/Toll Alert. Please refer to the Long Distance Signal/Toll Alert feature.

11.3.76 Make Busy Key

The Make Busy Key (MBK) can only be subscribed to lines which also subscribe to Call Forward Busy (CFB or CFBL). When MBK is subscribed and active, all incoming calls are forwarded regardless of the state of the line (busy or idle).

Calls from ported DNs to a line with MBK active are forwarded to the specified CFB/CFBL DN. Calls to a portable DN with MBK active are forwarded to the specified CFB/CFBL DN.

11.3.77 Spontaneous Call Waiting Identification

Spontaneous Call Waiting Identification (SCWID) allows a subscriber to view the name and DN of an incoming Call Waiting (CWT) call. The display appears between the first and second audio (CWT) tones, alerting the subscriber that another call is incoming. With SCWID, the subscriber can choose to accept or ignore the incoming call based on the information provided in the display. Please also see "Deluxe Spontaneous Call Waiting Identification" on page 42.

LNP processing is transparent to the operation of SCWID. Calls from ported DNs are displayed in the same manner as calls from non-ported DNs. A SCWID subscriber can port without affecting SCWID functionality.

11.3.78 MBS Individual Business Line

The Private Business Line (PBL) allows the P-phone subscriber the appearance of a POTS line for one of the Directory Number (DN) keys on the set. The PB line has the POTS dialing plan. A customer group is associated with the PB line. All calls originating on the PBL key are Direct Outward Dial (DOD), including calls within the customer group are on a 7-digit basis.

A ported PBL behaves like a non-ported PBL.

11.3.79 MBS Interactive Displays

Interactive Display Menu on MBS Sets is an enhancement to Power Features (PF) for Meridian business sets (MBS) equipped with a 2-line by 24-character (or greater) display. Power Features provides the end user with the ability to add or remove features and to review data on any set in a customer group.

LNP is not encountered when adding or removing features by MBS Interactive Displays.

11.3.80 MBS Malicious Call Hold

MBS Malicious Call Hold (MCH) allows a MBS user to hold a connection within the switching unit on a malicious call, enabling the call to be traced back to the originating party.

MCH involving one or more ported numbers behaves the same as with non-ported numbers.

11.3.81 Multilocation Business Group

The Multilocation Business Group (MBG) feature allows the same MDC features to be used on different switches linked together by integrated services digital network user part (ISUP) IBN trunks using public Common Channel Signaling 7 (CCS7) facilities. The major benefit of an MBG is to provide feature transparency using CCS7 facilities to subscribers in any of multiple locations on any of various switches.

For information on how MBG interacts with LNP please refer to Section "13.4.1. MultiLocation Business Group" on page 34.

11.3.82 MultiParty Bridge

The Multiparty Bridge (MPB) feature adds a group of up to four subscriber lines on the same switch to an MPB group. Each line has a unique line equipment number(LEN) and directory number (DN), but behaves as if it is a single party on a multiparty line that links the members of the group. When a call terminates on the MPB group, only the called DN rings.

MPB involving ported numbers as members behaves the same as an entire non-ported MPB group.

11.3.83 Network ACD

Network ACD (NACD) is a set of feature that increases the power of ACD (Automatic Call Distribution). With NACD, a user's ACD groups can reside on more than one DMS-100 switch. Calls are presented to the queue that answers them most quickly within user-defined guidelines of speed versus cost. A NACD can be in a single-node or a multi-node configuration.

Datafilling ported overflow ACD groups in Table NACDGRP:

For proper interactions between LNP and NACD, ported overflow ACD groups should be datafilled as follows in Table NACDGRP:

- Overflow to an intraswitch ported ACD group should be datafilled as a Local ACD group (LCL).
- Overflow to an interswitch ported ACD group should be datafilled as a Remote ACD group (REM). Calls that overflow to an interswitch ACD group do not trigger in the originating switch, however, they may trigger at the adjacent switch.

11.3.84 Network Access Registers

Previous to Network Access Registers (NARS), virtual facility groups (VFG) were used for throttling incoming and outgoing calls in an MDC group.

However, the use of VFGs for call throttling requires retranslation, which increases DMS switch processing time for each call. NARS eliminates the need for retranslation.

NARS is accessible at the customer group level. A customer group can be assigned default incoming and outgoing NARS groups. Each NARS group has a datafillable size that indicates the number of simultaneous calls allowed. Calls can be throttled on an entire customer or NCOS group basis, as well as on a selected call type basis.

NARS can be used to throttle calls to and from a customer group that originate or terminate on a ported line. Intra- and inter-office calls that successfully route through a NARS can encounter LNP trigger and the subsequent LNP call processing when they terminate to a ported DN. NARS can be used to throttle calls to and from a ported customer group.

11.3.85 Network Resource Selector

Network Resource Selector (NRS) enables a CO to identify the need for a modem on an outgoing call from a Data Unit (DU). When activated, the NRS causes a connection to the outbound DU-Modem pair selected from a modem pool by the switch when the user hears the carrier or answer tone as the far-end modem goes off-hook.

Intra- and inter-office LNP calls to a ported number from datapath Data Unit to modem, or from modem to a datapath Data Unit complete normally. Outbound modem pooling occurs.

11.3.86 Network Ring Again

Network Wide Ring Again (NRAG) enables a caller encountering a busy signal on a different switch to be notified when the called party becomes idle. If the caller accepts the recall, the original call is automatically redialed.

NRAG activation are allowed only for calls made over IBN trunks. Attempting to invoke NRAG for a call which involves public trunks is not permitted.

NRAG has three configurations, INTRAGRP, ONNET, and OFFNET.

If a customer group has the INTRAGRP or ONNET NRAG options datafilled, invoking NRAG against members of that group is permitted only for other members of the group.

If a customer group has the OFFNET NRAG option, users outside the customer group may invoke NRAG against members of the customer group.

This feature uses Common Channel Signaling Number No. 7 (CCS7) to communicate between the originating and destination nodes.

For information on how NRAG interacts with LNP please refer to Section "13.4.4. Network Ring Again" on page 45.

11.3.87 NPA Split

When an NPA region's NXX codes are exhausted, the region is split geographically into two regions, one with the old NPA, and one with the new NPA. This is referred to as an NPA Split. LNP affects both the provisioning and call processing aspects of the NPA Split procedure.

11.3.87.1 Provisioning

Tables such as table LNPCODE are not automatically updated to reflect the changed NPA digits. In general, any table which contains a field of digits which references the old NPA digits must be manually updated to take into account the new NPA digits. For example, table LNPCODE contains two fields, FROMDIGS and TODIGS, which define a range of DNs which are resident to the switch and require special routing. When the NPA associated with those DNs is changed, then these tuples must be deleted and reentered to reflect the new NPA.

Table HOMELRN can be managed in the same manner as identified above. However, in an office where all the NXX codes within the affected NPA are being moved to a new NPA, table HOMELRN may require special procedures which differ slightly in releases NA007, NA008, and NA009 versus the procedures required in releases NA010 and forward. The special procedures are required if:

- the operating company elects to delete the old NPA digits from table SNPANAME and replace them with the new NPA digits
- the LRNs used to route calls to this office are affected by the change of NPA
- there is a need to retain the old LRN to accommodate a delay in updating the NP Database

For releases NA007 through NA009, the old NPA must be reentered in table SNPANAME after it has been replaced by the new NPA. This step is not required for NA010 and beyond.

For all releases, after the conversion, the SITE options should be removed from the tuples containing the old NPA. The LRNs containing the new NPA should be added with the SITE option as appropriate.

After all NP databases have been updated such that the old LRNs are no longer required, the tuples containing the old LRNs may be deleted from table HOMELRN.

11.3.87.2 Call Processing

With the deployment of LNP there is a concern that during the permissive dialing period following an NPA Split that calls routed to ported numbers could fail. The permissive dialing period refers to a period of time whereby calls may terminate in the affected office via dialing either the DN with the old NPA or with the new NPA. In cases where the called DN requires LRN routing, the GAP parameter sent in the IAM could contain the incorrect NPA.

Table NPDIGMAP provides a method of mapping the NPANXX digits of the GAP to a new NPANXX combination if the original GAP is determined to be non-resident

Table NPDIGMAP contains a key field, NPANXX, and two data fields, AREACODE, and OFCCODE; the AREACODE - OFCCODE being a valid index into table TOFCNAME. This table is consulted when the IAM of a call coming over a trunk contains the HLRN of the switch, the Translated Called Number Indicator (TCNI) set to number translated, and a GAP that contains a non resident DN. If these conditions are met, the table is indexed by the NPANXX of the GAP. If a tuple is found, the NPANXX of the GAP is replaced with AREACODE and OFCCODE fields. The DN residency check is performed once again, and if the new GAP is found to be resident, call termination proceeds. If a tuple is not found in table NPDIGMAP or the second DN residency check fails the call is routed to LNP Misrouted Call (LNPM) treatment.

In the NA010 DMS software loads, table NPDIGMAP replaced the LNP patches LNP45bn7, LNP45bn8, and LNP45bn9. The aforementioned patches provided a temporary solution to the interaction of DMS NPA Splits with LNP during the permissive dialing period of a switch by using datafill in table NPASPLIT to correctly terminate the call. In NA010 there is no process to migrate the datafill of table NPASPLIT into table NPDIGMAP during an ONP, as there is insufficient information to correctly populate table NPDIGMAP. As a result, if an ONP is being performed to the NA010 software load during the permissive dialing period of an NPA Split, table NPDIGMAP must be properly datafilled prior to the Switch of Activity (SWACT) between the old load and the new load, otherwise failure of incoming LNP calls may result.

Table NPDIGMAP is encountered by call processing after a FLRN is received over an incoming ISUP trunk, or after a HLRN is received in response to an LNP query, prior to DN termination or AMA processing. As a result, the behavior expected for both DN termination feature, such as call display features, billing, or any feature, signalling, or query processing for which the CalledPartyID is used to populate display information, redirection or reorigination information, billing, or change information, the mapped CalledPartyID (i.e. the CalledPartyID which was derived after the lookup in table NPDIGMAP) will be used.

Similarly, any table indexed after table NPDIGMAP, such as LNPCODE, will be indexed with the mapped CalledPartyID.

Table NPDIGMAP does not interact with the CLASS table NPASPLIT. The primary purpose of table NPASPLIT is to provide a method of ensuring DN Validation performed during the permissive period of a DMS NPA Split occurs successfully. Table NPASPLIT must be datafilled in the same manner as was required prior to the introduction of table NPDIGMAP.

For more information on NPA splits please refer to Section "13.4.9. NPA Split" on page 49

11.3.88 Operator Number Identification

The Operator Number Identification (ONI) feature allows an Operator to be brought into the circuit to collect the calling number, when a subscriber has direct-dialed a long distance call that is to be charged on an itemized bill basis by CAMA equipment.

Long distance DD call with the ONI feature can be made to a ported number. LNP trigger processing is bypassed, allowing the call to be directed to an operator for the calling number collection.

11.3.89 Overflow Call Routing

See Section 11.3.50 on page 47

11.3.90 Permanent Hold

Permanent Hold (PHOLD) allows a station with a 500/2500 set to hold one active call against its own directory number without attendant assistance. The held call may then be retrieved from the same station.

PHOLD involving ported numbers behaves the same as with non-ported numbers.

11.3.91 Plug Up (Trouble Intercept)

The Plug-up (PLP) option indicates that a DN on a single-line set is placed on trouble intercept. This prevents calls from terminating on that line. A line log is generated with TRBL treatment when a call attempts to terminate on the line.

PLP involving ported numbers behaves the same as with non-ported numbers.

11.3.92 Preset Conference and Trigger LNP

A Preset Conference is initialized when a Preset DN is dialed. The switching office automatically invokes a simultaneous ringing of a maximum of 50 pre-selected conference members. In order to establish calls to each of the conference members (conferees), LNP trigger processing is encountered if

after application of the appropriate datafill all applicable LNP trigger criteria are satisfied.

Both primary and alternate DN's associated with a conference member, if portable and non-resident, would each cause an LNP query. Retrials on a Primary or Alternate conferee cause a second LNP query to be sent to the SCP.

A summary of expected behavior for different scenarios with regard to a conferee's DN attribute, is presented in the following table. This table assumes no error cases are encountered.

Table 11-3 Summary of LNP query results from Preset Call scenarios

Primary DN	Alternate DN	Conference call attempts and LNP query
Non-Portable	Not Provisioned	2 attempts on Primary DN
Non-Portable	Non-Portable	2 attempts on Primary DN, 2 attempts on Alternate DN, No LNP Queries
Portable	Not Provisioned	2 attempts with LNP Queries on Primary DN at location indicated by Response
Portable	Non-Portable	2 attempts with LNP Queries on Primary DN at location indicated by Response, 2 attempts on Alternate DN
Non-Portable	Portable	2 attempts on Primary DN, 2 attempts with LNP Queries on Alternate DN at location indicated by Response
Portable	Portable	2 attempts with LNP Queries on Primary DN at location indicated by Response, 2 attempts with LNP Queries on Alternate DN at location indicated by Response

The following SCP responses are supported for an LNP query from a Preset conference call:

Table 11-4 Summary of SCP response processing interaction (Sheet 1 of 2)

Response	Action Taken
Analyze Route with CalledPtyID returned	Route to CalledPtyID (normal LNP behavior)
Analyze Route with LRN returned	Route to LRN (normal LNP behavior)
Send-To-Resource (in response package)	Attempt default route if one is available. If a default route is not available route to treatment.
Send-To-Resource (in conversation package)	No digit collection or announcements are supported. Resource Clear is sent immediately. Subsequent AIN response is processed.
Continue	Continue processing (normal LNP behavior)

Table 11-4 Summary of SCP response processing interaction (Sheet 2 of 2)

Response	Action Taken
Disconnect	Abandon confree Preset goes to Alternate if available
No Response before T1 time-out	Attempt default route if available (normal LNP behavior)

In the case of an Analyze Route response with a CalledPtyID or LRN is returned, LNP routing function takes place with normal LNP response processing: the triggering agent (conference port) routing characteristics and CalledPtyID or SCP Local Routing Number (LRN) is used to route the call over an ISUP trunk to a recipient switch where the conferee DN is native/ported to. Call returns to Preset conference upon the following routing results:

- Routing failure. Preset conference abandons current conferee DN and proceeds to an alternate DN if available.
- Routing successful. An ISUP trunk was successfully seized. Preset conference continues call termination on current conferee DN.
- Routing terminates due to error (T1 timer expired, or application error) being detected during LNP. This is interpreted as a routing failure. Preset conference abandons current conferee DN and proceeds to an alternate DN if available.

In the case of another listed response is returned, AIN routing function takes place with normal AIN response processing. Call routing result with each response is given below:

- When an AIN Analyze_Route response is returned, normal AIN response processing is applied. If the call cannot complete with the SCP response, the conferee is retried or an alternate attempted if applicable.
- When a Send-To-Resource in a response package is returned (with play announcement and disconnect), the call uses default routing, if it is available. If default routing is not available the call is routed to treatment.
- When a Send-To-Resource in a conversation package is returned, a Resource_Clear SSP message is sent back to SCP immediately. No digit collection or playing of announcements are supported for a 6-port conference port by this feature activity. However, a subsequent SCP response is processed.
- When a Continue response is returned the Preset conference call is resumed as such terminating the call on the current conferee DN proceeds.
- When a Disconnect response is returned the Preset conference abandons this conferee DN and proceed to an alternate DN if available.

Default Routing is supported in all responses applicable to an LNP query, which means a Default Routing is attempted as a result of routing exhausted in AIN/LNP response processing, before AIN/LNP is returned to Preset conference.

Any other response returned as a result of the query of the DN is abandoned and control returned to Preset to route to the Alternate DN if available. If no alternate is available then we abandon this conferee.

11.3.92.1 LNP query message parameter population

LNP query message is constructed according to all LNP specs with the following query parameters being populated with the conference port characteristics:

- User ID: this parameter is populated with the LNP triggering agent, the Preset DN.
- ChargeNumber and ChargePartyStation: the Charge Number parameter is populated with the LNP triggering agent, the Preset DN; the ChargePartyStation is populated with “Identified Line”.
- PC does not populate the CallingPartyID in the IAM message. As a result, LNP will only populate the CallingPartyID parameter in cases where LNP follows Preset Conference directly. The CallingPartyID parameter in an LNP query is populated with the Preset DN.

11.3.92.2 Preset call termination from LNP

When a call returns from LNP processing, it continues at the termination stage in Preset conference. Preset conference conferees all have a timer provisioned with them. The timer starts only after termination is attempted.

- Termination succeeds: If within the timer interval no answer message is received, retrial is applied to the same DN. After two retrials with no answer, the alternate DN is attempted.

  If the alternate DN meets LNP query criteria LNP queries for that conference call attempt.

- Termination fails: After timer is expired, the current DN is discarded (no retrial). if an alternate DN is provided, call attempt to the alternate DN is tried.

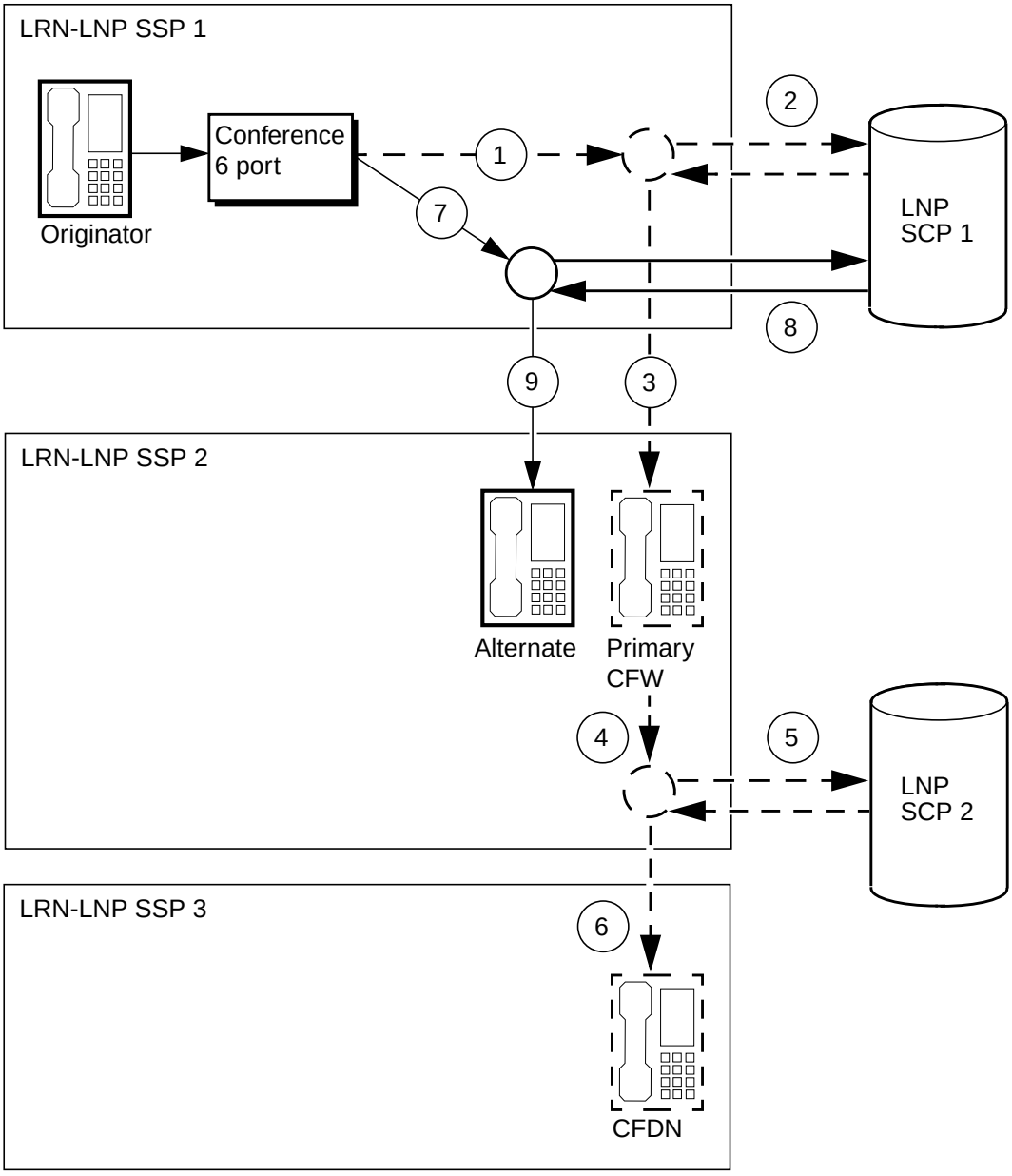
  Again if the alternate DN meets LNP query criteria LNP queries for that conference call attempt.

Other features may be encountered on the recipient switch, however, Preset begins its timer once LNP attempts termination. If another feature causes that timer to expire the call is taken down and retried.

The following figure follows a call through a complicated scenario involving a ported Primary DN with call forwarding subscribed and a ported Alternate DN.

1. Conferee Primary DN is in a portable NPA-NXX and triggers LNP
2. Query is launched and Response is received
3. Call goes out over ISUP trunk to another EO
4. Primary DN has switch based call forwarding subscribed to a CFDN in a portable NPA-NXX and triggers LNP
5. Query is launched and Response is received.
6. Call goes out over ISUP trunk to another EO. CFDN does not answer before Preset times out. On the first try the call is taken down and retried.
7. Conferee Alternate DN is in a portable NPA-NXX and triggers LNP.
8. Query is launched and Response is received.
9. Call goes out over ISUP trunk to another EO. Alternate DN does not answer before Preset times out. After the call to alternative DN on first attempt is taken down, the call proceeds from step 7 again.

Figure 11-18 Sample Supported Scenarios by Preset/LNP



Legend: – — — – indicates attempts that were abandoned after two attempts

11.3.93 Release Link Trunk

Release Link Trunk (RLT) is an ISDN PRI feature that allows the PBX to release B-channels connected to a DMS that are tied up for calls routed in and out of the PBX but no longer involving a PBX phone (that is, call forward or transfer).

When a PBX phone is engaged in a call over a PRI trunk, a call forward/transfer can be initiated from the PBX phone to a ported agent in the public environment over the PRI trunk. An LNP query is then launched from the DMS SSP to retrieve the LRN. When the LNP response is received and the call is routed to the ported DN location (that is, recipient switch), a bridge is established between the non PBX lines. LNP is no longer involved in the call model and normal call processing applies. If the PBX phone is disconnected from the call, the RLT function releases the PRI trunks from the PBX to the DMS.

An indication that RLT is requested for the call is included in the SETUP message of the second leg of the call from the PBX to the DMS. The DMS informs the PBX that RLT is enabled for the call when it sends back an ALERTING or PROGRESS message for that call to the PBX. When the PBX receives notification that the second call has connected, it sends out a FACILITY message requesting the trunks to the PBX be released.

11.3.94 Residential Call Hold

Call Hold is used to place an active call on hold, at which time the holding party can make another call or activate a feature.

A call from a ported number can be placed on hold. During the call setup to a portable Call Hold subscriber, standard LNP processing is used to route the call. When the call terminates successfully, Call Hold may be activated to place the call on hold.

11.3.95 Restricted Sent Paid

Restricted Sent Paid (RSP) is assigned to lines that have an LCC of Zero Minus Denied (ZMD) or Zero Minus Zero Plus Allowed (ZMZPA) to create a Coinless Pay Station. This option causes ANI information digit 7 (ANI information digit 2 in the case of ANI fail) plus the calling party's DN to be outpulsed on calls which require ANI to be sent.

RSP assigned to a ported number works the same as with a non-ported number.

11.3.96 Ring Again

The Ring Again (RAG) feature allows a calling party encountering a busy station to be notified when the busy station becomes idle. If the calling party activates RAG, the DMS-100 switch automatically dials the call. RAG is an intragroup, intraswitch feature only.

Since RAG is an intragroup intraswitch feature, LNP is not encountered on RAG activations nor RAG calls.

11.3.97 Screen List Editing features

Screen List Editing (SLE) is a set of features that allow incoming calls from parties on the screen list to be treated in a special way.

Screen List Editing features supported by LNP are listed as follows:

- Selective Call Acceptance (SCA)
- Selective Call Rejection (SCR)
- Selective Call Forwarding (SCF)
- Distinctive Ringing Call Waiting (DRCW)

Entries on the screen list may be ported numbers. Similarly, a SLE subscriber may be a ported number.

If the SLE subscriber is a portable number, then standard LNP processing is used to route the call.

When the call terminates to the portable SLE subscriber, the call is handled as follows:

- Selective Call Forwarding: the FCI bit is reset, so that LNP can be invoked during remaining call setup. The call is forwarded to the forward-to number. Since the FCI bit is reset, the forward-to number can also be portable.
- Selective Call Rejection: the call is rejected, if applicable
- Selective Call Acceptance: the call is accepted, if applicable
- Distinctive Ringing Call Waiting: the call is marked by a distinctive ringing pattern if call waiting is in effect.

11.3.98 SDS Enhanced Busy Call Return

Enhanced Busy Call Return is an end-office feature that provides operating companies with the capability to offer the end user an in-line access call completion service. Call completion services can be offered upon detection of a busy or no-answer condition and they consist of either office-nased features or off-board services provided by an external platform. EBCR enable all residential and business end users to access a call completion service without hanging up.

11.3.99 Security Code

Security Code (SEC) is a feature which allows a variable length (1 to 7 digits long) code to be assigned to a valid IBN station DN. This code is then used to restrict feature activation associated with this DN. Note that the SECURITY CODE feature can only be used in conjunction with other features, it is not a functional feature in itself. At present time, only the Directed Call Park

Retrieve feature (DCPK) can be used in conjunction with the SECURITY CODE feature which is an Intragroup feature.

SEC assigned to a ported number behaves the same as with a non-ported number.

11.3.100 Selective Call Messaging

The Selective Call Messaging (SCM) service is an enhancement to the existing Special Delivery Service (SDS). SDS is a feature which provides the caller the option to invoke message delivery when the called party is busy or does not answer within an office defined interval. SCM allows the operating company to optionally offer a message delivery service with universal access. A "sdsdeny" option is provided on a line and customer group basis. SCM also enhances SDS to offer messaging service on intra-LATA Privilege calls.

SCM behaves the same with ported numbers as with non-ported numbers.

11.3.101 Series Completion

Series Completion (SCMP) is a line option feature that redirects calls from a busy DN to another designated DN in the same office. Series Completion provides a method by which any end user-defined hunting scheme can be implemented for a given group of POTS and MDC lines.

Since SCMP is an intraswitch feature, the LNP trigger is not encountered upon SCMP redirection.

11.3.102 Service Analysis

The Service Analysis (SA) system is an observation system that is used to appraise the quality of service provided by the operating company. Service analysis is initiated and carried out by a service analyst that performs the SA functions by listening to calls and noting the events in a call as they occur.

SA can monitor LNP calls as it does for non-LNP calls. Info like offhook, connect time can be monitored. SA does not indicate that a call is LNP.

11.3.103 Simplified Message Desk Interface

Simplified Message Desk Interface (SMDI) provides an interface using a data link and the DMS switch to either of the two types of messaging desks: a voice messaging system (VMS) or a text messaging system (TMS). SMDI allows the end user to monitor and retrieve incoming messages.

SMDI is set up either with Uniform Call Distribution (UCD) or with hunt groups.

SMDI activates and deactivate the Message Waiting Indicator (MWI) on the end user's set when appropriate.

Whenever possible, SMDI should be setup to provide 10 digits when requesting MWI.

SMDI and the UCD/hunt group can port, provided the entire customer group ports. SMDI functionality is not affected after porting.

SMDI functionality is not affected by the portability of the UCD/hunt group it is associated with.

SMDI functionality is not affected by the portability of the requestor or the requestee, that is, it does not matter if the requestor or the requestee has been ported.

11.3.104 Single Button Transfer/Quick Conference Key

Single Button Transfer Operation allows a Meridian Business Set (MBS) user to transfer calls rapidly by using a QUICK CONFERENCE key (QCK). Pressing the key automatically generates the flash and sends a speed calling code or DN. The QUICK CONFERENCE key reduces the number of steps that are otherwise needed to complete the conference from an MBS.

The QCK DN can be a ported number. Intra- and inter-office QCK calls to a ported DN encounter LNP triggering.

11.3.105 Single Line Queuing

The Single Line Queueing (SLQ) feature provides end users of the Meridian business set (MBS) with the ability to queue calls against a single directory number (DN). When the SLQ feature is activated on an MBS set, calls coming into a busy MBS set are queued until the queue threshold is reached. If the queue has reached its limit, the caller is routed to an overflow route or DN if a valid route or DN has been datafilled.

SLQ can overflow to a ported number. Intra- and inter-office calls that overflow to a ported number encounter LNP triggering.

11.3.106 Single Line Variety Package for RES

Single Line Variety Package (SLVP) option is a set of services that include SLVP Intercom, SLVP Transfer, and SLVP Hold. With these services, distinctive ringing patterns are available to alert specific persons or extensions.

SLVP Intercom allows the subscriber to dial an access code, ring all the extensions of that DN, and speak with anyone who picks up on these extensions.

SLVP Transfer allows the subscriber to transfer a call to one of the extensions.

SLVP Hold allows the subscriber to place a call on hold by dialing an SLVP Hold access code. The call is reconnected when any one of the extensions goes off hook.

11.3.107 Single Party Revertive Calling

This feature allows a subscriber to dial his own directory number to ring an extension phone. The call is routed to SRRR treatment. The subscriber hangs up and is provided with ring back. Ringing stops when any of the subscribers extensions are answered.

INT can be assigned to a ported number. The LNP trigger is not encountered when a subscriber with the INT option dials his own number.

11.3.108 Softkey display

Softkey Display (SKDISP) provide access by softkeys to certain features that are assigned to the hard keys on an MFT set. The features displayed on the Softkeys is dependent on the current stage of the call.

If 3WC is assigned to a hard key, whenever the user is on an active call, one of the softkeys provides TRANSFER capability. If EMW is assigned to a hard key, whenever the user is receiving ringback, one of the softkeys provides MESSAGE capability.

11.3.109 Special Billing

A Special Billing Number may be datafilled against a line using the SPB option. For AIN and LNP queries, calls originated by a line with the SPB option will populate the ChargeNumber in the query with the special billing number. If no special billing number is present, the CallingDN is used.

11.3.110 Special Delivery Service and In Session Activation

The Special Delivery Service (SDS) feature on the originating end office provides callers with the option of routing the call to the SDS DN when the call is not answered within the office-defined interval or when the called party is busy.

The SDS service is offered on calls which are originated from SDS subscribed lines and for which the translated dialed digits satisfy the SDS screening criteria. There are two cases where the SDS service is offered: the no-answer call and the busy call.

The In Session Activation (ISA) feature is the Canadian version of the SDS feature. An SDS/ISA subscriber may port or may belong to a portable NPA-NXX. This portable or ported subscriber appears as the originator of the call, in terms of the SDS/ISA feature operation.

An SDS/ISA subscriber is able to leave a message against a portable/ported number, and a portable/ported number is able to retrieve messages left against it.

An SDS VMS Directory Number may be ported or may belong to a portable NPA-NXX.

11.3.111 Speech Activated Intelligent Dialing

This feature provides Speech Activated Intelligent Dialing (SAID) for subscribers of the DMS-100 or DMS-100/200 switch. This functionality provides a direct connection between a subscriber line and an intelligent peripheral (IP). This ability provides the subscriber with access to services that are provided directly by the IP such as voice recognition.

A DN (ported or nonported) can connect to the IP using SAID or NFRA. After connecting to the IP, the call can reach a portable number by LNP processing.

This feature includes the following features:

- Speech Activated Intelligent Dialing
- SAID Remote Access, (NFRA). Note that this variant uses DISA to connect to the IP.

Speech Activated Intelligent Dialing (SAID) Stringing of Digits (SOD) enhances the existing functionality of SAID by allowing a SAID trunk to dial certain feature access codes for a subscriber following by a second digit string. The first digit string (the feature access code) invokes a feature. The second digit string is processed by the feature. This eliminates the need for the subscriber to manually dial the second digit string from the telephone set whenever SAID is used to activate a feature.

SAID SOD can be used with a portable number as the second string dialed digits. Standard LNP processing is used to route the call.

Also refer to Section 11.3.40 , “Direct Inward System Access,” on page 43 for more information.

11.3.112 Speed Calling

Speed Calling provides abbreviated dialing for outgoing calls. With SCPAUSE, once the LNP trigger takes place, tones are not outpulsed.

The following Speed Calling features are supported by LNP:

- MDC Speed Calling Group User (SCU)
- Network Speed Calling (NSC)
- SAIF Stringing of Digits

- Speed Calling
- Speed Call Pause Insertion (SCPAUSE)/End to End signaling
- Speed Call Programming (Long), (SC2 and SCL)
- Speed Call Programming (Short), (SC1 and SCS)

Speed Calling can be used to originate calls to ported numbers. The following speed calling features are supported by LNP.

Speed call may be subscribed by portable numbers.

SCPAUSE allows a user to program a speed call cell which includes '*' characters. On invocation, if the speed call cell is terminated by an '*', the call pauses and allows the user to enter additional digits. If the '*'s are embedded in the digit string, the digits before the '*' are used for routing and the digits after the '*' are signalled as tones to the Terminating station. Once the LNP trigger takes place, the digits after the '*' are discarded and tones are not outpulsed to the Terminating station.

For restrictions and limitations on SCPAUSE please refer to Section "11.4.6. Speed Call Pause Insertion" on page 96.

No two-party call is set up during speed call programming. There are no interactions between speed call programming and LNP.

When speed call is invoked, the call is translated according to the speed call datafill, to determine the digits required to reach the called party. Speed dialing codes are translated during the Collecting_Info . The call is retranslated with the called number digits. If the called number is portable, then standard LNP processing is used to reach the called party.

11.3.113 Spontaneous Call Waiting Identification (SCWID)

Call Waiting Display, also called Spontaneous Call Waiting Identification or SCWID, allows the subscriber to view the name and directory name (DN) of a call in the call waiting (CWT) mode. The display appears between the first and second audio tones, alerting the subscriber that another call is incoming. With CLASS (Custom Local Area Signaling Services) SCWID, the subscriber can choose to accept or ignore the incoming call based on the information provided in the display.

11.3.114 Station Message Waiting

The Station Message Waiting (MWT) feature provides notifications to station users that a message has been queued against their directory number. The feature permits a station user to dial an access code to access the station user or attendant who has activated the message waiting feature.

Two MWT users (ported or nonported) can use MWT functionality to leave, retrieve and delete messages (between the two users) as long as they are on the same switch.

This feature includes the following features:

- CRA - Call Request Activation
- CRR - Call Request Retrieval
- CRDS - Call Request Delete Selective
- CRDA - Call Request Delete All

11.3.115 Station Origination Restrictions

The Station Origination Restrictions (SOR) option allows the user of an attendant console, Meridian business set or 2500 set designated as the controller station to directly assign one of five origination-restriction levels to phones in the associated customer group.

SOR behaves the same with ported numbers as with non-ported numbers.

11.3.116 Station Specific Authorization Codes

The Station Specific Authorization Codes (SSAC) option allows a set of numbers to be dialed from a specific station for purpose of recording billing information and overriding station NCOS restrictions (see authorization codes description as well).

SSAC involving ported numbers behaves the same as with non-ported numbers.

11.3.117 Subscriber Activated Call Blocking

The Subscriber Activated Code Blocking (SACB) feature package provides the SACB option for residential (RES) lines.With Subscriber Activated Call Blocking (SACB), subscribers can activate and deactivate call blocking, thereby restricting or allowing certain types of calls (for example, toll, IDDD, 1-976 numbers). Furthermore, if SACB is activated, subscribers can override call blocking on an individual call basis, leaving call blocking intact for subsequent calls.

On a call made to a DN in a portable NPA-NXX, SACB takes effect before the LNP trigger is encountered, so no LNP query is launched if a call is to be blocked by SACB.

11.3.118 Suppress Line Identification Information

The Suppress Line Identification Information (SUPPRESS) option allows a party to stop its DN or name from being displayed at the calls destination.

SUPPRESS involving ported numbers behaves the same as with non-ported numbers.

11.3.119 Terminating Billing Option (TBO)

The Terminating Billing Option feature provides the operating company with the ability to generate an Automatic Message Accounting (AMA) record for a call that terminates to a line or through a virtual facility group (VFG) that has this option assigned to it. This feature allows the operating company to charge an access fee for each line termination and assign up to 200 unique call codes and 200 unique service feature codes

11.3.120 Three-way Calling

Three-way Calling (3WC) allows a subscriber to join two existing calls together, so that all three parties can participate in the same call. The following interactions apply to 3WC:

- a portable number can originate a call to a 3WC subscriber
- a 3WC subscriber can originate a call to a portable number
- a portable number can subscribe to 3WC

Activation of three-way call joins two separate calls together. If either of the two separate calls are calls to a portable number, then standard LNP processing takes place.

Note: Encountering LNP from within an established 3WC is not allowed due to AIN restrictions.

The following figures show the process of establishing a three-way call.

Figure 11-19 3WC: First Call leg routes to ported number using LNP

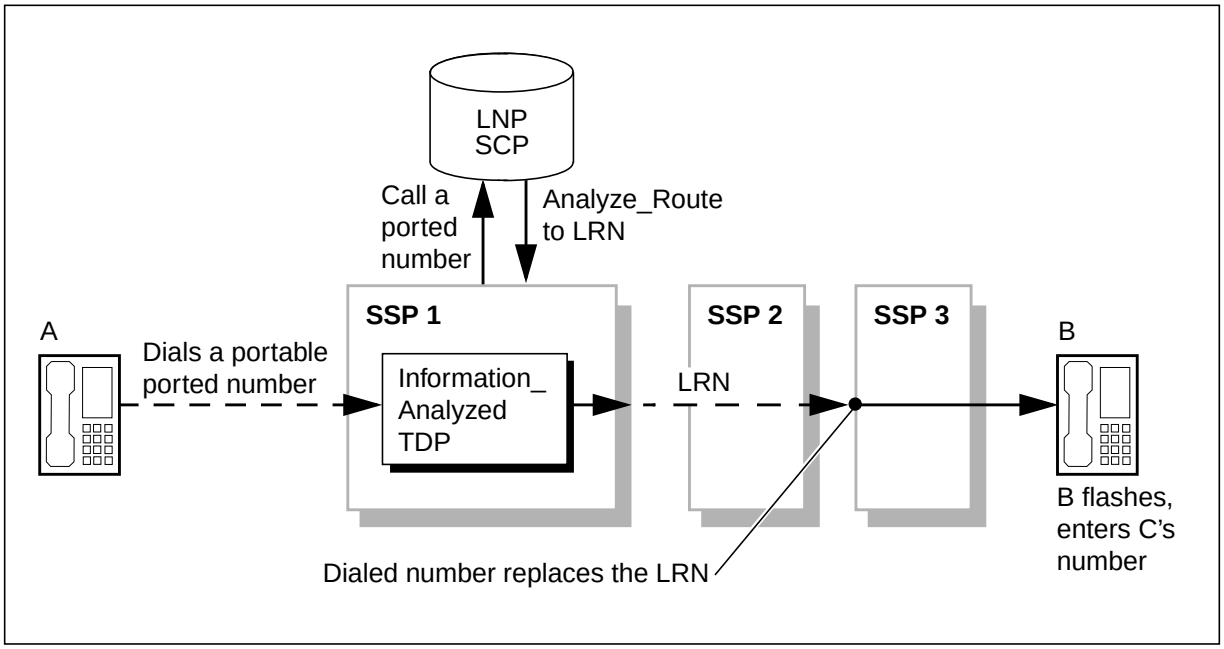


Figure 11-20 3WC: Second Call leg routes to portable non-ported number

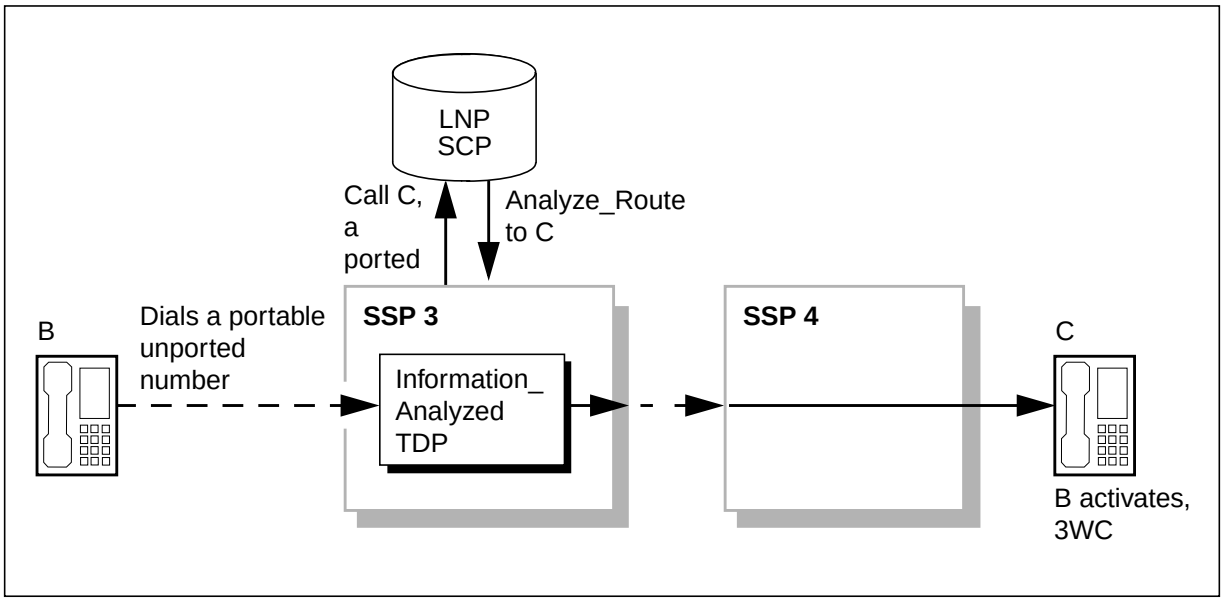
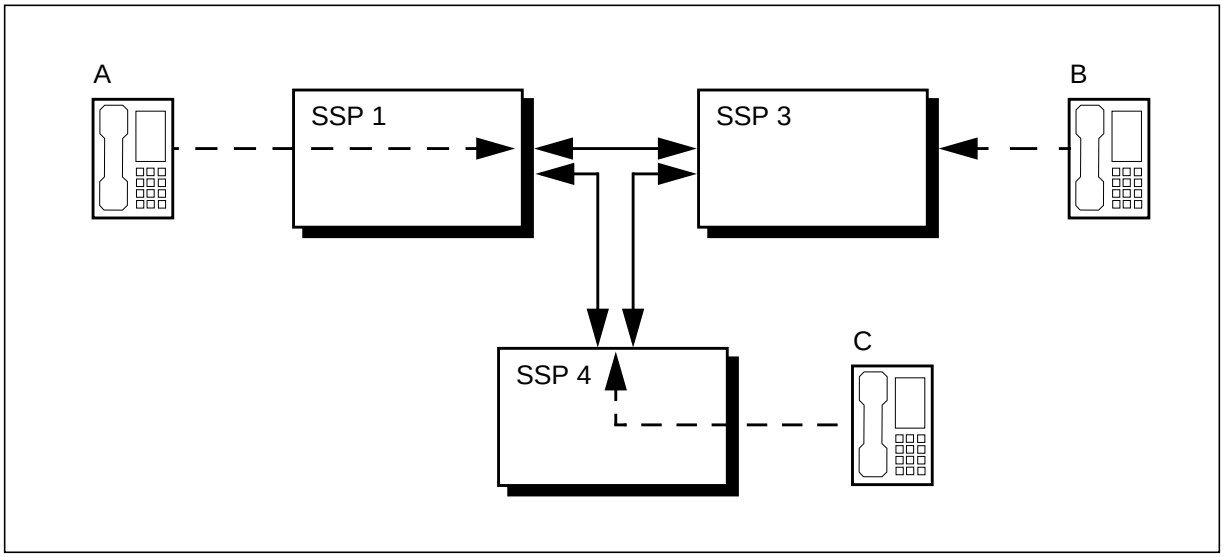


Figure 11-21 3WC: all parties joined in a 3WC



11.3.121 Three-way Calling with Public Announcement

The Three-way Calling with Public Announcement (3WCPUB) feature defines a new flavor of Three Way Calling (3WC) within the DMS-100. This flavor differs from the existing 3WC in that it automatically bridges all of the parties together during the call setup, rather than waiting for the controller of the 3WC to flash.

3WCPUB involving ported numbers behaves the same as with non-ported numbers.

11.3.122 Time of Day Routing

Time-of-Day Routing (TODROUTE) allows cost-effective use of facilities available by allowing or denying route choices based on the time of day. The times can be varied based on the day of the week or the day of the year, to account for weekends and holidays.

TODROUTE involving ported numbers behaves the same as with non-ported numbers.

11.3.123 Toll Essential

The Toll Essential (TES) feature allows a line to have access to the toll network when all other lines are denied access to it through the activation of toll network protection. Ported lines may subscribe to TES, While Toll Network Protection is active, TES subscribers may make toll calls to portable DNs.

11.3.124 Toll Restrictions

Toll restrictions are a set of features which affect the handling of a toll call when the feature is subscribed or encountered. The following toll restriction features are supported by LNP:

- Toll Denial (TDN)
- Toll Diversion (TDIV)
- Carrier Toll Denial (CTD)

11.3.124.1 Toll Diversion

Toll Diversion applies to Centrex lines. DMS implements Toll Diversion at the Analyzing_Info PIC, during private translations. Toll Diversion also applies to calls performing AIN/LNP response processing if the TOLL TDV option is encountered.

If a user dials an access code datafilled with the TDV option, followed by a portable number, the call is handled by TDV. No LNP query is sent to the SCP. The call is routed by TDV either to an attendant or to treatment.

If the TOLL TDV option is encountered during translation of an LNP response, and the response indicates a toll route, the call is sent to treatment or to an attendant depending upon TDV datafill.

Note: The prequery translations calltype matches the postquery translations calltype for FLRN responses to the LNP trigger. TDV is encountered for an LNP response if the response routes directly to an EA route.

11.3.124.2 Toll Denial

Toll Denial is an option assigned to a line, which routes toll calls dialed by the subscriber to TDND treatment. DMS implements Toll Denial at the Collecting_Info PIC. Toll Denial also applies to calls performing AIN/LNP response processing if the TOLL TDN option is encountered.

In summary, the TDN functionality is enforced before the LNP trigger is encountered.

When a Toll Denial subscriber dials a number which routes to a toll route, or encounters an LNP trigger which routes the call to a toll route, then the call is sent to TDND treatment as desired. When a call encounters an LNP trigger and translation of the response encounters the TOLL TDN option and the response indicates a toll route, the call is sent to TDND treatment as desired.

Note: The prequery translations calltype matches the postquery translations calltype for FLRN responses to the LNP trigger. TDN is

encountered for an LNP response if the response routes directly to an EA route.

11.3.124.3 Carrier Toll Denial

Carrier Toll Denial is an option which blocks calls to specified carriers. Blocked calls are routed to ILRS treatment. DMS implements Carrier Toll Denial at the Collecting_Info PIC.

When a Carrier Toll Denied subscriber dials a toll carrier to be blocked, the call is sent to ILRS treatment as desired.

11.3.124.4 Interactions Between E800/800Plus and Toll Restrictions

When a toll restriction subscriber dials an E800/800Plus number which routes the call over a toll route, the call is allowed to complete. This is valid because the toll-free service provider is paying for the call rather than the originator - the originator's toll restrictions should not apply.

11.3.124.5 Interactions Between E800/800Plus and Toll Restrictions and LNP

When a toll restriction subscriber dials an E800/800Plus number which routes the call to a portable number, which routes the call over a toll route, the call is allowed to complete.

Consider the following scenario for E800/800Plus/Toll Restrictions interactions with AIN/LNP:

- a toll restriction subscriber dials an E800/800Plus number
- the E800/800Plus routing response returns a LEC carrier
- the E800/800Plus routing response returns a portable number as the routing number
- the LNP trigger returns an Analyze_Route response
- the Analyze_Route response indicates a toll route

The call is routed over the toll route using the LEC. Allowing the call to continue is valid because the toll-free service provider is paying for the call. The originator's toll restrictions should not apply to this call leg once E800/800Plus is active on this call leg.

Furthermore, it is correct to use the LEC, because the E800/800Plus response indicated the LEC and the E800/800Plus service provider is paying for the call. Even if the originator of the call subscribes to PIC or LPIC, the LEC is used.

If the E800/800Plus response indicates an IEC, then the call is routed to the carrier before encountering the LNP trigger. The carrier-originated call is

responsible for handling the LNP processing. Once the call is routed to the carrier, E800/800Plus is no longer active on the call leg.

11.3.125 Trunk Verification From Designated Station

The Trunk Verification From Designated Station (TVDS) feature is assigned to the access code that allows operating company personnel to select and access individual trunks of a trunk group for transmission quality testing purposes. TVDS can be activated from a 2500 telephone set or an electronic telephone set (ETS) that has been assigned the appropriate network class of service (NCOS).

TVDS behaves the same with ported numbers as with non-ported numbers.

11.3.126 Universal Speech Activated Intelligent Dialing

Universal Speech Activated Intelligent Dialing (USAID) provides the ability to give public access to Speech Activated Intelligent Dialling (SAID) services to any caller. The form of this access is a new option for DISA DNs allowing them to be used as USAID DNs. After reaching the IP through DISA, the user is able to reach a portable number by standard LNP processing.

11.3.127 Usage Three Way Call

Usage Three Way Call (U3WC) is analogous to 3WC, except that the 3WC controller pays per usage of U3WC. U3WC is subscribed on an office-wide basis. U3WC differs from 3WC in that a usage AMA record is generated when the U3WC feature is activated.

For calls to portable numbers, U3WC behaves exactly as 3WC does - standard LNP processing is invoked on each call leg.

11.3.128 Virtual Facility Groups

Virtual Facility Groups (VFG) provide a mechanism to control the number of simultaneous incoming calls. VFGs are assigned a threshold value, that represents the number of simultaneous calls permissible. Additional calls above the pre-defined threshold value are sent to treatment.

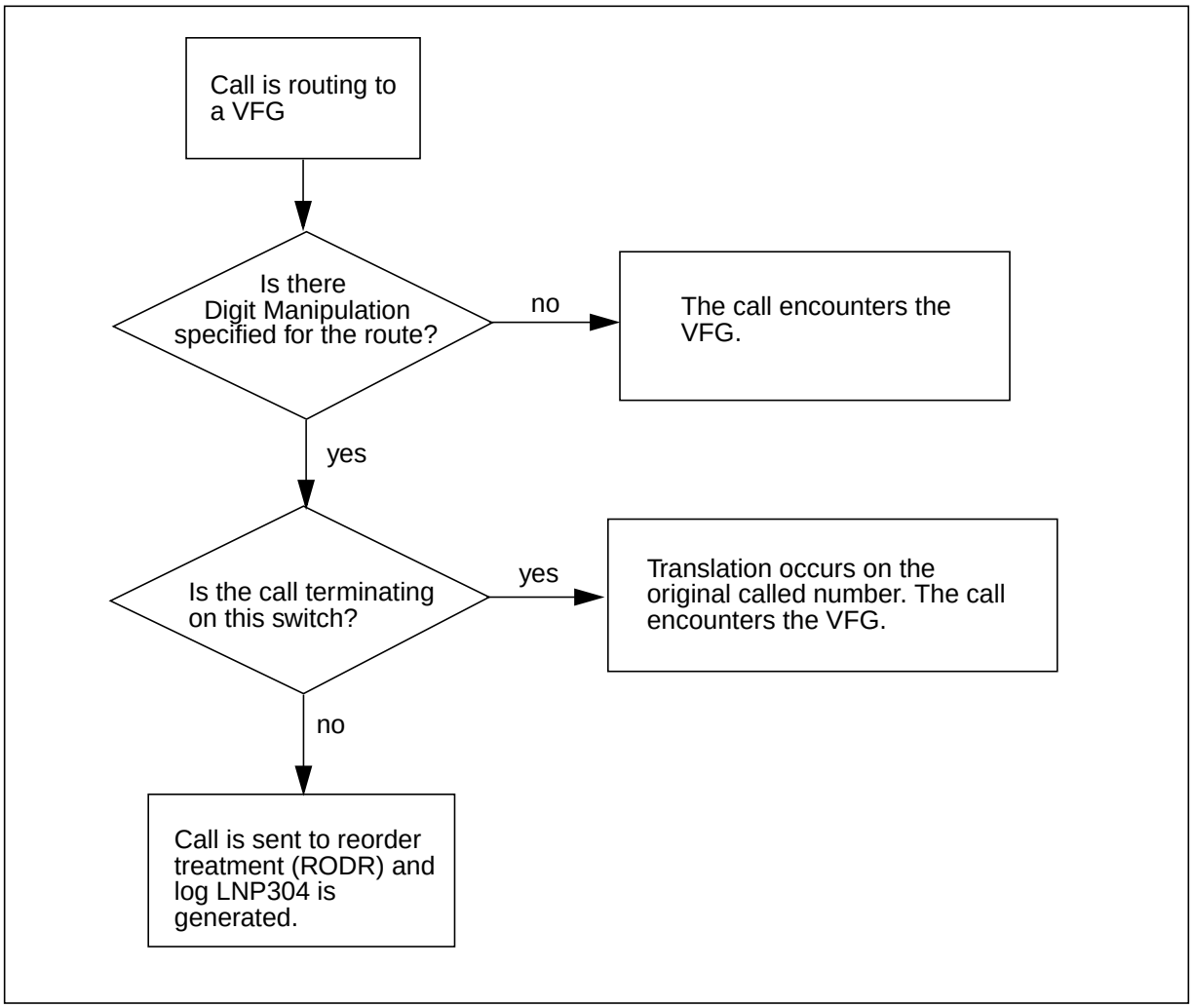
VFG throttling of calls takes place during the Selecting_Route PIC after the Info_Analyzed TDP. This means that a call encounters all triggers at Info_Analyzed (including LNP processing) before routing through the VFG.

An LNP call which encounters a VFG on a non-terminating switch is:

- allowed to continue through the VFG (with LNP information unchanged) if there is no digit manipulation applicable to the call.
- is blocked if there is digit manipulation applicable to the call.

A decision is made regarding whether to allow the call to continue to route through the VFG or send it to treatment. This is shown in the following figure. In the case where the call is not an LNP call, the VFG behavior is unchanged.

Figure 11-22 Deciding whether call to VFG is sent to treatment



The log LNP304 is shown in the following figure.

Figure 11-23 Example of LNP304 log

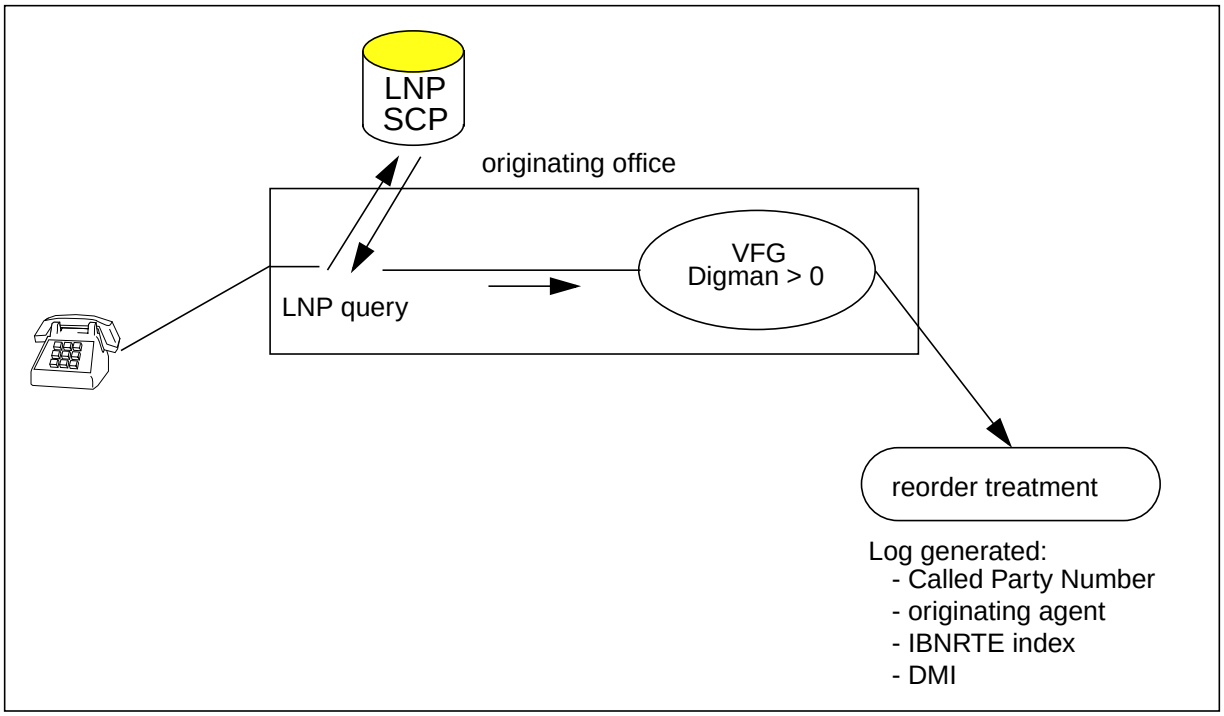
```
**  LNP304 JUN17 14:25:36 1800 TBL  Unable to pass LNP info through VFG
        Called Pty   6136631088
        Ported DN    4164638001
        Orig Ckt     HOST 02 1 10 10    DN 4164631001
        DMI          88
        Table        IBNRT2
        Index        111
        LNP call cannot be routed through VFG because DMI > 0
```

11.3.128.1 Non-terminating LNP call encounters VFG with digit manipulation

In the case where the call encountering VFG is an LNP call that is not terminating at the present switch and there is digit manipulation specified, the call goes to reorder treatment (RODR). A new LNP log LNP304 is generated indicating the Called Party number, the Originating circuit, the Routing table index and the Digit Manipulation Index.

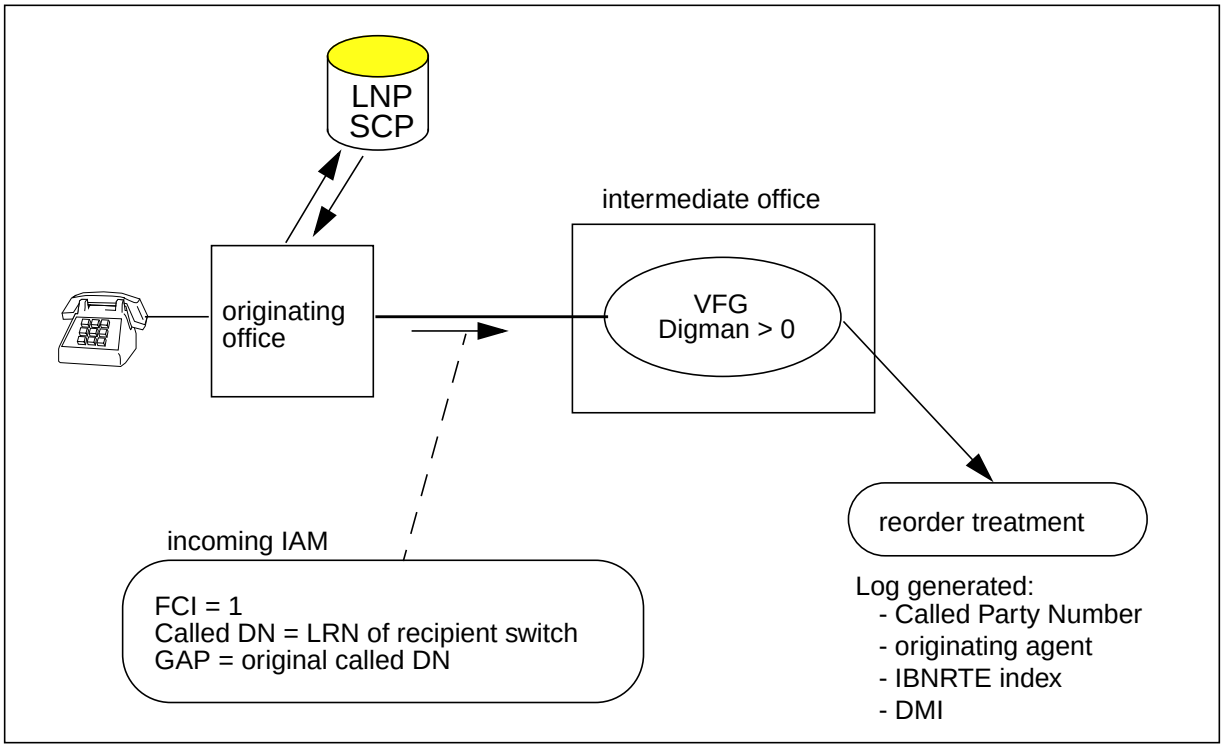
The following figure shows the call flow for an LNP call encountering VFG at an originating office.

Figure 11-24 LNP call encountering VFG at originating office



The following figure shows the call flow for an LNP call encountering VFG at an intermediate office.

Figure 11-25 LNP call encountering VFG at intermediate office

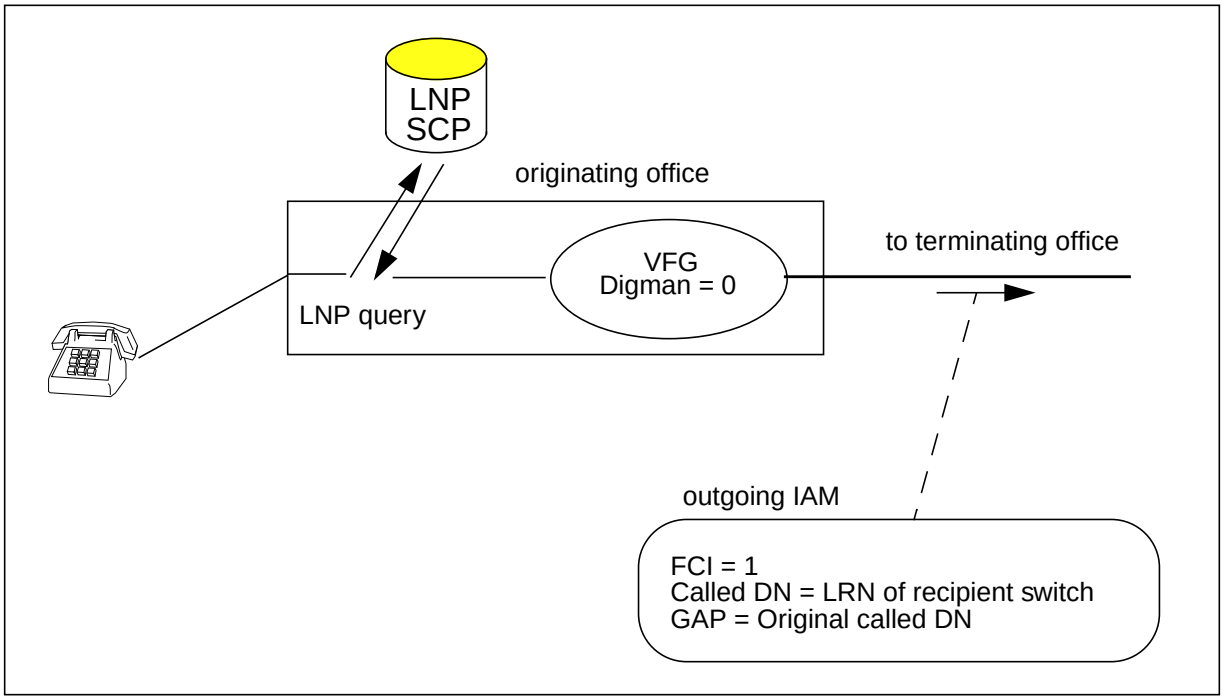


11.3.128.2 Non-terminating LNP call encounters VFG with no digit manipulation

In the case where the call encountering VFG is an LNP call that is not terminating at the present switch and there is no digit manipulation specified, the VFG behaves like an ISUP trunk and simply passes the LNP information through unchanged.

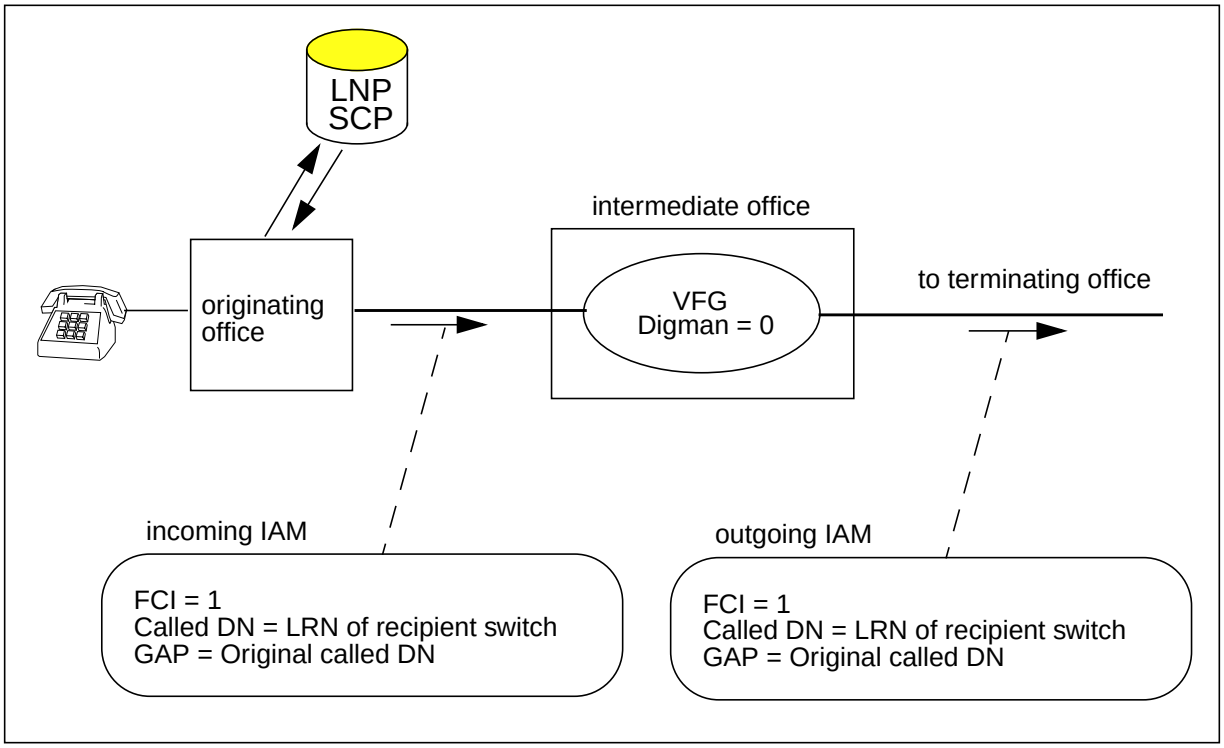
The following figure shows the call flow for an LNP call encountering VFG at an originating office.

Figure 11-26 LNP call encountering VFG at originating office



The following figure shows the call flow for an LNP call encountering VFG at an intermediate office.

Figure 11-27 LNP call encountering VFG at intermediate office

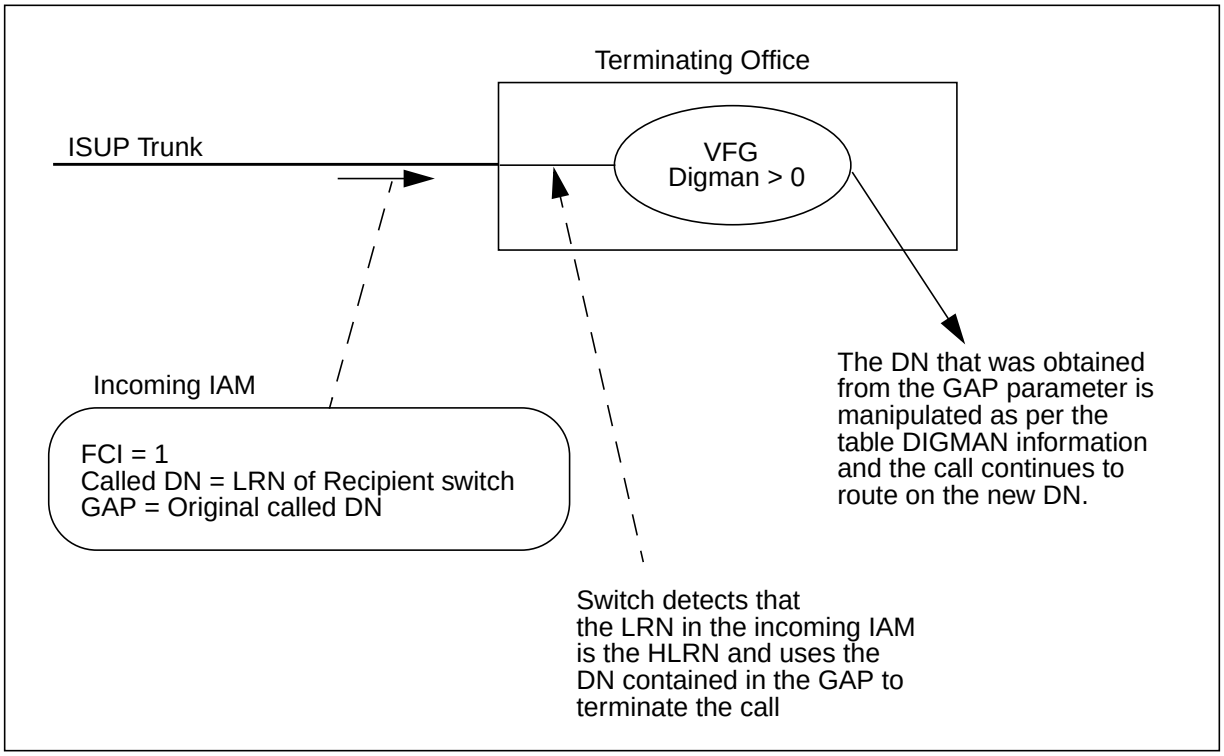


11.3.128.3 LNP call at terminating office encounters VFG with digit manipulation

At the terminating switch when the call routes on the original called DN, the call can go through a VFG with digit manipulation.

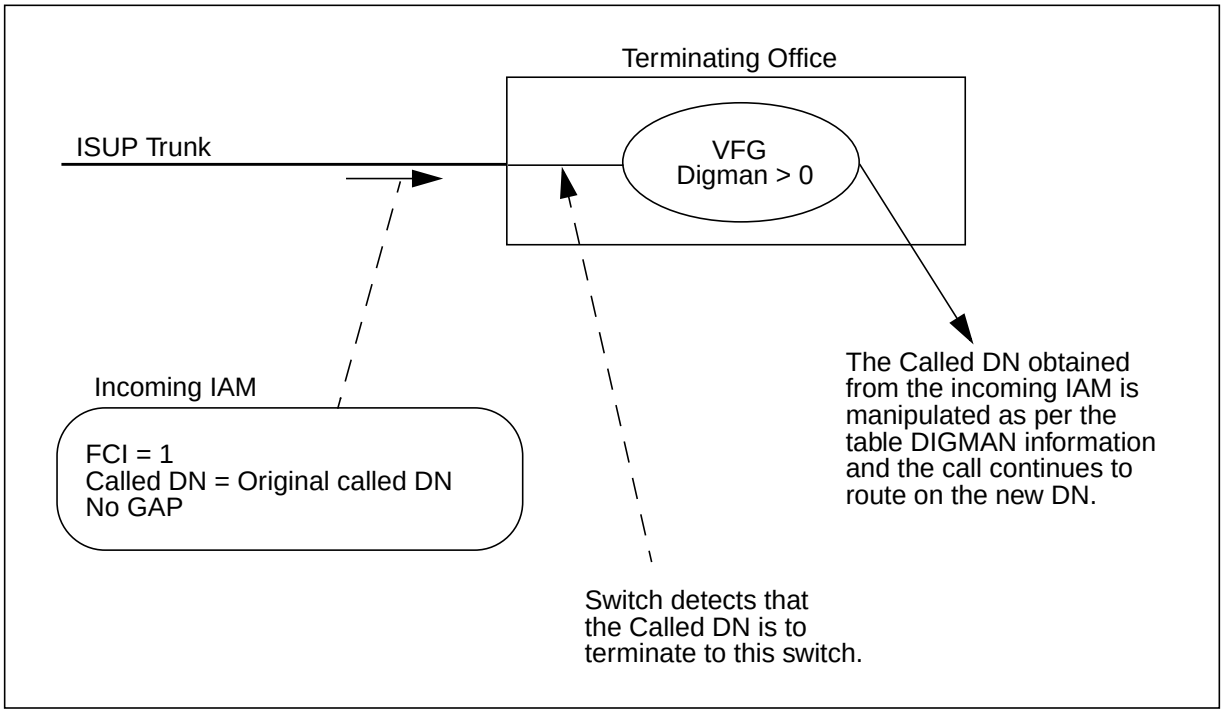
As shown in the following figure, for the case of an LNP call to a ported number on the terminating switch, the HLRN is detected in the incoming IAM and the translations at the terminating switch use the GAP to terminate the call. At this point, a VFG can be encountered that manipulates this DN.

Figure 11-28 Call to Ported DN encounters VFG at terminating office



As shown in the following figure, for the case of an LNP call to a non-ported number on the terminating switch, it is determined that the DN in the CalledPartyNumber of the IAM is native to the switch. At this point, a VFG can be encountered that manipulates this DN.

Figure 11-29 Call to Non-Ported DN encounters VFG at terminating office



11.3.128.4 TRAVERs

TRAVER functionality reflects the call processing behavior outlined in Section "11.3.128. Virtual Facility Groups".

In the NO TRACE portion of TRAVER the digit stream entering the VFG (based on the input values for the LRN, GAP and TCNI input at the TRAVER command line) is displayed.

The interaction between the TRAVER “v” selector and LNP information (LRN, GAP, TCNI) is supported on the TRAVER input command line.

The above functionalities are combined for the RTEVFG option of TRAVER.

As an illustration of the functionality, consider the following examples.

11.3.128.4.1 TRAVER shows both LRN and GAP entering VFG

Provided that there is a VFG set up on the LRN 416-463-1077 of an incoming LNP call, consider the following TRAVER:

```
>traver tr isupitic 4164631077 tcni 6136637001 b
```

Provided that there is no digit manipulation specified, execution of the above TRAVER command shows the call entering the VFG with both the LRN and the GAP.

If there is digit manipulation specified in the routing table (DMI > 0), the TRAVER indicates this and shows the call going to reorder treatment.

11.3.128.4.2 TRAVER allows TCNI option with VFG

Consider the following TRAVER:

```
> traver v vfg_name 4164631077 tcni 6136637001 b
```

Execution of the above TRAVER shows both the LRN and GAP being outpulsed from the VFG.

Note: This TRAVER assumes that there is no digit manipulation specified in the routing table (DMI = 0) since the VFG would not have been entered had there been digit manipulation.

11.3.128.4.3 TRAVER RTEVFG option

This example allows the output from the above two examples to be combined in the following TRAVER command:

```
> traver tr isupitic 4164631077 tcni 6136637001 b rtevfg all
```

11.3.128.5 Billing and signaling JIP

A new table VIRTGRPS option called “NOLNPAMA” (No LNP AMA generation) is provided to suppress, on a per VFG basis, originating module codes 719 and 720 after encountering the VFG. The presence of this option on the VIRTGRPS entry indicates that originating 719 and 720 module code generation will be suppressed for the remainder of call processing on that switch after encountering the VFG (unless a subsequent feature interaction changes the originating party of the call).

The default is that the option is not present on the VIRTGRPS tuple.

If the NOLNPAMA option is not present, Module codes 719 and 720 can be appended to any applicable billing records even after encountering the VFG (This could result in unwanted Module codes 719 and 720).

This option replaces the LNP70BN patches. These patches provide the same functionality as the NOLNPAMA option but apply to the entire office instead of on a per VFG basis.

Note: Even if the LNP70 patch is applied on the old side, the option will not be added to existing VIRTGRP datafill by the OHP process.

A VFG with the NOLNPAMA option is shown in the following figure.

Figure 11-30 VFG with the NOLNPAMA option

```
TABLE VIRTGRPS:

    KEY DATA OPTIONS
    ----------------
    LNPVFG SIZE 10 POTS N 401 N (NOLNPAMA ) $
```

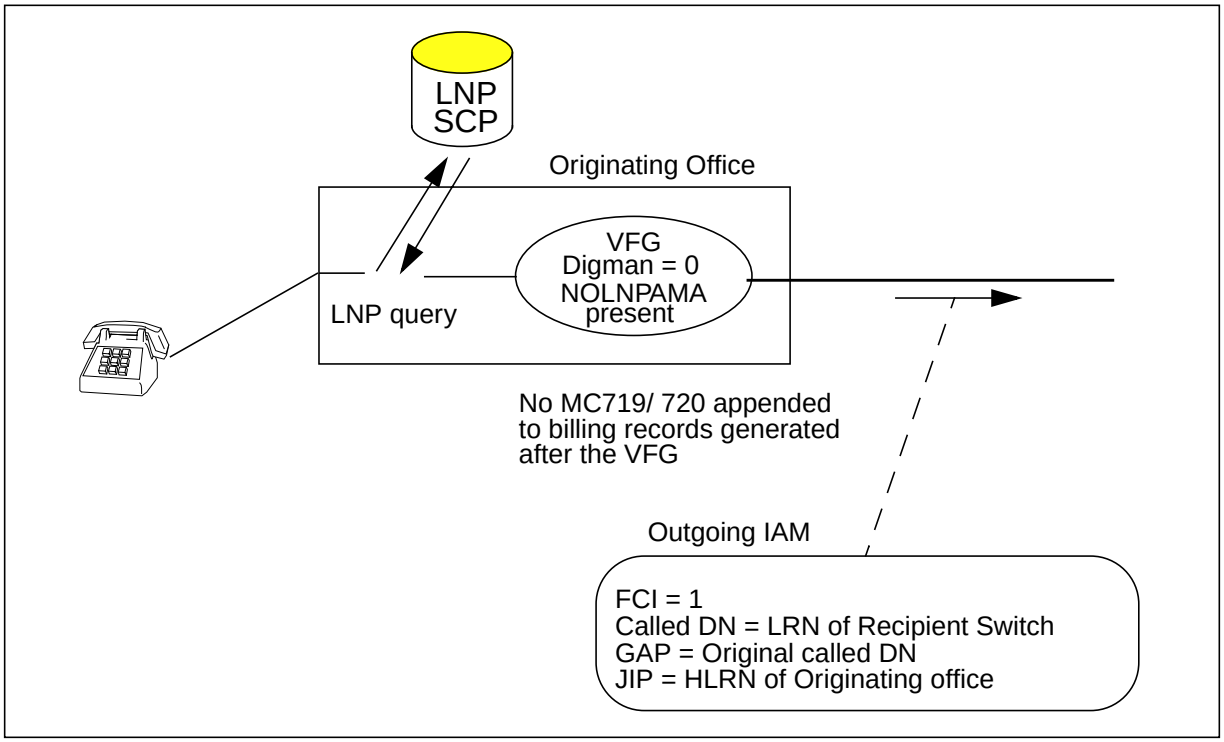
It should be noted that a VFG has no effect on the value of the JIP signalled out of the switch (if any). The signaling of the JIP is based on the originating agent and is independent of whether a VFG was encountered on the switch. The value of the LRN in module codes 719 and 720 generated after encountering a VFG is also independent of the VFG. It is also based on the originating agent. This is summarized in the following table.

Table 11-5 Post VFG JIP signaling

	Call Originator	Post-VFG billing MC719/ 720 population if NOLNPAMA not present	Post-VFG billing MC719/ 720 population if NOLNPAMA is present	Outgoing signaling
Regardless of the value of the VFG Billing Number.	Trk	populated with signalled-in JIP if present / 719/ 720 not generated otherwise.	No MC719/ 720 appended	Signalled-in JIP if present; otherwise JIP = provisioned LRN for the trunk
	Non-Native DN	populated with HLRN	No MC719/ 720 appended	JIP = HLRN
	Native DN	no MC719/ 720 generated	No MC719/ 720 appended	JIP = HLRN

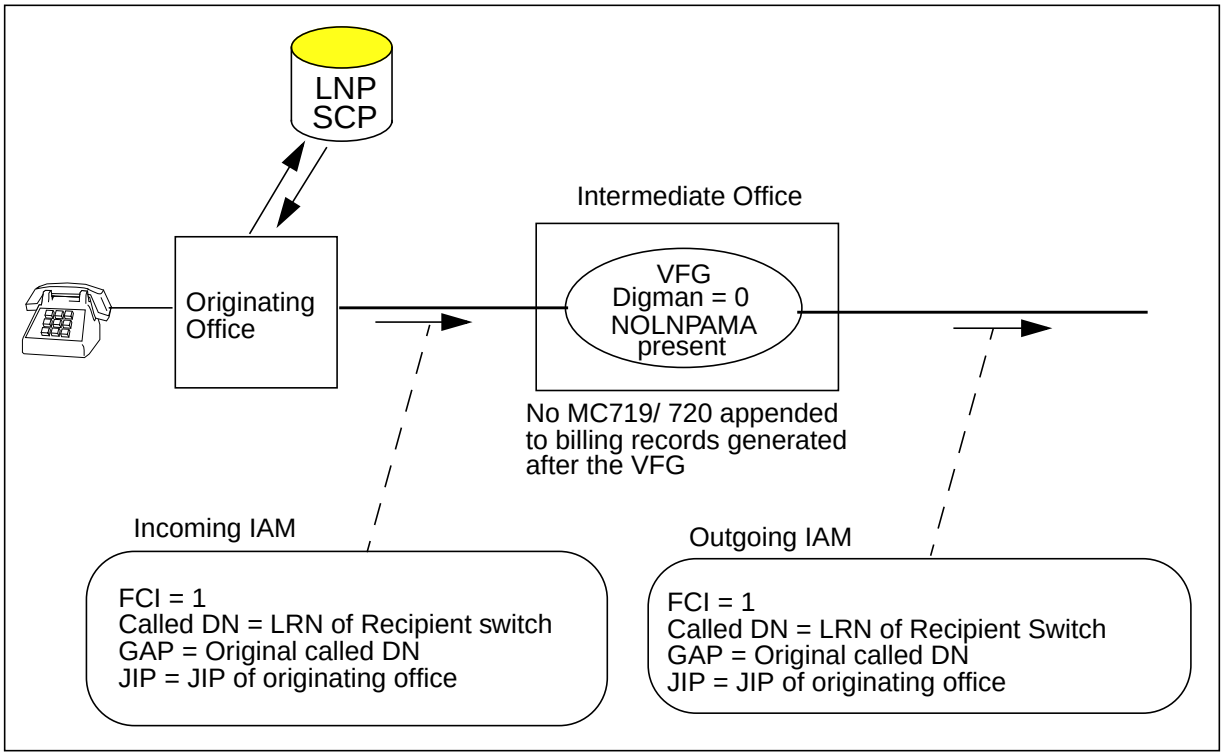
Further illustration of the JIP signaling and billing after encountering a VFG at a triggering switch are shown in the following figure.

Figure 11-31 JIP signaling and billing after a VFG (NOLNPAMA present) at a triggering switch



Further illustration of the JIP signaling and billing after encountering a VFG at an intermediate switch are shown in the following figure.

Figure 11-32 JIP signaling and billing after a VFG (NOLNPAMA present) at an intermediate office



Requirements: REQ-A.294, REQ-A.295

11.3.129 Virtual Facility Group Look Ahead

Virtual Facility Group Look Ahead (VFGLA) allows the DMS-100 to search for an idle Virtual Facility Group (VFG) member as soon as it is possible to determine from the digits being dialed that a VFG is required. If no idle VFG member is found, the user is notified before entering more digits.

11.3.130 Universal Access

Universal Access (DENY) to CLASS Features allows all Subscriber Services RES lines within an office the ability to access a custom local area signaling service (CLASS) feature, without requiring the lines to be assigned the CLASS feature individually through the service order system (SERVORD). With universal access, the subscriber does not need to notify the operating company to access a CLASS feature; instead, the subscribers access is on demand. In addition, Universal Access to CLASS Features gives the operating company the ability to restrict universal access to one or more CLASS features from individual subscribers or groups of subscribers.

Universal access does not change the operation of CLASS features. Universal access is applicable to the following CLASS features:

Automatic Call Back (ACB) Automatic Recall (AR) Customer Originated Trace (COT) Anonymous Caller Rejection (ACRJ) Calling Number Delivery Blocking (CNDB) Calling Name Delivery Blocking (CNAB) Distinctive Ringing/Call Waiting (DRCW) Selective Call Acceptance (SCA) Selective Call Forwarding (SCF) Selective Call Rejection (SCRJ)

Please refer to each individual feature description for interactions with LNP.

11.3.131 Universal Voice Messaging

Universal Voice Messaging (UVM) is a voice messaging service offered universally to residential and small business end-users through simplified dialing. A UVM subscriber may invoke UVM after a call is made which is busy or unanswered. The UVM subscriber may leave a message for a party of a previously dialed number even when the message recipient is not a subscriber to a voice messaging service (VMS). The recipient may then retrieve the message.

The UVM feature routes calls to the VMS connected to the end-office through an UCD/SMDI link or PRI link.

UVM behaves the same when ported numbers are involved as non-ported numbers.

11.3.132 Voice Mail Easy Access

This feature provides access to messaging services by routing calls to a Voice Mail System (VMS) using an access code.

11.3.133 Wake-up Call Reminder

Meridian Wake-up Service (WUCR) provides a wake-up call service for Subscriber Services (RES) and MDC lines. WUCR is assigned as a line option and is activated and deactivated by the end user through the use of access codes. Upon activation of WUCR, a wake-up call request is programmed by the end user to ring the end users line at a particular time within the next 24 hours. The end user can deactivate the feature and cancel the wake-up call request at any time after it is programmed.

There is no LNP query when the line is rung by the wake-up service.

11.3.134 Warm Line for POTS

The Warm Line (WML) feature enables the subscriber to reach a predetermined directory number (DN) by lifting the handset and waiting for a specified time.

WML for POTS behaves the same with ported numbers as with non-ported numbers.

11.3.135 Warm Line for MDC

The Warm Line (WML) feature enables the subscriber to reach a predetermined directory number (DN) by lifting the handset and waiting for a specified time.

WML for MDC behaves the same with ported numbers as with non-ported numbers.

11.4 Restrictions and Limitations

Any feature which is not specifically described in Section "11.3. Feature descriptions" on page 11 should be deemed to be unsupported by LNP.

The following sections describe features which have restrictions or limitations.

11.4.1 Call Messenger for RES

Call Messenger for RES cannot be supported on a network level until LNP/TOPS/Call Messenger interactions are supported.

11.4.2 Attendant console features

The following limitations apply to attendant console features:

- Only Feature Interactions applicable to the Nortel Meridian Digital Centrex Attendant Consoles and not other types of Attendant Consoles are provided. These consoles belong to a type called “data link consoles”.
- The Network Attendant Consoles are not supported.
- The Mini Attendant Consoles are not supported. They are a variant of the Meridian Business Set (MBS) agent and can handle functionality only for small customer groups, using a similar but not equivalent set of the Attendant Console features.
- Attendant consoles of a type “non-data link consoles” are not supported. Following are some of the non-data link consoles supported by the DMS:
  - — Conveyant Systems TeleDesk or
  - — AT&T 50B.
- Individual lines or entire customer families are portable, but not individual members (that is, customer groups belonging to these families, their extensions and Attendant Consoles) Stand-alone customer groups are portable as a whole group, with all the members included. In order to port a customer group that has a family dependency, the whole group must first be converted into a stand-alone customer group, and then ported.
- Whenever the attendant console routes through the VFG and then triggers AIN or LNP, the UserID and CallingPartyID parameters in the query message are not correct.

For information on how attendant console features interact with Number Pooling Evolution please refer to Section "13.4.3. Network Attendant Console" on page 45

11.4.3 E800

When an E800 response routes the call to a PODP number, and a Send_to_Resource operation that requests a normal number of digits takes place, the E800 PRETRAN option pretranslator is not used to translate the collected digits. If an Analyze_Route response is received, the E800 PRETRAN option pretranslator is used to route the call.

11.4.4 800Plus

A restriction applies to an OCR call with two routes where the first route is LNP and the second is not LNP.

When the call triggers LNP for the first route and receives an AR response message with CallingPartyID of “PresentationRestriction” it does not display the calling number. This restriction also prevents calling number display on the second route.

11.4.5 PRI Message Waiting Indicator

The PRI Message Waiting Indicator (MWI) feature is incompatible with LNP. The PRI MWI feature is a variation of Network Message Service (NMS), in which a Voice Message Service (VMS) that is located on one switch controls the Message Waiting Indicator of a call that was initiated from another switch. NMS uses TCAP to transport messages between switches and relies on 10-digit GTT (performed on the CalledPartyNumber) to route these messages, whereas PRI MWI sends its messages over PRI, and relies on switch datafill (routing tables) to route these messages through the network based on the CalledPartyNumber. No LNP query is performed upon a request to update an MWI. LNP requires that routing be based on the LRN that is associated with a CalledPartyNumber.

11.4.6 Speed Call Pause Insertion

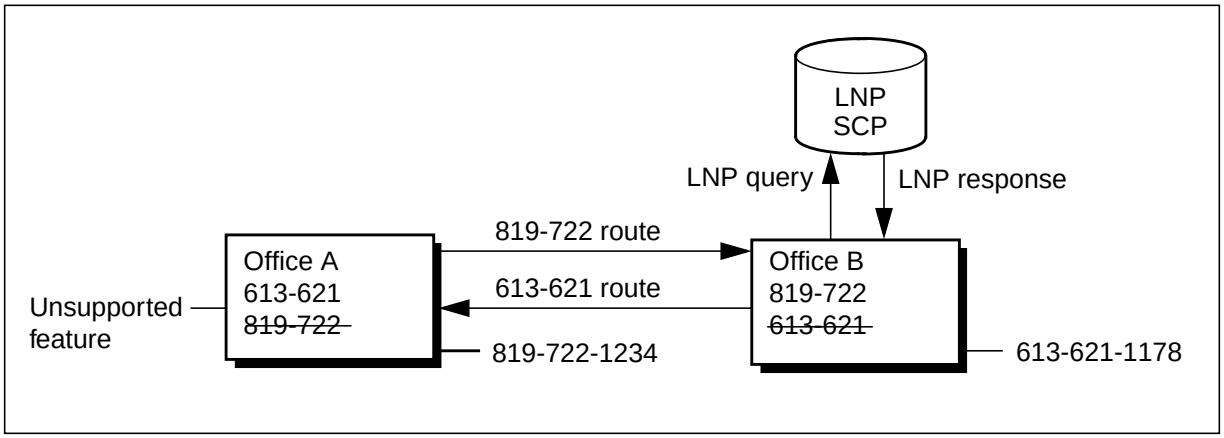
With Speed Call Pause Insertion (SCPAUSE), once the LNP trigger takes place, tones are not outpulsed.

11.4.7 Unsupported LNP feature interactions

The following figure represents two scenarios:

- an unsupported feature is located on the donor switch
- an unsupported feature is not located on the donor switch.

Figure 11-33 Unsupported LNP Feature Interactions



Scenario 1, an unsupported feature is located on donor switch

- Unsupported feature calls 613-621-1178, which has ported from its donor switch (office A) to office B
- Office A routes the call using normal translation and routing tables. Call is routed to terminate on a DN within office A.
- Because the DN no longer exists at that office, the call is routed to treatment.

Scenario 2, an unsupported feature is not located on donor switch

- An unsupported feature calls 819-722-1234, which has ported from its donor switch (office B) to office A.
- Office A routes the call using normal translation and routing tables. The call is routed to office B.
- Office B recognizes the called DN as belonging to a portable NPA-NXX and launches an LNP query to the LNP SCP.
- LRN SCP returns a Location Routing Number=613-621, which is used by office B to route the call to office A.
- LRN and called DN are swapped. The call terminates properly to 819-722-1234.

12 Other interactions

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

LRN is based on AIN Essentials and follows the AIN Essentials protocol. The following sections describe the exceptions and enhancements to AIN Essentials protocol.

12.1 Trigger precedence

LNP coexists with PODP and can have overlapping digit patterns. When the triggering digit pattern of the LNP matches an existing PODP trigger, PODP takes precedence. In this case, LNP is encountered if PODP returns a Continue response.

12.2 Serial triggering

Existing AIN Essentials rules for serial triggering apply to LNP.

The LNP query results in the serial triggering counter being incremented. The AIN application checks the serial triggering count prior to the LNP query and, if the serial triggering limit is exceeded, the SSP does not launch the query.

An LNP query is not launched if the FCI is set and a second LNP trigger is encountered.

The LNP capability conditionally maintain the Ported Number GAP across subsequent triggers, based on the called number replacement. If the called number is not replaced by a subsequent trigger, the GAP and FCI information is maintained.

12.3 PODP trigger

The interactions between PODP and LNP are as follows:

- LNP Querying Switch

  never encounter PODP after LNP query.

- Post LNP-Query Intermediate or Terminating switch

  — Default behavior: Always perform trigger checking on the dialed DN (whether in GAP or ISUP CdPN) and ship the dialed DN to the AIN SCP. If a response other than continue is received, reset FCI and discard the LRN (if present).

  — Optional Behavior: Escape ESCGP should be datafilled against escape PODP in table TRIGGRP for this functionality (as required).

12.4 Send_To_Resource

Following an LNP query, the SSP expects to receive either an AIN Essentials Analyze Route or Disconnect response from the SCP. Continue and Send_To_Resource (STR) response and conversation messages are not expected in response to an LNP query,. A continue message is accepted and processed using existing AIN Essentials procedures. If the SCP returns an STR conversation, the SSP sends back a Resource Clear message with a clear cause of ‘Failure’. If the SCP then sends an Analyze Route message, it undergoes LNP processing. Please refer to“Chapter 8: Response Processing” for more information.

12.5 Send_Notification

It is assumed that the LNP SCP-based service operation does not use the Send_Notification capability. Should a Send_Notification request be received, it is handled using existing AIN Essentials procedures. The call proceeds as normal.

12.6 Automatic Call Gapping

Existing ACG controls may affect LNP queries. If an ACG control is returned in response to a previous AIN trigger, the current LNP trigger query is blocked.

12.7 Update_Request

Update Request is not applicable to office-wide triggers.

12.8 AIN Service Enablers Extended Transactions

While an AIN Service Enablers Extended Transaction is open, it is possible to encounter the AIN Essentials-based LNP trigger and launch a query to the LNP database. If the SCP response from the LNP database:

- is an Analyze_Route message, the Analyze_Route message is processed according to LNP response processing procedures
- contains a Next Event List (NEL), it is treated as a fatal error in accordance with existing AIN Essentials procedures, and is routed to final treatment
- contains a Send_To_Resource request, it is processed according to existing AIN response processing procedures.

12.9 LNP and ARS originators

The ARS option in table HNPACONT is used to designate private customers whose calls are translated in the public environment (that is, their STS is not an SNPA). The presence of the ARS option on a given originator's STS in table HNPACONT prevents DN residency checking, LNP triggering and PODP triggering for that originator.

12.10 Equal access translations

Equal access translations applied to a portable Called Party DN must yield the same result as equal access translations applied to its LRN. For example, if the Called Party DN belongs to a digit range marked in the table LATAXLA as "PRIVILEGE" then its LRN digits range must also be marked as "PRIVILEGE" in the table LATAXLA.

13 Number Pooling

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

13.1 Introduction

This chapter introduces an evolution of LNP: Number Pooling, and addresses the interactions between them.

Number Pooling provides a measure of number exhaust relief, allowing operating companies to open a block of DNs smaller in scope than the ten thousand DNs associated with a complete NPA-NXX.

Number Pooling involves breaking NPA-NXX codes into blocks of numbers (initially 1000) and assigning these blocks to several different companies within the same rate center. One of those operating companies, termed the code holder, would be assigned the NXX code in the Local Exchange Routing Guide (LERG). Calls to numbers assigned to the other operating companies, known as block holders, would be routed using the capabilities of Number Portability as though the directory numbers had been ported. All of the DNs within a block, which have been assigned to a block holder, are associated in the Number Portability Data Base (NPDB) with the Location Routing Number (LRN) of the block holder. This is known as pre-porting the numbers.

Since an operating company may encounter a scenario where multi-DN groups may be composed of both Pooled and non-Pooled DNs features which previously had no requirements to interact with LNP may now have to do so. Additionally, features which provided limited interworking with LNP, or required substantial work around datafill to interact with LNP, may become issues in the customer network with the increased volume of ported numbers associated with Number Pooling.

13.2 Data Schema

This section describes the Data Schema changes necessary to make Number Pooling work in the LNP environment.

13.2.1 NPRESERV

The NPRESERV table identifies directory numbers (DN) or defines blocks of DNs as “Number Pool Reserved” (NP-Reserved).

A DN is an NP-Reserved number when it meets both of the following requirements:

- the DN is in table NPRESERV
- The blank directory number treatment (BLDN) represents the DN in table DNINV.

The NP-Reserved numbers do not receive the local number portability misrouted (LNPM) treatment and do not release back with an error cause code of 26. The NP-Reserved numbers receive the BLDN treatment. The system does not generate an LNP303 error log or other indications of a network error.

The following figure shows sample datafill for the NPRESERV table.

Figure 13-1 Datafill example Table IBNXLA LNP Option

FROMDIGS	TODIGS
6136631	6136631
6136639	6136639

13.2.2 IBNXLA

A new option is added to the IBNXLA table. The new LNP option is a NETRTE option, meaning it shows up as an option if the NET or ROUTE selector is chosen.

The LNP option is used to allow NET ESN or NET PVT calls to be eligible to encounter the LNP trigger.

LNP is not a valid option for the ROUTE selector. It is a valid selector for the NET selector only if the ESN or PVT sub-selector is chosen.

Presence of the LNP option allows the selection of the DMI option for NET ESN/PVT tuples. This option was not available for these selectors in previous releases.

Because LNP is an option, not a field, the table structure remains unchanged.

The NPE00005 controlled LNP option is introduced in the NA013 release under activity 59012192.

Figure 13-2 Datafill example Table IBNXLA LNP Option

```
 KEY
                                                              RESULT
-------------------------------------------------------------------
CUSTFEAT                  81
NET N N 0 N NDGT N Y ESN N 0 613_P621_0 L613_LATA1_0 (LNP ) $
```

13.2.3 HOMELRN

A new maintenance LRN option, MAINT_LRN, is added to the HOMELRN table.

During NPA splits the MAINT_LRN option is used to provision maintenance LRNs with the new NPA prior to ANI conversion. This guards against an incoming LRN containing the new NPA.

The MAINT_LRN option indicates that it is not necessary for a tuple to have a valid NPA or NPA-NXX. The NPA in the AREACODE field does not need to exist in table SNPANAME and the AREACODE/OFCCODE combination does not need to exist in table TOFCNAME.

Maintenance LRNs should only be present in the HOMELRN table during the permissive period of an NPA split. If this tuple is present outside the permissive period it may result in incorrect call terminations when the referenced NPA-NXX is assigned to another switch.

The HOMELRN option is introduced in the NA013 release under the activity 59013762.

Figure 13-3 Datafill Example Table HOMELRN MAINT_LRN option

```
AREACODE OFCCODE    STNCODE                          OPTIONS
-------------------------------------------------------------
     416     463          $ (SITE (HOST) $)$
     847     463          $                (MAINT_LRN )$
```

13.2.4 TOFCNAME

The CODEHLDR option is added to table TOFCNAME.

Enter CODEHLDR to indicate that an NPA-NXX is LERG assigned even though 1000 blocks may be pooled out to other switches. To assign the CODEHLDR option to a tuple the NPE00005 SOC option must be active.

Figure 13-4 Datafill Example Table TOFCNAME CODEHLDR option

```
>add 613 999 CODEHLDR $
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
ENTER Y TO CONTINUE PROCESSING OR N TO QUIT
>y
Do you really want to add this tuple”
Deleting a tuple from this table requires
special care, as described in the NTP
“NORTH AMERICAN DMS-100 TRANSLATIONS GUIDE.”
TUPLE TO BE ADDED:
    613    999                                    (CODEHLDR )$
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT.
>y
TUPLE ADDED
JOURNAL FILE INACTIVE
>
```

13.2.5 NPDIGMAP

Two new boolean fields, UPD4GAP and UPD4LRN, are added to the NPDIGMAP table.

The UPD4GAP and UPD4LRN fields can be set to either YES or NO depending on the functionality required. The boolean fields can only be set to YES if the NPE00005 SOC option is active.

Setting the UPD4GAP field to YES triggers the automatic update of the NPRESERV and LNPCODE tables to reflect the digits in the AREACODE and OFCCODE fields.

Figure 13-5 Datafill Example Table NPDIGMAP field UPD4GAP

```
NPANXX  AREACODE  OFCCODE     UPD4GAP        UPD4LRN
-------------------------------------------------
847525       416      525          Y              N
```

Setting the UPD4LRN field to YES triggers the automatic update of the HOMELRN table to reflect the digits in the AREACODE and OFCCODE fields. This tuple can be used to map LRN digits during the permissive dial period of an NPA Split.

Figure 13-6 Datafill Example Table NPDIGMAP field UPD4LRN

```
NPANXX  AREACODE  OFCCODE     UPD4GAP        UPD4LRN
-------------------------------------------------
416463       847      463          N              Y
```

The UPD4GAP and UPD4LRN fields are introduced in the NA013 release under the activity trigger 59013762.

13.2.6 LNPOPTS

The following options have been added to the LNPOPTS table in order to support Number Pooling functionality with LNP.

13.2.6.1 NP_MAX_CONTAM

A thousand block of numbers is not pooled if more than a certain percentage of the DNs in the block are contaminant. This criteria for eligibility is controlled by the NP_MAX_CONTAM tuple. The default for this criteria is 10%. A Number Pooling subscriber can choose between a range of 10% and 40% using this tuple.

A DN is considered contaminant if it is in a thousand block that is already assigned to service or is on an intercept other than BLDN. For more information on when this tuple is used please refer to Section "13.3.3.1. Provisioning Number Pooling Using the NPRESERVE CI command" on page 30.

13.2.6.2 LNP_305_LOG

The LNP_305_LOG tuple controls whether an LNP305 log is generated for LNP calls where the post-query LAAXLA values do not match the pre-query values, in the case where the NPE00005 SOC is idle. For more information on this tuple please refer to Section "13.4.5. Foreign Location Routing Number" on page 46.

13.2.6.3 NPRESERV_CI

The NPRESERV_CI tuple is used to control access to Number Pooling provisioning through the NPRESERVE CI. This secondary method of provisioning can not be accessed if this tuple has the value of OFF. For more information on this tuple please refer to Section "13.3.3. CI NPRESERVE" on page 28.

13.3 Provisioning

Although the concept of Number Pooling seems complex (multiple switches "sharing" NPA-NXXs) from an administrative point of view, the provisioning is fairly straight forward. This is due to an interface, done through the SERVORD mechanism, that is implemented in NA013 specifically for provisioning Number Pooling.

A secondary provisioning method has also been included, primarily for implementing Number Pooling prior to the NA013 release. This method, a CI, provides an interface that performs some of the steps necessary to pool DNs.

Detailed in this section are the two interfaces, as well as the NPE00005 SOC This SOC controls the use of the interfaces in addition to controlling the rest of the Number Pooling functionality.

13.3.1 SOC NPE00005

Thousand Block Number Pooling support is controlled by the NPE00005 option. When this option is in the IDLE state, functionality controlled under option NPE00005, including Servord interface prompting, and new LNP feature interactions will not be encountered. When this option is ON, any functionality specific to the Thousands Block Number Pooling development will be encountered if the given call scenario or provisioning scenario indicates it is appropriate to do so.

This option will be dependent upon the state of the LNP00200 SOC option in a manner such that the NPE00005 option may not be activated unless the LNP00200 option is active. Similarly, the LNP00200 option may not be deactivated unless the NPE00005 option has been deactivated.

There are only two valid, stable states which option NPE00005 may be in, namely ON and IDLE. The option will support the transition to and from both states.

In the ON state, functionality specific to Thousands Block Number Pooling may be executed, if applicable to the given call scenario.

In the IDLE state, functionality specific to Thousands Block Number Pooling is to be bypassed, regardless of whether the call scenario dictates that this functionality is to be encountered.

The IDLE2ON transition will perform the steps necessary to activate the functionality.

The ON2IDLE transition will perform the steps necessary to deactivate the functionality. Users will be warned of any impacts.

13.3.2 SERVORD

With the introduction of Number pooling, the porting of DNs both for number pooling and number portability increases in complexity with regard to the required changes to table data. It is hence desirable to provide a provisioning interface that would facilitate the porting of DNs.

In order to provide this interface, this feature introduces new functionality to the NEWDN and OUTDN Servord commands.

In addition to bringing virtual DNs (VDNs) into service, this activity allows the NEWDN command to be used to:

- pool in a thousands block of DNs
- port in a single or block of DNs (to be assigned to service at a later time)
- introduce a new LERG-assigned NPANXX to the switch

The OUTDN command functionality is also increased. Aside from using the OUTDN command to take VDNs out of service, it can also be used to:

- pool out a thousands block of DNs.
- port out a single or block of DNs

It should be noted that in order to port out a single or block of DNs which are assigned to a physical line, the DNs must first be removed from service (put on BLDN or UNDN intercept) before using the OUTDN command to port them out.

Also, in order to pool out a block of physical or virtual DNs, the DNs must first be removed from service (put on BLDN or UNDN intercept) before using the OUTDN command to pool them out (Any DNs in the block on PODN intercept must also be put back on BLDN or UNDN).

In addition, existing CI query commands QDN, QLEN and QPDN used to obtain information regarding the ported status of a DN(s) are updated to work in a number pooling environment. A new CI query command, QRDN is introduced by this activity to provide information regarding reserved DNs and the pooled status of DNs. Also included in this activity is the modification of QDN and QLEN such that when querying an unassigned DN using QDN or QLEN, information is displayed regarding whether the DN is owned by this switch. These functionalities are controlled via a SOC (Software Optionality Control) code NPE00005. For more information please refer toSection "13.5. Tools and Support" on page 51 .

13.3.2.1 Provisioning Number Pooling via Servord

The following table contains the information necessary to provision Number Pooling using the NEWDN servord command.

Table 13-1 NEWDN Provisioning (Sheet 1 of 13)

Desired Functionality	Steps required	NEWDN provisioning
Pool in a single DN	Not Applicable. Individual number pooling is not supported in this release.	N/A

Table 13-1 NEWDN Provisioning (Sheet 2 of 13)

Desired Functionality	Steps required	NEWDN provisioning
Pool in a block of DNs whose NPANXX already exists in table TOFCNAME with the CODEHLDR option. Contaminants in the block are specified.	1. Use the NEWDN command. >newdn SONUMBER: NOW 99 7 13 PM > SNPA: >416 BLOCK_OF_DNS: >yes FROM_DN: >4164631000 TO_DN: >2999 VDNTYPE: >portin PORTIN_ACTION: >pool CODEHOLDER: Y > CONTAMINANT: >1001to1003 CONTAMINANT: >1005 CONTAMINANT: >$ COMMAND AS ENTERED: NEWDN NOW 99 7 13 PM 416 4164631000 2999 portin pool y (1001to1003) (1005) $ ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y	Each of the contaminants listed is considered to have ported out of the switch. Hence, each contaminant DN specified, provided, it is not assigned to service on the switch, is assigned to PODN intercept. If the contaminant DN is in service on the switch, it had previously ported into this switch (before the block it was contained in was pooled in). This DN is treated as if it had been pooled in and then assigned. PODN is not assigned in this case. The range specified by the FROM_DN and TO_DN inputs is added to table NPRESERV.

Table 13-1 NEWDN Provisioning (Sheet 3 of 13)

Desired Functionality	Steps required	NEWDN provisioning
Pool in a block of DNs whose NPANXX already exists in table TOFCNAME with the NONNATIVE option. Contaminants in the block are specified.	1. Use the NEWDN command: >newdn SONUMBER: NOW 99 7 13 PM > SNPA: >905 BLOCK_OF_DNS: >yes FROM_DN: >9059631000 TO_DN: >999 VDNTYPE: >portin PORTIN_ACTION: >pool CODEHOLDER: N > CONTAMINANT: >1008 CONTAMINANT: >1010 CONTAMINANT: >$ COMMAND AS ENTERED: NEWDN NOW 99 7 13 PM 905 yes 9059631000 999 portin pool n (1008) (1010) $ ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y	Each of the contaminants listed is considered to have ported out of the switch. Hence, each contaminant DN specified, provided, it is not assigned to service on the switch, is assigned to PODN intercept. If the contaminant DN is in service on the switch, it had previously ported into this switch (before the block it was contained in was pooled in). This DN is treated as if it had been pooled in and then assigned. PODN is not assigned in this case. The range specified by the FROM_DN and TO_DN inputs is added to table NPRESERV.

Table 13-1 NEWDN Provisioning (Sheet 4 of 13)

Desired Functionality	Steps required	NEWDN provisioning
Pool in a block of DNs whose NPANXX does not yet exist in table TOFCNAME. The switch is to be the codeholder of the block. Contaminants in the block are specified.	1. Add the NPA to table SNPANAME. 2. Use the NEWDN command: >newdn SONUMBER: NOW 99 7 13 PM > SNPA: >613 BLOCK_OF_DNS: >yes FROM_DN: >6136681000 TO_DN: >2999 VDNTYPE: >portin PORTIN_ACTION: >pool CODEHOLDER: > y CONTAMINANT: >1002to1005 CONTAMINANT: >1010 CONTAMINANT: >$ COMMAND AS ENTERED: NEWDN NOW 99 7 13 PM 613 yes 6136681000 2999 portin pool y (1002to1005) (1010) $ ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y	The NPANXX of the FROM_DN entered is added to table TOFCNAME with the CODEHLDR option. Each of the contaminants listed is considered to have ported out of the switch. Hence, each contaminant DN specified, provided, it is not assigned to service on the switch, is assigned to PODN intercept. If the contaminant DN is in service on the switch, it had previously ported into this switch (before the block it was contained in was pooled in). This DN is treated as if it had been pooled in and then assigned. PODN is not assigned in this case. The range specified by the FROM_DN and TO_DN inputs is added to table NPRESERV.

Table 13-1 NEWDN Provisioning (Sheet 5 of 13)

Desired Functionality	Steps required	NEWDN provisioning
Pool in a block of DNs whose NPANXX does not yet exist in table TOFCNAME. The switch is to be the blockholder of the block. Contaminants in the block are specified.	1. Add the NPA to table SNPANAME. 2. Use the NEWDN command: >newdn SONUMBER: NOW 99 7 13 PM > SNPA: >613 BLOCK_OF_DNS: >yes FROM_DN: >6136681000 TO_DN: >2999 VDNTYPE: >portin PORTIN_ACTION: >pool CODEHOLDER: > n CONTAMINANT: >1002to1005 CONTAMINANT: >1010 CONTAMINANT: >$ COMMAND AS ENTERED: NEWDN NOW 99 7 13 PM 613 yes 6136681000 2999 portin pool y (1002to1005) (1010) $ ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y	The NPANXX of the FROM_DN entered is added to table TOFCNAME with the NONNATIVE option. Each of the contaminants listed is considered to have ported out of the switch. Hence, each contaminant DN specified, provided, it is not assigned to service on the switch, is assigned to PODN intercept. If the contaminant DN is in service on the switch, it had previously ported into this switch (before the block it was contained in was pooled in). This DN is treated as if it had been pooled in and then assigned. PODN is not assigned in this case. The range specified by the FROM_DN and TO_DN inputs is added to table NPRESERV.

Table 13-1 NEWDN Provisioning (Sheet 6 of 13)

Desired Functionality	Steps required	NEWDN provisioning
Pool in a block of DNs with an NXX that will result in a duplicate NXX being introduced to the switch for the first time. The switch is to be the blockholder of the block.	1. Add the NPA to table SNPANAME. 2. Use the NEWDN command: Note: The DN entered at the FROM_DN prompt must be 10 digits in length. >newdn SONUMBER: NOW 99 7 13 PM > SNPA: >604 BLOCK_OF_DNS: >yes FROM_DN: >6046681000 TO_DN: >2999 VDNTYPE: >portin PORTIN_ACTION: >pool CODEHOLDER: > n CONTAMINANT: >$ COMMAND AS ENTERED: NEWDN NOW 99 7 13 PM 604 yes 6046681000 2999 portin pool y $ ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y *** WARNING: This change will result in two TOFCNAME entries with the same office code. Service Order prompting will change to compensate for the resulting DN ambiguity, possibly preventing automated systems from performing Service Orders. Please contact your next level of support before confirming this change. >	The NPANXX of the FROM_DN entered is added to table TOFCNAME with the NONNATIVE option. The range specified by the FROM_DN and TO_DN inputs is added to table NPRESERV. A warning is displayed indicating that a duplicate NXX is being added and SERVORD prompting will change to compensate (i.e. SNPA will no longer be prompted for separately). This warning is only displayed the first time a duplicate NXX is introduced. It is not displayed upon introduction of a subsequent duplicate NXX

Table 13-1 NEWDN Provisioning (Sheet 7 of 13)

Desired Functionality	Steps required	NEWDN provisioning
Porting in a single DN whose NPANXX does not yet exist in table TOFCNAME.	1. Add the NPA to table SNPANAME. 2. Use the NEWDN command: >newdn SONUMBER: NOW 99 7 14 AM > SNPA: >613 BLOCK_OF_DNS: >no DN: >6136631000 VDNTYPE: >portin PORTIN_ACTION: >port COMMAND AS ENTERED: NEWDN NOW 99 7 14 AM 613 NO 6136631000 PORTIN PORT ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >	The NPANXX of the DN entered is added to table TOFCNAME with the NONNATIVE option.

Table 13-1 NEWDN Provisioning (Sheet 8 of 13)

Desired Functionality	Steps required	NEWDN provisioning
Porting in a single DN whose NPANXX already exists in table TOFCNAME. The DN is on PODN intercept.	>newdn SONUMBER: NOW 99 7 14 AM > SNPA: >416 BLOCK_OF_DNS: >no DN: >4164631000 VDNTYPE: >portin PORTIN_ACTION: >port COMMAND AS ENTERED: NEWDN NOW 99 7 14 AM 416 NO 4164631000 PORTIN PORT ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y 4164631000 : is on PODN. *** Warning: It will be changed to BLDN. >	The PODN intercept is removed and the DN is put back on BLDN. (A warning is displayed)

Table 13-1 NEWDN Provisioning (Sheet 9 of 13)

Desired Functionality	Steps required	NEWDN provisioning
Porting in a block of DNs whose NPANXX does not yet exist in table TOFCNAME.	>newdn SONUMBER: NOW 99 7 14 AM > SNPA: >613 BLOCK_OF_DNS: >yes FROM_DN: >6631000 TO_DN: >1020 VDNTYPE: >portin PORTIN_ACTION: >port COMMAND AS ENTERED: NEWDN NOW 99 7 14 AM 613 YES 6631000 1020 PORTIN PORT ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y	The NPANXX of the FROM_DN entered is added to table TOFCNAME with the NONNATIVE option.

Table 13-1 NEWDN Provisioning (Sheet 10 of 13)

Desired Functionality	Steps required	NEWDN provisioning
Porting in a block of DNs whose NPANXX already exists in table TOFCNAME. There are DNs in the block which are on PODN intercept.	>newdn SONUMBER: NOW 99 7 14 AM > SNPA: >416 BLOCK_OF_DNS: >yes FROM_DN: >4164670000 TO_DN: >0030 VDNTYPE: >portin PORTIN_ACTION: >port COMMAND AS ENTERED: NEWDN NOW 99 7 14 AM 416 YES 4164670000 0030 PORTIN PORT ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y 4164670010 : is on PODN. *** Warning: It will be changed to BLDN. 4164670015 : is on PODN. *** Warning: It will be changed to BLDN. >	Those DNs in the block which are on PODN intercept are changed back to BLDN intercept. (A warning is displayed)

Table 13-1 NEWDN Provisioning (Sheet 11 of 13)

Desired Functionality	Steps required	NEWDN provisioning
Port in a block of DNs with an NXX that will result in a duplicate NXX being introduced to the switch for the first time.	1. Add the NPA to table SNPANAME. 2. Use the NEWDN command: Note: The DN entered at the FROM_DN prompt must be 10 digits in length. >newdn SONUMBER: NOW 99 7 13 PM > SNPA: >604 BLOCK_OF_DNS: >yes FROM_DN: >6046681000 TO_DN: >2999 VDNTYPE: >portin PORTIN_ACTION: >port COMMAND AS ENTERED: NEWDN NOW 99 7 14 AM 604 YES 6046681000 2999 PORTIN PORT ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y *** WARNING: This change will result in two TOFCNAME entries with the same office code. Service Order prompting will change to compensate for the resulting DN ambiguity, possibly preventing automated systems from performing Service Orders. Please contact your next level of support before confirming this change. >	The NPANXX of the FROM_DN entered is added to table TOFCNAME with the NONNATIVE option. A warning is displayed indicating that a duplicate NXX is being added and SERVORD prompting will change to compensate (i.e. SNPA will no longer be prompted for separately). This warning is only displayed the first time a duplicate NXX is introduced. It is not displayed upon introduction of a subsequent duplicate NXX.

Table 13-1 NEWDN Provisioning (Sheet 12 of 13)

Desired Functionality	Steps required	NEWDN provisioning
Introducing a new LERG assigned NPANXX to the switch.	1. Add the NPA to table SNPANAME. 2. Use the NEWDN command (with either a block of DNs or a single DN to provide the NPANXX to be added). Using a block of DNs to specify the NPANXX to be added: >newdn SONUMBER: NOW 99 7 14 AM > SNPA: >450 BLOCK_OF_DNS: >yes FROM_DN: >4503001000 TO_DN: >999 VDNTYPE: >portin PORTIN_ACTION: >newnpanxx COMMAND AS ENTERED: NEWDN NOW 99 7 14 AM 450 YES 4503001000 999 PORTIN NEWNPANXX ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y Using a single DN to specify the NPANXX to be added:>newdnSONUMBER: NOW 99 7 14 AM >SNPA: >450BLOCK_OF_DNS: >noDN: >4505001000VDNTYPE: >portin PORTIN_ACTION: >newnpanxxCOMMAND AS ENTERED:NEWDN NOW 99 7 14 AM 450 NO 4505001000 PORTIN NEWNPANXX ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y	The NPANXX of the DN entered is added to table TOFCNAME with no option.

Table 13-1 NEWDN Provisioning (Sheet 13 of 13)

Desired Functionality	Steps required	NEWDN provisioning
Introducing a new LERG assigned NPANXX to the switch with an NXX that will result in a duplicate NXX being introduced to the switch for the first time.	1. Add the NPA to table SNPANAME if it doesn't already exist. 2. Use the NEWDN command: Note: The DN entered at the FROM_DN prompt must be 10 digits in length. >newdn SONUMBER: NOW 99 8 11 AM > SNPA: >416 BLOCK_OF_DNS: >no DN: >4164661000 VDNTYPE: >portin PORTIN_ACTION: >newnpanxx COMMAND AS ENTERED: NEWDN NOW 99 8 11 AM 416 NO 4164661000 PORTIN NEWNPANXX ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y *** WARNING: This change will result in two TOFCNAME entries with the same office code. Service Order prompting will change to compensate for the resulting DN ambiguity, possibly preventing automated systems from performing Service Orders. Please contact your next level of support before confirming this change	The NPANXX of the FROM_DN entered is added to table TOFCNAME with no option. A warning is displayed indicating that a duplicate NXX is being added and SERVORD prompting will change to compensate (i.e. SNPA will no longer be prompted for separately). This warning is only displayed the first time a duplicate NXX is introduced. It is not displayed upon introduction of a subsequent duplicate NXX.

The following table contains the information necessary to provision Number Pooling using the OUTDN servord command.

Table 13-2 OUTDN Provisioning (Sheet 1 of 9)

Desired Functionality	Steps required	NEWDN provisioning
Pooling out a single DN.	Not Applicable. Individual number pooling is not supported in this release.	N/A

Table 13-2 OUTDN Provisioning (Sheet 2 of 9)

Desired Functionality	Steps required	NEWDN provisioning
Pooling out a block of DNs. All DNs in the block are on BLDN intercept. The switch is the codeholder for the block (NPANXX is in TOFCNAME with the CODEHLDR option).	1. Use the OUTDN command: >outdn SONUMBER: NOW 99 7 15 PM > SNPA: >416 BLOCK_OF_DNS: >yes FROM_DN: >4164451000 TO_DN: >999 POOL_OUT: >y CODEHOLDER: Y > COMMAND AS ENTERED: OUTDN NOW 99 7 15 PM 416 YES 4164451000 999 Y Y ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y	The block of DNs is removed from table NPRESERV.
Pooling out a block of DNs. All DNs in the block are on BLDN intercept. The switch is the blockholder for the block (NPANXX is in TOFCNAME with the NONNATIVE option).	1. Use the OUTDN command: >outdn SONUMBER: NOW 99 7 15 PM > SNPA: >613 BLOCK_OF_DNS: >yes FROM_DN: >6136630000 TO_DN: >999 POOL_OUT: >y CODEHOLDER: N > COMMAND AS ENTERED: OUTDN NOW 99 7 15 PM 613 YES 6136630000 1999 Y N ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y	The block of DNs is removed from table NPRESERV.

Table 13-2 OUTDN Provisioning (Sheet 3 of 9)

Desired Functionality	Steps required	NEWDN provisioning
Pooling out a block of DNs. There are DN(s) in the block which are still assigned to service.	1. Use the OUTDN command: >outdn SONUMBER: NOW 99 7 15 PM > SNPA: >613 BLOCK_OF_DNS: >yes FROM_DN: >6136630000 TO_DN: >1999 POOL_OUT: >y CODEHOLDER: N > COMMAND AS ENTERED: OUTDN NOW 99 7 15 PM 613 YES 6136630000 1999 Y N ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y *** WARNING: The following contaminant station codes were found *** 1023 1025	The block of DNs is removed from table NPRESERV. The contaminant DNs found are considered to have ported into this switch. A warning message is displayed indicating that contaminant station codes were found in the block. (This occurs regardless of whether the switch is the codeholder or blockholder of the DNs). These contaminant DNs are untouched by the OUTDN command and are considered to have ported into this switch.

Table 13-2 OUTDN Provisioning (Sheet 4 of 9)

Desired Functionality	Steps required	NEWDN provisioning
Pooling out a block of DNs. This is the first time a block of this NPANXX has been pooled out of the switch (The NPANXX is presently in TOFCNAME with no option against it). The switch is to remain the codeholder of this NPANXX.	1. Use the OUTDN command: >outdn SONUMBER: NOW 99 7 15 PM > SNPA: >416 BLOCK_OF_DNS: >yes FROM_DN: >4164451000 TO_DN: >999 POOL_OUT: >y CODEHOLDER: >y COMMAND AS ENTERED: OUTDN NOW 99 7 15 PM 416 YES 4164451000 999 Y Y ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y	The TOFCNAME tuple for the NPANXX of the entered DNs is assigned the CODEHLDR option. The members of the NPANXX not specified in the block to be pooled out is added to NPRESERV.

Table 13-2 OUTDN Provisioning (Sheet 5 of 9)

Desired Functionality	Steps required	NEWDN provisioning
Pooling out a block of DNs. This is the first time a block of this NPANXX has been pooled out of the switch (The NPANXX is presently in TOFCNAME with no option against it). This switch is to remain the codeholder of this NPANXX. There are DN(s) in the block which are assigned to PODN intercept.	1. Remove the PODN intercept from the DNs. (This can be done using the NEWDN command to “port” the DNs back in. This will put the DNs back on BLDN intercept.) 2. Use the OUTDN command: >outdn SONUMBER: NOW 99 7 15 PM > SNPA: >416 BLOCK_OF_DNS: >yes FROM_DN: >4164451000 TO_DN: >999 POOL_OUT: >y CODEHOLDER: >y COMMAND AS ENTERED: OUTDN NOW 99 7 15 PM 416 YES 4164451000 999 Y Y ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y	The TOFCNAME tuple for the NPANXX of the entered DNs is assigned the CODEHLDR option. The members of the NPANXX not specified in the block to be pooled out is added to NPRESERV.

Table 13-2 OUTDN Provisioning (Sheet 6 of 9)

Desired Functionality	Steps required	NEWDN provisioning
Porting out a single VDN.	1. Use the OUTDN command: >outdn SONUMBER: NOW 99 7 15 PM > SNPA: >416 BLOCK_OF_DNS: >no DN: >4164631000 POOL_OUT: >n INTERCEPT_NAME: PODN > COMMAND AS ENTERED: OUTDN NOW 99 7 15 PM 416 NO 4164631000 N PODN ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y	The VDN is removed from service and placed on PODN intercept in DNINV.
Porting out a single DN assigned to a physical line.	1. Use the OUT command to remove the DN from service and assign BLDN intercept to it. 2. Use the OUTDN command: >outdn SONUMBER: NOW 99 7 15 PM > SNPA: >416 BLOCK_OF_DNS: >no DN: >4164631001 POOL_OUT: >n INTERCEPT_NAME: PODN > COMMAND AS ENTERED: OUTDN NOW 99 7 15 PM 416 NO 4164631001 N PODN ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y	The DN is placed on PODN intercept.

Table 13-2 OUTDN Provisioning (Sheet 7 of 9)

Desired Functionality	Steps required	NEWDN provisioning
Porting out a block of VDNs supported by the OUTDN command.	1. Use the OUTDN command: >outdn SONUMBER: NOW 99 7 15 PM > SNPA: >416 BLOCK_OF_DNS: >yes FROM_DN: >4164632002 TO_DN: >2005 POOL_OUT: >n INTERCEPT_NAME: PODN > COMMAND AS ENTERED: OUTDN NOW 99 7 15 PM 416 YES 4164632002 2005 N PODN ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y	The VDNs are removed from service and placed on PODN intercept.

Table 13-2 OUTDN Provisioning (Sheet 8 of 9)

Desired Functionality	Steps required	NEWDN provisioning
Porting out a block of DNs assigned to physical lines.	1. Remove all the DNs in the block from service, placing them on BLDN intercept. 2. Use the OUTDN command: >outdn SONUMBER: NOW 99 7 15 PM > SNPA: >416 BLOCK_OF_DNS: >yes FROM_DN: >4164632002 TO_DN: >2005 POOL_OUT: >n INTERCEPT_NAME: PODN > COMMAND AS ENTERED: OUTDN NOW 99 7 15 PM 416 YES 4164632002 2005 N PODN ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y	All the DNs in the block are placed on PODN intercept.

Table 13-2 OUTDN Provisioning (Sheet 9 of 9)

Desired Functionality	Steps required	NEWDN provisioning
Porting out a block of VDNs not supported by the OUTDN command.	1. Remove all the VDNs in the block from service, placing them on BLDN intercept. 2. Use the OUTDN command: >outdn SONUMBER: NOW 99 7 15 PM > SNPA: >416 BLOCK_OF_DNS: >yes FROM_DN: >4164632002 TO_DN: >2005 POOL_OUT: >n INTERCEPT_NAME: PODN > COMMAND AS ENTERED: OUTDN NOW 99 7 15 PM 416 YES 4164632002 2005 N PODN ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT >y	The DNs are placed on PODN intercept.

13.3.3 CI NPRESERVE

In cases where the Servord NEWDN and OUTDN interfaces are not available, table NPRESERV may be datafilled using the NPRESERVE CI command introduced by this feature.

The input parameters for the NPRESERV command are shown in the following table.

Table 13-3 NPRESERVE input parameters (Sheet 1 of 2)

Input Parameter	Description	Mandatory
in/out	Indicates whether DNs are being pooled in or out (i.e. whether ranges are being added to/deleted from table NPRESERV). Allowed values are: IN, OUT	Yes

Table 13-3 NPRESERVE input parameters (Sheet 2 of 2)

Input Parameter	Description	Mandatory
From_DN	Indicates the start of the range to be pooled in/out. It must be a 10-digit DN in the form of NPA-NXX-XXXX	Yes
To_DN	Indicates the end of the range to be pooled in/out. It must be a 10-digit DN in the form of NPA-NXX-XXXX	Yes

The NPRESERVE CI command only datafills table NPRESERV with the range specified by the From_DN and To_DN input parameters. It does not provide provisioning of TOFCNAME and DNINV like the SERVORD interface does.

The command format for NPRESERVE is shown below:

Figure 13-7 MAP NPRESERVE command format

```
NPRESERVE - A tool that updates table NPRESERV.

To Add a range to table NPRESERV:
  NPRESERVE IN <10-digit FROM_DN> <10-digit TO_DN>
To Delete a range from table NPRESERV:
  NPRESERVE OUT <10-digit FROM_DN> <10-digit TO_DN>

Parms: <IN_OR_OUT> {IN,
                    OUT}
       <FROM_DN> STRING
       <TO_DN> STRING
```

The input for the From_DN and To_DN parameters must have an NPANXX which already exists in table TOFCNAME.

Access to the NPRESERVE CI command is controlled via the NPRESERV_CI field in table LNPOPTS. The default value for this tuple is ‘OFF’. In order to use the NPRESERVE CI command, this value must be turned to ‘ON’.

When the NPRESERV_CI is changed from ‘OFF’ to ‘ON’, the following warning is displayed:

Setting NPRESERV_CI to ON allows the NPRESERVE CI command to be used to datafill NPRESERV. Note however that the servord commands NEWDN and OUTDN are the recommended means with which to provision number pooling.

13.3.3.1 Provisioning Number Pooling Using the NPRESERVE CI command

The following tables illustrate how the NPRESERVE CI command is used to pool DN blocks when the Servord interface is not available. Aside from table NPRESERV, all the table datafill mentioned below may be done with table editor.

Table 13-4 Pooling in blocks of DNs using the NPRESERVE CI command (Sheet 1 of 2)

Desired functionality	Steps required
Pooling in a single DN	Not Applicable. Individual number pooling is not supported in this release. An error message is displayed if the FROM_DN and TO_DN parameters contain the same DN.
Pool in a block of DNs. The switch is to be the codeholder. The block contains no contaminants.	1. If the NPANXX of the DNs is not already in TOFCNAME, add it with the CODEHLDR option. 2. Use the NPRESERVE CI command to add the pooled in block to table NPRESERV. > NPRESERVE IN 4164451000 4164451999
Pool in a block of DNs. The switch is to be the blockholder. The block contains no contaminants.	1. If the NPANXX of the DNs is not already in TOFCNAME, add it with the NONNATIVE option. 2. Use the NPRESERVE CI command to add the pooled in block to table NPRESERV. > NPRESERVE IN 4164451000 4164451999

Table 13-4 Pooling in blocks of DNs using the NPRESERVE CI command (Sheet 2 of 2)

Desired functionality	Steps required
Pool in a block of DNs. The switch is to be the codeholder. There are contaminants in the block.	1. If the NPANXX of the DNs is not already in TOFCNAME, add it with the CODEHLDR option. 2. For each of the contaminant DNs, in table DNROUTE put the DN on PODN intercept. Ensure that the number of contaminants in a thousands block does not exceed the percentage indicated by NP_MAX_CONTAM in table LNPOPTS. 3. Use the NPRESERVE CI command to add the pooled in block to table NPRESERV. > NPRESERVE IN 4164451000 4164451999
Pool in a block of DNs. The switch is to be the blockholder. There are contaminants in the block.	1. If the NPANXX of the DNs is not already in TOFCNAME, add it with the NONNATIVE option. 2. For each of the contaminant DNs, in table DNROUTE put the DN on PODN intercept. Ensure that the number of contaminants in a thousands block does not exceed the percentage indicated by NP_MAX_CONTAM in table LNPOPTS. 3. Use the NPRESERVE CI command to add the pooled in block to table NPRESERV. > NPRESERVE IN 4164451000 4164451999

Table 13-5 Pooling out blocks of DNs using the NPRESERVE CI command (Sheet 1 of 4)

Desired functionality	Steps required
Pooling out a single DN.	Not Applicable. Individual number pooling is not supported in this release. An error message is displayed if the FROM_DN and TO_DN parameters contain the same DN.

Table 13-5 Pooling out blocks of DNs using the NPRESERVE CI command (Sheet 2 of 4)

Desired functionality	Steps required
Pooling out a block of DNs. The switch is the codeholder for the block (NPANXX is in TOFCNAME with the CODEHLDR option). The block contains no contaminants.	1. Ensure that all DNs in the block are on either BLDN or UNDN intercept in table DNINV. 2. Use the NPRESERVE CI command to remove the pooled out block from table NPRESERV. > NPRESERVE OUT 4164451000 4164451999
Pooling out a block of DNs. The switch is the blockholder for the block (NPANXX is in TOFCNAME with the NONNATIVE option). The block contains no contaminants.	1. Ensure that all DNs in the block are on either BLDN or UNDN intercept in table DNINV. 2. Use the NPRESERVE CI command to remove the pooled out block from table NPRESERV. > NPRESERVE OUT 4164451000 4164451999
Pooling out a block of DNs. There are contaminants in the block (ie. there are DN(s) in the block which are still assigned to service).	1. Ensure that all DNs in the block other than the contaminants are on either BLDN or UNDN intercept in table DNINV. (The contaminants are now considered to have ported into this switch). Ensure that the number of contaminants in a thousands block does not exceed the percentage indicated by NP_MAX_CONTAM in table LNPOPTS. 2. Use the NPRESERVE CI command to remove the pooled out block from table NPRESERV. > NPRESERVE OUT 4164451000 4164451999

Table 13-5 Pooling out blocks of DNs using the NPRESERVE CI command (Sheet 3 of 4)

Desired functionality	Steps required
Pooling out a block of DNs. This is the first time a block of this NPANXX has been pooled out of the switch (The NPANXX is presently in TOFCNAME with no option against it). The switch is to remain the codeholder of this NPANXX. The block contains contaminants (DNs still assigned to service).	1. Ensure that all DNs in the block other than the contaminants are on either BLDN or UNDN intercept in table DNINV. (The contaminants are now considered to have ported into this switch). Ensure that the number of contaminants in a thousands block does not exceed the percentage indicated by NP_MAX_CONTAM in table LNPOPTS. 2. Add the CODEHLDR option to the TOFCNAME tuple for the NPANXX of the DNs to be pooled out. 3. Use the NPRESERVE CI command to add the entire NPANXX to table NPRESERV. (The block which is to be pooled out will be removed later). > NPRESERVE IN 4164450000 4164459999 4. Use the NPRESERVE CI command to remove the pooled out block from table NPRESERV. > NPRESERVE OUT 4164451000 4164451999

Table 13-5 Pooling out blocks of DNs using the NPRESERVE CI command (Sheet 4 of 4)

Desired functionality	Steps required
Pooling out a block of DNs. This is the first time a block of this NPANXX has been pooled out of the switch (The NPANXX is presently in TOFCNAME with no option against it). This switch is to remain the codeholder of this NPANXX. There are DN(s) in the block which are assigned to PODN intercept. The block contains contaminants (DNs still assigned to service).	1. Ensure that all DNs in the block other than the contaminants are on either BLDN or UNDN intercept in table DNINV. (The contaminants are now considered to have ported into this switch). The DNs on PODN intercept must also be changed back to BLDN or UNDN intercept. Ensure that the number of contaminants in a thousands block does not exceed the percentage indicated by NP_MAX_CONTAM in table LNPOPTS. 2. Add the CODEHLDR option to the TOFCNAME tuple for the NPANXX of the DNs to be pooled out. 3. Use the NPRESERVE CI command to add the entire NPANXX to table NPRESERV. (The block which is to be pooled out will be removed later). > NPRESERVE IN 4164450000 4164459999 4. Use the NPRESERVE CI command to remove the pooled out block from table NPRESERV. > NPRESERVE OUT 4164451000 4164451999

13.4 Enhanced Functionality

This section describes the interactions between Number Pooling and other functionalities.

13.4.1 MultiLocation Business Group

The LNP/MBG Interworking feature focuses on the interworking of the Multilocation Business Groups (MBG) feature with LNP. MBG allows customer group members that are connected to different switches to share some of the same services. By networking two or more Centrex groups across the Public Switched Telephone Network (PSTN), they appear as one MBG group.

The LNP/MBG Interworking feature has the following impacts on existing functionality.

- LNP trigger on an MBG call. This feature removes blocks that prevent triggering and allows private to private call scenarios to interact with the LNP trigger.
- LNP/MBG triggering. This feature introduces the combination of LNP and MBG information that results in the IAM message containing both the LNP ported number GAP and the MBG dialled number GAP.
- LNP/MBG Terminations. This feature creates the functionality necessary for terminating calls with both LNP and MBG signalling information in the IAM.
- Traver. This feature allows for MBG and LNP information to be entered on the command line. This functionality is necessary for validating translations on the switch and verifying the type of signalling that the customer should expect. The two types of Travers affected are:

  — LNP Response Traver created by MBG call.

  — Incoming LNP/MBG trunk call.

  An MBG call that uses the N and S selectors in the IBNRTE table, for routing, is unable to encounter the LNP trigger at any point during translations. This form of routing an MBG call is not supported by the LNP trigger.

The following figure represents an LNP Response Traver created by an MBG call.

Figure 13-8 LNP response traver for MBG call

```
traver l 6136737058 n cdn na 9059631099 ainres r01 lnpar mbg local 1
0 31351 4164731351 b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
LNP Info: Call Type set to NP for FLRN translations
TABLE RTECHAR
 . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE IBNLINES
HOST 02 0 05 15 0 DT STN IBN 6737051 MDC613 0 0 613 $

... <cut> ...

NP Info: HNPA translation completed on Foreign LRN.
LNP Info: HNPA results are used.
TABLE CLSVSCRC
KEY NOT FOUND

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 C1S1_ISUPITOG         9059631099         ST
          MBG: LOCAL 1  LP: 0  GAP: 39058
          PORTED NUMBER GAP: 4164731351

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT
```

The following figure represents an LNP Response Traver created by an incoming LNP/MBG trunk call.

Figure 13-9 LNP response traver for incoming LNP/MBG trunk call

```
traver tr c1s1_isupitic 4164631099 tcni mbg local 1 0 37051
6136637051 b
MBG CALL: LNP Call
MBG CALL: LNP GAP Present
MBG CALL: LRN Belongs to Office
MBG CALL: Route DN is resident
MBG CALL:CUST xla on GAP
TABLE TRKGRP
C1S1_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 PUB NSCR 613 000 N Y $

... <cut> ...

AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 LINE             6136637051ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

13.4.2 NET ESN/PVT selector

The IBN Translations NET Selector allows customer group members to access various networks. The networks include DOD, ESN, GEN, LOC, MBG, OWT and PVT.

The NET Selector allows access to various features, some of which are considered to be part of the “public” environment. Calls which encounter the NET selector, and are then routed to the public environment, are then able to encounter the LNP trigger and terminate to ported numbers. These features include; Direct Outward Dial (DOD), General Network Selector (GEN) and OUTWATS (OWT).

The NET Selector also allows calls in the “private” environment to use public translations while still being considered private. Calls which encounter these features do not encounter the LNP trigger while using public translations. These features include; Electronic Switched Network (ESN), Private Network (PVT), Multiswitch business group (MBG) and MBG with Location (LOC).

The Number pooling Feature Interactions feature changes the NET ESN and NET PVT selectors, to allow the call to encounter the LNP trigger while using public translations.The rationale for this item is to maintain consistency between the ESN, PVT, and MBG selectors when routing between Centrex

locations where LNP services are required due to ported/pooled DNs in the customer groups.

This functional change is enabled by the creation of an LNP option in table IBNXLA. Restricted to just the NET ESN and PVT selectors, the option is an indication by the customer that the ESN or PVT call in question should be considered eligible for triggering. Calls of this nature should match National Significant format when the prefix is removed.

If the dialed number is an ESN or PVT code (i.e. not in National Significant format), it is still possible to have it considered eligible for triggering. This is done through a combined use of the LNP and DMI options on the IBNXLA tuple. The DMI option is normally not allowed on NET ESN/PVT tuples, but now is allowed, if in the presence of the LNP option. The DMI option points towards an index in table DIGMAN, which must contain digit manipulation commands to render the number into National Significant format.

To further refine the scope of this functional change, it must be done for only the LNP trigger, not for all AIN triggers. Number Pooling introduces ported numbers in multi-DN groups; nothing outside the workings of the LNP framework. As AIN currently disallows these private calls from encountering AIN triggers, this should not change with the introduction of this activity.

Lastly, allowing ESN/PVT routed calls to encounter the LNP trigger does not mean that every call will encounter it. Only those calls whose digit count would correspond to that of a National Significant call will match the criteria for the trigger; i.e. 7 or 10 digits. This evaluation is made excluding the dialed prefix (in the case of the LNP option) or on the full dialed DN (in the case of the LNP and DMI options, since it has been thus manipulated).

In the following scenario, a private agent dials the prefix ‘6’, and then a 7 or 10 digit number that matches National Significant format. The LNP option is present.

Figure 13-10 7 digit Nat. Sig. dialed call, prefixed, LNP option

```
traver l 9059731051 64638003 b
TABLE IBNLINES
HOST 01 0 15 01 0 DT STN IBN 9731051 MDC905 0 0 905 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
MDC905 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
MDC905 0 0 0 KDK0 ( OHQ 0 TONE_OHQ) ( CBQ 0 3 N 2)$
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND
DIGCOL
MDC905 PXDK 905XDK FTCOMM 0 KDK
TABLE DIGCOL
KDK 6 COL L 1
TABLE IBNXLA: XLANAME PXDK
PXDK 64 NET N N 1 N NDGT N Y PVT 613 LCL NSCR ( LNP )$
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE HNPACONT
613 Y 930 20 ( 126) ( 1) ( 0) ( 0) 0 $
 . SUBTABLE HNPACODE
 . 4638003 463809 LRTE 747
 . SUBTABLE RTEREF
 .  747 T IBNRTE 88
 .  . TABLE IBNRTE
 .  .   88 VFG N N N MBGVFG 0
 .  . EXIT TABLE IBNRTE
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
TABLE FNPA7DIG
613 463 463 416
TABLE TRIGGRP
CDPCODE INFOANAL
 . CDPCODE ( DG CDPDIG)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
Checking AIN SDS Trigger Items as SDS is compatible with current
call
Checking AIN N11 Trigger Items as N11 is compatible with current
call
Checking AIN LNP Trigger Items as LNP is compatible with current
call
 .  . TABLE OFCTIID
 .  . 4 L4164630N
 .  . TABLE TRIGITM
 .  . 4 L416463LNP (DG 4164638003) (ESCEA ) (ESCOP ) (ESCDN ) $
ULK EVENT R01 SS7
 .  .     AINJAZZ $
 .  .  . TABLE C7GTTYPE
 .  .  . AINJAZZ ANSI7 3 $
 .  .  . TABLE C7GTT
 .  .  . AINJAZZ 4164638003 4164638003 SSNONLY (AINTEST) $
```

In the following scenario, a private agent dials the prefix ‘6’, and then an ESN or PVT code to reach a private agent on another switch. The LNP and DMI options are present.

Figure 13-11 Non-Natl. Sig. dialed call, prefixed, LNP + DMI option

```
traver l 9059731051 63518003 b
TABLE IBNLINES
HOST 01 0 15 01 0 DT STN IBN 9731051 MDC905 0 0 905 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
MDC905 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
MDC905 0 0 0 KDK0 ( OHQ 0 TONE_OHQ) ( CBQ 0 3 N 2)$
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT,
AND DIGCOL
MDC905 PXDK 905XDK FTCOMM 0 KDK
TABLE DIGCOL
KDK 6 COL L 1
TABLE IBNXLA: XLANAME PXDK
PXDK 63 NET N N 1 N NDGT N Y ESN N 80 613_PUB_161 L613_LATA1_0
( DMI 351) ( LNP )$
 . TABLE DIGMAN
 .   351 (REM 3) (INC 416463)
 . EXIT TABLE DIGMAN
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
80 IBN NONE NT 10 NILSFC 0 NIL NIL 00 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PUB_161 E613 613 PUB TSPS N $ $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE STDPRTCT
PUB ( 1) ( 0) 1
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 930 20 ( 126) ( 1) ( 0) ( 0) 0 $
 . SUBTABLE HNPACODE
 . 4164638003 416463809 FRTE 747
. SUBTABLE RTEREF
 .  747 T IBNRTE 88
```

The following is an invalid scenario.

The LNP option is to be used for calls whose dialed digits (minus the prefix) match National Significant format, and would match a public number in the network.

The LNP and DMI options are to be used for calls whose dialed digits need manipulation to match National Significant format, and match a public number in the network.

Use of just the LNP option in scenarios where the dialed digits need manipulation will result in the call being misrouted. An example is below; this is the same scenario as the previous example, but with the DMI option removed.

Figure 13-12 Non-national sig. dialed call, prefixed, LNP option

```
traver l 9059731051 63518003 b
TABLE IBNLINES
HOST 01 0 15 01 0 DT STN IBN 9731051 MDC905 0 0 905 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
MDC905 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
MDC905 0 0 0 KDK0 ( OHQ 0 TONE_OHQ) ( CBQ 0 3 N 2)$
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND
DIGCOL
MDC905 PXDK 905XDK FTCOMM 0 KDK
TABLE DIGCOL
KDK 6 COL L 1
TABLE IBNXLA: XLANAME PXDK
PXDK 63 NET N N 1 N NDGT N Y ESN N 80 613_PUB_161 L613_LATA1_0 (
LNP )$
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
80 IBN NONE NT 10 NILSFC 0 NIL NIL 00 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PUB_161 E613 613 PUB TSPS N $ $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE STDPRTCT
PUB ( 1) ( 0) 1
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
. SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 930 20 ( 126) ( 1) ( 0) ( 0) 0 $
 . SUBTABLE HNPACODE
 . 351 351 FRTE 651
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
TABLE TMTCNTL
LNT ( 113)
 . SUBTABLE TREAT
 . PDIL Y T OFRT 51
 . TABLE OFRT
 .   51 S D PSPD
 .      S D *OFLO
 .      S D ROH
 .      S D LKOUT
```

The following scenario is like Figure "13-11. 7 digit Nat. Sig. dialed call, prefixed, LNP option" on page 39, with the exception that the SOC controlling the functionality is IDLE.

Figure 13-13 7-digit Nat. Sig. dialed call, prefixed, LNPoption, SOC IDLE

```
traver l 9059731051 64638003 b
TABLE IBNLINES
HOST 01 0 15 01 0 DT STN IBN 9731051 MDC905 0 0 905 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
MDC905 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
MDC905 0 0 0 KDK0 ( OHQ 0 TONE_OHQ) ( CBQ 0 3 N 2)$
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT,
AND DIGCOL
MDC905 PXDK 905XDK FTCOMM 0 KDK
TABLE DIGCOL
KDK 6 COL L 1
TABLE IBNXLA: XLANAME PXDK
PXDK 64 NET N N 1 N NDGT N Y PVT 613 LCL NSCR ( LNP )$
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE HNPACONT
613 Y 930 20 ( 126) ( 1) ( 0) ( 0) 0 $
 . SUBTABLE HNPACODE
 . 4638003 463809 LRTE 747
 . SUBTABLE RTEREF
 .  747 T IBNRTE 88
 .  . TABLE IBNRTE
 .  .   88 VFG N N N MBGVFG 0
 .  . EXIT TABLE IBNRTE
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
TABLE FNPA7DIG
613 463 463 416
TABLE TRIGGRP
CDPCODE INFOANAL
 . CDPCODE ( DG CDPDIG)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
Checking AIN SDS Trigger Items as SDS is compatible with current
call
Checking AIN N11 Trigger Items as N11 is compatible with current
call
Checking AIN LNP Trigger Items as LNP is compatible with current
call
LNP Info: LNP interworking with ESN/PVT is IDLE.
LNP Info: NET ESN/PVT call will not trigger LNP.
AIN Info Analyzed TDP: trigger criteria not met.

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

13.4.3 Network Attendant Console

Attendant Console (AC) is an optional feature of Meridian Digital Centrex (MDC). A Console works with the controlling DMS-100 switch to perform a full range of call answering, handling, and tracking features that allow a customer to provide the service of an information and message center. An AC is associated with a customer group, which is an entity on a switch in which individuals can request special IBN services. Network AC (NAC) is largely the same hardware and software as the MDC Console. The largest difference is the NAC features are permitted to operate interswitch.

The following list indicates supported NAC features by this activity. The features, which query LNP, still function as expected:

- Network Attendant Busy Verification Line(BVL)
- Network Attendant Control
- Network Attendant Recall
- Network Camp-on l/ll
- Network NCOS and CLID Display on AC
- Network CLID and NCOS display l/A 3WC
- Network Attendant Feature Optionality

Number Pooling requires the ability for multi-DN groups to be composed of both ported and non-ported numbers. For each of the above Network AC features, it is expected that the feature will behave as expected regardless of the ported status of the originator or terminator, and the regardless of the necessity of an LNP query to terminate the call.

13.4.4 Network Ring Again

Ring Again allows a user encountering a busy station to queue against that station and be recalled when it becomes idle. If the user accepts the recall, the original call will be set up again automatically. Network Ring Again (NRAG) extends the ability to a different switch in the network in the same customer group.

The following 4 tables required datafill for NRAG: C7NETSSN, C7LOCSSN, CUSTNTWK and CUSTSTN. Table C7NETSSN contains nodes accessible within the network and applications at those nodes that can be addressed by signalling connection control part(SCCP). Table C7LOCSSN contains information for the local subsystem. Table CUSTNTWK provides the operating company client with the ability to specify a network name with which a customer group is associated. It also provides a predetermined global numeric identifier (NETCGID) within the specified network name that is for the customer group throughout the network. The Table CUSTSTN contains the

station options assigned to each customer groups to specify the length of the RAG call time.

As with the Network AC, Network Ring Again is expected to function properly regardless of the ported status of the originator and terminator and the necessity of performing an LNP trigger to terminate the call.

13.4.5 Foreign Location Routing Number

This activity addresses a restriction initially stipulated in the Functional Description of activity AU3086. That restriction indicated that Equal Access translations done on a portable CalledParty DN should yield the same results as Equal Access translations done on its LRN. This restriction is intended to provide consistent rating for calls to the ported DN, and consistency in routing of calls to a portable DN both before and after the DN ports.

With the increased volume of portability introduced with Number Pooling, and the inclusion of FLRN translations requirements in the T1S1.6 Number Portability standards, there is an increased need to provide the enforcement of the previously stated restriction.

This activity provides two levels of enhancement, directed at enforcement of the LATAXLA translations result of the FLRN.

The first level of enforcement is provided when the NPE00005 SOC is in the IDLE state. In this case, the operating company may choose to have an information log generated for each call attempt where the pre-query LATAXLA values differ from the post-query LATAXLA values. An example of this scenario is provided below:

Figure 13-14 NPE00005 SOC in the IDLE state.

```
NPE00005 SOC IDLE:

>traver l 4164671001 n cdn na 6136630000 ainres r01 lnpar 4164638621 dd intra
inter non_ea b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
LNP Info: Call Type set to DD for FLRN translations
......
TABLE LATAXLA
TUPLE NOT FOUND
ASSUMED TO BE DEFAULT INTRALATA, INTRASTATE, STD
LNP Info: FLRN LATAXLA result mismatches LNP Pre-Query values.
LNP Info: LNP305 log will be generated in Call Processing.
```

The optionality of the LNP305 log is controlled via table LNPOPTS. The tuple LNP_305_LOG defaults to LOG_ON, but may be set to LOG_OFF at the discretion of operating company personnel.

Disabling the LNP305 log is permitted to allow for cases such as the recipient switch is unable to provide additional LRNs for proper routing of the LNP calls. In this case, the operating company for which the LNP305 logs are being produced may be aware of the mismatch in LATAXLA results, but may not be in a position to affect any of the potential translations changes necessary to avoid the mismatch.

The second level of enforcement is provided when SOC NPE00005 is in the ON state. In this case, the pre-query LATAXLA values are enforced upon the post query LATAXLA translations performed on the FLRN. No log is produced in this case to inform of potential mismatches, since the pre-query value is always used, regardless of any data in table LATAXLA which would indicate the contrary.

For both levels of enforcement, the Traver command line is enhanced to allow the operating company personnel to specify the pre-query LATAXLA values for the LNP response traver. If no LATAXLA values are specified on the Traver command line, INTRA, INTRA, STD is assumed. An example of this is provided below:

Figure 13-15 NPE00005 SOC in the ON state

```
NPE00005 SOC ON:

>traver l 4164671001 n cdn na 6136630000 ainres r01 lnpar 4164638621 dd intra
inter non_ea b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
LNP Info: Call Type set to DD for FLRN translations
......
TABLE LATAXLA
TUPLE NOT FOUND
ASSUMED TO BE DEFAULT INTRALATA, INTRASTATE, STD
LNP Info: LNP Overrides LATAXLA result with Pre-LNP Query values.
LNP Info: LNP LATAXLA value is INTRALATA INTERSTATE NON_EA
```

It is important to note that for calls which do not encounter the LATAXLA table in pre-query translations, but do encounter the LATAXLA table in post-query translations, the LNP comparison of results is still performed. In this case the pre-query translations LATAXLA values are assumed to be INTRALATA, INTRASTATE, and STD.

Additionally, for calls which encounter LATAXLA in the pre-query translations but do not encounter table LATAXLA in the post-query LATAXLA translations, no LNP comparison is done. This scenario should typically not occur, since the calltype of pre-query translations is enforced upon post-query translations, and therefore encountering LATAXLA in the pre-query leg of the call would also occur in the post query leg.

13.4.6 Outpulsing on IBN SS7

Logic has been added such that when LNP response translations return a foreign LRN and the call is to be routed over an IBN SS7 trunk, the trunk behaves as if it has the Signal Ported Number (SPN) option on it.

LNP ISUP signalling parameters are public parameters, and as private ISUP trunks are not to send public parameters, this saves the customer from having to datafill the SPN option against all their private ISUP trunks.

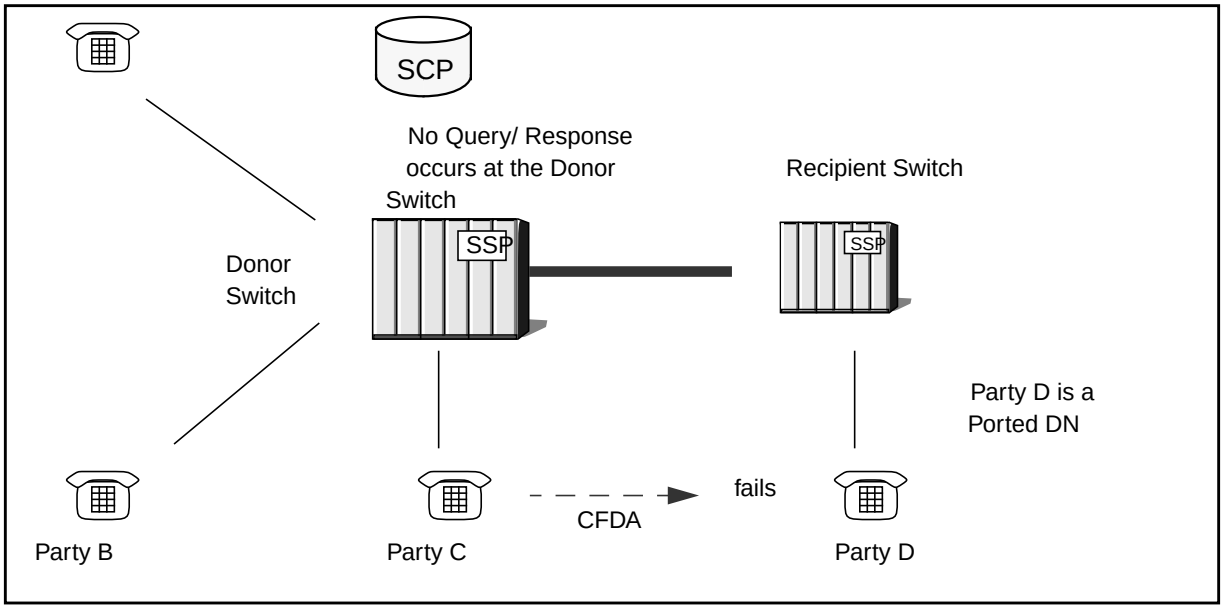
This enhancement is also necessary to facilitate the interworkings of the NRAG feature with LNP.

13.4.7 Three-Way Call Interworking Enhancement for LNP

This activity addressed a limitation of the AIN product with intraswitch Three Way Call invocations. Prior to this activity, security restrictions within AIN prevented an active Three Way call from being allowed to encounter an AIN based trigger as the result of a Call Forward, such as Call Forward Don't Answer (CFDA).

In this specific interaction, if an intraswitch Three-Way call is active with one party engaged in the call in the ringing state, and that ringing party encounters a call forward event (e.g. CFDA), the call forward is blocked if an AIN trigger is specified during the call forward translations. In this case, the existing connections are not broken, but the call forward is regressed back to the forwarding base station (i.e. the ringing station continues to ring and no call forward occurs). An example of this scenario appears in the figure below:

Figure 13-16 AIN restriction on Call Forward within an active 3WC



This activity removes the restriction of forwarding when the LNP trigger is the only AIN based trigger being encountered during the translation of the call forward call leg when the NPE00005 SOC is in the ON state. This activity does not alter the interaction of any other AIN based trigger when encountered in the above call scenario, and has not effect on the above call scenario if the NPE00005 SOC is IDLE.

13.4.8 CLASS (ACB, AR, SLE, SMDI) Interworking Enhancements for LNP

LNP Interworking with CLASS based features Automatic Call Back (ACB), Automatic Redial (AR), Simplified Message Desk Interface (SMDI), and Selective List Editing (SLE) is enhanced to align with the T1S1.6 Number Portability requirements on CLASS interworking. These requirements indicated the following guidelines for interworking LNP with the aforementioned features:

- The invocation of one of these CLASS based features is not to result in a TCAP query if the requestee DN is resident on the same switch as the requestor.
- LNP should result in a TCAP query being initiated for the invocation of a CLASS feature where the requestee DN is not resident on the same switch as the requestee, and the requestor DN is indicated to be portable at the requestor switch.
- LNP should also result in a TCAP query being initiated for the invocation of a CLASS based feature where the requestee DN is resident on the same switch as the requestor, and the requestee DN is assigned the 10 digit unconditional trigger (PORT option), and the requestee DN is indicated to be portable at the requestor switch.

The LNP interworking with the aforementioned CLASS based features is enhanced in the NA013 release to align with the above guidelines, since the volume of CLASS based feature interactions with LNP is expected to dramatically increase with the introduction of Number Pooling.

13.4.9 NPA Split

When an NPA in a given geographic area nears or reaches jeopardy conditions, the operating company may choose, or may be regulated, to implement an NPA Split to provide relief.

The LNP/NPA Split Interworking enhancements feature provides enhancements to the interworking between Call Processing and the Table Control components of Local Number Portability (LNP) and the DMS NPA Split capability.

The interworking between LNP and NPA Splits is focused in two main areas; correct recognition of a Location Routing Number (LRN) impacted by an NPA

Split; and correct recognition of Ported Number Generic Address Parameter (GAP) digits affected by an NPA Split.

This feature allows proper LRN and GAP recognition, and hence enhances the interworking of LNP with NPA Splits, by addressing the data changes necessary in three primary LNP tables: LNPCODE, NPRESERV, and HOMELRN. These data changes are controlled by the LNP table created in a previous release for NPA Split interworking, NPDIGMAP.

Since operating company(s) can perform the ANI Conversion (Automatic Number Identification) at any time within the permissive dialing period, the software changes required for this feature take into account the conditions revolving around three specific time frames:

- At the beginning of the permissive dialing period, and prior to the ANI conversion of the affected switch
- At the point of ANI conversion of the affected switch
- At the end of the permissive dialing period

Within these three time frames, provisioning steps must be performed to successfully implement an NPA split where LNP interworking is involved. A detailed description of the required provisioning steps is outlined in later sections.

13.4.9.1 LNP-Specific Steps for Performing an NPA Split

An NPA Split in a given geographic area may involve either or both of two processes, NPA Conversions and true NPA Splits

An NPA Conversion is the method of NPA Split by which, on each affected switch, all the NXX codes within the NPA being converted are moved to a new NPA.

In a true NPA Split, on the affected switch only some of the NXX codes in the affected NPA are migrated to the new NPA whereas some NXX codes remain in the old NPA.

ANI conversion can occur at any time within the permissive dialing period and the first three provisioning steps are executed only if the ANI conversion does not occur at the beginning of the permissive period, otherwise the steps may be excluded. Also, if NPE00005 is not active, there are certain alternate steps that need to be performed at the time of ANI conversion to compensate for the lost functionalities that would normally be present if the SOC were active.

13.4.9.2 Provisioning Steps Prior to ANI Conversion

The following steps must be performed prior to ANI Conversion:

- Provision tuples in the NPDIGMAP table to map the new NPA-NXX combination to the old NPA-NXX combination fro LNP calls where the GAP may contain a DN affected by the NPA Split and which has the new NPA.
- Provision maintenance LRNs in table HOMELRN to allow termination of LRNs which have been affected by the NPA Split, and which are routed via the new NPA instead of the old NPA.

13.4.9.3 Provisioning Steps at time of ANI Conversion

At the time of the ANI Conversion there is only one step to perform. Remove any NPDIGMAP tuples used to map the new NPA-NXXs to the old NPA-NXXs and remove any maintenance LRNs from the HOMELRN table used to allow LRNs routed using the new NPA to be recognized.

13.4.9.4 Provisioning Steps with NPE00005 SOC Active

If the NPE00005 SOC is active, one other step must be done at the time of the ANI Conversion. Enter mapping tuples in the NPDIGMAP table, setting the UPD4GAP and UPD4LRN fields as required.

13.4.9.5 Provisioning Steps with NPE00005 SOC Inactive

If the NPE00005 SOC is inactive the following alternate steps must be performed:

- Enter mapping tuple(s) in NPDIGMAP setting both boolean fields to No.
- Delete all data referencing old NPANXXs from LNP tables and re-enter the data with new NPANXXs. The three LNP tables, HOMELRN, NPRESERV, and LNPCODE must be manually updated to reflect the new NPA.
- Provision maintenance LRN(s) in HOMELRN. Since LRN digits may still contain the old NPA at the time of ANI conversion, a maintenance LRN is needed to guard against incoming LRNs that contain the old NPA.

13.4.9.6 Provisioning Steps at the End of the Permissive Period

At the end of the permissive period, there are no steps related to the actual provisioning of LNP tables. However, two following LNP specific operations must be done:

- Remove any mapping tuples from the NPDIGMAP table
- Remove any maintenance LRNs from table HOMELRN

13.5 Tools and Support

This section details the tools and supporting information that are enhanced or introduced in a Number Pooling environment.

13.5.1 QDN

The QDN command is used to display information on hardware and software associated with the following:

- a directory number (DN)
- Advanced Intelligent Network (AIN) trigger group subscribed for the office
- AIN trigger group assignments for the customer group line

This command can be used on DNs, subdirectory numbers (SDN), or enhanced subdirectory number (ESDN).

The QDN command is modified so that the system considers a DN as ported-in if all the following conditions are true:

- the DN is assigned to service
- the associated NPA-NXX is non-native or the codeholder of the switch
- the DN is not in the Reserved number database (NPRESERV)

The system considers a DN as ported out if the DN is assigned ported out DN intercept (PODN)

In a number pooling environment, an unassigned DN that is not owned by the switch is listed as “NOT-OWNED”. If the DN is owned by the switch, it is listed as “NP-RESERVED”. Software Optionality Control option NPE00005 controls this enhancement. This enhancement does not affect the unassigned DN with native NPA-NXX.

The following figure shows an example of the QDN command for an unassigned DN not owned by the switch.

Figure 13-17 MAP display of the QDN command, unassigned DN not owned by the switch

```
>qdn 6631001

-------------------------------------------
DN: 6631001      (NOT-OWNED)
TYPE: UNASSIGNED
-------------------------------------------
```

The following figure shows an example of the QDN command for an unassigned DN owned by the switch.

Figure 13-18 MAP display of the QDN command, unassigned DN owned by the switch

```
>qdn 6631001

-------------------------------------------
DN: 6631001      (NP-RESERVED)
TYPE: UNASSIGNED
-------------------------------------------
```

13.5.2 QLEN

The QLEN command is used to display information on the following:

- a line equipment number (LEN) or directory number (DN)
- advanced intelligent network (AIN) trigger group subscribed for the office
- AIN trigger group assignments for the customer group line

The QLEN command is modified so that the system considers a DN as ported in if all the following conditions are true:

- the DN is assigned to service
- the associated NPA-NXX is non-native or a codeholder on the switch
- the DN is not in the reserved number database (NPRESERV)

In a number pooling environment, an unassigned DN that is not owned by the switch is listed as “NOT-OWNED”. If the DN is owned by the switch, it is listed as “NP-RESERVED”. Software Optionality Control option NPE00005 controls this enhancement. This enhancement does not affect the unassigned DN with native NPA-NXX.

The following figure shows an example of the QLEN command for an unassigned DN not owned by the switch.

Figure 13-19 MAP Display of the QLEN command, unassigned DN not owned by the switch

```
>qlen 6631001

THE DN IS UNASSIGNED      (NOT-OWNED)
```

The following figure shows an example of the QLEN command for an unassigned DN owned by the switch.

Figure 13-20 MAP DIsplay of the QLEN command, unassigned DN owned by the switch

```
>qlen 4631001

THE DN IS UNASSIGNED      (NP-RESERVED)
```

13.5.3 QPDN

The QPDN command is used to query native and non-native ported directory numbers (DN) that move from one switch to another, ported DNs, and ported NPA-NXXs (numbering area plan code + office code). To use this command the LNP00200 SOC must be active.

In a number pooling environment, the definitions of native and non-native are irrelevant to an NPA-NXX. A DN with a non-native NPA-NXX can be owned by the switch. The QPDN command does not display information in NPA-NXXs when the NPE00005 SOC is active.

The QPDN command is modified to generate a range of DNs instead of an individual DN and to eliminate display of totals of ported NPANXXs. This modification occurs to switches that are capable of number pooling and are controlled by SOC option NPE00005.

The following figure shows an example of the QPDN command.

Figure 13-21 MAP Display of the QPDN command

```
>qpdn i d

Warning: It may take a long time to execute the request.
Do you want to continue?
Please confirm (“YES”, “Y”, “NO”, or “N”)
Y

Please wait...
-----------------------------------------------
PORTED IN NUMBERS:

6136631001

...

6136631010 -6136631020
Total number of ported-in numbers is: 400
-----------------------------------------------
```

13.5.4 QRDN

The QRDN was developed in NA013 to query assigned and unassigned DNs that are pooled in or out.

The QRDN command is used to list the following:

- assigned and unassigned DNs that are pooled in or out
- assigned and unassigned DNs of a particular numbering plan area and office code (NPANXX) that are pooled in
- assigned and unassigned DNs of a particular NPA-NXX that are pooled out
- aging DNs

Pooled in DNs have NPA-NXXs that are non-native. These DNs are reserved for the switch. Pooled out DNs have NPA-NXX as the codeholder. These DNs are not reserved for the switch. Assigned DNs are DNs assigned to service. Unassigned DNs are DNs not assigned to service.

Aging DNs are DNs on reserved intercept (RSVD). The system considers these DNs and ported out DN intercept (PODN) assigned DNs as assigned or unassigned. These DNs are not for assigning to service.

The NPE00005 SOC must be active in order to use the QRDN command.

Figure 13-22 MAP Display of QRDN command

```
>qrdn i a d

Warning: It may take a long time to execute the request.
Do you want to continue?
Please confirm (“YES”, “Y”, “NO”, or “N”)
Y

Please wait...
-------------------------------------------------
POOLED IN NUMBERS:

6136631001

...

6136631010 -6136631020
Total number of pooled-in assigned numbers is: 400
-------------------------------------------------
```

13.5.5 LOG LNP305

The LNP305 information log indicates a mismatch in the LATAXLA results of the pre-LNP query translations, as compared to the post-LNP query translations. An example of the LNP305 information log appears below.

This is an information log and requires no action by the operating company personnel.

The new information log LNP305 was introduced in NA013.

Figure 13-23 LNP305 log example

```
COMD1CDN13AX   **   LNP305 JAN01 03:16:01 9000 TBL   LRN LATAXLA marking
mismatch
        LRN            6136631088
        Ported DN      4164631111
        Orig LATA NAME LATA1
        LATAXLA markings for Ported DN do not match LRN
```

13.5.6 RSVD

The Number Pooling Servord Interface feature converts the obsolete treatment Query on Release Number not Found (QRNF) into the Reserved DN treatment (RSVD) treatment. Treatment QRNF (QoR Number not Found) was intended to indicate the DN which is the subject of a QoR routing attempt that was no longer served at the Donor switch.

Since the QoR treatment has no meaning outside of QoR routing, the treatment registry is converted to a new RSVD marking for Number Portability. RSVD provides a marking for aging Ported DNs at the recipient switch prior to snapback to the donor switch. By marking DNs in this manner, Cause Code 26 is not returned to the originating switch when LNP calls terminate to DNs marked with RSVD.

The RSVD treatment is defined as a valid intercept in Servord, to allow for its use with the OUTDN and CICP commands.

Finally, during a data transfer to the NA013 or subsequent releases where the dump side of the transfer is NA012 or earlier, any instance of the QRNF treatment is converted to the RSVD treatment.

Part IV
Planning and engineering

This part consists of the following chapters:

14 Hardware description

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

14.1 Hardware description

BRISC is the minimum hardware required in NA007. All NA007 initial switch installations need series 60 processors or higher, with 96 Mbytes memory. All upgrades to NA007 need series 50 processors or higher with mixed memory. Series 70 processors are positioned as the premium product.

14.2 Hardware product codes

The following products have been introduced or their status changed as a result of the updates to the product:

- Product Status
- PEC
- CPC
- Title

14.3 Hardware usage restrictions

This section is applicable only to the LNR-LNP product on a Service Switching point, which includes both DMS-100 and DMS-200 switches.

LRN-LNP supports only Service Provider Portability within a Rate Center. Location Portability, Service Portability and portability outside a Rate Center are not supported.

Limitations and restrictions applicable to the AIN Essentials SSP product are also applicable to the LRN-LNP product.

14.4 Hardware dependencies

Not applicable

14.5 Provisioning considerations

LRN-LNP does not introduce any new hardware functionality outside of those required for AIN Essentials.

14.6 P and C side port requirements

Not applicable

14.7 DMS-bus port requirements

Not applicable

14.8 Circuits per card

Not applicable

14.9 Discriminating numbering

Not applicable

14.10 Office layout information

Not applicable

14.11 Traffic tables

For LPP/LIU7 impacts, refer to SEB 92-12-001 LPP-LIU7: Performance, Throughput and Capacity.

For DPP/BMC impacts, refer to SEB 97-04-001: Real Time and Memory.

14.12 Product and system specifications

The following covers product and system specifications.

14.12.1 Physical characteristics

Not applicable

14.12.2 EMI/earthquake information

Not applicable

14.12.3 Sparing information

Not applicable

14.12.4 Power feed and fusing requirements

Not applicable

14.12.5 Current drain information

Not applicable

15 Software description

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see “About this document”.

Local Number Portability software on the DMS 100/200 switch is divided into the following eight functional components:

- Inter-switch signaling
- Translation and routing
- Billing
- Query processing
- Response processing
- Feature interaction handling
- Testing and maintenance

The components interact with each other and with other subsystems to support Local Number Portability on the DMS 100/200 switch.

15.1 Interswitch signaling

The interswitch signaling component implements ISUP and PTS trunk signaling requirements that support LNP. The signaling requirements are as follows:

- receiving and sending new fields in the IAM Forward Call Indicators parameter
- receiving and sending a Ported Number Generic Address Parameter in the IAM
- receiving and sending a Jurisdiction Information Parameter in the IAM
- receiving a Home Location Routing Number in the IAM CdPN parameter

- sending a Foreign Location Routing Number in the IAM CdPN parameter
- receiving and sending new ISUP Release cause value 26 “misrouted call to a ported number”
- provisioning a Signal Ported Number option against outgoing trunks
- provisioning a Location Routing Number against incoming trunks
- outpulsing a Ported Number GAP over PTS facilities after performing the necessary digit manipulation

15.2 Translation and routing

The translation and routing component implements the translation, screening and routing requirements that support LNP. The requirements are as follows:

- selecting the appropriate translation algorithm based on the availability of a Foreign Location Routing Number or a Home Location Routing Number, and on the evidence of an LNP query done at this switch or an earlier switch
- inferring the called NPA
- determining with real-time efficiency whether the called DN resides on the switch
- applying network management code controls to Location Routing Numbers
- enhancing TRAVER to accurately reflect the results of translation in the LNP environment
- provisioning to allow 7D FNPA dialing patterns
- provisioning Home Location Routing Numbers
- provisioning up to 8000 open NPA-NXX codes
- provisioning native and nonnative NPA-NXXs

15.3 Billing

The billing component implements AMA requirements that support LNP. The requirements are as follows:

- defining the Local Number Portability AMA module format
- defining the Connecting Network Access callcode and AMA record format
- capturing during call-processing, the information that is needed to populate the LNP AMA module
- formatting the LNP AMA module
- appending the LNP AMA module to the appropriate AMA records

- capturing during call-processing the information that is needed to populate the Connecting Network Access record
- formatting the Connecting Network Access record
- provisioning the Connecting Network Access recording option (and limited recording option) against incoming inter-network trunk-groups
- provisioning a billing number against incoming inter-network trunk-groups

15.4 Query processing

The query processing component implements AIN trigger criteria checking and query parameter population requirements that support LNP. The requirements are as follows:

- evaluating LNP trigger escape criteria
- inferring the called NPA
- enhancing AIN TRAVER
- suppressing AIN PODP queries after the LNP query
- always performing AIN PODP digit criteria checking on the called DN
- provisioning the new LNP trigger
- provisioning LNP trigger escape criteria

15.5 Response processing

The response processing component implements AIN response processing that support LNP. The requirements are as follows:

- creating the ported number GAP parameter
- indicating that the call has undertaken an LNP query
- processing the Analyze Route response message
- recognizing an HLRN in the Analyze Route response message
- default routing the call if the query goes bad
- suppressing a second end-user billing record during response translation
- passing necessary information to the billing component during response processing
- handling unexpected responses to the LNP query

15.6 Feature interaction handling

The feature interaction handling component implements requirements supporting interactions between LNP and switch- or SCP-based features. The requirements are as follows:

- allowing the LNP trigger to be encountered after IN- and AIN-based redirection
- allowing the LNP trigger to be encountered after switch-based call-forwarding or redirection service
- inhibiting CLASS SCP queries for calls that have become intraswitch because of number portability
- resetting number portability information whenever a supplementary service supplies a new called party number for the call
- preventing the display or delivery of a Location Routing Number

15.7 Testing and maintenance

The testing and maintenance component implements requirements supporting LNP test-call (this component is expected to grow as future maintenance requirements emerge. The requirements are as follows:

- providing an interface that can initiate an LNP test call
- collecting the target switch and the called DN to be tested
- constructing the ported number GAP together with its test-call indicator
- routing the test-call toward the target switch

16 System engineering

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

16.1 Capacity allocation and memory requirements

Deployment of Local Number Portability (LNP) affects many variables in a DMS-100 end office or tandem office. To determine its impact on office real time, memory and traffic capacity, use the information in this chapter as well as the Flexible Advanced Capacity Engineering Tool (FACET). FACET is a platform of automated programs that are designed to evaluate and plan DMS-100 switch capacity utilization for both the computing module (CM) and peripherals. It is owned and administered by the Nortel Systems Capacity Engineering (SCE) group.

LNP affects the following performance factors:

- CM memory
- CM real time
- LPP/LIU7 message throughput
- AMA storage and throughput

16.2 CM performance factor

Use the on-switch STORE commands from the MAPCI level to monitor office-wide memory usage.

16.3 LNP real time impact

LNP has network-wide implications. LNP switch activities occur in three separate office contexts: the originating switch, the intermediate tandem switch, and the terminating switch.

Real time costs are related to performing LNP queries to SCPs, SS7 ISUP message processing between offices, and unique translations for terminating DNs that are not native to the switch, that is, ported DNs with NPA-XXXs other than the ones assigned to the switch. LNP queries, creating 719 or 720 AMA modules for LNP queries, and creating CNAR records for local network interconnection charges affect real time performance. These factors are part of FACET tool real time calculations.

16.3.1 Originating office

In the originating office, LNP has different real time impacts for line-to-line or line-to-trunk calls. Typically, no queries are associated with line-to-line calls because internal translations provide a query escape if the called DN is determined to be in the office.

Calls to a portable NPA-NXX belonging to the switch do not initiate a query if the called DN has not been ported. The calls reside in the office. Calls to a portable NPA-NXX that is not assigned to the switch escape the query trigger if the called DN has been ported to the originating office. These line-to-line calls carry an additional real time cost due to translations, but the cost is insignificant.

For line-to-trunk calls, no queries are required for calls routed to inter- and intra-LATA toll carriers or to offices outside the portability zone. Calls to portable NPA-NXXs that do not meet LNP trigger escape criteria initiate queries to the SCP. The response to the query indicates whether the called DN has been ported. An ISUP IAM message is constructed and sent to the downstream office to indicate LNP query status.

There are variable real time costs for these queried calls. The activation cost, including query and IAM messaging, for a line-to-trunk call that has been ported is 3.136 ms in a SN70 office; a line-to-trunk call to an unported DN incurs the activation cost of 2.521 ms. These timings are used in FACET real time calculations for those offices.

16.3.2 Intermediate office

In intermediate offices calls can arrive from end offices or other tandems outside the portability zone. No previous query has been performed on calls to portable NPA-NXXs so queries must be performed by the intermediate office. The same requirement exists for calls from PBXs and cellular offices. For calls from toll carriers and other offices inside the portability zone, the queries were performed previously on calls to portable NPA-NXXs. Query status is provided if the incoming trunk is an SS7 trunk.

Total LNP real times costs of these calls include the time to query and the time for handling messaging for previously queried calls. The activation cost, including query and IAM messaging, for a trunk-to-trunk call that has been

ported is 3.049 ms in a SN70 office; a trunk-to-trunk call to an unported DN incurs the activation cost of 2.434 ms. These timings are used in FACET real time calculations for those offices.

The costs of handling previously ported calls are not enough to consider in real time calculations for actual offices.

16.3.3 Terminating office

There are no LNP queries for calls that terminate in the office. If an incoming call from a non-LNP office is routed to an office based on NPA-NXX routing and the NPA-XXX is portable, then a query initiated only if the called DN cannot be found using local translations. If the DN has been ported to another office, then the office functions as an intermediate office.

LNP real time expense in the terminating office depends on whether the called DN has been ported. Special translations are required to allow the call to terminate in the switch even though the ported DNs NPA-XXX belongs to a different, donor switch. This expense is not large enough to consider in the evaluation of capacity utilization in offices. There also are real time costs related to ISUP IAM messages for previously queried calls, but these costs are not large enough to consider in actual office calculations, either.

Of the three LNP call scenarios with AMA real time impacts, only two are considered in office real time calculations. They are the creation of a terminating 719 or 720 modules to attach to an existing AMA record for LNP queries in which the SCP returns an AMASLPID, and the creation of a CNAR for local network interconnection charges. Creating 719 or 720 modules for access and terminating charges for ported DNs and for billable calls that do not return AMASLPIDs have only a minimal real time impact and don’t warrant consideration in office calculations.

The additional real time cost of creating a CNAR record is 0.79 ms in a SN70 office. The cost of appending a terminating 719 or 720 module to an existing AMA record for LNP query charges when an AMASLPID is returned is 1.0 ms. The cost of creating an LNP721or LNP722 record is 1.3 ms. These are the timings used in FACET real time calculations for those offices.

16.4 CM real time performance factors

LNP queries impose a real time cost on CM call processing. The cost varies depending on whether the DN being queried has been ported. The following table shows the operational measurements used to quantify query costs.

Table 16-1 Performance data for LNP

OM group	OM registry	Log report
LNP	LNPQRY	None
LNP	LNPQRY1	None
LNP	LNPPORT	None
LNP	LNPPORT1	None

OM LNP_LNPQRY counts the office total of LNP queries generated for line-to-trunk and trunk-to-trunk call attempts. OM LNP_LNPPORT increments the number of those queries that identify a ported DN. The registers with 1 suffixes are extension registers which increment once for each 65,536 counts in the low order registers.

16.5 Monitoring LNP performance factors

Each of the capacity performance factors affecting LNP can be evaluated using operational measurement and log report data. The descriptions of the individual performance factors that follow identify the required measurements and the calculations that use the collected measurements.

16.6 How to evaluate LNP real time performance data

Total LNP query milliseconds (SN70) =
(LNP_LNPQRY-LNP_LNPPORT)
* LNP query not ported timing
+ (LNP_LNPPORT*LNP query ported timing.

16.7 Messaging and throughput

Capacity engineering rules to cover LIU7 message throughput associated with LNP queries (TCAP) and IAM traffic (ISUP) are located in SEB 92-12-001, LPP/LIU7 Performance, Throughput and Capacity.

16.8 LPP/LIU7 message throughput performance factor

Refer to SEB 92-12-001, LPP/LIU7 Performance, Throughput and Capacity.

16.9 LNP impact on AMA and billing

For LNP impact on AMA and billing, please refer to the FACET tool. For additional information about AMA storage considerations, including records throughput, refer to SEB 89-12-002 DMS 100 AMA Provisioning.

16.10 AMA storage and throughput performance factors

Refer to SEB 89-12-002, DMS 100 AMA Provisioning.

16.11 Grade of service requirements

To engineer LNP correctly, an operating company must establish the grade-of-service criteria to be applied in the engineering calculations based on office measurements or planning estimates. Relevant measurement-based performance calculations for LNP are described in the following sections.

16.12 Security

Not Applicable. This product did not add or enhance any security features.

16.13 Ordering Information

This product may be ordered through Northern Telecom Inc. (U.S.) only

17 Signaling requirements

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

This chapter deals with the signaling requirements necessary to provide LNP functionality.

This chapter enumerates the new requirements on ISUP and per trunk group signaling (PTS) created by Local Number Portability (LNP). The areas covered by this chapter include:

- switch signaling behaviors
- formats for LNP related ISUP parameters.
- GAP, LRN, FCI, and JIP population and propagation for ISUP
- PTS Inter-Working exceptions
- logs, OMs, ISUP release causes, and treatments.
- digit manipulation
- support for Test Call

Local Number Portability places requirements on ISUP and PTS signaling since new information must be carried across the network to allow callers to terminate on a ported subscriber. Essentially, a special routing number that identifies the ported directory number's new switch as well as the ported directory number's actual directory number must be transported.

17.1 Functional overview

LRN-LNP uses the concept of originating, donor, and recipient switches. From a signaling perspective, the originating switch generates the database query. The dialed number is ported from the donor switch; and the dialed number is ported to the recipient switch.

When a call is made in the originating switch, a series of translations occur to determine if the call should:

- terminate on the current switch,
- route out of the switch based on the dialed number, or
- route out of the switch based on another routing number.

The result of the translations is stored in a place that signaling can easily access. If the call does need to route out of the switch, signaling takes this information and builds the Initial Address Message (IAM) that signals the next switch.

17.2 ISUP IAM parameters

Some modifications are made to the IAM to allow for changed parameters specific to LNP. The affected parameters are explained in the following subsections.

17.2.1 Called Party Number parameter

The Called Party Number (CdPN) parameter of the IAM stores the original dialed number. For LNP, it is possible that the LRN may also be stored in this parameter if it is needed for routing. The Location Routing Number is the 10-digit (NPA-NXX-XXXX) special routing number that uniquely identifies the recipient switch for the LNP call. It is identifiable by the setting of the Forward Call Indicator to Number Translated and the presence of a Ported Number Generic Address Parameter. Any LRNs not datafilled on the switch are referred to as Foreign LRNs or FLRNs.

17.2.2 Ported number GAP parameter

The generic address parameter (GAP) is used in LNP processing to preserve the called party's actual directory number. The GAP is an existing parameter type. It is always a 10-digit (NPA-NXX-XXXX) number and uses a new Type of Address of Ported Dialed Number. The GAP parameter also includes a new Test Call indicator. This indicator can be set for any GAP type and it is used to tell the next office that this is a test call.

For the purposes of this document, references to GAP means the generic address parameter with type of address of Ported Dialed Number.

The ISUP Generic Address Parameter has the following format for LNP:

Table 17-1 Gap Format (Sheet 1 of 2)

	8	7	6	5	4	3	2	1
1	Type Of Address							
2	O/E	Nature of Address						

Table 17-1 Gap Format (Sheet 2 of 2)

	8	7	6	5	4	3	2	1
3	Test Ind.	Numbering Plan			Presentation		Reserved	
4	2nd address signal				1st address signal			
n	Filler (if necessary)				nth address signal			

Table 17-2 Legend for GAP format (Sheet 1 of 2)

(1)	Type Of Address	
	1 1 0 0 0 0 0 0	Ported Dialed Number
(2)	Odd/Even indicator	
	0	Even Number Of Address Signals
	1	Odd Number Of Address Signals
(3)	Nature of Address	
	0 0 0 0 0 0 1	subscriber number
	0 0 0 0 0 1 1	national (significant) number
	0 0 0 0 1 0 0	international number
	1 1 1 0 0 0 1	subscriber number, operator requested
	1 1 1 0 0 1 0	national number, operator requested
	1 1 1 0 0 1 1	international number, operator requested
	1 1 1 0 1 0 0	no number present, operator requested
	1 1 1 0 1 0 1	no number present, cut-through call to carrier
	1 1 1 0 1 1 0	950+ call from local switch to carrier public station
	1 1 1 0 1 1 1	hotel/motel, or non-exchange access end office test line code
(4)	Test Indicator	Test Call Indicator
	0	Not a test call (default)
	1	Test Call

Table 17-2 Legend for GAP format (Continued) (Sheet 2 of 2)

(5)	Numbering Plan	
	0 0 0	unknown (no interpretation)
	0 0 1	ISDN (Telephony) numbering plan
	1 0 1	Private Numbering Plan
(6)	Address Presentation Restriction	Not Applicable for Type Ported Dialed Number
	00	(Not applicable to LNP)
(7)	Rsvd	Reserved field -- for future use
(8)	Address Signal	Coding the same as Called Party Number
(9)	Filler (if needed)	

Note: The GAP follows the standard format specified by Bellcore and ANSI. The Type of Address code point for ported dialed number has not yet been defined. The Nature of Address and Numbering Plan for the ported dialed number type follow the Called Party Number parameter. The new test call indicator is defined as a 1 bit field.

17.2.3 FCI parameter

The forward call indicator (FCI) parameter is not new, but two currently unused bits have been reserved for use by LRN-LNP.

The LNP-specific bit is called the Translated Called Number Indicator (M bit) and has the settings: Number Not Translated, the current default, and Number Translated which indicates that an LNP query has been done for this call.

The Forward Call Indicator parameter format changes for LNP are:

Table 17-3 The FCI format

	8	7	6	5	4	3	2	1
1	H	G	F	E	D	C	B	A
2	P	O	N	M	L	K	J	I

Table 17-4 Legend for FCI format

bit	M:	Translated called number indicator
	0	number not translated (default)
	1	number translated

Note: FCI bits M and N are currently reserved for National use by ANSI T1S1.

17.2.4 JIP parameter

The Jurisdiction Information Parameter (JIP) is an existing ISUP parameter used by LNP. It consists of a datafilled NPA-NXX that is homed on the originating switch. This data is used to determine the service provider identification for connecting access billing throughout the call. The JIP is typically datafilled by flagging a datafilled LRN as a JIP. This is controlled in a new HOMELRN table that is implemented by translations.

Default JIP generation is a new capability that provides a default JIP to be sent on an outgoing ISUP trunk. In general, the JIP is obtained the following ways:

- For line originations, the JIP is always obtained from the HOMELRN table with option SITE.
- For public trunks, the JIP is taken
  - — from the incoming IAM if available
  - — if not available from the incoming IAM the JIP is taken from the default LRN option on the trunk group
  - — if neither is available, no JIP is generated.
- For private trunks, the JIP is obtained from the HOMELRN table as if the trunk were a line origination.

The LRN Trunk Group option allows a 10-digit LRN to be datafilled for incoming ISUP and PTS Trunks to specify the LRN of the far end switch.

Note: Although the LRN trunk group option is assignable to a PRA trunk, it should not be assigned to a PRA trunk that is used as a private PRA. In the case of a private PRA trunk, the JIP is obtained from table HOMELRN whether or not the LRN trunk group option is assigned.

The parameter that gets built into the IAM depends on the results of translations and AIN before signaling comes into play. AIN is responsible for querying a database if the dialed number has been determined to have a portable NPA-NXX by translations. The LRN is then returned from the database. Only if the LRN is an FLRN does signaling set the Translated Called Number Indicator of the FCI and populate the LRN into the CdPN of the IAM. The GAP then is populated using the original dialed number, and the JIP is based on the HLRN for the office.

The LRN is not populated into the CdPN of the IAM if the signal ported number (SPN) option has been provisioned in table ADJNODE. In this case, the digit-manipulated original-dialed number, or GAP (depending on the call scenario), is placed into the CdPN of the IAM, and no GAP parameter is generated. Also, the Translated Called Number Indicator is set to Number Not Translated. This is to allow signaling to non-LNP offices that do not recognize the concept of an LRN.

The ISUP Jurisdiction Information Parameter has the following format:

Table 17-5 ISUP Jurisdiction Information format

8	7	6	5	4	3	2	1
2nd Address Signal				1st Address Signal			
4rd Address Signal				3th Address Signal			
6th Address Signal				5th Address Signal			

For LNP, the address signal are populated with an NPA-NXX where the NPA digits are specified in the 1st, 2nd, and 3rd address signals and the NXX digits are specified in the 4th, 5th, and 6th address signals.

17.3 Digit manipulation

The GAP is signaled instead of the LRN, if the trunk group has the SPN option provisioned. The GAP is also outpulsed if the outgoing trunk uses per-trunk signaling (PTS). In both cases, it is possible that digit manipulation needs to be performed on the GAP before it is signaled. However, it may not be possible to safely manipulate the GAP depending on the similarities between the GAP and the LRN.

The following cases occur when translation is performed on the LRN but GAP is outpulsed:

- Standard outpulsing logic is administered to the GAP if the routing selectors indicates it is to be used.
- Nonstandard outpulsing logic is only applied to the GAP when specified by the routing selector if all of the following conditions are present:
  - — the number of digits in the translated LRN equals to the number of digits in the ported number (GAP)
  - — if leading digits are to be deleted, then the affected digits of the GAP must match those of the LRN.

In cases where digit manipulation cannot be safely administered to the ported number (GAP), the call is blocked rather than misrouting it. In this case, the call is taken down gracefully with appropriate treatment; a log as well as a minor alarm is also generated.

18 Messaging requirements

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

The CCS7 network handles messages by the link peripheral processor (LPP) and associated application-specific units (ASU) in the DMS switch. Refer to the LPP/SSP Product Specification for information on throughput, capacity, and message size. Refer to SEB-94-05-055 for LPP/Signaling Link Engineering Guidelines for AIN functionality.

LRN-LNP software sends a TCAP message to the LPP using the DMS bus. The maximum-size TCAP message that can be handled by the LPP is 253 octets.

18.1 Interfaces

This section describes the interface between the LRN-LNP SSP and the LNP-SCP (TCAP interface), and the interface between the LRN-LNP SSP and other network switching nodes (ISUP interface).

18.1.1 TCAP interface

The LRN-LNP SSP communicates with the LNP-SCP through the SS7 TCAP application layer protocol, as defined by Bellcore specification TR-NWT-001285. This interface is described in detail in AIN Essentials SSP Product Specification. This section discusses only the TCAP interfaces that are directly applicable to Nortel's LRN-LNP SSP (that is, TCAP messaging that occurs at the Information Analyzed trigger detection point).

18.1.2 ISUP interface

Refer to the chapters Signaling Requirements and Query on Release for the description of the ISUP interface between an LRN-LNP SSP and other network switching nodes.

18.2 Global title translation

For LNP services a new GTT name is required. The datafill required is shown in the following tables.

Table 18-1 Table C7GTT

GTTKEY	GTTRESULT
LRNGTT 0 9	PCONLY (LNP_RTESET 0)$ GT$

Table 18-2 Table C7GTTYPE

GTTNAME	GTTYPE	GTTID
LRNGTT	ANSI7 GTNUM (Note)	$
Note: The value of GTNUM has not been determined.		

18.3 Traffic Engineering

TCAP traffic changes as numbers are ported. Therefore, some planning is required for new routing in a network changing to LNP. For more information, see SEB 92-12-001, Issue 02.01 which includes capacity and provisioning guidelines for LPP, LIU7s and HLIU. Also, see Chapter 3 “System Capacity Engineering”.

18.4 Error detection

Error detection for LRN-LNP on the SSP is handled by existing AIN Essentials error detection procedures, with the following exception:

If an Analyze_Route message that is received in response to an LNP query contains an improperly encoded GenericAddressList parameter, then the SSP follows the fault recovery procedures outlined in Section 2.7.4 of TR-NWT-001284 for fatal erroneous data value errors. In this case, the call is sent to AIN Final treatment, since the call cannot complete without the actual DN contained in the GAL parameter.

19 Call walkthrough

ATTENTION

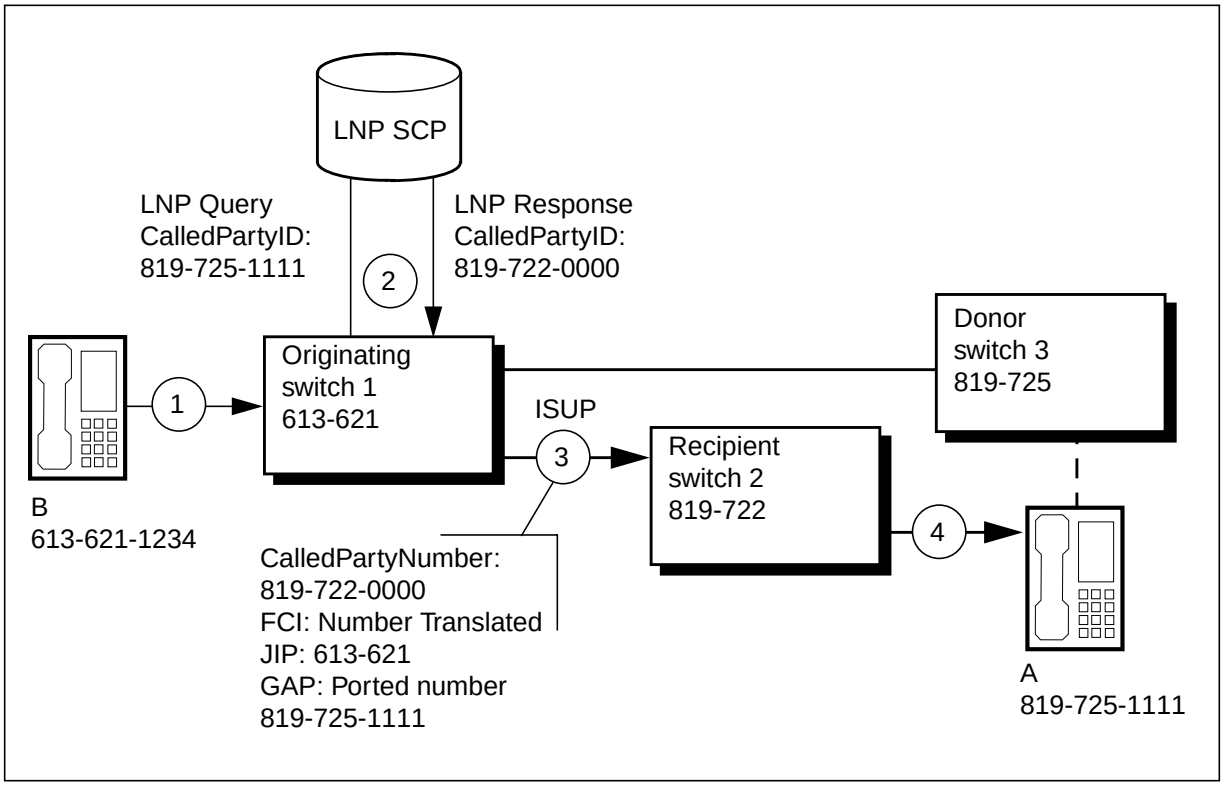
LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

This section provides a walk-through of the signaling process.

19.1 Basic call walkthrough

As shown in the following figure, User A with DN 819-725-1111 has ported from Switch 3 (donor switch) to Switch 2. (recipient switch).

Figure 19-1 Basic call walk-through



The following steps of the call take place:

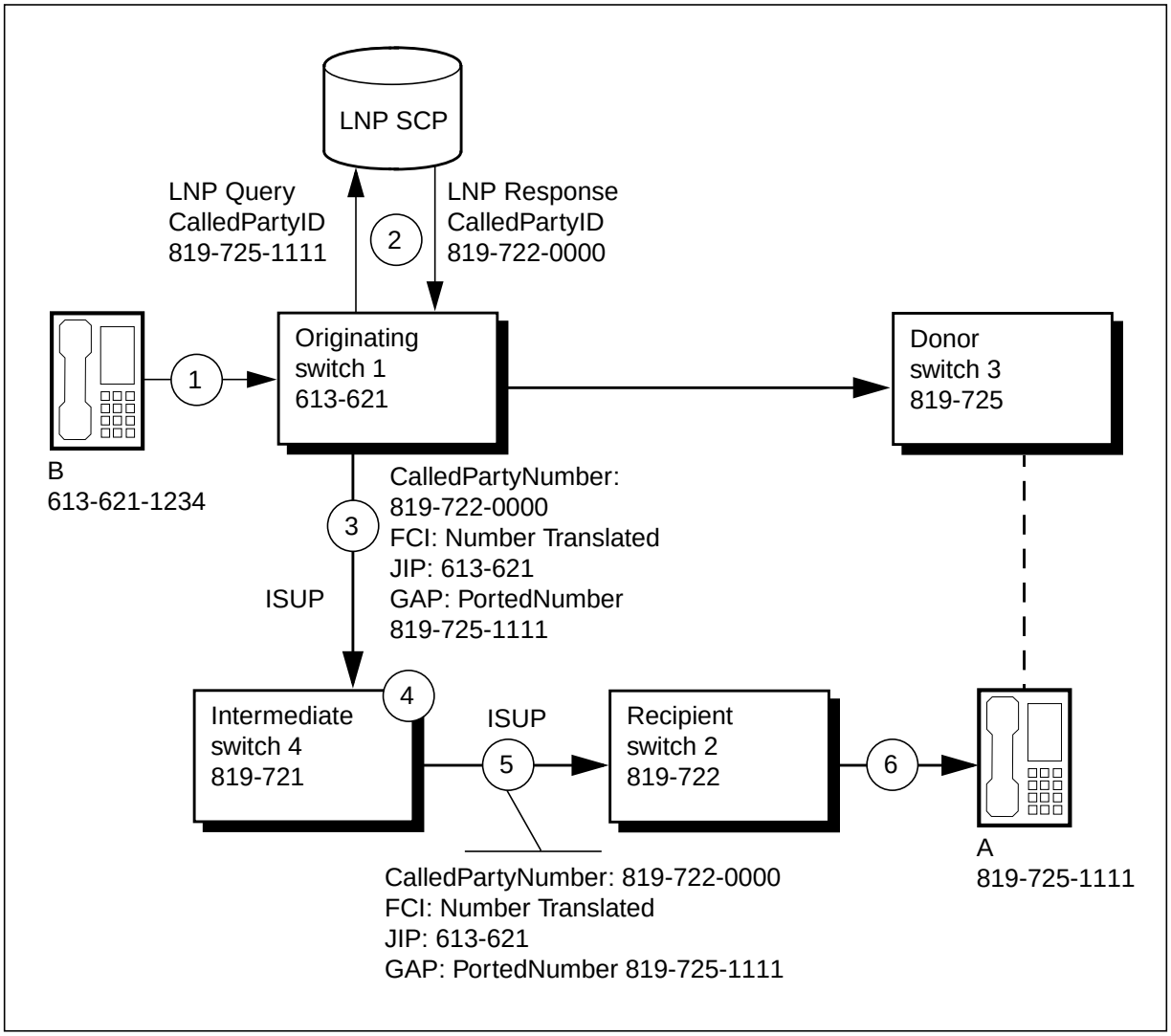
1. User B on another switch (Switch1) goes off-hook and dials User A.
2. Switch 1 (originating switch) determines that 819-725 is a portable NPA-NXX and queries the database (the LNP Service Control Point). The response received is a CalledPartyID of 819-722-0000. Since this number is not the same as the original dialed number and it does not reside on the Originating switch, it must be an LRN that is used to route the call to another switch.
3. Signaling then builds the IAM to send to Switch 2. The CalledPartyNumber of the IAM is built using the LRN that was received from the database. The Translated Called Number Indicator of the FCI structure is set to Number Translated since a query was performed. Since this is the originating switch, the JIP parameter is built based on the designated HLRN of the switch. In this case, 613-621 is datafilled as the JIP parameter for Switch1. And finally, the GAP is built using the original dialed number, and as said earlier, the type of address is set to Ported Dialed Number.
4. When Switch 2 receives the IAM, signaling continues to process the call by determining what number to send to translations. The FCI structure and the ported number GAP identify this as an LNP call. Next the switch

decides if the LRN is a home LRN for this office. If it is, the GAP is sent to translations to complete the call. If it wasn't, the call would have been translated on the LRN and sent out to the next switch.

19.2 Intermediate switch call scenario

If an intermediate switch is added into the previous scenario, the changes are minimal, but signaling does have to handle the tandeming of the IAM and making sure all the parameters are populated correctly. This scenario, illustrated in the following figure has the following steps.

Figure 19-2 Intermediate switch call walk-through



1. User B originates the call.
2. Same query and response processing as in the Basic Call.
3. ISUP IAM to Switch 4 built the same as in Basic Call.
4. Switch 4 still performs the checks on the LRN and FCI like Switch 2 did in the previous scenario, but since the LRN is a foreign LRN (FLRN) in this case, the call is routed on the LRN and essentially tandemed along to Switch2.
5. The parameters in the outgoing IAM to Switch 2 are the same as those in the incoming IAM. It is possible that the values of the parameters may be different, but in this case they are the same.
6. The call terminates to User A at the Recipient switch.

Note: If an intermediate switch is a DMS switch that is not equipped with the LNP software, it still tandems all the parameters to the next switch, including parameters that are specific to the LNP call such as the ported number GAP and the JIP.

19.3 Error scenarios

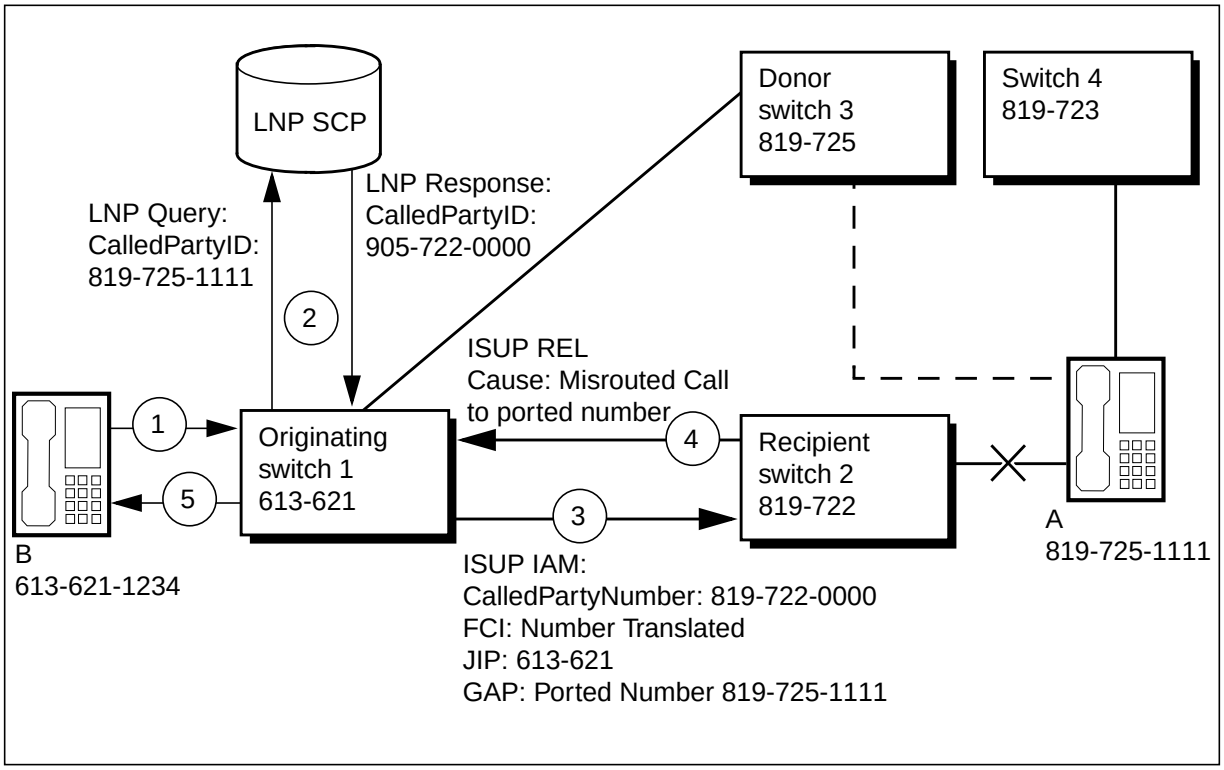
There are two scenarios where an LNP call is started but is released from the other end due to an error condition. This is done through the use of two ISUP release messages with a specified cause value:

- Misrouted call to a ported number (26)
- Invalid number format (address incomplete) (28)

19.3.1 Misrouted call to a ported number

This error scenario shown in the following figure is related to an LRN database inconsistency. For example, if in the basic call scenario, User A moves location again without the database being updated, a call routed to User A would fail.

Figure 19-3 Misrouted call to ported number



1. User B dials User A.
2. The database is queried and the same response is received as before since the SCP doesn't have an entry to indicate User A has moved.
3. The originating switch still attempts to route the call to the original recipient switch because has no entry indicating which switch User A has moved to.
4. Switch 2 receives an unallocated number treatment when it attempts to complete the call to User A. An ISUP Release message is then sent back to the originating switch with a cause value of "Misrouted call to a ported number".

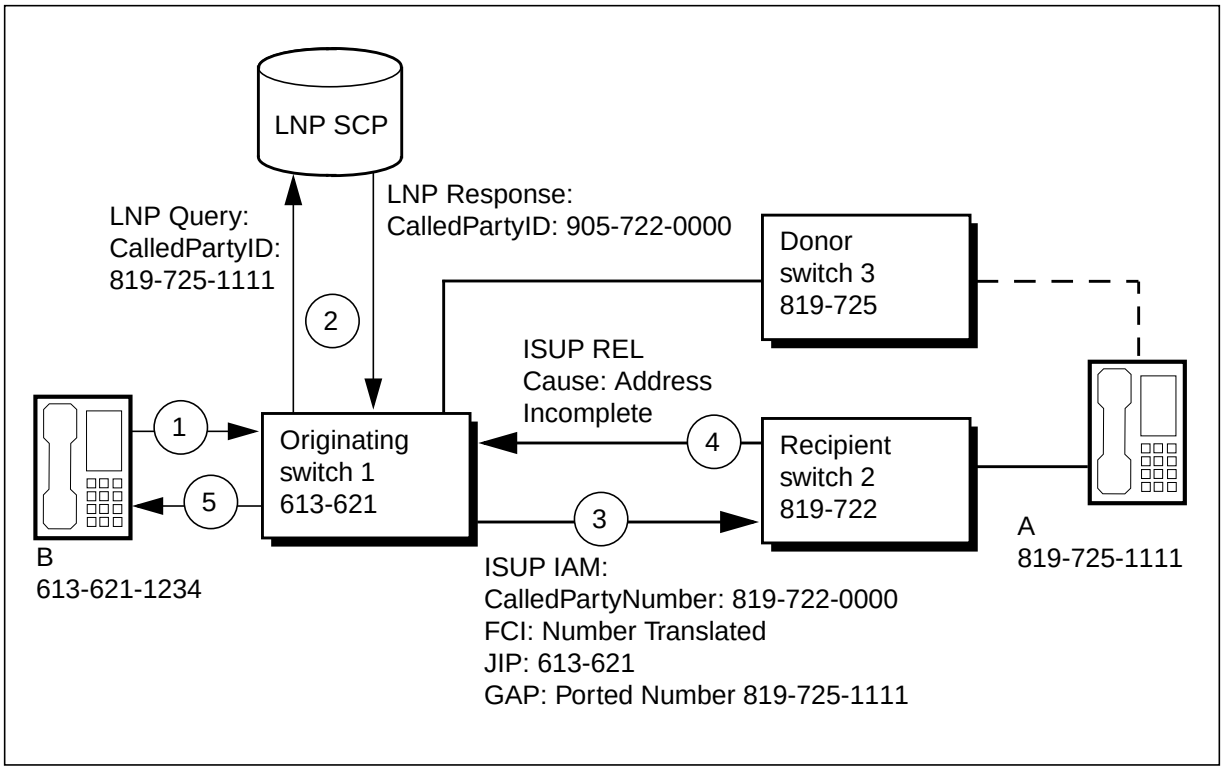
   Note: If Switch 2 is a donor switch and PODN is assigned to 819-725-1111, Switch 2 also receives LNPM treatment when it attempts to complete the call to User A. An ISUP release is also sent back to the originating switch with a cause value of "Misrouted call to a ported number".

5. Upon receiving the release message, Switch1 then translates this cause value to a treatment and apply it to User B. This treatment (LNPM) was created for the LNP feature. An LNP302 log is also generated.

19.3.2 Invalid number format (address incomplete)

This error scenario, illustrated in the following figure, is related to an invalid format of the GAP structure. The GAP structure consists of several fields. Any deviations from the accepted values marks the GAP as invalid and a release message is sent as specified in the following steps.

Figure 19-4 Invalid number format (address incomplete)



1. User B dials User A.
2. Query and Response is the same as in the Basic Call scenario.
3. The IAM is sent off to Switch 2 with the appropriate parameters.
4. When the IAM is received in Switch 2, the switch checks to verify if the GAP has been formatted correctly. If it is not, a release message is sent back to the originating switch with a cause_value of “Invalid number format (address incomplete)”.
5. This is an existing cause_value on the DMS and is mapped to Partial Dial (PDIL) treatment in Switch 1 which then is applied to User B’s case. A TRK138 log is generated.

Table 19-1 Format of GAP structure

Field Name	Accepted value for LNP
Type of Address	Ported Dialed Number
Odd/Even Indicator	Even Number of Address Signals
Nature of Address	national (significant) number
Test Indicator	Test call / Not a test call
Numbering Plan	ISDN (Telephony) numbering plan
Address Presentation Restriction	Not Applicable for Type “Ported Dialed Number”
Address Signal	10 digits coded the same as Called Party Number

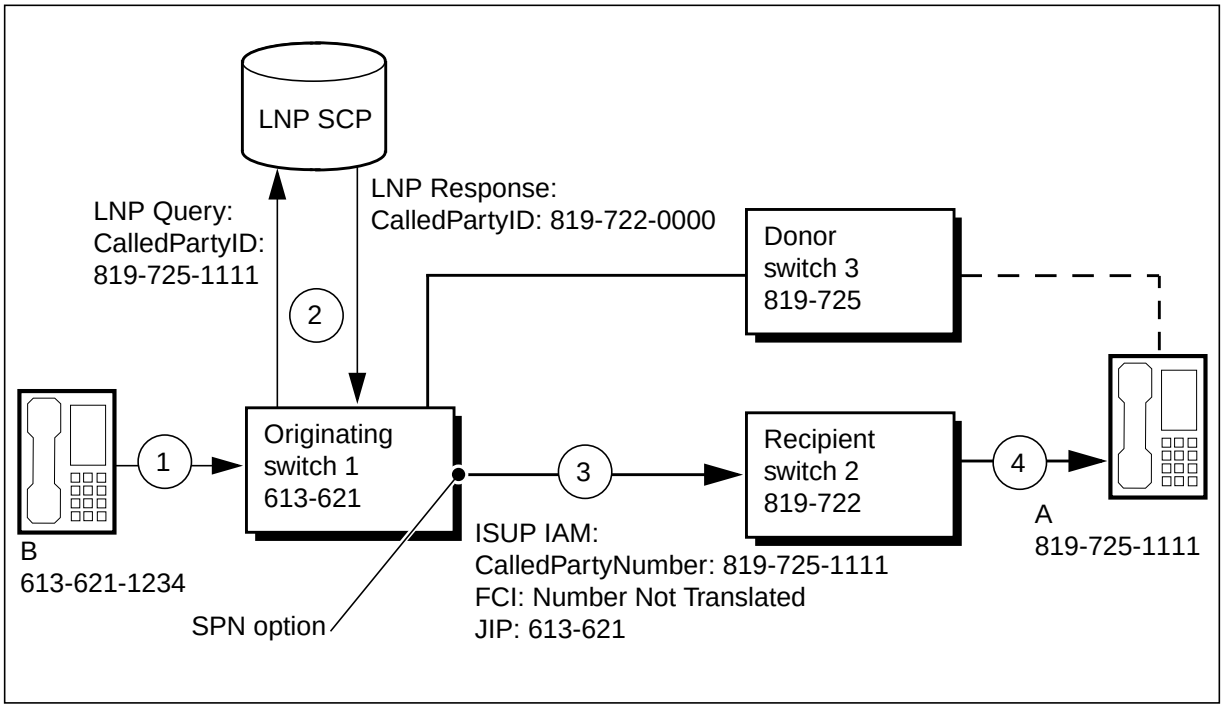
19.4 Signaling the ported number

In two cases the ported number GAP or the dialed number is signaled out of the originating switch instead of the LRN. This occurs when the outgoing trunk is using ISUP signaling with the signal ported number (SPN) option assigned in table ADJNODE, or when the outgoing trunk uses per-trunk signaling (PTS).

19.4.1 Outgoing ISUP with SPN option

The SPN option on outgoing ISUP trunks is created to allow signaling to offices that are not yet ready to handle the new ISUP LNP parameters that are passed in the IAM. This scenario, shown in the following figure, involves the following steps:

Figure 19-5 Outgoing ISUP w/ SPN option recipient switch



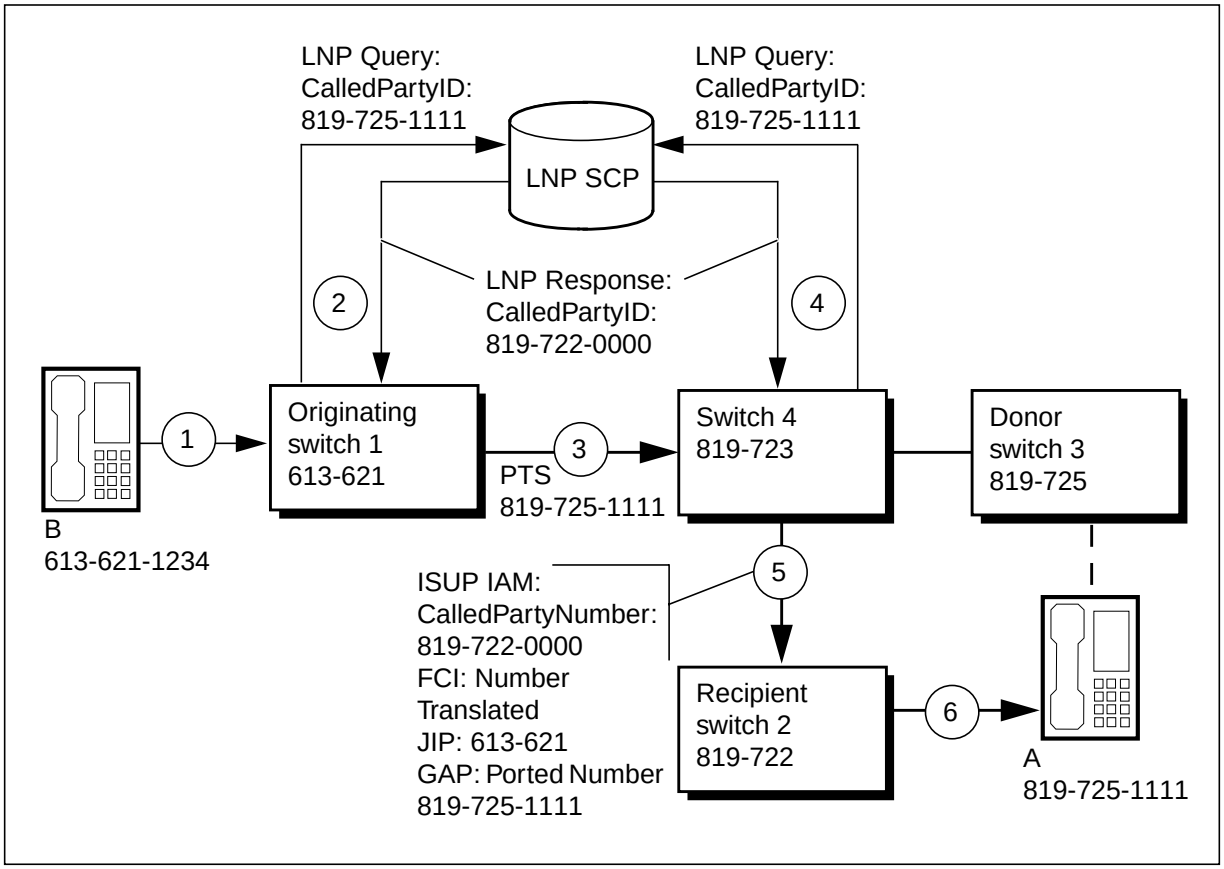
1. User B dials User A.
2. A query is performed at Switch 1 because it is an LNP-capable switch and translates 819-725 as a portable NPA-NXX. The call is routed within Switch 1 using the LRN that was returned from the database and attempts to terminate to the trunk going out to Switch3.
3. Signaling then checks for the presence of the SPN option on the trunk before outpulsing. Since it is present in this example, the IAM is built with the dialed number populated into the CdPN of the IAM instead of creating a GAP parameter. Any digit manipulation that is required for this outgoing trunk, has to be performed on the dialed number before it is built into the CdPN. The FCI parameter is always built into the IAM, so for this example, signaling sets the Translated Called Number Indicator to Number Not Translated, which is the default. The JIP is also built and sent since it is not an LNP-specific parameter.
4. Switch 2 then routes the call directly to User A. Since this switch does not have LNP software, it may have translations set up to route the call to the ported DN.

19.4.2 Outgoing to a PTS trunk

The other scenario where the ported number is signaled to the next switch instead of the LRN occurs when the outgoing trunk uses per-trunk signaling.

Since there is no IAM that is associated with PTS, there is no way to preserve the LNP information that was obtained from the originating switch. As shown in the following figure, the switch at the end of the PTS trunk is then forced to query the database.

Figure 19-6 Outgoing PTS trunk to intermediate switch



1. User B dials User A.
2. The call still queries and is routed within Switch 1 based on the LRN returned from the database. This time, however, since an PTS trunk is selected, an IAM cannot be built.
3. The ported number (original dialed number in this case) is subjected to any digit manipulation for that trunk and outpulsed to the next switch.
4. Since all LNP data was lost in the transmission from the originating switch, Switch 4 queries the database to obtain the LRN.
5. The call is routed on the LRN and sent to the recipient switch over an ISUP trunk. The IAM is built using standard LNP procedures: the LRN is populated in the CdPN parameter, the appropriate Translated Called

Number Indicator of the FCI is set to Number Translated, and the GAP is built using the original dialed number (outpulsed from the originating switch). The JIP can only be built in this case if the PTS trunk coming from Switch 1 was provisioned with a default LRN against its trunk group in Switch 4.

6. The call then is routed to User A in the recipient switch based on the incoming GAP.

Part V
Provisioning

This part consists of the following chapters:

20 Provisioning overview

ATTENTION

The provisioning of E911 and other services requiring dedicated trunks depends on NPA NXX distribution.

20.1 LNP components

This section describes the components involved with LNP.

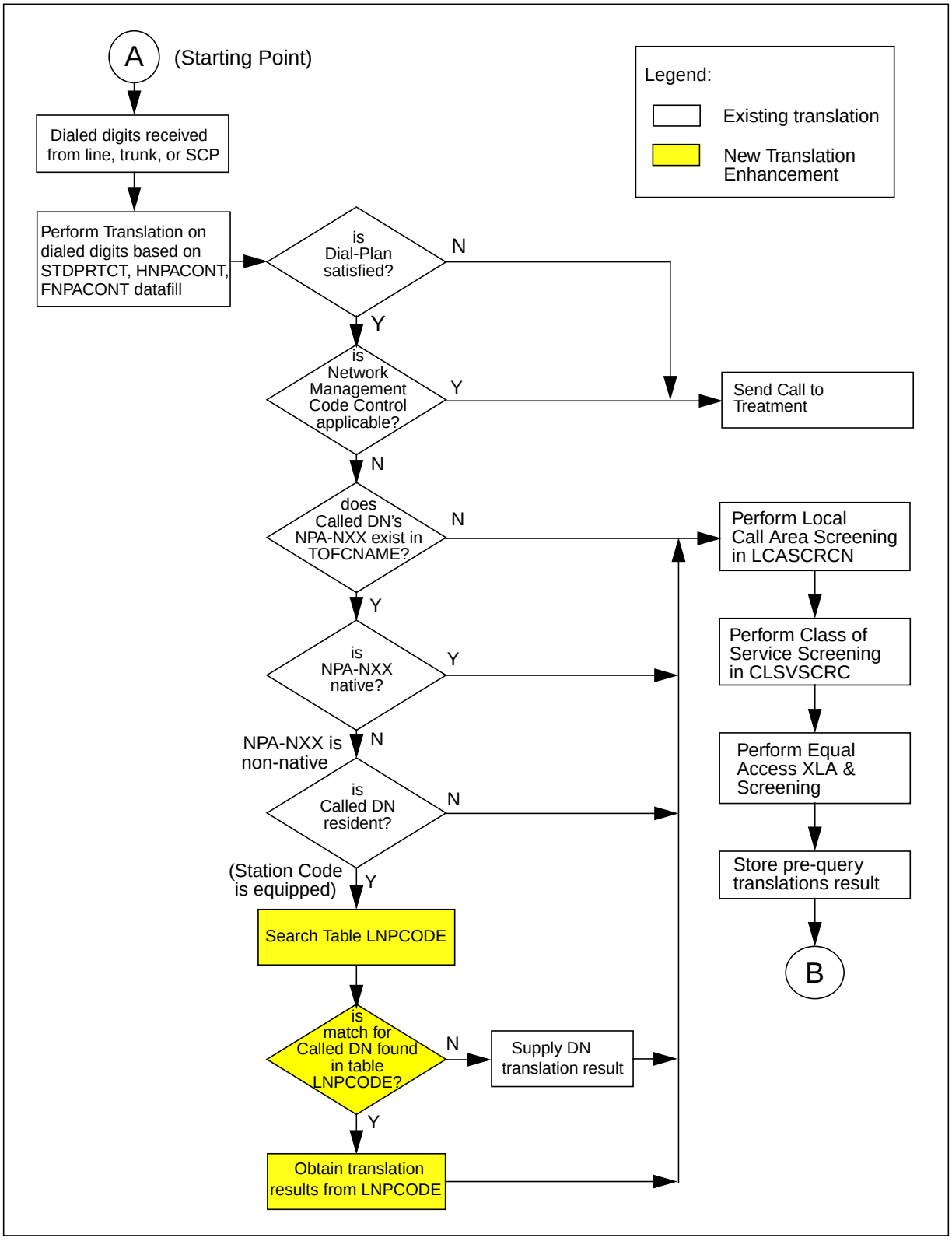
20.1.1 Translations

LNP changes the way that call translation and routing are typically done in the DMS switch. LNP translations allows calls to terminate to a resident directory number (DN) that has ported. This translation functionality also includes capability

- to terminate a call to a ported DN at the recipient switch, without having to change the datafill of the operating company.
- through table FNPA7DIG, to associate an office code (NXX) with a numbering plan area (NPA) for a 7-digit dialing plan.
- through table HOMELRN, to
  - — allow service providers to identify Home LRNs
  - — designate a Home LRN as a jurisdiction information parameter (JIP)
  - — specify LRNs associated with remote switches
- through new TRAVER functionality, to
  - — show calls, terminating to a resident DN, ported from another switch.
  - — include new parameters in the command line.

LNP translations flowcharts follow.

Figure 20-1 LNP translation at originating switch (before query)



LNP translations flowcharts follow.

Figure 20-2 LNP translation at originating switch (after query)

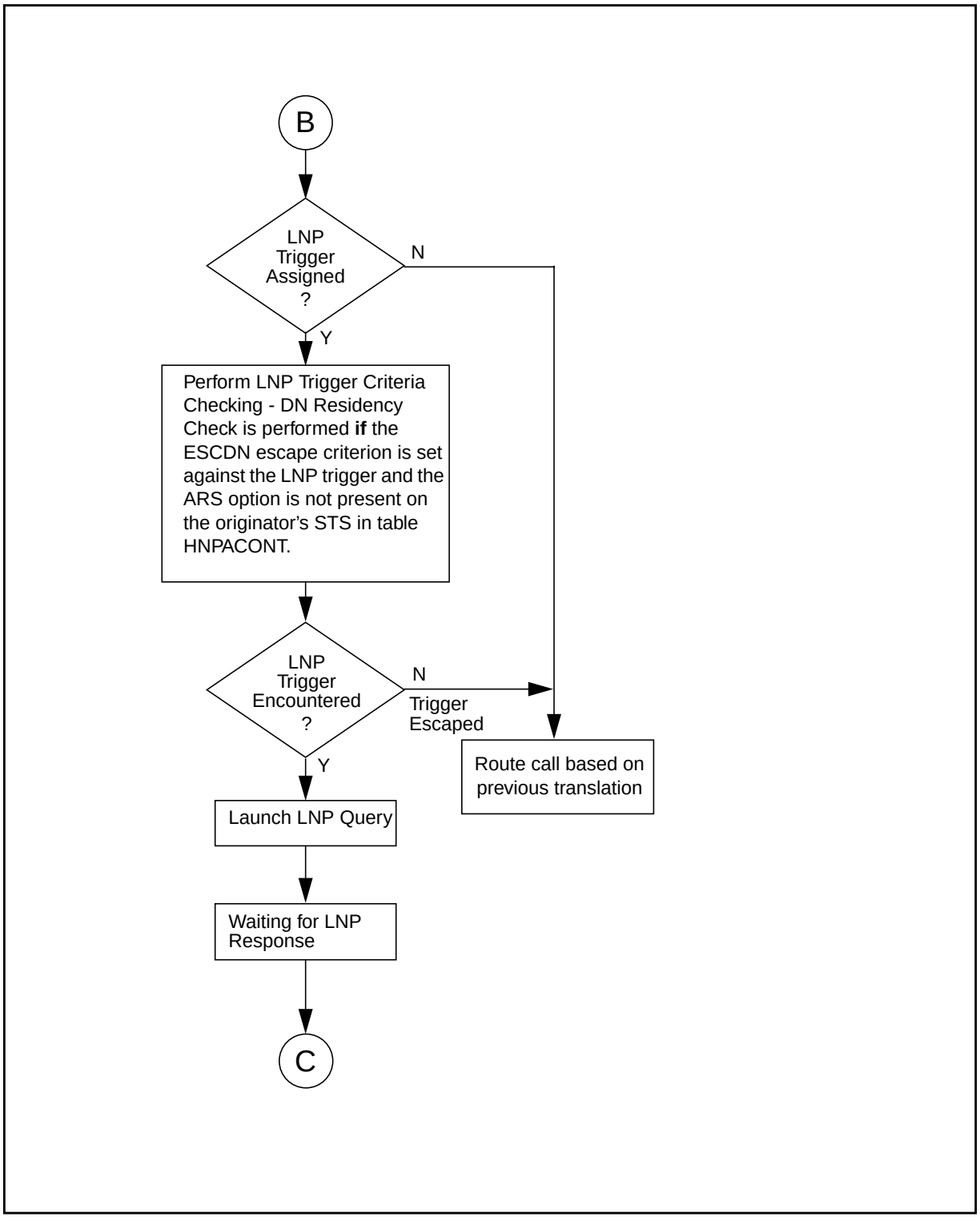


Figure 20-3 LNP translation at triggering switch (after query)

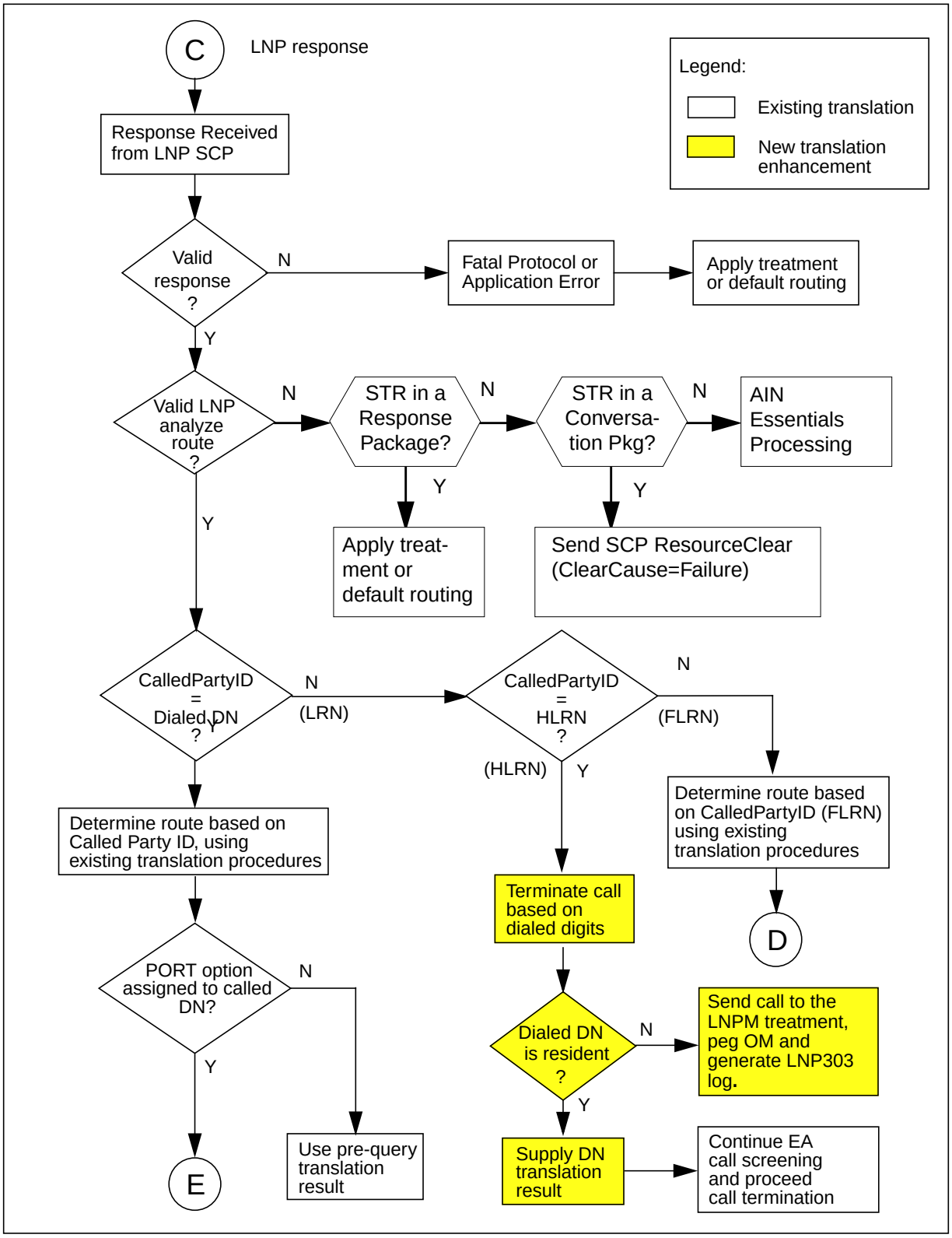


Figure 20-4 Existing translation procedures for route determination

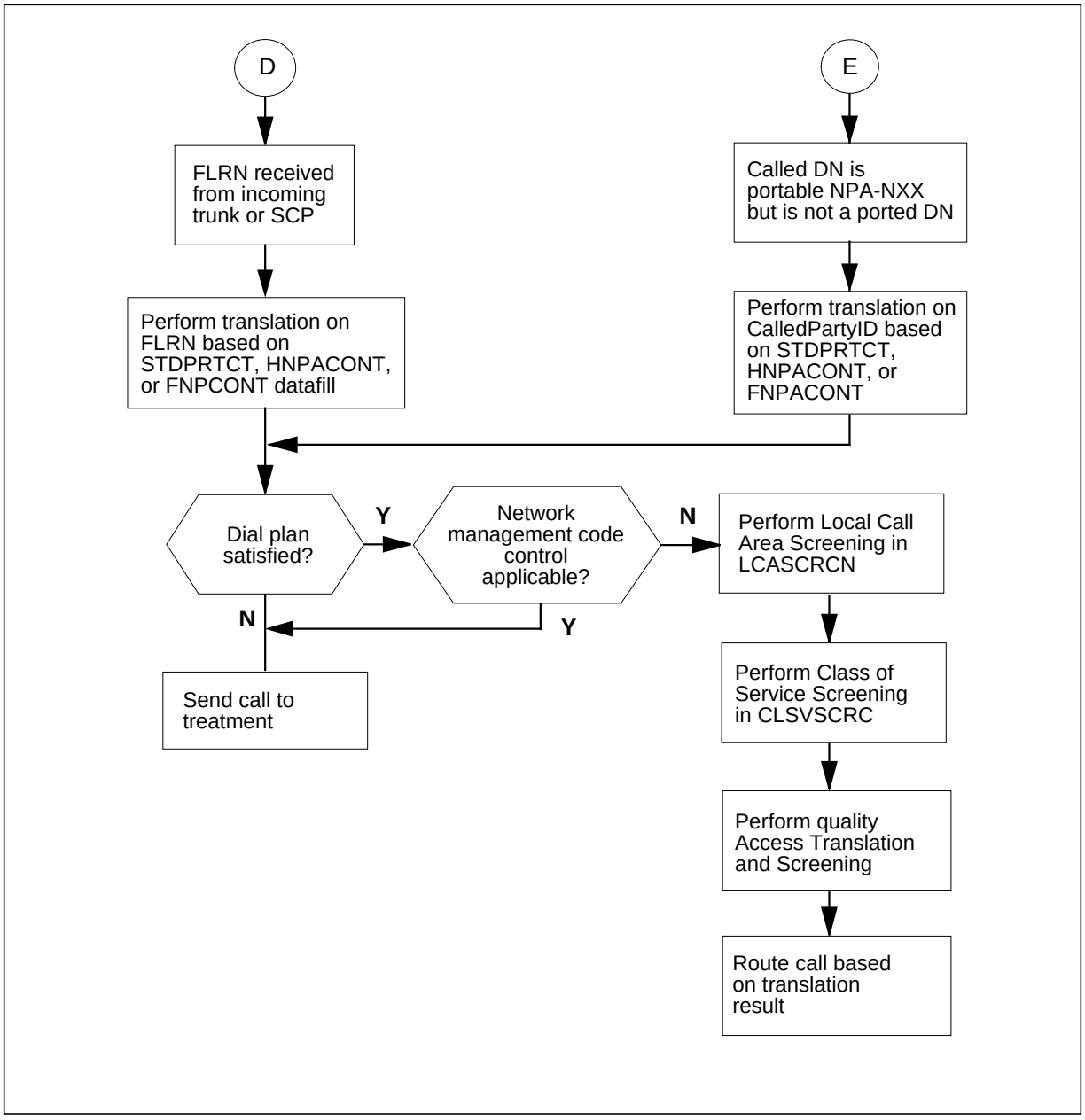


Figure 20-5 LNP translation at intermediate switch

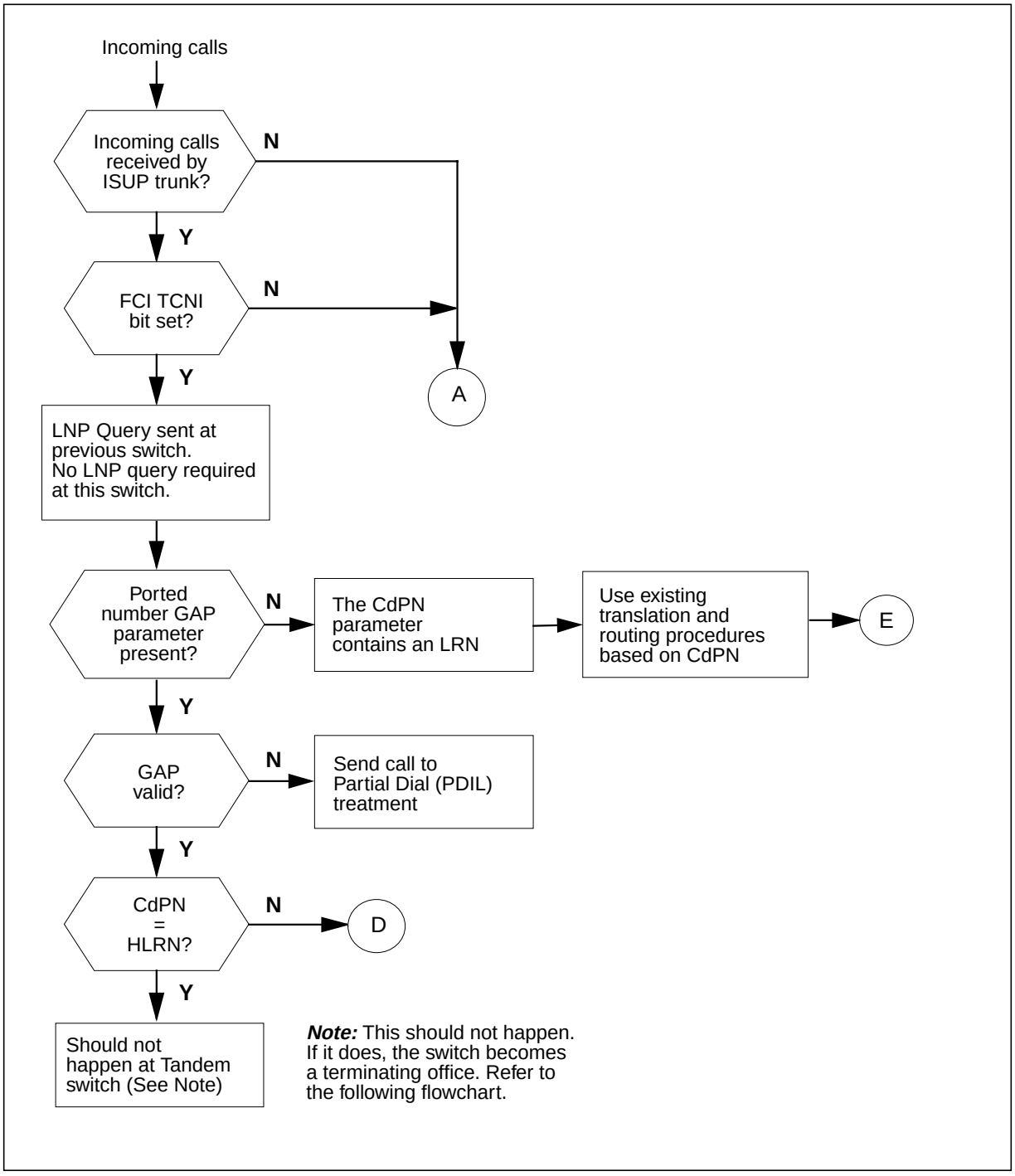
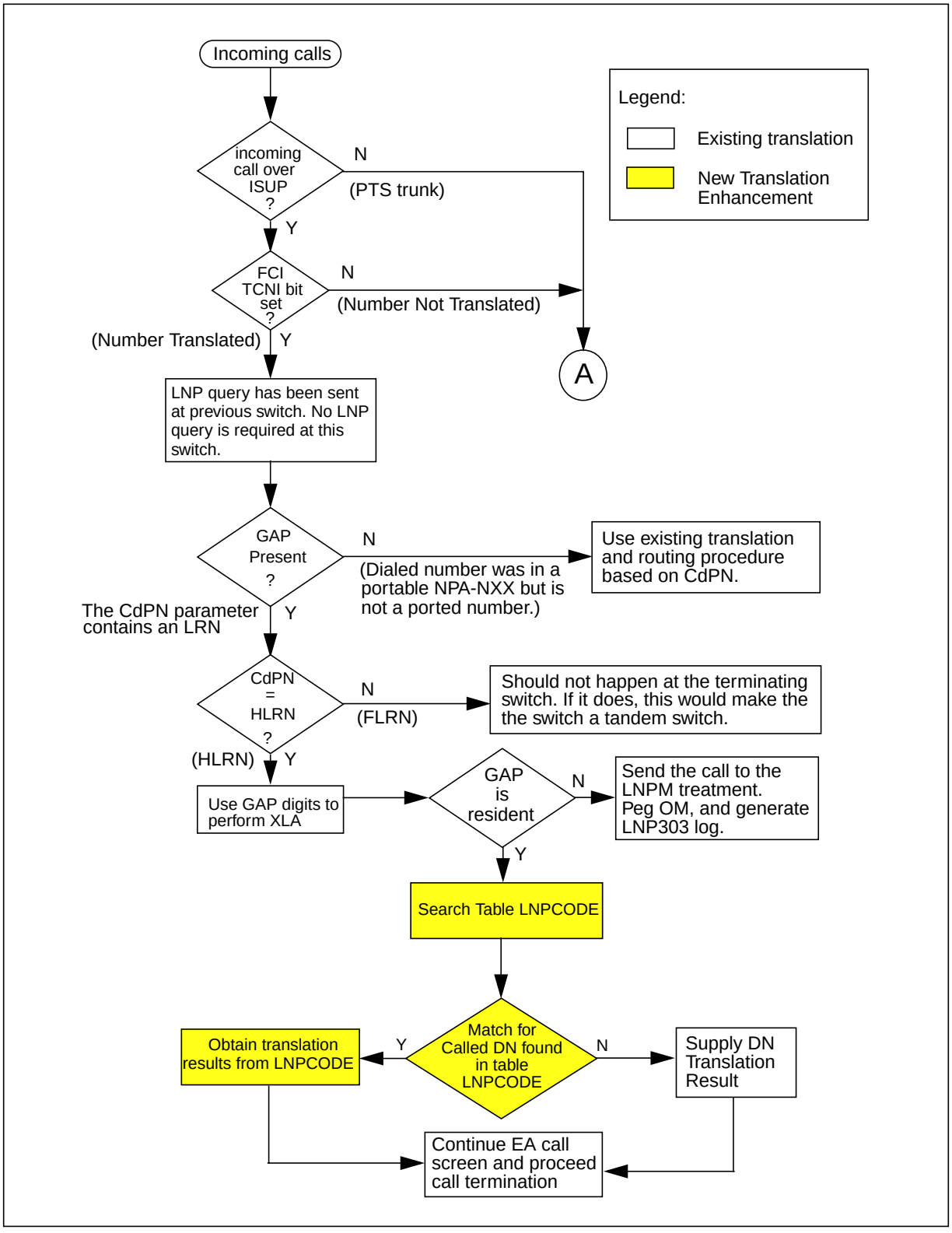


Figure 20-6 LNP translation at terminating switch



For a detailed description of LNP translations, refer to the Translations chapter.

20.1.2 Query processing

LNP query processing creates

- a new Public Office Dialing Plan (PODP)-like trigger called the LNP trigger.
- a new line option PORT, assignable through SERVORD, that allows encountering of a 10-digit unconditional LNP trigger.

  Note: Both the 10-digit unconditional LNP trigger and the PODP-like LNP trigger are built onto the existing AIN Essentials platform.

- new escape criteria unique to the LNP trigger.
- enhanced TRAVER capability.

For a detailed description of LNP query processing refer to the

- 10-digit unconditional trigger (PORT option) section of this chapter, and
- Query and response processing chapter of this document.

Note: For a description of LNP query processing for BLV TOPS, refer to *DMS-100 Translations Guide*, 297-8003-350.

20.1.3 Signaling

LNP signaling

- modifies the Forward Call Indicator (FCI) and Generic Address Parameter (GAP) of the ISUP IAM.
- adds, through table HOMELRN, option SITE, entry HOST to assign the Home LRN that is identified as the JIP for the office (SITE_HOST is equivalent to the JIP.), for billing purposes.
- adds, through table HOMELRN, option SITE with an entry of a site name to specify remote switching units for an office, for billing purposes.
- creates new release cause values to associate particular LNP release scenarios with specific actions or treatments — "Misrouted call to a ported number" cause value 26.
- adds trunk-based options to table control to facilitate the control of LRN routing on a trunk group basis. These options are controlled in tables TRKGRP and ADJNODE.

20.1.4 Response processing

LNP SSP response processing modifies existing AIN Essentials procedures to provide LNP functionality in the following areas:

- response processing — provides LNP capabilities to handle messages received from the SCP in response to an LNP query
- default routing — provides default routing capability for LNP
- operational measurements (OM) - provides registers for LNP-related measurements
- TRAVER - provides new LNP-specific TRAVER capabilities

For a detailed description of response processing, refer to the Query and Response chapter of this document. For a description of LNP query processing for BLV TOPS, refer to *DMS-100 Translations Guide*, 297-8003-350.

20.1.5 Billing—AMA enhancements for LNP

LNP introduces the following enhancements to Bellcore automatic message accounting (AMA) format recording procedures:

- changes the way the terminating NPA and terminating number fields are populated in charge and access records
- appends LNP module 719 or 720 (to existing AMA records) to identify service provider portability information for both originating and terminating parties
- provides an option to record the “Connecting Network Access Call Code 720” for calls that cross network boundaries

For a detailed description of billing, refer to the Billing part of this document.

20.1.6 Interactions

For a description of interactions between LNP and other functionality, refer to the Feature interactions chapter of this document.

20.1.6.1 Interactions with AIN Essentials PODP trigger

Interactions between PODP and LNP are as follows:

- on the LNP querying switch: never encounter PODP after an LNP query
- on the post-LNP-query intermediate or terminating switch: default behavior is as follows:
  - — always perform trigger checking on the dialed DN (in GAP or ISUP CdPN), and send the dialed DN to the AIN SCP
  - — if a response other than continue is received, reset the FCI and discard the LRN (if present)
- optional behavior: escape the PODP if the LRN is present (ported numbers lose PODP service)

20.1.7 Limitations and restrictions

For a description of limitations and restrictions that apply to LNP, refer to the "Planning and engineering" section of this document.

20.1.8 Response translations simplification

Response simplification translations is an optional capability with order code AIN00026 that simplifies the response translations use of standard pre-translations.

For information on response translations simplification, refer to *Advanced Intelligent Network Service Implementation Guide*.

20.1.9 LNPTST option (TESTCALL)

Option LNPTST is assigned to a single party residential line (1FR RES line) to enable an LNP test call.

For a detailed description of the LNPTST option, refer to the OA&M chapter of this document and the "Provisioning by call scenario" section of this chapter.

20.1.10 Operational measurements

LNP creates an operational measurement: LNP.

LNP updates OM TRMTFR3.

OM logic flowcharts follow.

Figure 20-7 OM logic flow—query processing at the triggering switch

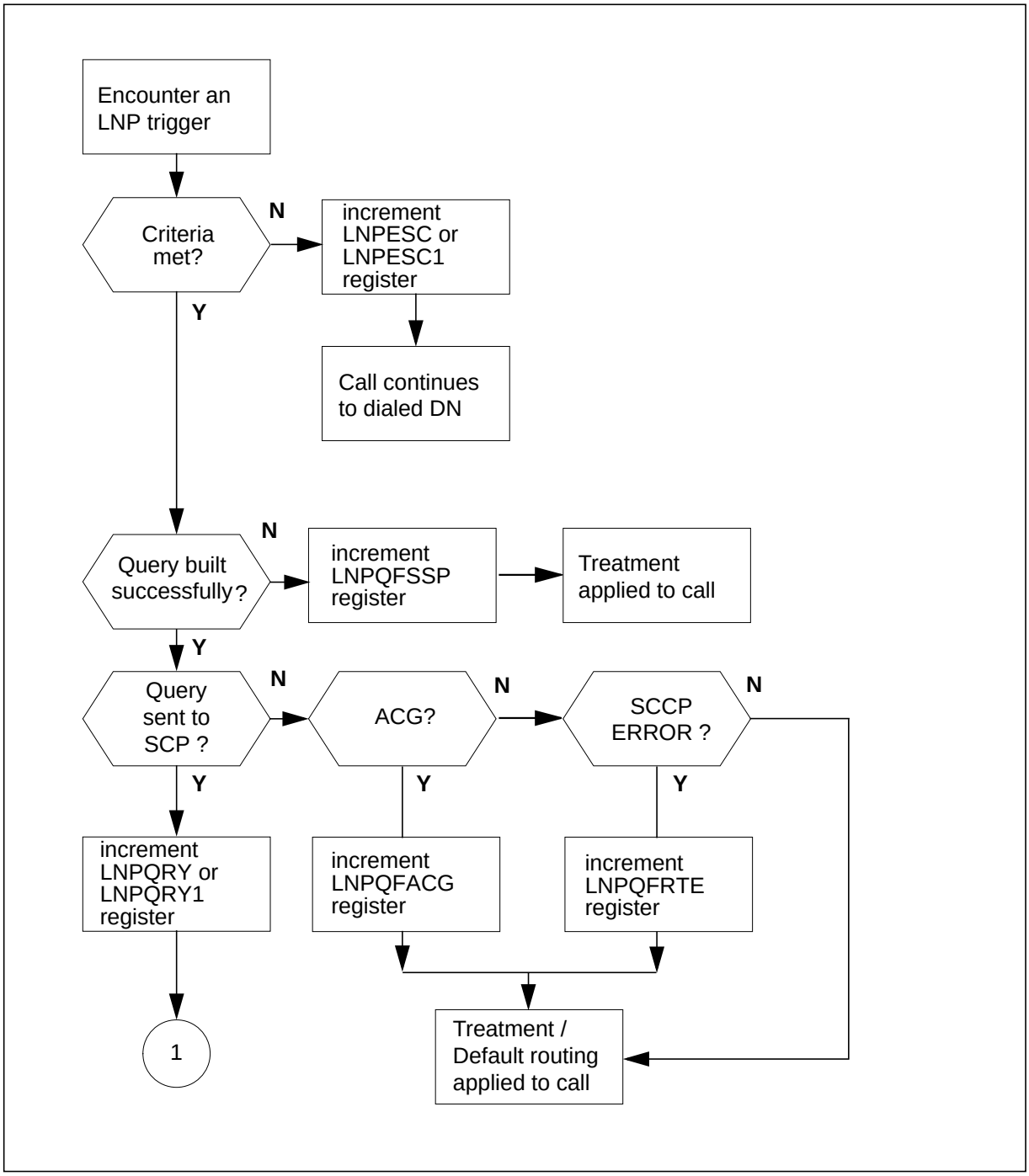


Figure 20-8 OM logic flow—response processing

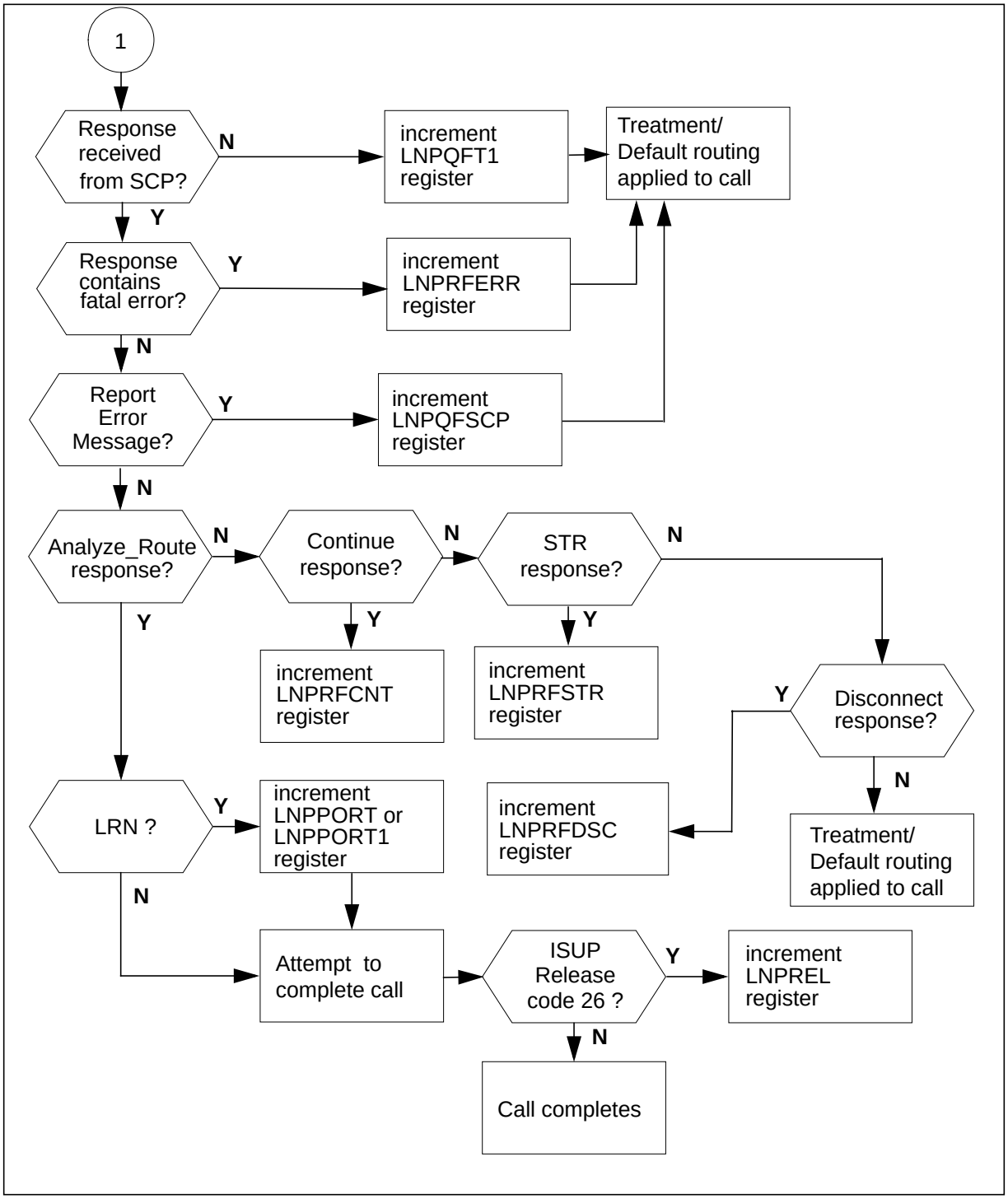
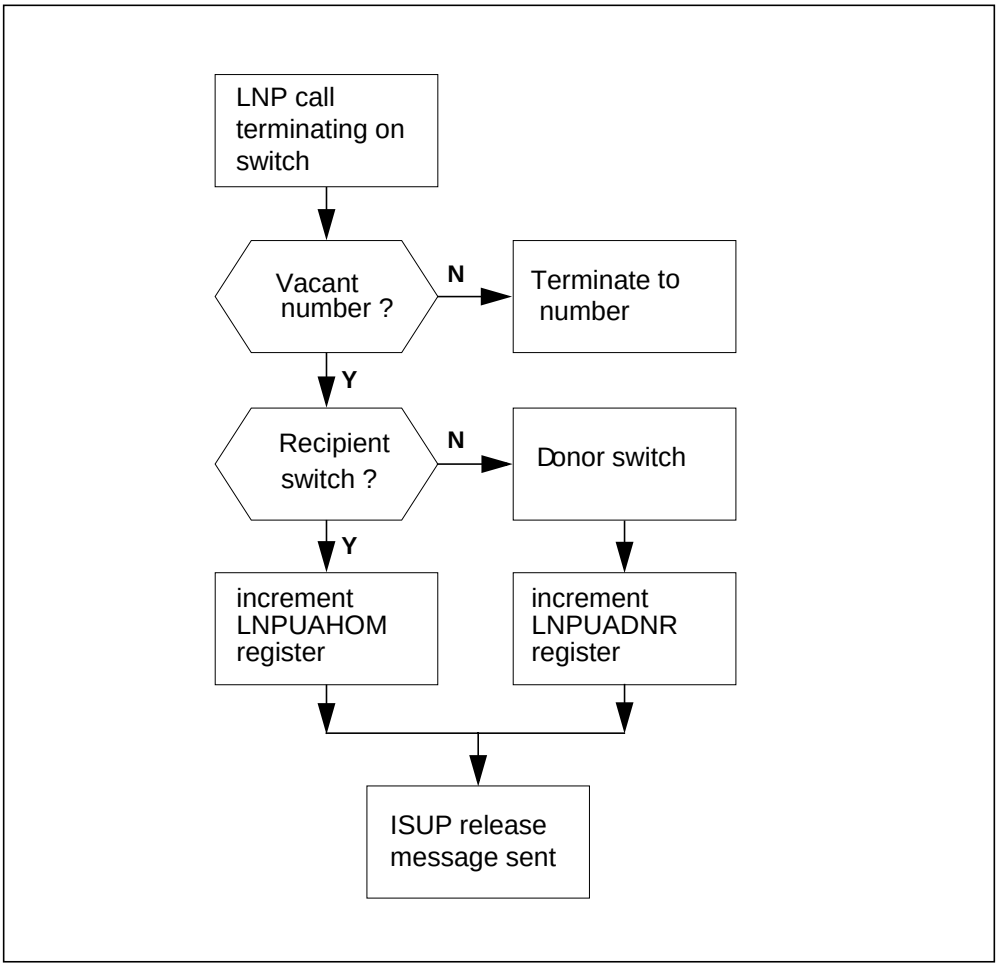


Figure 20-9 OM logic flow—terminating switch



For a detailed description of OMs, refer to the OAMP part of this document.

20.1.11 Logs

LNP creates four new logs: LNP 300, 301, 302 and 303.

For a detailed description of logs, refer to the OAMP part of this document.

20.1.12 Office parameters

LNP uses existing office parameters for the standard AIN Essentials platform.

Note: Review and consider all AIN Essentials parameters for LNP implementation.

For more information on these parameters, refer to *DMS-100 Office Parameters Reference Manual*, 297-8003-855 and the “Datafill the general office” section of this chapter.

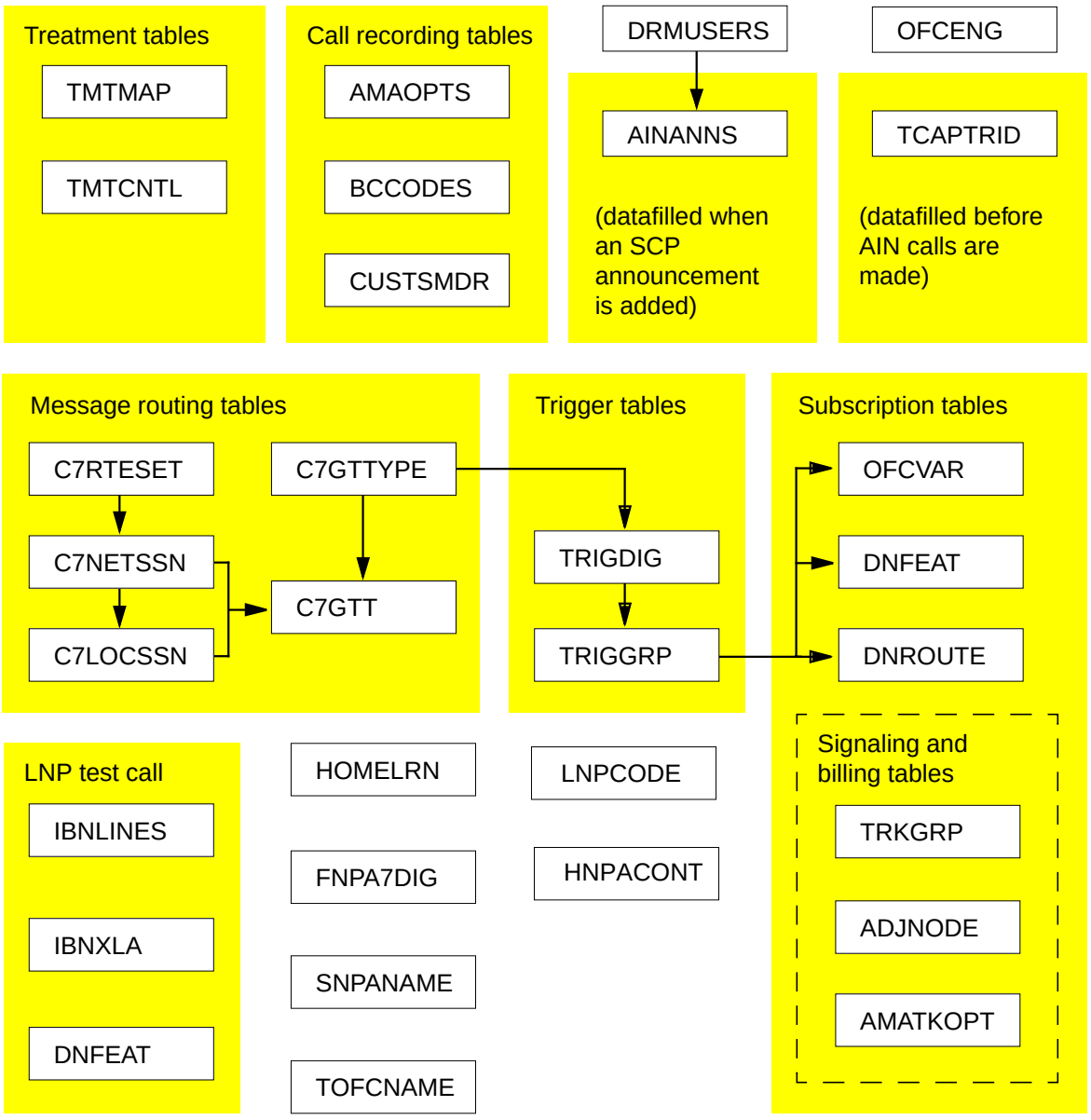
20.2 Preparing to datafill

This section describes

- LNP translations table flow
- tables associated with LNP
- AIN tables affected by LNP

Refer to the following diagram for LNP translations table flow.

Figure 20-10 LNP translations table flow



Note 1: AIN tables associated with LNP are included in this flowchart. For information on AIN, refer to Advanced Intelligent Network 0.1: SSP Provisioning Cookbook, 297-5161-352.
Note 2: Tables DRMUSERS and AINANNS are associated with LNP only when a Send_To_Resource message is returned from the SCP instead of Analyze_Route.

Refer to the following list for tables associated with LNP.

Table 20-1 Tables associated with LNP (Sheet 1 of 2)

Table name	New or modified
OFCENG	ACTIVE_DN_SYSTEM: added information on TOFCNAME, and NORTH_AMERICAN-to-UNIVERSAL conversion information
ADJNODE	added LNP options: NOJIP and SPN
AMATKOPT	added option CNAR, field BILLNO and field LCNAR
DNFEAT	added option PORT
DNROUTE	added treatment PODN
*FNPA7DIG	a new table that provides information to associate an NPA with a 7-digit dialing plan
*HOMELRN	new table used to specify location routing numbers (LRN) in an office
HNPACONT	The 'ARS' option in table HNPACONT is used to designate private customers whose calls are translated in the public environment (that is, their STS is _not_ an SNPA). The presence of the ARS option on a given originator's STS in table HNPACONT prevents DN residency checking and LNP triggering.
IBNLINES	added option LNPTST (to support the Test Call feature)
IBNXLA	added entry Test Call (LNPTST)
LNPCODE	a table added to address translations between VFG and LNP
LNPRTE	new table used to specify office route lists (e.g from table OFRT) and IBN route lists (for example, from table IBNRTE) for which LNP trigger criteria checking is enabled on calls routing directly out of prefix translations or class of service screening.
TRKGRP	added option LNP to trunk group types: IT, SC, TI, T2, PRA, OC, ATC.
TOFCNAME	added option field NONNATIVE
TMTMAP	added treatments: MISROUTED_CALL_TO_PORTED_NUMBER (LNPM), Cause value 26; and PODN. PODN is mapped to "unalloc" ISUP release cause value.
TMTCNTL subtable TREAT	added treatments LNPM and QRNF / PODP added treatment PODN in NA009 release

Table 20-1 Tables associated with LNP (Continued) (Sheet 2 of 2)

Table name	New or modified
TRIGDIG	added an LNP trigger added an LNP trigger with the following escape criteria: ESCDN, ESCEA, ESCOP, ESCCN
TRIGGRP	added escape criteria ESCGP for the PODP trigger.
Note 1: Table names that have an asterisk (*) are new tables created for LNP and are detailed in this chapter. For information on all other tables, refer to *DMS-100 Translations Guide*, 297-8003-350. ***Note 2:*** For information on AIN response translations, refer to *Advanced Intelligent Network Essentials Service Implementation Guide,* 297-5161-021.	

Refer to the following list for AIN tables affected by LNP.

Table 20-2 AIN tables affected by LNP (Sheet 1 of 2)

Table name	Notes
OFCENG	AIN Essentials and LNP parameters. Refer to “Chapter 23: General Office” on page 1.
C7GTTYPE	
C7GTT	
C7RTESET	
C7NETSSN	
C7LOCSSN	
TCAPTRID	
AMAOPTS	
BCCODES	Datafill this parameter for unanswered AMA records. If an AMA slip ID is not sent back, this table is not used. (This table is only affected with Structure code 220.). For more information on this table, refer to *DMS-100 Translations Guide*, 297-8003-350.
CUSTSMDR	Datafill this parameter for unanswered AMA records. If an AMA slip ID is not sent back, this table is not used. (This table is only affected with Structure code 220.)
TMTCNTL	
TMTMAP	
AINANNS	This table is required when a Send_To_Resource message is returned from the SCP instead of Analyze_Route.

Table 20-2 AIN tables affected by LNP (Continued) (Sheet 2 of 2)

Table name	Notes
DRMUSERS	This table is required when a Send_To_Resource message is returned from the SCP instead of Analyze_Route.

Note: For information on AIN, refer to *Advanced Intelligent Network Essentials Service Implementation Guide*, 297-5161-021.

21 Translation and routing overview

ATTENTION

For more detailed information on provisioning LNP see “Chapter 20: Provisioning overview”. This chapter is an overview of translations involved in LNP.

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see “About this document”.

LRN-LNP changed the way call translation and routing was usually performed at the DMS switch. Prior to LNP, end-offices and tandems were capable of routing calls to the terminating switch using the 6 NPA-NXX digits. Every end-office in North America was assigned one or more unique NPA-NXXs and no two switches shared the same NPA-NXX. Thus, by simply analyzing the NPA-NXX of a terminating DN, the routing system of the switch selected a route to the end-office that owns the terminating number.

As LNP service is implemented in the network it is no longer possible to determine the switch that owns a DN by examining the NPA-NXX digits. Instead, when a call is made to a ported DN, LRNs are used to route calls to the terminating switch (referred to as the recipient switch).

Every North American end office is assigned one or more unique LRNs for each LATA and no two switches share the same LRN. Based on the number of digits datafilled in table HOMELRN, Network Service Providers can specify the number of digits (either 6 digits or 10 digits) that is sufficient to identify the recipient switch.

Calls to non-ported numbers do not use LRNs for routing. These calls are routed based on the translated dialed digits using existing routing procedures.

Existing routing procedures use tables HNPACONT and FNPACONT and are routed according to the NPA-NXX of the translated dialed number. These tables contain lists of NPA-NXXs with direct or indirect routes to the switch that owns the NPA-NXX. Since the LRNs contain the NPA-NXX that is owned by the recipient switch, existing routing procedures can also be used for routing on LRNs to obtain a route to the recipient switch.

However, once the call reaches the recipient switch over an ISUP trunk, the GAP that contains the terminating DN must be used to route the call to its final destination.

Note: that the NPA-NXX of the GAP is actually the NPA-NXX of the donor switch. If existing routing procedures were used to route on the GAP, the call would get rerouted out of the recipient switch to the donor switch. To avoid this, new routing procedures are used to route calls to ported DNs once the call has reached the terminating switch.

The following sections describe in more detail how routing is performed for calls to ported and non-ported DNs at the triggering office, intermediate office, and terminating office.

21.1 VFG Interaction with LNP translations: table LNPCODE

Virtual Facility Groups (VFG) are a means of throttling calls in the DMS. A VFG simulates a loop-around trunk. Using a VFG avoids physical loop-around trunks while providing virtual loop-around capability using the software. These VFGs restrict the number of simultaneous active calls to the datafilled size (Table VIRTGRPS) of each VFG.

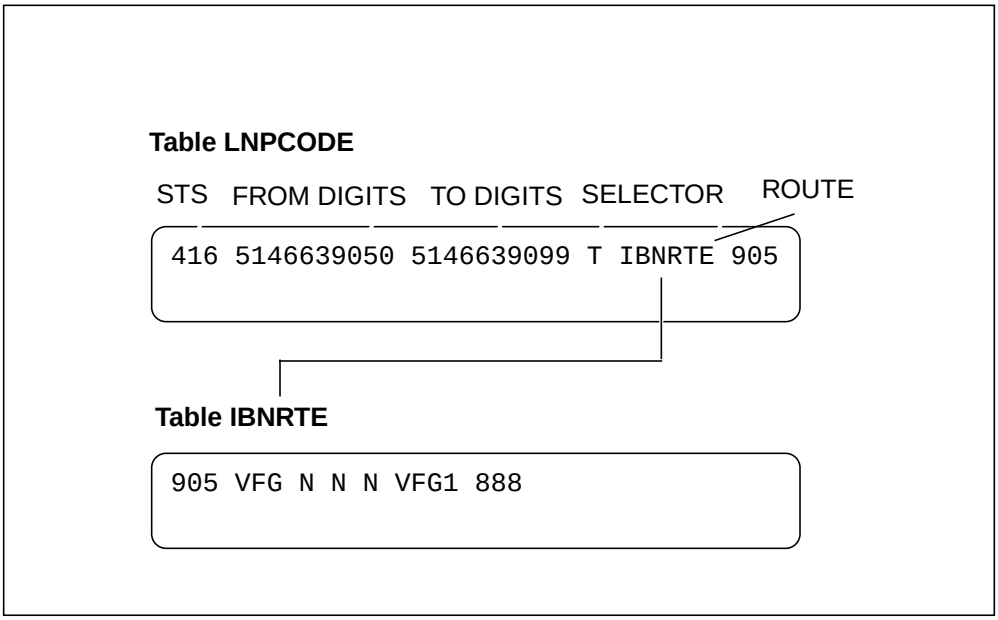
Since the VFG simulates a looparound trunk, the access to VFG is similar to the access to a trunk group; that is, by way of IBNRTE. The routing table IBNRTE may be pointed to from the translation tables such as STDPRT, HNPACODE, FNPACODE, IBNXLA, and XLANAME.

If the called number is resident on the switch (i.e the called DN is not native but has been ported into this switch from another switch), the DN residency check done at the switch overrides the routing information provided by HNPACONT or FNPACONT translation tables and automatically terminates the call on the resident DN. Thus for such a call, if an access to the VFG is desired from the HNPACONT or FNPACONT tables, it cannot be realized.

To address the interaction issue between VFG and LNP translations a new table called LNPCODE is created. This table can be datafilled for a special disposition of calls attempting to terminate on ported-in DNs; that is, the datafill in this table would determine if the call should terminate on the resident DN or routed as specified.

The datafill in this table would only be consulted if the dialed digits correspond to a resident DN (that is, the called DN is not native but has been ported into this switch from another switch). If the LNPCODE table contains a matching tuple for the ported-in DN, the call routes according to the routing information in the table. Otherwise, the call is completed by terminating on the resident DN. The sample datafill for the table LNPCODE is as shown in the following figure.

Figure 21-1 Sample datafill for the new LNP translation table



There are two scenarios for ported DN termination, that may be encountered at a recipient switch.

The first scenario is when the call is originated at the recipient switch. (It may also be a call originated at another switch and for which no LNP triggering has taken place or the queried information has been lost due to encountering a MF trunk prior to arriving at this switch). For this call, the modified ported DN termination takes effect right after the HNPACONT/FNPACONT translation has been performed. First, the DN residency check is performed to see if the called DN is resident:

- If the DN is determined to be either native or non-resident on the switch, the translation results from table HNPACONT or FNPACONT are used to route the call.
- If the DN is determined to be non-native and resident on the switch, the new table LNPCODE is searched for a matching entry. (The LNPCODE table is keyed on the current STS and the terminating digits.)
  - — If a matching entry is found in table LNPCODE, the routing information provided there is used to route the call.
  - — If no matching entry is found in table LNPCODE, the call is terminated on the resident DN; as if the DN selector has been encountered during HNPACONT translation.

The second scenario involves a call on an incoming ISUP trunk, with the GAP parameter specifying the actual dialled digits and the Called Party Number (CdPN) being the HLRN (Home LRN) of the recipient switch. It may also be a call scenario where a HLRN is received in response to an LNP query. In either case the HNPACONT or FNPACONT translations are not performed. The modified LNP ported DN termination takes place. The DN residency check is performed to see if the called DN is resident:

- If the DN is determined to be non-native and resident on the switch, the new table LNPCODE is searched for a matching entry. (The LNPCODE table is keyed on the current STS and terminating digits.)
- If a matching entry is found in table LNPCODE, the routing information provided there is used to route the call.
  - — If no matching entry is found in table LNPCODE, the call is terminated on the resident DN; as if the DN selector has been encountered.
  - — If the DN is determined to be non-resident on the switch, the call is sent to the LNPM (LNP Misrouted call to Ported Number) treatment.

21.1.1 Ported-in DN routing information – LNPCODE

The new table LNPCODE houses special routing information required by calls terminating on numbers ported in to the switch. The datafill in this table would only be significant for calls attempting to terminate on the DNs ported in to the switch.

It should also be noted that the datafill in this table is not mandatory for every number ported into the switch; the datafill is optional and is required only if special routing (such as to a VFG or to a trunk loop-around) is desired.

Figure 21-2 New table LNPCODE

```
TABLE LNPCODE

STS   FROMDIGS      TODIGS                      RTE
-----------------------------------------
416   613663        613663        T             IBNRTE   905
514   6135425471    6135425489    T             OFRT     77
514   61358         613595        TRMT          ANCT
```

The new table has a 3 part key consisting of the originating STS, and the range of the terminating digits. The originating STS is 3 digits long while the range of the terminating digits accepted by the FROMDIGS and TODIGS field varies from 1 to 10 digits. However, the datafill for FROMDIGS and TODIGS must follow the N, NP, NPA, ... NPANXXXXXX format. (Since LNP translation is based on 10 digits, the digits in the FROMDIGS and TODIGS field must start with the NPA of the terminating number.)

Only the T selector and the TRMT selector are accepted as valid routing selectors by this table. For this reason only a single routing element is accepted per tuple, instead of a routing list like other routing tables. The T selector can be used to route the call to another routing table such as OFRT, thus providing access to a route list and other selectors (like CND or NOT) if required. The TRMT selector can be used to route a call to treatment.

This feature does not support the partitioned table editor (PTE) capability for this table. (Partitioned table editor allows the operating company to authorize a user from outside the operating company to edit specified tuples of the table.)

21.1.2 Table LNPCODE Enhancements

This activity enhances the LNPCODE table to allow the STS of the incoming trunk to match the STS of a VFG indicated by an LNPCODE route.

Prior to this enhancement, if the STS of a trunk carrying an incoming LNP call indicated an LNPCODE route to a VFG with the same STS as the incoming trunk, a loop condition occured. This condition lead to the entire size of a VFG being used before the call reached failure conditions. The same condition occured if a Traver was performed for this call scenario with the RTEVFG ALL option.

The LNPCODE table is enhanced to allow only one access per call leg. In the case of a call that encounters redirection, the LNPCODE table may be traversed once per call leg, as appropriate for encountering the table.

21.2 Routing at the triggering office

The triggering office is responsible for performing the LNP query. In addition, these offices need to determine whether the LRN or dialed DN must be used for routing and what set of routing procedures to use. The various call scenarios are described in the following text.

When a call is made to a DN in a nonportable NPA-NXX, no LNP query is made and the call is routed according to existing routing procedures that are based on the NPA-NXX of the translated dialed DN. The translation result from table HNPACONT/FNPACONT is used to route the call.

If a call is made to a DN in a portable NPA-NXX and the switch determines that the call is destined for an Interexchange Carrier (IEC) or Operator Service position (if ESCEA or ESCOP criteria are provisioned, respectively), then the LNP query is not sent and the call is routed according to existing routing procedures.

If a call is made to a DN that is resident on the switch and ESCDN criteria is provisioned, then the LNP query is not sent and the call proceeds to routing. However, if the DN is one that has ported onto the switch from another switch, then existing routing procedures would route the call back to the donor switch. To prevent this scenario new routing procedures were created to terminate the call to the designated number.

When a call is made to a portable NPA-NXX and the switch determines the DN is not resident and the call is not destined for an Interexchange Carrier or Operator Service position, then the LNP query is sent. In response to the LNP query, the SCP returns the Analyze_Route message.

If the CalledPartyID in the Analyze_Route message from the service control point is the same as the dialed number, then the terminating DN has not ported. The call uses the translated dialed DN to route the call according to existing routing procedures (the translation result from table HNPACONT or FNPACONT is used to route the call).

If the CalledPartyID in the Analyze_Route message from the SCP is not the same as the dialed DN, then the call is being made to a ported DN and the CalledPartyID contains the LRN of the recipient switch. One of the following behaviors then occurs:

- If analysis of the LRN determines that it is not the Home LRN (a Foreign LRN [FLRN] has been received), the LRN from the SCP is used to route the call to the recipient switch using the existing routing procedures.
- If analysis of the LRN determines that it is the HLRN, the LRN is not used for routing. Instead, the previously translated dialed DN is used by the new routing procedures to route the call to the called DN. If the called DN is not resident, the call is sent to the LNPM (LNP Misrouted Call to Ported DN) treatment. The LNPUAHOM register is also pegged along with the output of the LNP303 log.

If an unexpected event occurs while a response from the LNP database is in process, then an optional default route is used to route the call using existing routing procedures.

AIN 0.1 Response Translations (re-translations) are avoided only when the terminator status is found to be not ported. This is determined when the dialed digits are identical to the CalledPartyID parameter in the Analyze_Route response.

In cases where the PORT option is assigned to the called DN and an LNP query is launched, LNP response processing invokes AIN Essentials response translations and retranslates the call. The prequery translations result is not used.

Table 21-1 Routing Determination for Originating / Triggering Office (Sheet 1 of 2)

LNP Trigger Status	Called DN status	LNP Query sent?	Description	Basis for Routing	Routing Procedures to Use
LNP Trigger not assigned	Called DN is not ported	No	Called DN is either resident or not resident	Dialed DN	Existing pre-query translations result
LNP Trigger assigned	Called DN is ported from another switch (that is, DN's NPA-NXX is non-native)	No	Called DN is resident	Dialed DN	Ported DN Translation
		No	Called DN is not resident	Dialed DN	Existing

Table 21-1 Routing Determination for Originating / Triggering Office (Sheet 2 of 2)

LNP Trigger Status	Called DN status	LNP Query sent?	Description	Basis for Routing	Routing Procedures to Use
	Called DN is ported to another switch (that is, DN's NPA-NXX is native)	No	The call is an EA or OA type call	Dialed DN	Existing
LNP Trigger assigned	Called DN is in a portable NPA-NXX (that is, NPA-NXX is native to the switch or may not be owned by the triggering switch)	Yes	CalledPartyID = dialed DN	Dialed DN	Existing
		Yes	CalledPartyID = LRN (Foreign LRN)	LRN	Existing
		Yes	CalledPartyID = LRN (Home LRN)	Dialed DN	Ported DN Translation
		Yes	SCP Failure	Dialed DN	Existing

Figure 21-3 Flow chart for LNP translation at originating switch (before query)

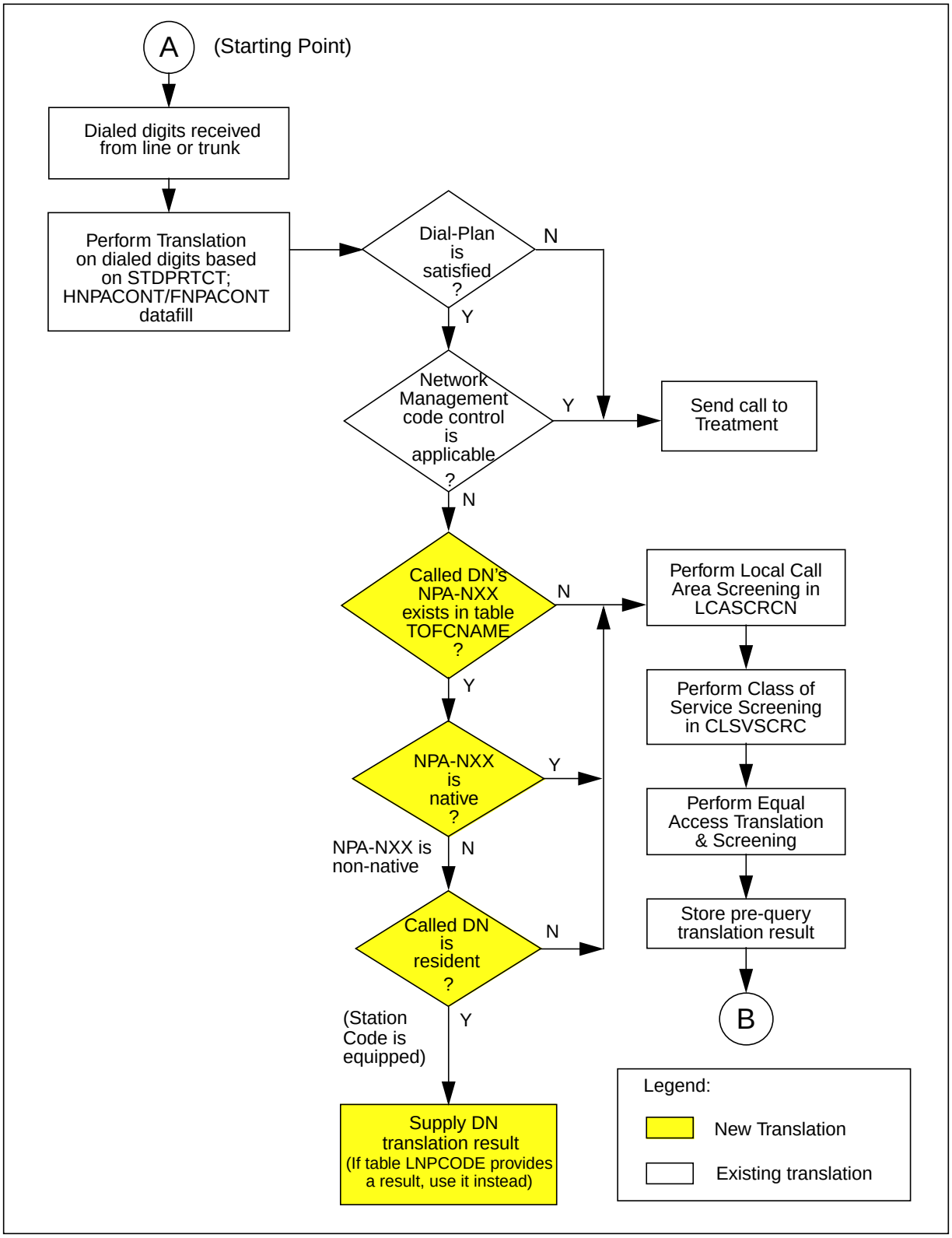


Figure 21-4 Flow chart for LNP translation at originating switch (after query)

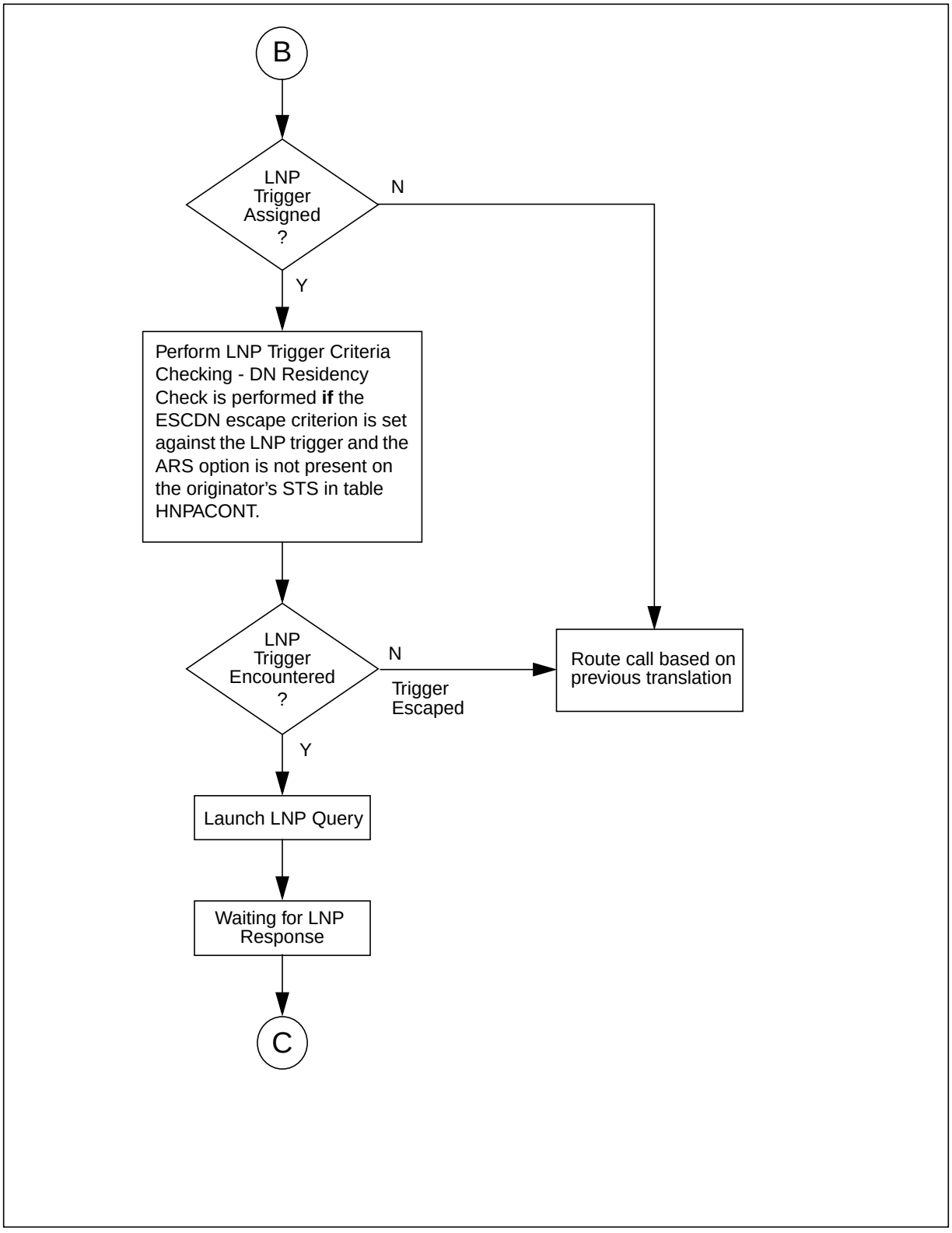


Figure 21-5 Flow chart for LNP translation at triggering switch (after query)

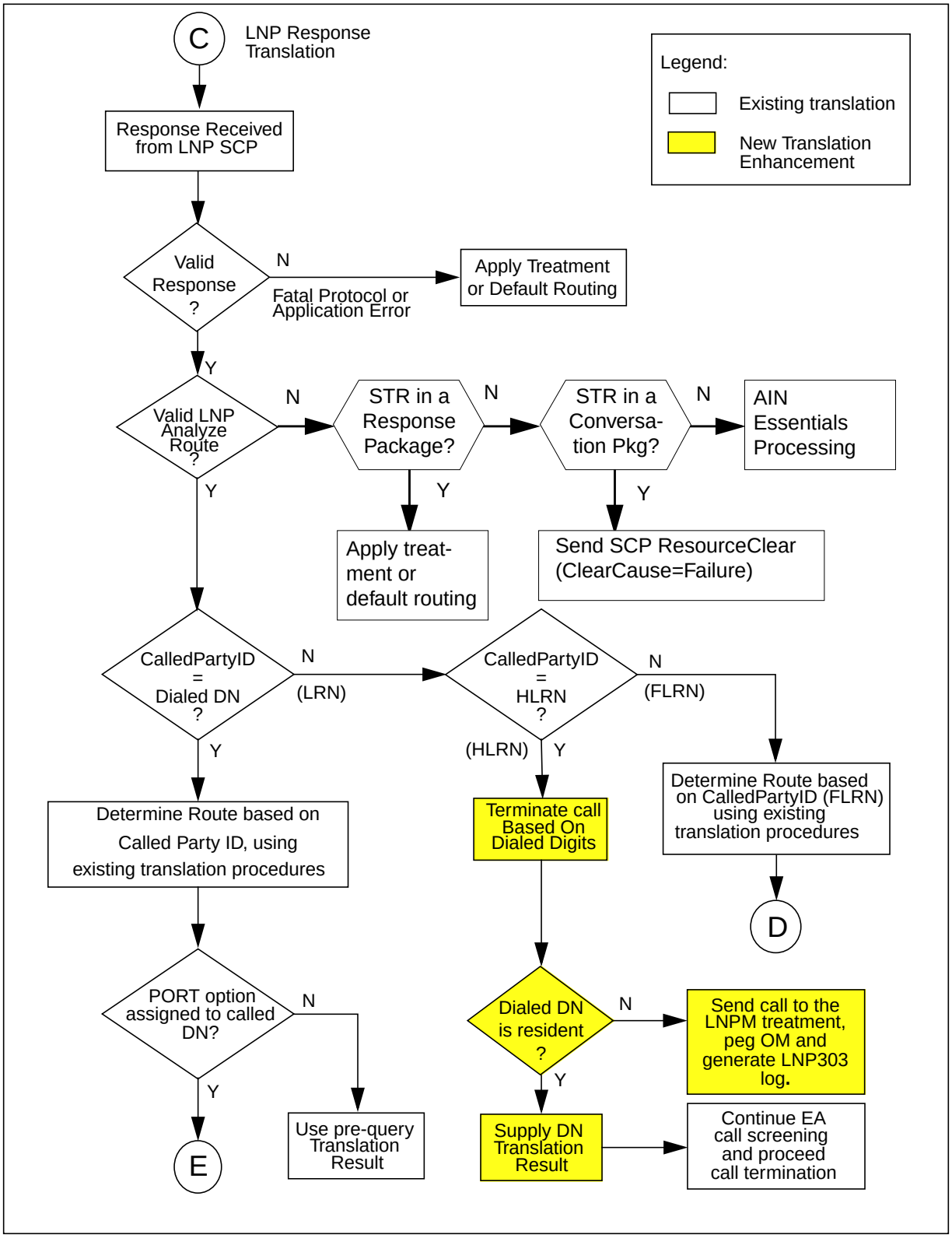
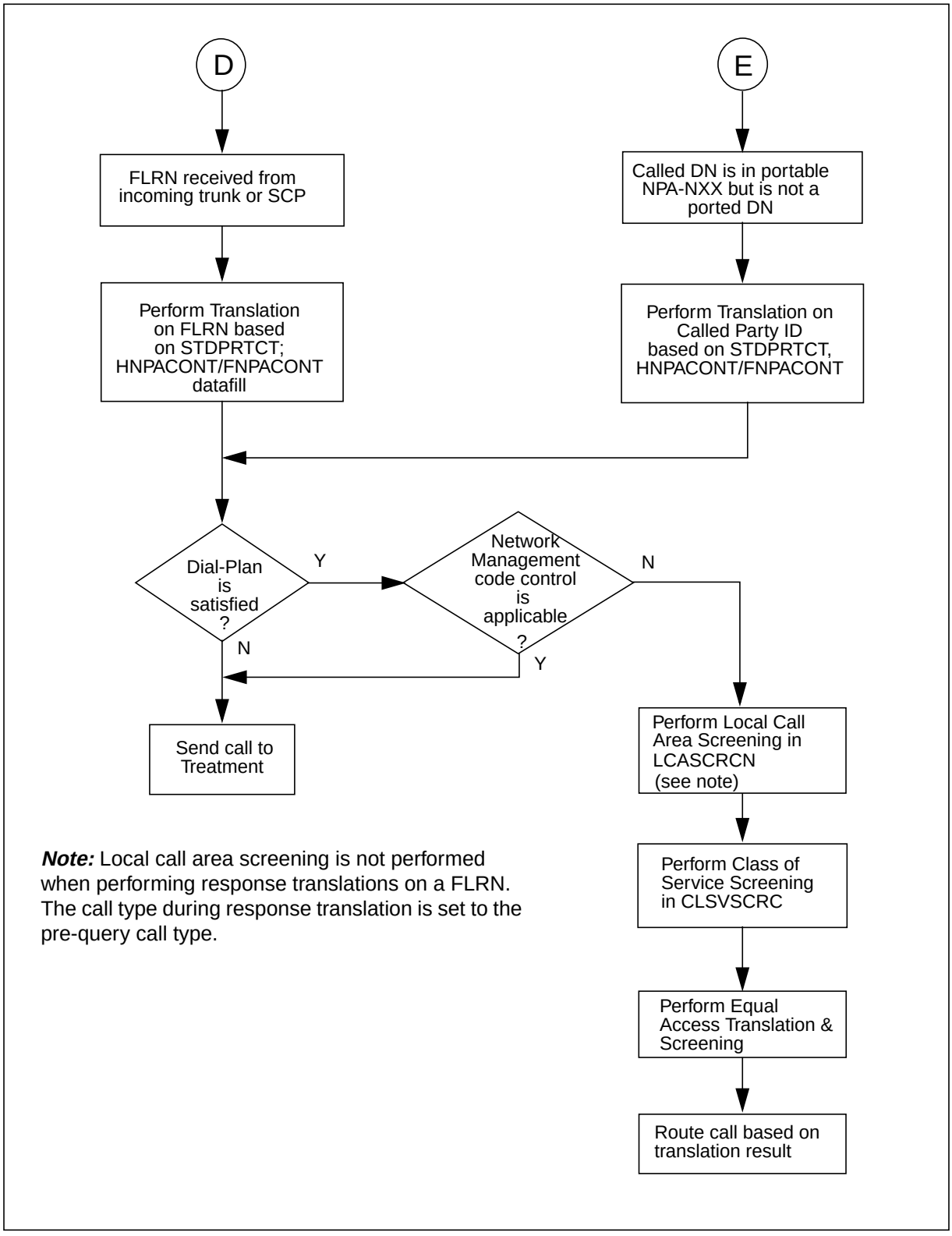


Figure 21-6 Existing translation procedure for route determination



Note: Local call area screening is not performed when performing response translations on a FLRN. The call type during response translation is set to the pre-query call type.

21.3 Routing at the intermediate office

An intermediate office in the LNP network is the tandem switch that carries a call that may have undergone an LNP query in a previous switch. The intermediate office must pass the call to another tandem office or to the terminating end-office.

An intermediate switch checks for an indication that an LNP query has already been performed by examining the FCI parameter in the incoming ISUP signaling. The FCI Translated Called Number Indicator (TCNI) field, when set to Number Translated, indicates that no LNP query is required at the intermediate switch. Per-trunk signalling (PTS) is not capable of sending FCI information. Therefore, the intermediate switch performs the LNP query for PTS calls and ISUP calls in which the FCI TCNI field is not set to Number Not Translated. For PTS and ISUP calls the intermediate switch routes LNP queries as if it was a triggering office.

An intermediate switch behaves much like the triggering office when it receives no indication that an LNP query has been previously performed (that is, a PTS call or an ISUP call with FCI= Number Not Translated). If an incoming ISUP call contains the FCI TCNI field set to Number Not Translated, then the switch determines if the route is to be based on an LRN or the GAP.

No GAP present in the IAM indicates the call is being made to a non-ported DN. The DN in the Called Party Number (CdPN) parameter is used to route the call based on the HNPACONT or FNPACONT datafill (existing routing procedures).

If a GAP parameter is included in the IAM, the switch determines a call is being made to a ported DN and the CdPN parameter must contain an LRN. The LRN is analyzed to determine if it is the HLRN by checking table HOMELRN. Since this is a tandem switch, the LRN would not be the HLRN, thus the call routes using the LRN and existing routing procedures.

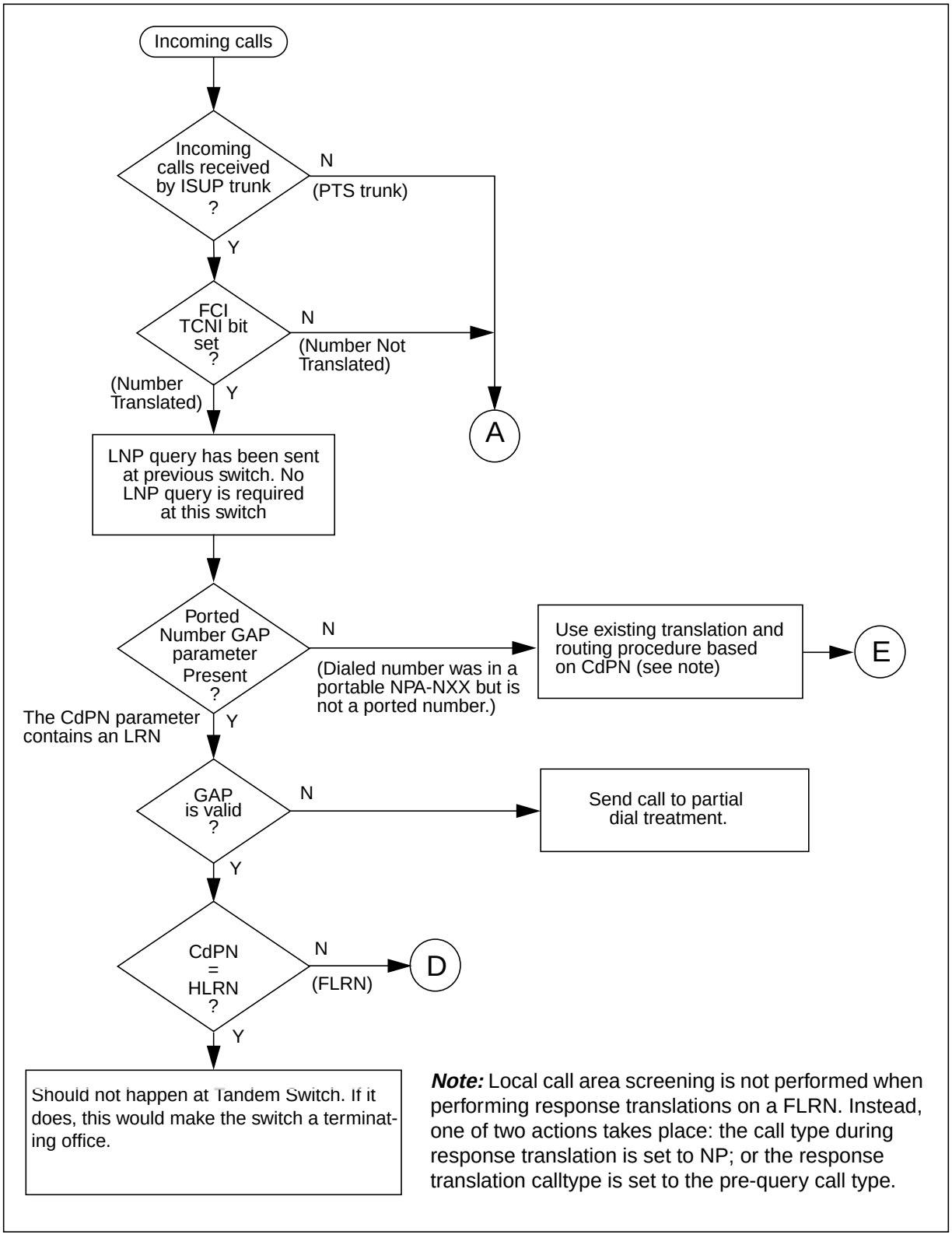
The various call scenarios that are handled by the intermediate office are summarized in the following text. In the table it is assumed that the Number Translated FCI is set and the call is not triggering at the intermediate office. A value of 0 in the FCI column indicates Number Not Translated, while a value

of 1 indicates Number Translated. An asterisk in a cell indicates the value is unimportant.

Table 21-2 Routing determination for intermediate office

Incoming Signaling Type	FCI	GAP	CdPN = own LRN?	LNP trigger result	Basis for routing	Routing procedures to use
PTS	N/A	N/A	N/A	No LNP trigger assigned	CdPN	Existing
PTS	N/A	N/A	N/A	Not Encountered - EA or OA type	CdPN	Existing
PTS	N/A	N/A	N/A	CalledPartyID = CdPN	CdPN	Existing
PTS	N/A	N/A	N/A	CalledPartyID = LRN	LRN	Existing
PTS	N/A	N/A	N/A	SCP Failure	CdPN	Existing
ISUP	0	*	*	No LNP trigger assigned	CdPN	Existing
ISUP	0	*	*	Not Encountered- EA or OA type	CdPN	Existing
ISUP	0	*	*	CalledPartyID = CdPN	CdPN	Existing
ISUP	0	*	*	CalledPartyID = LRN	LRN	Existing
ISUP	0	*	*	SCP Failure	CdPN	Existing
ISUP	1	None	*	N/A	CdPN	Existing
ISUP	1	Present	N	N/A	CdPN	Existing
ISUP	1	Present	Y	N/A	GAP	New

Figure 21-7 Flowchart for LNP translation at intermediate switch



21.4 Routing at the terminating office

The terminating office refers to the office at which the terminating DN resides.

PTS trunks are not capable of sending GAP and FCI information (so the incoming digits contain the terminating DN and are used to route the call to its destination). The call escapes the LNP trigger because at the terminating office the DN resides at the switch. Since the terminating DN may have ported to this switch existing routing procedures must not be used. The call uses new routing procedures which direct the call to the terminating DN's destination.

A call received by way of ISUP with the FCI TCNI field set to Number Not Translated behaves similar to the PTS case. The call uses the terminating DN in the Called Party Number parameter of the IAM for routing. The LNP trigger is escaped since the DN is resident. However, since the terminating DN may have ported to the switch, existing routing procedures are not used. The new routing procedures use the terminating DN to route the call to its destination.

An incoming IAM that has the FCI TCNI field set to Number Translated but no GAP is present, indicates the call is being made to a nonported number. The terminating DN is obtained from the Called Party Number parameter of the IAM and is used for routing by existing routing procedures.

If the incoming IAM has the FCI TCNI field set to Number Translated and the ported number GAP parameter is present, the switch determines a call is being made to a ported DN. The Called Party Number parameter of the IAM contains the switch's LRN. In this case, the terminating DN is obtained from the GAP for routing by the new routing procedures.

The call scenarios handled by the terminating switch are summarized in the following table. A value of 0 in the FCI column indicates Number Not Translated, while a value of 1 indicates Number Translated. An asterisk in a cell indicates the value is unimportant.

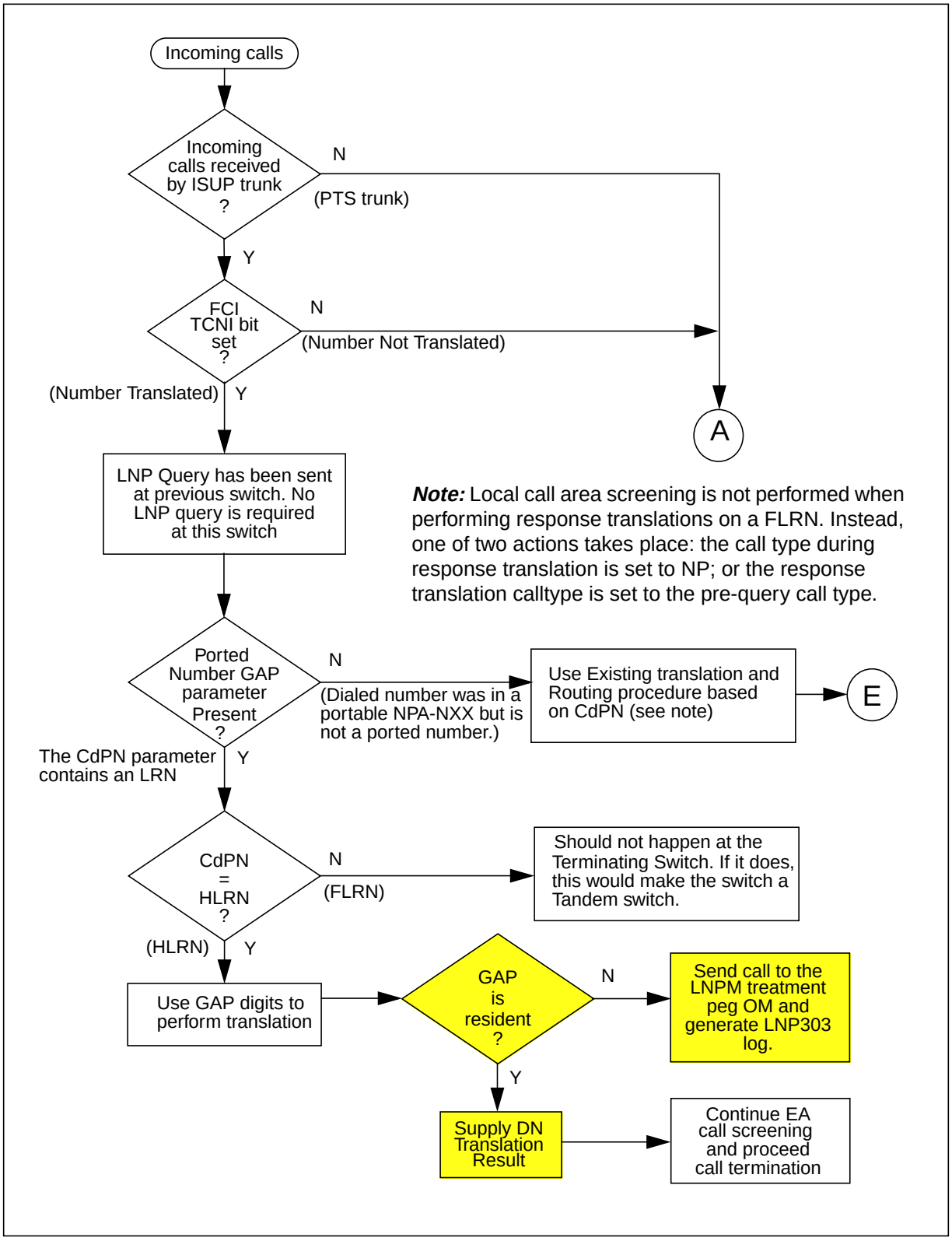
Table 21-3 Routing Determination for Terminating Office (Sheet 1 of 2)

Incoming Signaling				LNP trigger result	Basis for routing	Routing procedures to use
PTS	N/A	N/A	N/A	No LNP trigger assigned	CdPN	Existing
PTS	N/A	N/A	N/A	LNP trigger is or is not assigned - called DN has a non-native NPA-NXX and is resident	CdPN	Ported DN Translation

Table 21-3 Routing Determination for Terminating Office (Continued) (Sheet 2 of 2)

Incoming Signaling				LNP trigger result	Basis for routing	Routing procedures to use
PTS	N/A	N/A	N/A	LNP trigger encountered but escaped - due to called DN being resident	CdPN	Ported DN Translation
ISUP	0	*	CdPN	No LNP trigger assigned	CdPN	Existing
ISUP	0	*	Called DN	LNP trigger is or is not assigned - called DN has a non-native NPA-NXX and is resident	CdPN	Ported DN Translation
ISUP	0	*	Called DN	LNP trigger encountered but escaped - due to called DN being resident	CdPN	Ported DN Translation
ISUP	1	None	DN	N/A	CdPN	Existing
ISUP	1	DN	LRN	N/A	GAP	New

Figure 21-8 Flowchart for LNP translation at terminating switch



21.5 Translation Enhancements – Ported DN Termination

As discussed in the previous sections, the existing translation functionality is enhanced to allow calls to ported DNs to be able to terminate at the recipient switch without changing the operating company's translation datafill.

The new translation functionality applies right after HNPACONT or FNPACONT translation has been performed (except for calls incoming on an ISUP trunk with HLRN and GAP resident in the switch or calls which query LNP and receive the HLRN of the querying switch in the response; in these cases STDPRTCT and HNPA/FNPACONT are skipped and DN Result is provided instead to terminate). First, a check is performed to determine whether the NPA-NXX of the called DN is native or non-native:

- If the NPA-NXX is non-native, another check is performed to determine if the called DN resides on the switch.
  - — If the DN is not resident, the call routes based on the supplied translation datafill result.
  - — If the DN is determined to be resident on the switch, the call terminates automatically to the called DN (as if the DN selector has been encountered during HNPACONT translation). The route originally supplied by table HNPACONT or table FNPACONT is ignored. Alternatively, LNPCODE may provide the result instead of using the DN result.
  - — If the STS of the originating party has the 'ARS' option in table HNPACONT, the DN residency check is bypassed.
- If the NPA-NXX is native, the translation result from table HNPACONT or FNPACONT is used to route the call.

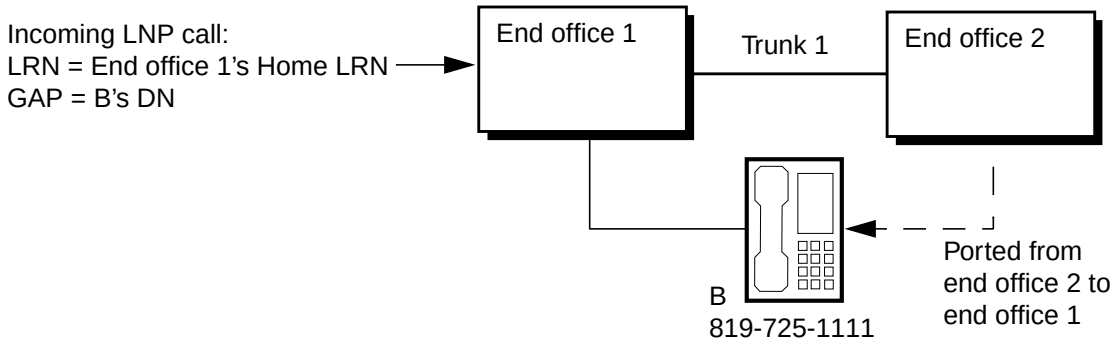
Note 1: Local Call Screening and Class of Service Screening remain applicable to the call. This means that Class of Service Screening can alter the previous translation result. LNPRTE can prevent CLSVSCRC from applying its route.

Note 2: A DN is considered resident only if the DN exists in table DNINV. However, if the DN exists in table DNINV but the DN is associated with BLDN (Blank DN), UNDN (Unassigned DN), PODN (Ported Out DN) treatment, or VACT treatment, the DN is considered not resident.

Since the North American translation system uses tables HNPACONT and FNPACONT, the new translation enhancements for LNP is only activated if table HNPACONT or FNPACONT is encountered during translation. If table HNPACONT or FNPACONT is not used during translation (for example when

a call is routed from STDPRTCT) or the route it selected is overwritten later in translations, it is assumed that the setup is for a special call scenario (like trunk loop-around) and the new translation enhancements are not used to terminate the call onto a ported DN directly. LNPRTE can change this behavior.

Figure 21-9 Comparison Between LNP-Supported and Unsupported Datafill



Scenario 1: Routing call to end office 2 by way of STDPRTCT (new translation algorithm is not used)

```
TABLE STDPRTCT
PUB ( 1) (65021) 0
.SUBTABLE STDPRT
.819 819  T  DD  OFRT  99 10 10 NONE
TABLE OFRT
99 ( S D  TRK1)$
```

Note: If a route is specified in subtable STDPRT, the call is routed to the donor switch even if the DN is ported onto end office 1. LNP query is not launched. LNPRTE may alter behavior.

Scenario 2: Routing calls to end office 2 by way of HNPACONT (new translation algorithm is used)

```
TABLE STDPRTCT
 (no datafill)
DEFAULT VALUE IS: N NP 0 NA

TABLE HNPACONT
613 (incoming trunk's NPA)
.SUBTABLE HNPACODE
.819 819 FRTE 819
.SUBTABLE RTEREF
.819  ( S D  TRK1) $
```

Note: If a route is specified in subtable HNPCONT.HNPACODE, the call is terminated to the number that has been ported to the switch. If the number is not ported, the call is routed to end office 2 as per HNPACONT datafill.

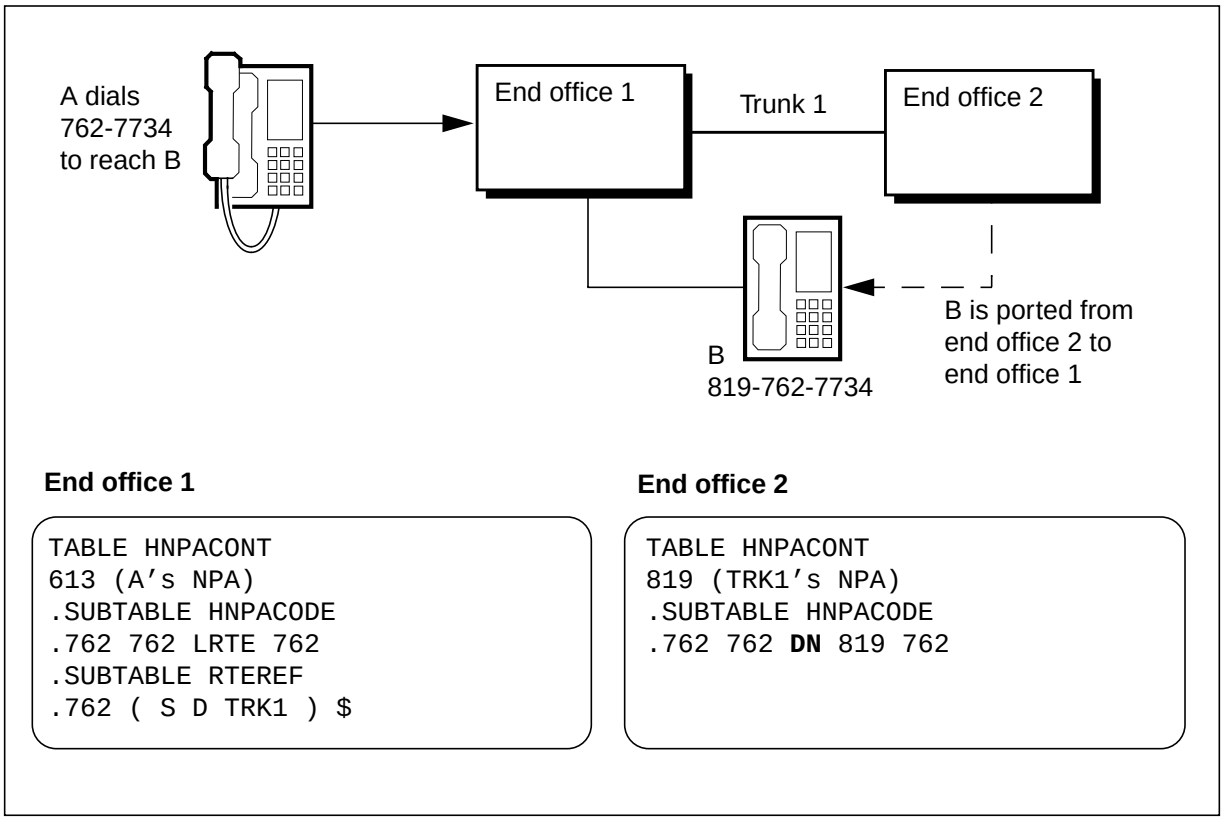
21.6 NPA derivation

For 7-digit dialing or outpulsing, the NPA of the called number must be derived before the check for DN residency can be performed.

In the case of Home NPA (HNPA) 7-digit dialing, the NPA of the terminating number can be obtained from the NPA of the originator (from table LINEATTR in the case of line origination or from table TRKGRP in the case of trunk origination). However, in the case of Foreign NPA (FNPA) 7-digit dialing/outpulsing, the terminator's NPA cannot be obtained from any existing datafill.

As shown in the following figure when originator A uses a 7-digit dial plan to originate a call to a DN with a Foreign-NPA (FNPA), there is no information regarding the terminating NPA in the existing translation tables. However, the full 10 digits of a called DN is required to determine unambiguously whether or not the DN is resident on the switch. Therefore, a new capability to derive the terminating NPA for 7-digit dialing is needed.

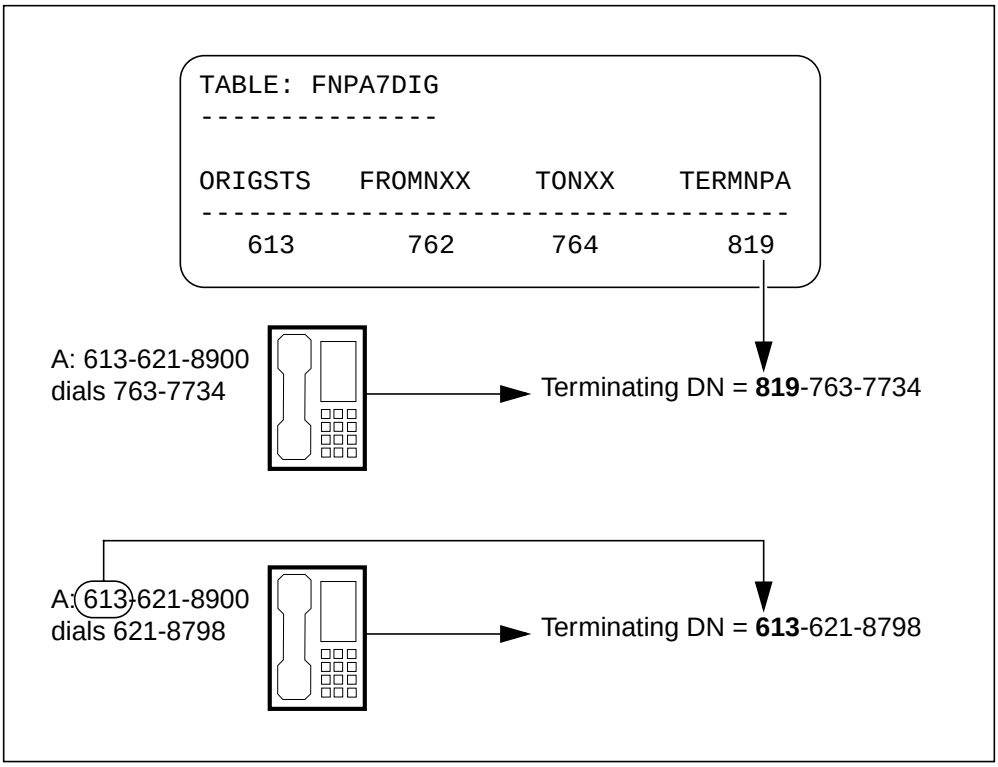
Figure 21-10 Foreign-NPA 7 digit dialing



As a result, a new table FNPA7DIG was created to allow operating companies to specify the NPA for a 7-digit dialing plan (if the office supports 7-digit dialing for foreign NPA numbers). It is datafilled against the originator's NPA and the dialing NXX. See the following figure.

There are several side-effects and limitations to the FNPA7DIG table. Please refer to Section 22.1 , “Table FNPA7DIG,” on page 1 for additional information.

Figure 21-11 Data datafill of table FNPA7DIG



21.7 Table TOFCNAME enhancements

Table TOFCNAME is used to define the area and office code combinations (that is, NPA-NXX) residing on the switch. There are three types of DN systems. These systems are NORTH_AMERICAN, ENHANCED_NORTH_AMERICAN, and UNIVERSAL. The Enhanced North American DN system is not supported in North America (it is only supported in the APC market). In the NORTH_AMERICAN DN system the capacity of TOFCNAME table is 100 (that is, each individual office can define up to 100 different area code and office code combinations). However the capacity of this table for the UNIVERSAL DN system have been increased from 1024 to 8171.

A fixed field called OPTION is used by table TOFCNAME. The option NONNATIVE has been defined for this field and is used to identify whether a particular NPA-NXX is native or non-native (that is, ported from another switch).

SOC option NPE00001 (Nbr Plan Evol 1) allows duplicate NPA-NXX in the office. This SOC is applicable to both DN systems (North American and Universal). The existing duplicate NPA-NXXs can be transferred over during ONP regardless of state of this SOC. However when the state of this SOC is set to IDLE you cannot add any more duplicate NPA_NXX to the office.

SOC option NPE00002 (Nbr Plan Evol 2) is only applicable to the DN systems that are configured as Universal. By changing the state of this SOC to ON, the capacity of table TOFCNAME in Universal system increases from 1024 to 8171. When there are more than 1024 entries in table TOFCNAME, you cannot change the state of SOC option NPE00002 to IDLE. In order to change the state of this SOC to IDLE, the number of NPA-NXX in table TOFCNAME has to be reduced to 1024.

21.7.1 Table TOFCNAME capacity expansion

Currently, up to 100 terminating office numbers can be supported in North America. A terminating office number is assigned to a specific area code and office code (NPA-NXX) combination, and all 10,000 station codes (ranging from 0000 to 9999) are then owned by that terminating office. This provides 1,000,000 possible DN combinations that can be served by an individual switch.

This has been more than enough until the introduction of Local Number Portability. The need to serve a wider range of DNs (not more DNs, just different combinations) became apparent.

In BCS-33, table DN was replaced by table DNINV to provide greater flexibility in the way directory numbers are managed, and the Directory Number System (DNSYS) was created. There are currently two DN systems, North American and Universal. In the Universal DN system, up to 1024 terminating office numbers can be supported, whereas in the North American system, only 100 terminating office numbers are allowed.

Office parameter ACTIVE_DN_SYSTEM in table OFCENG designates the DN system being used. The expanded capability can be obtained by converting the North American DN system to the Universal DN system. Two conversion methods are discussed in the following sections.

21.7.1.1 Offices with few or no DNs already assigned

In offices with no directory numbers assigned, (table DNINV is empty) office parameter ACTIVE_DN_SYSTEM can be changed from NORTH_AMERICAN to UNIVERSAL. To activate the new DN systems, the operating company must perform a CM restart (warm, cold, or reload). If only a small number of DNs are assigned, delete them, perform the parameter change, restart, and then add them back in again.

Note: This would only be feasible where the service impact would be minimal, for example, in a lab environment.

21.7.1.2 Offices with many DNs already assigned

The DN system may also be converted by using the One Night Process (ONP). This process provides a means of transferring data from the active CPU to the inactive CPU with minimal service impact. By changing office parameter ACTIVE_DN_SYSTEM from NORTH_AMERICAN to UNIVERSAL on the inactive side before the DN tables are transferred, the DN system conversion is performed automatically when the DN data tables are transferred from the active to the inactive side.

The following steps are used to perform data transfer during a software upgrade.

On the active side (old release):

Step 1: Set up a monitoring process for dumping the table data by issuing the following CI command:

```
CI:
>LOGUTIL
LOGUTIL:
>TRACECI ME
```

Step 2: Before dumping the data, the SETUP command of TABXFR must be set to DUMPONLY. This is recommended to be done on a separate window:

```
CI:
>TABXFR
TABXFR:
>SETUP DUMPONLY
```

Step 3: This step starts the table data dumping process. Before starting to dump, make sure the device used to dump data has enough room to hold all the data.

```
>TABXFR:
DUMP <DEVICE>
```

Make sure the device specified is accessible from the inactive side.

On the inactive side (new release):

Step 4: Set up a monitoring process for restoring the table data by issuing the following commands at CI prompt. This is similar to step 1.

```
CI:
>LOGUTIL
LOGUTIL:
>TRACECI ME
```

Step 5: Before starting the restoring process, the following values of TABXFR must be set.

```
CI:
>TABXFR
TABXFR:
>STOPIF 1 --> The transfer stops after this number of failures
>LIMIT 25 --> The upper limit of failures on one table.
>SETUP LBREST -->  Set the transfer process to restore
>RMOUNT <DEVICE> --> Mounting the device which stores the data
```

Step 6: Prior to issuing the STARTXFR command, a stop to the transfer process must be added after table OFCENG so that the office parameter change can be performed.

```
TABXFR>STOPXFR AFTER OFCENG; quit
```

Step 7: When it is ready, execute the STARTXFR command in TABXFR to start the restoring process.

```
TABXFR>STARTXFR
```

Step 8: When the TABXFR process stops at table OFCENG, change parameter ACTIVE_DN_SYSTEM from NORTH_AMERICAN to UNIVERSAL and resume the process.

```
TABXFR>STOPXFR CLEAR AFTER OFCENG
TABXFR>STARTXFR       ---> resume the process
```

Step 9: Type QUIT in TABXFR when it is all done.

Refer to NTP 297-1001-303 for more details on the ONP process.

21.7.1.3 Restrictions

Although changing the DN system from North American to Universal is necessary to allow expansion of table TOFCNAME, it does not imply that LNP supports Universal DN format. In contrast, LNP only supports North American DN format (that is, 3-digit NPA, 3-digit office code and 4-digit station code) even if the DN system is changed to Universal.

Note: When converting to the Universal DN system in North American switches, it is possible to datafill variable length NPAs and NXXs in tables SNPANAME and TOFCNAME.

Although changing DN system from North American to Universal increases the capacity of table TOFCNAME, it decreases the capacity of tables DNINV and DNROUTE. The capacity of table DNROUTE is reduced from 650,000 to 500,000; and the capacity of table DNINV is reduced from about 500,000 to 300,000.

21.7.1.4 Comparison of North American to Universal DN system

The North American DN System averages approximately 4 bytes per entry:

- 1-1000 entries in a thougrp uses 4000 bytes.
- all numbers per NNX appear in table DNINV

The Universal-DN-System averages approximately 11+ bytes per entry:

- only assigned numbers in NNX appear in table DNINV
- memory impact per thougrp depends on distribution of DNs in thougrp (least impact for consecutive DN assignment rather than distributed assignment throughout thougrp)
- 1000 assigned DNs in thougrp uses 10884 bytes
- 360 assigned DNs in thougrp uses 3964-7044 bytes
- 70 assigned DNs in thougrp uses 816-3984 bytes

When less than approximately 37% of the set of unique “DEF” digits of the station code (for example, 000x, 001x,... 999x) are in use within a thougrp, the Universal DN system always results in a memory savings.

21.8 Option field added to table TOFCNAME

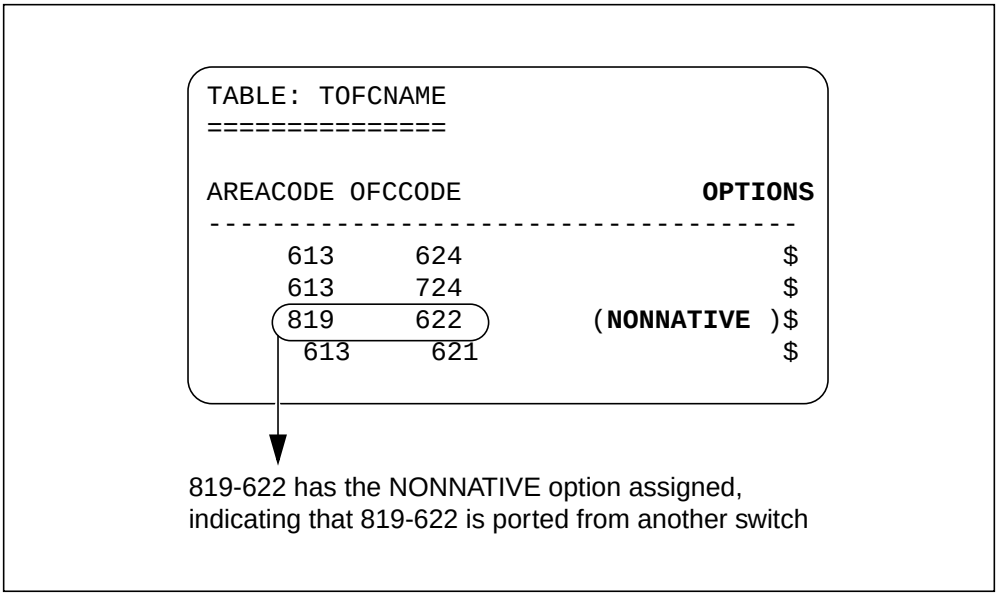
To satisfy billing requirements, it is necessary to identify whether the directory number of either an originator or terminator is native or nonnative to the switch.

To identify if an office number is native to the switch, a new OPTION field was added to the existing table TOFCNAME. A new option called NONNATIVE was also introduced to identify whether a particular office number (NPA-NXX) is native or not-native.

When the NONNATIVE option is not assigned to an NPA-NXX, it is assumed that a particular office number is native to the switch and all lines with the same office number may or may not be ported to another switch.

On the other hand, when the NONNATIVE option is assigned to an NPA-NXX, the NPA-NXX is ported in from another switch.

Figure 21-12 Sample datafill for the new 'NONNATIVE' option



21.9 Option field CODEHLDR added to table TOFCNAME

For information about the CODHLDR option please refer to Section 13.2.4 , "TOFCNAME," on page 4.

21.10 Option field LNPTCT added to table LNPOPTS

Option LNPTCT is added to table LNPOPTS with the default value set to PODP. When this option is set to LNP, for all LNP calls the new LocalNumberPortability TriggerCriteriaType is assigned in Info_Analyzed messages.

This new trigger criteria type represents an evolution of messaging for LNP. Not all customers may be ready to support this new type so it is implemented as an office-wide option, controlled in table LNPOPTS.

The following figures give a general description of the point in CallP where this feature is implemented.

Figure 21-13 Info analyzed TDP

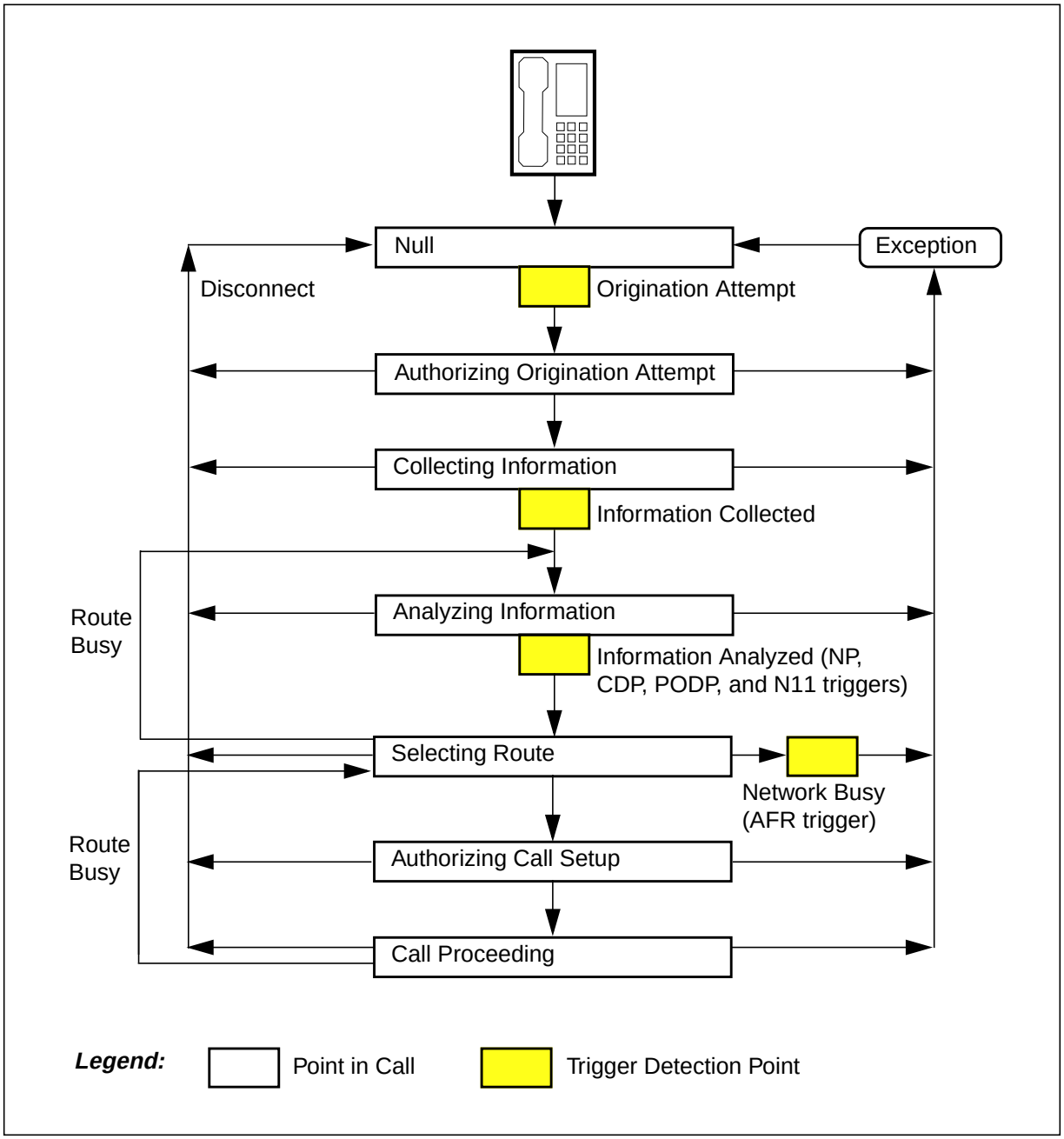
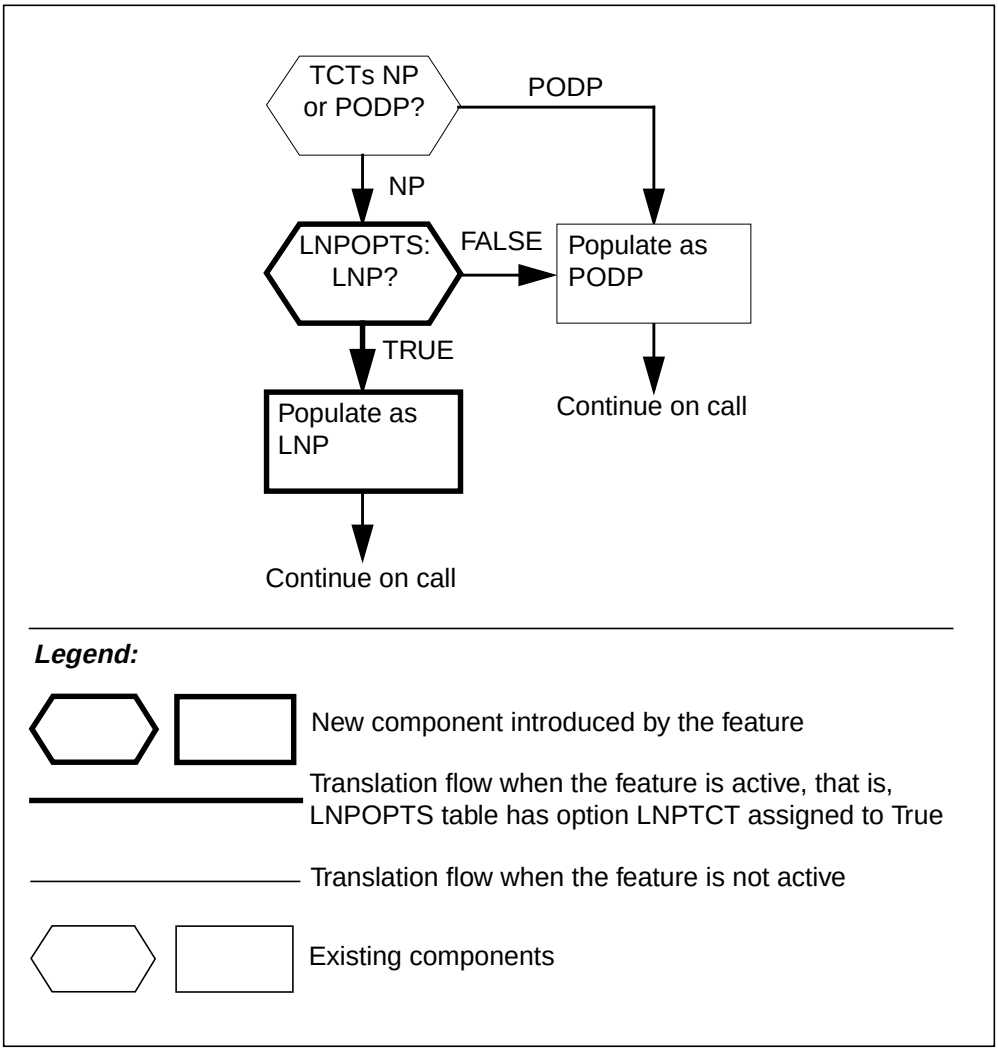


Figure 21-14 Dataflow with LNPTCT added to table LNPOPTS



This feature is activated from LNPOPTS table by datafilling the new option called LNPTCT to LNP. The default value of LNPTCT is PODP.

Figure 21-15 Datafill example of table LNPOPTS

```
KEY OPTIONS
-------------------------------
LNPTCT LNPTCT LNP
```

Where, first LNPTCT is LNPOPTS_KEY and the second LNPTCT is LNP_OPTION_TYPE. The option is in alphabetical order.

To de-activate this feature, datafill the LNPOPTS table as follows:

Figure 21-16 Datafill example of table LNPOPTS

```
KEY OPTIONS
-------------------------------
LNPTCT LNPTCT PODP
```

21.11 Option field BLOCKLNP added to table LNPOPTS

The field BLOCKLNP can be datafilled as either ACTIVE or INACTIVE. If BLOCKLNP is assigned to ACTIVE, then inter-network undipped calls that would have queried at this switch are instead routed to treatment (by way of the suboption) or sent to default routing. If BLOCKLNP is INACTIVE this feature is not activated, that is, normal CallP occurs. A warning message is printed with the changed value of this option.

Blocking undipped calls becomes active from LNPOPTS table by datafilling the BLOCKLNP option ACTIVE. At this point the customer must also choose, on an office-wide basis, the type of treatment they want the call to receive (should the BLOCKLNP option in TRKOPTS be set to TREAT). This is an example of table LNPOPTS:

Figure 21-17 Datafill example of table LNPOPTS

```
KEY OPTIONS
-------------------------------
BLOCKLNP BLOCKLNP ACTIVE FNAL
```

Where the first BLOCKLNP is LNPOPTS_KEY and the second BLOCKLNP is LNP_OPTION_TYPE.

Turning this option ACTIVE generates a warning message stating the subsequent effects on calls that match the blocking criteria.

To de-activate this blocking, datafill the LNPOPTS table as follows:

Figure 21-18 Datafill example of table LNPOPTS

```
KEY OPTIONS
-------------------------------
BLOCKLNP BLOCKLNP INACTIVE
```

The INACTIVE setting is the default setting; in this scenario queries are not blocked.

When changing the status of the BLOCKLNP option in table LNPOPTS, the direction of call processing can change dramatically. Call that used to query

now could now escape the trigger and default route, or they could go directly to treatment. These calls of course would have to satisfy all conditions of the block checking criteria.

Because of this potential for change, warning messages are displayed when the craftsperson changes this option.

21.12 Option field BLOCKLNP added to table TRKOPTS

BLOCKLNP allows the craftsperson to block all undipped calls coming over a particular trunk. Note that this functionality only occurs if the BLOCKLNP option in table LNPOPTS is turned ACTIVE. If it is INACTIVE, the TRKOPTS information with regard to this option are disregarded.

The blocking is either sending the call to treatment or sending the call to default routing. The craftsperson decides which blocking should occur on a trunk group basis.

Table CLLI and table TRKGRP must be datafilled prior to TRKOPTS.

Next, an incoming trunk group that represents an inter-network connection needs to have the BLOCKLNP option added to it. Note that this option is only available on ISUP IC or 2W trunks. We use the trunks ISUPIC and ISUP2W as examples. The following figure provides datafill example of table TRKOPTS:

Figure 21-19 Datafill example of table TRKOPTS

```
OPTKEY OPTINFO
------------------------------
ISUPIC BLOCKLNP BLOCKLNP TREAT
ISUP2W BLOCKLNP BLOCKLNP DFLTRT
```

If trunk ISUP2W brings in an undipped call that would trigger at LNP, the call escapes the trigger and default routes instead. If trunk ISUPIC brings in a like call, it is blocked from querying and is given FNAL treatment (from table LNPOPTS).

21.13 Identification of the home LRNs - Table HOMELRN

For LNP translation and routing to work properly, the office needs to determine whether the LRN received (from an SCP or an incoming ISUP trunk) is a Home LRN (HLRN) or Foreign LRN (FLRN). In the case of HLRN being received, the call routes based on the original dialed number. Otherwise, the call routes based on the FLRN.

21.13.1 HOME LRN identification

A new table HOMELRN was created to allow service providers to identify the home LRNs for the recipient switch. Home LRNs are 6-digit (NPA-NXX) or 10-digit (NPA-NXX-XXXX).

Each office must examine the LRN (received from an SCP or an incoming ISUP trunk) to determine to which office the call should terminate. If the incoming LRN matches any one of the home LRNs defined in table HOMELRN, that LRN is the home LRN and the call terminates in that office. If not, the call continues routing based on the incoming LRN.

The following summarizes how a match is determined:

- If the home LRN is defined as a 6-digit number in table HOMELRN, only the NPA-NXX of the incoming LRN needs to be matched to identify it as the home LRN. For example, if 613-621 is defined in table HOMELRN and the LRN received is 613-621-XXXX, the LRN received is considered a home LRN since 613-621 is assigned as a home LRN in table HOMELRN.
- If the incoming LRN from the ISUP Initial Address Message (IAM) is 7-digit, the NPA of that 7-digit number is derived before matching the digits with the datafill in table HOMELRN.
- If the home LRN is defined as a 10-digit number, all 10 digits from the incoming LRN have to be matched in order to identify the incoming LRN as the home LRN.

Shown in the following figure is a sample datafill for table HOMELRN.

Figure 21-20 Sample datafill for table HOMELRN

```
TABLE: HOMELRN
--------------

AREACODE OFCCODE    STNCODE               OPTIONS
-------------------------------------------------
     416     463       1088                    $
     416     467          $                    $
```

Note: Table HOMELRN has a dependency on table TOFCNAME. The NPA-NXX of the home LRN to be defined in table HOMELRN must be native, or the specified digits are not allowed for datafill in table HOMELRN.

The following figure shows how table HOMELRN is datafilled against native NPA-NXX.

Figure 21-21 Table HOMELRN can only be datafilled against native NPA-NXX

```
CI:
>table homelrn
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
TABLE: HOMELRN
>add 613 663 $ $
NPA-NXX NOT NATIVE
TUPLE TO BE ADDED:
     613     663          $                    $
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT.
>n
DMO REJECTED
>
```

21.14 Network management code control

Network Management (NWM) is the supervision and control of telephone switching networks to ensure the maximum flow of traffic under adverse or overload conditions. Overload conditions occur when the demand for service from the switching office exceeds the ability of its trunk groups or common control equipment (or both) to provide satisfactory service.

NWM features provide commands to alter the flow of traffic going through a switch or its connecting offices. The sequences of commands and responses that are available to perform NWM are referred to as the Man-Machine Interface (MMI). These commands are also available through the Command Interpreter (CI) level. NWM feature descriptions and their MMI are given in Northern Telecom Practice (NTP) 297-1001-453, Release 10.06, 1993.

21.14.1 NWM code control in LNP networks

Prior to the introduction of LNP, Network Management Code Control only applied to the called number. With LNP active, network management code control is applicable to both the LRN and the dialed number (contained in the Ported Number GAP parameter).

The functionality of LNP network management code control is developed under the following assumption:

- If the number is less than 7 digits (that is, the code being controlled is in the form of NPA or NPA-NXX), then the purpose of the code control is to control calls routing to a particular switch.
- If the number is 7 digits or more (that is, the code being controlled is in the form of NXX-XXXX or NPA-NXX-XXXX), then the purpose of the code control is to control calls routing to a particular DN.

Prior to LNP, the called DN was used to determine the routing and the destination of the call, therefore no further clarification was required.

However, with the introduction of LNP, it is important to distinguish the functionality since the routing number (LRN) and the terminating number (GAP) may not be the same. As a result, the following functionality is provided for Network Management code control on LNP calls based on the previously mentioned assumptions:

- If network management code control is encountered before LNP triggering, then the code control is applicable to the Called Number regardless of the number of digits that were used in the control.
- If network management code control is encountered after LNP triggering but the dialed number is not ported, then the code control is applicable to the Called Number regardless of the number of digits that were used in the control.
- If network management code control is encountered after LNP triggering and the dialed number is ported, only code control of length less than 7-digits is applicable to the LRN since it is the number to be used to route the call to the destination switch. On the other hand, only Code Control of length equal to 10-digit is applicable to the number in GAP parameter since it is the terminating number at the recipient switch. Code Control of length 7-digits is not supported for ported numbers.

21.14.2 NWM code control examples

The following three examples help explain the LNP NWM Code Control feature. In each of these examples, DN 905-963-8601 is ported from switch X to switch Z. DN 905-967-1001 dials the ported DN 963-8601. The LNP trigger is encountered at switch X and the LNP SCP returns the LRN 613-664 which is the home LRN of the recipient switch Z. The path traversed (through intermediate switch Y) by the LNP call is shown by the directed arrows. The objective of these examples is to show the application of Network Management Controls:

- on ported DN 905-963-8601 at the recipient switch X
- on LRN 613-664 at intermediate switch Y
- on GAP 905-963-8601 at intermediate switch Y

Network Management Controls can be applied by either using the MAP level interface or using the CI command masscall. (For complete description of NWM MMI, refer to NTP 297-1001-453.) For example, to block calls destined for ported DN 905-963-8601 originating from SNPA 416, the following command can be issued from the CI level:

```
CI:
>masscall apply cbk acode ‘9059638601’ 100 nca ‘416’
```

where:

masscall is a network management control command name

apply means activate the control

cbk means code block

acode is the type of code block

the digits 9059638601 refer to the DN 905-963-8601

100 refers to the percentage of blocking

nca refers to a type of treatment which is ‘no circuit announcement’

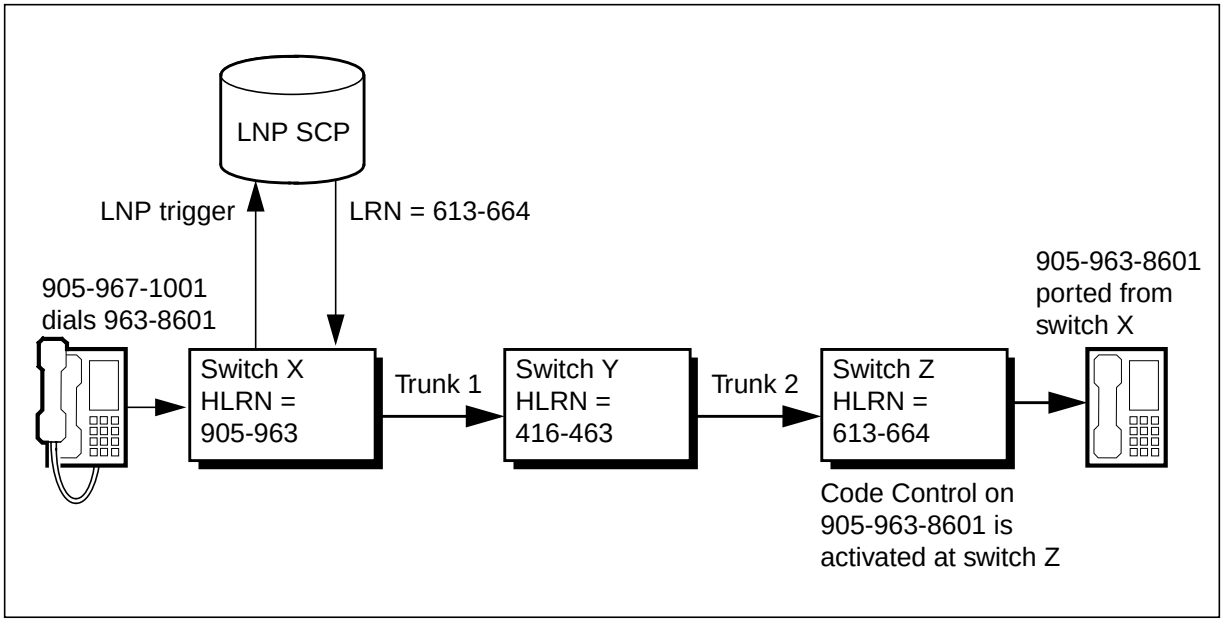
and the digits 416 refer to the originating SNPA.

For a complete description of DMS network management feature, refer to NTP 297-1001-453 Network Management System Reference Manual.

21.14.3 NWM Code Control on Ported DN

In this example, Code Control on Ported DN 905-963-8601 is activated at the recipient switch Z. In the absence of this control, the LNP call is completed successfully. In the presence of this control, the LNP call is blocked.

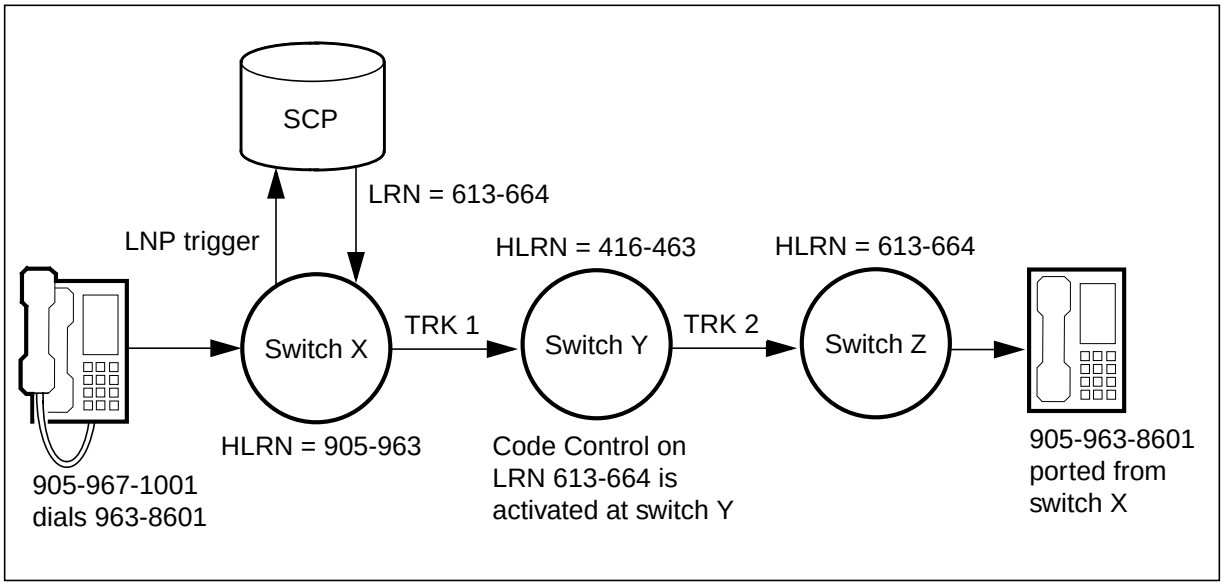
Figure 21-22 NWM Code Control on Ported DN



21.14.4 NWM Code Control on LRN

In this example, Code Control on LRN 613-664 is activated at the intermediate switch Y. In the absence of this control, the LNP call is completed successfully. In the presence of this control on LRN, the LNP call is blocked.

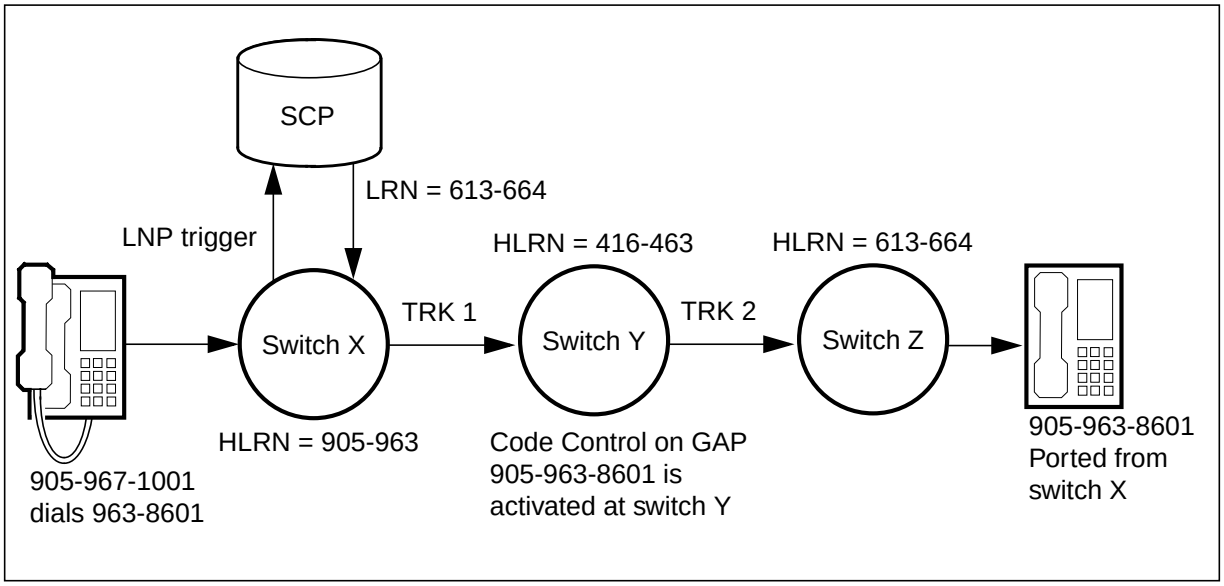
Figure 21-23 NWM Code Control on LRN



21.14.5 NWM Code Control on GAP

In this example, Code Control on GAP 905-963-8601 is activated at the intermediate switch Y. In the absence of this control, the LNP call is completed successfully. In the presence of this control on GAP, the LNP call is blocked.

Figure 21-24 NWM Code Control on GAP



21.15 Sourcing of Patch LNP40

BRI sets that fail to comply with ISDN Q.931 protocol send numbers with the pattern 9+1+NPANXXXXXX or 9+NPANXXXXXX, with type of number

(TON) set to National (NA). AIN/LNP response translation for TON=NA is 10-digit–based, and it uses the ISDN translation system. Therefore, the ISDN translation system cannot distinguish between BRI translations and AIN/LNP translations. Sourcing of Patch LNP40 resolves this conflict by providing the capability to disable TON-based routing. It accomplishes this by changing the TON for BRI calls from NA to Unknown (UN). Changing TON from NA to UN allows BRI calls and AIN/LNP calls to have different RCNAMEs, permitting them to take separate paths through the translation system. The customer must provide separate tuples for BRI and AIN/LNP translations in RTECHAR. Also, the customer must provide appropriate datafill for table XLAMAP. This is illustrated in Figures 21-25, 21-26 and 21-27 below.

Figure 21-25 Sample Datafill for RTECHAR

As an example, the following tuple in table RTECHAR:

56KDATA (BC 56KDATA (CDN NA) $) (BC 56KDATA $) $

must be broken into two tuples as shown below:

56K (BC 56KDATA $) $---------- ***(for BRI)***
NA56K (BC 56KDATA (CDN NA) $) $ --------- ***(for AIN/LNP)***

Figure 21-26 BRI Translation Flow with TON=Unknown

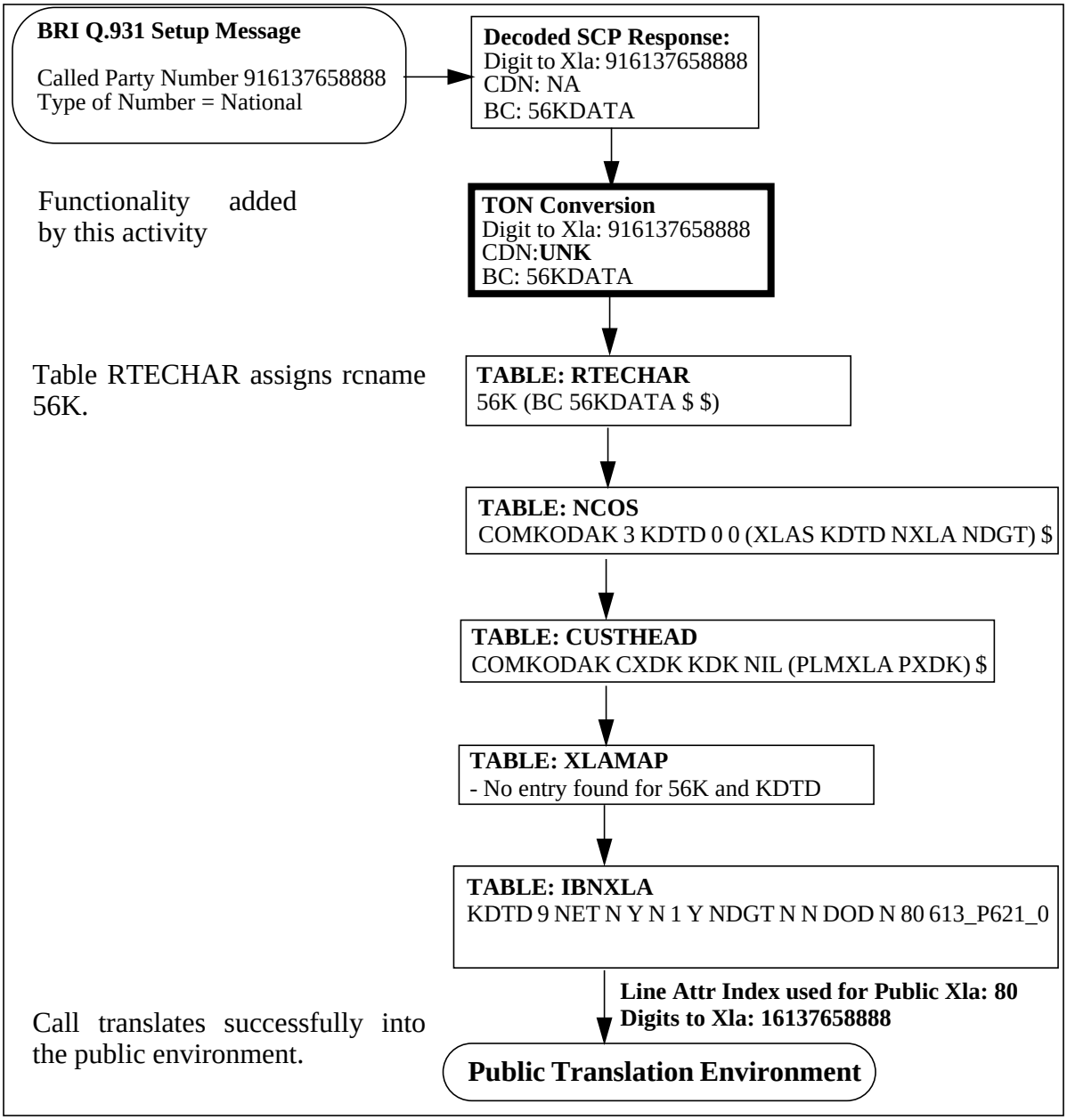
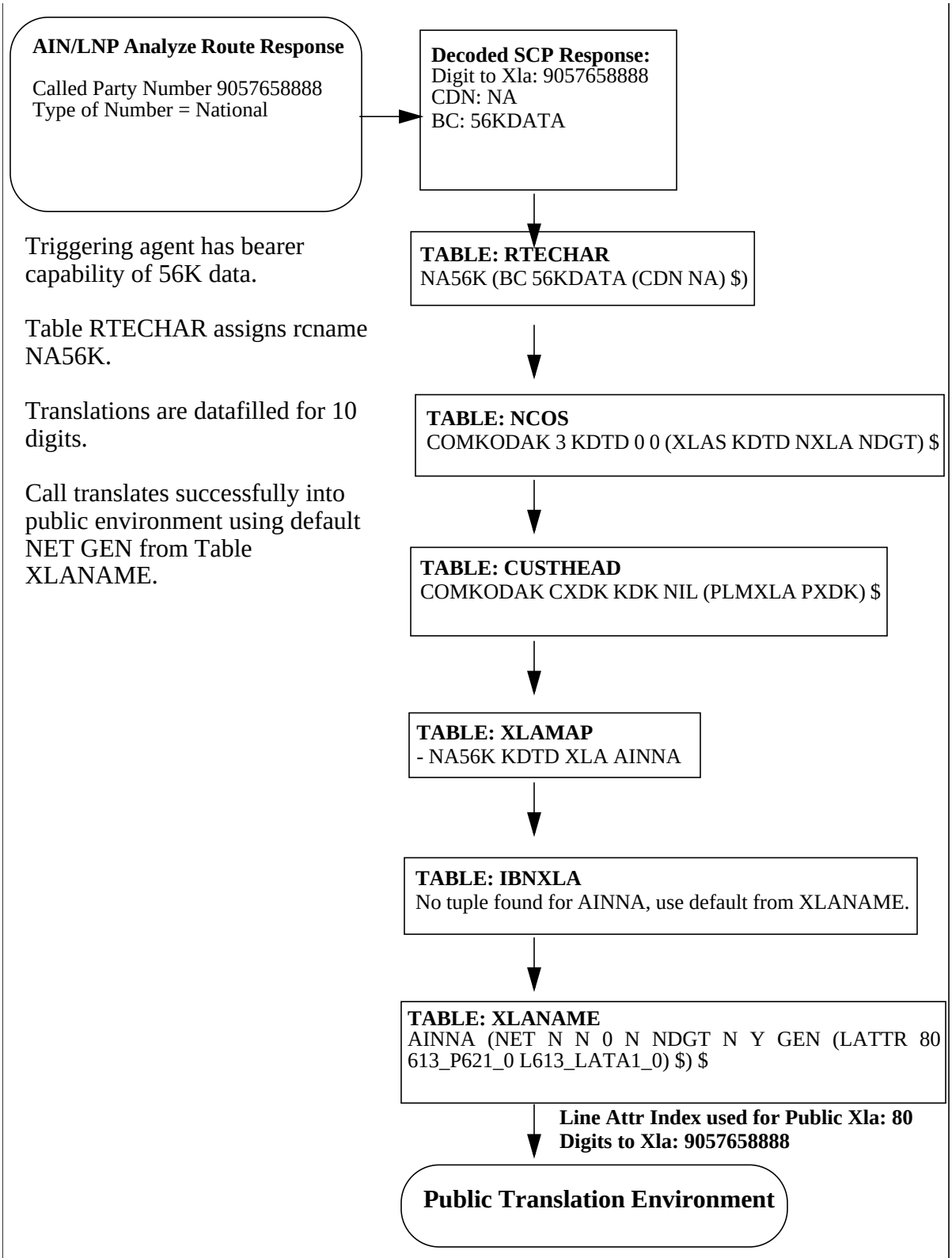


Figure 21-27 AIN/LNP Response Translation flow with TON = NA



21.15.1 Customer Group Option for Changing the TON

The function is optional and is offered on a customer group basis via the customer group option, BRITONUN, which can be datafilled against any valid customer group in table CUSTSTN. This is illustrated in Figure 21-28 .

Figure 21-28 Option BRITONUN in table CUSTSTN

TABLE CUSTSTN

CUSTNAME OPTNAME OPTION
CO MKODAK BRITONUN BRITONUN

22 Data schema

ATTENTION

The provisioning of E911 and other services requiring dedicated trunks depends on NPA NXX distribution.

This section describes data schema specific to LNP.

The following tables are created for LNP:

- FNPA7DIG
- TOFCNAME
- HOMELRN
- LNPRTE
- LNPCODE

22.1 Table FNPA7DIG

Foreign Numbering Plan Area for 7 Digits

22.1.1 Functional description

Table FNPA7DIG provides information to associate an NPA with a 7-digit dialing plan. Operating company personnel can specify the NPA for a 7-digit dialing plan. The intention of Table FNPA7DIG is to provide an NPA to a Called Party Number, where the NPA for that Called Party Number differs from the NPA of the originating agent. This table is required to be datafilled for all LNP translations, and specifically for scenarios where an originating agent (for example, a trunk or a line) provides only 7 digits, and LNP translations are required (for example, for querying LNP, for ported-in DN termination). Some example scenarios are provided below. Additionally, there are two limitation scenarios to the use of table FNPA7DIG documented in sections “LNP ported-in DN limitation with 7 digit dialing” and “FNPA7DIG interaction with 7-digit dialing”.

This table is datafilled against the NPA of the originator and the dialed NXX. If there is no datafill for a particular NXX pattern, the terminating NPA is assumed to be the same as the originating NPA.

When a caller uses a 7-digit dialing plan to originate a call from one NPA to another, all 10 digits of the directory number (DN) are needed for LNP translations. LNP translations determine whether or not the DN is resident on the switch. Table FNPA7DIG provides the information needed for this translation.

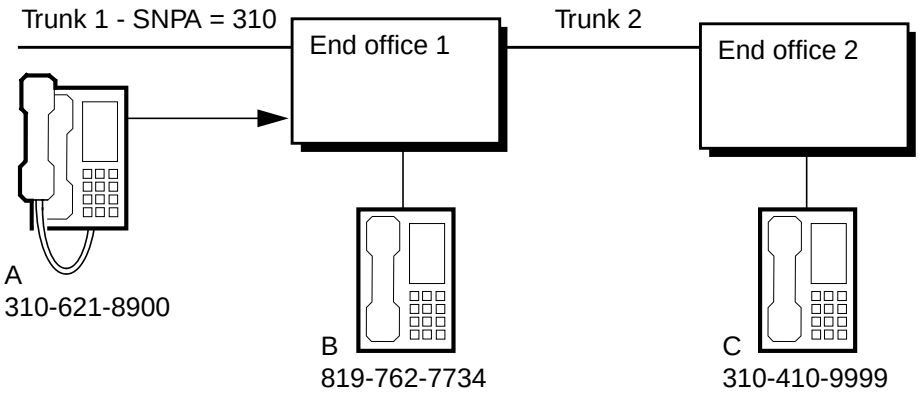
22.1.2 FNPA7DIG interaction with 7-digit dialing

The following scenario describes an interaction between table FNPA7DIG, and an existing permissive seven-digit dialing pattern.

22.1.2.1 Call flow

The following figure shows the basic call flow of the interaction between table FNPA7DIG and an existing permissive 7-digit dialing pattern.

Figure 22-1 Foreign-NPA-7-digit dialing



End office 1 datafill

```
TABLE FNPA7DIG
--------------
310 410 410 213

TABLE TRIGDIG
-------------
LNPDIG LNP 213410 LNP EVENT TCAP R01 SS7 AINJAZZ DFLT $
LNPDIG LNP 310410 LNP EVENT TCAP R01 SS7 AINJAZZ DFLT $
```

22.1.2.2 Scenario description

In the scenario shown in the figure above, the originating agent TRK1 pulses in 7 digits (410-1310), sent from the previous switch, intended to terminate to the ported-in agentB. Since no terminating NPA has been provided for the digits coming from TRK1, Table FNPA7DIG is referenced, providing the NPA 213. The call terminates correctly to agent B.

The tuple shown in the figure above for Table FNPA7DIG was added specifically to allow the scenario above to complete properly. If the tuple in table FNPA7DIG is not present in this case, the call routes to the DN 310-410-1310, based upon the SNPA of the originator (the SNPA of the originator is utilized when no other SNPA may be determined).

As a side-effect of adding the FNPA7DIG tuple for the above scenario, the following impact is seen to the existing 7 digit dialing pattern.

- A call originated from agentA (dials 410-9999), with an intended terminator of agentC. This network configuration allows 7 digit permissive dialing to any number where the originator's NPA matches the terminator's NPA.
- HNPACONT datafill indicates the call originated from agentA is to route over TRK2.
- Trigger Criteria Checking is performed on the dialled digits. Since the originator provided no NPA, table FNPA7DIG is referenced. The FNPA7DIG entry provides NPA 213. Since 213410 is datafilled as a portable NPANXX in TRIGDIG, the call triggers LNP.
- The SCP returns either the dialled digits, or the HLRN of the serving switch of DN 213-410-9999. The call subsequently routes, using the DN 213-410-9999 as the CalledPartyID, as opposed to 310-410-9999, as was the originator's intended terminator.

22.1.2.3 Recommended corrective action

This interaction causes the incorrect routing of calls where an NXX which can be reached by 7 digit permissive dialing is also the NXX of a DN ported into the serving switch.

To correct this scenario, one of two options may be considered. The preferable option in this case is to correct the translations of the switch sending digits over TRK1 to EO1. This office should be modified to outpulse 10 digits, especially in the above scenario, since the call should have triggered LNP in that office. By correcting the originating office to outpulse 10 digits, no datafill is required for table FNPA7DIG, thus avoiding the corruption of the permissive dialing pattern.

A second option is to provide an additional trunk group, connecting the same offices as TRK1. The new trunk group should be datafilled with the same

SNPA as the NPA of the ported-in DN. Again, this avoids the need of FNPA7DIG datafill.

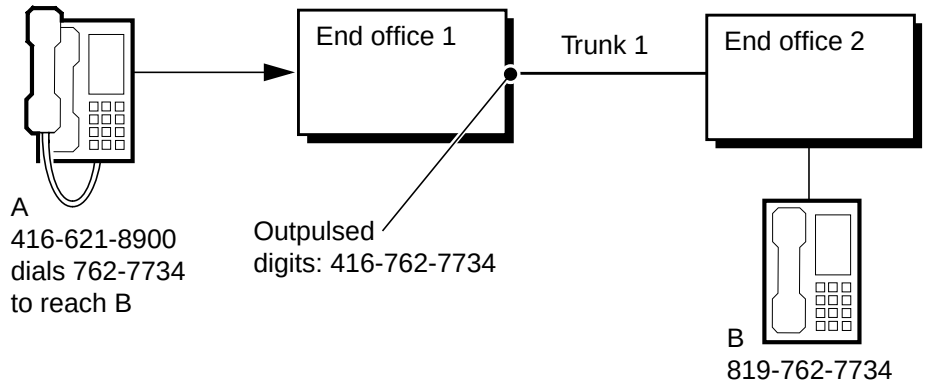
22.1.3 LNP ported-in DN limitation with 7-digit dialing

The following call scenario describes a limitation of LNP ported-in DNs with existing 7-digit dialing.

22.1.3.1 Call flow

The following figure shows the basic call flow of the 7 digit dialing limitation with LNP ported-in DNs.

Figure 22-2 Foreign-NPA-7-digit dialing



End office 1 datafill

```
TABLE TOFCNAME
--------------
905 967 $
416 621 (NONNATIVE)
TABLE HNPACONT
416 (A's NPA)
.SUBTABLE HNPACODE
.762772 762779 LRTE 730
.SUBTABLE RTEREF
.730 T OFRT 730
..TABLE OFRT
..730 S D C0C1_ISUPITOG
```

22.1.3.2 Scenario description

The originator (416-621-8900) dials 762-7734 (the terminator is a non-portable NPA-NXX, since this call flow does not result in an LNP query

and response). Translations of this number determine the DN is not resident on the originator's SSP.

A route is chosen over an ISUP trunk to EO2. (in the figure provided, an ISUP route is chosen. In fact, any trunk type may be utilized for this call example) The route encountered in table OFRT is datafilled with the S selector, indicating standard digit manipulation applies. See North American DMS-100 Translations Guide Volume 24 of 27, 297-8021-350 for further information on the S selector in OFRT tables.

As indicated by the S selector, since the serving NPA of EO1, and the connecting NPA of the selected ISUP trunk are not equal, then the S selector logic is to utilize the originator's NPA, in the assumption that the originator is attempting to reach a number in its own NPA.

The digits outpulsed on the selected route correspond to the originator's NPA, followed by the 7 dialed digits. This results in the call terminating on EO2, and receiving treatment.

22.1.3.3 TRAVER example for ported-in DN limitations

The following figure provides an example of a TRAVER for LNP ported-in limitations with 7 digit dialing. FNPA7DIG is referenced in this case only for Trigger Criteria Checking, and not for routing purposes.

Figure 22-3 TRAVER of LNP ported-in DN limitations with 7 digit dialing

```
>traver l 4164638621 9631001 b
TABLE IBNLINES
HOST 00 0 16 18 0 DT STN RES 4638621 403 416_PUB_403 L416_LATA1_400 416 $
TABLE LINEATTR
403 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_PUB_403 L416_LATA1_400 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_PUB_403 NSCR 416 PUB TSPS Y RESG416 0 0 $
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG416 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
RESG416 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
RESG416 NXLA RX416 RESGSTAR 0 RES
TABLE DIGCOL
RES specified: RES digit collection
TABLE IBNXLA: XLANAME RX416
TUPLE NOT FOUND
Default from table XLANAME:
RX416
    (NET N N 0 N NDGT N Y GEN ( LATTR 413 416_EAP1_413 L416_LATA1_400)
    (EA NILC Y 0) $ $)$ 9
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
413 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_EAP1_413 L416_LATA1_400 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
```

Figure 22-3 TRAVER of LNP ported-in DN limitations with 7 digit dialing

```
TABLE XLAPLAN
416_EAP1_413 NSCR 416 EAP1 TSPS Y RESG416 0 0 $
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 $
TABLE STDPRTCT
EAP1 ( 1) ( 0) 3
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . 96 99 N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
416 Y 771 1 ( 90) ( 1) ( 4) ( 0) 0 $
 . SUBTABLE HNPACODE
 . 9631001 9631076 LRTE 747
 . SUBTABLE RTEREF
 .  747 T OFRT 747
 .  . TABLE OFRT
 .  .  747 S D C0S1_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
TABLE LCASCRCN
416 L416 ( 27) OPTL N N
 . SUBTABLE LCASCR
 . 963 963
TABLE PFXTREAT
OPTL NP Y NP UNDT
AIN Info Collected TDP: no subscribed trigger.
TABLE FNPA7DIG
416 963 963 905
TABLE TRIGGRP
CDPCODE INFOANAL
 . CDPCODE ( DG CDPDIG)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
 . CDPCODE ( DG CDPTRAF)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
Checking AIN LNP Trigger Items as LNP is compatible with current call
```

Figure 22-3 TRAVER of LNP ported-in DN limitations with 7 digit dialing

```
 .  . TABLE OFCTIID
 .  . 4 L905963 ON
 .  . TABLE TRIGITM
 .  . 4 L905963 LNP (DG 905963) (ESCEA ) (ESCOP ) (ESCDN ) (ESCCN ALL)
$ ULK EVENT R01
 .  .     SS7 AINROCK $
 .  .  . TABLE C7GTTYPE
 .  .  . AINROCK ANSI7 5 $
 .  .  . TABLE C7GTT
 .  .  . AINROCK 9059631001 9059631001 PCSSN (AINTATM_RTESET2 AIN01 0)
$ SSN
AIN Info Analyzed TDP: trigger criteria met.
Querying the database.

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

22.1.3.4 Recommended corrective action

The ideal method of correcting this limitation is to impose a ten-digit dialing requirement in this scenario. This may, however, be impractical to immediately implement within an existing network.

This limitation may be avoided, while still retaining the 7-digit dialing pattern in existence prior to the presence of the ported-in DN. If the OFRT datafill is altered to utilize the N selector, the digits outpulsed on the trunk correspond to the 7 dialed digits only, no NPA is appended to the beginning of the digit string. The OFRT datafill appears as:

```
TABLE OFRT

730 N D C0C1_ISUPITOG 0 N N
```

If other originators in the originating end-office also utilize the route, or if the terminating end-office is expecting to receive an incoming digit string of 10 digits, the above proposed datafill change may result in additional, unwanted side effects.

This may result in additional required datafill changes. Possible changes include additional datafill in the terminating office to account for the possibility of receiving a 7 digit string. Additionally, the OFRT datafill may be utilized to prefix an NPA to the beginning of the digit string prior to outpulsing if the terminating end-office serves only one NPA, or the terminating office serves no ambiguous NPA-NXX combinations (for example, 819-762, and 919-762 are not served by the same office).

22.1.4 Field information

The following fields are created for table FNPA7DIG:

- ORIGSTS: This field is the NPA of the originator. This part of the key must be an entry in table SNPANAME.
- FROMNXX: This field is the start of the range of dialed NXXs that is associated with the TERMNPA.
- TONXX: This field is the end of the range of dialed NXXs that is associated with the TERMNPA.
- TERMNPA: This field is the NPA, within the specified range, that is associated with the dialed NXX.

22.1.5 Datafill sequence and implications

Datafill table HNPACONT with the ORIGSTS before datafilling table FNPA7DIG.

22.1.6 Table size

4000 to 8000 tuples

22.1.7 Datafill

The following table lists datafill for table FNPA7DIG.

Table 22-1 Field descriptions

Field	Entry	Explanation and action
ORIGSTS	3-digit NPA	ORIGINATING SERVING TRANSLATIONS SYSTEM Enter the NPA of the originator. This part of the key must be an entry in table HNPACONT or SNPANAME.
FROMNXX	3-digit code	FROM NXX Enter the start of the range of dialed NXXs that is associated with the TERMNPA.
TONXX	3-digit code	TO NXX Enter the end of the range of dialed NXXs that is associated with the TERMNPA.
TERMNPA	3-digit NPA	TERMINATING NUMBERING PLAN AREA Enter the NPA, within the specified range, that is associated with the dialed NXX.

22.1.8 Datafill example

The following figure shows sample datafill for table FNPA7DIG.

When a 7-digit dialed call with an NXX between 762 and 764 is originated from an agent with the 613 NPA, the terminating NPA is 819 instead of the defaulted value 613.

Figure 22-4 MAP display example for table FNPA7DIG

ORIGSTS	FROMNXX	TONXX	TERMNPA
613	762	764	819

22.1.9 Example TRAVERs for Table FNPA7DIG

The TRAVERs in the following figures show examples of using Table FNPA7DIG for 7-digit dialing.

Figure 22-5 TRAVER showing a native DN dialing 7 digits to a ported-in DN

```
>traver l 6136631001 4638621 b
TABLE LINEATTR
401 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_PUB_401 L613_LATA1_0 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PUB_401 NSCR 613 PUB TSPS N $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 436) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 463862 463869 LRTE 734
 . SUBTABLE RTEREF
 .  734 T OFRT 734
 .  . TABLE OFRT
 .  .  734 S D C0C1_ISUPT2A
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is resident.
```

Figure 22-5 TRAVER showing a native DN dialing 7 digits to a ported-in DN

```
LNP Info: Called DN has non-native NPANXX.
LNP Info: HNPA results not used.
TABLE LNPCODE
TUPLE NOT FOUND
LNP Info: Ported DN termination in effect.
TABLE TOFCNAME
416 463 (NONNATIVE ) $
TABLE DNINV
416 463 8621 L HOST 00 0 16 18
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LCASCRCN
613 L613 ( 44) OPTL N N
 . SUBTABLE LCASCR
 . 463 463
TABLE PFXTREAT
OPTL NP Y NP UNDT
AIN Info Collected TDP: no subscribed trigger.
TABLE FNPA7DIG
613 463 463 416
Checking AIN LNP Trigger Items as LNP is compatible with current call
 .  . TABLE OFCTIID
 .  . 4 L416463 ON
 .  . TABLE TRIGITM
 .  . 4 L416463 LNP (DG 416463) (ESCEA ) (ESCOP ) (ESCDN ) $ ULK EVENT
R01 SS7
 .  .     AINBLUES $
Not triggering due to criteria: ESCDN
AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 LINE                  4164638621         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 22-6 TRAVER—incoming trunk pulsing 7 digits—terminating to ported-in DN

```
>traver tr c0c1_mfitic 4638621 b
TABLE TRKGRP
C0C1_MFITIC IT 63 ITTD NCTC IC NIL MIDL 613 PUB NSCR 613 000 N Y $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HNPACONT
613 Y 932 2 ( 436) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 463862 463869 LRTE 734
 . SUBTABLE RTEREF
 .  734 T OFRT 734
 .  . TABLE OFRT
 .  .  734 S D C0C1_ISUPT2A
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is resident.
LNP Info: Called DN has non-native NPANXX.
LNP Info: HNPA results not used.
TABLE LNPCODE
TUPLE NOT FOUND
LNP Info: Ported DN termination in effect.
TABLE TOFCNAME
416 463 (NONNATIVE ) $
TABLE DNINV
416 463 8621 L HOST 00 0 16 18
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
AIN Info Collected TDP: no subscribed trigger.
TABLE FNPA7DIG
613 463 463 416
```

Figure 22-6 TRAVER—incoming trunk pulsing 7 digits—terminating to ported-in DN

```
Checking AIN LNP Trigger Items as LNP is compatible with current call
 .  . TABLE OFCTIID
 .  . 4 L416463 ON
 .  . TABLE TRIGITM
 .  . 4 L416463 LNP (DG 416463) (ESCEA ) (ESCOP ) (ESCDN ) $ ULK EVENT
R01 SS7
 .  .     AINBLUES $
Not triggering due to criteria: ESCDN
AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 LINE                  4164638621         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 22-7 TRAVER for native DN dialing 7 digits to a DN, triggering LNP

```
>traver l 6136672001 4639929 b
TABLE LINEATTR
401 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_PUB_401 L613_LATA1_0 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PUB_401 NSCR 613 PUB TSPS N $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
```

Figure 22-7 TRAVER for native DN dialing 7 digits to a DN, triggering LNP

```
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 436) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 463992 463999 LRTE 736
 . SUBTABLE RTEREF
 .  736 T OFRT 736
 .  . TABLE OFRT
 .  .  736 S D C0C1_MFITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
TABLE LCASCRCN
613 L613 ( 44) OPTL N N
 . SUBTABLE LCASCR
 . 463 463
TABLE PFXTREAT
OPTL NP Y NP UNDT
AIN Info Collected TDP: no subscribed trigger.
TABLE FNPA7DIG
613 463 463 416
Checking AIN LNP Trigger Items as LNP is compatible with current call
 .  . TABLE OFCTIID
 .  . 4 L416463 ON
 .  . TABLE TRIGITM
 .  . 4 L416463 LNP (DG 416463) (ESCEA ) (ESCOP ) (ESCDN ) $ ULK EVENT
R01 SS7
 .  .     AINBLUES $
 .  .  . TABLE C7GTTYPE
 .  .  . AINBLUES ANSI7 11 $
 .  .  . TABLE C7GTT
 .  .  . AINBLUES 4164639929 4164639929 PCSSN (SIMTOOL_RTESET SIMTOOL 0)
$ SSN
```

Figure 22-7 TRAVER for native DN dialing 7 digits to a DN, triggering LNP

```
AIN Info Analyzed TDP: trigger criteria met.
Querying the database.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


AIN Info Analyzed TDP: trigger criteria met.
Querying the database.
LNP Info: Displaying pre-query translations result.
LNP Info: It is used if the database indicates the called DN is
non-ported

DIGIT TRANSLATION ROUTES

1 C0C1_MFITOG           4639929            ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 22-8 TRAVER for incoming trunk pulsing 7 digits DN, triggering at LNP

```
>traver tr C0S1_PRI_2WAY n cdn e164 l 9631001 bc speech b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
TABLE TRKRCSEL
 . C0S1_PRI_2WAY ( BC ON) (OSA OFF) (CDN ON) (TNS OFF) ( SR OFF) ( PI
OFF)$
TABLE TRKGRP
C0S1_PRI_2WAY PRA 0 PRAC NCRT ASEQ N (ISDN 660) $ $
TABLE LTCALLS
ISDN 660 PUB XLAIBN 411 613_PUB_401 L613_LATA1_0 RESG613 0 0 $
TABLE CUSTSTN
RESG613 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE LINEATTR
411 IBN NONE NT 0 0 NILSFC 0 NIL NIL 00 613_PUB_401 L613_LATA1_0 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PUB_401 NSCR 613 PUB TSPS N $
```

Figure 22-8 TRAVER for incoming trunk pulsing 7 digits DN, triggering at LNP

```
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 436) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 9631001 9631076 LRTE 747
 . SUBTABLE RTEREF
 .  747 T OFRT 747
 .  . TABLE OFRT
 .  .  747 S D C0S1_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
TABLE LCASCRCN
613 L613 ( 44) OPTL N N
 . SUBTABLE LCASCR
 . 963 963
TABLE PFXTREAT
OPTL NP Y NP UNDT
AIN Info Collected TDP: no subscribed trigger.
TABLE FNPA7DIG
613 963 963 905
TABLE TRIGGRP
CDPCODE INFOANAL
 . CDPCODE ( DG CDPDIG)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
 . CDPCODE ( DG CDPTRAF)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
Checking AIN LNP Trigger Items as LNP is compatible with current call
 .  . TABLE OFCTIID
 .  . 4 L905963 ON
```

Figure 22-8 TRAVER for incoming trunk pulsing 7 digits DN, triggering at LNP

```
.  . TABLE TRIGITM
 .  . 4 L905963 LNP (DG 905963) (ESCEA ) (ESCOP ) (ESCDN ) (ESCCN ALL)
$ ULK EVENT R01
 .  .     SS7 AINROCK $
 .  .  . TABLE C7GTTYPE
 .  .  . AINROCK ANSI7 5 $
 .  .  . TABLE C7GTT
 .  .  . AINROCK 9059631001 9059631001 PCSSN (AINTATM_RTESET2 AIN01 0)
$ SSN
AIN Info Analyzed TDP: trigger criteria met.
Querying the database.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


AIN Info Analyzed TDP: trigger criteria met.
Querying the database.
LNP Info: Displaying pre-query translations result.
LNP Info: It is used if the database indicates the called DN is
non-ported

DIGIT TRANSLATION ROUTES

1 C0S1_ISUPITOG         9631001            ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 22-9 TRAVER for ported-in DN dialing a 7 digit DN, querying at LNP

```
>traver l 9059638621 4631021 b
TABLE IBNLINES
HOST 01 0 03 07 0 DT STN RES 9638621 405 905_PUB_405 L905_LATA1_402 905 $
TABLE LINEATTR
405 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 905_PUB_405 L905_LATA1_402 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
905_PUB_405 NSCR 905 PUB TSPS Y RESG905 0 0 $
TABLE RATEAREA
L905_LATA1_402 L905 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG905 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
RESG905 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
RESG905 NXLA RX905 RESGSTAR 0 RES
TABLE DIGCOL
RES specified: RES digit collection
TABLE IBNXLA: XLANAME RX905
TUPLE NOT FOUND
Default from table XLANAME:
RX905
    (NET N N 0 N NDGT N Y GEN ( LATTR 415 905_EAP1_415 L905_LATA1_402)
    (EA NILC Y 0) $ $)$ 9
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
415 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 905_EAP1_415 L905_LATA1_402 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
905_EAP1_415 NSCR 905 EAP1 TSPS Y RESG905 0 0 $
TABLE RATEAREA
L905_LATA1_402 L905 NIL LATA1 $
TABLE STDPRTCT
EAP1 ( 1) ( 0) 3
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION
```

Figure 22-9 TRAVER for ported-in DN dialing a 7 digit DN, querying at LNP

```
 . 46 510 N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
905 Y 771 1 ( 90) ( 1) ( 0) ( 0) 3 $
 . SUBTABLE HNPACODE
 . 463102 4631098 LRTE 730
 . SUBTABLE RTEREF
 .  730 T OFRT 730
 .  . TABLE OFRT
 .  .  730 S D C0C1_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
TABLE LCASCRCN
905 L905 ( 26) OPTL N N
 . SUBTABLE LCASCR
 . 463 463
TABLE PFXTREAT
OPTL NP Y NP UNDT
AIN Info Collected TDP: no subscribed trigger.
TABLE FNPA7DIG
905 463 463 416
TABLE TRIGGRP
CDPCODE INFOANAL
 . CDPCODE ( DG CDPDIG)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
 . CDPCODE ( DG CDPTRAF)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
Checking AIN LNP Trigger Items as LNP is compatible with current call
 .  . TABLE OFCTIID
 .  . 4 L416463 ON
 .  . TABLE TRIGITM
 .  . 4 L416463 LNP (DG 416463) (ESCEA ) (ESCOP ) (ESCDN ) $ ULK EVENT
R01 SS7
 .  .     AINBLUES $
 .  .  . TABLE C7GTTYPE
 .  .  . AINBLUES ANSI7 11 $
 .  .  . TABLE C7GTT
 .  .  . AINBLUES 4164631021 4164631021 PCSSN (SIMTOOL_RTESET SIMTOOL 0)
$ SSN
AIN Info Analyzed TDP: trigger criteria met.
```

Figure 22-9 TRAVER for ported-in DN dialing a 7 digit DN, querying at LNP

```
Querying the database.
LNP Info: Displaying pre-query translations result.
LNP Info: It is used if the database indicates the called DN is
non-ported

DIGIT TRANSLATION ROUTES

1 C0C1_ISUPITOG         9054631021         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

The TRAVER in the following figure shows a ported-in DN dialing a 7 digit DN, which triggers LNP out of CLSVSCRC due to datafill in Table LNPRTE.

In this scenario, despite the DN selector being encountered in HNPACONT:HNPACODE datafill, the LNP trigger is being encountered in Table CLSVSCRC, due to datafill in table LNPRTE. In this case the DN selector results are ignored, and the FNPA7DIG entry is required.

Figure 22-10 TRAVER for ported-in DN triggering LNP out of CLSVSCRC

```
>traver l 4164638621 4639302 b
TABLE IBNLINES
HOST 00 0 16 18 0 DT STN RES 4638621 403 416_PUB_403 L416_LATA1_400 416
$
TABLE LINEATTR
403 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_PUB_403 L416_LATA1_400 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_PUB_403 NSCR 416 PUB TSPS Y RESG416 0 0 $
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG416 AIN AIN CDPCODE
```

Figure 22-10 TRAVER for ported-in DN triggering LNP out of CLSVSCRC

```
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
RESG416 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND
DIGCOL
RESG416 NXLA RX416 RESGSTAR 0 RES
TABLE DIGCOL
RES specified: RES digit collection
TABLE IBNXLA: XLANAME RX416
TUPLE NOT FOUND
Default from table XLANAME:
RX416
    (NET N N 0 N NDGT N Y GEN ( LATTR 413 416_EAP1_413 L416_LATA1_400)
    (EA NILC Y 0) $ $)$ 9
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
413 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_EAP1_413 L416_LATA1_400 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_EAP1_413 E416 416 EAP1 TSPS Y RESG416 0 0 $
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 $
TABLE STDPRTCT
EAP1 ( 1) ( 0) 3
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . 46 510 N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
416 Y 771 1 ( 90) ( 1) ( 4) ( 0) 0 $
 . SUBTABLE HNPACODE
 . 4639302 463939 LRTE 732
 . SUBTABLE RTEREF
```

Figure 22-10 TRAVER for ported-in DN triggering LNP out of CLSVSCRC

```
.  732 T OFRT 732
 .  . TABLE OFRT
 .  .  732 S D C0C1_ISUPTIOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
TABLE LCASCRCN
416 L416 ( 27) OPTL N N
 . SUBTABLE LCASCR
 . 463 463
TABLE PFXTREAT
OPTL NP Y NP UNDT
TABLE CLSVSCRC
416 E416 NP 2 N NONE ( 1)
 . SUBTABLE CLSVSCR
 . 4639 4639 T OFRT 656
TABLE OFRT
 656 N D C0S1_PRI_2WAY 2 N N
EXIT TABLE OFRT
AIN Info Collected TDP: no subscribed trigger.
TABLE FNPA7DIG
TUPLE NOT FOUND
TABLE TRIGGRP
CDPCODE INFOANAL
 . CDPCODE ( DG CDPDIG)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
 . CDPCODE ( DG CDPTRAF)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
LNP Info: Table LNPRTE enables trigger criteria checking out of CLSVSCRC.
Checking AIN LNP Trigger Items as LNP is compatible with current call
 .  . TABLE OFCTIID
 .  . 4 L416463 ON
 .  . TABLE TRIGITM
 .  . 4 L416463 LNP (DG 416463) (ESCEA ) (ESCOP ) (ESCDN ) $ ULK EVENT
R01 SS7
 .  .     AINBLUES $
 .  .  . TABLE C7GTTYPE
 .  .  . AINBLUES ANSI7 11 $
 .  .  . TABLE C7GTT
 .  .  . AINBLUES 4164639302 4164639302 PCSSN (SIMTOOL_RTESET SIMTOOL 0)
$ SSN
```

Figure 22-10 TRAVER for ported-in DN triggering LNP out of CLSVSCRC

```
 AIN Info Analyzed TDP: trigger criteria met.
Querying the database.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

LNP Info: Table LNPRTE enables trigger criteria checking out of
CLSVSCRC.

AIN Info Analyzed TDP: trigger criteria met.
Querying the database.
LNP Info: Displaying pre-query translations result.
LNP Info: It is used if the database indicates the called DN is
non-ported

DIGIT TRANSLATION ROUTES

1 C0S1_PRI_2WAY     N CDN E164 L 39302 NIL_NSF BC SPEECH

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

22.2 Table TOFCNAME

Table TOFCNAME stores the area code and office code for the switch. A terminating office number (TOFCNO) consists of both an area code and an office code.

For Local Number Portability (LNP), it is preferable for the switch to use the universal directory number (DN) system with the North American dialing plan.

22.2.1 Field options

Enter NONNATIVE option for the LNP to identify the office number for a DN that the system ports to the switch.

Number Pooling introduces the CODEHLDR option to table TOFCNAME, for more information about this option refer to Section 13.2.4 , “TOFCNAME,” on page 4.

22.2.2 Field information

The fields in table TOFCNAME are as follows:

- AREACODE: The area code identifies a major geographical area that the switch serves. This field can contain one to seven digits. In an office that uses the North American numbering plan, the area code must be three digits.
- OFCCODE: The office code is a subregion of the area code. The office code can have zero to seven digits. In an office that uses the North American numbering plan, the office code must be three digits
- Option NONNATIVE: Enter NONNATIVE option for the LNP to identify the office number for a DN that the system ports to the switch.

22.2.3 Datafill sequence and implications

Datafill one of the following tables before table TOFCNAME:

- HNPACONT
- SNPANAME

22.2.4 Table size

The size of table TOFCNAME depends on:

- the value of office parameter ACTIVE_DN_SYSTEM in table OFCENG
- if SOC option NPE00002 is active

The following table shows sizes for table TOFCNAME.

Table 22-2

Value of ACTIVE_DN_SYSTEM	Maximum size of table TOFCNAME
NORTH_AMERICAN	100 tuples
UNIVERSAL	1024 tuples if NPE00002 is not active
	8171 tuples if NPE00002 is active

22.2.5 Datafill example

The following example shows sample datafill for table TOFCNAME.

Figure 22-11 MAP display example for table TOFCNAME

```
AREACODE    OFCCODE                                   OPTIONS
---------------------------------------------------------
     613        621                                        $
     819        725                          (NONNATIVE) $
```

22.2.6 Datafill

The following table lists field descriptions for table HOMELRN.

Table 22-3 Field descriptions for table HOMELRN

Field	Subfield or refinement	Entry	Explanation and action
AREACODE		0 to 9999999 (vector of up to 7 digits)	Enter the area code. The area code (NPA) identifies a geographical area served by the switch. This field can contain one to seven digits. In an office that uses the North American numbering plan, the area code must be three digits.
OFCCODE		0 to 9999999 (vector of up to 7 digits) or $	Enter the office code. The area code region consists of a number of areas. The office code identifies the area served by the office. An office code can have from zero to seven digits. For an office that uses the North American numbering plan, the office code must contain three digits. Enter a number that is not used as an area code. For example, if the area code is 613, the office code cannot be 613.
OPTIONS		NONNATIVE	Enter NONATIVE to identify a ported in DN. End the tuple with a $ (dollar sign).

22.3 Table HOMELRN

Table HOMELRN specifies location routing numbers (LRN) in an office. This table

- allows service providers to identify Home LRNs
- specifies LRNs with each site to be used
  - — for signalling ISUP Jurisdiction Information Parameter (JIP)
  - — for populating correct LRN in 719 and 720 modules for billing purposes

Local Number Portability (LNP) routes calls to ported directory numbers (DN) to terminating switches. No two switches in a LATA share the same LRN. LRNs can identify the site of a ported-in number for billing purposes.

Service providers use table HOMELRN to datafill 6- or 10-digit LRNs. Differences between types of LRNs follow.

- 6-digit LRNS: The NPA-NXX of the incoming LRN must match in order to identify it as a Home LRN.

  If table HOMELRN defines 613-621 and the received LRN is 613-621-XXX then that LRN is a Home LRN (because table HOMELRN assigned 613-621 as a Home LRN).

- 10-digit LRNs: All 10 digits from the incoming LRN must match in order to identify the incoming LRN as the Home LRN.

  For an NPA with a 7-digit incoming CalledPartyID parameter from the ISUP Initial Address Message (IAM) translations must occur before table HOMELRN matches the digits with its datafill.

Each office must examine the LRN to determine to which office to terminate the call. If the incoming LRN matches any one LRN that is defined in the switch, it is the Home LRN. The call can terminate in that office. If the LRN does not match, call translations continue routing.

22.3.1 Field options

Option SITE in table HOMELRN identifies the LRN for the HOST, and LRNs for remote switching units. Each office must have at least one unique LRN.

Option SITE, entry HOST assigns a 6- or 10-digit Home LRN to identify the JIP for the office. (SITE_HOST is the equivalent to the JIP.) For a 10-digit Home LRN, only the first 6 digits (NPA-NXX pattern) are used as the JIP. At a minimum, table HOMELRN must contain one tuple with the SITE HOST option.

Option SITE with an entry of a site name

- allows service providers to identify HOME LRNs for the office and remote switching units
- specifies LRNs with each site to be used including remote switching units
  - — for signaling ISUP Jurisdiction Information Parameter (JIP)
  - — for populating correct LRN in 719 and 720 modules for billing purposes

A new maintenance LRN option, MAINT_LRN, is added to the HOMELRN table.

The MAINT_LRN option is used to provision maintenance LRNs with the new NPA prior to ANI conversion. This guards against an incoming LRN containing the new NPA.

The MAINT_LRN option indicates that it is not necessary for a tuple to have a valid NPA or NPA-NXX. The NPA in the AREACODE field does not need to exist in table SNPANAME and the AREACODE/OFCCODE combination does not need to exist in table TOFCNAME.

Maintenance LRNs should only be present in the HOMELRN table during the permissive period of an NPA split. If this tuple is present outside the permissive period it may result in incorrect call terminations when the referenced NPA-NXX is assigned to another switch.

22.3.1.1 Field information

The following lists field information in table HOMELRN:

- AREACODE: The area code of the Home LRN.
- OFCCODE: The NXX of the Home LRN.
- STNCODE: The station code of the Home LRN. This field is emptied [that is, enter a $ (dollar sign)] for a 6-digit Home LRN.
- Option SITE: An option name that allows service providers to specify site names.
- Option SITE_HOST: A site name that assigns the Home LRN as the JIP for the office.
- Option SITE_NAME: A site name that identifies a remote switching unit.
- Option MAINT_LRN: An option that is used to provision maintenance LRNs with the new NPA prior to ANI conversion. This guards against an incoming LRN containing the new NPA.

22.3.2 Datafill sequence and implications

Datafill table TOFCNAME before table HOMELRN.

Site names must be datafilled in table SITE before they are datafilled in table HOMELRN.

22.3.3 Table size

4000 to 8000 tuples

Note: The datafill distribution in table HOMELRN determines the maximum number of tuples.

22.3.4 Datafill example

The following example shows sample datafill for table HOMELRN.

Figure 22-12 Datafill Example Table HOMELRN MAINT_LRN option

```
AREACODE OFCCODE    STNCODE                          OPTIONS
-------------------------------------------------------------
     416     463          $ (SITE (HOST) $)$
     847     463          $                 (MAINT_LRN )$
```

22.3.5 Datafill

The following table lists field descriptions for table HOMELRN.

Table 22-4 Field descriptions for table HOMELRN

Field	Subfield or refinement	Entry	Explanation and action
AREACODE		3-digit code	Enter the area code of the Home LRN.
OFCCODE		3-digit code	Enter the NXX of the Home LRN.
STNCODE		4-digit code or empty	Enter the station code of the Home LRN. For a 6-digit home LRN, enter a $ (dollar sign).
OPTIONS	SITE (multiple with)	HOST (1 site name), SITE_NAME (vector of up to 10 site indexes)	Enter SITE to • assign the Home LRN that is identified as the HOST for the office • allow service providers to specify remote switching units
	MAINT_LRN	MAINT_LRN	This option indicates that it is not necessary for the tuple to have a valid NPA or NPANXX. The NPA in the AREACODE field does not need to exist in table SNPANAME and the AREACODE-OFCCODE combination does not need to exist in table TOFCNAME. The MAINT_LRN option is used to provision maintenance LRNs with the new NPA prior to ANI conversion. This guards against an incoming LRN containing the new NPA.

Note 1: If a remote switching unit is specified, a HOST must also be specified. Option SITE can have a total of 10 site names associated with it. This includes site name HOST. For example, one tuple can contain HOST and up to 9 remote switching units. Another tuple can contain up to 10 remote switching units.

Enter HOST to indicate that the Home LRN is host to the switch.

Enter a site name to specify a remote switching unit.

Note 2: Site names must be datafilled in table SITE before they can be datafilled in table HOMELRN.

22.4 Table LNPRTE

Local Number Portability Route

Local number portability for calls routing directly out of prefix translations or class of service screening.

22.4.1 Functional description

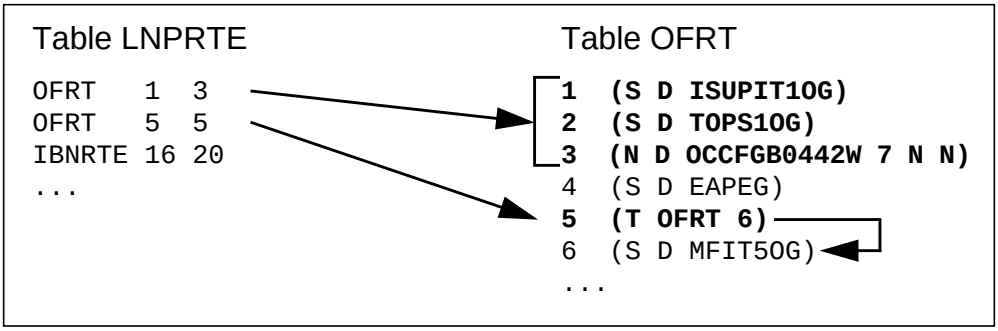
Table LNPRTE is used to provision office and IBN routes (from table OFRT family and IBNRTE family) for which triggering is enabled on calls routing directly from prefix translations or class of service screening. Table LNPRTE contains ranges of route tuple pointers consisting of the route table name and a range of route lists within the table.

22.4.2 Table control

To allow the customer the freedom to choose when LNP should be triggered, a mechanism must be in place to identify call scenarios routing directly out of STDPRTCT or CLSVSCRC that require LNP trigger criteria checking. This function is provided by a new lookup table Local Number Portability RouTE (LNPRTE).

The table LNPRTE references all routing tuples in the OFRT and IBNRTE table families for which LNP criteria checking is desired when routing occurs directly out of STDPRTCT or CLSVSCRC. The LNPRTE table is then checked in call processing to determine whether LNP criteria checking should be done. The table LNPRTE can be datafilled by the customer with pointers to all ranges of routing tuples in the OFRT and IBNRTE table families for which LNP trigger criteria checking is desired. The following figure provides an example of the structure of table LNPRTE.

Figure 22-13 Structure of table LNPRTE



22.4.3 Use of table LNPRTE

The table is used when routing directly out of STDPRTCT or CLSVSCRC to determine if LNP should be considered when selecting the route. LNPRTE is checked for the presence of the selected route. If the route has not been datafilled by the customer in table LNPRTE then the route is maintained with

no change to call processing. If, however, the route is in table LNPRTE then LNP trigger criteria checking occurs or if LNP routing has already occurred earlier in the call the earlier selected LNP route is used.

In some tables in the OFRT and IBNRTE table families tuples may exist that reference other routing tuples in the same routing table or some other routing table. One example is shown above with tuple 5 of table OFRT referencing tuple 6 of the same table. When routing occurs directly out of STDPRTCT or CLSVSCRC only the first routing tuple encountered determines if LNP trigger criteria checking occurs. If this original tuple is datafilled in table LNPRTE then trigger criteria checking occurs. On the other hand, if this tuple is not datafilled then LNP criteria checking does not occur. Subsequent routing tuples referenced by the original routing tuple have no effect on whether LNP criteria checking is encountered.

22.4.4 Datafilling table LNPRTE

Table LNPRTE has one key. Field names and possible values of LNPRTE are as follows:

- FROMIDX = 1 to 1023
- RTETABID TABID = {OFRT,OFR2,OFR3,OFR4,IBNRTE,IBNRT2,IBNRT3,IBNRT4}
- TOIDX = 1 to 1023

Note that the entire tuple is the key.

Tuples can be added to table LNPRTE using the CI table editor. 1023 tuples from each of the 8 tables in the OFRT and IBNRTE table families can be datafilled in LNPRTE. That makes a maximum of 8184 tuples referenced by table LNPRTE.

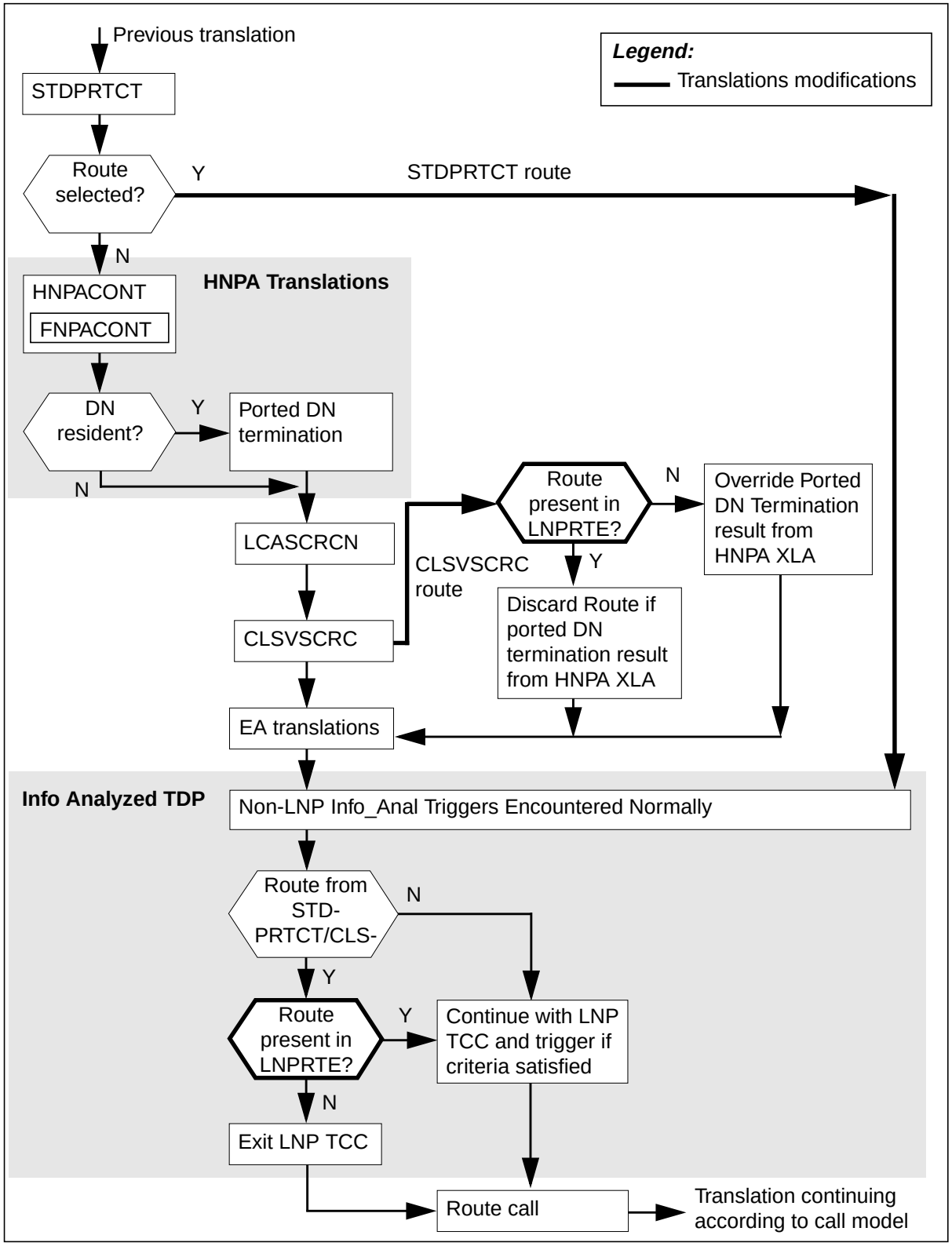
Caution should be shown in the maintenance of the LNPRTE datafill. If a non-existent tuple from some table in the OFRT or IBNRTE table families is datafilled in table LNPRTE a warning is issued but no error condition results. If, however, the routing tuple which is referenced in LNPRTE is added at some later date, LNP criteria checking is activated for that route. For the most part this is not the expected or desired result. In a similar way if a tuple is changed caution must be shown to ensure that LNPRTE is updated to reflect whether LNP criteria checking is desired for routing directly out of STDPRCT or CLSVSCRC. As a rule it is best to datafill table LNPRTE only with tuples that exist and be sure to update LNPRTE when tuples in the OFRT and IBNRTE table families are added, deleted or changed.

22.4.5 Call processing

Changes to call processing are responsible for enabling LNP triggering for call scenarios that have been selected by the customer. When a call is routed

directly out of STDPRTCT or CLSVSCRC a lookup into table LNPRTE is initiated. If the selected route has been datafilled in table LNPRTE (that is, LNP triggering has been enabled by the customer for this route) then the call enters LNP trigger criteria checking. If the selected route has not been datafilled in table LNPRTE then the call proceeds normally using the selected route. This new addition to call processing is shown in the following figure with the addition of the “Route present in LNPRTE?” box.

Figure 22-14 Translation flow with LNPRTE



22.4.6 Ported DN Termination and CLSVSCRC

This component involves modifying class of service screening so that the route selected by class of service screening does not override LNP Translations Ported DN Termination results. This occurs only if the call scenario has been selected to allow LNP trigger criteria checking by datafilling the class of service screening route in table LNPRTE.

Ported DN Termination determines a new route if the DN has been ported to the switch. After this route has been selected in the HNPA Translations block, the call continues through the call process. If the call process enters class of service screening, a new route may be selected. If the call route selected by CLSVSCRC has been datafilled in LNPRTE, then the newly selected route is discarded in favor of the old LNP Translations Ported DN Termination routing result. If the route is not in LNPRTE, the call continues as normal with the new route selected by class of service screening maintained.

Figure 22-14 shows the modifications to class of service screening to include checking for Ported DN Termination routing if the CLSVSCRC selected route has been datafilled in table LNPRTE.

22.4.7 TRAVERs and LNPRTE

The TRAVER tool is modified to show table LNPRTE when it enables trigger criteria checking. An example of this TRAVER is shown in the following figure.

Figure 22-15 TRAVER output showing triggering directly out of STDPRTCT

```
.>traver l 6136632001 4164639999 b
TABLE LINEATTR
401 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_PUB_401
L613_LATA1_0 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PUB_401 NSCR 613 PUB TSPS N $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . 4164639999 4164639999 T DD 0 OFRT 736 7 10 NONE
 .  . TABLE OFRT
 .  .  736 N D C0C1_MFITOG 0 N N
 .  . EXIT TABLE OFRT
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE LATAXLA
TUPLE NOT FOUND
ASSUMED TO BE DEFAULT INTRALATA, INTRASTATE, STD
AIN Info Collected TDP: no subscribed trigger.
LNP Info: Table LNPRTE enables trigger criteria checking out
of STDPRTCT.
LNP Info: ESCDN criteria will not affect triggering.
Checking AIN LNP Trigger Items as LNP is compatible with cur-
rent call
 .  . TABLE OFCTIID
 .  . 4 L416463 ON
 .  . TABLE TRIGITM
```

Figure 22-15 TRAVER output showing triggering directly out of STDPRTCT

```
 .  . 4 L416463 LNP (DG 416463) (ESCEA ) (ESCOP ) (ESCDN ) $
ULK EVENT R01 SS7
 .  .     AINBLUES $
 .  .  . TABLE C7GTTYPE
 .  .  . AINBLUES ANSI7 11 $
 .  .  . TABLE C7GTT
 .  .  . AINBLUES 4164639999 4164639999 PCSSN (SIMTOOL_RTESET
SIMTOOL 0) $ SSN
AIN Info Analyzed TDP: trigger criteria met.
Querying the database.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

LNP Info: Table LNPRTE enables trigger criteria checking out
of STDPRTCT.
LNP Info: ESCDN criteria will not affect triggering.

AIN Info Analyzed TDP: trigger criteria met.
Querying the database.
LNP Info: Displaying pre-query translations result.
LNP Info: It is used if the database indicates the called DN
is non-ported

DIGIT TRANSLATION ROUTES

1 C0C1_MFITOG           4164639999         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

TRAVER has be modified to show the changes to CLSVSCRC introduced by this feature. CLSVSCRC does not override Ported DN Termination results for scenarios where the CLSVSCRC selected route has been datafilled in table LNPRTE. An example of what the TRAVER output looks like when CLSVSCRC is prevented from overriding the Ported DN Terminating result is shown in the following figure.

Figure 22-16 CLSVSCRC prevented from overriding Ported DN Termination result

```
>traver l 4164638621 4164631021 b
TABLE IBNLINES
HOST 00 0 16 18 0 DT STN RES 4638621 403 416_PUB_403
L416_LATA1_400 416 $
TABLE LINEATTR
403 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_PUB_403
L416_LATA1_400 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_PUB_403 NSCR 416 PUB TSPS Y RESG416 0 0 $
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG416 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
RESG416 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VAC-
TRMT, AND DIGCOL
RESG416 NXLA RX416 RESGSTAR 0 RES
TABLE DIGCOL
RES specified: RES digit collection
TABLE IBNXLA: XLANAME RX416
TUPLE NOT FOUND
Default from table XLANAME:
RX416
    (NET N N 0 N NDGT N Y GEN ( LATTR 413 416_EAP1_413
L416_LATA1_400)
    (EA NILC Y 0) $ $)$ 9
TABLE DIGCOL
NDGT specified: digits collected individually
```

Figure 22-17 CLSVSCRC prevented from overriding Ported DN Termination result(continued)

```
TABLE LINEATTR
413 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_EAP1_413
L416_LATA1_400 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_EAP1_413 E416 416 EAP1 TSPS Y RESG416 0 0 $
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 $
TABLE STDPRTCT
EAP1 ( 1) ( 0) 3
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . 41 42122 N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
416 Y 771 1 ( 90) ( 1) ( 4) ( 0) 0 $
 . SUBTABLE HNPACODE
 . 416463102 4164631098 FRTE 730
 . SUBTABLE RTEREF
 .  730 T OFRT 730
 .  . TABLE OFRT
 .  .  730 S D C0C1_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
TABLE LCASCRCN
416 L416 ( 27) OPTL N N
 . SUBTABLE LCASCR
 . TUPLE NOT FOUND.  DEFAULT IS NON-LOCAL
TABLE PFXTREAT
OPTL NP N DD UNDT
TABLE CLSVSCRC
416 E416 DD 2 N NONE ( 1)
 . SUBTABLE CLSVSCR
 . 4164631021 4164631021 T OFRT 747
TABLE OFRT
 747 S D C0S1_ISUPITOG
EXIT TABLE OFRT
TABLE LATAXLA
TUPLE NOT FOUND
```

Figure 22-18 CLSVSCRC prevented from overriding Ported DN Termination result(continued)

```
ASSUMED TO BE DEFAULT INTRALATA, INTRASTATE, STD
AIN Info Collected TDP: no subscribed trigger.
TABLE TRIGGRP
CDPCODE INFOANAL
 . CDPCODE ( DG CDPDIG)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
 . CDPCODE ( DG CDPTRAF)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
LNP Info: Table LNPRTE enables trigger criteria checking out
of CLSVSCRC.
Checking AIN LNP Trigger Items as LNP is compatible with cur-
rent call
 .  . TABLE OFCTIID
 .  . 4 L416463 ON
 .  . TABLE TRIGITM
 .  . 4 L416463 LNP (DG 416463) (ESCEA ) (ESCOP ) (ESCDN ) $
ULK EVENT R01 SS7
 .  .     AINBLUES $
 .  .  . TABLE C7GTTYPE
 .  .  . AINBLUES ANSI7 11 $
 .  .  . TABLE C7GTT
 .  .  . AINBLUES 4164631021 4164631021 PCSSN (SIMTOOL_RTESET
SIMTOOL 0) $ SSN
AIN Info Analyzed TDP: trigger criteria met.
Querying the database.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

LNP Info: Table LNPRTE enables trigger criteria checking out
of CLSVSCRC.

AIN Info Analyzed TDP: trigger criteria met.
Querying the database.
LNP Info: Displaying pre-query translations result.
LNP Info: It is used if the database indicates the called DN
is non-ported

DIGIT TRANSLATION ROUTES

1 C0S1_ISUPITOG         4164631021         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

22.5 Table LNPOPTS

Table LNPOPTS contains office-wide LNP options.

The following table is a description of the fields in table LNPOPTS.

Table 22-5 Table LNPOPTS

KEY	OPTIONS
QPARMS	QPARMS (LATA N) (CHARGNUM Y) (CLGPTYID Y) (CLGPBGID N) (CHGPTYST Y) (PRIMCARR N) (TCM N) (OCLDPTID N) (REDIRPID N) (REDIRINF N) $
BLOCKLNP	BLOCKLNP INACTIVE
FLRN_CALLTYPE	FLRN_CALLTYPE NO_PREFIX_LOCAL
LNPTCT	LNPTCT PODP
NP_MAX_CONTAM	
LNP_305_LOG	
NPRESERV_CI	
ACG_10D_TRMT	ACG_10D_TRMT AINF

22.5.1 QPARMS tuple

The QPARMS tuple is created for selecting the query parameters in an LNP query message. After provision, before launching an LNP query, SSP checks the datafill in table LNPOPTS to decide which parameters are in the query. All the mandatory parameters are always sent in an LNP query. Only the optional query parameters are selectable. The following table is a list of all the LNP query parameters and their characteristics.

Table 22-6 Parameters in LNP query message (Sheet 1 of 2)

Parameter Name	Mandatory/ Optional	Resetable (Y/N)	Default Value
Userid	M	N	TRUE
BC	M	N	TRUE
Calledparty	O	N	TRUE
LATA	O	Y	FALSE
CALLING_PARTY_ID	O	Y	TRUE
CALLING_PARTY_BGID	O	Y	FALSE

Table 22-6 Parameters in LNP query message (Sheet 2 of 2)

Parameter Name	Mandatory/ Optional	Resetable (Y/N)	Default Value
CHARGE_NUMBER	O	Y	TRUE
CHARGE_PARTY_STATION_TYPE	O	Y	TRUE
PRIMARY_CARRIER	O	Y	FALSE
TCM	O	Y	FALSE
ORIGINAL_CALLED_PARTY_ID	O	Y	FALSE
REDIRECTING_PARTY_ID	O	Y	FALSE
REDIRECTION_INFORMATION	O	Y	FALSE

A user can select query parameters using table editor. The following figure provides an example that shows the steps to include the parameter LATA in a LNP query message (we assume it is not included in the query message before).

Figure 22-19 Steps to include the parameter LATA in a LNP query message

```
>table LNPOPTS
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
TABLE: LNPOPTS
>pos QPARMS
QPARMS QPARMS (LATA N)(CHARGNUM Y) (CLGPTYID Y)
(CLGPBGID N) (CHGPTYST Y) (PRIMCARR N) (TCM N) (OCLDPTID
Y) (REDIRPID Y) (REDIRINF Y) $
>cha
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
ENTER Y TO CONTINUE PROCESSING OR N TO QUIT
>y
PARMNAME: LATA
>
PARMVAL: Y
>N
...
TUPLE TO BE CHANGED:
QPARMS QPARMS (LATA Y) (CHARGNUM Y) (CLGPTYID Y)
(CLGPBGID N) (CHGPTYST Y) (PRIMCARR N) (TCM N) (OCLDPTID
Y) (REDIRPID Y) (REDIRINF Y) $
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT.
>y
TUPLE CHANGED
JOURNAL FILE INACTIVE
```

Turning a parameter to N indicates that parameter is not included in a query.

22.5.2 BLOCKLNP option for table LNPOPTS

Table LNPOPTS contains an option, also named BLOCKLNP, which has the default value of “INACTIVE”. Markets that wish to utilize this blocking feature must change the value to “ACTIVE” in their offices.

It is this entry that the customer datafills the type of treatment they want to apply to the call should the call be sent to treatment instead of querying. The BLOCKLNP option has a mandatory subfield of type treatment that allows the customer to choose from the full range of treatments possible. The customer must ensure that the chosen treatment is properly mapped.

To be properly mapped, the treatment selected in the BLOCKLNP option must also be datafilled in table TMTMAP or table TMTCNTL, depending on how the customer wishes to apply treatment to the call.

22.5.3 LNPTCT option for table LNPOPTS

A new option LNPTCT is added to table LNPOPTS with the default value set to PODP. When this option is set to LNP, for all LNP calls the new value LocalNumberPortability is assigned in the Trigger Criteria Type field of Info_Analyzed messages.

This new trigger criteria type represents an evolution of messaging for LNP. Not all customers may be ready to support this new type so it is implemented as an office-wide option, controlled in table LNPOPTS.

22.5.4 FLRN_CALLTYPE option for table LNPOPTS

Patch LNP18 provides an alternative to the implementation of AU3086 by marking all Foreign LRN translations as no_prefix_local calls for the purposes of post-LNP billing generation.

The FLRN_CALLTYPE tuple is set based upon the activation state of patch LNP18 on the dump side of the transfer. If patch LNP18 is ON on the old load, the FLRN_CALLTYPE tuple is set to NO_PREFIX_LOCAL. If patch LNP18 is OFF on the old load, the FLRN_CALLTYPE tuple is set to MATCH_PREQUERY.

It is not recommended implementation of LNP FLRN translations to set the FLRN_CALLTYPE tuple to NO_PREFIX_LOCAL. This may produce unexpected billing and routing, and may not be compatible with future LNP development.

22.5.5 NP_MAX_CONTAM option for table LNPOPTS

A thousand block of numbers is not pooled if more than a certain percentage of the DNs in the block are contaminant. This criteria for eligibility is

controlled by the NP_MAX_CONTAM tuple. The default for this criteria is 10%. A Number Pooling subscriber can choose between a range of 10% and 40% using this tuple.

A DN is considered contaminant if it is in a thousand block that is already assigned to service or is on an intercept other than BLDN. For more information on when this tuple is used please refer to Section "13.3.3.1. Provisioning Number Pooling Using the NPRESERVE CI command" on page 30.

22.5.6 LNP_305_LOG option for table LNPOPTS

The LNP_305_LOG tuple controls whether an LNP305 log is generated for LNP calls where the post-query LAAXLA values do not match the pre-query values, in the case where the NPE00005 SOC is idle. For more information on this tuple please refer to Section "13.4.5. Foreign Location Routing Number" on page 46.

22.5.7 NPRESERV_CI option for table LNPOPTS

The NPRESERV_CI tuple is used to control access to Number Pooling provisioning through the NPRESERVE CI. This secondary method of provisioning can not be accessed if this tuple has the value of OFF. For more information on this tuple please refer to Section "13.3.3. CI NPRESERVE" on page 28.

22.5.8 ACG_10DTRMT option for table LNPOPTS

The ACG_10DTRMT tuple is used to route LNP calls blocked by 10-digit ACG (10D ACG) controls. The value is selected from the list of available extended treatments. That is, the value must match the value entered in EXTENDED_TREATMENT. If a value is not selected, the default treatment is AINF (AIN Final).

22.6 Table LNPCODE

Table LNPCODE enables operating companies to specify special routing to a virtual facility group (VFG) for directory numbers that port into a switch.

Datafill for table LNPCODE applies only to incoming LNP calls to ported-in DNs. This feature enables special routing such as to a VFG or a trunk loop-around. Each tuple in the table corresponds to a range of digits. For directory numbers in each range, one of the following is specified:

- treatment to apply when an LNP call to a ported-in DN arrives on the switch
- routing table to use when an LNP call to a ported-in DN arrives on the switch

Table LNPCODE size is dynamically allocated according to datafill. The fields in table LNPCODE are shown in the following table.

Table 22-7 LNPCODE fields

Field name	Subfield	Range of values	Default values
STS		3 digits	None
FROMDIGS		vector of up to 10 digits	None
TODIGS		vector of up to 10 digits	None
RTE	RTESEL	T or TRMT This field has an associated field EXTRTEID when RTESEL is T and an associated field of RTETRMT when the RTESEL is TRMT. RTESEL = T EXTRTEID: This field consists of subfields TABID and KEY TABID: OFRT, OFR2, OFR3, OFR4, IBNRTE, IBNRT2, IBNRT3, IBNRT4, RRTE, TTL4. KEY: 1 to 1023 RTESEL = TRMT RTETRMT: alphanumeric; a list of valid treatments.	None

The field names are:

- STS: corresponds to the current STS of the call
- FROMDIGS: corresponds to the start of the range of the terminating NPANXXXXXXX that should use the special routing information provided here
- RTE: gives the routing information for the calls made to the DNs that fall in the range of the FROMDIGS to TODIGS field, from an originator whose STS is given in the STS field. This field can be datafilled either with a T selector or TRMT selector
- TODIGS: corresponds to the end of the range of the terminating NPANXXXXXX that should use the special routing information provided here

The routing tables should be datafilled with the appropriate route before datafilling this table, if a T selector is to be datafilled in this table.

23 General Office

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document". For more information about office parameters, refer to 297-8003-855, DMS-100/200 Office Parameters Reference Manual

23.1 Office parameter changes

Two office parameters are changed for LRN-LNP:

- CRS_SUBRU_POOL2_SIZE
- NO_OF_HIS_DATA_BLKS

23.1.1 Office parameter CRS_SUBRU_POOL2_SIZE changes for Billing

Parameter CRS_SUBRU_POOL2_SIZE in table OFCENG is an existing office parameter that is modified by the billing system.

The extension block that this parameter governs is used for the new LNP module 720 for the LNP application. The provisioning rule for this parameter is changed.

23.1.1.1 Provisioning rules

This extension block is used during call processing by LNP module to store portability information of the originator or terminator. The provisioning should be changed to support all LNP call scenarios simultaneously. The rule for LAMA office and CAMA office are provided.

23.1.1.2 Calculation for a LAMA office

1. Append Originating LNP module to Originating Access Record when originator is ported (1).
2. Append terminating LNP module to Terminating Access Record when terminator is ported (1).
3. Append terminating LNP module to Charge Record when the call triggers LNP (1).

The number in parentheses indicates the maximum number of extension blocks that can be recorded for a single call.

Apply the following rule to calculate the size of CSR_SUBRU_POOL2_SIZE in a LAMA office:

<existing equation> +
% of calls with Originating Access Record when originator is ported +
% of calls with Terminating Access Record when terminator is ported +
% of calls with Charge Record when the call triggers LNP

23.1.1.3 Calculation for a CAMA office

1. Append Originating LNP module to Originating Access Record when originator is ported (1).
2. Append Terminating LNP module to Terminating Access Record when terminator is ported (1).
3. Append Terminating LNP module to Charge Record when the call triggers LNP (1).
4. Append Originating LNP module to Charge Record when a call incoming on a trunk with JIP in its IAM message (1).
5. Append Originating LNP module to Charge Record when a call originates from trunk with LRN subscription (1).

The number in parenthesis indicates the maximum number of extension blocks that can be recorded for a single call.

Apply the following rule to calculate the size of CSR_SUBRU_POOL2_SIZE in a CAMA office:

- number of SC trunk group members
- x engineered percentage of simultaneous trunk off-hooks

- x percentage of calls originating from SuperCAMA trunks that are billable
- x percentage of billable calls originating from SuperCAMA trunks unable to use fast-write.

23.1.2 Office parameter NO_OF_HIS_DATA_BLKS changes for signaling

Parameter NO_OF_HIS_DATA_BLKS is an existing parameter that controls the number of all History Data Blocks (HDB)s that can be allocated at one time for an office. In addition to the current HDBs that are used for call processing, LNP makes use of one additional large HDB, the LNP HDB.

An LNP HDB is attached to incoming LNP calls, calls involving feature interactions which affect the calling number, and calls dialing a number which is portable. The following is a description of the types of calls impacted by the new LNP HDB. The new LNP HDB is attached:

- when Bit M of the FCI parameter is set to Number Translated on incoming ISUP calls
- when an LNP Response is received
- to Direct Inward System Access (DISA) calls
- to all variants of Call forwarding calls
- to Hunt Group Line Overflow to DN (LOD) calls
- to Key Short Hunt (KSH) overflow to DN calls
- if a JIP parameter is present
- when the AIN Essentials PODP and Termination Attempt trigger is encountered

Note: Only one LNP HDB is allocated per call. If a call meets more than one of the above criteria no additional LNP HDBs are used. Data is placed in the existing LNP HDB.

As LNP makes use of the JIP parameter, an increase of the occurrence of the JIP parameter in IAM messages is anticipated. As a result, for those switches which are not LNP capable but are responsible for tandeming the call, the number of HDBs which are allocated is increased.

The new LNP HDB is a large HDB.

The LNP HDB is released at:

- LNP call originating office after answer is received from terminator
- LNP call terminating office after terminator has answered

- intermediate office with at least one ISUP trunk involved the LNP HDB is released after an answer is reported to CM
- intermediate office with no ISUP involved LNP HDB stays until call has terminated.

Note: For 800Plus Call Prompter calls, both the LNP HDB and the AIN HDB are not released until the call is answered at the final destination after completing the Call Prompter interaction. The increased hold time for these HDBs during call setup should be considered in 800Plus LNP offices when provisioning the amount of LNP and AIN HDBs required.

23.2 Datafilling steps

This section describes the datafill for setting up the AIN Essentials SSP.

The following steps must be completed before implementing LNP:

- Implement AIN.
- Set up the datafill before turning ON the SOC options.
- Turn ON the AIN SOC options before turning ON the LNP SOC options.

23.2.1 Datafill table OFCENG for AIN Essentials/LNP SSP software

Office parameters are generally pre-set during the One-night Process (ONP) according to the lines and trunks in an office. They can be affected if the SSP switch is equipped for LNP.

Note: LNP uses a standard AIN Essentials platform. Review and consider all AIN Essentials parameters for LNP implementation.

For more information, refer to *DMS-100 Office Parameters Reference Manual*, 297-8003-855

The following table lists office parameters affected by LNP:

Table 23-1 Office parameters affected by LNP (Sheet 1 of 3)

Office parameter name	How it affects LNP
AIN_NUM_EXT_BLKS	This extension block is held by an AIN call while waiting for a response from the SCP or adjunct processor. It is held from the time that an AIN trigger criteria is successfully met, until the call is either connected or taken down (whichever comes first).
NUM_RC_EXT_BLKS	Calls receiving AIN Analyze_Route or AIN Forward_Call responses use routing characteristics to translate and route the response.

Table 23-1 Office parameters affected by LNP (Continued) (Sheet 2 of 3)

Office parameter name	How it affects LNP
NO_OF_LARGE_FTR_ DATA_BLKS	This parameter specifies the number of large feature data blocks available. Increase this parameter by the potential number of calls that may be simultaneously involved in encoding or decoding a message.
NO_OF_HIS_DATA_BLKS	This parameter specifies the number of regular, large, and extra-large history data blocks (HDB) available. Increase the number of large HDBs to reflect the number of calls in the call setup phase that subscribe to AIN. The provisioning rules for this parameter are modified for LNP.
MAX_NO_OF_TRANS_ID	This parameter specifies the maximum number of transaction IDs that a DMS switch can allocate.
NO_OF_HIS_CONTROL_BLKS	Set the value for NO_OF_HIS_CONTROL_BLKS to equal the total number of AIN subscribers. In most offices, this can be done by setting the value of NO_OF_HIS_CONTROL_BLKS equal to the number assigned to the OFCENG tuple NCCBS. ***Note:*** LNP never allocates a history control block (HCB). An HCB is always present when LNP needs to allocate an HDB.
TRIGDIG_NUM_DGLTR_POOLS	This parameter is required in an office with the Advanced Intelligent Network (AIN) feature. It specifies the number of digilator pools that are allocated for use by table TRIGDIG. ***Note:*** Under-provisioning of this parameter limits the number of tuples that can be added to table TRIGDIG. Over-provisioning this parameter results in unnecessary use of data store. To monitor the use of digilator pools, use the DBLOCKS command within the BCSMON utility.
AIN_NUM_PROCESSING_ EXT_BLKS	This parameter is required in a switching unit with the Advanced Intelligent Network (AIN) feature. It specifies the number of AIN processing extension blocks that are available for use during the processing of a response, following a service control point (SCP) query.
CRS_SUBRU_POOL2_SIZE	This parameter is used for the 720 module. It stores originating and terminating information for the AMA record.
CRS_PRU_POOL2_SIZE	As of BCS36, blocks from this pool are used to record calls that are only billable because they are AIN calls. For example, a POTS line-to-POTS line call does not produce an AMA record. However, if the same call becomes an AIN call, it DOES produce an AMA record.
AIN_MAX_SERIAL_TRIGGERS	This parameter determines the number of times that a call is allowed to trigger per call leg.

Table 23-1 Office parameters affected by LNP (Continued) (Sheet 3 of 3)

Office parameter name	How it affects LNP
AIN_T1_TIMER	This parameter specifies the length of time (in seconds) that the switching service point (SSP) waits for a response from the off-board processor (the SCP) after sending a query message.
AIN_NUM_TERM_NOTIF_EXT_BLKS	This parameter specifies the number of AIN Essentials SSP termination notification extension blocks allowed in the office. ***Note:*** This parameter is only used if requested by the SCP.
ACTIVE_DN_SYSTEM	This parameter specifies the type of DNs that can be used in an office. The two types are NORTH_AMERICAN and UNIVERSAL. For LNP, ACTIVE_DN_SYSTEM is usually changed from NORTH_AMERICAN to UNIVERSAL. .
PSTN_GT_SIZE	This parameter allows Custom Local Area Signaling Service (CLASS) global title address to vary from 6 to 10 digits. ***Note:*** LNP ports numbers from one switch to another. This makes 6-digit global translations obsolete. Therefore, set PSTN_GT_SIZE to 10.

23.2.2 Datafill TCAP in table TCAPTRID

The AIN Essentials SSP communicates with an SCP by means of query and response messages. These messages are sent in the transaction capabilities application part (TCAP) components (messages) within TCAP packages.

The TCAP transaction and component ID table, TCAPTRID, controls the number of transaction and component IDs that are available for an application. For AIN Essentials, the number of component IDs should be equal to the number of transaction IDs. (Both numbers must be greater than zero.)

Note: LNP uses the AIN entry for table TCAPTRID. Nortel supplies the formula for this entry to operating companies that purchase LNP. For more information on this table, refer to *DMS-100 Translations Guide*, 297-8003-350.

The following example shows that 410 transaction IDs and 410 component IDs are available for use by the AIN Essentials application.

Table 23-2 TCAPTRID example

TCAPAPPL	NUMTRIDS	NUMCOMPS
AIN	410	410

23.2.3 Datafill treatments

Specific treatments for AIN Essentials follow.

23.2.3.1 Datafill table TMTCNTL

Table TMTCNTL defines tones, announcements, and states that are returned to the originator of a call. Each type of originator can have its own AIN final announcement defined. The AINF associated with OFFTREAT is applied if the originator does not have its own AINF defined.

23.2.3.1.1 Example In table TMTCNTL, add the AINF announcement to the following types of originators:

- OFFTREAT (for office)
- LNT (for lines)
- ITTRKGRP (for trunks)
- TITRKGRP (for trunks)

To add the AINF announcement, perform the following steps.

1. In table TMTCNTL, position on tuple OFFTREAT.
2. Go to subtable TREAT and add the tuple shown in the following table.
3. Repeat step 2 for tuples LNT, ITTRKGRP, and TITRKGRP, respectively.

Table 23-3 Subtable TREAT of table TMTCNTL example

Treatment	Log	FSTRSEL	CLLI
AINF	Y	S	T120

Note: Ensure that the distant switch release back message and locally-dialed messages match, so that the announcement for the trouble is the same.

23.2.3.2 AIN Final Treatment

AIN Final Treatment (AINF) applies whenever there is a call-related fatal error. This can be a protocol or application error. For ISDN user part (ISUP) users, this treatment can be mapped to Temporary Failure in the Treatment Map table (TMTMAP) and Treatment Control table (TMTCNTL). The operating company determines the type of error notification (reorder tone or announcement).

23.2.3.3 LNP Misrouted Call To A Ported Number (LNPM)

LNPM indicates that an LNP call to a ported number was misrouted. It can be mapped to a DRAM announcement that indicates the call was unable to complete.

23.2.3.4 PODN treatment

PODN treatment is used to indicate a native DN that has been ported from a donor switch.

Figure 23-1 Sample datafill for PODN treatment in TMTCNTL

```
TABLE: TMTCTNL LNT:TREAT
TREATMT LOG FSTRTE
-----------------------
PODN Y T OFRT 55
```

23.2.3.5 Datafill table TMTMAP

Datafill table TMTMAP to apply the AINF treatments to ISUP.

In key field TMTMPKEY, specify AINF as the cause associated with the treatment, as shown in the following example.

Table 23-4 TMTMAP example

TMTMPKEY	TMTMPVAR
Q764 AINF ALLBC	ISUP NOLOCAL TEMPFAIL LOCNET N

23.2.3.6 AIN Disconnect Call

Apply AIN Disconnect Call (AIND) treatment when the off-board processor sends the Disconnect (DISC) response to the SSP to disconnect the call. The call clears as normal.

24 Software optionality control

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

Software Optionality Control (SOC) gives customers the flexibility to activate additional features of the software through the entry of software codes on a switch.

Options can be categorized into two main types, tracked or controlled:

- A controlled option contains one or more features that are state controlled, usage controlled, or a combination of both. These features are registered with SOC and are internally controlled, monitored, or restricted by SOC.
- A tracked option does not contain any specific features that are controlled, monitored, or limited by SOC. These options identify functionality that is not SOC aware (that is, does not contain any SOC interaction software), but may, in the future, become enhanced to become SOC aware. The tracked option is essentially a bookkeeping identifier used by the customer and NT for Billing purposes.

For LRN LNP, Nortel provides the ability to activate or deactivate separately the following:

- LRN-LNP SOC option (LNP00100): This option provides core functionality of LRN LNP which controls LRN LNP functionality on the originating switch, in addition to providing support for Query on Release at the Terminating office.
- LNP GR-2936 Phase 1 option (LNP00200): This option tracks phase one of Bellcore GR-2936 compliance. This option controls functionality

developed for compliance to Bellcore GR-2936. Please see Section "24.1. LNP00200 Functionality" on page 2 for additional information.

- LNP Canadian Requirements option (LNP00300): This option provides LNP functionality required specifically by the Canadian market. This option currently controls functionality required for LNP interworking with 800Plus services. (LNP00100) is a prerequisite).

SOC for LRN LNP resides on top of (that is, is dependent on) the following existing AIN SOC options:

- AIN Essentials Option (AIN00002): This option activates/deactivates the basic AIN call processing capability. Its state determines whether AIN is considered active in the office.
- AIN Call Management Option (AIN00006): This option controls the activation and deactivation of all AIN Essentials SSP related capability. It is dependent on the AIN00002 ASOC option. Thus, these two ASOC options (AIN00002 and AIN00006) must be in the ON state in order for AIN Essentials SSP software to function.
- AIN Call Model Control Option (AIN00007): This is a track option associated with features that enhance AIN Essentials call control.
- AIN Services Supporting Option (AIN00009): This track option is associated with features that provide support for services on AIN.

For LRN LNP to be enabled, AIN Essentials must be enabled. When LRN LNP is disabled through SOC, whenever an LRN LNP trigger is encountered, it is skipped as if the trigger does not exist. This is the case regardless of whether the switch is the originating, intermediate, or terminating switch.

If AIN Essentials is disabled, LRN LNP cannot be enabled.

PODP/LRN LNP interworking can be enabled or disabled independently of the other SOC options.

24.1 LNP00200 Functionality

SOC LNP00200 controls functionality implemented to meet Bellcore GR-2936 compliance. LNP00200 is a controlled SOC option within the LNP SOC structure. The following functionality is controlled by LNP00200:

- Ported Out DN Marking
- LNP Call Code 721/722 Billing
- LNP Billing Module Enhancements
- LNP 10-Digit Unconditional Trigger Enhancements
- LNP Query Parameter Reduction

There are specific provisioning measures associated with each functional area controlled under LNP00200.

LNP Ported Out DN marking is provisioned against DNs through SERVORD. This provisioning is blocked when the LNP00200 SOC option is IDLE. Execution of QPDN is blocked when LNP00200 is idle. The status of the LNP00200 SOC option does not control the functionality of PODN, only the provisioning of PODN against a DN. Therefore, if PODN is provisioned against a DN when LNP00200 is in the ON state, and the SOC option is subsequently transitioned to the IDLE state, PODN may still be encountered for the DN against which it was provisioned, but it may not be provisioned against any subsequent DNs.

Similarly, PORT may not be provisioned against agents for which it was supported in the NA009 software released. The following provides a list of agents supported in the NA009 software release for PORT.

Table 24-1 NA009 PORT option support for Line Class Codes, DN selectors, Feature DNs

Line Class Codes	DN Selectors	Feature DNs
CDF	SYN	SRA
CCF	D	
CFD	T	RTE
CSD		MCDN
CSP	M	RCTL
ETW		
EOW		
INW		PC
M5009		
M5112		
M5209		
M5212		
OWT	MM	UCD
ZMD	SDN	ASR
ZMZPA		ACD
2WW	LC with RCF DN	RCF

Again, the state of LNP00200 does not control the functionality of the PORT option when it has been provisioned against DNs, it only controls provisioning of the PORT option.

LNP billing module 719 and Call Type Codes 721 and 722 are controlled through Table AMAOPTS. If SOC option LNP00200 is in the IDLE state, the LNP options in table AMAOPTS may be changed from OFF to ON. Once these billing options are ON however, changing the LNP00200 SOC state to IDLE does not disable the LNP billing functionality. The LNP00200 SOC option only controls the activation of the LNP billing option in Table AMAOPTS through provisioning, not the LNP billing functionality itself.

Table LNPOPTS, tuple QPARMS allows the customer to specify a reduced query parameter set for all LNP queries. When the LNP00200 SOC option is IDLE, the LNPOPTS tuple may not be changed. Therefore, if the LNP00200 option is IDLE, the QPARMS tuple cannot change. Similarly, if the QPARMS tuple is changed, and the LNP00200 SOC option is transitioned back to the

IDLE state, the QPAMRS tuple may be changed again until the LNP00200 option is returned to the ON state. LNP00200 only controls changing the QPARMS tuple, and has no impact on functionality associated with Query Processing.

24.1.1 SSP Route on FOD

Option SSP Route on FOD (SOC LNP00202): This option provides the capability of selecting a datafilled treatment for LNP calls encountering 10-digit Automatic Call Gapping (10D ACG). When an LNP call encounters 10D ACG, and when LNP00202 is ON, the call is routed to the treatment datafilled in field ACG_10D_TRMT in Table LNPOPTS. If no datafill is provided there, the call is routed to the default treatment AIN Final (AINF). LNP00202 may be activated only when LNP00200 is active, and may not be deactivated unless LNP00200 is also deactivated. The active state for LNP00202 is ON, and the inactive state is IDLE.

24.2 Activate LNP SSP software using SOC

The SOC utility controls LNP software. SOC options have two states: ON or IDLE. To activate LNP, SOC options AIN0002 and AIN0006 must be in the ON state (These SOC options control basic AIN functionality.).

The following SOC options are specific to LNP:

- LNP00100: LRN-LNP
- LNP00200: LNP GR-2936 compliance
- LNP00300: functionality for Canadian market (LNP Canadian Requirements)

The following AIN SOC options are prerequisites for LNP:

- AIN00002: AIN Essentials
- AIN00006: AIN Call Management
- AIN00007: AIN Call Model Control
- AIN00009: AIN Services Supporting

Note: Advanced Intelligent Network Essentials Service Implementation GuideAIN00026, Response Simplification, is an optional AIN SOC option for LNP. For information on response simplification translations, refer to 297-5161-021.

24.2.1 SOC option status

To determine the status of the SOC options, issue the following command in the SOC utility:

>select group ain

The following figure shows the result of the command.

Figure 24-1 AIN SOC option status

```
>soc
SOC:
>select group AIN

GROUP:AIN
OPTION     NAME                 RTU STATE   USAGE   LIMIT   UNITS  LAST_CHG
------     ----                 --- -----   -----   -----   -----  --------
AIN00001   Primer                N       -       -       -       -  95/05/17  TRAK
AIN00002   Essentials           Y      ON       -       -       -  95/05/24
AIN00006   Call Management      Y      ON       -       -       -  95/05/24
AIN00007   Call Model Cntrl     N       -       -       -       -  95/05/17  TRAK
AIN00008   Display Services     N    IDLE       -       -       -  97/06/25
AIN00009   Services Supporting  N       -       -       -       -  97/06/25  TRAK
AIN00010   Default Routing      Y      ON       -       -       -  95/05/24
AIN00011   SSP Svcs Enhcemnts   N       -       -       -       -  97/06/25  TRAK
AIN00015   Ntwk Srvcs Enhncmnts N       -       -       -       -  97/06/25  TRAK
AIN00018   ACB/AR Premium       N    IDLE       -       -       -  97/06/25
AIN00022   Maint Enhancements   N       -       -       -       -  97/06/25  TRAK
AIN00026   Transltns simplifctn N    IDLE       -       -       -  97/06/25
AIN00027   Office Trigger Flex  N       -       -       -       -  97/06/25  TRAK
AIN00210   Service Enablers     N    IDLE       -       -       -  97/06/25
AIN00211   SE Counter - Office  N       -       0       0     1AM  98/02/04
AIN00212   SE Counter - Subscr  N       -       0       0     1AM  98/02/04
AIN00213   SE Counter - NCR     N       -       0       0     1AM  98/02/04
AIN00220   Service Enablers R2  N    IDLE       -       -       -  98/02/04
AIN00230   Service Enablers R3  N       -       -       -       -  98/02/04  TRAK
AIN00231   SE R3 - GETS EACR    N    IDLE       -       -       -  98/02/04
```

The following figure shows the LNP SOC option status.

Figure 24-2 LNP SOC option status

```
LNP00100   LRN                  Y      ON       -       -       -  97/10/17
LNP00200   GR-2936 Ph I         N    IDLE       -       -       -  98/02/04
LNP00300   Canadian Requiremts  N    IDLE       -       -       -  98/04/15
```

24.2.2 Option passwords

To turn SOC options ON, a password must be applied to these options. (The password must be purchased from Nortel.) After the password is applied to the appropriate SOC option, update the RTU field of that SOC option to indicate "Y".

Fields of interest are RTU and STATE.

- The RTU (Right-To-Use) field indicates if the password was purchased and applied (valid values are Y and N; default is N).
- The STATE field indicates the state of the SOC option (valid states are ON and IDLE; default is IDLE).

Note: Appropriate RTUs are set from No to Yes (N to Y) during the ONP. A SOC password file is downloaded to the switch and activated after the ONP.

24.2.3 Transition SOC options

SOC options can be set to the ON state providing the RTU field is set to Y. To transition a SOC option to ON, enter the following command from within the SOC utility:

>SOC

Ensure that the option dependency requirements are taken into consideration when transitioning an option to the ON state. Options must be set to the ON state in the following order:

1. AIN00002
2. AIN00006
3. LNP00100
4. LNP00200
5. LNP00300

The following figure shows the transitioning of option LNP00100 to the ON state.

Figure 24-3 Transitioning LNP00100 SOC option ON

```
CI:
>soc
SOC:

>assign state on to LNP00100
Done.
>select group lnp

GROUP:LNP
OPTION     NAME                 RTU STATE   USAGE   LIMIT   UNITS  LAST_CHG
------     ----                 --- -----   -----   -----   -----  --------
LNP00100   LRN                  Y      ON       -       -       -  97/10/17
LNP00200   GR-2936 Ph I         N    IDLE       -       -       -  98/02/04
LNP00300   Canadian Requiremts  N    IDLE       -       -       -  98/04/15
```

To transition a SOC option to IDLE, enter the following command from within the SOC utility:

>assign state idle to <option code>

where

<option code> is any one of the control options (for example AIN00002).

Ensure that the option dependency requirements are taken into consideration when transitioning an option to the IDLE state. Options must be transitioned to the IDLE state in the following order:

1. LNP00200
2. LNP00100
3. AIN00006
4. AIN00002

Each ON-to-IDLE transition creates a warning and requests a confirmation.

> ***Note:*** AIN00007 and AIN00009 do not have states. They cannot be transitioned.

The following figure shows the transitioning of SOC LNP00100 to the IDLE state.

Figure 24-4 Transitioning LNP00100 SOC option IDLE

```
>assign state idle to LNP00100
This transition will disable NP Triggers for all current
and future LNP subscribers.
Confirm state change of option LNP00100 to state IDLE
by entering the textual option name:
>LRN
Done.

>select group lnp

GROUP:LNP
OPTION     NAME                 RTU STATE   USAGE   LIMIT   UNITS  LAST_CHG
------     ----                 --- -----   -----   -----   -----  --------
LNP00100   LRN                  Y      ON       -       -       -  97/10/17
LNP00200   GR-2936 Ph I         N    IDLE       -       -       -  98/02/04
LNP00300   Canadian Requiremts  N    IDLE       -       -       -  98/04/15
```

The following transition disables LNP triggers for all current and future LNP subscribers.

Confirm state change of option LNP00100 to state IDLE by entering the textual option name:

>LRN

The following figure shows a TRAVER output with AIN00006 SOC option IDLE.

Figure 24-5 TRAVER example—AIN00006 SOC option IDLE

```
>traver l 6136672001 6137224444 b
TABLE IBNLINES
HOST 00 1 07 17 0 DT STN RES 6672001 200 613_P621_200 L613_LATA1_0 613 $
TABLE LINEATTR
200 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_P621_200 L613_LATA1_0 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_P621_200 FR01 613 P621 TSPS Y RESG200 0 0 $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
HOST 00 1 07 17 0 AIN AIN TIID (1 OHI1 ON) $
TABLE CUSTSTN
RESG200 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
Checking AIN OFFHKIMM Trigger Items as OFFHKIMM is compatible with current call
 .  . TABLE TRIGITM
 .  . 1 OHI1 OFFHKIMM (CT VBINFO) $ ULK EVENT R01 SS7 AINBLUES $
 .  .  . TABLE C7GTTYPE
 .  .  . AINBLUES ANSI7 11 $
 .  .  . TABLE IBNFEAT
 .  .  . TUPLE NOT FOUND
 .  .  . TABLE C7GTT
 .  .  . AINBLUES 6136672001 6136672001 PCSSN (SIMTOOL_RTESET SIMTOOL 0) $ SSN
AIN Orig Attempt TDP: trigger criteria met.
NOT querying database, AIN00006 AIN SOC Option is IDLE.
TABLE NCOS
RESG200 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
RESG200 NXLA RXCMN200 RESGSTAR 0 RES
TABLE DIGCOL
RES specified: RES digit collection
TABLE IBNXLA: XLANAME RXCMN200
TUPLE NOT FOUND
Default from table XLANAME:
RXCMN200
    (NET N N 0 N NDGT N Y GEN ( LATTR 262 613_EAP1_262 L613_LATA1_0)
    (EA NILC Y 0) $ $)$ 9
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
262 1FR NONE NT 0 0 NILSFC 0 NIL NIL 00 613_EAP1_262 L613_LATA1_0 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_EAP1_262 FR01 613 EAP1 TOPS Y RESG200 0 0 $
```

Figure 24-5 TRAVER example—AIN00006 SOC option IDLE

```
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE STDPRTCT
EAP1 ( 1) ( 0) 3
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . 61 69 N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 436) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 6137 6139 HNPA 0
 . 722 722 DN 613 722
TABLE TOFCNAME
613 722 $
TABLE DNINV
613 722 4444 H 107 2
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE HUNTGRP
107 613 7224442 DNH N N N RCVD N N N N N N 100 $
TABLE HUNTMEM
107 2 N D 7224444 N
LNP00100 SOC Option is IDLE.
LNP Info: Called DN is resident.
LNP Info: Called DN has native NPANXX.
LNP Info: HNPA results are used.
TABLE LCASCRCN
613 L613 ( 44) OPTL N N
 . SUBTABLE LCASCR
 . 613 613
TABLE LCASCRCN
613 L613 ( 44) OPTL N N
 . SUBTABLE LCASCR
 . 722 722
TABLE PFXTREAT
OPTL NP Y NP UNDT
```

Figure 24-5 TRAVER example—AIN00006 SOC option IDLE

```
TABLE CLSVSCRC
AIN Info Collected TDP: no subscribed trigger.
TABLE TRIGGRP
CDPCODE INFOANAL
 . CDPCODE ( DG CDPDIG)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
 . CDPCODE ( DG CDPTRAF)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
Checking AIN LNP Trigger Items as LNP is compatible with current call
AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


AIN Orig Attempt TDP: trigger criteria met.
NOT querying database, AIN00006 AIN SOC Option is IDLE.

DIGIT TRANSLATION ROUTES

1 LINE                  6137224444         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

The following figure shows a TRAVER output with LNP00100 SOC option ON.

Figure 24-6 TRAVER example—LNP SOC option ON

```
>traver l 6136631021 4164631021 b
TABLE IBNLINES
HOST 00 1 11 09 0 DT STN RES 6631021 404 613_PUB_404 L613_LATA1_0 613 $
TABLE LINEATTR
404 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_PUB_404 L613_LATA1_0 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PUB_404 NSCR 613 PUB TSPS Y RESG613 0 0 $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG613 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
RESG613 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
RESG613 NXLA RX613 RESGSTAR 0 RES
TABLE DIGCOL
RES specified: RES digit collection
TABLE IBNXLA: XLANAME RX613
TUPLE NOT FOUND
Default from table XLANAME:
RX613
    (NET N N 0 N NDGT N Y GEN ( LATTR 414 613_EAP1_414 L613_LATA1_0)
    (EA NILC Y 0) $ $)$ 9
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
414 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_EAP1_414 L613_LATA1_0 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_EAP1_414 NSCR 613 EAP1 TSPS Y RESG613 0 0 $TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE STDPRTCT
EAP1 ( 1) ( 0) 3
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
. 41 42122 N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
```

Figure 24-6 TRAVER example—LNP SOC option ON

```
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 436) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 416463102 4164631092 FRTE 730
 . SUBTABLE RTEREF
 .  730 T OFRT 730
 .  . TABLE OFRT
 .  .  730 S D C0C1_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
TABLE LCASCRCN
613 L613 ( 44) OPTL N N
 . SUBTABLE LCASCR
 . 416 416
TABLE LCASCRCN
KEY NOT FOUND
LCASCRCN TUPLE MISSING
AIN Info Collected TDP: no subscribed trigger.
TABLE TRIGGRP
CDPCODE INFOANAL
 . CDPCODE ( DG CDPDIG)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
 . CDPCODE ( DG CDPTRAF)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
Checking AIN LNP Trigger Items as LNP is compatible with current call
 .  . TABLE OFCTIID
 .  . 4 L416463 ON
 .  . TABLE TRIGITM
 .  . 4 L416463 LNP (DG 416463) (ESCEA ) (ESCOP ) (ESCDN ) $ ULK EVENT R01 SS7
 .  .     AINBLUES $
 .  .  . TABLE C7GTTYPE
 .  .  . AINBLUES ANSI7 11 $
 .  .  . TABLE C7GTT
 .  .  . AINBLUES 4164631021 4164631021 PCSSN (SIMTOOL_RTESET SIMTOOL 0) $ SSN
AIN Info Analyzed TDP: trigger criteria met.
Querying the database.
+++ TRAVER: SUCCESSFUL CALL TRACE +++
AIN Info Analyzed TDP: trigger criteria met.
Querying the database.
LNP Info: Displaying pre-query translations result.
LNP Info: It is used if the database indicates the called DN is non-ported
DIGIT TRANSLATION ROUTES
1 C0C1_ISUPITOG         4164631021         ST
TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

The following figure shows a TRAVER output with LNP SOC option IDLE.

Figure 24-7 TRAVER example—LNP SOC option IDLE

```
>traver l 6136631021 4164631021 b
TABLE IBNLINES
HOST 00 1 11 09 0 DT STN RES 6631021 404 613_PUB_404 L613_LATA1_0 613 $
TABLE LINEATTR
404 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_PUB_404 L613_LATA1_0 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PUB_404 NSCR 613 PUB TSPS Y RESG613 0 0 $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG613 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
RESG613 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
RESG613 NXLA RX613 RESGSTAR 0 RES
TABLE DIGCOL
RES specified: RES digit collection
TABLE IBNXLA: XLANAME RX613
TUPLE NOT FOUND
Default from table XLANAME:
RX613
    (NET N N 0 N NDGT N Y GEN ( LATTR 414 613_EAP1_414 L613_LATA1_0)
    (EA NILC Y 0) $ $)$ 9
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
414 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_EAP1_414 L613_LATA1_0 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_EAP1_414 NSCR 613 EAP1 TSPS Y RESG613 0 0 $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE STDPRTCT
EAP1 ( 1) ( 0) 3
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
. 41 42122 N NP 0 NA
 . SUBTABLE AMAPRT
```

Figure 24-7 TRAVER example—LNP SOC option IDLE

```
. SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 436) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 416463102 4164631092 FRTE 730
 . SUBTABLE RTEREF
 .  730 T OFRT 730
 .  . TABLE OFRT
 .  .  730 S D C0C1_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP00100 SOC Option is IDLE.
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
TABLE LCASCRCN
613 L613 ( 44) OPTL N N
 . SUBTABLE LCASCR
 . 416 416
TABLE LCASCRCN
KEY NOT FOUND
LCASCRCN TUPLE MISSING
AIN Info Collected TDP: no subscribed trigger.
TABLE TRIGGRP
CDPCODE INFOANAL
 . CDPCODE ( DG CDPDIG)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
 . CDPCODE ( DG CDPTRAF)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
Checking AIN LNP Trigger Items as LNP is compatible with current call
 .  . TABLE OFCTIID
 .  . 4 L416463 ON
 .  . TABLE TRIGITM
 .  . 4 L416463 LNP (DG 416463) (ESCEA ) (ESCOP ) (ESCDN ) $ ULK EVENT R01 SS7
 .  .     AINBLUES $
 .  .  . TABLE C7GTTYPE
 .  .  . AINBLUES ANSI7 11 $
 .  .  . TABLE C7GTT
 .  .  . AINBLUES 4164631021 4164631021 PCSSN (SIMTOOL_RTESET SIMTOOL 0) $ SSN
AIN Info Analyzed TDP: trigger criteria met.
LNP00100 SOC Option is IDLE.  NOT querying database
+++ TRAVER: SUCCESSFUL CALL TRACE +++
DIGIT TRANSLATION ROUTES
1 C0C1_ISUPITOG         4164631021         ST
TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

24.2.4 LNP00300 option

Base LNP functionality is controlled by the SOC option LNP00100. When this option is in the IDLE state, all LNP functionality is bypassed. When in the ON state, the switch is able to encounter the LNP trigger, launch an LNP query, and encounter LNP specific translations. A similar mechanism is required to separate the Canadian market specific functionality from the base LNP functionality. This SOC option is a controlled option, dependent upon the state of the LNP00100 option.

There are two valid states which option LNP00300 may be in, ON and IDLE. In the ON state, a Boolean indicator is set to TRUE, indicating Canadian specific functionality may be executed, if applicable to the given call scenario. In the IDLE state, the boolean indicator is set to FALSE, indicating Canadian specific functionality is to be bypassed, regardless of whether the call scenario dictates this functionality is to be encountered. This option does not implement any Canadian-specific LNP functionality. This feature is only intended to provide the mechanism by which Call Processing code may determine if LNP specific functionality is to be executed.

24.2.5 SOC NPE00005

Thousand Block Number Pooling support is controlled by the NPE00005 option. When this option is in the IDLE state, functionality controlled under option NPE00005, including Servord interface prompting, and new LNP feature interactions will not be encountered. When this option is ON, any functionality specific to the Thousands Block Number Pooling development will be encountered if the given call scenario or provisioning scenario indicates it is appropriate to do so.

This option will be dependent upon the state of the LNP00200 SOC option in a manner such that the NPE00005 option may not be activated unless the LNP00200 option is active. Similarly, the LNP00200 option may not be deactivated unless the NPE00005 option has been deactivated.

There are only two valid, stable states which option NPE00005 may be in, namely ON and IDLE. The option will support the transition to and from both states.

In the ON state, functionality specific to Thousands Block Number Pooling may be executed, if applicable to the given call scenario.

In the IDLE state, functionality specific to Thousands Block Number Pooling is to be bypassed, regardless of whether the call scenario dictates that this functionality is to be encountered.

The IDLE2ON transition will perform the steps necessary to activate the functionality.

The ON2IDLE transition will perform the steps necessary to deactivate the functionality. Users will be warned of any impacts.

25 Datafilling for triggers

ATTENTION
The provisioning of E911 and other services requiring dedicated trunks depends on NPA NXX distribution.

This chapter describes datafill that allows triggering to occur.

25.1 Overview

The following assumptions are made:

- The call type criterion is optional for all noted trigger types. When this criteria is not specified, both voice and data calls trigger.
- The action information [action (EVENT), protocol (TCAP), message set (R01), transport (SS7), GTT (LNPGTT), and GTSOURCE (DFLT)] for all examples is the same.

  Note 1: LNPGTT is used for illustration purposes only. The field GTT should represent the corresponding tuple in table C7GTTYPE. All other values shown are constants.

  Note 2: SS7 is the SSP interface to the off-board processor. Subsection "Datafill SS7 message routing", described in section "Common trigger datafill", must be completed.

- The triggering messages sent to the off-board processor are correct.

Note: The Query parameter population is not covered by this release of the document.

25.2 Call type criterion

Call type (CT) is an optional parameter. It is normally not specified for LNP so that both voice and data can trigger. For more information on this parameter, refer to *NA DMS-100 Translations Guide*, 297-8003-350.

25.3 10-digit unconditional LNP trigger (PORT option)

The PORT option allows 10-digit unconditional LNP triggering for a directory number (DN).

During the porting of a DN, the DN can exist on both donor and recipient switches at the same time. The assignment of the PORT option to a DN on a donor or recipient switch allows calls to the porting DN to trigger at LNP and query the SCP for routing information.

For a DN with the PORT option assigned, there must be at least one tuple in table TRIGGRP with a trigger type of LNP, and at least one tuple in table TRIGDIG where a digits criterion match occurs for that DN.

If a call is made to a DN with the PORT option assigned and the call matches the LNP trigger criteria then the ESCDN trigger criteria (if any) is bypassed and the SSP sends an LNP query.

For DN types that are provisionable through SERVORD, assign the PORT option to the DN as follows:

- use the NEWDN/NEW command at the time of creation
- use the ADO command to add PORT to an existing DN
- use the DEO command to delete PORT from a DN.

Note 1: When the SERVORD utility deletes the DN definition, it automatically deletes the corresponding PORT option assignment in table DNFEAT.

Note 2: After the DN successfully ports (SCP data is updated), remove the PORT option.

Note 3: The PORT option is required on both the primary DN as well as the SDN (TEEN) number when porting a line that also has a SDN number assigned.

Use the table editor for DN types that are not provisionable through SERVORD. Assign the PORT option to the DN as follows:

- use the ADO command to assign PORT
- use the DEO command to delete PORT

Note: After the DN successfully ports, remove the PORT option.

The following is an example of PORT option assignment with the output of the QDN.

Figure 25-1 Example of PORT option assignment with QDN output

```
>ADO
$ 6631001
>OPTION:
>port
OPTION:
>$COMMADN AS ENTERED:
ADO NOW 98 1 27 AM 6631001 ( PORT ) $
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT
>y
qdn 6631001
----------------------------------------------------
DN: 6631001
TYPE: SINGLE PRTY LINE
SNPA: 613 SIG: DT LNATTIDX: 401
LINE EQUIPMENT NUMBER: HOST 05 0 06 24
LINE CLASS CODE: 1FR
CARDCODE: 6X17AC GND: N PADGRP: NPDGP BNV: NL MNO: N
PM NODE NUMBER: 131
PM TERMINAL NUMBER: 217
OPTIONS:
DGT PORT
OFFICE OPTIONS:
AIN OFCTRIG U3WC
```

For a DN on the donor switch, updates to tables TRIGDIG and TRIGGRP are not needed.

25.4 DN compatibility

The following types of DN selectors are not supported:

- A
- ACDTK
- AL
- AVMM
- AVR
- C

The following table shows PORT compatibility to LCC.

Table 25-1 Port to LCC compatibility

Line class code	Compatible?
1FR,1MR:	Yes
RES:	Yes
IBN:	Yes
2FR-4FR:	Yes
CSD:	Yes
ISDNKSET:	Yes
DATA-PDATA:	Yes
WATSLCC: (OWT, INW, 2WW, EOW, ETW)	No
COIN LCC: (CCF, CDF, CFD, CSP)	Yes
PBX LCC:	Yes
TWX LCC:	No
ZMD, ZMZPA:	Yes
PBM:	Yes
PSET (M5009, M5112, M5209, M5212):	Yes

25.5 Assignability

Not applicable

25.6 Option prerequisites

There are no prerequisites for the PORT option.

25.7 Prompts

There are no new system prompts introduced for the PORT option.

26 SS7 datafill

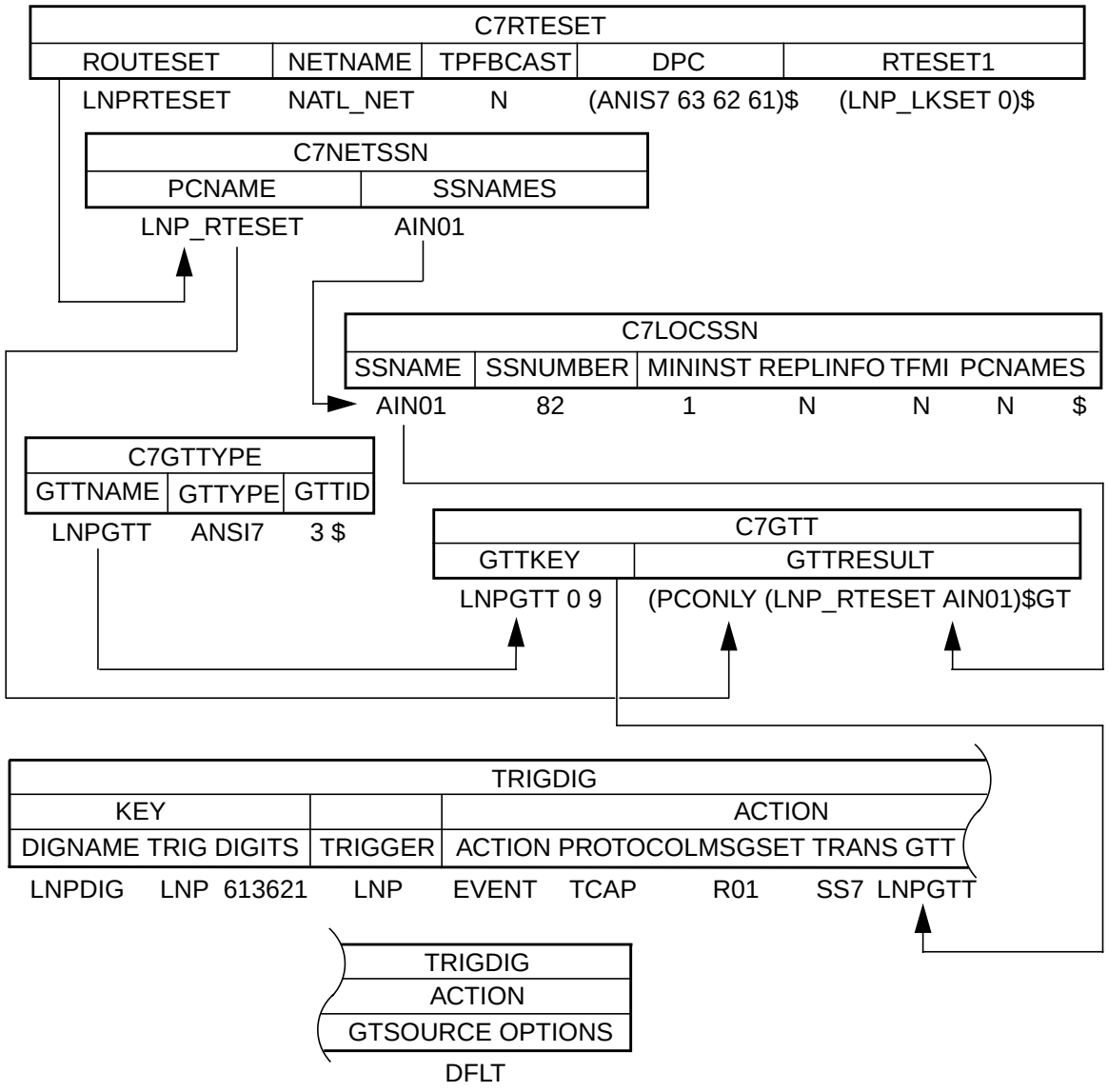
The AIN Essentials/LNP SSP can interface to the off-board processor through Signaling System Number 7 (SS7) or through the Transmission Control Protocol/Internet Protocol (TCP/IP). Interface by TCP/IP is not covered in this document. The examples given in the following triggering sections use the SS7 transport for queries and responses.

To use the SS7 transport, the following must occur:

- the TRANSPRT field of the DIGNAME or INFONAME defined in table TRIGDIG must be set to SS7
- a global title (GT) must be defined in the SS7 message routing tables before it can be referenced from table TRIGDIG

The following figure is a datafill example that illustrates the relationship between message and routing tables.

Figure 26-1 SS7 routing table dependencies — LNP



Note 1: Datafill shown is an example. Consult local procedures for possible datafill.
Note 2: Table TRIGDIG is shown for illustration purposes only to indicate the global title source.

Global title (GT) translation is used by the AIN Essentials/LNP SSP to perform message routing translations for sending query messages to the off-board processor. There are several data tables that are used by the SSP to store GT information. Because these tables are provided by existing software

and are not altered for AIN Essentials/LNP, they are described briefly in the following table.

Table 26-1 Tables used by the SSP to store GT information

Data table	Description
C7LOCSSN	Local subsystem table: This table specifies a local subsystem name and number for an LNP SCP application. For the LNP application on the SSP, use subsystem name, AIN01.
C7RTESET	SS7 Route Set table: This table associates link sets and routes logically to define a signaling point in the network to which signaling information is carried. The destination point code (DPC) in table C7RTESET specifies the unique address of signaling point LNP_RTESET in the network.
C7NETSSN	Network Subsystem Routing table: This table provides the set of remote point code and subsystem identifiers at the remote point code, where messages are routed by the signaling connection control part (SCCP) of the SS7 protocol. The point code in this table must be datafilled in C7RTESET. Because ACG List Overflow functionality requires return of a UDT message, Table C7NETSSN must be datafilled with the remote SSN of the SCP application and an SSP route sent to the SCP.
C7GTTYPE	Global Title Translation Type table: This table provides the mapping of the user-defined symbolic global title translation name (GTTNAME) to a network defined global title translation type number (GTTNUM). The translation type number specifies the numbering plan (for example, Implicit, ISDN) and an encoding scheme such as binary-coded decimal (BCD) that is used to map the GT to an SS7 network address.
C7GTT	Global Title Translation table. This table maps the GT of a particular translation type to an SS7 network address used to route the message to its destination. The GT is an application address, such as the dialed digits. The digits for LNP are taken from the GT source and datafilled in table TRIGDIG. The translation type is derived from table C7GTTYPE using the GTTNAME. The GTTNAME is datafilled for LNP in table TRIGDIG. The GTTRSLT specifies the network address, and can be one of the following: PC only, SSN only, PC and SSN, PC and New GT, or Error. The GTTRSLT indicates if further translation at subsequent nodes is required. ***Note:*** For related information on SS7 tables used by LNP, see *DMS SuperNode Common Channel Signaling 7 Translations Guide,* 297-5151-350, for related information.

27 LNP trigger provisioning

The 3- to 10-digit LNP trigger type occurs at the Analyzing Information (INFOANAL) points in call in the originating call model.

This trigger operates on an office basis and is applicable to any facility with access to the Public Office Dialing Plan.

The triggering number used to determine whether or not a call matches the digits criteria is always based on a 10-digit national number. If the user dials 7 digits, the NPA is automatically added in front of the number so that the call triggers based on 10 digits (provided that table FNPA7DIG is datafilled correctly).

The triggering digit criterion is specified in 3- to 10-digit patterns, that is, NPA, NPAN, NPANX, NPANXX, NPANXXX, NPANXXXX, NPANXXXXX, and NPANXXXXXX. Only when the triggering number matches the digit criterion datafilled in table TRIGDIG does a call trigger. If the user is a private facility agent that dials a number in a private dial plan (for example, extension dialing), this trigger cannot be encountered.

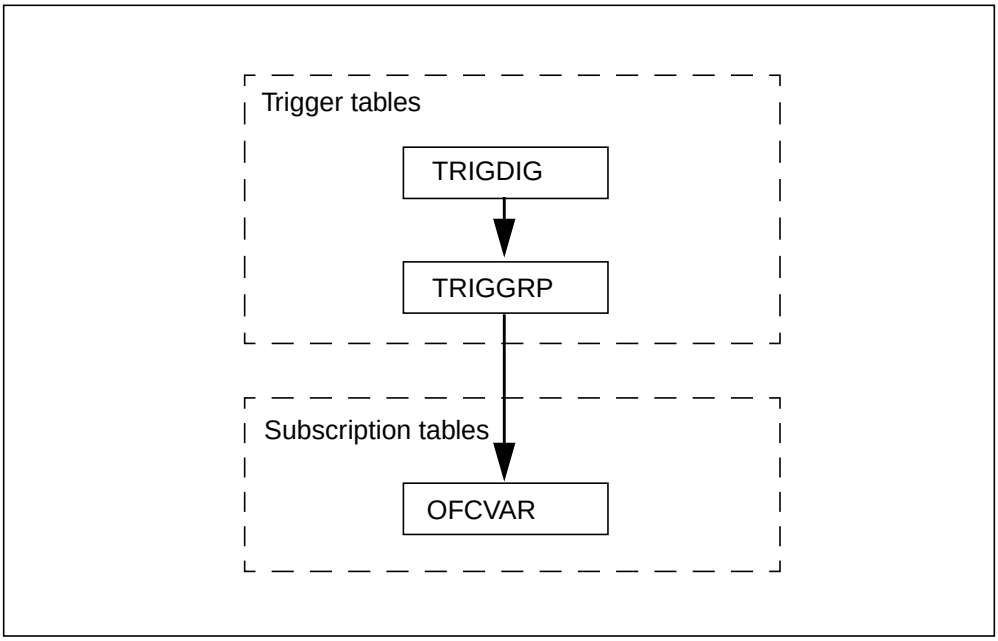
27.1 Datafill for LNP trigger

Note 1: It is assumed that proper trigger datafill and TCAP routing are in place in order to launch a query.

Note 2: If the STS of the originating party has the 'ARS' option in table HNPACONT, the LNP trigger and the DN residency check are bypassed.

The following figure shows the datafilling steps required for the LNP trigger.

Figure 27-1 LNP trigger datafill



27.1.1 Step 1: Datafill table TRIGDIG

The DG criterion is mandatory for the LNP trigger type. A DIGNAME must be datafilled in table TRIGDIG before it can be referenced from table TRIGGRP to specify the DG criterion. A DIGNAME indicates addressing information based on dialed digits and the action to be performed by the SSP when the digits (DG) criterion is met.

The key consists of a DIGNAME, the trigger type, and the dialed digits.

To datafill table TRIGDIG:

1. In response to the DIGNAME prompt, enter the DIGNAME being used in table TRIGGRP.
2. In response to the TRIGGER prompt, enter LNP to specify the trigger name to which the DG criterion applies.
3. For the LNP trigger type, the DG criterion is based on the translated digits, that is, the dialed digits that were translated into the LNP format. For example, if the dialed digits are 6211171, the digits to enter in the DIGITS field are 613621.

   A DG match is defined as the most specific match. For example, if the dialed digits are 6137225998 and the datafilled digits are 613, 613722, and 6137225998, the entry with the most specific digits 6137225998 matches.

4. In response to the second TRIGGER prompt, enter LNP. The value in this field must be the same as the trigger name used in the key field.
5. In response to the (optional) OPTION field prompt, apply the default routing (DFLTRT) option. Refer to the “Datafill default routing” section in this chapter for more information on datafilling this option.

Assumptions regarding the datafill for the ACTION field in all triggering examples are described in the "Overview" on page 1, and "Datafilling for triggers" on page 1 of this chapter.

27.1.2 Step 2: Datafill table TRIGGRP

An AINGRP that contains the LNP trigger must be defined in table TRIGGRP before it can be referenced in any subscription table.

Table TRIGGRP is keyed on the trigger group name and on the trigger detection point (TDP). Create a name for the AINGRP (up to 16 characters). The TDP for the LNP trigger type must be INFOANAL.

Note 1: All examples in this document are limited to a one trigger-one response case and, for simplicity, an AINGRP always contains only one trigger. For the office basis trigger type, it is likely that an AINGRP would contain all the office basis trigger types (LNP, N11, and PODP.)

Note 2: If an office-wide trigger group already exists, add the LNP trigger to that group.

Note 3: It is recommended that the digits (DG) criteria be datafilled first since it is only when a digits criteria is matched that a trigger occurs. For example, datafill table TRIGGRP in the following order: DG, ESCDN, ESCEA, ESCOP, ESCCN.

To datafill table TRIGGRP, perform the following steps.

1. In response to the TRIGGER prompt, enter LNP.
2. In response to the CRITERIA prompt, enter the applicable criteria for the LNP trigger:
   a. Digits (DG) criterion: This criterion is mandatory for the LNP trigger. When the DG criterion is specified, a prompt for the DIGNAME follows. In response to the DIGNAME prompt, enter the DIGNAME defined in Step 1: To datafill table TRIGDIG
   b. Escape DN (ESCDN) criterion: This criterion is optional, but datafilling it is recommended. When specified, the LNP does not trigger if the call is to a DN that resides on the switch.
   c. Escape Equal Access (ESCEA) criterion: This criterion is optional, but datafilling it is recommended. When specified, the LNP trigger does not trigger if the call is an Equal Access call.

d. Escape Operator (ESCOP) criterion: This criterion is optional, but datafilling it is recommended. When specified, the LNP trigger does not trigger if the call is going to an operator.

e. Escape Coin (ESCCN) criterion: This criterion is optional, but datafilling it is recommended. Adding this criterion restricts which coin-originated call types (DD, DD_OA, OA, NP) trigger. Use the DD_OA option with LNP.

f. Call type (CT) criterion: This criterion is optional. It is normally not specified for LNP so that both voice and data can trigger. For more information on this parameter, refer to *DMS-100 Translations Guide*, 297-8003-350.

Note: For examples of how these criteria are datafilled, refer to the datafill criteria in table TRIGGRP. When all desired criteria are entered, enter a "$" (dollar sign) at the CRITERIA prompt.

3. In response to the INFONAME prompt, enter NIL.

27.1.3 Step 3: Datafill table OFCVAR

Subscription to a LNP AINGRP is done for an entire office. The AINGRP defined in Step 2 can be assigned to the office parameter AIN_OFFICE_TRIGGRP in table OFCVAR, (through table editor). After AIN_OFFICE_TRIGGRP is assigned a trigger group and LNP is active in the office (that is, LNP00100 SOC option is ON), LNP triggers subscribed by the office are applied to all calls.

Note 1: The parameter AIN_OFFICE_TRIGGRP can only be set to one office trigger group.

Note 2: Changing table OFCVAR requires setting RWOK to ON.

Note 3: If an office-wide trigger already exists, add the LNP trigger to that group.

The following table shows the highlights of steps 1 to 3 with the trigger definition and subscription tables for the LNP trigger type.

Table 27-1 Trigger definition and subscription tables (Sheet 1 of 2)

TDP	Trigger type	Criteria	Definition tables	Definition tables	Subscription tables	Option	SERVORD
INFOANAL	LNP	CT ESCDN ESCEA ESCOP ESCCN	TRIGGRP	Office	OFCVAR	N/A	no

Table 27-1 Trigger definition and subscription tables (Sheet 2 of 2)

TDP	Trigger type	Criteria	Definition tables	Definition tables	Subscription tables	Option	SERVORD
		DG	TRIGDIG				

The following table shows the sample DIGNAME LNPDIG definition in table TRIGDIG**.**

Table 27-2 Sample DIGNAME LNPDIG definition in table TRIGDIG

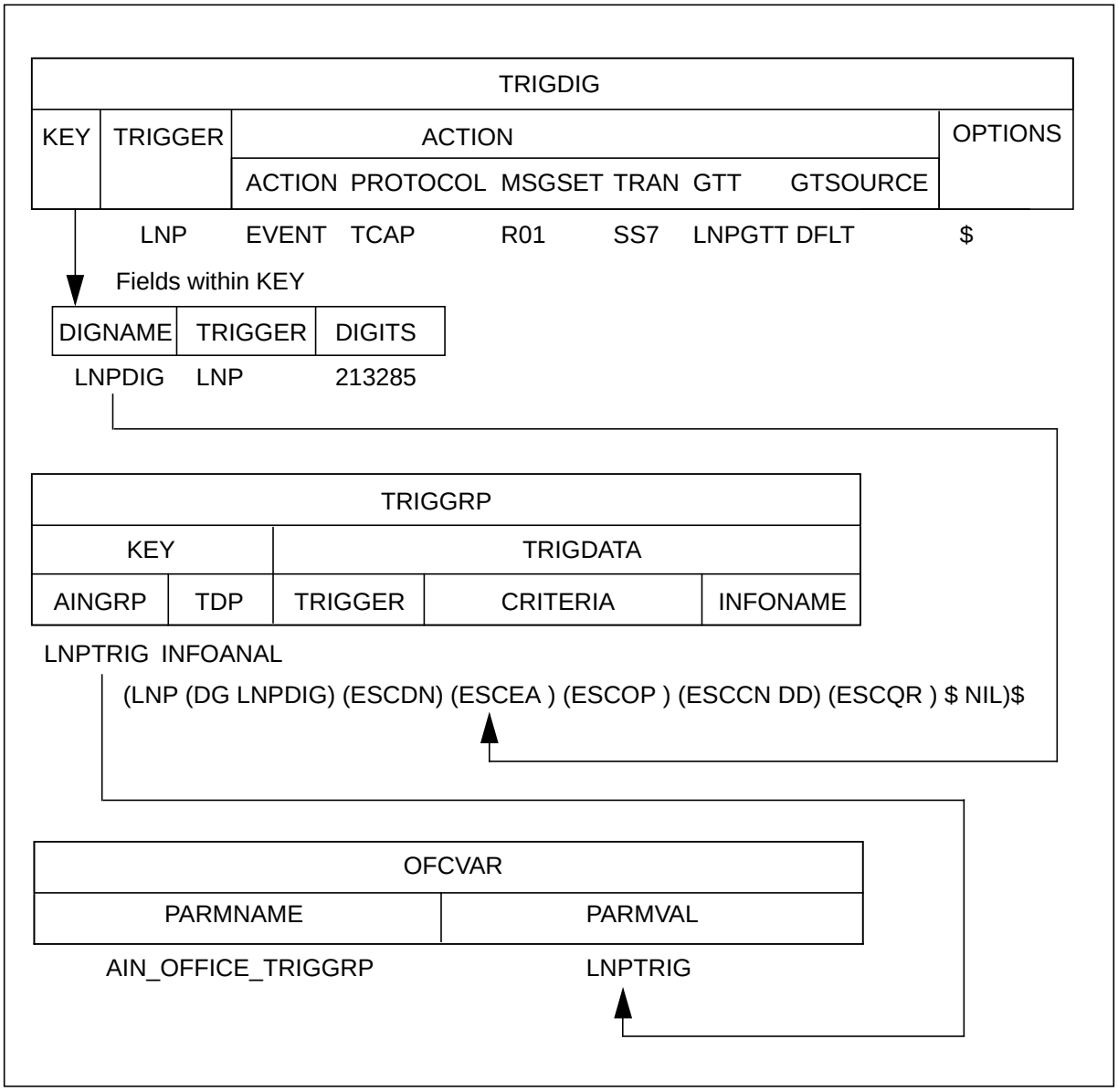
DIGNAME	TRIGGER	DIGITS	TRIGGER	ACTION	OPTION
LNPDIG	LNP	213285	LNP	EVENT TCAP R01 SS7 LNPGTT DFLT	$

27.1.4 Step 4: Verifying with TRAVER

Once the datafill is set up for the LNP trigger, TRAVER can be used to verify LNP triggering.

The following figure illustrates the datafill for this sample call. It also shows the dependencies between the datafilling tables. Apply the instructions already outlined in steps 1 to 3 to add the sample tuples shown in the following figure. Verify the datafill with TRAVER.

Figure 27-2 From a line (DN 7225028), dial 92132850000, where 9 is a public environment access code. The call triggers at LNP and queries the database.



27.1.5 Deletion of a tuple from table TRIGDIG

Tuples in table TRIGDIG can be deleted. This usually results from scheduled daily audit checks.

Note: Deletion of a tuple from table TRIGDIG is blocked if the DIGNAME/TRIGGER combination being deleted is referenced by an existing tuple in table TRIGGRP.

A table can be updated with the AIN Trigger Item Transition Tool (AINTITT). This tool provides a means to automatically convert the office wide triggers from the trigger group datafill to a functionally equivalent set of trigger items in table TRIGITM and OFCTIID. The AINTITT tool uses TOOLSUP as a method of controlling and restricting access. For more information on table TRIGITM see the section “Table TRIGITM” in chapter “LNP Trigger”.

In table TRIGGRP, following the deletion of the TRIGGRP tuple, deleted tuples are stored until two table audits are completed.

If

- the DIGNAME/TRIGGER combination being deleted is referred to by a deleted TRIGGRP tuple and,
- the DIGNAME does not appear elsewhere in table TRIGDIG,

the deletion of the TRIGDIG tuple is blocked.

Suitable error messages are displayed indicating the reason for denial of the deletion. Various error messages follow.

If

- the DIGNAME/TRIGGER combination being deleted is referred to by a deleted TRIGGRP tuple and,
- the DIGNAME/TRIGGER combination does not appear elsewhere in the table, but the DIGNAME appears in table TRIGDIG,

the deletion of the TRIGDIG tuple is allowed.

Suitable error messages are displayed indicating the reason for denial of the deletion. Suitable warning messages follow.

For more information, refer to *Advanced Intelligent Network Essentials Service Implementation Guide*, 297-5161-021.

27.2 Datafill for default routing

Default routing for LNP fault handling (as specified in the Bellcore specification), requires that LNP default routing route the call to the donor switch. Nortel provides this functionality by routing on the dialed DN to the donor switch. This is accomplished by using option DFLTRT DN $ in table TRIGDIG. See Section "27.2.1. TRIGDIG examples" on page 9 for more information.

Nortel enhanced this functionality by providing default routing for:

- another DN
- an announcement
- an announcement followed by a DN

Default routing procedures are provided for the following errors:

- signaling connection control part (SCCP) routing (error indicated by the receipt of an SCCP return on error message)
- T1 timer expiry
- Automatic Call Gapping (ACG)
- fatal application and protocol

Default routing can be subscribed on a per trigger basis by using the options field in table TRIGDIG. Datafill this field with DFLTRT to subscribe a trigger to default routing. The fields that are associated with DFLTRT are as follows:

- DN: This field indicates that the call can route to the DN specified. If this field is datafilled, field DN applies.

  The digits field can contain a DN of 3, 7, or 10 decimal digits, on which the call routed can be based. If no digits are required, enter a "$" (dollar sign) in place of the digits. A continue then occurs based on the original digits dialed. This option provides the base donor switch default routing functionality.

- ANN: This field specifies that an announcement can be played once default routing applies. If this field is datafilled, field ANNIDX applies.

  This field also indicates to play the index of the announcement in table AINANNS.

- ANNDN: If this field is datafilled, both ANNIDX and DN fields apply and must be datafilled.

After datafilling an option and its associated fields, the user is prompted for another option. To indicate that there are no more options, enter a "$" (dollar sign). Otherwise, more options are expected.

27.2.1 TRIGDIG examples

The following table shows examples of datafill for default routing in table TRIGDIG.

Table 27-3 Examples of table TRIGDIG datafill

Key	Trigger	Action	Options
LNPDIG LNP 613621	LNP	EVENT TCAP R07 SS7 LNPGTT DFLT	DFLTRT DN $
LNPDIG LNP 613621	LNP	EVENT TCAP R01 SS7 LRNGTT DFLT	DFLTRT ANN 34 $
LNPDIG LNP 819821	LNP	EVENT TCAP R01 SS7 LRNGTT DFLT	DFLTRT DN 6137211000 $
LNPDIG LNP 905963	LNP	EVENT TCAP R01 SS7 LRNGTT DFLT	DFLTRT ANNDN 34 6137221234 $
LNPDIG LNP 476473	LNP	EVENT TCAP R01 SS7 LRNGTT DFLT	DFLTRT ANNDN 34 $

The first tuple indicates that if default routing applies, the call is routed to the dialed DN. This is an example of the basic default routing functionality.

The second tuple indicates that when default routing is applicable for this trigger, the announcement at index 34 of table AINANNS is played. After the announcement ends, the call is sent to disconnect treatment (DISC).

The third tuple indicates that if default routing applies, the call is routed to the specified DN. A procedure similar to an Analyze_Route response with a Called Party Number is followed.

The fourth tuple indicates that an announcement is played. When the announcement completes, routing continues as described for the third tuple.

The fifth tuple indicates that an announcement is played. When the announcement completes, the call continues routing to the originally-dialed DN.

Note: A fifth default routing option, E911ESN, is present in table TRIGDIG. This option is not compatible with the LNP trigger.

27.2.2 Routing characteristics

Default routing allows call processing to continue as if a response was received from the SCP. It uses the same datafill setup that is required for routing in an Analyze_Route response. It also uses the same datafill setup that is required

for the playing of an announcement in a Send_To_Resource response. For more detailed information, refer to “Chapter 28: Datafilling for responses”.

27.3 Trigger item provisioning interface

For information on trigger item see the Advanced Intelligent Network Service Enablers Service Implementation Guide, 297-5161-022.

Starting with the NA009 release, the DMS SSP provides an alternative provisioning data interface. The new data interface supports provisioning for office-wide triggers. LNP is the only office-wide trigger considered in this documentation guide. For information on table TRIGITM and related tables for AIN, see the Advanced Intelligent Network Service Enablers Product Specification (NSS-AIN02-PS).

The term DMS Trigger Item Interface refers to this new provisioning interface. It is the Nortel implementation of trigger items and trigger item subscription as defined in Bellcore GR-1298. The term DMS Trigger Group Interface refers to the traditional AIN provisioning system.

Customers can choose which interface to use to provision and administer LNP triggers. The choice of trigger provisioning interface occurs at subscription time. Both the trigger group and trigger item interfaces can be provisioned independently. However, the data created by the two interfaces are mutually exclusive for a particular AIN subscriber at run time.

Since the office is viewed as a single subscriber, either the trigger group data or the trigger item data are in effect for the office at runtime.

The office parameter AIN_OFFICE_TRIGGRP in table OFCVAR maintains backwards compatibility with the DMS trigger group interface. If AIN_OFFICE_TRIGGRP is set to “TIID” the office-wide triggers are checked using the Trigger Item Provisioning Interface. Any value other than “TIID” implies that the DMS trigger group interface is in effect.

Note 1: Because TIID is a reserved trigger group name, it cannot be entered as a trigger group name in table TRIGGRP.

Note 2: Switching from one provision interface to another does not affect the underlying trigger provisioning data. However, this practice is not recommended.

The design of the Trigger Item Provisioning Interface is composed of table TRIGITM for the implementation of the trigger items. This table has the capacity to store 32,000 trigger item definitions or instances (that is, tuples).

Each trigger item consists of the following data:

- Trigger Item ID (for example, key)
- Trigger Criteria
- Trigger Type
- State
- Action
- Service Logic Host Route information (that is, Message Set, Transport, Global Title Translation)
- Options

The following sections describes the data fields in detail.

27.3.1 Trigger item identifier

Each trigger item definition is identified by means of a trigger item identifier (TIID), a two-part key which is formatted as follows:

- TDP (part 1) — <standard 2 digit number representing a trigger detection point (TDP)>
- Name (part 2) — <8-character alphanumeric string>

Because only office wide trigger types are supported, the TDP part is restricted to ‘4’ and ‘17’, which are the standard identifiers for Info_Analyzed and NETBUSY TDPs respectively.

Table TRIGITM automatically sorts all trigger items by TDP, followed by trigger type in order of runtime precedence. Trigger items of a given type appear in the order in which they were datafilled.

27.3.2 Trigger types

Trigger type of ‘LNP’ is used when provisioning a LNP trigger.

After a trigger item tuple has been entered into table TRIGITM, its corresponding TYPE field cannot be changed.

Table TRIGITM automatically sorts all trigger items by TDP, followed by trigger type in order of runtime precedence. Trigger items of a given type appear in the order in which they were datafilled.

27.3.3 Trigger criteria

The trigger item interface supports the same criteria as the trigger group interface. The criteria generally consist of following

The criteria are summarized in.

- a set of digits;
- call type and
- escape codes if applicable.

The criteria are summarized in the table below.

Table 27-4 Supported Criteria per Trigger Type

	Criteria		
Trigger Type	**Digits**	**Call Type**	**Escape**
LNP	NPA-NXX-XXXX		ESCCN (coin)
			ESCDN (resident DN)
			ESCEA (equal access)
			ESCOP (operator)

For more information on AIN trigger criteria, please refer to the AIN Product Specification, “Provisioning Guidelines” and “Provisioning”.

27.3.4 Digits

The digits are stored as part of the criteria in the trigger item definition. The digits criterion of an existing trigger item are modifiable (that is, the digits are allowed to be edited anytime).

However, this operation is potentially expensive in term of real time since all references to this trigger item must be updated to reflect the change. Therefore, it is recommended that the edit operations should be carried out during low traffic periods.

If any subscriber has subscribed to the trigger item being modified has also subscribed to a trigger item of the same trigger type whose digits match the modified digits (i.e the new digits), the digit modification operation is rejected.

27.3.5 Administrative State Code

The administrative state code (STATE) field is used to selectively enable and disable a trigger item. The setting affects all assignments referencing that trigger item.

The administrative state code (STATE) field supports the following value:

- LK-- (that is, LOCKED) this value deactivates a trigger item;
- ULK -- (that is, UNLOCKED) this value activates a trigger item.

The value of the Administrative State Code does not prevent the user from changing the activation state of any assignment.

27.3.6 Action

As in the DMS trigger group data model, the action field specifies the querying behavior of the SSP when the criteria for the corresponding trigger item has been satisfied. The Event value instructs the SSP to launch a query, whereas Escape prevents a query from being launched.

The Event value is applicable to LNP triggers. When the ACTION field is set to Event, service logic host route information is required, and so values for the following fields must be provided:

- MsgSet
- Transport
- GTT

When an ESCAPE is specified for the ACTION field, the service logic host route information is not required, and so the corresponding fields do not appear. Although the Options field is not required, it does appear on the command line, but only an empty value is accepted.

27.3.7 SLHR Fields

A number of fields dictate the routing details for launching a query when the criteria for the corresponding trigger item have been satisfied (the action field must also be set to Event in table TRIGITM). These fields (that is, Message Set, Transport and Global Title Translation) are collectively known as the service logic host route (SLHR).

The following fields make up the Service Host Logic Route information:

- Message set: R01: AIN Service Essentials
- Transport: supports SS7.
- Global Title Translation: the Global Title name is used to determine which translator is used on the node to perform translations based on the Global Title address.

27.3.8 Options

LNP trigger items support default routing (DFLTRT).

27.3.9 TRIGITM Example

The following datafill examples illustrate the provisioning concept for LNP trigger items on the DMS. Table TRIGITM automatically sorts all trigger items by TDP, followed by trigger type in order of runtime precedence. Trigger

items of a given type (for example, LNP) appear in the order in which they were datafilled.

Table 27-5 Sample datafill for table TRIGITM

KEY		Trigger				SHRL			
TDP	Name	Trigger	Criteria	State	Action	MsgSet	Transport	GTT	Options
4	LNPTRG1	LNP	(DG 613722) (ESCEA) (ESCOP) (ESCDN) $	ULK	EVENT	R02	SS7	GTT1	$
4	LNPTRG2	LNP	(DG 613711)	ULK	ESCAPE				$

27.3.10 TRAVER examples

Please refer to the Translation verification (TRAVER) tool section in this document for LNP TRAVER examples with TRIGITM.

27.3.11 Provisioning of LNP Trigger Item Assignments: OFCTIID

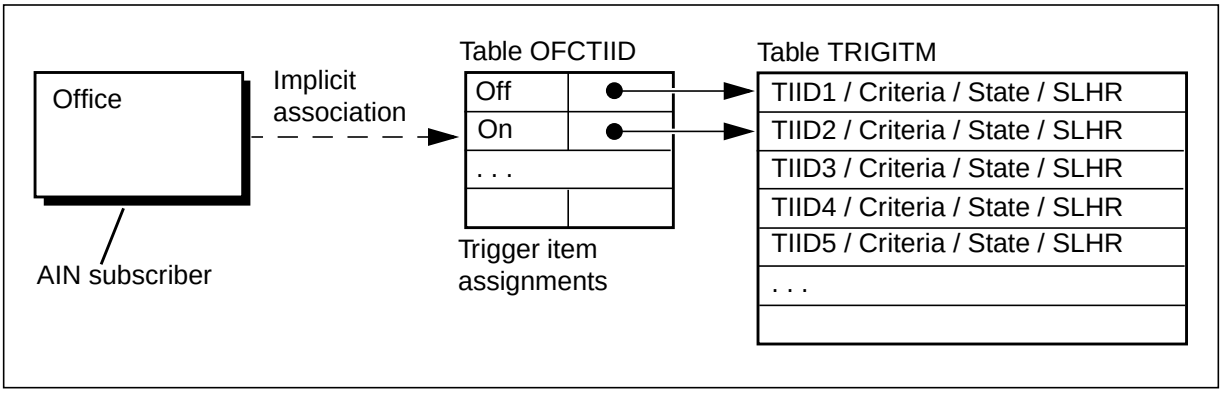
A trigger item assignment involves the following:

- Assignment of the trigger items to a specific subscriber.
- Selection of the DMS Trigger Item Interface.

OFCTIID stores assignments to office wide-trigger (for example, LNP) items. The figure below shows the relationship between the office and its trigger item assignment data.

Relationship Between an AIN Subscriber and LNP Trigger Item Data

Figure 27-3 Relationship Between an AIN Subscriber and Trigger Item Data



27.3.11.1 Enabling Office-wide Trigger Item Assignments

Office wide trigger (for example, LNP) item assignments are enabled when the AIN_OFFICE_TRIGGRP office parameter is set to ‘TIID’ - a reserved name that acts as a datafill selector. Conversely, trigger group data is in effect if AIN_OFFICE_TRIGGRP is set to a valid trigger group name (any name defined in table TRIGGRP) other than ‘TIID’.

> ***Note:*** When AIN_OFFICE_TRIGGRP is set to ‘TIID’ office wide triggers provisioned using the Trigger Group Provisioning Interface is not encountered. Triggers to be used under the Trigger Item Provisioning Interface should be provisioned before setting the value of AIN_OFFICE_TRIGGRP to ‘TIID’. Switching from one provisioning interface to another does not affect the underlying trigger provisioning data. However, this practice is not recommended.

AIN_OFFICE_TRIGGRP is defined in table OFCVAR.

27.3.11.2 Provisioning Office Wide Trigger Item Assignments: OFCTIID

Table OFCTIID is implemented to administer the assignments to office wide trigger items. The tuples in OFCTIID consists of the following data fields:

- Activation state code field (TRIGACT), one of the following values:
- KEY: the trigger item identifier that refers to a trigger item provisioned in table TRIGITM.
  - — ON: indicates that the assignment is enabled.
  - — OFF: indicates that the assignment is disabled.

27.3.11.3 Effect of the Activation State Code on Triggering

When an assignment to a trigger item is disabled (that is, the State field is set to OFF), the corresponding trigger item fails to trigger even if all of its criteria are met at run-time.

Criteria checking resumes with another trigger item assignment if one exists. In particular, if the trigger item which fails to trigger has digits criteria (for example, LNP), criteria checking resumes with a trigger item (or an escape item) of the same type whose digits are the next most specific match.

27.3.11.4 Operational Details

Table TRIGITM defines the trigger items. Assignments to LNP trigger items are stored in table OFCTIID. In terms of datafill sequence, an assignment to a LNP trigger item can only be performed after it is defined in table TRIGITM.

Normal DMS table operations such as add, delete, and replace can be performed on these tables.

All fields, except the key and the trigger type, can be modified in table TRIGITM.

In the case of the delete operation, a tuple is not allowed to be removed from the table if a dependency exists between another table. For example, tuple LNPTRG1 cannot be deleted from table TRIGITM if the tuple is used by table OFCTIID. The delete operation can potentially be expensive since a search most be perform before a tuple is allowed to be deleted from the table.

In the case of an add operation, fields which are used to reference tuples in another table, are checked to ensure that the corresponding tuple in that table is present (that is, referencing name/index is defined in the referenced table).

Both the trigger group and trigger item interfaces. However, the data for only one interface is in effect at run time for a given AIN subscriber (for example, office). The trigger group data for office wide triggers should be converted to the trigger item format before switching over from the trigger group interface. Currently a conversion tool (AINTITT) is implemented to automate the conversion of trigger group data to trigger item data only.

For information on Trigger Item and tools, see the Advanced Intelligent Network Service Enablers Product Specification (NSS-AIN02-PS).

27.4 Trigger administration

The following assumptions are made:

- The call type criterion is optional for all noted trigger types. When this criteria is not specified, both voice and data calls trigger.
- The action information [action (EVENT), protocol (TCAP), message set (R01), transport (SS7), GTT (LNPGTT), and GTSOURCE (DFLT)] for all examples is the same.

  Note 1: LNPGTT is used for illustration purposes only. The field GTT should represent the corresponding tuple in table C7GTTYPE. All other values shown are constants.

  Note 2: SS7 is the SSP interface to the off-board processor. Subsection “Datafill SS7 message routing”, described in section “Common trigger datafill”, must be completed.

- The triggering messages sent to the off-board processor are correct.

  Note: The Query parameter population is not covered by this release of the document.

27.4.1 Call type criterion

Call type (CT) is an optional parameter. It is normally not specified for LNP so that both voice and data can trigger. For more information on this parameter, refer to *DMS-100 Translations Guide*, 297-8003-350.

27.4.2 10-digit unconditional LNP trigger (PORT option)

The PORT option allows 10-digit unconditional LNP triggering for a directory number (DN).

During the porting of a DN, the DN can exist on both donor and recipient switches at the same time. The assignment of the PORT option to a DN on a donor or recipient switch allows calls to the porting DN to trigger at LNP and query the SCP for routing information.

For a DN with the PORT option assigned, there must be at least one tuple in table TRIGGRP with a trigger type of LNP, and at least one tuple in table TRIGDIG where a digits criterion match occurs for that DN.

If a call is made to a DN with the PORT option assigned and the call matches the LNP trigger criteria then the ESCDN trigger criteria (if any) are bypassed and the SSP sends an LNP query.

For DN types that are provisionable through SERVORD, assign the PORT option to the DN as follows:

- use the NEWDN/NEW command at the time of creation
- use the ADO command to add PORT to an existing DN
- use the DEO command to delete PORT from a DN.

Note 1: When the SERVORD utility deletes the DN definition, it automatically deletes the corresponding PORT option assignment in table DNFEAT.

Note 2: After the DN successfully ports (SCP data is updated), remove the PORT option.

Use the table editor to provision DN types that are not provisionable through SERVORD. Assign the PORT option to the DN as follows:

- use the ADO command to assign PORT
- use the DEO command to delete PORT

Note: After the DN successfully ports, remove the PORT option.

The following is an example of PORT option assignment with the output of the QDN.

Figure 27-4 Example of PORT option assignment with QDN output

```
>ADO
$ 6631001
>OPTION:
>port
OPTION:
>$COMMADN AS ENTERED:
ADO NOW 98 1 27 AM 6631001 ( PORT ) $
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT
>y
qdn 6631001
-------------------------------------------------
DN: 6631001
TYPE: SINGLE PRTY LINE
SNPA: 613 SIG: DT LNATTIDX: 401
LINE EQUIPMENT NUMBER: HOST 05 0 06 24
LINE CLASS CODE: 1FR
CARDCODE: 6X17AC GND: N PADGRP: NPDGP BNV: NL MNO: N
PM NODE NUMBER: 131
PM TERMINAL NUMBER: 217
OPTIONS:
DGT PORT
OFFICE OPTIONS:
AIN OFCTRIG U3WC
```

For a DN on the donor switch, updates to tables TRIGDIG and TRIGGRP are not needed.

27.4.3 DN compatibility

The following types of DN selectors are not supported:

- A
- ACDTK
- AL
- AVMM
- AVR
- C

The following table shows PORT compatibility to LCC.

Table 27-6 Port to LCC compatibility

Line class code	Compatible?
1FR,1MR:	Yes
RES:	Yes
IBN:	Yes
2FR-4FR:	Yes
CSD:	Yes
ISDNKSET:	Yes
DATA-PDATA:	Yes
WATSLCC: (OWT, INW, 2WW, EOW, ETW)	No
COIN LCC: (CCF, CDF, CFD, CSP)	Yes
PBX LCC:	Yes
TWX LCC:	No
ZMD, ZMZPA:	Yes
PBM:	Yes
PSET (M5009, M5112, M5209, M5212):	Yes

27.4.4 Assignability

Not applicable

27.4.5 Option prerequisites

There are no prerequisites for the PORT option.

27.4.6 Prompts

There are no new system prompts introduced for the PORT option.

28 Datafilling for responses

ATTENTION

The provisioning of E911 and other services requiring dedicated trunks depends on NPA NXX distribution.

This chapter describes the various LNP SCP responses associated with LNP.

Following an LNP query, the SSP expects to receive an AIN Essentials Analyze_Route or Disconnect response from the SCP.

Continue and Send_To_Resource (STR) response and conversation messages are not expected in response to an LNP query. Continue messages but are accepted and processed using existing AIN Essentials procedures. STR response messages cause the call to use default routing, if applicable. If default routing cannot be applied the call is routed to treatment. STR conversation messages cause a Resource Clear message to be returned to the SCP. If the SCP returns an STR conversation, the Analyze_Route following the STR undergoes LNP processing.

28.1 Response translations simplification

Response translations simplification is an optional SOC (AIN00026) that simplifies the response translations use of standard pre-translations.

For information on Response simplification translations, refer to *Advanced Intelligent Network Essentials Service Implementation Guide*, 297-5161-021.

28.2 Analyze_Route

The Analyze_Route response requests the SSP to resume call processing, taking into account the address, routing, and billing information provided in the message.

For purposes of routing the call through LNP processing, the only applicable parameter in the Analyze_Route response is the CalledPartyID. After the response is received, the CalledPartyID is analyzed to determine:

- whether it is the same as the dialed DN
- if it is the LRN of another switch (Foreign LRN [FLRN])
- if it is the LRN of this switch (Home LRN [HLRN])

If an Analyze_Route response is received with Trunk Group or Carrier (including 110) parameters present, LNP processing is bypassed. The response is handled using existing AIN Essentials procedures.

All other parameters received in the Analyze_Route response (with the exception of AMASlpID, which is discussed in the "Billing" chapter of this document) are handled using existing AIN Essentials procedures, as outlined in the *Advanced Intelligent Network Essentials Service Implementation Guide*, 297-5161-021.

28.3 Datafill RCNAME and RTECHAR

Table RTECHAR associates an RCNAME entry with several routing characteristics. The RCNAME entry is used throughout translations and routing to select a route based on the routing characteristics of the call.

A routing characteristic name must be datafilled in table RCNAME before it can be referenced from table RTECHAR.

The following MAP displays show sample datafill in table RCNAME and table RTECHAR. These RCNAMEs are used throughout this chapter.

Figure 28-1 RCNAME example datafill

```
NAMEKEY
-------
IXCDDNA
LECNA
LECIN
LECOA
```

Figure 28-2 RTECHAR example datafill

```
     RCKEY                                  GROUPRC
-----------------------------------------------
     LECNA  (CDN NA $) (BC 3_1KHZ (CDN NA) $)
.    NACALL                          (CDN NA $ )$
```

The TRAVER utility can be used to verify that the call picks up the RCNAME in translation. The following figure shows a sample TRAVER output for a call when the routing characteristics are present.

Figure 28-3 TRAVER example—finding RCNAME

```
traver l6631001 n cdn na 6136631088 ainres r01 lnpar 9059737061 b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
TABLE RTECHAR
 . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE LINEATTR
```

28.3.1 Using table RTECHAR to change pretranslators

Some switches do not have the pretranslator set up to allow outgoing calls. In this case, calls received on an incoming trunk from another carrier will experience blocked calls as detailed in the following scenario:

1. a call is received from another carrier that has not queried the SCP for an LRN
2. the SCP is queried by the receiving switch for an LRN
3. the SCP returns an FLRN and response processing begins
4. the pretranslator blocks the call

Pretranslators for response processing can be changed to allow response processing by modifying the datafill in tables RTECHAR and PXLAMAP.

For those offices that do not wish to change the function of their standard pretranslators, tables RTECHAR and PXLAMAP can be used to map to a different pretranslator to handle outgoing calls.

Figure 28-4 Datafill example to change pretranslators

```
>table stdprtct
>add LNPRESP
>sub stdprt
>add 2 9 nt np 0 na $

>table rcname
>add nacall

> table rtechar
>add nacall cdn na $ $

>table pxlamap
>add nacall incl xla lnpresp $
>add nacall atcl xla lnpresp $
```

Note: In table PXLAMAP the first pretranslator must match the pretranslator used by the incoming trunk.

Figure 28-5 TRAVER example— using RTECHAR to change pretranslators

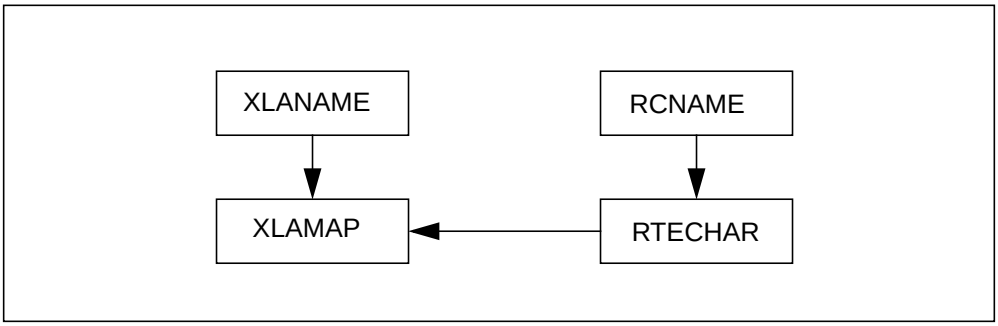
```
.>traver tr isupitic n cdn na 6048993434 ainres r01 lnpar 6048794325 b
TABLE RTECHAR
. NACALL (CDN NA $ )$
TABLE TRKGRP
ISUPITIC ATC 0 EML6 NCIT 2W IT MIDL ATC1 NSCR 604 5066 Y EAPLAN Y 0 COMB Y$
TABLE PXLAMAP
. NACALL ATC1 (XLA LNPRESP )$
```

28.4 Datafill IBN-originated calls

For IBN-originated calls, the private dialing plan is enforced; however, the CDN is received as a public number. The translations must be moved to the public environment using the ISDN routing characteristics tables.

The following figure shows the datafill hierarchy to move a call from the private to the public environment.

Figure 28-6 Datafill hierarchy for moving a call from the private to the public environment



28.4.1 Datafilling requirements

Assuming that tables RCNAME and RTECHAR are already datafilled, only tables XLANAME and XLAMAP need to be datafilled. Table XLANAME must be datafilled before table XLAMAP.

28.4.2 Example

A call originates from an IBN line (DN 9671321) and triggers from the private environment at LNP. An Analyze_Route (AR) response is received that instructs the call to route based on a national CDN (6136631088).

28.4.3 Step 1: Datafill table XLANAME

The new pretranslator name must be defined in table XLANAME before it can be referenced in table XLAMAP. This name is used to move the translations to the public environment.

Figure 28-7 Sample tuple from table XLANAME

```
RX905
 (NET N N N 0 N NDGT N Y GEN (LATTR 916_PUB_512 L916_LATA1_502)
(EA NILC Y 0) $ $)$ 9
```

28.4.4 Step 2: Datafill table XLAMAP

Table XLAMAP is used to replace the pre-defined pretranslator with a new pretranslator for IBN calls. The new pretranslator, defined in XLANAME in Step 1, must already be datafilled.

Figure 28-8 Sample tuple from table XLAMAP

```
LECNA RX905 ( XLA RX905)$
```

28.4.5 Step 3: Verifying with TRAVER

TRAVER can be used to verify that the call translated correctly. The routing characteristics of the call must be specified in the TRAVER command.

The following figure shows a TRAVER output with the translation order.

Note: The tuple added to RCNAME is not shown directly from the output.

Figure 28-9 TRAVER—tuples added in tables RTECHAR, XLAMAP, XLANAME

```
traver l 6671321 n cdn na 9059631088 ainres r01 lnpar 6136639004 b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
LNP Info: Call Type set to NP for FLRN translations
TABLE RTECHAR
 . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE IBNLINES
HOST 03 1 14 05 0 DT STN RES 6671321 404 613_PUB_404 L613_LATA1_0 613 $
TABLE LINEATTR
404 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_PUB_404 L613_LATA1_0 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PUB_404 NSCR 613 PUB TSPS Y RESG613 0 0 $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG613 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE NCOS
RESG613 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
RESG613 NXLA RX613 RESGSTAR 0 RES
TABLE DIGCOL
RES specified: RES digit collection
TABLE XLAMAP
 . Tuple not found. Default is use original XLANAME.
TABLE IBNXLA: XLANAME RX613
TUPLE NOT FOUND
Default from table XLANAME:
RX613
    (NET N N 0 N NDGT N Y GEN ( LATTR 414 613_EAP1_414 L613_LATA1_0)
    (EA NILC Y 0) $ $)$ 9
TABLE DIGCOL
NDGT specified: digits collected individually
```

Figure 28-9 TRAVER—tuples added in tables RTECHAR, XLAMAP, XLANAME

```
TABLE LINEATTR
414 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_EAP1_414 L613_LATA1_0 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_EAP1_414 NSCR 613 EAP1 TSPS Y RESG613 0 0 $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE PXLAMAP
 . LECNA EAP1 ( XLA PBXNOCAR) ( PREFIX )$
 . NOTE: ISDN Digit Conversion has been performed:
 .       Resulting digits are: 19059631088
TABLE STDPRTCT
 . Tuple not found. Default to old pretranslator name.
TABLE STDPRTCT
EAP1 ( 1) ( 0) 3
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . 19 19 N DD 1 NA
LNP Info: Call Type set to NP for FLRN translations
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 437) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 905963108 905963109 FRTE 747
 . SUBTABLE RTEMAP
 .  . Tuple not found. Default to old index.
 . SUBTABLE RTEREF
 .  747 T OFRT 747
 .  . TABLE OFRTMAP
 .  .  . Tuple not found. Default to old index.
 .  . TABLE OFRT
 .  .  747 S D C0S1_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: HNPA translation completed on Foreign LRN.
LNP Info: HNPA results are used.

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 28-9 TRAVER—tuples added in tables RTECHAR, XLAMAP, XLANAME

```
DIGIT TRANSLATION ROUTES

1 C0S1_ISUPITOG          9059631088          ST
     PORTED NUMBER GAP: 6136639004

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

28.5 Datafill POTS/RES-originated calls

Table PXLAMAP, similar to table XLAMAP, is used to replace the pre-defined pretranslator with a new pretranslator for POTS calls. The new pretranslator must be datafilled in order to replace the pre-defined pretranslator.

For information related to response translations and response simplification translations, refer to *Advanced Intelligent Network Essentials Service Implementation Guide*, 297-5161-021.

28.6 Disconnect (DISC) response

For AIN Essentials, the off-board processor may return a Disconnect (DISC) message in response to any AIN Essentials trigger detection point (TDP). When the SSP receives a DISC response from the off-board processor, the SSP routes the call to AIN disconnect call treatment and clears the call as normal.

28.6.1 Datafilling requirements

The datafill requirement for the SSP to handle the DISC message is to datafill the AIN disconnect treatment. For Integrated Service Digital Network (ISDN) user part (ISUP) users, the treatment can be mapped to Normal Clearing in the Treatment Map table (TMTMAP) and Treatment Control table (TMTCNTL).

28.6.2 Datafill table TMTCNTL

In table TMTCNTL, tones, announcements, and states that are returned to the originator of a call can be defined. In theory, each type of the originator can have its own AIN disconnect announcement defined. The AIND associated with the OFFTREAT is applied if the originator does not have its own AIND defined.

The range of TREATMT in table TMTCNTL:TREAT includes PODN treatment. The TMTCNTL:TREAT subtable is used to associate routes to the PODN treatment calls. PODN treatment call must not be routed to Operator Service Switch (OSS), Traffic Operator Position System (TOPS), Traffic Service Position (TSPS) or Automatic Intercept System (AIS).

28.6.3 Example

Table DNROUTE must be datafilled prior to datafilling TMTCNTL. In table TMTCNTL, add the AIND announcement to the types of originator. Originator choices are:

- OFFTREAT for office
- LNT for lines
- ITTRKGRP and TITRKGRP for trunks

In table TMTCNTL: 1) Position on tuple OFFTREAT. 2) Go to subtable TREAT. 3) Add the tuple shown in the following table. 4) Repeat the same step for tuples LNT, ITRKGRP, and TITRKGRP, respectively.

Table 28-1 Sample datafill in subtable TREAT of table TMTCNTL

Treatment	Log	FSTRSEL	CLLI
AIND	Y	S	TI20

When a call (not originated from ISUP) terminates on the PODN treatment, Table TMTCNTL is accessed to determine where the call should be routed to. In this example, when a call (originated from a line agent) goes to PODN treatment, it is routed to office route 55 defined in Table OFRT.

Figure 28-10 Sample datafill for PODN treatment in TMTCNTL

```
TABLE: TMTCNTL LNT:TREAT
TREATMT LOG FSTRTE
_____________________
PODN         Y     T    OFRT  55
```

28.6.4 Datafill table TMTMAP

Table TMTMAP is accessed before table TMTCNTL where treatment occurs on a call incoming on a CCS7 trunk group with table TRKSGRP field SIGDATA set to C7UP and field PROTOCOL set to a protocol name found in table TMTMAP. The PODN treatment is datafilled with a default cause value of UNALLOC in the TMTMPVAR.CAUSE field when the LNP software is loaded into the switch.

Datafill table TMTMAP to allow the application of AIND treatments to ISUP. Table DNROUTE must be datafilled before table TMTMAP.

When a call originated from an ISUP trunk and encounters PODN treatment, Table TMTMAP is accessed to determine the release cause value. In this example, unalloc cause value is released.

Table 28-2 TMTMAP

TMTMPKEY	TMTMPVAR
Q764 PODN ALLBC	ISUP NOLOCAL UNALLOC LOCLNET N

In key field TMTMPKEY, you can specify AIND as the cause associated with the treatment, as shown below.

Table 28-3 TMTMAP

TMTMPKEY	TMTMPVAR
Q764 LNPM ALLBC	ISUP NOLOCAL NORMCLR LOCLNET N

28.7 CONT response

The continue (CONT) response is an off-board processor-to-SSP message that can be received only at the Information Analyzed (INFOANAL) trigger detection point (TDP). It is not an expected response. It instructs the call to continue processing at the INFOANAL TDP and triggers again if more triggers are found. If no more triggers are found, the SSP attempts to route the call.

If there is not enough information to perform normal routing, the call is sent to AIN FINAL (AINF) treatment.

No extra datafill is required to process this response.

28.8 Cancel_Resource response

When the off-board processor sends the SSP a Send_To_Resource response and the Send_To_Resource operation does not request digit collection, the off-board processor can follow through with a Cancel_Resource response.

The Cancel_Resource directs the SSP to stop the non-interruptible announcement and returns a RESOURCE_CLEAR message to the off-board processor.

28.9 FLRN Routing interactions with DN selectors

LNP responses that return a foreign LRN, or calls that tandem through an office and route with an FLRN, will be sent to RODR treatment for the following selectors:

- the DN routing selector in table HNPACONT$HNPACODE
- the L routing selector in table STDPRTCT$STDPRT

The following TRAVER provides an example:

Figure 28-11 FLRN routing error, call sent to RODR treatment

```
traver tr c1s1_isupitic 6137221111 tcni 9059638621 b
TABLE TRKGRP
C1S1_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 PUB NSCR 613 000 N Y $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP OFCTRIG
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HNPACONT
613 Y 932 2 ( 422) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 6137 6139 HNPA 0
 . 722 722 DN 613 722
 . LNP Info: Routed to reorder, FLRN routing should not take place via DN
selector
TABLE TMTCNTL
ITTRKGRP ( 2)
 . SUBTABLE TREAT
KEY NOT FOUND
DEFAULT OFFTREAT IS USED
TABLE TMTCNTL
OFFTREAT ( 39)
 . SUBTABLE TREAT
 . RODR Y T OFRT 58
 . TABLE OFRT
 .   58 S D *OFLO
. EXIT TABLE OFRT
```

Figure 28-11 FLRN routing error, call sent to RODR treatment

```
AIN Info Collected TDP: no subscribed trigger.
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
Skipping AIN LNP Trigger Items as LNP is NOT compatible with current
call
AIN Info Analyzed TDP: trigger criteria not met.

+++ TRAVER: SUCCESSFUL CALL TRACE +++



TREATMENT ROUTES.  TREATMENT IS: RODR
1 *OFLO

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

28.10 Additional translations for ported DN termination

For a call terminating to a ported-in DN, the DN residency check done at the switch overrides the routing information provided by table HNPACONT or table FNPACONT. The call is automatically terminated to the resident DN. Extra datafill is required if incoming calls to the ported-in DN require special routing (such as to a VFG or to a trunk loop-around). Table LNPCODE is modified to allow calls terminating on ported-in DNs to take a specified route, or to route to treatment.

Figure 28-12 Example datafill for table LNPCODE -Ported DN termination

```
    STS           FROMDIGS             TODIGS                       RTE
-------------------------------------------------------------------------
    416             613663             613663          T   IBNRTE  905
```

28.11 Additional translations for NPA split

When the switch supports an NPA split with a permissive dialing period, table NPDIGMAP requires additional datafill. Change the datafill in table NPDIGMAP to map NPANXX digits of a GAP to a new NPANXX combination if the original GAP is non-resident.

Figure 28-13 Example datafill for table NPDIGMAP -NPA split

```
      NPANXX    AREACODE    OFCCODE
-------------------------------------
      613663         713        663
```

For more information on NPA split interactions with LNP, see Section "11.3.87. NPA Split" on page 61.

29 Porting

ATTENTION

The provisioning of E911 and other services requiring dedicated trunks depends on NPA NXX distribution.

29.1 Porting out

In previous releases of LNP when a directory number is ported out from one service provider's switch to another service provider's switch, the directory number is deleted from the directory number database (Table DNINV or Table DNROUTE). Thus there is no distinction between the native ported-out directory number and the unassigned directory numbers after the deletion.

LNP Ported Out DN marking provides the capabilities to mark native ported-out directory numbers, to list all the ported directory numbers and to ensure that no services can be assigned to native ported-out directory numbers through SERVORD, Table MMCONF, Table PRECONF or Table DNROUTE in the donor switch where the NPANXX of the directory numbers is native. By marking the native directory numbers as ported-out, service providers can avoid assigning new services to native ported-out directory numbers accidentally.

For example, if operating company personnel assign a DN to the PODN treatment, the DN cannot be provisioned in table PRECONF. The following error message appears if operating company personnel attempt further provisioning on the DN.

The following figure provides an example of a user adding a tuple to table PRECONF. If PODN is already assigned to the table, an error message is generated.

Figure 29-1 Reject assignment to DN through table PRECONF

```
Table PRECONF

PCNFKEY CONFADDR PCNFVAR OPTIONS
--------------------------------
0 0 6137225133 D IBN COMKODAK 0 Y Y Y N N Y $
>add 0 0 6137225133 D IBN COMKODAK 0 Y Y Y N N Y $
THE DN CANNOT BE PUT INTO SERVICE AS A PRESET CONF. DN
BECAUSE PODN TREATMENT IS ALREADY ASSIGED TO THE DN
TUPLE TO BE ADDED:
0 0 6137225133 D IBN COMKODAK 0 Y Y Y N N Y $
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT.
```

The following figure provides an example of a user adding a tuple to table MMCONF. If PODN is already assigned to the table, an error message is generated.

Figure 29-2 Reject new assignment to PODN through table MMCONF

```
Table MMCONF
   >add COMKODAK  0 613 722   4597    0    Y     N   30     STD $
    PODN IS ALREADY ASSIGNED TO THE DN SPECIFIED
    TUPLE TO BE ADDED:
    COMKODAK  0   613  722   4597    0    Y     N   30     STD $
    ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT.
    >
```

The following figure provides an example of a user adding a tuple to table PRECONF. If PODN is already assigned to the given DN, an error message is generated.

Figure 29-3 Reject new assignment to PODN through table DNROUTE

```
Table DNROUTE
>add 819 622 1096 T     OFRT   83
ENTER Y TO CONTINUE PROCESSING OR N TO QUIT
>y
TUPLE TO BE ADDED:
     819 622 1096 T OFRT 83
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT.
>y
KEY ERROR
TUPLE ALREADY EXISTS
TUPLE TO BE ADDED:
     819     622       1096
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT.
```

This does not change the current provisioning methods nor the LNP triggering policy in DMS. If a DN cannot be removed from service through SERVORD, then the DN must still be removed by the existing procedures before marking the DN as ported-out. For example, if a MeetMe Conference DN (MM) is ported, you must first delete the MeetMe Conference DN from the Table MMCONF before you can datafill the ported out DN in Table DNROUTE. The decision on escaping LNP triggering is not based on the fact that a native DN is not marked as ported_out.

The PODN treatment can be assigned to native DNs through the SERVORD commands OUT, OUTDN, CICP, CDN, CHDN, DEL and EXBDELG. The SERVORD commands are covered in the chapter “Service orders”. The commands QDN and QLEN show ported out numbers, as shown in the chapter “Other CI tools”.

This section describes the basic datafill requirements for setting up a switch to allow calls to DNs in portable NPANXXs (and to allow DNs to port out).

The following steps are the minimum steps that must be performed in order for switches in the local network, that are LNP-capable, to query. With this minimum datafill, these switches can have DNs ported out to other switches, but cannot have DNs ported in.

Assumptions:

- Basic AIN Essentials setup required for LNP is complete.
- No DNs have ported onto the switch yet.
- LNP00100 is activated after all steps are complete.

Steps:

1. Datafill the SS7 tables to allow LNP queries to route to the appropriate SCP. Refer to the Chapter 25, “Datafilling for triggers,” on page -1.
2. Datafill table TRIGDIG with an LNP trigger for each portable NPANXX. (The trigger shown has the Default Routing option assigned.)

Figure 29-4 Default routing options assigned

```
KEY              TRIGGER   ACTION
OPTIONS
------------------------------------------------------
LNPDIG LNP 416463  LNP    EVENT TCAP R01 SS7 LNPGTT DFLT
(DFLTRT DN $)$
```

3. Datafill table TRIGGRP with the LNP trigger and associated escape criteria.
   - If office-wide AIN Essentials subscription is already in place:
     - — Check the value in parameter AIN_OFFICE_TRIGGRP of table OFCVAR.
     - — Locate that parameter in table TRIGGRP.
     - — Add the LNP trigger and associated escape criteria to the end of that tuple.
   - If office-wide AIN Essentials subscription is not in place:
     - — Check the value in parameter AIN_OFFICE_TRIGGRP of table OFCVAR.
     - — Add a new office-wide trigger tuple in table TRIGGRP with the LNP trigger and associated escape criteria.
     - — Save the trigger group name for step 4.

Figure 29-5 LNP trigger and associated escape criteria added

```
KEY                                                TRIGGER DATA
---------------------------------------------------------------
OFCTRIG INFOANAL
(LNP (DG LNPDIG) (ESCDN) (ESCEA ) (ESCOP ) (ESCCN DD)
 $ NIL)$
```

4. Datafill table OFCVAR with the name of the office-wide trigger group. Verify that the SOC option is turned ON.

Figure 29-6 Datafilling table OFCVAR

```
PARMNAME                                        PARMVAL
-----------------------------------------------------
AIN_OFFICE_TRIGGRP                              OFCTRIG
```

29.2 Porting in

This section describes the datafill required for DNs to port in.

Assumptions:

- All steps described previously are completed.
- LNP00100 is activated after all steps are complete.

Steps:

1. Datafill the switch's Home LRN in table HOMELRN.

Figure 29-7 Datafilling the Home LRN

```
AREACODE OFCCODE    STNCODE          OPTIONS
-------------------------------------------------------
  416     463       $               (SITE (HOST) $)$
```

2. Add all portable NPANXXs to table TOFCNAME, marking all foreign NPANXXs with the NONNATIVE option.

Figure 29-8 Add portable NPANXXs to table TOFCNAME

```
AREACODE OFCCODE                                    OPTIONS
-------------------------------------------------------------
416      463                                  (NONNATIVE )$
```

3. Datafill FNPA7DIG to allow the switch to derive a ported DN's NPA when 7-digit dialing is used between different NPAs. This step is not necessary if 10-digit dialing is enforced, or if the local area has only one NPA.

Figure 29-9 Datafill FNPA7DIG

```
ORIGSTS FROMNXX   TONXX TERMNPA
-------------------------------
 613     463      463     416
```

29.3 Porting DN 4164634000 from SSP1 to switch SSP2

This section describes porting from one switch to another.

Assumptions:

- SSP1 is setup to allow DNs to port out.
- SSP2 is setup to allow DNs to port in.

Steps:

1. SSP1: Assign the PORT option to the DN. The PORT option is assigned to the DN at the donor switch using the following SERVORD command:

   >ADO $ 4634000 PORT $

2. SSP2: Provision new line data for the porting DN, and assign the PORT option.

   Provision new line through standard SERVORD procedures. Ensure that proper translations for new customer dialing plan is in place for the ported-in line in SSP2.

3. LNPSCP: Update data to return the LRN of the SSP2.
4. SSP1 & SSP2: Complete any physical changes required.
5. SSP1: PODN treatment should be assigned to NATIVE ported-out DNs as follows:

   >OUT $ 4634000 HOST 00 1 19 02 PODN

   Note: Do not assign PODN treatment to non-native DNs.

6. SSP2: Remove the PORT option from the line as follows:

   >DEO $ 4634000 PORT $

7. A new tuple is added to the table DNINV when PODN is assigned to the porting DN by the SERVORD OUT command.

Figure 29-10 Add a new tuple to table DNINV

```
TABLE: DNINV
AREACODE OFCCODE STNCODE DNRESULT
--------------------------------
416 463 4000 D PODN
```

29.4 Dedicated trunk

An example of a dedicated trunk is the trunk used by the E911 service.

Anytime an agent ports onto a switch:

- the NPA of that agent may be new to the switch
- the agent subscribes to a service that requires dedicated trunking (for example, E911)
- new dedicated trunking must be created for that agent's NPA

Note: Where the trunks are non-ISUP, use a 7-digit ANI spill.

To datafill for E911 service, refer to *DMS-100 Translations Guide*, 297-8003-350.

29.5 PODN

Note: The provisioning of PODN is prevented when SOC option LNP00200 is IDLE. Please see the chapter “Software Optionality Control” for additional information.

PODN treatment normally does not occur in LNP call scenarios. When PODN is assigned to a DN, this DN must have been ported to a recipient switch where it is associated with services. Calls to ported-out DN shall terminate on the recipient switch. However, there are cases in which PODN treatment does occur:

- a non-LNP call to a DN marked as PODN
- a LNP call triggers but SCP fails or there is data inconsistency in SCP

When there is data inconsistency and SCP returns LRN of donor switch (where the PODN is assigned), calls routed to LNPM treatment instead of PODN treatment.

PODN treatment calls (not originated from ISUP trunk) are routed based on the routes defined in subtable TMTCNTL.TREAT. When a call is originated from an ISUP trunk and the PODN treatment occurs, the table TMTMAP is accessed to determine if the treatment should be handled locally or non-locally. If the call is released back, the default ISUP cause value for PODN is “unalloc” unless otherwise overwritten (an operating company can associate PODN with a different cause value in Table TMTMAP). The ISDN (REL) cause value for PODN treatment calls is set to ISDN_UNASSIGNED_NUMBER_CSE.

A PODN treatment call is classified by dynamic controlled access detection (DCA) feature as an ineffective attempt. The dynamic controlled access detection feature detects and reports mass calling events that cause network congestion.

When a call is sent to PODN treatment an ACB request is not valid for that call attempt. However, when a call actually terminates on a busy ported-out DN in the recipient switch, an ACB request is valid (that is, no PODN treatment occurs).

Whenever an AIN call triggered at PODP is routed to a DN marked as PODN, the PODN digits show in the AIN AMA117 record’s “Called DN” field.

When a call is sent to PODN treatment, before the treatment is applied, LNP checks to see if it is necessary to modify the PODN treatment to the misrouted_call_to_ported_dn treatment.

If LRN is received and the call is sent to PODN treatment, then PODN treatment is changed to misrouted_call_to_ported_dn.

Figure 29-11 Sample datafill for routing PODN treatment to an announcement

```
TABLE CLLI
PODN_ANNS 2345 2 PODN_ANNS

TABLE ANNS
PODN_ANNS STND 25 30 14 1

TABLE ANNMEMS
PODN_ANNS 1 DRAM DRA 0 DTM 0 9 $

TABLE DRAMTRK
PODN_ANNS 1 (PODN_ANNS) $

TABLE OFRT
1018 S D PODN_ANNS $

TABLE: TMTCNTL
>pos LNT (   46)
>subtable
TABLE: TMTCNTL OFFTREAT: TREAT
>pos PODN Y T OFRT 1018

PODN   Y     T     OFRT 1018

TABLE: TMTCNTL LNT: TREAT
> pos PODN Y T OFRT 1018
PODN   Y     T     OFRT 1018
```

29.5.1 Porting native DNs back to donor switch

When a native DN is ported out from a donor switch the DN is marked with the PODN treatment. Once the DN is marked as PODN, new services cannot be assigned to the DN through SERVORD commands or table controls software.

In the event that the DN is ported back from the recipient switch to the donor switch, the DN can be brought back to service by explicitly removing the PODN intercept from the DN by the CICP command.

The following is an example of porting back a POTS line to the donor switch.

1. Use the CICP command to remove the PODN intercept:

   >CCICP $ 4638001 BLDN

2. Provision the DN with the NEW command:

   >NEW $ 4638001 1FR HOST 02 0 04 04 $

3. Assign PORT option to the DN:

>**ADO $ 4638001 PORT $**

Complete any physical changes required.

4. Confirm that the LNPSCP is updated for the DN and remove the PORT option from the line with DEO:

   >**DEO $ 4638001 PORT $**

30 Trigger administration

This chapter describes:

- deletion of a tuple from table TRIGDIG
- TRAVER error scenarios
- normal AIN TRAVERs

30.1 Deletion of a tuple from table TRIGDIG

Tuples in table TRIGDIG can be deleted. This usually results from scheduled daily audit checks.

Note 1: Deletion of a tuple from table TRIGDIG is blocked if the DIGNAME/TRIGGER combination being deleted is referenced by an existing tuple in table TRIGGRP.

Note 2: A table can be updated with the AIN Trigger Item Transition Tool (AINTITT). This tool provides a means to automatically convert the office wide triggers from the trigger group datafill to a functionally equivalent set of trigger items in table TRIGITM and OFCTIID. The AINTITT tool uses TOOLSUP as a method of controlling and restricting access. For more information on table TRIGITM see the section “Table TRIGITM” in chapter “LNP Trigger”.

In table TRIGGRP, following the deletion of the TRIGGRP tuple, deleted tuples are stored until two table audits are completed.

If

- the DIGNAME/TRIGGER combination being deleted is referred to by a deleted TRIGGRP tuple and,
- the DIGNAME does not appear elsewhere in table TRIGDIG,

the deletion of the TRIGDIG tuple is blocked.

Suitable error messages are displayed indicating the reason for denial of the deletion. Various error messages follow.

If the DIGNAME/TRIGGER combination being deleted is referred to by a deleted TRIGGRP tuple and the DIGNAME/TRIGGER combination does not appear elsewhere in the table but the DIGNAME appears in table TRIGDIG, then the deletion of the TRIGDIG tuple is allowed.

Suitable error messages are displayed indicating the reason for denial of the deletion. Suitable warning messages follow.

For more information, refer to *Advanced Intelligent Network 0.1: Service Implementation Guide*, 297-5161-021.

30.2 Tables TRIGITM and OFCTIID

For information on table TRIGITM and related tables, see the “Advanced Intelligent Network Service Enablers Product Specification” (NSS-AIN02-PS). Also see the section “Table TRIGITM” in chapter “LNP Trigger”.

30.3 TRAVER error scenarios

LNP cannot be initiated again on a subsequent switch, as the TRAVER in the following figure indicates.

Figure 30-1 TRAVER error scenario—LNP initiated again on a subsequent switch

```
traver tr isupitic n cdn na 6136631088 ainres r01 lnpar 4164631077 tcni
9059731081 b
**** ERROR: OPTION TCNI INCOMPATIBLE WITH AINRES LNPAR
```

LNP information cannot be sent over an MF trunk, as the TRAVER in the following figure indicates.

Figure 30-2 TRAVER error scenario—LNP information sent over an MF trunk

```
traver tr  t2mf 4164631099 tcni 9059737061 b
**** ERROR: OPTION TCNI ONLY VALID FOR ISUP ORIGINATORS
```

TRAVER enforces 10 digits for the GAP, as the TRAVER in the following figure indicates.

Figure 30-3 TRAVER error scenario—TRAVER enforces 10 digits for the GAP

```
traver tr isupitog 6136681088 tcni 9731081 b
**** ERROR: TCNI DIGITS MUST BE N OR 10 DIGITS
```

30.4 Normal AIN TRAVERs

An LNP response should not contain carrier parameters. The following TRAVER displays a message to the user indicating that normal AIN translations are taking effect.

When the value of the AIN_OFFICE_TRIGGRP tuple in the DMS table OFC VAR is ‘TIID’ TRAVER performs office wide trigger checking using the Trigger Item Provisioning Interface.

If a supported digit string based trigger (SDS, N11, LNP) is subscribed at the INFOANAL TDP, TRAVER displays a message indicating whether the trigger is applicable or not at this TDP.

If the administrative state code of the subscribed trigger item is ULK (that is, UNLOCKED) and there are any supported digit string based triggers (SDS, N11, LNP) subscribed at the INFOANAL TDP with the assignment activation state “ON” and trigger criteria for that trigger item are matched then the following are displayed:

- The table name OFCTIID followed by the assignment tuple from the office wide trigger item assignment table OFCTIID.
- The tuple of the subscribed trigger item in table TRIGITM.
- The table name TRIGITM.
- The table name C7GTTYPE.
- The corresponding tuple of table C7GTTYPE.
- The table name C7GTT.
- The corresponding tuple of table C7GTT.

For AFR trigger item subscription, the AFR trigger occurs at the NETBUSY TDP, and is only encountered if all routes in the route list are busy. Since TRAVER is a call simulation, routes are not busy and criteria for this trigger are never met. Therefore, if AFR is encountered in the route list, subscription to the AFR trigger is checked. If the AFR trigger is subscribed, a message is displayed indicating that triggering would take place if all routes are busy. Tuples from tables OFCTIID, TRIGITM, C7GTTYPE, and C7GTT are displayed.

The following figure provides an example of a TRAVER for normal AIN translations.

Figure 30-4 TRAVER example—normal AIN translations

```
traver l 6136211001 2132551001 b
TABLE LINEATTR
6 CDF NONE LO 0 10 NILSFC 0 NIL NIL 00 613_P621_6 L613_NILLA_4 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_P621_6 FR01 613 P621 TSPS Y RESG200 0 2 $
TABLE RATEAREA
L613_NILLA_4 L613 NIL NILLATA $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE STDPRTCT
P621 ( 1) ( 0) 1
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . 21 221 N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 437) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 213 216 HNPA 0
 . 255 255 LRTE 719
 . SUBTABLE RTEREF
 .  719 N D ISUPITOG 0 $ Y
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
TABLE LCASCRCN
613 L613 ( 44) OPTL N N
 . SUBTABLE LCASCR
 . TUPLE NOT FOUND.  DEFAULT IS NON-LOCAL
```

Figure 30-4 TRAVER example—normal AIN translations

```
TABLE PFXTREAT
OPTL NP N DD UNDT
TABLE CLSVSCRC
LATA IS NIL, THEREFORE NOT AN EQUAL ACCESS CALL
AIN Info Collected TDP: no subscribed trigger.
Checking AIN SDS Trigger Items as SDS is compatible with current call
 .  . TABLE OFCTIID
 .  . 4 SDSTRIG1 ON
 .  . TABLE TRIGITM
 .  . 4 SDSTRIG1 SDS (DG 213255) $ ULK EVENT R01 SS7 AINJAZZ $
 .  .  . TABLE C7GTTYPE
 .  .  . AINJAZZ ANSI7 3 $
 .  .  . TABLE C7GTT
 .  .  . AINJAZZ 2132551001 2132551001 SSNONLY (AINTEST) $
 .  . TABLE PODPATTR
 .  . TUPLE NOT FOUND
AIN Info Analyzed TDP: trigger criteria met.
Querying the database would occur now.
Use the AINMQG option to save the query to a file for use in TstQuery.
Use the AINRES option for further information

+++ AIN TRAVER: SUCCESSFUL CALL TRACE +++


AIN Info Analyzed TDP: trigger criteria met.
Querying the database would occur now.
Use the AINMQG option to save the query to a file for use in TstQuery.
Use the AINRES option for further information

+++ AIN TRAVER: SUCCESSFUL CALL TRACE +++
```

31 Datafilling by call scenario

This chapter describes most types of LNP call scenarios. For more information on setting up LNP calls, refer to *DMS-100 Translations Guide*, 297-8003-350.

Each call scenario

- shows an illustration of the call flow
- describes each step in the call flow
- shows associated datafill
- shows associated TRAVERs (if applicable)

> ***Note:*** ISUP trunks apply for all call scenarios, unless otherwise specified.

31.1 Porting of a customer group in progress

The following call scenario describes the porting of a customer group in progress.

31.1.1 Call flow

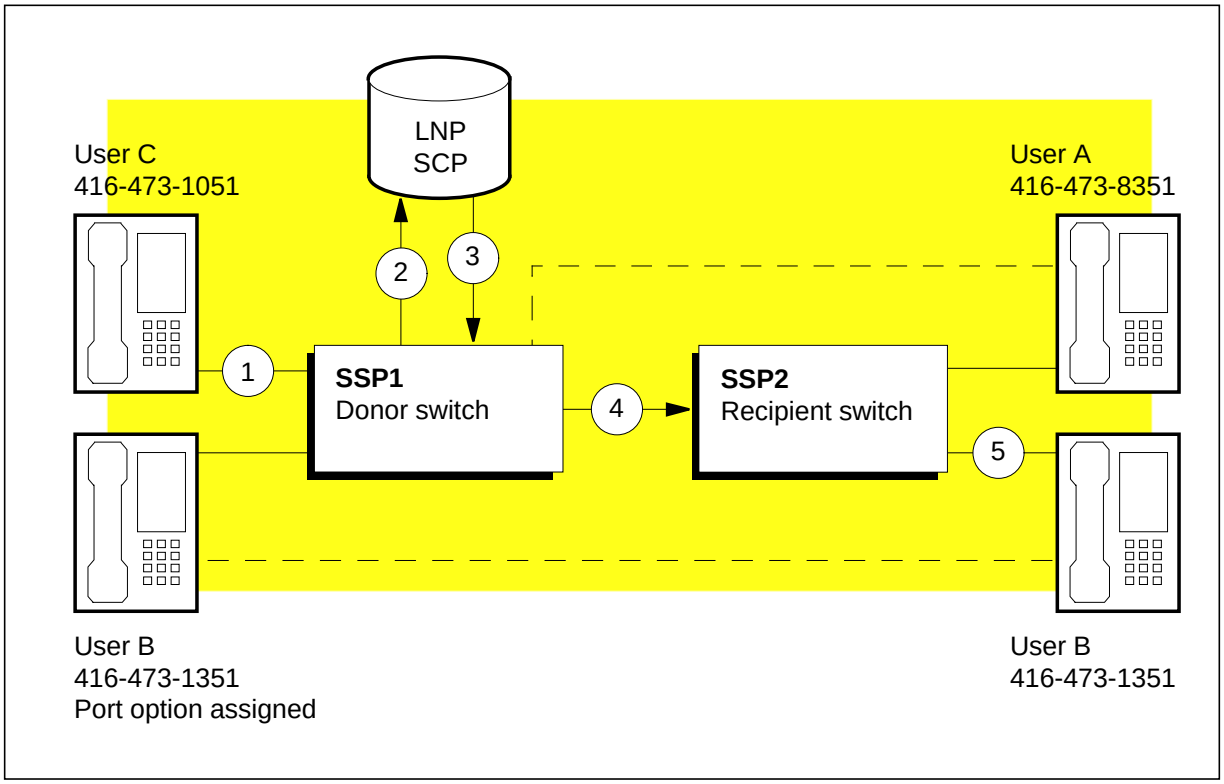
To port a customer group from the donor switch to the recipient switch, all members of the customer group must be ported from the donor switch to the recipient switch.

In the following figure:

- A, B and C are members of the same customer group porting from the donor switch to the recipient switch.
- A ported successfully.
- B is in the process of porting. The line shows up on both the donor and recipient switches.
- C is not ported yet.

The following figure shows the call flow for the porting of a customer group in progress.

Figure 31-1 Call to a member in the process of porting



31.1.2 Scenario description

1. C dials B (473-1351).
2. B is present on the donor switch. The PORT option is assigned to line 416-473-1351. As a result, rather than trying to terminate to B on the donor switch, the call results in an LNP query sent to the SCP. This query is sent with the dialed DN (473-1351) as the CalledPartyID.
3. The Analyze_Route message, sent back from the SCP, contains the LRN (905-963-1099) of the recipient switch (to which 416-473-1351 is in the process of porting) in the CalledPartyID.
4. The call routes to the recipient switch based on the LRN returned from the SCP. The ISUP IAM message sent to the recipient switch contains the LRN 905-963-1099 in the CalledPartyID and the GAP parameter contains

the dialed 416-473-1351. The TCNI field of the FCI parameter is set to "Number Translated".

5. The recipient switch, upon detecting its HLRN in the incoming IAM and discovering that the DN is resident, terminates the call to the desired (416) 473-1351.

   Note: During the porting of a customer group, it is possible that some members are not ported yet to the new switch. That is, some members are on the recipient switch while others have yet to be ported and are still on the donor switch.

At this time, any private dialing plans (such as 5-digit extension dialing) between members on different switches does not work. For example, if, in the previous scenario, C dialed B's extension, 31351, the call would not trigger LNP (even though 4167631351 would trigger.) This is because LNP is based on the Public Office Dialing Plan (PODP) and the 5-digit dialing plan is a Private Dialing Plan. As a result, the call (to B) tries terminating to B on the donor switch and receives Blank DN treatment.

31.1.3 Datafill

For datafill, refer to "Chapter 29: Porting".

Setup the customer group dialing plan translations on the recipient switch. That is, five-digit extension dialing. Datafill tables CUSTHEAD, CUSTENG, and IBNXLA, as follows.

Figure 31-2 Datafill tables CUSTHEAD, CUSTENG and IBNXLA

```
   TABLE CUSTHEAD:

     CUSTNAME CUSTXLA DGCOLNM IDIGCOL OPTIONS
     ----------------------------------------
     MDC416 416XDK KDK NIL (VACTRMT 0) (EXTNCOS 0) (FETXLA CUSTFEAT)
     (PLMXLA PXDK) (OCTXLA CUSTSHRP) $

   TABLE CUSTENG:

     CUSTNAME ADNUM NONCOS NOIBNTMT CONSOLES MASCON DOMAIN GROUPID
OPTIONS

-------------------------------------------------------------------------
     MDC416 777 1 30 Y N PRIVATE 0 $

   TABLE IBNXLA:

     KEY RESULT
     ----------
     416XDK 38 EXTN N   Y 416 473 5 $ $
```

Corresponding TRAVERs follow. The following figure shows member DN 4731051 dialing member DN 94731351, which is in the process of porting out to SSP2.

Figure 31-3 TRAVER example - 4731051 dials 94731351, porting out to SSP2

```
traver l 4164731051 94731351 b
TABLE IBNLINES
REM3 01 1 17 21 0 DT STN IBN 4731051 MDC416 0 0 416 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
MDC416 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
MDC416 0 0 0 KDK0 ( OHQ 0 TONE_OHQ) ( CBQ 0 3 N 2)$
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND
DIGCOL
MDC416 PXDK 416XDK CUSTFEAT 0 KDK
TABLE DIGCOL
KDK 9 RPT
TABLE IBNXLA: XLANAME PXDK
TUPLE NOT FOUND
Default is to go to next XLA name.
TABLE IBNXLA: XLANAME 416XDK
416XDK 9 NET N Y 1 Y POTS Y N GEN ( LATTR 410 416_PUB_400
L416_LATA1_400) ( EA NILC Y 0)$ $
TABLE DIGCOL
POTS specified: POTS digit collection
TABLE LINEATTR
410 IBN NONE NT 0 0 NILSFC 0 NIL NIL 00 416_PUB_400 L416_LATA1_400 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_PUB_400 NSCR 416 PUB TSPS N $
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 $
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
```

Figure 31-3 TRAVER example - 4731051 dials 94731351, porting out to SSP2

```
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
416 Y 772 1 ( 90) ( 1) ( 4) ( 0) 0 $
 . SUBTABLE HNPACODE
 . 473 473 DN 416 473
TABLE TOFCNAME
416 473 $
TABLE DNINV
416 473 1351 L REM1 01 0 11 14
TABLE DNFEAT
416 473 1351 (PORT ) $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
LNP Info: Called DN is resident.
LNP Info: Called DN has native NPANXX.
LNP Info: HNPA results are used.
TABLE LCASCRCN
416 L416 ( 27) OPTL N N
 . SUBTABLE LCASCR
 . 473 473
TABLE PFXTREAT
OPTL NP Y NP UNDT
AIN Info Collected TDP: no subscribed trigger.
TABLE FNPA7DIG
TUPLE NOT FOUND
TABLE TRIGGRP
CDPCODE INFOANAL
 . CDPCODE ( DG CDPDIG)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
 . CDPCODE ( DG CDPTRAF)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
Checking AIN LNP Trigger Items as LNP is compatible with current call
 .  . TABLE OFCTIID
 .  . 4 L416473 ON
 .  . TABLE TRIGITM
 .  . 4 L416473 LNP (DG 416473) (ESCEA ) (ESCOP ) (ESCDN ) $ ULK EVENT
R01 SS7 AINPOP
 .  .     $
```

Figure 31-3 TRAVER example - 4731051 dials 94731351, porting out to SSP2

```
 .  .  . TABLE C7GTTYPE
 .  .  . AINPOP ANSI7 6 $
 .  .  . TABLE C7GTT
 .  .  . AINPOP 4164731351 4164731351 PCSSN (SIMTOOL_RTESET SIMTOOL3 0) $
SSN
AIN Info Analyzed TDP: trigger criteria met.
Querying the database.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


AIN Info Analyzed TDP: trigger criteria met.
Querying the database.
LNP Info: Displaying pre-query translations result.
LNP Info: PORT option overrides ESCDN only.
LNP Info: PORT option has been assigned to the called DN.
LNP Info: Database response will be used to route the call

DIGIT TRANSLATION ROUTES

1 LINE                  4164731351         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

The following figure shows that donor switch SSP1 receives the SCP response to the LNP query and an ISUP IAM message routes to recipient switch SSP2 using the LRN returned by the SCP. The original dialed digits 4164731351 are in the GAP parameter of the ISUP IAM message. The LRN in the SCP response is in the CalledPartyID parameter.

Figure 31-4 SSP1 receives SCP response; ISUP IAM message routes to recipient switch

```
traver l 4164731051 n cdn na 9059631099 ainres r01 lnpar 4164731351 np b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
LNP Info: Call Type set to NP for FLRN translations
TABLE RTECHAR
 . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE IBNLINES
REM3 01 1 17 21 0 DT STN IBN 4731051 MDC416 0 0 416 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
MDC416 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE NCOS
MDC416 0 0 0 KDK0 ( OHQ 0 TONE_OHQ) ( CBQ 0 3 N 2)$
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND
DIGCOL
MDC416 PXDK 416XDK CUSTFEAT 0 KDK
TABLE DIGCOL
KDK 9 RPT
TABLE XLAMAP
 . LECNA PXDK ( XLA AINLEC)$
TABLE IBNXLA: XLANAME AINLEC
TUPLE NOT FOUND
DEFAULT FROM TABLE XLANAME:
AINLEC
    (NET N N 0 N NDGT N Y GEN ( LATTR 200 613_P621_200 L613_LATA1_0)
    (EA NILC Y 0) $ $)$ 9
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
200 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_P621_200 L613_LATA1_0 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_P621_200 FR01 613 P621 TSPS Y RESG200 0 0 $
```

Figure 31-4 SSP1 receives SCP response; ISUP IAM message routes to recipient switch

```
TABLE XLAPLAN
613_P621_200 FR01 613 P621 TSPS Y RESG200 0 0 $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE PXLAMAP
 . LECNA P621 ( XLA P621)$
TABLE STDPRTCT
P621 ( 1) ( 0) 1
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . 90 910 N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 422) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 905963109 905963109 FRTE 747
 . SUBTABLE RTEMAP
 .  . Tuple not found. Default to old index.
 . SUBTABLE RTEREF
 .  747 T OFRT 747
 .  . TABLE OFRTMAP
 .  .  . Tuple not found. Default to old index.
 .  . TABLE OFRT
 .  .  747 S D C1S1_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: HNPA translation completed on Foreign LRN.
LNP Info: HNPA results are used.
TABLE CLSVSCRC

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 31-4 SSP1 receives SCP response; ISUP IAM message routes to recipient switch

```
DIGIT TRANSLATION ROUTES

1 C1S1_ISUPITOG          9059631099          ST
     PORTED NUMBER GAP: 4164731351

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

The following figure shows a TRAVER example where the recipient switch SSP2 receives the ISUP IAM message from the donor switch. The call terminates to the dialed digits contained in the GAP parameter.

Figure 31-5 Recipient switch SSP2 receives ISUP IAM message from the donor switch

```
>traver tr s1c1_isupitic 9059631099 tcni 4164731351 b
TABLE TRKGRP
S1C1_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 PUB NSCR 613 000 N Y $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
LNP Info: Home LRN received.
LNP Info: Bypassing STDPRTCT and HNPACONT translations.
LNP Info: Orig Called DN is resident.
TABLE LNPCODE
TUPLE NOT FOUND
LNP Info: Ported DN Termination in effect.
TABLE HOMELRN
905 963 $ (SITE (HOST)$)$
TABLE TOFCNAME
416 473 (NONNATIVE ) $
TABLE DNINV
416 473 1351 L HOST 01 0 11 01
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
AIN Info Collected TDP: no subscribed trigger.
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
Skipping AIN LNP Trigger Items as LNP is NOT compatible with current call
AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 LINE                  4164731351         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

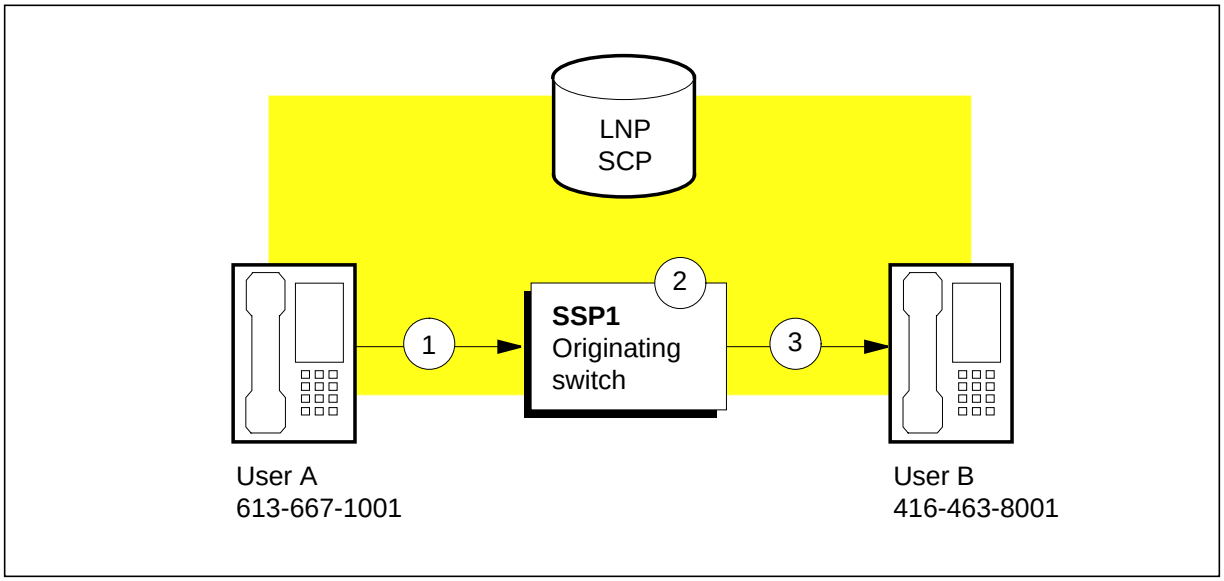
31.2 LNP call to a ported number resident to an originating switch

The following call scenario describes a call to a ported number resident to an originating switch.

31.2.1 Call flow

The following figure shows the call flow for a call to a ported number resident to an originating switch.

Figure 31-6 LNP call to a ported number resident to an originating switch



31.2.2 Scenario description

1. User A dials user B (463-8001).
2. The originating switch
   a. finds an entry matching the dialed digits in table HNPACONT.
   b. looks in table FNPA7DIG to determine the terminating NPA (based on the originator's NPA and the terminating NPX)
   c. sees, from table TOFCNAME, that the NPA-NXX of the called DN is not local
   d. sees an entry in table DNINV corresponding to the dialed DN, indicating that the dialed DN is resident on the switch
   e. ignores the route supplied by table HNPACONT because the dialed DN is resident
3. Ported DN termination takes place and the call terminates to 416-463-8001.

The previous scenario requires setup to port the DN 416-463-8001 from the donor switch (SSP2) to the recipient (or originating) switch (SSP1).

The datafill includes the following:

1. SSP1: Datafill at the originating switch, that allows the derivation of the NPA during 7-digit dialing, resides in table FNPA7DIG. The terminating NPA is derived by using the originating NPA and the terminating NXX.

```
ORIGSTS FROMNXX TONXX TERMNPA
 ----------------------------
 613     463     463   416
```

2. SSP1: Datafill exists in table TRIGGRP for the LNP trigger group and associated escape criteria.

```
KEY
 TRIGDATA
 ------------
 OFCTRIG INFOANAL
(LNP (DG LNPDIG) (ESCEA) (ESCOP) (ESCDN) $ NIL)$
```

3. SSP1: Datafill table TRIGDIG with an LNP trigger for the NPA-NXX 416-463, as follows.

```
KEY            TRIGGER  ACTION
 OPTIONS
-------------------------------------------------------
LNPDIG LNP 416463 LNP  EVENT TCAP R01 SS7 AINJAZZ DFLT $
```

4. SSP1: Datafill table TOFCNAME so that the terminating office of the dialed DN (416-463) is recognized as NONNATIVE on the originating switch, as follows.

```
AREACODE OFCCODE OPTIONS
------------------------------
416      463     (NONNATIVE ) $
```

5. SSP1: Add the DN through SERVORD such that the dialed DN is recognized as being resident on the originating switch and the ported DN termination can occur as in step 3 of the previous figure.

```
AREACODE OFCCODE STNCODE DNRESULT
  ----------------------------------------
  416      463     8001    L HOST 03 1 06 16
```

6. SSP1: Datafill table LCASCRCN and subtable LCASCR such that the dialed digits are considered within the local calling area, as follows.

```
TABLE LCASCRCN:

     NPALOCNM   LCASCR PFXSELEC PFXFOR10 LOCALOVR
     ----------------------------------------
     613 L613   (43)   OPTL     N        N


   TABLE LCASCR:

     FROMDIGS TODIGS
     ---------------
     463      463
```

The following figure provides a TRAVER example for an LNP call to a ported number resident on the originating switch.

Figure 31-7 LNP call to a ported number resident on the originating switch

```
traver l 6136631001 9638003 b
TABLE LINEATTR
401 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_PUB_401 L613_LATA1_0 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PUB_401 NSCR 613 PUB TSPS N $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 437) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 9638003 963809 LRTE 747
 . SUBTABLE RTEREF
 .  747 T OFRT 747
 .  . TABLE OFRT
 .  .  747 S D C0S1_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is resident.
LNP Info: Called DN has non-native NPANXX.
LNP Info: HNPA results not used.
```

Figure 31-7 LNP call to a ported number resident on the originating switch

```
TABLE LNPCODE
TUPLE NOT FOUND
LNP Info: Ported DN termination in effect.
TABLE TOFCNAME
905 963 (NONNATIVE ) $
TABLE DNINV
905 963 8003 L REM2 02 0 00 02
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LCASCRCN
613 L613 ( 44) OPTL N N
 . SUBTABLE LCASCR
 . 963 963
TABLE PFXTREAT
OPTL NP Y NP UNDT
AIN Info Collected TDP: no subscribed trigger.
TABLE FNPA7DIG
613 963 963 905
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN LNP Trigger Items as LNP is compatible with current call
AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 LINE                  9059638003         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

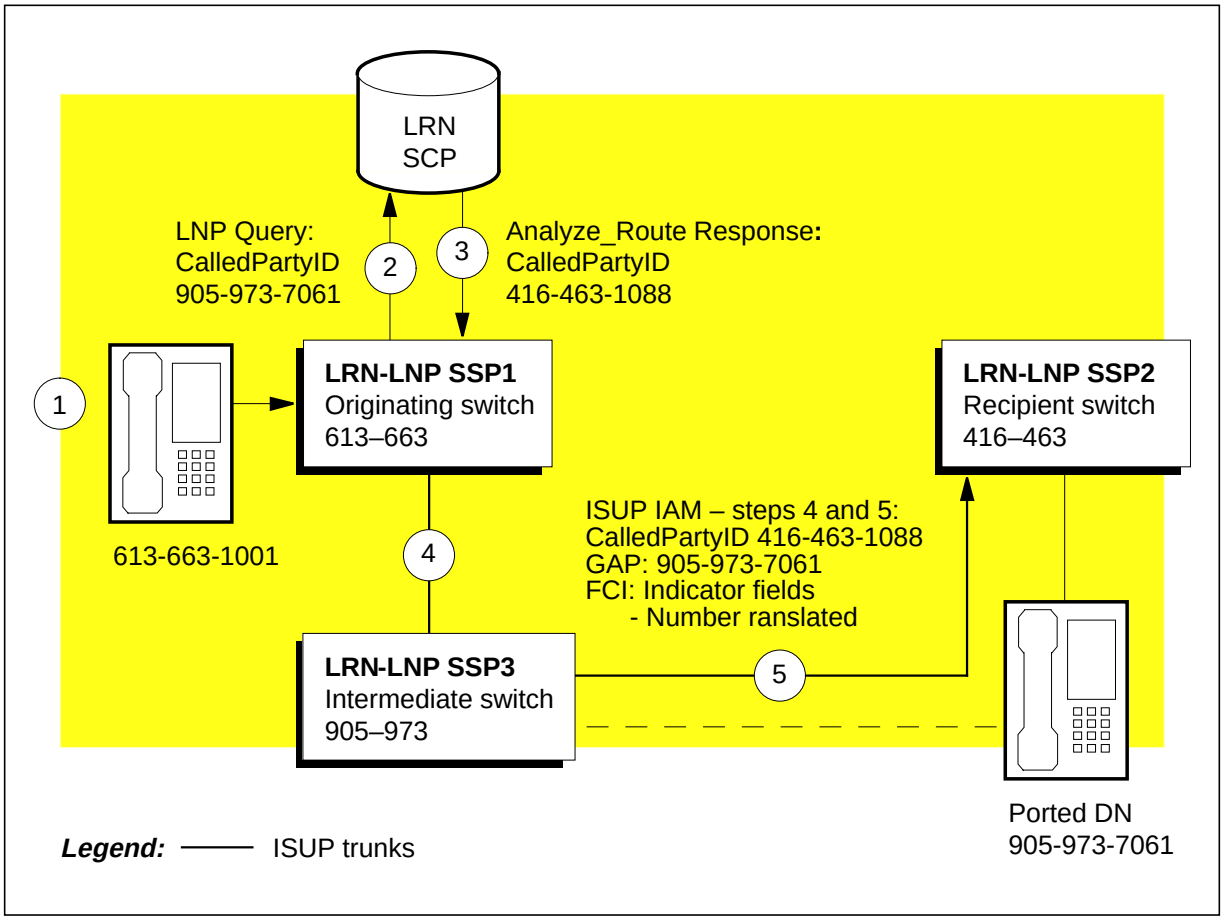
31.3 Call to a ported DN through an intermediate switch

The following call scenario describes a call to a ported DN through an intermediate switch.

31.3.1 Call flow

The following figure shows the basic steps involved in a call to a ported DN that routes through an intermediate switch.

Figure 31-8 Call to a ported DN through an intermediate switch



31.3.2 Scenario description

1. The originator (613-663-1001) dials 905-973-7061. Translation of this number determines that the DN is not resident on the originator's SSP, and that 905-973 is a portable NPA-NXX. An LNP query is performed

(step 2). The datafill that allows the SSP to determine this is shown in the following example.

```
TABLE FNPA7DIG
 613 973 973 905
TABLE TRIGGRP
 OFCTRIG INFOANAL
 LNP (DG LNPDIG) (ESCEA) (ESCOP) (ESCDN) $ NIL
TABLE TRIGDIG
 LNPDIG LNP 905973 LNP EVENT TCAP R01 SS7 AINJAZZ DFLT $
```

2. SSP1 performs an LNP query with the dialed DN populated as the CalledPartyID.
3. The LNP SCP determines if the dialed DN ported. In this case, it has. The LNP SCP responds with an Analyze_Route message containing the LRN of SSP2 (416-463-1088).

   After receiving the Analyze_Route message, SSP1 re-translates the call, using the LRN contained in the CalledPartyID, which chooses a route to recipient switch SSP2 through intermediate switch SSP3. The following datafill provides the route.

```
TABLE HNPACONT
   613 Y 932 2 ( 420) ( 1) ( 84) ( 0) 2
   SUBTABLE HNPACODE
      4164631088 4164631088 FRTE 747
   SUBTABLE RTEREF
      747 T OFRT 747
TABLE OFRT
   747 S D C0S1_ISUPITOG
```

4. A route over an ISUP trunk is chosen. The LRN is populated in the IAM Called Party Number parameter. The ported (dialed) DN is populated in the IAM GAP. The IAM Forward Call Indicator is populated with “Number Translated” in the Translated Called Number Indicator field.
5. SSP3 receives this IAM, examines the contents and determines that the LRN is not its HLRN, and translates the call to determine a route out of the switch. A route to SSP2 is chosen, and all LNP info that SSP3 received from SSP1 is shipped, in an IAM, to SSP2. The SSP uses information from table HOMELRN to determine if the call is destined for this switch, as follows.

```
TABLE HOMELRN
   613 673 $ (SITE (HOST)$)$
```

6. SSP2 receives this IAM, examines the contents, determines that the LRN is its Home LRN (HLRN), swaps the incoming Called Party Number with

the GAP, and terminates to the ported DN. The SSP uses information from table HOMELRN to determine if the call is destined for this switch. It also uses datafill in table TOFCNAME to determine if the DN is non-native, requiring LNP translations to terminate.

```
TABLE HOMELRN
   416 463 $ (SITE (HOST)$)$
TABLE TOFCNAME
   905 973 (NONNATIVE ) $
```

The TRAVER example in the following figure is associated with Figure 31-8 on page 16 and steps 1 and 2.

Figure 31-9 The originator on SSP1 dials a ported DN and encounters LNP

```
traver l 6136631001 9737061 b
TABLE LINEATTR
401 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_PUB_401 L613_LATA1_0 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PUB_401 NSCR 613 PUB TSPS N $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 437) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 973706 973709 LRTE 747
 . SUBTABLE RTEREF
 .  747 T OFRT 747
 .  . TABLE OFRT
 .  .  747 S D C0S1_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
```

Figure 31-9 The originator on SSP1 dials a ported DN and encounters LNP

```
TABLE LCASCRCN
613 L613 ( 44) OPTL N N
 . SUBTABLE LCASCR
 . 973 973
TABLE PFXTREAT
OPTL NP Y NP UNDT
AIN Info Collected TDP: no subscribed trigger.
TABLE FNPA7DIG
613 973 973 905
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN LNP Trigger Items as LNP is compatible with current call
 .  . TABLE OFCTIID
 .  . 4 LNPTRIG2 ON
 .  . TABLE TRIGITM
 .  . 4 LNPTRIG2 LNP (DG 905973) (ESCDN ) (ESCEA ) (ESCOP ) $ ULK EVENT
R01 SS7
 .  .     AINJAZZ $
 .  .  . TABLE C7GTTYPE
 .  .  . AINJAZZ ANSI7 3 $
 .  .  . TABLE C7GTT
 .  .  . AINJAZZ 9059737061 9059737061 SSNONLY (AINTEST) $
AIN Info Analyzed TDP: trigger criteria met.
Querying the database.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


AIN Info Analyzed TDP: trigger criteria met.
Querying the database.
LNP Info: Displaying pre-query translations result.
LNP Info: It is used if the database indicates the called DN is
non-ported

DIGIT TRANSLATION ROUTES

1 C0S1_ISUPITOG         9737061            ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

The following TRAVERs are associated with Figure 31-8 on page 16 and steps 3 and 4. In the following figure TRAVER SSP3 receives LRN, GAP, and TCNI over ISUP. The call translates on FLRN. A route is determined to SSP2. LNP information is signaled over ISUP to SSP2.

Figure 31-10 SCP returns FLRN, selects a route to SSP3

```
traver tr s1c0_isupitic 4164631077 tcni 9059737061 b
TABLE TRKGRP
S1C0_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 PUB NSCR 613 000 N Y $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP OFCTRIG
TABLE STDPRTCT
PUB ( 1) ( 0) 1
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HNPACONT
613 Y 930 20 ( 122) ( 1) ( 0) ( 0) 0 $
 . SUBTABLE HNPACODE
 . 416463107 4164631087 FRTE 747
 . SUBTABLE RTEREF
 .  747 T OFRT 747
 .  . TABLE OFRT
 .  .  747 S D S1C1_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: HNPA translation completed on Foreign LRN.
LNP Info: HNPA results are used.
AIN Info Collected TDP: no subscribed trigger.
TABLE TRIGGRP
OFCTRIG INFOANAL
 . N11 ( DG N11DIG)$ NIL
Trigger AIN N11 is applicable to office.
 . PODP ( DG PODPDIG)$ NIL
Trigger AIN PODP is applicable to office.
 . LNP ( DG LNPDIG) ( ESCEA ) ( ESCOP ) ( ESCDN )$ NIL
Trigger AIN LNP is applicable to office.
AIN Info Analyzed TDP: trigger criteria not met.

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 31-10 SCP returns FLRN, selects a route to SSP3

```
DIGIT TRANSLATION ROUTES

1 S1C1_ISUPITOG          4164631077          ST
     PORTED NUMBER GAP: 9059737061

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

In the following figure, SSP2 receives LRN, GAP, and TCNI over ISUP. LRN is determined to be HLRN. Translations are performed on GAP. The call terminates to a ported DN.

Figure 31-11 SSP2 receives LRN, GAP, and TCNI over ISUP

```
traver tr c1s1_isupitic 4164631077 tcni 9059737061 b
TABLE TRKGRP
C1S1_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 PUB NSCR 613 000 N Y $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP OFCTRIG
LNP Info: Home LRN received.
LNP Info: Bypassing STDPRTCT and HNPACONT translations.
LNP Info: Orig Called DN is resident.
TABLE LNPCODE
TUPLE NOT FOUND
LNP Info: Ported DN Termination in effect.
TABLE HOMELRN
416 463 $ (SITE (HOST)$)$
TABLE TOFCNAME
905 973 (NONNATIVE ) $
TABLE DNINV
905 973 7061 L REM1 01 0 09 02
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
AIN Info Collected TDP: no subscribed trigger.
TABLE TRIGGRP
OFCTRIG INFOANAL
 . N11 ( DG N11DIG)$ NIL
Trigger AIN N11 is applicable to office.
 . PODP ( DG PODPDIG)$ NIL
```

Figure 31-11 SSP2 receives LRN, GAP, and TCNI over ISUP

```
Trigger AIN PODP is applicable to office.
 . N11 ( DG N11TRAF)$ NIL
Trigger AIN N11 is applicable to office.
 . PODP ( DG PODPTRAF)$ NIL
Trigger AIN PODP is applicable to office.
 . LNP ( DG LNPDIG) ( ESCEA ) ( ESCOP ) ( ESCDN )$ NIL
Trigger AIN LNP is applicable to office.
AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 LINE                  9059737061         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

31.4 TEST CALL

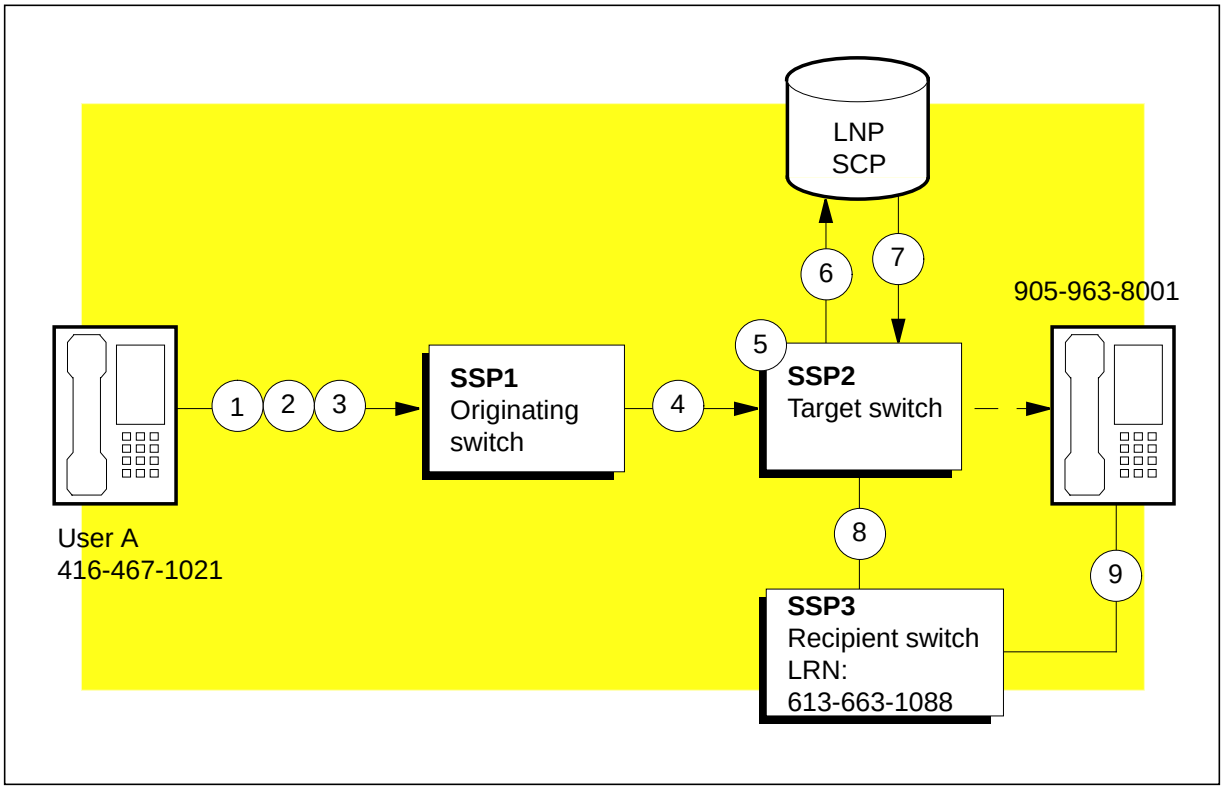
The following call scenario describes a test call.

Note: No line options except DGT are allowed on the line.

31.4.1 Call flow

The following figure shows the basic steps involved in a test call.

Figure 31-12 Test call



31.4.2 Scenario description

1. User A dials access code *88 to initiate the LNP test call feature (LNPTST).
2. Prompted by a special dial tone, user A enters a 10-digit LRN (target switch LRN) 905-963-1099.
3. Prompted by another special dial tone, the user enters a 10-digit GAP 905-963-8001.
4. The IAM message sent contains the collected LRN and the GAP. It also has the GAP test indicator set and the Forward Call Indicator (FCI) set to “Number Translated”. The message is routed to the target switch (the LRN entered by the user).
5. At the test switch, the call is recognized as a test call (because the GAP test indicator is set.). The GAP test indicator is reset to the default and the FCI is reset to “Number Not Translated” in order that the call hits the LNP trigger.
6. The LNP SCP query is sent with the user-specified GAP as the CalledPartyID.

7. The analyze Route Message sent back from the SCP contains LRN (613) 663-1088 of the recipient switch [to which (905) 963-8001 ported] in the CalledPartyID.
8. The call routes to the recipient switch by translating on the LRN (613) 663-1088 returned by the SCP. The ISUP IAM sent to the recipient switch contains LRN (613) 663-1088 in the CalledPartyID and (905) 963-8001 in the GAP. The TCNI field of the FCI parameter is set to “Number Translated”.
9. The recipient switch, upon detecting its HLRN in the incoming IAM, terminates the call to the desired (905)-963-8001.

31.4.3 Datafill required for setup of the test call scenario

The setup of the previous test call scenario is broken up into the following:

- The setup required to port the DN 905-963-8001 from the donor switch (SSP2) to the recipient switch (SSP3). To port 905-963-8001, follow the steps outlined in the “Porting a DN” scenario, respectively.
- The datafill required to provide an access code to activate the LNP test call feature. The datafill for this follows.

Add the following tuple to table IBNXLA to activate LNP test call through access code *88.

Figure 31-13 Add tuple table IBNXLA

```
KEY            RESULT
  ------------------------------
  RESGSTAR 88    FEAT N N    LNPTST
```

The TRAVER in the following figure illustrates the translations involved when dialing the access code for the LNPTST feature. TRAVER does not support the LNP test call feature.

Figure 31-14 TRAVER example—Access code for LNPTST feature dialed

```
traver l 6136631021 b88 b
TABLE IBNLINES
HOST 00 1 11 09 0 DT STN RES 6631021 404 613_PUB_404 L613_LATA1_0 613 (LNPTST) $
TABLE LINEATTR
404 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_PUB_404 L613_LATA1_0 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PUB_404 NSCR 613 PUB TSPS Y RESG613 0 0 $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG613 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
RESG613 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
RESG613 NXLA RX613 RESGSTAR 0 RES
TABLE DIGCOL
RES specified: RES digit collection
NCOS FEAT XLA name is NIL. Go to next XLA name.
TABLE IBNXLA: XLANAME RESGSTAR
RESGSTAR 88 FEAT N N LNPTST
AIN Info Collected TDP: no subscribed trigger.
TABLE TRIGGRP
CDPCODE INFOANAL
 . CDPCODE ( DG CDPDIG)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
 . CDPCODE ( DG CDPTRAF)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
Checking AIN SDS Trigger Items as SDS is compatible with current call
Skipping AIN LNP Trigger Items as LNP is NOT compatible with current call
AIN Info Analyzed TDP: trigger criteria not met.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

Feature LNPTST not supported by TRAVER
+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

The TRAVER in the following figure illustrates the outgoing ISUP IAM message generated (step 4 of Test Call figure) by Test Call which routes to the target switch with LRN 905-963-1099 and a GAP value 905-963-8001 (user-specified). Note that in the IAM message of step 4, the FCI is set to

"Translated Called Number". This is reflected in the TRAVER by the presence of the TCNI parameter. In call processing, the Gap Test Indicator is also set.

Figure 31-15 TRAVER example—IAM routes to target switch with LRN and GAP

```
traver tr c1c0_isupitic 9059631099 tcni 9059638001 b
TABLE TRKGRP
C1C0_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 PUB NSCR 613 000 N Y $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP OFCTRIG
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HNPACONT
613 Y 932 2 ( 422) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 905963109 905963109 FRTE 747
 . SUBTABLE RTEREF
 .  747 T OFRT 747
 .  . TABLE OFRT
 .  .  747 S D C1S1_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: HNPA translation completed on Foreign LRN.
LNP Info: HNPA results are used.
AIN Info Collected TDP: no subscribed trigger.
TABLE TRIGGRP
OFCTRIG INFOANAL
 . N11 ( DG N11DIG)$ NIL
Trigger AIN N11 is applicable to office.
 . PODP ( DG PODPDIG)$ NIL
Trigger AIN PODP is applicable to office.
 . N11 ( DG N11TRAF)$ NIL
Trigger AIN N11 is applicable to office.
```

Figure 31-15 TRAVER example—IAM routes to target switch with LRN and GAP

```
 . PODP ( DG PODPTRAF)$ NIL
Trigger AIN PODP is applicable to office.
 . LNP ( DG LNPDIG) ( ESCEA ) ( ESCOP ) ( ESCDN )$ NIL
Trigger AIN LNP is applicable to office.
AIN Info Analyzed TDP: trigger criteria not met.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 C1S1_ISUPITOG         9059631099         ST
     PORTED NUMBER GAP: 9059638001

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

At the target switch (see step 5 of TestCall figure), the call is recognized as a test call. The Gap Test Call Indicator is reset to its default and the FCI is set to "Number Not Translated". Translation then occurs on the GAP. The TRAVER in the following figure illustrates this, showing that the GAP satisfies the LNP trigger criteria and the SCP is queried.

Figure 31-16 TRAVER—at the target switch, the call is recognized as a test call

```
traver tr s1c1_isupitic 9059638001 b
TABLE TRKGRP
S1C1_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 PUB NSCR 613 000 N Y $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP OFCTRIG
TABLE STDPRTCT
PUB ( 1) ( 0) 1
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HNPACONT
613 Y 930 20 ( 122) ( 1) ( 0) ( 0) 0 $
 . SUBTABLE HNPACODE
```

Figure 31-16 TRAVER—at the target switch, the call is recognized as a test call

```
 . 905 905 HNPA 0
 . 963 963 DN 905 963
TABLE TOFCNAME
905 963 $
TABLE DNINV
905 963 8001 D BLDN
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE TMTCNTL
ITTRKGRP ( 109)
 . SUBTABLE TREAT
 . BLDN Y S T120
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
AIN Info Collected TDP: no subscribed trigger.
TABLE TRIGGRP
OFCTRIG INFOANAL
 . N11 ( DG N11DIG)$ NIL
Trigger AIN N11 is applicable to office.
 . PODP ( DG PODPDIG)$ NIL
Trigger AIN PODP is applicable to office.
 . LNP ( DG LNPDIG) ( ESCEA ) ( ESCOP ) ( ESCDN )$ NIL
Trigger AIN LNP is applicable to office.
 .  . TABLE TRIGDIG
 .  . LNPDIG LNP 905963 LNP EVENT TCAP R01 SS7 AINBLUES DFLT $
 .  .  . TABLE C7GTTYPE
 .  .  . AINBLUES ANSI7 11 $
 .  .  . TABLE C7GTT
 .  .  . AINBLUES 9059638001 9059638001 PCSSN (SIMTOOL_RTESET SIMTOOL 0)
$ SSN
AIN Info Analyzed TDP: trigger criteria met.
Querying the database.

+++ TRAVER: SUCCESSFUL CALL TRACE +++
AIN Info Analyzed TDP: trigger criteria met.
Querying the database.
LNP Info: Displaying pre-query translations result.
LNP Info: It is used if the database indicates the called DN is
non-ported

TREATMENT ROUTES.  TREATMENT IS: BLDN
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

The TRAVER in the following figure shows the translations at the target switch following the SCP response received (step 7 of Test Call figure) resulting from the LNP query which occurred in the previous TRAVER example.

Figure 31-17 TRAVER example - At the target switch, response received from SCP

```
traver tr s1c1_isupitic n cdn na 6136631088 ainres r01 lnpar 9059638001 b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
LNP Info: Call Type set to NP for FLRN translations
TABLE RTECHAR
 . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE TRKGRP
S1C1_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 PUB NSCR 613 000 N Y $
Warning: Routing characteristics in TRAVER command
line will override any bearer capability datafilled
in table TRKGRP.
TABLE OFCVAR
AIN_OFFICE_TRIGGRP OFCTRIG
TABLE PXLAMAP
 . Tuple not found. Default to old pretranslator name.
TABLE STDPRTCT
PUB ( 1) ( 0) 1
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 930 20 ( 122) ( 1) ( 0) ( 0) 0 $
 . SUBTABLE HNPACODE
 . 613663108 613663109 FRTE 730
 . SUBTABLE RTEMAP
 .  . Tuple not found. Default to old index.
 . SUBTABLE RTEREF
 .  730 T OFRT 730
 .  . TABLE OFRTMAP
 .  .  . Tuple not found. Default to old index.
 .  . TABLE OFRT
 .  .  730 S D S1C0_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
```

Figure 31-17 TRAVER example - At the target switch, response received from SCP

```
LNP Info: HNPA translation completed on Foreign LRN.
LNP Info: HNPA results are used.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 S1C0_ISUPITOG         6136631088         ST
     PORTED NUMBER GAP: 9059638001

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

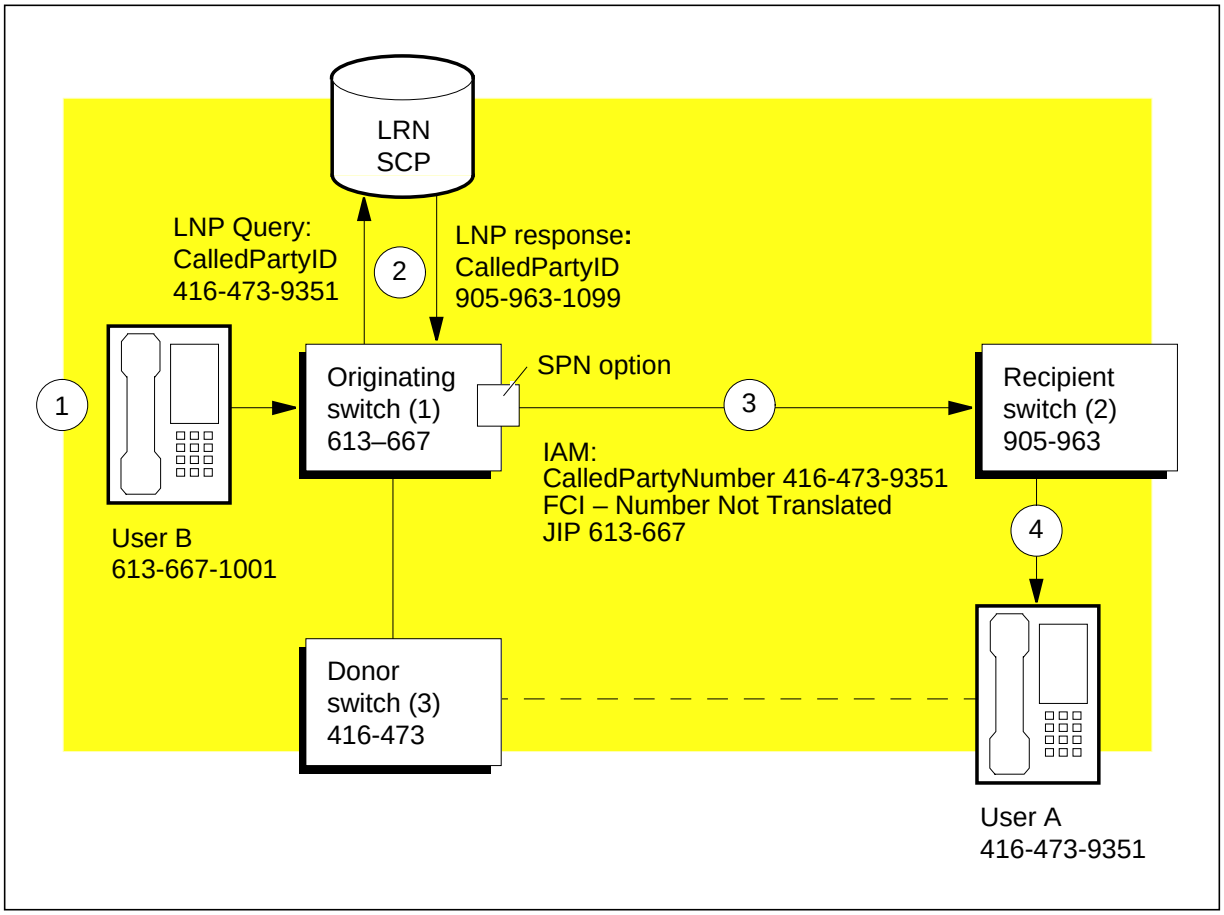
31.5 Using the SPN option

The signal ported number (SPN) option on ISUP outgoing trunks is used to allow signaling to recipient switches that are not yet ready to handle a ported GAP parameter passed in the IAM. The following example illustrates the use of the SPN option.

31.5.1 Call flow

The following figure shows the SPN option in use.

Figure 31-18 Outgoing ISUP with SPN option to a recipient switch



31.5.2 Scenario description

1. User B dials user A.
2. Switch 1 performs an LNP query because it is an LNP-capable switch and notices that 416473 is a portable NPANXX. The call routes within switch 1 using the LRN returned from the database and attempts to terminate to the trunk going out to switch 2.
3. Signaling looks for the presence of the SPN option on the trunk before outpulsing. Because it is present, the dialed number is populated into the CdPN of the IAM instead of creating a GAP parameter. If any digit manipulation is required for this outgoing trunk, it is performed on the dialed number before it is put into the CdPN. The FCI parameter is always built into the IAM, so, for example, signaling sets the Translated Called

Number indicator to “Number Not Translated”, which is the default. The JIP is built and sent because it is not an LNP-specific parameter.

4. Switch 2 routes the call directly to user A. Regardless of whether switch 2 is LNP-capable, the NPANXX of any line residing on the switch must be datafilled in table TOFCNAME and the NPA must be datafilled in SNPANAME, as follows.

Figure 31-19 NPA datafilled in SNPANAME

```
SNPANAME
    KEY
    ---
    416

TOFCNAME
    AREACODE                    OFFCODE
-----------------------------------------
    416                 473
```

In order to force the call to terminate to 416-473-9351, translations is datafilled with the DN selector. The TRAVER in the following figure shows translations at switch 1.

Figure 31-20 TRAVER example—Translations at switch 1

```
traver l 6136671001 n cdn na 9059631099 ainres r01 lnpar 4164739351 b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
LNP Info: Call Type set to NP for FLRN translations
TABLE RTECHAR
 . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE LINEATTR
401 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_PUB_401 L613_LATA1_0 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PUB_401 NSCR 613 PUB TSPS N $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE PXLAMAP
 . LECNA PUB ( XLA PBXNOCAR) ( PREFIX )$
 . NOTE: ISDN Digit Conversion has been performed:
 .       Resulting digits are: 19059631099
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . 19 19 N DD 1 NA
LNP Info: Call Type set to NP for FLRN translations
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 437) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 905963109 905963109 FRTE 747
 . SUBTABLE RTEMAP
 .  . Tuple not found. Default to old index.
 . SUBTABLE RTEREF
 .  747 T OFRT 747
```

Figure 31-20 TRAVER example—Translations at switch 1

```
 .  . TABLE OFRTMAP
 .  .  . Tuple not found. Default to old index.
 .  . TABLE OFRT
 .  .  747 S D C0S1_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: HNPA translation completed on Foreign LRN.
LNP Info: HNPA results are used.
TABLE LCASCRCN
613 L613 ( 44) OPTL N N
 . SUBTABLE LCASCR
 . TUPLE NOT FOUND.  DEFAULT IS NON-LOCAL
TABLE PFXTREAT
OPTL NP Y NP UNDT

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 C0S1_ISUPITOG         9059631099         ST
     PORTED NUMBER GAP: 4164739351

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Part VI
Billing

This part consists of the following chapters:

32 Automated message accounting

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

Initially, LNP restricts portability to within a rate center. Despite this restriction, a number of billing issues arise. Each is described in the following sections.

32.1 Population of terminating NPA/number fields

Typically, when the DMS generates a billing record it populates the Terminating NPA and Terminating Number fields in the structure with the translated called number. It is undesirable, however, to use these digits if the call has translated using an LRN. If the LRN digits were populated in the Terminating Number fields, downstream billing would not be able to correctly identify the real terminating party DN which may be used to calculate a subscriber or access charge.

This issue arises when a call is made to a ported number and charge or access record is generated at an intermediate switch which receives an LRN, FCI Translated Called Party Number field set to Number Translated and Ported Number GAP. An example would be:

- A call is made to a ported DN at a non-LAMA end office. The end-office is LNP-capable and performs the LNP query. The call routes over an ISUP trunk to the CAMA office, sending the LRN, FCI and GAP. The CAMA office translates on the LRN (which is not the HLRN) and determines the call is billable. The appropriate charge record is generated for the call, recording the originating and terminating parties. The CAMA office routes the call to the recipient switch.
- An intra-LATA call is made to a ported number. The call routes to the IXC which performs the LNP query. The IXC routes the call to the terminating network over an ISUP trunk sending the LRN, FCI and GAP. The point of

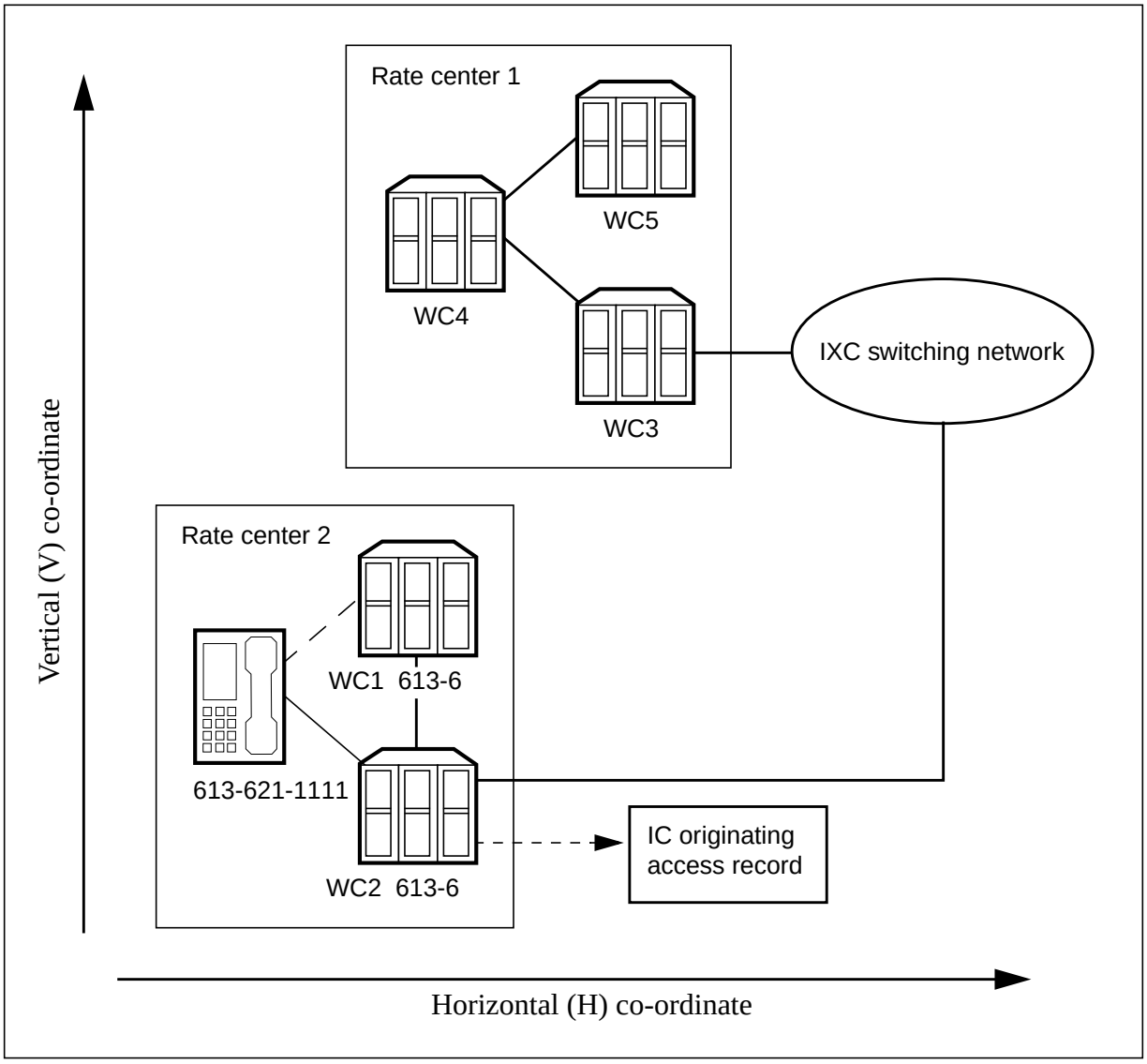
presence at the terminating network is an access tandem which translates the call using the LRN (which is not the HLRN). Upon translation, the tandem determines a Terminating Access record must be generated for the call and records the originating and terminating parties. The tandem routes the call to the recipient switch.

32.2 Access rate calculation

Initially, since subscribers are not able to port outside their rate center, information currently populated in AMA records is sufficient to derive the rate-center V&H coordinates used to perform correct rate billing. It is possible, however, for a subscriber to port to a new wire center. A wire center is usually defined as a switch, switch building, or remote switching unit.The V&H coordinates of a wire center are derived using the NPA-NXX of a switch. Originating Access charges (for example Call Type Codes 110, 131) are generated by local service providers to charge carriers for subscriber access. The amount to charge the carrier is usually calculated based on the distance between the wire center (that is, location) of the originating switch and the carrier. In addition, some service providers may perform local measured rating and toll rating using wire center V&H. Prior to LNP, the wire center of the originating switch could be determined by the NPA-NXX of the originating party. Today, however, if the originator has ported, the NPA-NXX of the originator identifies the wire-center of the Donor switch. This could lead to incorrect access charge calculation.

The following figure illustrates a local network with 2 rate centers. A subscriber (DN 613-621-1111) at a switch in wire center 1 (WC1) ports to a switch at wire center 2 (WC2) which is another switch in the same rate center. The LRN at WC2 which is designated for JIP population is 613-622. The ported subscriber, 613-621-1111 now makes an equal access call which routes the call directly to the IXC. To bill the IXC for this call WC2 generates an originating access record which records information including Originating Number 613-621-1111 and the carrier access code. Typically downstream billing would use the Originating Number to calculate the access charge. The result is an access charge based on V&H coordinates of WC1. This is incorrect since the call actually originated from WC2.

Figure 32-1 Wire center billing for originating access charges



To solve this problem LNP Module 720 is appended to access charges and contains the LRN of the originating switch. The same need arises for Terminating Access charges (for example, Call Type Codes 119, 135). In these cases, the LNP Module is appended to Terminating Access charges if the terminating party has ported. The module contains the LRN of the terminating switch. Downstream billing procedures are modified to use the LRN for rate calculation.

Rating based on wire-center distance may not be limited to access billing in some local networks. Initially, ICC requirements only addressed carrier access rating. In NA009, Bellcore requirements are addressed which expands the rules for appending the LNP module to all AMA records.

In NA009, Module 719 and Call Type Codes 721 & 722 are introduced. Module 719 can be produced in lieu of Module 720 by enabling option LNP_MODULE_719 in table AMAOPTS. Generation of Module 719 or 720 also includes three new call scenarios:

- an AMA record is generated at the originating switch and the originating DN is ported. This includes feature usage record such as CLASS, CFW activation record.
- an AMA record is generated for a call originated and terminated on the same switch to a ported DN.
- terminating study record is generated and portability information of the terminating agent is provided either in incoming signaling, SCP or switch datafill.

32.3 Charging for local network interconnection

Service providers in the LNP network may wish to record access charges for LNP calls received from other local networks when other access charges do not apply (for example, Call Type Codes 119, 066). For example, a new local service provider (LSP1) does not have a direct trunks to a switch owned by LSP2. LSP1 must route any calls destined for LSP2 through a tandem owned by LSP3. LSP3 may want to charge LSP1 for the connection.

To record such charges, the existing AMA Structure Code 625 is generated with a new “Connecting Network Access” Call Type Code 720. LSP3 assigns a Connecting Network Access option to the incoming trunk from LSP1. Calls routed over this trunk generate a new Call Type Code 720 for `Connecting Network Access'. Alternatively, the service provider may wish to generate Call Type Code 720 only if the call from LSP1 involved an LNP query. To do this, LSP3 assigns the `Limited Recording of Connecting Network Access' option to the incoming trunk. If a call over this trunk performs an LNP query, Call Type Code 720 is generated and the new module 720 is appended to the record. Generation of the “Connecting Network Access” and the “Limited Recording Connecting Network Access” records are controlled by provisioning of options against incoming trunk groups.

32.4 Charging for database queries

Service providers may wish to charge users or other service providers for database queries. To identify such cases, the new LNP module 720 is appended to the existing pre-query record at the SSP whenever a query is made, no AMAslpID is returned in the response, and the call is billable. If an AMAslpID is returned in the LNP response message, the LNP module 720 is appended to the 220 structure code; not the pre-query record. If no AMAslpID is returned and the call is not billable, the LNP module 720 is not recorded.

32.5 Call Type Code 721

Call Type Code 721 is generated when AMA is not normally generated during an LNP query by calling parties served by the originating switch. Two options apply that is to create this record for both ported and non-ported numbers, or to create this record solely for ported numbers.

CTC 721 is controlled by three new parameters in table AMAOPTS that have either ON or OFF values. All three have the default value ‘OFF’. The three options are:

- LNP_721

  If this option is ON, it indicates the recording of CTC 721.

- LNP_721_USE_SC0500

  If this option is ON, it indicates that CTC 721 is recorded using Bellcore AMA Format Structure Code 0500. If this option is OFF, Structure Code 0001 is used as a default. If this option is set ON before LNP_721 is set to ON, table control generates a warning to remind the user to activate LNP_721.

- LNP_721_PortedDNOnly

  If this option is ON, it indicates that CTC 721 is recorded only if an LRN is received in the response of the LNP query and the Dialed DN is ported. If this option is set ON before LNP_721 is set to ON, table control generates a warning to remind the user to activate LNP_721.

32.6 Call Type Code 722 - Last Resort Routing

Call Type Code 722 is known as Last Resort AMA. This occurs when last resort routing to a recipient switch occurs at a donor switch. This applies to public trunk originating calls to a number ported from the donor switch.

CTC 722 is provisioned in table AMAOPTS with either ON or OFF options.

If this option is ON, it indicates the recording of CTC 722 with BAF Structure Code 625.

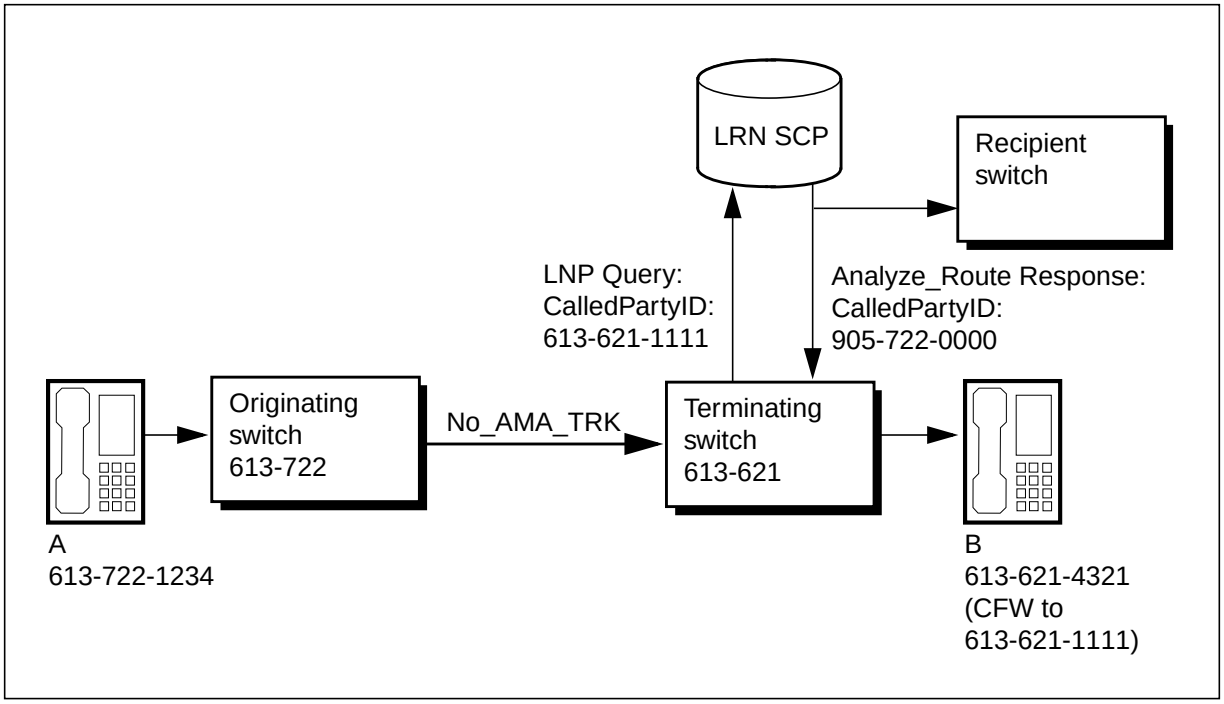
Last Resort AMA (CTC 722) is not applicable to redirected trunk- originating calls that trigger LNP. One such scenario is an interswitch call where Agent A calls Agent B. If Agent B has forwarded calls to a ported DN that triggers an LNP query then CTC 722 AMA is NOT generated for the call. illustrates one such example of call re-direction. The following list shows all the DMS features that cause a redirection without generating CTC 722. The following figure provides an example.

- All types of CFW (call forwarding)
- AIN Essentials PODPATTR, PODP (public office dialing plan)

- AIN Essentials TERMATT (termination attempt)
- AIN Essentials DFLT (default) routing
- AC (attendant console) Night Service
- DISA (direct inward system access)
- LOD (line overflow to directory number)
- Key Stroke LOD
- 800 services
- Virtual Facility Groups (VFG)

Consequently, it is never possible to generate both CTC 721 and CTC 722 for the same call.

Figure 32-2 Call re-direction example (CFW -> LNP)



The call walkthrough of the above scenario is:

- 613-722-1234 dials 613-621-4321.
- 613-621-4321 has call forwarding ON routing to 613-621-1111.
- 613-621-1111 is a ported number that produces a query to SCP.
- Since call forwarding is a call redirecting feature listed in Table 5,CTC 722 is not generated.

32.7 LNP module 719

A new LNP module 719 is added to support billing for portability within a rate center. As a result, there are two similar LNP modules - existing module 720 and new module 719.

Prior to this activity, LNP module 720 was appended to an AMA record generated under specific call scenarios (please refer to AR2098 for those call scenarios). With this activity, instead of appending LNP module 720, LNP module 719 maybe appended to those same call scenarios. In addition, this feature appends LNP module 719 or module 720 for the following cases:

- an AMA record is generated at the originating switch and the originating DN is ported. This includes feature usage record such as CLASS, CFW activation record.
- an AMA record is generated for a call originated and terminated on the same switch to a ported DN.
- terminating study record is generated and portability information of the terminating agent is provided either in incoming signaling, SCP or switch datafill.

To control which LNP module is applicable for a given office, a new option LNP_MODULE_719 has been added in table AMAOPTS. The functions consist of implementing LNP module 719 and appending Originating LNP module or Terminating LNP module to existing AMA records. The LNP module captures portability information of the originator or terminator.

The originating LNP module is appended for the following cases:

- The originating DN has ported and an AMA record is generated on the originating switch. The AMA record may be an Originating Charge record, Originating Access record or feature usage record.
- The originating switch generates an AMA record and it cannot determine if the calling party has ported or not (i.e private trunk originated call).
- JIP is sent to the intermediate/terminating office in the IAM (or the incoming trunk group subscribes to an LRN) and an AMA record is generated at the intermediate or terminating office.

The terminating LNP module is appended for the following cases:

- A call terminates to a ported DN and an AMA record is generated. The AMA record may be a Terminating Charge record, a Terminating Access record or a terminating study record.
- An LNP query is performed
- An LRN is received in the IAM and an AMA record is generated.

A summary of the various cases where the LNP module (originating and terminating) is appended to an AMA record in DMS 100 or DMS 100/200 is provided in . Please note, these rules are applicable to DNs provisioned off the HOST as well DNs provisioned off remotes.“Table 32-1 Rules for appending LNP Module”

The following table uses the following notations:

- TERM indicates that a terminating LNP module is appended
- ORIG indicates that an originating LNP module is appended
- N/A indicates that the LNP module is not applicable or the specified AMA record is not expected for the scenario.
- TERM NOT APPENDED: indicates that the terminating LNP module is applicable but not appended by this feature.

Table 32-1 Rules for appending LNP Module (Sheet 1 of 2)

		LNP Query, Response No AMASIpID	LNP Query, Response with AMASIpId	Intraswitch call to ported DN	LRN present in incoming IAM	Ported DN originated call	JIP against Incoming trunk or in IAM
Originating Charge Record	TERM		See Note 1	TERM	N/A	ORIG	N/A
Originating Access Record	N/A		N/A	N/A	N/A	ORIG	ORIG
Terminating Charge Record	TERM		see Note 2	TERM	TERM	ORIG	N/A
Terminating Access Record	TERM		See Note 1	N/A	TERM	N/A	ORIG
CTC 720	TERM		See Note 1	N/A	TERM	N/A	ORIG
CAMA Record	TERM		See Note 1	N/A	N/A	N/A	ORIG
Originating Study Record	TERM		See Note 1	TERM	N/A	ORIG	ORIG
Feature Usage Record	TERM NOT APPENDED		See Note 1	TERM	N/A	ORIG	N/A
No-Prefix LNP Query Record - CTC 721	TERM		See Note 3	N/A	N/A	ORIG	N/A

Table 32-1 Rules for appending LNP Module (Continued) (Sheet 2 of 2)

		LNP Query, Response No AMASlpID	LNP Query, Response with AMASlpId	Intraswitch call to ported DN	LRN present in incoming IAM	Ported DN originated call	JIP against Incoming trunk or in IAM
Last Resort Record - CTC 722	TERM		See Note 3	N/A	N/A	N/A	ORIG
Terminating Study record	TERM		See Note 2	TERM	TERM	ORIG	ORIG
No Record	N/A		N/A	N/A	N/A	N/A	N/A

Note 1: When LNP query is launched and the response includes an AMASlpID, a post query record is generated. In this case, only the post query is appended with the LNP module. The pre-query record of the type indicated in the left most column is not appended with the LNP module.

Note 2: When a call generates the AMA record of the type specified in the left most column and an LNP query is launched, if the response includes an AMASlpID, a post query record is generated. In this case, a terminating LNP module is appended to the post query AMA record as well as the AMA record specified in the left most column

Note 3: When an LNP query is launched, and the response include an AMASlpID, only the post query record is generated. The terminating LNP module is appended to the post query record. CTC 721 or CTC 722 would not be generated even if it is provisioned.

The rules summarized above are also applicable to remotes. (i.e, for ported DNs off a remote.)

32.8 LNP Module

LNP module provides the portability information of the originating agent or the terminating agent. The layouts of modules 719 and 720 are shown in. the following tables.

Table 32-2 Layout of module 719 (Sheet 1 of 2)

Information	Table number	Number of Characters	Description
Module Code (719)		4 BCD	Identifies module 719.
Party Identifier	730	4 BCD	Identifies the party with which the module is associated (for example, Terminating or Originating party)

Table 32-2 Layout of module 719 (Continued) (Sheet 2 of 2)

Information	Table number	Number of Characters	Description
Location Routing Number (LRN)	731	12 BCD	Identifies the switching entity that provides service to the party. The source of the LRN may be SCP response, switch datafill or incoming signaling.
Supporting Information	734	8 BCD	Identifies the source of the LRN (for example, SCP or switch datafill) and provides information about query status.

Table 32-3 Layout of module 720

Information	Table number	Number of Characters	Description
Module Code (720)	88	4 BCD	Identifies module 720.
Party Identifier	730	4 BCD	Identifies the party with which the module is associated (for example, Terminating or Originating party)
Location Routing Number (LRN)	731	12 BCD	Identifies the switching entity that provides service to the party. The source of the LRN may be SCP response, switch datafill or incoming signaling.
Supporting Information	734	8 BCD	Identifies the source of the LRN (for example, SCP or switch datafill) and provides information about query status.
Service Provider Identity	732	10 BCD	Identifies the entity on the switch that provides local service. This field is for future use.
Location	733	16 BCD	Identifies the location of the party's switch. This field is for future use.

32.8.1 Populating the data field in LNP Module

The possible values used to populate the LNP module are described in the following sections.

32.8.1.1 Party Identifier

For service provider portability, the likely values for this field are 001C or 002C. Where 001C indicates the originating DN has ported, 002C indicates the terminating DN has ported. Refer to the AM chapter of this feature for other applicable values of this field.

32.8.1.2 Location Routing Number

The value of this field identifies the serving switch or remote for the ported party which is a 10 digit number with the format NPA-NXX-XXXX.

If the module is an originating LNP module the LRN could be the value provided in

- incoming signaling
- JIP of originating switch (or JIP of the remote if the ported party is off the remote) provisioned for the incoming trunk

If the module is a terminating LNP module the LRN could be the value provided in

- SCP response
- incoming signaling
- JIP of the terminating switch (or JIP of the remote if the ported party is off the remote)

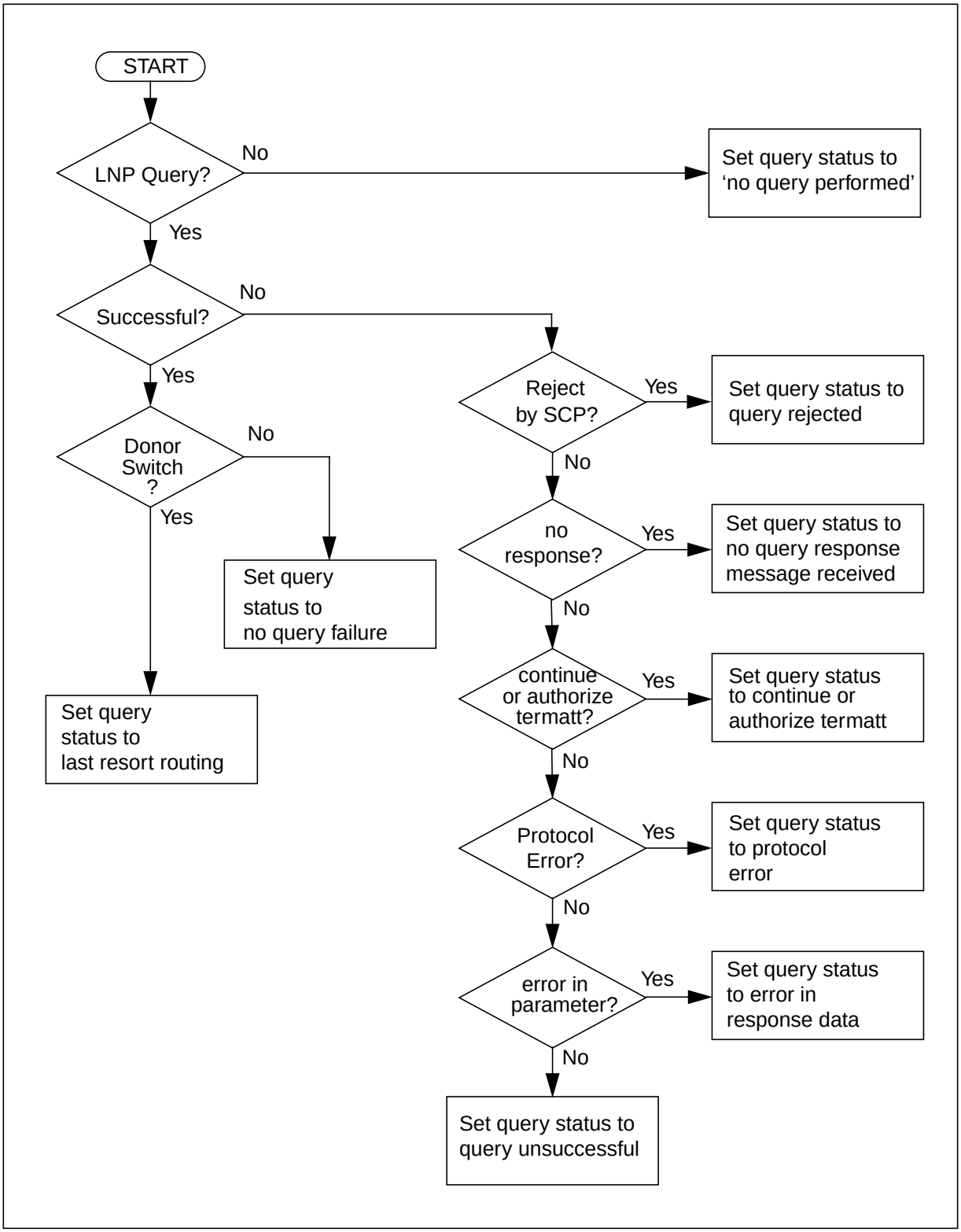
32.8.1.3 Supporting Information

The information provided in this field consists of the source of LRN and the query status value.

Depending on where the LRN is taken from, the value of source of LRN could be SCP, signaling or switch datafill.

The query status field could be populated with a number of different values. The flow chart for populating the query status field is shown in the following figure.

Figure 32-3 Flow chart for Populating the query status field



32.9 AMA enhancements for LNP

Local Number Portability introduces changes to Bellcore Automatic Message Accounting (AMA) Format recording procedures.These changes involve:

1. changing the way the Terminating NPA and Terminating Number fields are populated in charge and access records - addresses the scenario described in Section 32.1 , “Population of terminating NPA/number fields,” on page 1.
2. appending the new LNP modules 719 or 720 to identify service provider portability information of originating and terminating parties - addresses the scenario described in Section 32.2 , “Access rate calculation,” on page 2and in Section 32.4 , “Charging for database queries,” on page 4.
3. recording the new “Connecting Network Access Call Type Code 720” for calls which cross network boundaries. - addresses the scenario described in Section 32.3 , “Charging for local network interconnection,” on page 4.

In future, for switches on which lines may be “sold” to third party service providers (known as re-sellers), the LNP module information may be used to identify which service provider should receive AMA records generated for subscriber charges (for example, -station paid, message rate, local charges).

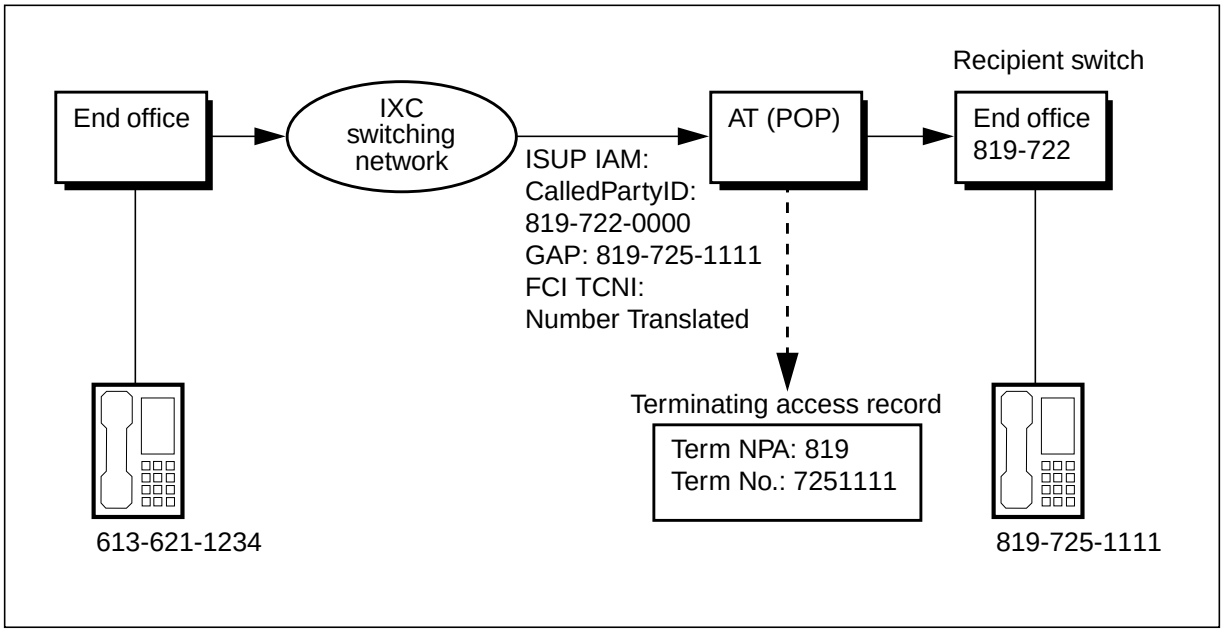
The following sections describe the billing requirements in more detail.

32.10 Populating the terminating number and terminating NPA fields

Prior to LNP, the Terminating NPA and Terminating Number field were typically populated using the translated called party number. With LNP, an incoming ISUP call with the FCI Translated Number bit set and a ported number GAP may translate using the LRN (when it is not the HLRN). If this call is billable (for example, Terminating Access charge or CAMA) the translated called number which is the LRN, should not be used to populate the Terminating NPA and Terminating Number. If the translated called number is an LRN the ported number GAP is used.

The following diagram illustrates an intra-LATA call from DN 613-621-1234 to DN 819-725-1111. The IXC in the intra-LATA switching network performs the LNP query and delivers the call the terminating network. The call is sent to the terminating network’s access tandem which routes the call using the LRN 819-722-0000 to the appropriate end-office. The access tandem records a Terminating Access record for this call. The actual terminating DN, 819-725-1111 signaled in the GAP is recorded in the Terminating NPA and Number fields.

Figure 32-4 Population of the terminating number from the GAP



32.11 The connecting network access record

AMA Call Type Code 720 is defined to support “Connecting Network Access” for calls which cross local network boundaries, but for which existing access charge recording (such as those for terminating IC access) does not apply. This new Connecting Network Access Call Type Code is used in conjunction with existing AMA Structure Code 625. AMA records that use the new Connecting Network Access Call Type Code are generated for calls incoming over interoffice trunk groups specifically marked for such recording through a per trunk group option. A refinement of this option allows the Connecting Network Access Call Type Code to only be used when the switch generating the record has performed an LNP query.

Generation of the Connecting Network Access record is controlled by provisioning options against incoming trunk groups. A new CNAR option is added to table AMATKOPT. The CNAR option contains fields LCNAR and BILLNO. The following figure provides an example of the datafill of a tuple using fields LCNAR and BILLNO.

Figure 32-5 Datafilling a tuple in table AMATKOPT

```
TABLE: AMATKOPT
>add
ENTER Y TO CONTINUE PROCESSING OR N TO QUIT
>y
CLLI:
>isupitic
OPTION:
>cnar
LCNAR:
>n
BILLNUM:
>6136754321
OPTION:
>$
TUPLE TO BE ADDED:
        ISUPITIC

(        CNAR N 6137654321)$

ENTER Y TO CONFIRM, N TO REJECT OR E TO
EDIT.
>y
TUPLE ADDED
```

The following figure illustrates a call scenario that generates the CNAR. As shown in the figure, the BILLNO field is used to identify the connecting service provider (originating number field).

Service providers may wish to generate this new record only if they have to perform a query on behalf of the originating switch. This limited recording of the Connecting Network Access record (CNA) can be achieved by setting the LCNAR field to Yes. The following figure illustrates a call generating a LCNA Record. Figure 32-7 provides an example CNAR record.

Figure 32-6 Connecting network access record generation (CNAR option)

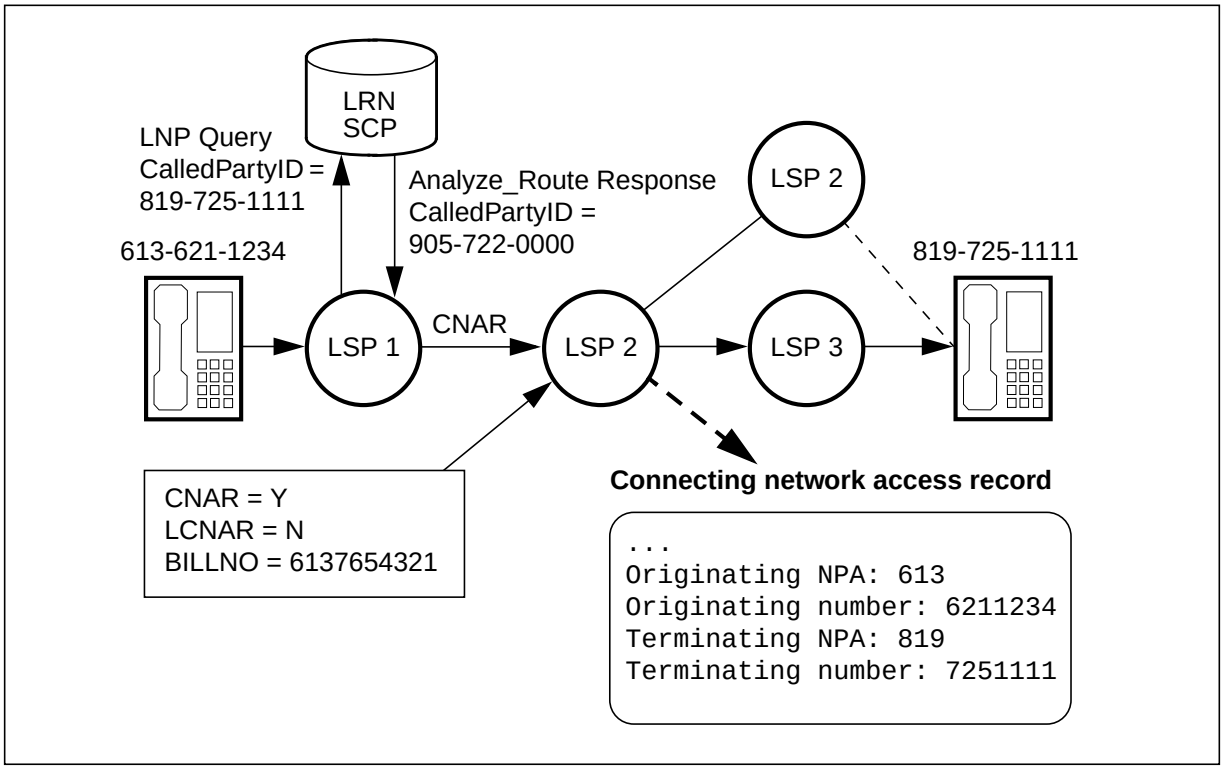


Figure 32-7 CNAR Record

```
*HEX ID:AA  STRUCTURE CODE:40625C  CALL CODE:720C  SENSOR TYPE:036C
 SENSOR ID:0000000C  REC OFFICE TYPE:036C  REC OFFICE ID:0000000C
 DATE:81215C  TIMING IND:00000C  STUDY IND:0200000C  CLD PTY OFF-HK:1C
 SERVICE OBSERVED:0C  OPER ACTION:0C  SERVICE FEATURE:000C  ORIG NPA:613C
 ORIG NUMBER:7654321C  OVERSEAS IND:0C  TERM NPA:00819C
 TERM NUMBER:7251111C  CONNECT TIME:1305444C  ELAPSED TIME:000000029C
 IC/INC PREFIX:00009C  CC DATE:81215C  CC TIME:1305394C
 ELAPSED CC:000000050C  IC/INC EVENT STATUS:001C  TRUNK GROUP NUM-
BER:30059C
 ROUTING INDICATOR:0C  DIALING INDICATOR:8C  ANI INDICATOR:0C
 MODULE CODE:025C  CIRCUIT DATE:81215C  CIRCUIT TIME:1305444C
 MODULE CODE:719C  PARTY IDENTIFIER:002C
 LOCATION ROUTING NUMBER:09057220000C  SUPPORTING INFORMATION:1010000C
  MODULE CODE:000C
```

33 Billing structures and modules

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

A new AMA module 720 is appended to existing AMA records for LNP recording.

As many as two LNP modules may be appended to the same AMA record - one containing service provider information for the originating DN and one for the terminating DN. The LNP modules containing the originator's and terminator's service provider identity are referred to as the "Originating LNP Module" and "Terminating LNP Module" respectively.

33.1 LNP module description

Number portability information that is captured in the LNP module for AMA recording consists of:

- **Party identifier** - identifies if the module contains information of the originating, terminating, billing or feature usage DN party
- **Location routing number** - records the LRN of the switch
- **Supporting information** - indicates the source of the LNP information (switch datafill, SCP response, incoming signaling) and status of the LNP query
- **Service provider identity** - indicates the service provider of the party (to be implemented)
- **Location** - identifies location of party (for example, zip code, postal code, V&H coordinates) (to be implemented)

33.2 Generation of LNP modules

The originating LNP module is appended for the following cases:

- The originating DN has ported and an AMA record is generated on the originating switch. The AMA record may be an Originating Charge record, Originating Access record or feature usage record.
- The originating switch generates an AMA record and it can NOT determine if the calling party has ported or not(i.e private trunk originated call).
- JIP is sent to the intermediate/terminating office in the IAM (or the incoming trunk group subscribes to an LRN) and an AMA record is generated at the intermediate or terminating office.

The terminating LNP module is appended for the following cases:

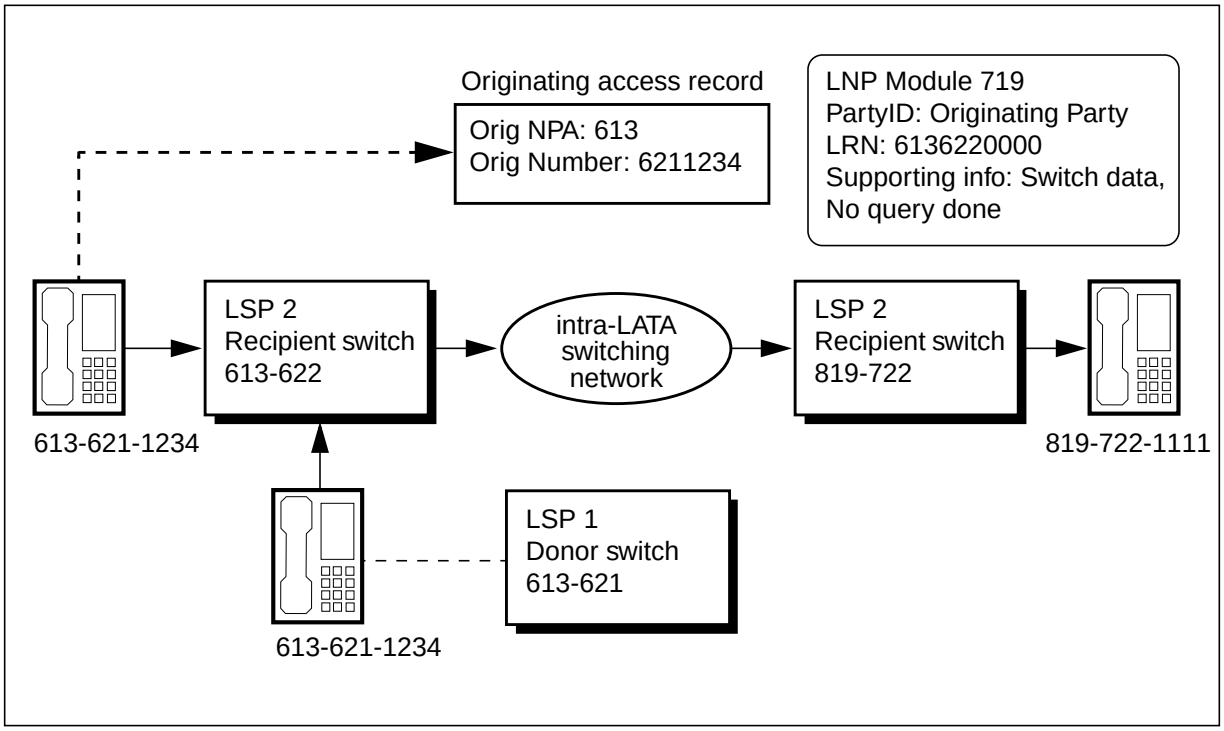
- A call terminates to a ported DN and an AMA record is generated. The AMA record may be a Terminating Charge record, a Terminating Access record or a terminating study record.
- An LNP query is performed.
- An LRN is received in the IAM and an AMA record is generated.

33.2.1 Appending the originating LNP module

The Originating LNP Module is appended to originating access AMA records and all originating charge records generated for calls originating from ported DNs.

The following diagram illustrates an intra-LATA toll call originated from a ported DN 6136211234. The originating switch records an originating access record for the call when carrier connect is received. Since the originator is ported, the switch appends an Originating LNP module to the record and contains the LRN of the switch which is designated for JIP population (613-622). The supporting information field indicates the LRN came from switch data and no query was performed.

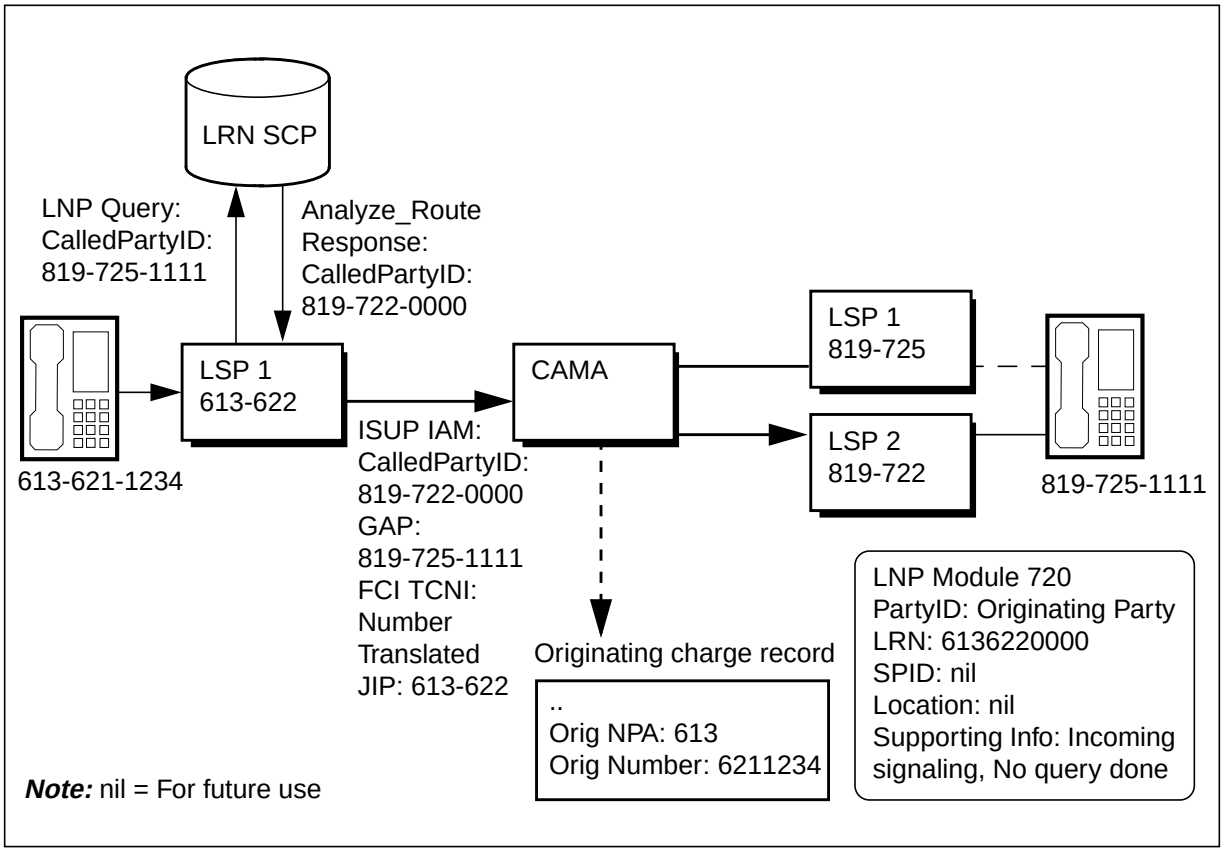
Figure 33-1 Appending the originating LNP module for originating access



If charge or access recording is being performed at an intermediate switch (for example, CAMA office) the billing system needs a means of obtaining service provider identification of the originating party. This information may be obtained from either the JIP received from the incoming IAM or the LRN option on the incoming trunk group.

The following diagram illustrates the generation of the Originating LNP Module using the contents of the JIP. A call is made from 613-621-1234 to a ported DN 819-722-1111. When the Analyze_Route response is received, the call translates and routes using the LRN to a CAMA office. The JIP containing the NPA-NXX of a designated LRN of the switch (613-622) is sent along with the CalledPartyNumber and GAP. The CAMA office determines the call is billable. The Originating LNP module is appended to the charge record. The contents of the JIP are used to populate the LRN field.

Figure 33-2 Using JIP for billing



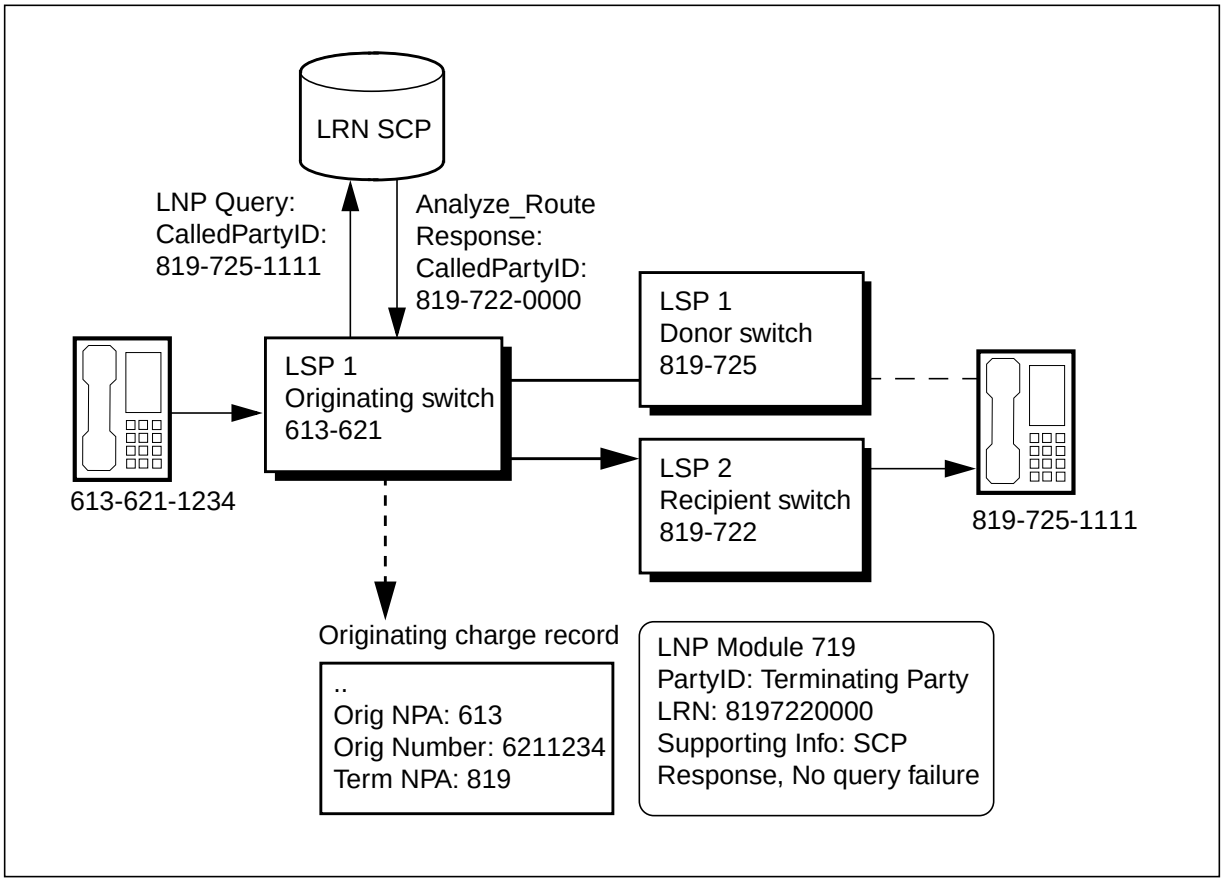
33.2.2 Appending the terminating LNP module

The Terminating LNP Module is appended to AMA records when:

- the LNP trigger is encountered and results in a query to the database in the LRN SCP
- a terminating access AMA record is generated and for a call terminating to a ported DN.

The following diagram illustrates the Terminating LNP module appended to an Originating Charge AMA record when an LNP query is performed. The originator 613-621-1234 makes a call to a ported DN 819-725-1111. This is a billable call so an originating charge record is generated containing the originating and terminating DNs. Since an LNP query was performed for the call, the Terminating LNP module is appended to the charge record. The LNP module contains the LRN supplied by the CalledPartyID parameter in the Analyze_Route. The PartyID field is set to “Terminating Party Data” and the Supporting information indicates the LRN was supplied by the LNP database and no query failure occurred.

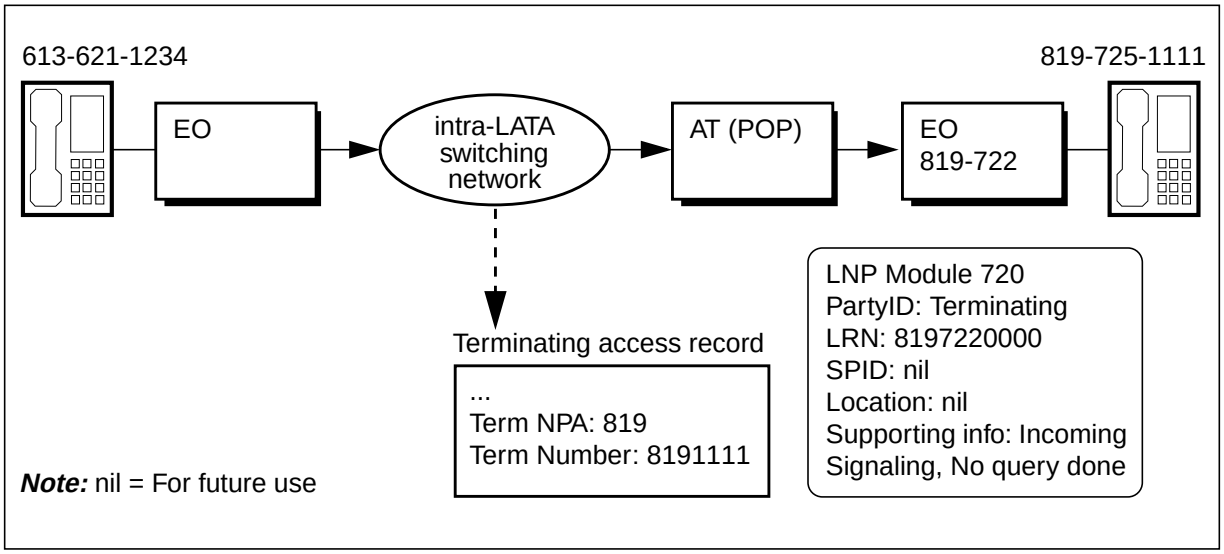
Figure 33-3 Terminating LNP Module appended to originating charge record



If a switch records a terminating or connecting network access record for a call terminating to a ported DN and incoming signaling indicates the LNP query has already been performed, a Terminating LNP module must be appended to the terminating access record for correct wire-center billing.

The following diagram illustrates an intra-LATA call from DN 613-621-1234 to DN 819-725-1111. The IXC in the intra-LATA switching network performs the LNP query and delivers the call to the terminating network. The call is sent to the terminating network's access tandem which routes the call using the LRN 819-722-0000 to the appropriate end-office. The access tandem records a Terminating Access record for this call. The actual terminating DN, 819-725-1111 signaled in the GAP is recorded in the Terminating NPA and Number fields.

Figure 33-4 Appending terminating LNP module to terminating access



33.2.2.1 Remove Terminating LNP Module from Originating Feature Access Records

This feature removes any terminating party LNP modules 719 or 720 from Originating AMA Feature records, specifically Call Type Codes (CTCs) 031, 048, and 330. This feature was introduced in the NA012 release.

The removal of LNP modules from the CTCs is due to a lack of information relevant to the terminating party at the time the associated features are activated. Because information on the terminating party is not available at the time the terminating recordss are populated, any attempt to populate the portability information of the terminator into LNP modules 719 or 720 will lead to inaccurate results.

The activity described above does not affect the recording of the terminating module from AMA records generated during call set up for this feature..

33.3 LNP module layout

The new LNP module is defined in the following tables.

Table 33-1 LNP module (module code 720)

Field Description	Bellcore AMA Format Table	Number of Characters
Module Code (720)	88	4 (BCD)
Party Identifier	730	4 (BCD)
Location Routing Number	731	12 (BCD)

Table 33-1 LNP module (module code 720) (Continued)

Field Description	Bellcore AMA Format Table	Number of Characters
Service Provider Identify	732	10 (BCD)
Location	733	16 (BCD)
Supporting Information	734	8 (BCD)

Table 33-2 Party Identifier field

BCD Character	Meaning
1-3	Party ID Type: 001 = Originating Party data 002 = Terminating Party data 003 = Billing Party data 004 = Aggregate/Feature record DN data 999 = Unknown
4	SIGN (Hex “C”)

Table 33-3 Location Routing Number field

BCD Character	Meaning
1	Constant (0)
2-11	Location Routing Number (NPA-NXX-XXXX)
12	SIGN (Hex “C”)

Table 33-4 Service Provider Identity field

BCD Character	Meaning
1	Constant (0)
2-9	Service Provider Identity
10	SIGN (Hex “C”)

Table 33-5 Location field

BCD Character	Meaning
1-3	Location Type: 001 = V & H coordinates 002 = 5 digit U.S. zip code 003 = 9 digit U.S. zip code 004 = Canadian Postal Code 005 = Longitude & Latitude 999 = Unknown
4-15	Location digits
16	SIGN (Hex “C”)

Table 33-6 Supporting Information field

BCD Character	Meaning
1	LRN Source Indicator
	1 = LNP Database
	2 = Switch Data
	3 = Incoming Signaling
	9 = Unknown
2-3	Query Failure Indicator
	01 = No query failure
	02 = No response message received
	03 = AIN CONTINUE or Authorize_Termination message received as response
	04 = Protocol Error received in response message
	05 = Error Detected in response data
	06 = Query rejected
	07 = Last resort routing
	09 = No query performed
	99 = Query unsuccessful, reason unknown
4	Reserved for Future Use (Constant = 0)
5	Reserved for Future Use (Constant = 0)
6	Reserved for Future Use (Constant = 0)
7	Reserved for Future Use (Constant = 0)
8	SIGN (Hex “C”)

Part VII
Operations, administration, maintenance and provisioning

This part consists of the following chapters:

34 Maintenance overview

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

This part provides maintenance information that helps operating company personnel maintain switch performance at acceptable levels.

LRN-LNP software requires relatively little maintenance in addition to the regular maintenance activities of the DMS SuperNode switch.

You can find information about the digital recorded announcement machine (DRAM) hardware in DRAM and EDRAM Guide, 297-1001-527. For product information on LRN-LNP, refer to the documents listed in "About this document".

34.1 Fault conditions

For information on LRN-LNP failures and system faults, refer to Chapter 40: "Trouble locating for LRN-LNP" on page 1.

34.2 Maintenance impact

You base your analysis of a switching system on a combination of maintenance and traffic indicators. These indicators provide information on the state of the system and assist in identifying actual or potential service problems.

The switch uses operational measurements (OM) that the system associates with provisioning and administration. You use the OMs to determine if adequate software and hardware resources are in place.

In addition, maintenance measurements, along with log reports, provide data that you can use to evaluate LRN-LNP performance and the impact on system performance.

34.3 Automatic maintenance

LRN-LNP does not incorporate automatic maintenance.

34.4 Manual maintenance

Because LRN-LNP is primarily a software product, you do not perform manual maintenance activities. If you perform manual maintenance, you do so on components that affect the software.

34.5 LRN-LNP card requirements

LRN-LNP software uses existing DMS-100 family hardware, CCS7 communication links, and operating company-supplied SCPs.

LRN-LNP hardware restrictions require the enhanced digital recorded announcement machine (EDRAM) card NT1X80AA and DRAM controller card NT1X75BA (instead of NT1X75AA) to play customized AIN announcements.

For calls on PRI trunks, the SCP AIN Send_To_Resource response message requires a Digitone receiver (DTR) card NT2X48CB on the maintenance trunk module (MTM) instead of the universal tone receiver (UTR) card NT6X92AA on the XMS-based peripheral module (XPM). This requirement does not apply to other call scenarios.

34.6 Routine maintenance procedures

Routine maintenance procedures ensure that both hardware and software have no faults. Routine maintenance schedules comprise tasks performed according to a predefined schedule. Refer to North American DMS-100 Routine Maintenance Procedures for procedures to complete these and other maintenance tasks.

Preventive routine maintenance for the switch includes routine exercise (REX) testing at regular intervals on DMS-100 equipment by internal software. This diagnostic test indicates whether any problems exist on the switch.

Other routine maintenance includes automatic line testing (ALT) and testing of both line circuits and attached loops. You run the ALT test on a large group of lines during a low traffic period. Maintenance activities using ALT include gathering and interpreting log reports and OMs to analyze and monitor performance factors of the switch.

34.7 Routine maintenance schedules

For DMS hardware and software, Nortel recommends a monthly schedule for preventive routine maintenance. You do not perform routine maintenance for LRN-LNP.

35 Service orders

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

SERVORD is used to assign PODN treatment to native ported-out DNs. The commands: CICP, DEL, OUT, OUTDN, CDN, CHDN and EXBDELG can be used to datafill the PODN treatment.

35.1 OUTDN prompts

A new prompt has been added to OUTDN command to accept an intercept_name. If the PODN treatment is assigned to a native DN, new assignments to the native DN cannot be done by New and EST command. QDN and QLEN display the status of the DN; whether it is ported-in or ported-out. A prompt for intercept_name has been added to the command OUTDN as shown in the following table.

Note: The option option PORT and the PODN treatment may not be provisioned when SOC option LNP00200 is IDLE. Please see the chapter "Software Optionality Control" for additional information.

Table 35-1 OUTDN prompts

PROMPT TEXT	VALID INPUT	DESCRIPTION	AREAS AFFECTED BY PROMPTS.
Intercept_name	BLDN, UNDN, ANCT, OPRT, AINT, CANN, PODN	The intercept_name prompt is added to OUTDN	OUTDN Command
intercept_name	BLDN, UNDN, ANCT, OPRT, AINT, CANN, PODN	The prompt of intercept name is expanded to include PODN as an valid input	CICP, DEL, OUT, OUTDN, SWAP, CHDN, CDN, EXBDELG

35.2 Examples of service orders

The following examples show the use of service orders, especially with respect to PODN:

- Assigning PODN by OUT: A user executes the OUT command to remove a DN which is associated with a LEN from services and put the directory number on an intercept. SERVORD prompts for a service order number, directory number, LEN, and intercept_name. The user inputs PODN for the INTERCEPT_NAME and SERVORD removes the line, assigns PODN to the DN and stores it in Table DNROUTE. The following figure shows an example of the OUT command.

Figure 35-1 Example of the OUT command in prompt mode

```
>out
SONUMBER:     NOW  76  1  3 PM
>
DN:
>7277014
LEN_OR_LTID:
>REM3  03 0 00 01
INTERCEPT_NAME:
>PODN
COMMAND AS ENTERED:
OUT NOW 76 1 3 PM 7277014 REM3 03 0 00 01 PODN
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>y
```

The following figure shows the DN status after the OUT command has been executed.

Figure 35-2 DN status after the execution of the OUT command

```
>QDN 7277014
-------------------------------------------
DN: 7277014                 (PORTED-OUT)
TYPE: NUMBER ON INTERCEPT PODN
-------------------------------------------
```

- Assigning PODN by OUTDN: A user invokes the OUTDN command to remove a block of DNs that are not associated with line equipment. SERVORD prompts for the required fields. If the user enters “YES” for BLOCK_OF_DNS, then SERVORD prompts for FROM_DN, TO_DN. If user enters “NO” for BLOCK_OF_DNS, then SERVORD prompts for a single DN. After the BLOCK_OF_DNS, SERVORD prompts for INTERCEPT_NAME. The user enters all fields with valid values and inputs PODN for the INTERCEPT_NAME. SERVORD assigns PODN to the DN, and stores it in table DNROUTE. The following figure shows an

example of the OUTDN command in prompt mode. Note that the SNPA field is not prompted when Duplicate NXX feature is activated.

Figure 35-3 Example of the OUTDN command in prompt mode

```
>outdn
SONUMBER:     NOW  97  7  5 PM
>
SNPA:
>819
BLOCK_OF_DNS:
>NO
DN:
>6221113
INTERCEPT_NAME:
>PODN
COMMAND AS ENTERED:
OUTDN NOW 97 7 5 PM 819 NO 6221113 RTE OFRT 83 PODN
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>Y
```

The following figure shows an example of the OUTDN command when Duplicate NXX is activated.

Figure 35-4 Example of OUTDN command in prompt mode when Duplicate NXX is activated

```
>outdn
SONUMBER:     NOW  98 4 5 PM
>
BLOCK_OF_DNS:
>NO
DN:
>6136631001
INTERCEPT_NAME:
>PODN
COMMAND AS ENTERED:
OUTDN NOW 98 4 5 PM 819 NO 6136631001 PODN
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>Y
```

The following figure shows the DN status after the OUT command has been executed.

Figure 35-5 DN status after the OUTDN is executed

```
> QDN 6221113
------------------------------------------------------------
DN:     6221113                        (PORTED-OUT)
TYPE: NUMBER ON INTERCEPT PODN
------------------------------------------------------------
```

- Changing a BLDN treatment to PODN treatment by CICP: A user executes the CICP command. SERVORD prompts for SONUMBER, DN and INTERCEPT_NAME. The user enters PODN for the INTERCEPT_NAME. SERVORD assigns PODN to the DN and stores it in Table DNROUTE. The following figure shows an example of the CICP command.

Figure 35-6 Example of the CICP command in prompt mode

```
>cicp
SONUMBER:     NOW  76  1  3 PM
>
DN:
>6221097
INTERCEPT_NAME:
>PODN
COMMAND AS ENTERED:
CICP NOW 76 1 3 PM 6221097 PODN
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>y
```

The following figure shows the DN status after the CICP command has been executed.

Figure 35-7 DN status after execution of the CICP command

```
> QDN 6221097
------------------------------------------------------
DN:     6221097                        (PORTED-OUT)
TYPE: NUMBER ON INTERCEPT PODN
------------------------------------------------------
```

- Replacing a DN with another DN and assigning PODN to the old DN by CDN: A user executes the CDN command. SERVORD prompts for a SONUMBER, OLD_DN, NEW_DN and INTERCEPT_NAME. The user inputs PODN for the INTERCEPT_NAME. SERVORD assigns PODN to the OLD_DN and stores it in Table DNROUTE. The following figure shows an example of the CDN command.

Figure 35-8 Example of the CDN command in prompt mode

```
>cdn
SONUMBER:     NOW  76  1  3 PM
>
OLD_DN:
>6221177
NEW_DN:
>6221097
INTERCEPT_NAME:
>PODN
COMMAND AS ENTERED:
CDN NOW 76 1 3 PM 7421177 6221097 PODN
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>y
```

The following figure shows the DN status after the CDN command has been executed.

Figure 35-9 DN status after the execution of CDN

```
> QDN 6221177
------------------------------------
DN: 6221177          (PORTED-OUT)
TYPE: NUMBER ON INTERCEPT PODN
-------------------------------------------------
```

- Deleting a DN from a hunt group and assigning PODN to the DN: A user executes the DEL command. SERVORD prompts for a SONUMBER, GROUPTYPE. If the GROUPTYPE is DNH and BNN, then SERVORD prompts for an intercept_name. The user inputs PODN for the INTERCEPT_NAME. SERVORD assigns PODN to the DN and stores it in Table DNROUTE. The following figure shows an example of the DEL command.

Figure 35-10 Example of the DEL command in prompt mode

```
>del
SONUMBER:     NOW  76  1  3 PM
>
GROUPTYPE:
>DNH
MEM_DN:
>7421177
MEM_DN:
>$
INTERCEPT_NAME:
>PODN
COMMAND AS ENTERED:
DEL NOW 76 1 3 PM DNH ( 7421177 ) $ PODN
```

The following figure shows the DN status after the DEL command has been executed.

Figure 35-11 DN status after the execution of the DEL command

```
> QDN 7421177
------------------------------------------
DN: 7421177                          (PORTED-OUT)
TYPE: NUMBER ON INTERCEPT PODN
------------------------------------------
```

- Swapping DNs and assigning PODN to the last DNs: A user executes the SWAP command. SERVORD prompts for a DN range and LENs to be swapped. It prompts for a DN option. The user inputs “INTERCEPT” as FIRST_DN_OPTIONS. SERVORD asks for an intercept_name. The user inputs PODN. SERVORD generates an error message indicating PODN cannot be assigned by SWAP. The following figure shows an example of the SWAP command.

Figure 35-12 Example of the SWAP command in prompt mode

```
>swap
SONUMBER:     NOW  97  7  6 PM
>
FROM_DN_OR_LEN:
>4671001
TO_DN_OR_LEN:
>4671002
NEXT_DN_OR_LEN:
>$
FIRSTDN:
INTERCEPT
>PODN
COMMAND AS ENTERED:
SWAP NOW 97 7 6 PM HOST 02 0 05 03 HOST 02 0 05 04 $ INTERCEPT PODN
>Y
PODN cannot be assigned via SWAP
***  ERROR - INCONSISTENT DATA  ***
```

- Deleting the primary DN of the MADN extension; bridging and assigning PODN to the primary DN: A user executes EXBDELG command. SERVORD prompts for a group_dn, out_primary, intercept_name. The user inputs the digits for the DN, Y for the out_primary and PODN for the INTERCEPT_NAME. SERVORD assigns PODN to the primary DN and stores it in table DNROUTE. The following figure shows an example of the EXBDELG command.

Figure 35-13 Example of the EXBDELG command in prompt mode

```
>DELGRP(CR)
SONUMBER: NOW 96 1 1 AM
>(CR)
GROUP_DN:
>6218001(CR)

GROUP MEMBER LIST:
PRIMARY LEN - HOST 0 1 8 21
SECONDARY LENS:
HOST 0 1 9 0 , HOST 0 1 9 1

OUT_PRIMARY:
>Y(CR)
INTERCEPT_NAME:
PODN(CR)
COMMAND AS ENTERED:
DELGRP NOW 96 1 1 AM 6218001 Y PODN
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>Y
```

The following figure shows the DN status after the EXBDELG command has been executed.

Figure 35-14 DN status after the execution of the EXBDELG command

```
> QDN 6218001
-------------------------------------------
DN:     6218001                       (PORTED-OUT)
TYPE: NUMBER ON INTERCEPT PODN
-------------------------------------------
```

- Assigning PODN to CHANGED huntgrp member by CHDN: User executes CHDN. SERVORD prompts for SONUMBER, LEN_OR_LTID, NEW_DN, INTERCEPT. Users entered PODN intercept for the INTERCEPT field. SERVORD puts the old MLH member with a unique DN on PODN intercept and changes the services to the new DN. The following figure shows an example of this.

Figure 35-15 Example of CHDN command in prompt mode

```
> CHDN
SONUMBER:     NOW  97 11 19 AM
>
LEN_OR_LTID:
>HOST  02 0 04 16
NEW_DN:
>4164631001
INTERCEPT
>PODN
COMMAND AS ENTERED:
CHDN NOW  97 11 19 AM HOST  02 0 04 16 4164631001 PODN
>y
```

- Assignment to ported-out DN by NEW is denied: A user executes the NEW command. SERVORD prompts for a DN. User inputs a DN associated with a PODN treatment. SERVORD generates an error message indicating that the DN is on intercept. The following figure shows an example of the NEW command. The SNPA field is not prompted when the duplicate NXX feature is activated.

Figure 35-16 Example of the NEW command in prompt mode

```
>new
SONUMBER:     NOW  97  7  5 PM
>
DN:
>6221096
LCC_ACC:
>1fr
LEN_OR_LTID:
>REM1  00 0 05 13
OPTION:
>$
COMMAND AS ENTERED:
NEW NOW 97 7 5 PM 6221096 1FR REM1 00 0 05 13 $
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>y
DN IS ON INTERCEPT
COMMAND AS ENTERED:
NEW NOW 97 7 5 PM 6221096 1FR REM1 00 0 05 13 $
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
```

- Assignment to ported-out DN by “EST” is not allowed: A user executes the EST command. SERVORD prompts for a pilot DN and member DN(s). If PODN is assigned to any of the DNs. An error message is generated

indicating that the DN is on intercept. The following figure shows an example of this.

Figure 35-17 Example of EST command in prompt mode

```
>est
SONUMBER:     NOW  97  7  6 PM
>
GROUPTYPE:
>DNH
PILOT_DN:
>6221112
LCC:
>1fr
PILOT_LEN:
>HOST  02 0 04 04
DN_LEN:
>$
OPTION:
>$
GROUPSIZE:
>1
COMMAND AS ENTERED:
EST NOW 97 7 6 PM DNH 6221112 1FR HOST 02 0 04 04 $ $ 1
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>y
6221112     :  IS ON INTERCEPT
***  ERROR - INCONSISTENT DATA  ***
COMMAND AS ENTERED:
EST NOW 97 7 6 PM DNH 6221112 1FR HOST 02 0 04 04 $ $ 1
```

36 Test Call

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

LNP Test Call is a capability that allows an operating company's personnel to verify proper translations and response processing for LNP calls. This tool enables them to target a specific switch for triggering at LNP.

36.1 Test Call process

At the originating switch, enter the LRN of the target switch and the subscriber's number as an input on a test call. Based on the provided LRN, the originating switch uses the routing tables to route the call over an ISUP or PTS trunk to the target switch.

In the Initial Address Message (IAM) that is generated at the originating office, the Called Party Number (CdPN) is populated with the input LRN, the subscriber's number is loaded into the Ported Number Generic Address Parameter (GAP), and the Forward Call Indicator (FCI) is set to Number Translated. This is the same as if an LNP query had been launched and the input LRN was successfully returned from SCP. The only difference is that in the case of LNP Test Call, the Test Indicator bit in the Ported Number GAP is also set to indicate that the call is an LNP test call.

Detecting its Home LRN (HLRN), the target switch determines whether the incoming IAM is for Test Call by examining the Test Indicator bit. If this bit is set, the target switch resets it back to its default value. The target switch then changes the FCI parameter to Number Not Translated and uses the stored digits in the ported number GAP to route the call.

From this point on, the call continues as a regular LRN LNP call. That is, the target switch analyzes the Ported Number GAP information and the call may

encounter the LNP trigger. In this case, the LNP processing occurs as though LNP was not previously involved in the call.

36.2 LNPTST option

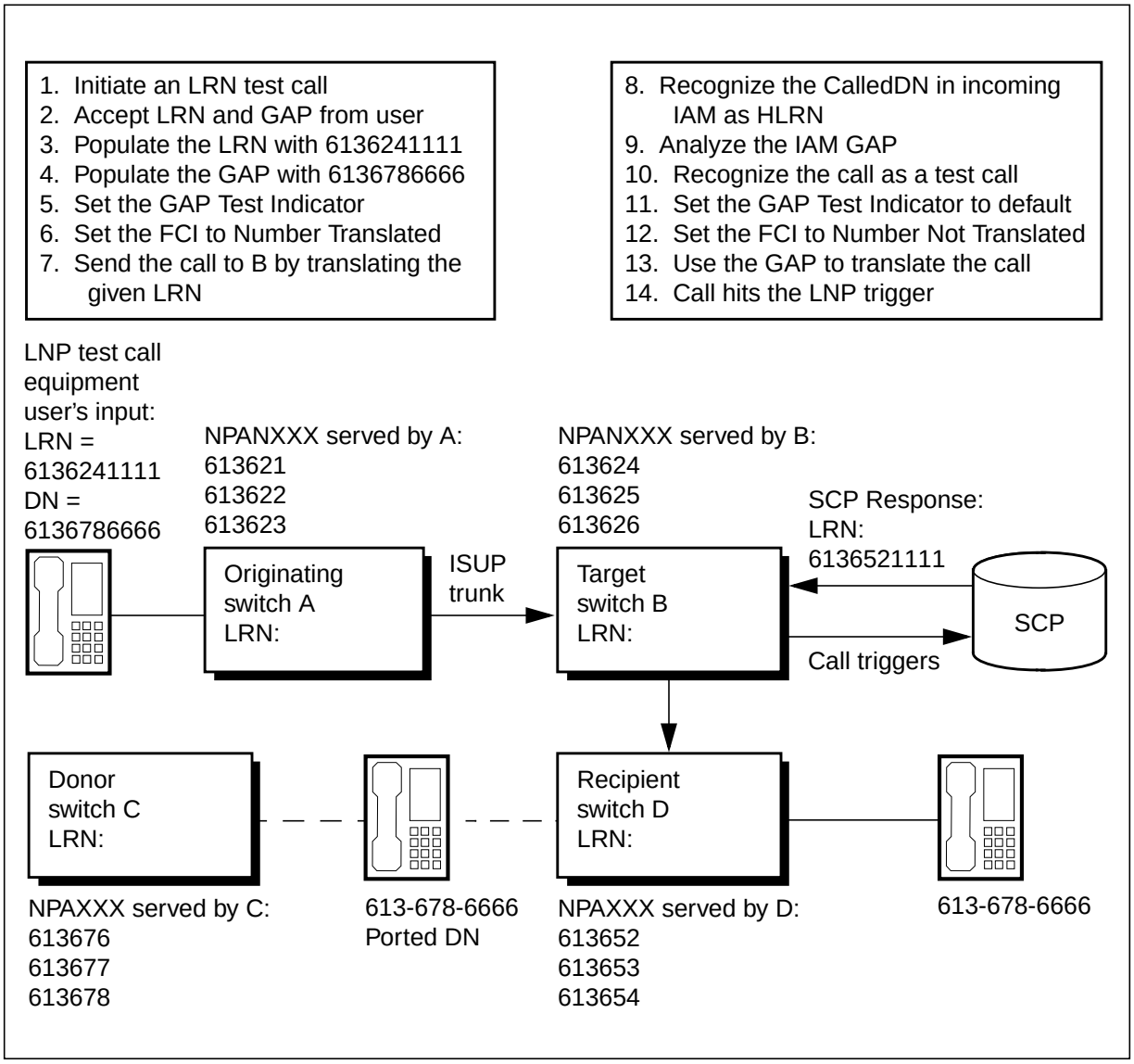
The Test Call feature adds a new option called LNPTST that can be assigned to 1FR RES lines by means of SERVORD. Subscription to this option by any other type of line is blocked by SERVORD.

SERVORD prevents the assignment of LNPTST and incompatible line options on the same line. The only line option with which LNPTST can coexist on the same line is Digitone (DGT).

36.3 Example of LNP Test Call

The following figure provides an example of an LNP TEST Call.

Figure 36-1 An example of LNP Test Call



While input collection is in progress for an LNP Test Call originating from a 1FR RES line with LNPTST option, initiation of any office wide and customer based features and options from that line is blocked.

Note: LNP Test Call is subjected to standard switch based AMA recording at originating and intermediate switches as the call routes toward the target office. In any billing record generated for a LNP Test Call on its route to the target switch, the AMA Test Bit indicator is set in order to mark the record as a test call AMA record.

37 Operational measurements for LRN-LNP

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

This chapter provides information about the operational measurements (OM) that support LRN-LNP.

OMs monitor and count the occurrences of events within the DMS SuperNode switch. This information is used for traffic provisioning, service monitoring, accounting, allocation, and market evaluation. OMs are also a useful source of information for fault indication, identification, and location.

You can schedule and route OMs to output devices by modifying the contents of specific system data tables using the table editor or command interpreter (CI) commands.

The OMs for LNP are as follows:

- LNP
  - LNPPORT
  - LNPPORT1
  - LNPQESC
  - LNPQESC1
  - LNPQFACG
  - LNPRFERR
  - LNPQFRTE
  - LNPQFSCP
  - LNPQFSSP
  - LNPQFT1
  - LNPQLRNA
  - LNPQLRNQ
  - LNPQLRNR
  - LNPQLRNV
  - LNPQRY
  - LNPQRY1
  - LNPREL
  - LNPRFCNT
  - LNPRFDSC
  - LNPRFSTR
  - LNPUADNR
  - LNPUAHOM
- TRMTCM2
  - TCMCCRG
  - TCMCCRM
  - TCMCCRP
  - TCMCCRH
  - TCMCCRT

  - — TCMMTBL
  - — TCMPODN
- TRMTFR3
  - — FRMISRTE
  - — FRQORREL

For detailed explanations of other individual OMs, including CCS7 OMs, refer to Operational Measurements Reference Manual, 297-8003-840. For detailed information about how to activate these OMs, refer to Basic Administration Procedures, 297-1001-300.

37.1 OM group LNP

OM group LNP, which holds LNP specific operational measurements, contains one tuple that keeps track of these counts on a switch-wide basis.

Description: OM group LNP counts number of LNP events that occur, including

- queries launched
- queries escaped
- query failures
- response failures
- calls misrouted to unallocated numbers

To calculate the total number of LNP queries performed by a switch, the formula is LNPQRY1 * 32767 + LNPQRY + LNPQFSSP

Release history: LNP was created in NA007.

The OM registers in the LNP group are divided as follows:

- registers incremented in a triggering switch
- registers incremented in a terminating switch
- registers used for QLRN purposes

37.1.1 LNP OM registers incremented in a triggering switch

The following table provides information on the OM registers incremented in a triggering switch. Information is provided on each individual register in the

group, its release history, related registers and logs, and if applicable, a method of validating the register output.

Table 37-1 LNP OM registers incremented in a triggering switch (Sheet 1 of 3)

LNPQRY	**Description:** The number of calls that encounter an LNP trigger that results in an LNP SCP query. **Associated registers:** None **EXT registers:** LNPQRY1 **Release history:** LNPQRY was created in NA007.
LNPQRY1	**Description:** The number of calls that encounter an LNP trigger that results in an LNP SCP query. This register handles LNPQRY overflows. **Associated registers:** None **Release history:** LNPQRY1 was created in NA007.
LNPQFT1	**Description:** The number of calls that encounter an LNP trigger that results in an LNP SCP query, but that query failed due to T1 timer expiry. **Associated registers:** None **Release history:** LNPQFT1 was created in NA007.
LNPRFERR	**Description:** The number of calls that encounter an LNP trigger that results in an LNP SCP query, but that query failed because the response contained a fatal protocol error or application error. **Associated registers:** None **Release history:** LNPRFERR was created in NA007.
LNPQFRTE	**Description:** The number of calls that encounter an LNP trigger that result in an LNP SCP query, but the query cannot be launched because of a problem with SS7. **Associated registers:** None **Release history:** LNPQFRTE was created in NA007.
LNPQESC	**Description:** The number of calls that encounter an LNP trigger and that result in the trigger being escaped. **Associated registers:** None **EXT registers:** LNPQESC1 **Release history:** LNPQESC was created in NA007.

Table 37-1 LNP OM registers incremented in a triggering switch (Continued)

LNPQESC1	**Description:** The number of calls that encounter an LNP trigger that result in the trigger being escaped. This is the extension register of LNPQESC. **Associated registers:** None **Release history:** LNPQESC1 was created in NA007.
LNPQFACG	**Description:** The number of queries blocked by ACG. **Associated registers:** None **Release history:** LNPQFACG was created in NA007.
LNPQFSCP	**Description:** This register is incremented if the SCP reported a fatal protocol error or application error in the query message. **Associated registers:** None **Release history:** LNPQFSCP was created in NA007.
LNPQFSSP	**Description:** This OM is pegged in the following two scenarios: 1. DMS is unable to build the LNP query message (i.e. software resources or data unavailable. 2. DMS is unable to send the LNP query out onto the SS7 network. (i.e. problem with SS7 network, Local LNP subsystem down, LNP link or routeset down) **Associated registers:** None **Release history:** LNPQFSSP was created in NA007.
LNPRFCNT	**Description:** The number of continue responses that the system receives. **Associated registers:** None **Release history:** LNPRFCNT was created in NA007.
LNPRFDSC	**Description:** The number of disconnect responses that the system receives. **Associated registers:** None **Release history:** LNPRFDSC was created in NA007.
LNPRFSTR	**Description:** The number of send to resource responses that the system receives. **Associated registers:** None **Release history:** LNPRFSTR was created in NA007.

Table 37-1 LNP OM registers incremented in a triggering switch (Continued)

LNPPORT	**Description:** The number of calls that encounter an LNP trigger where: • the trigger results in an LNP SCP query, and • the SCP's response contained an LRN (not the dialed number) **Associated registers:** None **EXT registers:** LNPPORT1 **Release history:** LNPPORT was created in NA007.
LNPPORT1	**Description:** The number of calls that encounter an LNP trigger where: • the trigger results in an LNP SCP query, and • the SCP's response contained an LRN (not the dialed number) This register is used only in case the LNPPORT overflows. **Associated registers:** None **Release history:** LNPPORT1 was created in NA007.
LNPREL	**Description:** The number of calls that encounter an LNP trigger where: • the trigger results in an LNP SCP query, but • the call associated with that LNP query encountered an ISUP REL message with a cause of 26 **Associated registers:** None **Release history:** LNPREL was created in NA007.
Note: Information that does not apply to the individual registers is omitted from that entry in the table.	

37.1.2 LNP OM registers incremented in a terminating switch

The following table provides information on the OM registers incremented in a terminating switch. Information is provided on each individual register in the

group, its release history, related registers and logs, and if applicable, a method of validating the register output.

Table 37-2 LNP OM registers incremented in a terminating switch

LNPUADNR	**Description:** The number of calls that encounter an unallocated/vacant number indication in the donor switch following: • an LNP query in this switch or • another switch as indicated by the TCNI in the FCI parameter with no “ported number” GAP **Associated registers:** None **Release history:** LNPUADNR was created in NA007.
LNPUAHOM	**Description:** The number of LNP calls that encounter unallocated/vacant indication when: • the switch’s own LRN has been detected after an LNP query in this switch or • after an LNP query in another switch as indicated by the TCNI in the FCI parameter and the “ported number” GAP **Associated registers:** None **Release history:** LNPUAHOM was created in NA007.
Note: Information that does not apply to the individual registers is omitted from that entry in the table.	

37.1.3 LNP OM registers used for QLRN purposes

The following table provides information on the registers used for QLRN purposes. Information is provided on each individual register in the group, its release history, related registers and logs, and if applicable, a method of validating the register output.

Table 37-3 LNP OM registers used for QLRN purposes (Sheet 1 of 2)

LNPQLRNQ	**Description:** The number of queries sent by QLRN. **Associated registers:** TCMSGOUT, TCINVKL (TCAPUSAG group). **Validation formulas:** 1 LNPQLRNQ = 1 TCMSGOUT = 1 TCINVKL. **Release history:** LNPQLRNQ was created in NA008.

Table 37-3 LNP OM registers used for QLRN purposes (Continued) (Sheet 2 of

LNPQLRNR	**Description:** The number of responses received by QRLN. **Associated registers:** TCMSGIN, TCQWPERM, TCRESPNS (TCAPUSAG group). **Validation formulas:** 1 LNPQLRNR = 1 TCMSGIN = 1 TCPRESPNS. **Release history:** LNPQLRNR was created in NA008.
LNPQLRNV	**Description:** The number of valid responses received by QLRN. A valid response includes the following information: • routing number • calling party DN • office CLLI • data and start time • elapsed time **Associated registers:** None **Release history:** LNPQLRNV was created in NA008.
LNPQLRNA	**Description:** The number of time the system prompts the customer for, and the customer chooses to, override ACG blocking controls. **Associated registers:** BLKCASCP, BLKCASMS, SCPOVLDO, SMSOVLDO (AINACG group). These registers mark information about ACG blocked queries. **Validation formulas:** 1 LNPQLRNA 1 (BLKCASCP + BLKCASMS + SCPOVLDO + SMSOVLDO) = 0 QLRN increments one of the two registers when the system prompts the customer to continue if a blocking control is found. **Release history:** LNPQLRNA was created in NA008.
Note: Information that does not apply to the individual registers is omitted from that entry in the table.	

37.1.4 OM group LNP example

The following figure shows an example of the register contents in the LNP group.

Figure 37-1 Example of OM group LNP

```
   LNPQRY    LNPQRY1     LNPQFT1    LNPRFERR
LNPQFRTE    LNPQESC    LNPQESC1    LNPQFACG
LNPQFSCP   LNPQFSSP    LNPRFCNT    LNPRFDSC
LNPRFSTR    LNPPORT    LNPPORT1      LNPREL
LNPUADNR   LNPUAHOM    LNPQLRNQ    LNPQLRNR
LNPQLRNV   LNPQLRNA
```

37.2 OM group TRMTCM2

OM group TRMTCM2 is a feature-related treatment extension. Registers in this OM group are automatically incremented whenever the corresponding treatment is applied. Registers FRMISRTE and FRQORREL are FRSPR9 and FRSPR10 respectively in CSP07.

Associated OM groups: None

Release history: TRMTCM2 was created in BCS33.

The following table provides information on the OM registers incremented. Information is provided on each individual register in the group, its release history, related registers and logs, and if applicable, a method of validating the register output.

Table 37-4 LNP OM registers incremented in a triggering switch (Sheet 1 of 2)

TCMCCRG	**Description:** The number of times a call routes to treatment CCRG (cumulative charge restriction for general subscribers). **Associated registers:** None **Release history:** TCMCCRG was created in CSP008.
TCMCCRH	**Description:** The number of times a call routes to treatment CCRH (cumulative charge restriction for PHS subscribers). **Associated registers:** None **Release history:** TCMCCRH was created in CSP008.
TCMCCRM	**Description:** The number of times a call routes to treatment CCRM (cumulative charge restriction for mobile subscribers). **Associated registers:** None **Release history:** TCMCCRM was created in CSP008.

Table 37-4 LNP OM registers incremented in a triggering switch (Continued)

TCMCCRP	**Description:** The number of times a call routes to treatment CCRP (cumulative charge restriction for payphone subscribers). **Associated registers:** None **Release history:** TCMCCRP was created in CSP008.
TCMCCRT	**Description:** The number of times a call routes to treatment CCRT (cumulative charge restriction for third-party billed calls). **Associated registers:** None **Release history:** TCMCCRT was created in CSP008.
TCMPODN	**Description:** The number of times a ported out directory number (PODN) treatment occurs. The operating company specifies PODN treatment for calls to a directory number with a native NPA-NXX that has moved to another switch. **Associated registers:** None **Release history:** TCMPODN was created in NA009.
TCMMTBL	**Description:** The number of times a mobile trouble treatment occurs. **Associated registers:** None **Release history:** TCMMTBL was created in BCS33.

Note: Information that does not apply to the individual registers is omitted from that entry in the table.

37.3 OM group TRMTFR3

OM group TRMTFR3 is a feature-related treatment extension. The system automatically increments registers in this OM group whenever the corresponding treatment applies. Registers FRMISRTE and FRQORREL are FRSPR9 and FRSPR10 respectively in CSP07.

Associated OM groups

- TRMTCM/TRMTCM2: customer-related miscellaneous treatments
- TRMTCU/TRMTCU2: customer unauthorized related treatments
- TRMTER: equipment related treatments
- TRMTFR/TRMTFR2: feature related treatments
- TRMTPR: protocol related treatments
- TRMTRS: resource shortage treatments

Release history: TRMTFR3 was created in NA007.

The following table provides information on the OM registers incremented. Information is provided on each individual register in the group, its release history, related registers and logs, and if applicable, a method of validating the register output.

Table 37-5 LNP OM registers incremented in a triggering switch

FRMISRTE	**Description:** The number of call attempts to ported DNs that terminate to an unallocated number treatment in the terminating switch. **Associated registers:** None **Release history:** FRMISRTE was created in NA007.
FRQORREL (Note 2)	**Description:** The number of times a treatment applies to a call. This treatment builds and sends a REL message with a cause value of NP_QoR_Number_Not_Known. **Associated registers:** None **Release history:** FRQORREL was created in NA007.

Note 1: Information that does not apply to the individual registers is omitted from that entry in the table.

Note 2: Since QoR is not applicable in North America the FRQORREL register is never pegged.

37.4 Recovery

LNP is not considered to significantly impact system recovery time during restarts.

Table and data structure initialization done at IPL time have little or no impact during other restart times.

38 Translation verification tool for LRN-LNP

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

The Translation Verification tool (TRAVER) is a low level diagnostic tool that simulates a call from a user-specified origination to a user-specified destination, allowing a customer to perform translation verification. TRAVER displays the AIN specific translation, routing, and trigger subscription information. It also indicates whether or not trigger criteria has been met. TRAVER is enhanced to show when an LNP trigger is encountered. Since TRAVER only simulates a call, a query message is not sent to the LNP SCP.

Any changes that are required by the AIN application for LNP are mirrored in AIN TRAVER code. This includes all Query and Response processing, and SOC changes. Translation verification tool TRAVER is modified to reflect the functionality of LNP translation.

The encountering of the LNP trigger is displayed in the trace portion of TRAVER in the same manner as any other trigger encountered at the Info_Analyzed TDP.

If the LNP trigger is encountered and criteria are met, TRAVER stops tracing and states that a query would be launched to the database.

TRAVER is enhanced to accept an extra DN parameter. This new parameter permits simulation of LNP SCP response processing, by allowing the user to specify the Original_dialed DN as well as the CalledPartyID on the command line.

38.1 New parameters for LNP TRAVER

TRAVER command allows customer to perform translation verification. For the purpose of LNP translation, a number of new parameters are added to the TRAVER command.

38.1.1 TCNI: Translated Called Number Indicator.

This parameter indicates that the Translated Called Number Indicator (bit M) in the FCI parameter of the ISUP IAM is set to Number Translated. It indicates that an LNP query has been performed on a previous switch.

When a call originated from an ISUP trunk and Number Translated is set in the IAM, then TCNI should be used in the TRAVER. If a GAP is present in the IAM, then TCNI should have the 10_digit GAP as its parameter, otherwise ‘n’ is used. Please refer to Figure 38-1 on page 3 for a TRAVER example with TCNI parameter.

38.1.2 LNPAR: LNP Analyze Route

This is a new Response Type of the option AINRES. This response type is used to signify that the TRAVER being performed is for an Analyze_Route response resulting from an LNP data base query. This sub-option requires one parameter - Original_Called_DN.

When verifying the LNP response translation, LNPAR should be used. Please refer to Figure 38-2 on page 3 for a TRAVER example with LNPAR parameter.

38.1.3 Number Pooling Enhancements

TRAVER has been modified for Number Pooling subscribers. TRAVER now allows for LNP and MBG information to be entered on the command line. Please refer to Section 13.4 , “Enhanced Functionality,” on page 34.

38.2 TRAVER enhancement

TRAVER enhancements are covered under the following topics:

- command syntax
- summary of new parameters
- foreign LRN enhancement
- TRAVER examples

38.2.1 Command syntax

The called number in the following TRAVER examples can be a 7 or 10 digit number. This applies to trunk TRAVERs only. Figure 38-1 on page 3 provides a TRAVER command example for incoming ISUP LNP calls with FCI bit M (Translated Called Number indicator) set to Number Translated. Figure 38-2 on page 3 provides a TRAVER command example for AIN LNP trigger responses.

Figure 38-1 TRAVER command—incoming ISUP LNP calls with FCI bit M set

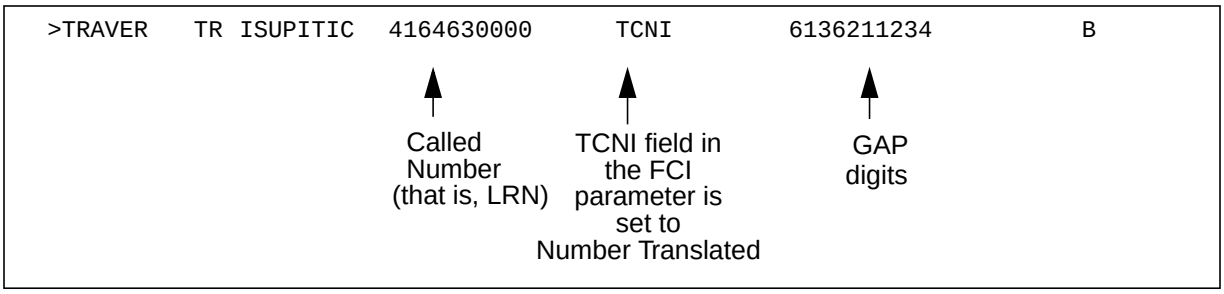
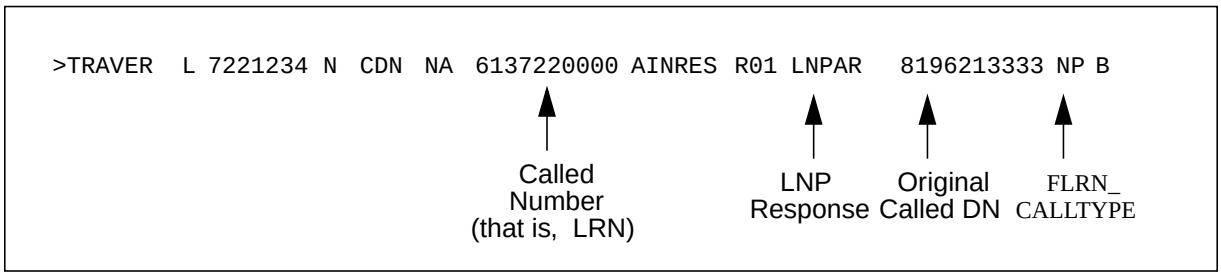


Figure 38-2 TRAVER command example for AIN LNP trigger responses



38.2.2 Summary of new parameters

There are some new parameters are introduced for the purpose of LNP translation. They are: TCNI, LNPAR, LRN and GAP. The following table gives a summary of these parameters.

Table 38-1 New Parameter Definition (Sheet 1 of 2)

Parameter	Value	Definition
TCNI	None	For ISUP-originating calls, this parameter indicates that the Translated Called Number Indicator (bit M) in the FCI parameter of the ISUP IAM is set to Number Translated. It indicates that an LNP query has been performed on a previous switch. This option has an optional parameter GAP_DIGITS. See description for GAP_DIGIT below.
LNPAR	None	This is a new Response Type of the option AINRES. This response type is used to signify that the TRAVER being performed is for an Analyze_Route response resulting from an LNP data base query. This sub-option requires one parameter-Original_Called_DN. See description of `ORIG_CALLED_ DN', below.

Table 38-1 New Parameter Definition (Continued) (Sheet 2 of 2)

Parameter	Value	Definition
GAP_DIGITS	10-digit DN or N	This is an optional parameter of the Traver option TCNI. This 10-digit represents the GAP, as contained in the incoming ISUP message. If “N” is entered, it indicate no GAP is present.
ORIG_CALLED_DN	N or a 10-digit DN	This is the required parameter for the suboption LNPAR of AINRES. A value of “N” indicates that the ORIG_CALLED_DN is the same as the Called DN returned from the SCP (a parameter of TRAVER CDN). The TRAVER output in this case is changed in NA008 and NA009.
FLRN_CALLTYPE	NONE	No calltype specified - default calltype of NP used in FLRN translations
	NP	No Prefix calltype used for FLRN translations
	DD	No Prefix calltype used for FLRN translations

38.2.3 Foreign LRN enhancement

With this activity, Call Processing stores pre-LNP trigger call classification parameter values in order to use them during post-LNP trigger Call Processing. Pre-LNP trigger and post-LNP trigger TRAVERs are two separate TRAVERs, so, unfortunately, pre-LNP trigger data cannot easily be stored for use in a post-LNP trigger TRAVER. A solution for this problem is to add a new command line option to TRAVER. This new option allows a craft person to enter a desired pre-LNP trigger call type on the CI command line, when using TRAVER to verify FLRN translations.

The following two call types can be specified: NP (No Prefix) for local calls or DD (Direct Dialed) for toll calls. The user specified call type overrides call type determined based on the translation tables datafill.

To warn a craft person that the NP call type is used, and not DD call type determined by translations, the following message is output to the TRAVER trace:

LNP Info: Call Type set to NP for FLRN translation,

In the opposite case the following message is output:

LNP Info: Call Type set to DD for FLRN translation

At the beginning of the TRAVER trace, the above warning massage is always displayed to indicate that NP or DD call type is imposed. Since call type may

not be specified at the CI command line, TRAVER assumes that a default NP call type is used during FLRN translation.

Additional changes have been made to the way TRAVER performs LCA screening during FLRN translations It is performed on Called Party DN. If the LCABILL option is datafilled, TRAVER gets the pre-LNP trigger values by performing LCA screening on the Called Party DN entered on the command line. In this case, a message is displayed at the TRAVER trace in order to provide a warning:

LNP Info: LCABILL on - Billing done on basis of pre-query LCA screening.

38.2.4 TRAVER examples

The TRAVER examples in this section demonstrate LNP triggering and translations. The following table lists the examples and their corresponding figures.

Note: In all the LNP response TRAVER examples in this section the Response Translation Simplification Feature has been used.

Table 38-2 List of TRAVER examples (Sheet 1 of 3)

TRAVER example	Figure number
Call routed to a resident DN (same NPA)	Figure 38-3 on page 8
Call routed to a resident DN ported from another switch; no special routing info provided in table LNPCODE	Figure 38-4 on page 10
Call routed to a resident DN ported from another switch; special routing info provided in table LNPCODE	Figure 38-5 on page 12
Call to a ported DN, call triggers	Figure 38-6 on page 14
Call to a resident ported DN, LNPl trigger is escaped	Figure 38-7 on page 16
Line origination, Foreign LRN returned from SCP	Figure 38-8 on page 18
MF Trk org, Foreign LRN returned from SCP	Figure 38-9 on page 20
Call originating from an ISUP trunk with TCNI field set to Number Translated and Home LRN as the CdPN; no special routing info provided in LNPCODE	Figure 38-10 on page 21
Call originating from an ISUP trunk with TCNI field set to Number Translated and Home LRN as the CdPN; special routing info provided in LNPCODE	Figure 38-11 on page 22

Table 38-2 List of TRAVER examples (Continued) (Sheet 2 of 3)

TRAVER example	Figure number
ISUP trunk origination, terminating to MF trunk	Figure 38-12 on page 23
Line origination, Home LRN returned from SCP; no special routing info provided in LNPCODE	Figure 38-13 on page 24
Line origination, Home LRN returned from SCP; special routing info provided in LNPCODE	Figure 38-14 on page 26
Line origination, Dialed DN returned from SCP, dialed DN resident on querying switch	Figure 38-15 on page 27
Trunk origination, dialed DN returned from SCP, dialed DN has PORT option	Figure 38-16 on page 27
Trunk origination, terminating to ISUP trunk, SPN set	Figure 38-17 on page 29
Line origination, terminating to ISUP trunk, SPN set	Figure 38-18 on page 31
TRAVER examples for TCNI N digits	Figure 38-19 on page 32
TRAVER for calls to PBX lines ported from another switch	Figure 38-20 on page 33
Trunk origination, Home LRN received but the GAP is not resident	Figure 38-21 on page 34
Trunk Origination, Home LRN Received, GAP not resident, but NPDIGMAP indicated new mapping for Called DN	Figure 38-22 on page 35
Line origination, Home LRN returned from SCP	Figure 38-23 on page 36
LNPRTE allows triggering after routing out of STDPRTCT with T selector	Figure 38-24 on page 38
LNPRTE allows triggering after routing out of CLSVSCRC	Figure 38-25 on page 40
NP and DD pre-query calltype examples; NP specified	Figure 38-26 on page 43
NP and DD pre-query calltype examples; DD specified	Figure 38-27 on page 45
NP and DD pre-query calltype examples; LCABILL option on	Figure 38-28 on page 48
TRAVER example—error response 1	Figure 38-29 on page 53
TRAVER example—error response 2	Figure 38-30 on page 53

Table 38-2 List of TRAVER examples (Continued) (Sheet 3 of 3)

TRAVER example	Figure number
TRAVER example—error response 3	Figure 38-31 on page 53
TRAVER example—error response 4	Figure 38-32 on page 54
TRAVER example—error response 5	Figure 38-33 on page 54
64k Data call using information elements	Figure 38-34 on page 55
64k Data call without information elements (normal dialing)	Figure 38-35 on page 58
Changing the TON from National (NA) to Unknown (UN)	Figure 38-36 on page 61
Optional removal of NPA in areas where 1+10-digit dialing is mandatory.	Figure 38-37 on page 63 Figure 38-38 on page 64

Figure 38-3 Call routed to a resident DN (same NPA)

```
traver l 4164671001 4671002 b
TABLE LINEATTR
400 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_PUB_400 L416_LATA1_400 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_PUB_400 NSCR 416 PUB TSPS N $
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
416 Y 772 1 ( 90) ( 1) ( 4) ( 0) 0 $
 . SUBTABLE HNPACODE
 . 467 467 DN 416 467
TABLE TOFCNAME
416 467 $
TABLE DNINV
416 467 1002 L HOST 02 0 04 16
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
```

Figure 38-3 Call routed to a resident DN (same NPA)

```
LNP Info: Called DN is resident.
LNP Info: Called DN has native NPANXX.
LNP Info: HNPA results are used.
TABLE LCASCRCN
416 L416 ( 27) OPTL N N
 . SUBTABLE LCASCR
 . 467 467
TABLE PFXTREAT
OPTL NP Y NP UNDT
AIN Info Collected TDP: no subscribed trigger.
TABLE FNPA7DIG
TUPLE NOT FOUND
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
Checking AIN LNP Trigger Items as LNP is compatible with current call
AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 LINE                  4164671002         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-4 Call to a resident DN ported from another switch; no special routing in LNPCODE

```
traver l 4164671001 6637001 b
TABLE LINEATTR
400 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_PUB_400 L416_LATA1_400 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_PUB_400 NSCR 416 PUB TSPS N $
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
416 Y 772 1 ( 90) ( 1) ( 4) ( 0) 0 $
 . SUBTABLE HNPACODE
 . 6637001 663709 LRTE 730
 . SUBTABLE RTEREF
 .  730 T OFRT 730
 .  . TABLE OFRT
 .  .  730 S D C1C0_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is resident.
LNP Info: Called DN has non-native NPANXX.
```

Figure 38-4 Call to a resident DN ported from another switch; no special routing in LNPCODE

```
LNP Info: HNPA results not used.
TABLE LNPCODE
TUPLE NOT FOUND
LNP Info: Ported DN termination in effect.
TABLE TOFCNAME
613 663 (NONNATIVE ) $
TABLE DNINV
613 663 7001 L REM1 01 0 02 09
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LCASCRCN
416 L416 ( 27) OPTL N N
 . SUBTABLE LCASCR
 . 663 663
TABLE PFXTREAT
OPTL NP Y NP UNDT
AIN Info Collected TDP: no subscribed trigger.
TABLE FNPA7DIG
416 663 663 613
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
Checking AIN LNP Trigger Items as LNP is compatible with current call
 .  . TABLE OFCTIID
 .  . 4 L613663 ON
 .  . TABLE TRIGITM
 .  . 4 L613663 LNP (DG 613663) (ESCEA ) (ESCOP ) (ESCDN ) $ ULK EVENT
R01 SS7 AINPOP
 .  .     $
Not triggering due to criteria: ESCDN
AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 LINE                  6136637001         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-5 Call to a resident DN ported from another switch; special routing in LNPCODE

```
traver l 4164671001 6637001 b
TABLE LINEATTR
400 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_PUB_400 L416_LATA1_400 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_PUB_400 NSCR 416 PUB TSPS N $
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
416 Y 772 1 ( 90) ( 1) ( 4) ( 0) 0 $
 . SUBTABLE HNPACODE
 . 6637001 663709 LRTE 730
 . SUBTABLE RTEREF
 .  730 T OFRT 730
 .  . TABLE OFRT
 .  .  730 S D C1C0_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is resident.
LNP Info: Called DN has non-native NPANXX.
LNP Info: HNPA results not used.
TABLE LNPCODE
416 613663700 6136637043 T IBNRTE 855
```

Figure 38-5 Call to a resident DN ported from another switch; special routing in LNPCODE

```
 .TABLE IBNRTE
 . 855 VFG N N N AIN613 613
LNP INFO: VFG digit manipulation on LNP information not permitted
LNP INFO: IF LNP query occurs and the called DN is non-ported,
LNP INFO: send the call to RODR

 .  .TABLE DIGMAN
 .  .  613
 .  .EXIT TABLE DIGMAN
 .
 .EXIT TABLE IBNRTE
EXIT TABLE LNPCODE
LNP Info: Routing based on LNPCODE result.
TABLE LCASCRCN
416 L416 ( 27) OPTL N N
 . SUBTABLE LCASCR
 . 663 663
TABLE PFXTREAT
OPTL NP Y NP UNDT
AIN Info Collected TDP: no subscribed trigger.
TABLE FNPA7DIG
416 663 663 613
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
Checking AIN LNP Trigger Items as LNP is compatible with current call
 .  . TABLE OFCTIID
 .  . 4 L613663 ON
 .  . TABLE TRIGITM
 .  . 4 L613663 LNP (DG 613663) (ESCEA ) (ESCOP ) (ESCDN ) $ ULK EVENT
R01 SS7 AINPOP
 .  .     $
Not triggering due to criteria: ESCDN
AIN Info Analyzed TDP: trigger criteria not met.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 VFG: AIN613           6637001            ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-6 Call to a ported DN, call triggers

```
traver l 4164671001 4638003 b
TABLE LINEATTR
400 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_PUB_400 L416_LATA1_400 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_PUB_400 NSCR 416 PUB TSPS N $
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
416 Y 772 1 ( 90) ( 1) ( 4) ( 0) 0 $
 . SUBTABLE HNPACODE
 . 463 463 DN 416 463
TABLE TOFCNAME
416 463 $
TABLE DNINV
416 463 8003 D BLDN
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE TMTCNTL
LNT ( 46)
 . SUBTABLE TREAT
```

Figure 38-6 Call to a ported DN, call triggers

```
 . BLDN Y T OFRT 50
 . TABLE OFRT
 .   50 S D VDN
 .      S D *OFLO
 .      S D LKOUT
 . EXIT TABLE OFRT
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
TABLE LCASCRCN
416 L416 ( 27) OPTL N N
 . SUBTABLE LCASCR
 . 463 463
TABLE PFXTREAT
OPTL NP Y NP UNDT
AIN Info Collected TDP: no subscribed trigger.
TABLE FNPA7DIG
TUPLE NOT FOUND
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
Checking AIN LNP Trigger Items as LNP is compatible with current call
 .  . TABLE OFCTIID
 .  . 4 L416463 ON
 .  . TABLE TRIGITM
 .  . 4 L416463 LNP (DG 416463) (ESCEA ) (ESCOP ) (ESCDN ) $ ULK EVENT
R01 SS7 AINPOP
 .  .     $
 .  .  . TABLE C7GTTYPE
 .  .  . AINPOP ANSI7 6 $
 .  .  . TABLE C7GTT
 .  .  . AINPOP 4164638003 4164638003 PCSSN (SIMTOOL_RTESET SIMTOOL3 0)
$ SSN
AIN Info Analyzed TDP: trigger criteria met.
Querying the database.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

AIN Info Analyzed TDP: trigger criteria met.
Querying the database.
LNP Info: Displaying pre-query translations result.
LNP Info: It is used if the database indicates the called DN is
non-ported

TREATMENT ROUTES.  TREATMENT IS: BLDN
1 VDN
2 *OFLO
3 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

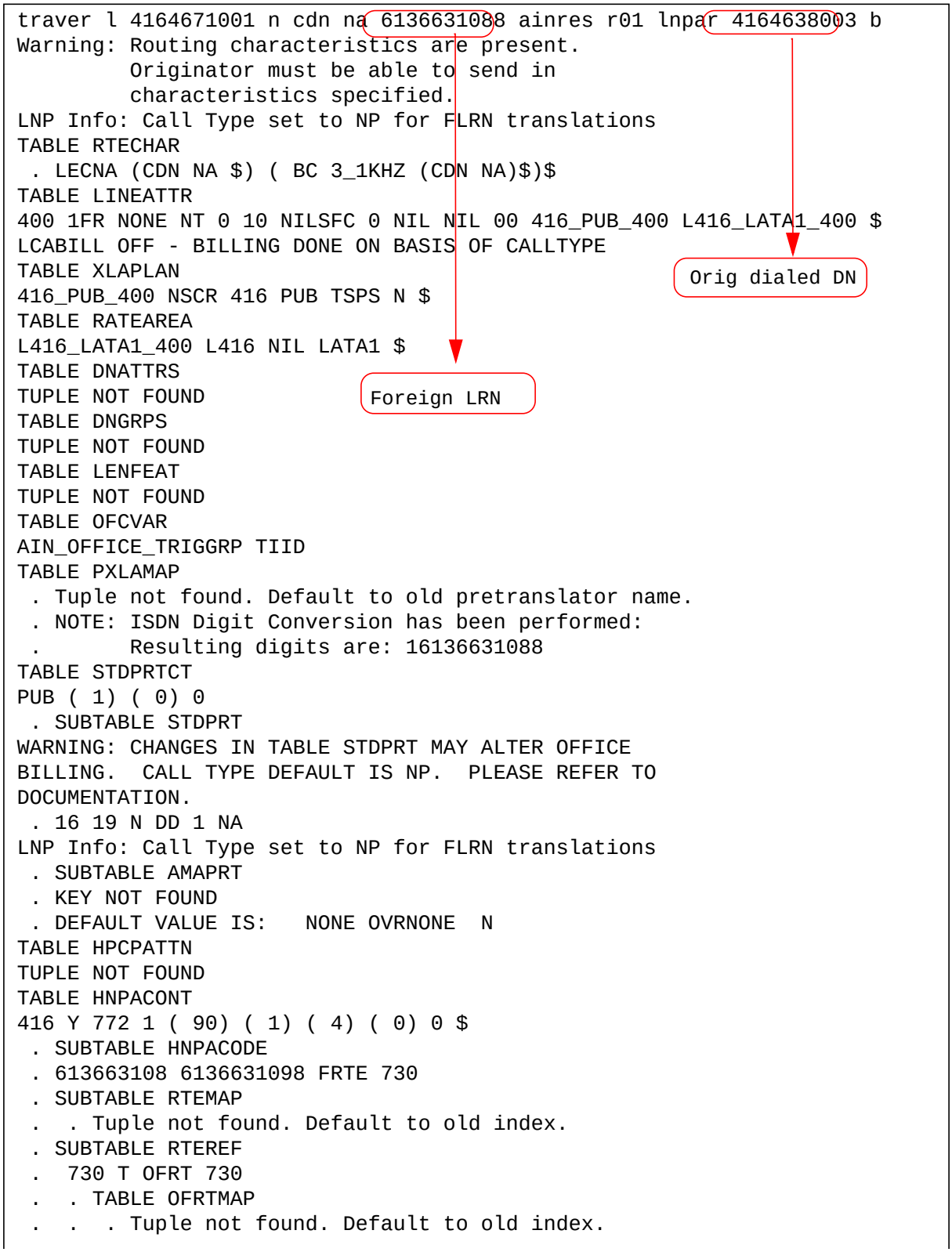
Figure 38-7 Call to a resident ported DN, LNP trigger is escaped

```
traver l 4164671001 9637004 b
TABLE LINEATTR
400 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_PUB_400 L416_LATA1_400 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_PUB_400 NSCR 416 PUB TSPS N $
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
416 Y 772 1 ( 90) ( 1) ( 4) ( 0) 0 $
 . SUBTABLE HNPACODE
 . 9637004 963709 LRTE 747
 . SUBTABLE RTEREF
 .  747 T OFRT 747
 .  . TABLE OFRT
 .  .  747 S D C1S1_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is resident.
LNP Info: Called DN has non-native NPANXX.
LNP Info: HNPA results not used.
TABLE LNPCODE
TUPLE NOT FOUND
LNP Info: Ported DN termination in effect.
```

Figure 38-7 Call to a resident ported DN, LNP trigger is escaped

```
TABLE TOFCNAME
905 963 (NONNATIVE ) $
TABLE DNINV
905 963 7004 L HOST 05 1 06 02
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LCASCRCN
416 L416 ( 27) OPTL N N
 . SUBTABLE LCASCR
 . 963 963
TABLE PFXTREAT
OPTL NP Y NP UNDT
AIN Info Collected TDP: no subscribed trigger.
TABLE FNPA7DIG
416 963 963 905
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
Checking AIN LNP Trigger Items as LNP is compatible with current call
 .  . TABLE OFCTIID
 .  . 4 L905963 ON
 .  . TABLE TRIGITM
 .  . 4 L905963 LNP (DG 905963) (ESCEA ) (ESCOP ) (ESCDN ) $ ULK EVENT
R01 SS7 AINPOP
 .  .     $
Not triggering due to criteria: ESCDN
AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 LINE                  9059637004         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-8 Line origination, Foreign LRN returned from SCP

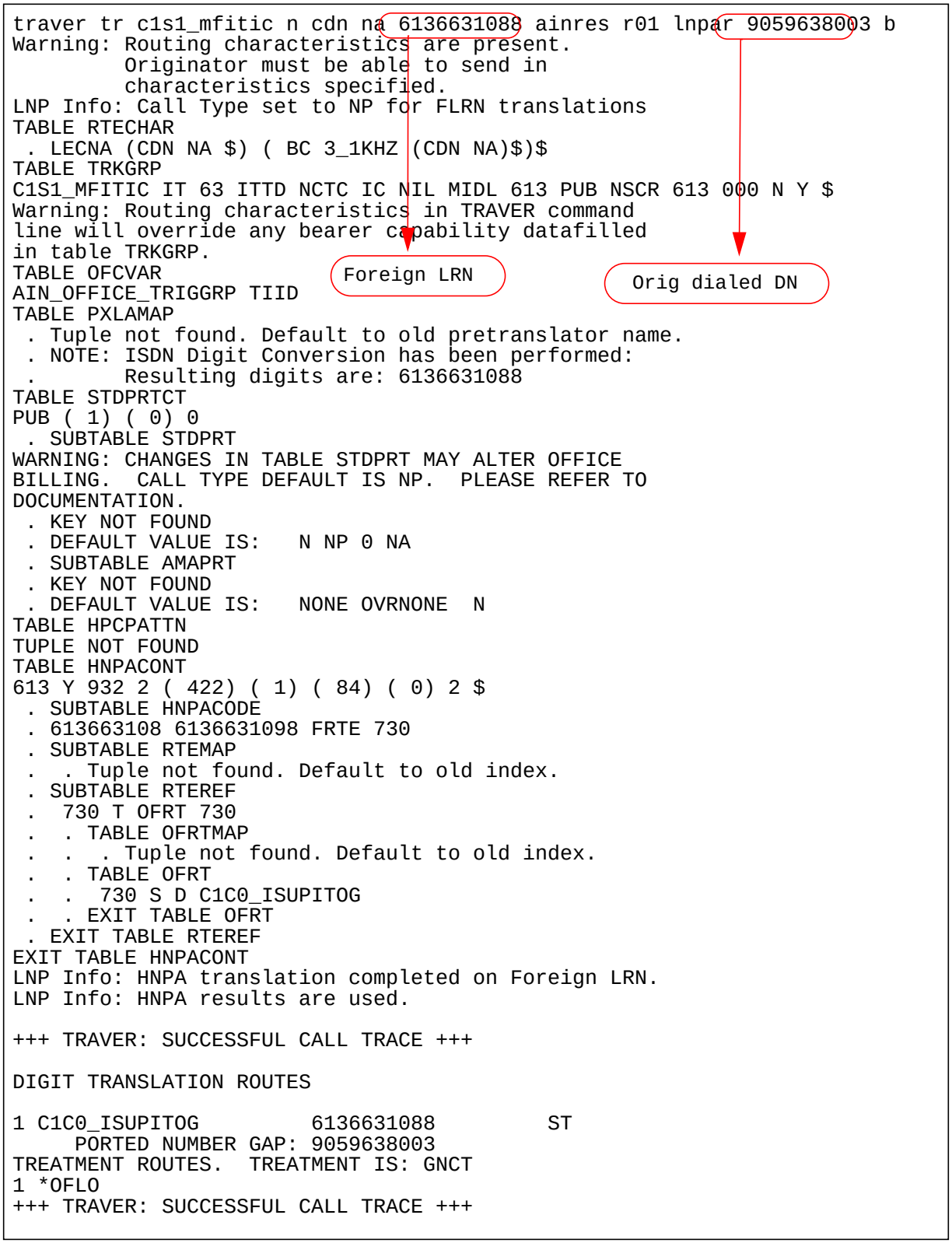



```
traver l 4164671001 n cdn na 6136631088 ainres r01 lnpar 4164638003 b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
LNP Info: Call Type set to NP for FLRN translations
TABLE RTECHAR
 . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE LINEATTR
400 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_PUB_400 L416_LATA1_400 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_PUB_400 NSCR 416 PUB TSPS N $
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE PXLAMAP
 . Tuple not found. Default to old pretranslator name.
 . NOTE: ISDN Digit Conversion has been performed:
 .       Resulting digits are: 16136631088
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . 16 19 N DD 1 NA
LNP Info: Call Type set to NP for FLRN translations
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
416 Y 772 1 ( 90) ( 1) ( 4) ( 0) 0 $
 . SUBTABLE HNPACODE
 . 613663108 6136631098 FRTE 730
 . SUBTABLE RTEMAP
 .  . Tuple not found. Default to old index.
 . SUBTABLE RTEREF
 .  730 T OFRT 730
 .  . TABLE OFRTMAP
 .  .  . Tuple not found. Default to old index.
```

Figure 38-8 Line origination, Foreign LRN returned from SCP

```
 .  . TABLE OFRT
 .  .  730 S D C1C0_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: HNPA translation completed on Foreign LRN.
LNP Info: HNPA results are used.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 C1C0_ISUPITOG         6136631088         ST
     PORTED NUMBER GAP: 4164638003

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-9 MF Trunk origination, Foreign LRN returned from SCP




```
traver tr c1s1_mfitic n cdn na 6136631088 ainres r01 lnpar 9059638003 b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
LNP Info: Call Type set to NP for FLRN translations
TABLE RTECHAR
 . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE TRKGRP
C1S1_MFITIC IT 63 ITTD NCTC IC NIL MIDL 613 PUB NSCR 613 000 N Y $
Warning: Routing characteristics in TRAVER command
line will override any bearer capability datafilled
in table TRKGRP.
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE PXLAMAP
 . Tuple not found. Default to old pretranslator name.
 . NOTE: ISDN Digit Conversion has been performed:
 .       Resulting digits are: 6136631088
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 422) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 613663108 6136631098 FRTE 730
 . SUBTABLE RTEMAP
 .   . Tuple not found. Default to old index.
 . SUBTABLE RTEREF
 .  730 T OFRT 730
 .   . TABLE OFRTMAP
 .   .   . Tuple not found. Default to old index.
 .   . TABLE OFRT
 .   .  730 S D C1C0_ISUPITOG
 .   . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: HNPA translation completed on Foreign LRN.
LNP Info: HNPA results are used.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 C1C0_ISUPITOG         6136631088         ST
     PORTED NUMBER GAP: 9059638003
TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-10 Call from ISUP trunk—TCNI field set to Number Translated—Home LRN as the CdPN—no special routing in LNPCODE

```
traver tr sain_isupitic 4164631088 tcni 6136637001 b
TABLE TRKGRP
SAIN_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 P621 NSCR 613 000 N Y $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
LNP Info: Home LRN received.
LNP Info: Bypassing STDPRTCT and HNPACONT translations.
LNP Info: Orig Called DN is resident.
TABLE LNPCODE
TUPLE NOT FOUND
LNP Info: Ported DN Termination in effect.
TABLE HOMELRN
416 463 $ (SITE (HOST)$)$
TABLE TOFCNAME
613 663 (NONNATIVE ) $
TABLE DNINV
613 663 7001 L REM1 01 0 02 09
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
AIN Info Collected TDP: no subscribed trigger.
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
Skipping AIN LNP Trigger Items as LNP is NOT compatible with current
call
AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 LINE                  6136637001         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-11 Call from ISUP trunk— TCNI field set to Number Translated—Home LRN as the CdPN—special routing in LNPCODE

```
traver tr sain_isupitic 4164631088 tcni 6136637001 b
TABLE TRKGRP
SAIN_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 P621 NSCR 613 000 N Y $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
LNP Info: Home LRN received.
LNP Info: Bypassing STDPRTCT and HNPACONT translations.
LNP Info: Orig Called DN is resident.
TABLE LNPCODE
613 613663700 613663700 T IBNRTE 855
 .TABLE IBNRTE
 . 855 VFG N N N AIN613 613
 .  .TABLE DIGMAN
 .  .  613
 .  .EXIT TABLE DIGMAN
 .
 .EXIT TABLE IBNRTE
EXIT TABLE LNPCODE
LNP Info: Routing based on LNPCODE result.
TABLE HOMELRN
416 463 $ (SITE (HOST)$)$
AIN Info Collected TDP: no subscribed trigger.
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
Skipping AIN LNP Trigger Items as LNP is NOT compatible with current
call
AIN Info Analyzed TDP: trigger criteria not met.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 VFG: AIN613           6136637001         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-12 ISUP Trunk origination, terminating to MF trunk (at intermediate switch)

```
traver tr sain_isupitic 9059632099 tcni 4164639021 b
TABLE TRKGRP
SAIN_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 P621 NSCR 613 000 N Y $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE STDPRTCT
P621 ( 1) ( 0) 1
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . 90 910 N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HNPACONT
613 Y 932 2 ( 422) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 905963209 905963209 FRTE 750
 . SUBTABLE RTEREF
 .  750 T OFRT 750
 .  . TABLE OFRT
 .  .  750 S D C1S1_MFITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: HNPA translation completed on Foreign LRN.
LNP Info: HNPA results are used.
AIN Info Collected TDP: no subscribed trigger.
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
Skipping AIN LNP Trigger Items as LNP is NOT compatible with current
call
AIN Info Analyzed TDP: trigger criteria not met.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 C1S1_MFITOG           4164639021         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-13 Line origination—Home LRN returned from SCP—no special routing in LNPCODE

```
 traver l 4164671001 n cdn na 4164631077 ainres r01 lnpar 6136637001 b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
TABLE RTECHAR
 . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE LINEATTR
400 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_PUB_400 L416_LATA1_400 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_PUB_400 NSCR 416 PUB TSPS N $
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
LNP Info: Home LRN received.
LNP Info: Bypassing STDPRTCT and HNPACONT translations.
LNP Info: Orig Called DN is resident.
TABLE LNPCODE
TUPLE NOT FOUND
LNP Info: Ported DN Termination in effect.
TABLE HOMELRN
416 463 $ (SITE (HOST)$)$
TABLE TOFCNAME
613 663 (NONNATIVE ) $
TABLE DNINV
613 663 7001 L REM1 01 0 02 09
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
```

Figure 38-13 Line origination—Home LRN returned from SCP—no special routing in LNPCODE

```
TABLE DNGRPS
TUPLE NOT FOUND
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 LINE                  6136637001         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-14 Line origination—Home LRN returned from SCP—special routing in LNPCODE

```
traver l 4164671001 n cdn na 4164631077 ainres r01 lnpar 6136637001 b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
TABLE RTECHAR
 . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE LINEATTR
400 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_PUB_400 L416_LATA1_400 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_PUB_400 NSCR 416 PUB TSPS N $
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
LNP Info: Home LRN received.
LNP Info: Bypassing STDPRTCT and HNPACONT translations.
LNP Info: Orig Called DN is resident.
TABLE LNPCODE
416 613663700 6136637043 T IBNRTE 855
 .TABLE IBNMAP
 .  .Tuple not found. Default to old index.
 .TABLE IBNRTE
 . 855 VFG N N N AIN613 613
 .  .TABLE DIGMAN
 .  .  613
 .  .EXIT TABLE DIGMAN
 .
 .EXIT TABLE IBNRTE
EXIT TABLE LNPCODE
LNP Info: Routing based on LNPCODE result.
TABLE HOMELRN
416 463 $ (SITE (HOST)$)$

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 VFG: AIN613           6136637001         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-15 Line Origination, Dialed DN returned from SCP, dialed DN is resident

```
traver l 4164671001 n cdn na 4164631021 ainres r01 lnpar n b
LNP Info: Call processing will use pre-query translations
LNP Info: result to route this call.
```

Whenever an LNP agent dials a portable number and an LNP query is launched, and LNP response processing determines that the dialed DN (terminator) is not ported, then AIN response translations are avoided. The prequery translations result is still valid and is used.

AIN 0.1 Response Translations (re-translations) are avoided only when the terminator status is found to be not ported. This is determined when the dialed digits are identical to the CalledPartyID parameter in the Analyze_Route response.

In cases where the PORT option is assigned to the called DN and an LNP query is launched, LNP response processing invokes AIN Essentials response translations and retranslates the call. The prequery translations result is not used.

Figure 38-16 Trunk origination, dialed DN returned from SCP, dialed DN has PORT option

```
traver tr c1c0_isupitic n cdn na 4164631021 ainres r01 lnpar n b
LNP Info: Port option has been assigned to the called DN.
LNP Info: Using response translations result to route call.
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
TABLE RTECHAR
 . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE TRKGRP
C1C0_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 PUB NSCR 613 000 N Y $
Warning: Routing characteristics in TRAVER command
line will override any bearer capability datafilled
in table TRKGRP.
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE PXLAMAP
 . Tuple not found. Default to old pretranslator name.
 . NOTE: ISDN Digit Conversion has been performed:
 .       Resulting digits are: 4164631021
```

Figure 38-16 Trunk origination, dialed DN returned from SCP, dialed DN has PORT option

```
TABLE STDPRTCT
PUB ( 1) ( 0) 0
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 422) ( 1) ( 84) ( 0) 2 $
 . SUBTABLE HNPACODE
 . 416 416 HNPA 0
 . 463 463 DN 416 463
TABLE TOFCNAME
416 463 $
TABLE DNINV
416 463 1021 L HOST 02 0 05 25
TABLE DNFEAT
416 463 1021 (PORT ) $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
LNP Info: HNPA translation completed on Called DN.
LNP Info: HNPA results are used.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 LINE                  4164631021         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-17 Trunk origination, terminating to ISUP trunk, SPN set (at intermediate switch)

```
traver tr s1c0_isupitic 9059631099 tcni 4164739351 b
TABLE TRKGRP
S1C0_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 PUB NSCR 613 000 N Y $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
LNP Info: Home LRN received.
LNP Info: Bypassing STDPRTCT and HNPACONT translations.
LNP Info: Orig Called DN is resident.
TABLE LNPCODE
TUPLE NOT FOUND
LNP Info: Ported DN Termination in effect.
TABLE HOMELRN
905 963 $ (SITE (HOST)$)$
TABLE TOFCNAME
416 473 (NONNATIVE ) $
TABLE DNINV
416 473 9351 L HOST 01 1 02 05
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
AIN Info Collected TDP: no subscribed trigger.
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
Skipping AIN LNP Trigger Items as LNP is NOT compatible with current
call
AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 LINE                  4164739351         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-18 Line origination, terminating to ISUP, SPN set

```
traver l 9059671001 n cdn na 4164631077 ainres r01 lnpar 9059637621
np b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
LNP Info: Call Type set to NP for FLRN translations
TABLE RTECHAR
 . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE LINEATTR
402 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 905_PUB_326 L905_LATA1_402 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
905_PUB_326 NSCR 905 PUB TSPS N $
TABLE RATEAREA
L905_LATA1_402 L905 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE PXLAMAP
 . Tuple not found. Default to old pretranslator name.
 . NOTE: ISDN Digit Conversion has been performed:
 .       Resulting digits are: 4164631077
TABLE STDPRTCT
PUB ( 1) ( 0) 1
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
905 Y 772 1 ( 91) ( 1) ( 0) ( 0) 3 $
 . SUBTABLE HNPACODE
 . 416463107 4164631087 FRTE 747
 . SUBTABLE RTEMAP
 .  . Tuple not found. Default to old index.
 . SUBTABLE RTEREF
 .  747 T OFRT 747
```

Figure 38-18 Line origination, terminating to ISUP, SPN set

```
.  . TABLE OFRTMAP
 .  .  . Tuple not found. Default to old index.
 .  . TABLE OFRT
 .  .  747 S D S1C1_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: HNPA translation completed on Foreign LRN.
LNP Info: HNPA results are used.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 S1C1_ISUPITOG         9059637621         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-19 TRAVER example for TCNI N digits (at intermediate switch)

```
traver tr s1c1_isupitic 9059631001 tcni n b
TABLE TRKGRP
S1C1_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 PUB NSCR 613 000 N Y $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE STDPRTCT
PUB ( 1) ( 0) 1
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HNPACONT
613 Y 930 20 ( 122) ( 1) ( 0) ( 0) 0 $
 . SUBTABLE HNPACODE
 . 905 905 HNPA 0
 . 963 963 DN 905 963
TABLE TOFCNAME
905 963 $
TABLE DNINV
905 963 1001 L HOST 01 1 12 04
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
LNP Info: HNPA translation completed on Called DN.
LNP Info: HNPA results are used.
AIN Info Collected TDP: no subscribed trigger.
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
Skipping AIN LNP Trigger Items as LNP is NOT compatible with current
call
AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.
+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES
1 LINE                  9059631001         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-20 TRAVER for calls to PBX lines ported from another switch

```
.traver tr s1c0_isupitic 9059631099 tcni 4164638651 b
TABLE TRKGRP
S1C0_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 PUB NSCR 613 000 N Y $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
LNP Info: Home LRN received.
LNP Info: Bypassing STDPRTCT and HNPACONT translations.
LNP Info: Orig Called DN is resident.
TABLE LNPCODE
TUPLE NOT FOUND
LNP Info: Ported DN Termination in effect.
TABLE HOMELRN
905 963 $ (SITE (HOST)$)$
TABLE TOFCNAME
416 463 (NONNATIVE ) $
TABLE DNINV
416 463 8651 T OFRT 58
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
 . TABLE OFRT
 .   58 ISA N N N S1C1_PRI_2WAY PVT 0 PVT 100
 .  . TABLE TRKGRP
 .  . S1C1_PRI_2WAY PRA 0 PRAC NCRT ASEQ N (ISDN 661) $ $
 .  . TABLE LTCALLS
 .  . ISDN 661 PVT XLAIBN 600 613_PUB_325 L613_NILLA_101 COMKODAK 0 0$
 .  . TABLE DIGMAN
 .  .   100 (DTO 5)
 .  . EXIT TABLE DIGMAN
 . EXIT TABLE OFRT
AIN Info Collected TDP: no subscribed trigger.
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
Skipping AIN LNP Trigger Items as LNP is NOT compatible with current
call
AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES
1 S1C1_PRI_2WAY      N CDN PVT L 38651 PRVT 0 BC SPEECH

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120
+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-21 Trunk Origination, Home LRN received but the GAP is not resident

```
traver tr s1c0_isupitic 9059630000 tcni 4164638877 b
TABLE TRKGRP
S1C0_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 PUB NSCR 613 000 N Y $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
LNP Info: Home LRN received.
LNP Info: Bypassing STDPRTCT and HNPACONT translations.
TABLE NPDIGMAP
TUPLE NOT FOUND
LNP WARNING: Misrouted call. Orig Called DN is not resident.
             Call sent to treatment.
TABLE TMTCNTL
ITTRKGRP ( 110)
 . SUBTABLE TREAT
 . LNPM Y T OFRT 50
 . TABLE OFRT
 .   50 S D VDN
 .      S D *OFLO
 .      S D LKOUT
 . EXIT TABLE OFRT

+++ TRAVER: SUCCESSFUL CALL TRACE +++



TREATMENT ROUTES.  TREATMENT IS: LNPM
1 VDN
2 *OFLO
3 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-22 Trunk Origination, Home LRN Received, GAP not resident, but NPDIGMAP indicated new mapping for Called DN

```
traver tr s1c0_isupitic 9059630000 tcni 8194639001 b
TABLE TRKGRP
S1C0_ISUPITIC IT 63 ITTD NCRT IC NIL MIDL 613 PUB NSCR 613 000 N Y $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
LNP Info: Home LRN received.
LNP Info: Bypassing STDPRTCT and HNPACONT translations.
LNP Info: Original GAP non-resident
LNP Info: Changing GAP digits based on NPDIGMAP results
TABLE NPDIGMAP
819463 416 463
LNP Info: Orig Called DN is resident.
TABLE LNPCODE
TUPLE NOT FOUND
LNP Info: Ported DN Termination in effect.
TABLE HOMELRN
905 963 $ (SITE (HOST)$)$
TABLE TOFCNAME
416 463 (NONNATIVE ) $
TABLE DNINV
416 463 9001 L HOST 00 1 06 00
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
AIN Info Collected TDP: no subscribed trigger.
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
Skipping AIN LNP Trigger Items as LNP is NOT compatible with current call
AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 LINE                  4164639001         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

The following figure illustrates the scenario in which the SCP returns the Home LRN in response to an LNP query. Normally, if the number dialed has not been ported, the SCP should return the original dialed number in the response. However, as the example illustrates, if the HLRN is returned, the call is still terminated on the Dialed DN.

Figure 38-23 Line origination, Home LRN returned from SCP

```
traver l 9059631021 n cdn na 9059630000 ainres r01 lnpar 4164639001 b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
TABLE RTECHAR
 . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE IBNLINES
HOST 01 0 02 07 0 DT STN RES 9631021 405 905_PUB_405 L905_LATA1_402
905 $
TABLE LINEATTR
405 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 905_PUB_405 L905_LATA1_402 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
905_PUB_405 NSCR 905 PUB TSPS Y RESG905 0 0 $
TABLE RATEAREA
L905_LATA1_402 L905 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG905 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE NCOS
RESG905 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND
DIGCOL
RESG905 NXLA RX905 RXCFNXXX 0 RES
TABLE DIGCOL
RES specified: RES digit collection
TABLE XLAMAP
 . Tuple not found. Default is use original XLANAME.
TABLE IBNXLA: XLANAME RX905
TUPLE NOT FOUND
Default from table XLANAME:
RX905
    (NET N N 0 N NDGT N Y GEN ( LATTR 415 905_EAP1_415
L905_LATA1_402)
    (EA NILC Y 0) $ $)$ 9
```

Figure 38-23 Line origination, Home LRN returned from SCP

```
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
415 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 905_EAP1_415 L905_LATA1_402
$
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
905_EAP1_415 NSCR 905 EAP1 TSPS Y RESG905 0 0 $
TABLE RATEAREA
L905_LATA1_402 L905 NIL LATA1 $
LNP Info: Home LRN received.
LNP Info: Bypassing STDPRTCT and HNPACONT translations.
LNP Info: Orig Called DN is resident.
TABLE LNPCODE
TUPLE NOT FOUND
LNP Info: Ported DN Termination in effect.
TABLE HOMELRN
905 963 $ (SITE (HOST)$)$
TABLE TOFCNAME
416 463 (NONNATIVE ) $
TABLE DNINV
416 463 9001 L HOST 00 1 06 00
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LATAXLA
TUPLE NOT FOUND
ASSUMED TO BE DEFAULT INTRALATA, INTRASTATE, STD
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 LINE                  4164639001         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-24 LNPRTE allows triggering after routing out of STDPRTCT with T selector

```
>traver l 9059631001 4164638621 b
TABLE LINEATTR
402 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 905_PUB_326 L905_LATA1_402 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
905_PUB_326 NSCR 905 PUB TSPS N $
TABLE RATEAREA
L905_LATA1_402 L905 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE STDPRTCT
PUB ( 1) ( 0) 1
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . 4164638621 4164638621 T NP 0 OFRT 58 3 11 NONE
 .  . TABLE OFRT
 .  .   58 ISA N N N S1C1_PRI_2WAY PVT 0 PVT 100
 .  .  . TABLE TRKGRP
 .  .  . S1C1_PRI_2WAY PRA 0 PRAC NCRT ASEQ N (ISDN 661) $ $
 .  .  . TABLE LTCALLS
 .  .  . ISDN 661 PVT XLAIBN 600 613_PUB_325 L613_NILLA_101 COMKODAK 0
0 $
 .  .  . TABLE DIGMAN
 .  .  .   100 (DTO 5)
 .  .  . EXIT TABLE DIGMAN
 .  . EXIT TABLE OFRT
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
AIN Info Collected TDP: no subscribed trigger.
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
LNP Info: Table LNPRTE enables trigger criteria checking out of
STDPRTCT.
LNP Info: ESCDN criteria will not affect triggering.
Checking AIN LNP Trigger Items as LNP is compatible with current call
```

Figure 38-24 LNPRTE allows triggering after routing out of STDPRTCT with T selector

```
 .  . TABLE OFCTIID
 .  . 4 L416463 ON
 .  . TABLE TRIGITM
 .  . 4 L416463 LNP (DG 416463) (ESCEA ) (ESCOP ) (ESCDN ) $ ULK EVENT
R01 SS7 AINPOP
 .  .     (DFLTRT DN 4164637023) $
 .  .  . TABLE C7GTTYPE
 .  .  . AINPOP ANSI7 6 $
 .  .  . TABLE C7GTT
 .  .  . AINPOP 4164638621 4164638621 PCSSN (SIMTOOL_RTESET SIMTOOL3 0) $
SSN
AIN Info Analyzed TDP: trigger criteria met.
Querying the database.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

LNP Info: Table LNPRTE enables trigger criteria checking out of STDPRTCT.
LNP Info: ESCDN criteria will not affect triggering.

AIN Info Analyzed TDP: trigger criteria met.
Querying the database.
LNP Info: Displaying pre-query translations result.
LNP Info: It is used if the database indicates the called DN is
non-ported

DIGIT TRANSLATION ROUTES

1 S1C1_PRI_2WAY       N CDN PVT L 38621 PRVT 0 BC SPEECH

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-25 LNPRTE allows triggering after routing out of CLSVSCRC

```
traver l 9059631021 6136639077 b
TABLE IBNLINES
HOST 01 0 02 07 0 DT STN RES 9631021 405 905_PUB_405 L905_LATA1_402 905
$
TABLE LINEATTR
405 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 905_PUB_405 L905_LATA1_402 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
905_PUB_405 NSCR 905 PUB TSPS Y RESG905 0 0 $
TABLE RATEAREA
L905_LATA1_402 L905 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG905 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
RESG905 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND
DIGCOL
RESG905 NXLA RX905 RXCFNXXX 0 RES
TABLE DIGCOL
RES specified: RES digit collection
TABLE IBNXLA: XLANAME RX905
TUPLE NOT FOUND
Default from table XLANAME:
RX905
    (NET N N 0 N NDGT N Y GEN ( LATTR 415 905_EAP1_415 L905_LATA1_402)
    (EA NILC Y 0) $ $)$ 9
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
415 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 905_EAP1_415 L905_LATA1_402 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
905_EAP1_415 FR01 905 EAP1 TSPS Y RESG905 0 0 $
TABLE RATEAREA
L905_LATA1_402 L905 NIL LATA1 $
```

Figure 38-25 LNPRTE allows triggering after routing out of CLSVSCRC

```
TABLE STDPRTCT
EAP1 ( 1) ( 0) 3
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
905 Y 772 1 ( 91) ( 1) ( 0) ( 0) 3 $
 . SUBTABLE HNPACODE
 . 613663907 613663909 FRTE 730
 . SUBTABLE RTEREF
 .  730 T OFRT 730
 .  . TABLE OFRT
 .  .  730 S D S1C0_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
TABLE LCASCRCN
905 L905 ( 26) OPTL N N
 . SUBTABLE LCASCR
 . 613 613
TABLE LCASCRCN
613 L905 ( 1) OPTL N N
 . SUBTABLE LCASCR
 . 663 663
TABLE PFXTREAT
OPTL NP Y NP UNDT
TABLE CLSVSCRC
905 FR01 NP 2 N NONE ( 1)
 . SUBTABLE CLSVSCR
 . 6136639 6136639 T OFRT 750
TABLE OFRT
 750 S D S1C1_MFITOG
EXIT TABLE OFRT
AIN Info Collected TDP: no subscribed trigger.
```

Figure 38-25 LNPRTE allows triggering after routing out of CLSVSCRC

```
TABLE TRIGGRP
CDPCODE INFOANAL
 . CDPCODE ( DG CDPDIG)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
LNP Info: Table LNPRTE enables trigger criteria checking out of CLSVSCRC.
Checking AIN LNP Trigger Items as LNP is compatible with current call
 .  . TABLE OFCTIID
 .  . 4 L613663 ON
 .  . TABLE TRIGITM
 .  . 4 L613663 LNP (DG 613663) (ESCEA ) (ESCOP ) (ESCDN ) $ ULK EVENT
R01 SS7 AINPOP
 .  .     $
 .  .  . TABLE C7GTTYPE
 .  .  . AINPOP ANSI7 6 $
 .  .  . TABLE C7GTT
 .  .  . AINPOP 6136639077 6136639077 PCSSN (SIMTOOL_RTESET SIMTOOL3 0) $
SSN
AIN Info Analyzed TDP: trigger criteria met.
Querying the database.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

LNP Info: Table LNPRTE enables trigger criteria checking out of CLSVSCRC.

AIN Info Analyzed TDP: trigger criteria met.
Querying the database.
LNP Info: Displaying pre-query translations result.
LNP Info: It is used if the database indicates the called DN is
non-ported

DIGIT TRANSLATION ROUTES

1 S1C1_MFITOG           6136639077         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-26 NP and DD pre-query calltype examples; NP specified

```
traver l 9059631021 n cdn na 6136631088 ainres r01 lnpar 9059638899 np b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
LNP Info: Call Type set to NP for FLRN translations
TABLE RTECHAR
 . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE IBNLINES
HOST 01 0 02 07 0 DT STN RES 9631021 405 905_PUB_405 L905_LATA1_402 905 $
TABLE LINEATTR
405 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 905_PUB_405 L905_LATA1_402 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
905_PUB_405 NSCR 905 PUB TSPS Y RESG905 0 0 $
TABLE RATEAREA
L905_LATA1_402 L905 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG905 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE NCOS
RESG905 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND
DIGCOL
RESG905 NXLA RX905 RXCFNXXX 0 RES
TABLE DIGCOL
RES specified: RES digit collection
TABLE XLAMAP
 . Tuple not found. Default is use original XLANAME.
TABLE IBNXLA: XLANAME RX905
TUPLE NOT FOUND
Default from table XLANAME:
RX905
    (NET N N 0 N NDGT N Y GEN ( LATTR 415 905_EAP1_415 L905_LATA1_402)
    (EA NILC Y 0) $ $)$ 9
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
415 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 905_EAP1_415 L905_LATA1_402 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
905_EAP1_415 FR01 905 EAP1 TSPS Y RESG905 0 0 $
TABLE RATEAREA
L905_LATA1_402 L905 NIL LATA1 $
TABLE PXLAMAP
 . LECNA EAP1 ( XLA DDNA)$
TABLE STDPRTCT
 . Tuple not found. Default to old pretranslator name.
```

Figure 38-26 NP and DD pre-query calltype examples; NP specified

```
TABLE STDPRTCT
EAP1 ( 1) ( 0) 3
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
905 Y 772 1 ( 91) ( 1) ( 0) ( 0) 3 $
 . SUBTABLE HNPACODE
 . 613663108 613663109 FRTE 730
 . SUBTABLE RTEMAP
 .  . Tuple not found. Default to old index.
 . SUBTABLE RTEREF
 .  730 T OFRT 730
 .  . TABLE OFRTMAP
 .  .  . Tuple not found. Default to old index.
 .  . TABLE OFRT
 .  .  730 S D S1C0_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: HNPA translation completed on Foreign LRN.
LNP Info: HNPA results are used.
TABLE CLSVSCRC
905 FR01 NP 2 N NONE ( 1)
 . SUBTABLE CLSVSCR

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 S1C0_ISUPITOG         6136631088         ST
     PORTED NUMBER GAP: 9059638899

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-27 NP and DD pre-query calltype examples; DD specified

```
traver l 9059631021 n cdn na 4164631077 ainres r01 lnpar 6136631001 dd b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
LNP Info: Call Type set to DD for FLRN translations
TABLE RTECHAR
 . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE IBNLINES
HOST 01 0 02 07 0 DT STN RES 9631021 405 905_PUB_405 L905_LATA1_402 905 $
TABLE LINEATTR
405 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 905_PUB_405 L905_LATA1_402 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
905_PUB_405 NSCR 905 PUB TSPS Y RESG905 0 0 $
TABLE RATEAREA
L905_LATA1_402 L905 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG905 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE NCOS
RESG905 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
RESG905 NXLA RX905 RXCFNXXX 0 RES
TABLE DIGCOL
RES specified: RES digit collection
TABLE XLAMAP
 . Tuple not found. Default is use original XLANAME.
TABLE IBNXLA: XLANAME RX905
TUPLE NOT FOUND
Default from table XLANAME:
RX905
    (NET N N 0 N NDGT N Y GEN ( LATTR 415 905_EAP1_415 L905_LATA1_402)
    (EA NILC Y 0) $ $)$ 9
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
415 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 905_EAP1_415 L905_LATA1_402 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
905_EAP1_415 FR01 905 EAP1 TSPS Y RESG905 0 0 $
TABLE RATEAREA
L905_LATA1_402 L905 NIL LATA1 $
TABLE PXLAMAP
 . LECNA EAP1 ( XLA DDNA)$
TABLE STDPRTCT
 . Tuple not found. Default to old pretranslator name.
TABLE STDPRTCT
EAP1 ( 1) ( 0) 3
```

Figure 38-27 NP and DD pre-query calltype examples; DD specified

```
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
LNP Info: Call Type set to DD for FLRN translations
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
905 Y 772 1 ( 91) ( 1) ( 0) ( 0) 3 $
 . SUBTABLE HNPACODE
 . 416463107 4164631087 FRTE 747
 . SUBTABLE RTEMAP
 .  . Tuple not found. Default to old index.
 . SUBTABLE RTEREF
 .  747 T OFRT 747
 .  . TABLE OFRTMAP
 .  .  . Tuple not found. Default to old index.
 .  . TABLE OFRT
 .  .  747 S D S1C1_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: HNPA translation completed on Foreign LRN.
LNP Info: HNPA results are used.
TABLE CLSVSCRC
TABLE IBNFEAT
HOST 01 0 02 07 0 LPIC LPIC VAPN N
TABLE LATAXLA
TUPLE NOT FOUND
ASSUMED TO BE DEFAULT INTRALATA, INTRASTATE, STD
TABLE OCCINFO
VAPN 0566 EAP Y Y Y Y N N N Y Y Y Y LONG 0 FGRPD N N Y N N N N N Y N N N N Y
TABLE EASAC
TUPLE NOT FOUND
OVERLAP CARRIER SELECTION (OCS) DOES NOT APPLY - AIN_OFFICE_TRIGGRP DEFINED
TABLE PXLAMAP
 . LECNA EAP1 ( XLA DDNA)$
TABLE STDPRTCT
 . Tuple not found. Default to old pretranslator name.
TABLE STDPRTCT
EAP1 ( 1) ( 0) 3
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . 10566 10566 EA DD 5 P PEA1 VAPN Y OFRT 900 6 20 N
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
 .  . TABLE OFRTMAP
 .  .  . Tuple not found. Default to old index.
 .  . TABLE OFRT
 .  .  900 CND EA INTNL SK 2
```

Figure 38-27 NP and DD pre-query calltype examples; DD specified

```
 .  .      N D ISUPOGITT 0 N N
 .  .      CND ALWAYS SK 1
 .  .      N D ISUPOGITT 0 D179 N
 .  . EXIT TABLE OFRT
TABLE PXLAMAP
 .  . Tuple not found. Default to old pretranslator name.
 . TABLE STDPRTCT
 . PEA1 ( 1) ( 0) 2
 .  . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 .  . 4 9 EA DD 0 T NA ITT N
TABLE HPCPATTN
TUPLE NOT FOUND

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 ISUPOGITT             4164631077         ST
     PORTED NUMBER GAP: 6136631001

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Figure 38-28 NP and DD pre-query calltype examples; LCABILL option on

```
traver l 9059631021 n cdn na 4164631077 ainres r01 lnpar 6136631001 dd b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
LNP Info: Call Type set to DD for FLRN translations
TABLE RTECHAR
 . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE IBNLINES
HOST 01 0 02 07 0 DT STN RES 9631021 405 905_PUB_405 L905_LATA1_402 905 $
TABLE LINEATTR
405 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 905_PUB_405 L905_LATA1_402 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
905_PUB_405 NSCR 905 PUB TSPS Y RESG905 0 0 $
TABLE RATEAREA
L905_LATA1_402 L905 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG905 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE NCOS
RESG905 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
RESG905 NXLA RX905 RXCFNXXX 0 RES
TABLE DIGCOL
RES specified: RES digit collection
TABLE XLAMAP
 . Tuple not found. Default is use original XLANAME.
TABLE IBNXLA: XLANAME RX905
TUPLE NOT FOUND
Default from table XLANAME:
RX905
    (NET N N 0 N NDGT N Y GEN ( LATTR 415 905_EAP1_415 L905_LATA1_402)
    (EA NILC Y 0) $ $)$ 9
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
415 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 905_EAP1_415 L905_LATA1_402 (
LCABILL )$
LCABILL ON - BILLING DONE ON BASIS OF PRE QUERY LCA SCREENING
TABLE XLAPLAN
905_EAP1_415 FR01 905 EAP1 TSPS Y RESG905 0 0 $
TABLE RATEAREA
L905_LATA1_402 L905 NIL LATA1 $
TABLE PXLAMAP
 . LECNA EAP1 ( XLA DDNA)$
```

Figure 38-28 NP and DD pre-query calltype examples; LCABILL option on

```
TABLE STDPRTCT
 . Tuple not found. Default to old pretranslator name.
TABLE STDPRTCT
EAP1 ( 1) ( 0) 3
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   N NP 0 NA
LNP Info: Call Type set to DD for FLRN translations
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
905 Y 772 1 ( 91) ( 1) ( 0) ( 0) 3 $
 . SUBTABLE HNPACODE
 . 416463107 4164631087 FRTE 747
 . SUBTABLE RTEMAP
 .  . Tuple not found. Default to old index.
 . SUBTABLE RTEREF
 .  747 T OFRT 747
 .  . TABLE OFRTMAP
 .  .  . Tuple not found. Default to old index.
 .  . TABLE OFRT
 .  .  747 S D S1C1_ISUPITOG
 .  . EXIT TABLE OFRT
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP Info: HNPA translation completed on Foreign LRN.
LNP Info: HNPA results are used.
TABLE CLSVSCRC
TABLE LATAXLA
TUPLE NOT FOUND
ASSUMED TO BE DEFAULT INTRALATA, INTRASTATE, STD
TABLE OCCINFO
VAPN 0566 EAP Y Y Y Y N N N Y Y Y Y LONG 0 FGRPD N N Y N N N N N N Y N N N N Y
TABLE EASAC
TUPLE NOT FOUND
OVERLAP CARRIER SELECTION (OCS) DOES NOT APPLY - AIN_OFFICE_TRIGGRP DEFINED
TABLE PXLAMAP
 . LECNA EAP1 ( XLA DDNA)$
TABLE PXLAMAP
 . LECNA EAP1 ( XLA DDNA)$
TABLE STDPRTCT
 . Tuple not found. Default to old pretranslator name.
TABLE STDPRTCT
EAP1 ( 1) ( 0) 3
 . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 . 10566 10566 EA DD 5 P PEA1 VAPN Y OFRT 900 6 20 N
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
```

Figure 38-28 NP and DD pre-query calltype examples; LCABILL option on

```
 .  . TABLE OFRTMAP
 .  .  . Tuple not found. Default to old index.
 .  . TABLE OFRT
 .  .  900 CND EA INTNL SK 2
 .  .      N D ISUPOGITT 0 N N
 .  .      CND ALWAYS SK 1
 .  .      N D ISUPOGITT 0 D179 N
 .  . EXIT TABLE OFRT
TABLE PXLAMAP
TABLE PXLAMAP
 . Tuple not found. Default to old pretranslator name.
 .  . Tuple not found. Default to old pretranslator name.
 . TABLE STDPRTCT
 . PEA1 ( 1) ( 0) 2
 .  . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
DOCUMENTATION.
 .  . 4 9 EA DD 0 T NA ITT N
TABLE HPCPATTN
TUPLE NOT FOUND

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 S1C1_ISUPITOG         4164631077         ST
     PORTED NUMBER GAP: 6136631001

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

38.2.5 TRIGITM TRAVER examples

The following TRAVER examples demonstrate LNP triggering and translations using the LNP trigger item (TRIGITM) data model:

- Call to a ported DN, call triggers (Figure 38-6 on page 15)
- Call to a resident ported DN, LNP trigger is escaped (Figure 38-7 on page 17)

38.2.6 Responses of TRAVER command

This section contains a brief description of the possible error outcomes of TRAVER.

- Response 1

  ```
  ERROR: OPTION TCNI ONLY VALID FOR ISUP ORIGINATORS
  ```

  Explanation: The TRAVER originator must be an ISUP trunk.

  System action: The TRAVER command is rejected.

  User action: None.

- Response 2

  ```
  ERROR: OPTION TCNI INCOMPATIBLE WITH AINRES LNPAR
  ```

  Explanation: (the error message is self-explanatory)

  System action: The TRAVER command is rejected.

  User action: None.

- Response 3

  ```
  ERROR: TCNI DIGITS MUST BE N OR 10 DIGITS
  ```

  Explanation: (the error message is self-explanatory)

  System action: The TRAVER command is rejected.

  User action: None.

- Response 4

  ```
  ERROR: TCNI DIGITS MUST BE BETWEEN 0 TO 9
  ```

  Explanation: (the error message is self-explanatory)

  System action: The TRAVER command is rejected.

  User action: None.

- Response 5

  ```
  ERROR: RECEIVED LRN MUST BE 10-DIGIT LONG
  ```

  Explanation: (the error message is self-explanatory)

  System action: The TRAVER command is rejected.

  User action: None.

- Response 8

  ```
  ERROR: AINRES LNPAR DIGITS MUST BE N OR 10 DIGITS
  ```

  Explanation: (the error message is self-explanatory)

System action: The TRAVER command is rejected.

User action: None.

- Response 9

```
ERROR: AINRES LNPAR DIGITS MUST BE 0 TO 9
```

Explanation: (the error message is self-explanatory)

System action: The TRAVER command is rejected.

User action: None.

- Response 10

```
WARNING: COLLISION BETWEEN TNS AND AINRES LNPAR AINRES LNPAR
IS IGNORED'
```

Explanation: (the error message is self-explanatory)

System action: The TRAVER command is executed as if AINRES LNPAR were not specified.

User action: None.

- Response 11

```
ERROR: CDN DIGITS MUST BE PRESENT AND HAVE 10 DIGITS
```

Explanation: (the error message is self-explanatory)

System action: The TRAVER command is rejected.

User action: None.

- Response 12

```
CALL IS BLOCKED - NO LRN-BASED AIN 0.0 QUERY PERMITTED
```

Explanation: There was an attempt to launch AIN 0.0 query basing on LRN.

System action: TRAVER is terminated with the fore-mentioned error message

User action: User is required to redo the TRAVER again making sure that LRN is not provisioned as an AIN 0.0 number in the intermediate switch.

- Response 13

  ```
  USE PRE-QUERY TRANSLATIONS RESULTS FOR NON-PORTED CALLED
  NUMBER
  ```

  Explanation: If an LNP query is made, and the terminator is not ported, the pre-query route is used to route the call. In that case, response translations are not invoked.

  System action: TRAVER exits normally.

  User action: Use pre-query translations result.

38.2.7 TRAVER error scenarios

LNP cannot be hit again on a subsequent switch, as the TRAVER in the following figure indicates.

Figure 38-29 TRAVER example—error response 1

```
traver tr isupitic n cdn na 6136631088 ainres r01 lnpar 4164631077 tcni
9059731081 b
**** ERROR: OPTION TCNI INCOMPATIBLE WITH AINRES LNPAR
```

LNP info cannot be sent over an MF trunk, as the TRAVERs in the following figures indicate.

Figure 38-30 TRAVER example—error response 2

```
traver tr  t2mf 4164631099 tcni 9059737061 b
**** ERROR: OPTION TCNI ONLY VALID FOR ISUP ORIGINATORS
```

Figure 38-31 TRAVER example—error response 3

```
traver tr  t2mf 4164631099 rai b
**** ERROR: OPTION RAI ONLY VALID FOR ISUP ORIGINATORS
```

TRAVER enforces 10 digits for the GAP, as the TRAVER in the following figure indicates.

Figure 38-32 TRAVER example—error response 4

```
  traver tr isupitog 6136681088 tcni 9731081 b
  **** ERROR: TCNI DIGITS MUST BE N OR 10 DIGITS
```

Figure 38-33 TRAVER example—error response 5

```
traver l 9059631001 n cdn na 6136630000 tns na cic 488 ainres r01 lnpar
9059638621 b
**** WARNING: COLLISION BETWEEN TNS AND AINRES LNPAR
**** AINRES LNPAR IS IGNORED
```

38.2.8 TRAVER 64k Data calls

The following figures detail the results of running TRAVER on 64k datacall using information elements and 64k data calls without information elements (normal dialing).

Figure 38-34 TRAVER example—64k data call using information elements

```
>traver l 6771074 n cdn na 4164631301 bc 64kdata b
 Warning: Routing characteristics are present.
         Originator must be able to send in
          characteristics specified.
 TABLE RTECHAR
  . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$) ( BC 64KDATA (CDN NA)$)$
 TABLE KSETLINE
 ISDN 33 1 DN Y 6771074 COMKODAK 0 0 613 (MSB) (SFC) $ BRI UNDEF N $
 TABLE DNATTRS
 TUPLE NOT FOUND
 TABLE DNGRPS
 TUPLE NOT FOUND
 TABLE KSETFEAT
 TUPLE NOT FOUND
 TABLE CUSTSTN
 COMKODAK AIN AIN CDPCODE
 TABLE OFCVAR
 AIN_OFFICE_TRIGGRP TIID
 AIN Orig Attempt TDP: no subscribed trigger.
 TABLE NCOS
 COMKODAK 0 0 0 KDK0 ( OHQ 0 TONE_OHQ) ( CBQ 0 3 N 2)$
. .
```

Figure 38-34 TRAVER example—64k data call using information elements

```
 TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND
 DIGCOL
 COMKODAK PXDK CXDK CUSTFEAT 0 KDK
 TABLE DIGCOL
 KDK 4 COL L 2
 TABLE XLAMAP
  . LECNA PXDK ( XLA AINLEC)$
 TABLE IBNXLA: XLANAME AINLEC
 TUPLE NOT FOUND
 DEFAULT FROM TABLE XLANAME:
 AINLEC
     (NET N N 0 N NDGT N Y GEN ( LATTR 200 613_P621_200 L613_LATA1_0)
     (EA NILC Y 0) $ $)$ 9
 TABLE DIGCOL
 NDGT specified: digits collected individually
 TABLE LINEATTR
 200 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_P621_200 L613_LATA1_0 $
 LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
 TABLE XLAPLAN
 613_P621_200 FR01 613 P621 TSPS Y RESG200 0 0 $
 TABLE RATEAREA
 L613_LATA1_0 L613 NIL LATA1 $
 TABLE PXLAMAP
  . LECNA P621 ( XLA PBXNOCAR) ( PREFIX )$
  . NOTE: ISDN Digit Conversion has been performed:
  .       Resulting digits are: 14164631301
. .
```

Figure 38-34 TRAVER example—64k data call using information elements

```
> TABLE STDPRTCT
 PBXNOCAR ( 1) ( 0) 3
  . SUBTABLE STDPRT
 WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
 BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
 DOCUMENTATION.
  . 14 179776 N DD 1 NA
  . SUBTABLE AMAPRT
  . KEY NOT FOUND
  . DEFAULT VALUE IS:   NONE OVRNONE  N
 TABLE HPCPATTN
 TUPLE NOT FOUND
 TABLE HNPACONT
 613 Y 932 2 ( 436) ( 1) ( 84) ( 0) 2 $
  . SUBTABLE HNPACODE
  . 4164631301 4164631398 FRTE 732
  . SUBTABLE RTEMAP
  .  . Tuple not found. Default to old index.
  . SUBTABLE RTEREF
  .  732 T OFRT 732
  .  . TABLE OFRTMAP
  .  .  . Tuple not found. Default to old index.
  .  . TABLE OFRT
  .  .  732 S D C0C1_PRI_2WAY
  .  . EXIT TABLE OFRT
  . EXIT TABLE RTEREF
 EXIT TABLE HNPACONT
 LNP Info: Called DN is not resident.
 LNP Info: HNPA results are used.
 TABLE LCASCRCN
 613 L613 ( 44) OPTL N N
  . SUBTABLE LCASCR
  . 416 416
 TABLE LCASCRCN
 KEY NOT FOUND
 LCASCRCN TUPLE MISSING
 TABLE CLSVSCRC
 TABLE LATAXLA
 TUPLE NOT FOUND
 ASSUMED TO BE DEFAULT INTRALATA, INTRASTATE, STD
 AIN Info Collected TDP: no subscribed trigger.
 TABLE TRIGGRP
 CDPCODE INFOANAL
  . CDPCODE ( DG CDPDIG)$ NIL
 Trigger AIN CDPCODE is applicable to customer group.
  . CDPCODE ( DG CDPTRAF)$ NIL
 Trigger AIN CDPCODE is applicable to customer group.
 Checking AIN SDS Trigger Items as SDS is compatible with current call
```

Figure 38-34 TRAVER example—64k data call using information elements

```
Checking AIN N11 Trigger Items as N11 is compatible with current call
 Checking AIN LNP Trigger Items as LNP is compatible with current call
  .  . TABLE OFCTIID
  .  . 4 L416463 ON
  .  . TABLE TRIGITM
  .  . 4 L416463 LNP (DG 416463) (ESCEA ) (ESCOP ) (ESCDN ) $ ULK EVENT
 R01 SS7 AINPOP
  .  .  . TABLE C7GTTYPE
  .  .  . AINPOP ANSI7 6 $
  .  .  . TABLE C7GTT
  .  .  . AINPOP 4164631301 4164631301 PCSSN (SIMTOOL_RTESET SIMTOOL3 0)
 $ SSN
 AIN Info Analyzed TDP: trigger criteria met.
 Querying the database.

 +++ TRAVER: SUCCESSFUL CALL TRACE +++


 AIN Info Analyzed TDP: trigger criteria met.
 Querying the database.
 LNP Info: Displaying pre-query translations result.
 LNP Info: It is used if the database indicates the called DN is
 non-ported

 DIGIT TRANSLATION ROUTES

 1 C0C1_PRI_2WAY              N CDN  E164  NA  4164631301 NIL_NSF   BC
 64KDATA
```

Figure 38-35 TRAVER example—64k data call without information elements (normal call)

```
>traver l 6771074 94164631301 bc 64kdata b
 Warning: Routing characteristics are present.
          Originator must be able to send in
          characteristics specified.
 TABLE RTECHAR
  . 64KDATA ( BC 64KDATA $)$
 TABLE KSETLINE
 ISDN 33 1 DN Y 6771074 COMKODAK 0 0 613 (MSB) (SFC) $ BRI UNDEF N $
 TABLE DNATTRS
 TUPLE NOT FOUND
 TABLE DNGRPS
 TUPLE NOT FOUND
 TABLE KSETFEAT
 TUPLE NOT FOUND
 TABLE CUSTSTN
 COMKODAK AIN AIN CDPCODE
 TABLE OFCVAR
 AIN_OFFICE_TRIGGRP TIID
 AIN Orig Attempt TDP: no subscribed trigger.
 TABLE NCOS
 COMKODAK 0 0 0 KDK0 ( OHQ 0 TONE_OHQ) ( CBQ 0 3 N 2)$
 TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND
 DIGCOL
 COMKODAK PXDK CXDK CUSTFEAT 0 KDK
 TABLE DIGCOL
 KDK 9 RPT
 TABLE XLAMAP
  . Tuple not found. Default is use original XLANAME.
 TABLE IBNXLA: XLANAME PXDK
 TUPLE NOT FOUND
 Default is to go to next XLA name.
 TABLE XLAMAP
  . Tuple not found. Default is use original XLANAME.
 TABLE IBNXLA: XLANAME CXDK
 CXDK 9 NET N Y 1 Y POTS Y N GEN ( LATTR 80 613_P621_80 L613_LATA1_0) (
 EA NILC Y 0)$ $
 TABLE DIGCOL
 POTS specified: POTS digit collection
 TABLE LINEATTR
 80 IBN NONE NT 0 0 NILSFC 0 NIL NIL 00 613_P621_80 L613_LATA1_0 $
 LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
 TABLE XLAPLAN
 613_P621_80 ATGO 613 P621 TSPS N $
 TABLE RATEAREA
 L613_LATA1_0 L613 NIL LATA1 $
 TABLE PXLAMAP
  . Tuple not found. Default to old pretranslator name.
```

Figure 38-35 TRAVER example—64k data call without information elements

```
94164631301 bc 64kdata b
 Warning: Routing characteristics
TABLE STDPRTCT
 P621 ( 1) ( 0) 1
  . SUBTABLE STDPRT
 WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
 BILLING.  CALL TYPE DEFAULT IS NP.  PLEASE REFER TO
 DOCUMENTATION.
  . 416 420 N NP 0 NA
  . SUBTABLE AMAPRT
  . KEY NOT FOUND
  . DEFAULT VALUE IS:   NONE OVRNONE  N
 TABLE HPCPATTN
 TUPLE NOT FOUND
 TABLE HNPACONT
 613 Y 932 2 ( 436) ( 1) ( 84) ( 0) 2 $
  . SUBTABLE HNPACODE
  . 4164631301 4164631398 FRTE 732
  . SUBTABLE RTEMAP
  .  . Tuple not found. Default to old index.
  . SUBTABLE RTEREF
  .  732 T OFRT 732
  .  . TABLE OFRTMAP
  .  .  . Tuple not found. Default to old index.
  .  . TABLE OFRT
  .  .  732 S D C0C1_PRI_2WAY
  .  . EXIT TABLE OFRT
  . EXIT TABLE RTEREF
 EXIT TABLE HNPACONT
 LNP Info: Called DN is not resident.
 LNP Info: HNPA results are used.
 TABLE LCASCRCN
 613 L613 ( 44) OPTL N N
  . SUBTABLE LCASCR
  . 416 416 TABLE LCASCRCN
 KEY NOT FOUND
 LCASCRCN TUPLE MISSING
 TABLE CLSVSCRC
 AIN Info Collected TDP: no subscribed trigger.
 TABLE TRIGGRP
 CDPCODE INFOANAL
  . CDPCODE ( DG CDPDIG)$ NIL
 Trigger AIN CDPCODE is applicable to customer group.
  . CDPCODE ( DG CDPTRAF)$ NIL
 Trigger AIN CDPCODE is applicable to customer group.
 Checking AIN SDS Trigger Items as SDS is compatible with current call
 Checking AIN N11 Trigger Items as N11 is compatible with current call
 Checking AIN LNP Trigger Items as LNP is compatible with current call
```

Figure 38-35 TRAVER example—64k data call without information elements (normal call)

```
 .  . TABLE OFCTIID
 .  . TABLE TRIGITM
 .  . 4 L416463 LNP (DG 416463) (ESCEA ) (ESCOP ) (ESCDN ) $ ULK EVENT
R01 SS7 AINPOP
 .  .  . TABLE C7GTTYPE
 .  .  . AINPOP ANSI7 6 $
 .  .  . TABLE C7GTT
 .  .  . AINPOP 4164631301 4164631301 PCSSN (SIMTOOL_RTESET SIMTOOL3 0)
$ SSN
AIN Info Analyzed TDP: trigger criteria met.
Querying the database.

+++ TRAVER: SUCCESSFUL CALL TRACE +++


AIN Info Analyzed TDP: trigger criteria met.
Querying the database.
LNP Info: Displaying pre-query translations result.
LNP Info: It is used if the database indicates the called DN is
non-ported

DIGIT TRANSLATION ROUTES

1 C0C1_PRI_2WAY               N CDN  E164  NA  4164631301 NIL_NSF   BC
64KDATA

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

38.2.9 Changing Type of Number (TON) from NA to UN

To eliminate the conflict between BRI and LNP response translations, it is necessary to remove TON-based routing. The BRITONUN option in table CUSTSTN accomplishes this by changing TON from NA to UN. TON is changed from NA to UN when all of the following conditions are satisfied:

- The originator is a BRI set
- Routing characteristics are specified in the command line
- TON is NA
- Originator’s customer group has BRITONUN option selected in CUSTSTN

Figure 38-36 Traver returns message to notify change in TON

Table RTECHAR

NA56K (BC 56KDATA (CDN NA) $) $
56K (BC 56KDATA $) $

NOTE: LECNA is not referenced in the traver below

```
>traver l 4771079 n cdn na 96136771058 bc 56kdata b
Warning: Routing characteristics are present.
Originator must be able to send in
         characteristics specified.
AIN Info: BRITONUN option present in table CUSTSTN
AIN Info: CDN changed from NA to UNK
TABLE RTECHAR
56K (BC 56KDATA $) $
TABLE KSETLINE
MFT 261 1 DN Y 4771079 MDC416 0 0 416 $ BRI UNDEF N $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE KSETFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
```

38.2.10 Optional Removal of NPA

AIN Response Translation Simplification feature removes the NPA of the called DN if the following conditions are true:

- SOC AIN00026 is ON.
- The call is local.
- Option PFXFOR10 is TRUE in Table LCASCRCN or Table LCAINFO.
- NPA of the SCP-returned number is the same as the NPA of the originating number.

Removal of NPA in this scenario presents a problem in regions where 1+10-digit dialing is mandatory both for toll and for local calls. In that case, the removal of NPA results in a 7-digit number, and the call is sent to treatment. This is an undesirable result.

Therefor, removal of NPA is optional. The customer must datafill field STRIPNPA in Table LCASCRCN and Table LCAINFO. NPA is removed only when all four of the above conditions are true and option STRIPNPA is set to Y.

The following Traver examples illustrate the effect of setting option STRIPNPA to N (FALSE) or Y (TRUE):

Figure 38-37 Traver Example: STRIPNPA set to N:

```
traver l 6671031 n cdn na 6136211031 ainres r02 ar digconv  b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
TABLE RTECHAR
 . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE IBNLINES
HOST 01 0 02 11 0 DT STN RES 6671031 404 613_PUB_404 L613_LATA1_0
613 $
TABLE LINEATTR
404 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_PUB_404 L613_LATA1_0
$
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PUB_404 NSCR 613 PUB TSPS Y RESG613 0 0 $ $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG613 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP OFCTRIG
TABLE NCOS
RESG613 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT,
AND DIGCOL
RESG613 NXLA RX613 RESGSTAR 0 RES
TABLE DIGCOL
RES specified: RES digit collection
TABLE XLAMAP
 . Tuple not found. Default is use original XLANAME.
TABLE IBNXLA: XLANAME RX613
TUPLE NOT FOUND
Default from table XLANAME:
RX613
    (NET N N 0 N NDGT N Y GEN ( LATTR 414 613_EAP1_414
L613_LATA1_0)
    (EA NILC Y 0) $ $)$ 9
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
414 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_EAP1_414 L613_LATA1_0
$
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_EAP1_414 C667 613 EAP1 TSPS Y RESG613 0 0 $ $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE PXLAMAP
 . Tuple not found. Default to old pretranslator name.
 . NOTE: ISDN Digit Conversion has been performed:
 .       Resulting digits are: 6136211031
TABLE STDPRTCT
EAP1 ( 1) ( 0) 3
....
```

Figure 38-38 Traver Example: STRIPNPA set to Y:

```
traver l 6671031 n cdn na 6136211031 ainres r02 ar digconv  b
Warning: Routing characteristics are present.
         Originator must be able to send in
         characteristics specified.
TABLE RTECHAR
 . LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE IBNLINES
HOST 01 0 02 11 0 DT STN RES 6671031 404 613_PUB_404 L613_LATA1_0
613 $
TABLE LINEATTR
404 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_PUB_404 L613_LATA1_0
$
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PUB_404 NSCR 613 PUB TSPS Y RESG613 0 0 $ $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG613 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP OFCTRIG
TABLE NCOS
RESG613 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT,
AND DIGCOL
RESG613 NXLA RX613 RESGSTAR 0 RES
TABLE DIGCOL
RES specified: RES digit collection
TABLE XLAMAP
. Tuple not found. Default is use original XLANAME.
TABLE IBNXLA: XLANAME RX613
TUPLE NOT FOUND
Default from table XLANAME:
RX613
    (NET N N 0 N NDGT N Y GEN ( LATTR 414 613_EAP1_414
L613_LATA1_0)
    (EA NILC Y 0) $ $)$ 9
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
414 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_EAP1_414 L613_LATA1_0
$
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_EAP1_414 C667 613 EAP1 TSPS Y RESG613 0 0 $ $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE PXLAMAP
 . Tuple not found. Default to old pretranslator name.
 . NOTE: ISDN Digit Conversion has been performed:
 .       Resulting digits are: 6211031
TABLE STDPRTCT
EAP1 ( 1) ( 0) 3
```

39 Other CI commands for LRN-LNP

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

39.1 Query local routing number tool

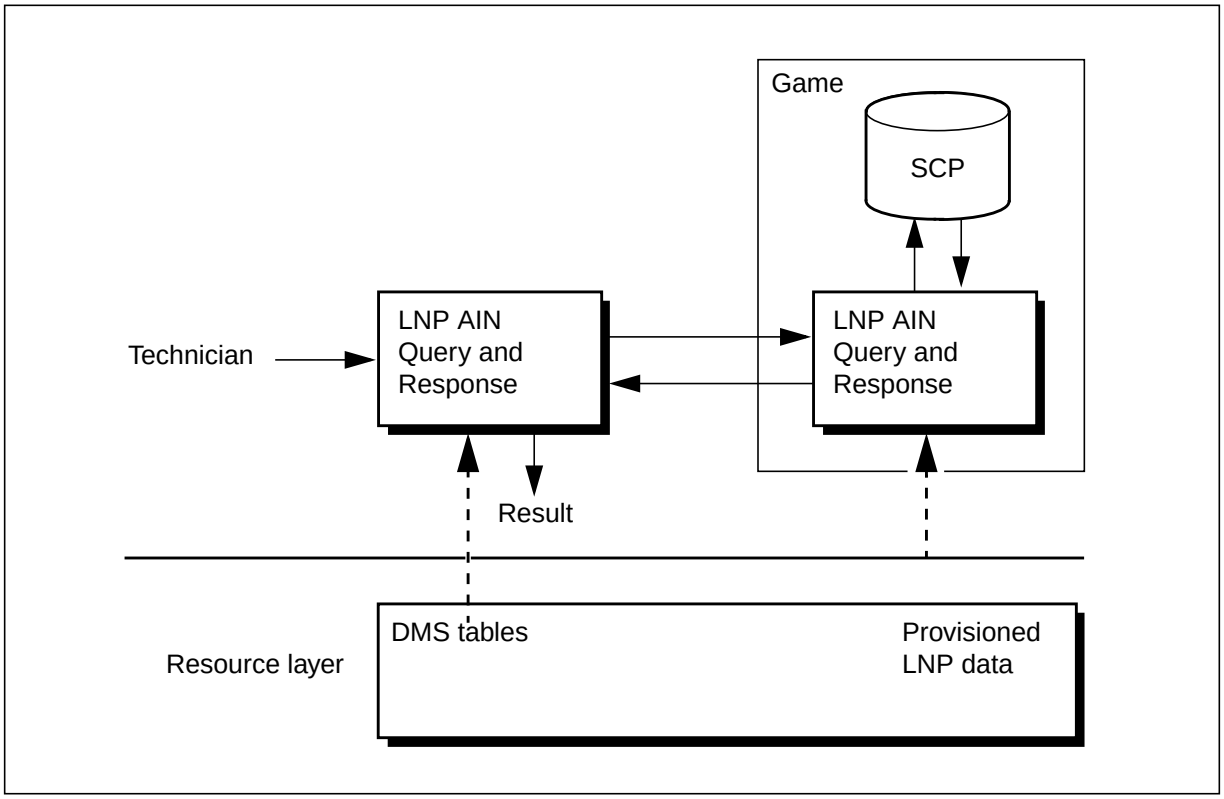
Query local routing number (QLRN) tool is a CI tool that provides the ability to enter a ten digit directory number and launch a query to the SCP as though it were a called number from the SSP. Upon receipt of the SCP response, the LRN routing information of the directory number in the query is presented.

QLRN is a tool for line maintenance. By using TSTQUERY functionality QLRN provides a well-defined interface for querying the SCP and viewing the results.

When Service Provider Portability becomes available there will be many additional reasons for a possible failure of call routing. Current switch-based tools are only valuable for providing information about a line on the switch. Once the network or SCP becomes involved, the provisioning scope is increased and therefore a method to check the data from the SSP is required of the SCP. QLRN allows the viewing of SCP data based on a given Called Party ID or DN.

On invocation of QLRN a query is populated with various parameters. If datafill is missing in a certain table, QLRN informs the user of the situation and exits. If all information is found, including the destination SCP, the originating switch then queries the SCP and awaits a response. During the interaction with GAME, some OM logs are written. Once the SCP response is received, it is displayed at the terminal. The following figure shows the OLRN functionality and interactions with LNP.

Figure 39-1 QLRN Interaction between LNP functional components



39.1.1 Command syntax

QLRN queries the SCP to determine if a number has been ported, and returns the called party ID. Operating company personnel use the command at the CI level of the MAP display. The syntax for the command is

QLRN <called_party_DN> <calling_party_DN>

where

<called_party_DN> is a mandatory parameter representing the Called Party for which we are required to find the routing number in the SCP response

<calling_party_DN> is an optional parameter representing the Calling Party. This parameter replaces the default value taken for UserID from the Home LRN.

If the command encounters problems with either datafill (that is, the DN is not in the tables) or SCP access, the system displays an on-screen error message.

Enter abort at any prompt to cancel the command.

QLRN exits automatically on termination.

Two or more users can issue this command simultaneously.

39.1.2 Command syntax examples

The following subsections provide syntax examples (command responses do not appear). For information on responses, see Section "39.1.3. Responses to QLRN" on page 6.

39.1.2.1 Entering QLRN with no parameters

In this example, the operating company personnel enters QLRN without any parameters. The command prompts for both the called and calling party DNs. The command does not make any assumptions about the parameters and prompts for input on both the called number and the calling number.

Figure 39-2 QLRN example with no parameters

```
CI:
>QLRN
TEN DIGIT CALLED PARTY:
>6135551212
The Home LRN will be used for the CALLING NUMBER, enter otherwise or press
RETURN.
>8192341234

Query sent: 1997/03/18 15:14:25.180 TUE.
...
CI:
>
```

39.1.2.2 Entering QLRN with the called party ID parameter

In this example, the operating company personnel enters QLRN with the called party DN parameter. Because the operating company personnel does not include the calling party DN, the command takes the default value from the master home LRN.

Figure 39-3 QLRN example with the called party ID parameter

```
CI:
>QLRN 6135551212

Query sent: 1997/03/18 15:14:25.180 TUE.
....
CI:
>
```

39.1.2.3 Entering QLRN with all parameters

In this example, the operating company personnel enters QLRN with both the called party DN and calling party DN parameters.

Figure 39-4 QLRN example with all parameters

```
CI:
>QLRN 6135551212 5551234567

Query sent: 1997/03/18 15:14:25.180 TUE.
...
CI:
```

39.1.2.4 Entering invalid QLRN parameters during run time

In this example, the operating company personnel enters QLRN with no parameters. During the command run, as the command prompts for called and calling numbers, the operating company personnel enters invalid input.

Figure 39-5 QLRN example with run time parameters

```
CI:
>QLRN
TEN DIGIT CALLED PARTY:
>$
*** ERROR ***
$
|
TYPE OF TEN DIGIT CALLED PARTY IS DIGIT_TABLE_10
TEN DIGIT CALLED PARTY:
>
TEN DIGIT CALLED PARTY:
>6135558901
The Home LRN will be used for the CALLING NUMBER, enter otherwise or press
RETURN.
TEN DIGIT CALLING NUMBER: 6132910000
>$
*** ERROR ***
$
|
TYPE OF TEN DIGIT CALLING NUMBER IS DIGIT_TABLE_10
TEN DIGIT CALLING NUMBER: 6132910000
>BCD1239090
*** ERROR ***
BCD1239090
|
TYPE OF TEN DIGIT CALLING NUMBER IS DIGIT_TABLE_10
TYPE IS DIGIT_TABLE_10 TABLE OF 10 {1,2,3,4,5,6,7,8,9,0}'S
TEN DIGIT CALLING NUMBER: 6132910000
>

Query sent: 1997/03/18 15:14:25.180 TUE.
...
CI:
>
```

39.1.2.5 Home LRN not found

In this example, the home LRN is not in datafill.

Figure 39-6 QLRN example with home LRN not found

```
CI:
>QLRN
TEN DIGIT CALLED PARTY:
>6135558901
The Calling Number must be provided since the Home LRN can not be
determined.
TEN DIGIT CALLING NUMBER:
>$
*** ERROR ***
$
|
TYPE OF TEN DIGIT CALLING NUMBER IS DIGIT_TABLE_10
TEN DIGIT CALLING NUMBER:
>6134446789

Query sent: 1997/03/18 15:14:25.180 TUE.
...
CI:
>QLRN 6135551234
The Calling Number must be provided since the Home LRN can not be
determined.
TEN DIGIT CALLING NUMBER:
>6134446789

Query sent: 1997/03/18 15:14:25.180 TUE.
...
CI:
>
```

39.1.3 Responses to QLRN

The system can provide one of many possible responses to QLRN, depending on error conditions, missing datafill, valid response, an so on. The following subsections describe the responses with examples.

39.1.3.1 Base LNP datafill not found in table TRIGGRP

QLRN cannot query because there is no LNP trigger criteria in table TRIGGRP.

System action: notify the user and quit.

User action: verify translations.

Example: Insufficient datafill in table TRIGGRP to build a query.

Figure 39-7 QLRN response: base LNP datafill not found in table TRIGGRP

```
CI:
>QLRN 6135551212

Base LNP datafill could not be found in table TRIGGRP.
>
```

39.1.3.2 LNP digit criteria match for <Called Party ID> not found in table TRIGDIG

QLRN cannot query because there is no matching digit criteria in table TRIGDIG.

Note: This message indicates that QLRN, as in CALLP, has searched through available LNP digit criteria in table TRIGGRP and has not found a digit match in table TRIGDIG. There may be matching digit patterns in table TRIGDIG but there are no tuples with digit criteria linked back to an LNP digit criteria record in table TRIGGRP.

System action: Notify the user and quit.

User action: verify translations.

Example: Insufficient datafill in table TRIGDIG to build a query.

Figure 39-8 QLRN response: insufficient datafill in table TRIGDIG

```
CI:
>QLRN 6135551212

LNP digit criteria match for 6135551212 could not be found
in table TRIGDIG.
>
```

39.1.3.3 SCP (ACG) traffic overload control is in effect

When ACG traffic overload controls are in effect, sending a query to the database may increase network congestion. However, for maintenance purposes, the system allows queries for testing for the SCP. In such cases, QLRN prompts the operating company personnel and continues with launching the query only upon receiving a positive response.

System action: Await user response.

User action: Input yes or no.

Example: Override ACG controls. When the user chooses “yes”, a response follows depending on the SCP.

Figure 39-9 QLRN response: override ACG controls

```
CI:
>QLRN 6135551212

*********************************************
SCP (ACG) traffic overload control is in effect.
*********************************************
Do you still want to continue? (Y/N)
>N
>
```

39.1.3.4 The SCP has returned a valid response

The only valid response for QLRN is an LNP Analyze Route response. Upon receipt of a valid response from the SCP, QLRN notifies the operating company personnel and displays the following information:

- routing number
- calling party DN
- office CLLI
- date and start time
- elapsed time

System action: Display information and quit.

User action: none.

Example: Complete QLRN run with valid response and no optional Calling Party ID.

Figure 39-10 QLRN response: complete valid response with no optional Calling Party ID

```
>QLRN 6135551212
Query sent: 1997/03/18 15:14:25.180 TUE.
Valid QLRN response received.
Routing Number: 8191234567.
CALLING DN: 6135250000. Office: OFFICE_CLLI.
Elapsed Time (MM:SS:mS): 00:00:380.
>
```

Example: Complete QLRN run with valid response and the optional Calling Party ID.

Figure 39-11 QLRN response: complete valid response with optional Calling Party ID

```
CI:
>QLRN 6135551212 6138281234

Query sent: 1997/03/18 15:14:25.180 TUE.
Valid QLRN response received.
Routing Number: 8191234567.
CALLING DN: 6138281234. Office: OFFICE_CLLI.
Elapsed Time (MM:SS:mS): 00:00:380.
>
```

39.1.3.5 No response within switch default time-out period

No response has arrived from the SCP within the period that the switch specified (AIN 0.1 T1 timer has expired).

System action: notify the user and quit.

User action: escalate problem to next level of support.

Example: T1 timer expiry.

Figure 39-12 QLRN response: T1 timer expiry

```
CI:
>QLRN 6135551212

Query sent: 1997/03/18 15:14:25.180 TUE.
No response within switch default time-out period (AIN 0.1
T1 timer has expired).
>
```

39.1.3.6 QLRN has detected a digit criteria

Table TRIGDIG contains a tuple that satisfies the digit criteria for another trigger in addition to LNP. QLRN has detected a digit criteria that matches another trigger at the AIN Information Analyzed TDP.

System action: continue with LNP query.

User action: make sure the non-LNP trigger allows call processing to continue such that the LNP trigger is hit.

Example: Other matching digit criteria.

Figure 39-13 QLRN response: other matching digit criteria

```
CI:
>QLRN 6135551212

Call will hit AIN Trigger “PODP” prior to LNP.
Ignoring Non-LNP triggers and continuing with LNP trigger
information.

Query sent: 1997/03/18 15:14:25.180 TUE.
...
>
```

39.1.3.7 Invalid QLRN response received

A response other than an LNP Analyze Route message is received from the SCP. The response may be valid for call processing but is indeterminate to QLRN.

System action: notify the user and quit.

User action: Inform next level of support as required.

Example: Invalid response.

Figure 39-14 QLRN response: Invalid response

```
CI:
>QLRN 6135551212

Query sent: 1997/03/18 15:14:25.180 TUE.
Invalid QLRN response received.
CALLING DN: 6138281234. Office: OFFICE_CLLI.
Elapsed Time (MM:SS:mS): 00:00:380.
>
```

39.1.3.8 LNP SOC option is off

The SOC option for LNP is off. WARNING: LNP SOC OPTION IS OFF. LNP calls do not work. Results may or may not be useful.

System action: notify the user and quit.

User action: none

Example: SOC option warning.

Figure 39-15 QLRN response: SOC option is off

```
CI:
>QLRN 6135551212

WARNING: LNP SOC OPTION IS OFF.LNP calls will NOT work but
QLRN will attempt to query anyway.

Query sent: 1997/03/18 15:14:25.180 TUE.
...
```

39.1.3.9 Corrupt message from SCP or SCP is not attached

The message sent from the SCP is corrupt or the link between the SSP and the SCP is down.

System action: notify the user and quit.

User action: Inform next level of support as required.

Example: SCP error.

Figure 39-16 QLRN response: Corrupt message from SCP or SCP is not attached

```
CI:
>QLRN 6135551212

Query sent: 1997/08/13 09:55:12.076 WED.
Error, either received corrupt message from SCP
or SCP is not attached.

...
```

39.1.3.10 SCP returned abort or error message

This occurs when the SCP sends back an abort or error message due to an unrecognizable package type, incorrect or badly structured transaction portion.

System action: notify the user and quit.

User action: inform next level of support as required.

Example: SCP error.

Figure 39-17 QLRN response: SCP returned abort or error message

```
CI:
>QLRN 6135551212

Query sent: 1997/08/13 09:39:01.110 WED.
Error, SCP returned abort or error message.

>QLRN 4164631001
...
```

39.2 AINTRACE

AINTRACE is supported as described in 297-5161-022, Advanced Intelligent Network Service Enablers Service Implementation Guide.

AINTRACE is a CI-based AIN TCAP message tracing tool. AINTRACE traces the messages of selected originating agents through their corresponding DN, LEN, trunk, TID, or LTID.

Figure 39-18 AINTRACE Command syntax

```
aintrace
AINTRACE:
>select dn 6136671603
>start
Tracing started. Messages will be recorded using AINT 700 logs.
>stop
Tracing stopped. Messages were recorded using AINT 700 logs.
>logutil
LOGUTIL:
>open aint 700
Done.
```

Figure 39-19 AINTRACE Command syntax (continued)

```
COMDUS11BG     AINT700 MAR10 17:51:57 9200 INFO AINTrace Report

         TCAP Message recorded by AINTrace:
        Time: 99/03/10 17:51:57  Tid:   35  363
        Agent:                   HOST 00 1 11 10    DN 6136671603
        Direction:               from SCP or Adjunct (incoming)

                 ***** TCAP message in HEX format *****
                             E4 24 C7 04 00 00 24 00 E8 1C E9 1A CF 02 01
                             00 D1 02 65 01 30 10 8F 07 03 10 09 95 36 01
                                99 8A 05 09 00 00 22 02

                 ***** TCAP message in TEXT format *****
        TCAP Package Type:       Response
            Origin ID:           NIL
            Respond ID:          00 00 24 00

        Component Sequence
        ==================

        COMPONENT:               1

        Component code:          E9
        Component Type:          Invoke (last) Component

        Invoke ID:               1
        Correlation ID:          0

        Operation Code
            Opcode Bytes:        65 01
            Operation Family:    Connection Control
            Operation Name:      Analyze_Route

            Parameter Tag:       30
        ====Parameter  Sequence====

            Parameter Id:        8F
            Contents:            03 10 09 95 36 01 99
        CalledPartyID:           9059631099
            Nature of Number:    National (significant) number
            Numbering Plan:      ISDN Numbering Plan
            Odd/Even Indicator: Even digits

            Parameter Id:        8A
            Contents:            09 00 00 22 02
        AMAslpID:                900000222
COMDUS11BG     AINT700 MAR10 17:51:57 9000 INFO AINTrace Report
```

Figure 39-20 AINTRACE Command syntax (continued)

```
>back
COMDUS11BG     AINT700 MAR10 17:51:57 9000 INFO AINTrace Report

         TCAP Message recorded by AINTrace:
        Time: 99/03/10 17:51:57  Tid:   35  363
        Agent:                   HOST 00 1 11 10    DN 6136671603
        Direction:               from SSP (outgoing)

                 ***** TCAP message in HEX format *****
                             E2 42 C7 04 00 00 24 00 E8 3A E9 38 CF 01 00
                             D1 02 64 03 30 2F BF 35 07 81 05 16 63 76 61
                             30 8D 01 00 8F 07 01 10 16 63 36 31 30 9F 34
                             01 25 93 07 03 10 16 63 76 61 30 92 07 03 13
                                16 63 76 61 30 94 01 00

                 ***** TCAP message in TEXT format *****
        TCAP Package Type:       Query with Permission
            Origin ID:           00 00 24 00
            Respond ID:          NIL

        Component Sequence
        ==================

        COMPONENT:               1

        Component code:          E9
        Component Type:          Invoke (last) Component

        Invoke ID:               0
        Correlation ID:          256

        Operation Code
            Opcode Bytes:        64 03
            Operation Family:    Request Instructions
            Operation Name:      Info_Analyzed

            Parameter Tag:       30
        ====Parameter  Sequence====

            Parameter Id:        BF 35
            Contents:            81 05 16 63 76 61 30
        UserID:
        DN:                      6136671603
        --{ End of UserID }--
```

Figure 39-21 AINTRACE Command syntax (continued)

```
            Parameter Id:       8D
            Contents:           00
        BearerCapability:       speech

            Parameter Id:       8F
            Contents:           01 10 16 63 36 31 30
        CalledPartyID:          6136631303
            Nature of Number:   Subscriber number
            Numbering Plan:     ISDN Numbering Plan
            Odd/Even Indicator: Even digits

            Parameter Id:       9F 34
            Contents:           25
        TriggerCriteriaType:    localNumberPortability

            Parameter Id:       93
            Contents:           03 10 16 63 76 61 30
        ChargeNumber:           6136671603
            Nature of Number:   ANI of the calling party; national number
            Numbering Plan:     ISDN Numbering Plan
            Odd/Even Indicator: Even digits

            Parameter Id:       92
            Contents:           03 13 16 63 76 61 30
        CallingPartyID:         6136671603
            Nature of Number:   Unique national (significant) number
            Numbering Plan:     ISDN Numbering Plan
            Presentation Indicator: Presentation allowed
            Screen Indicator:   Network provided
            Odd/Even Indicator: Even digits

            Parameter Id:       94
            Contents:           00
        ChargePartyStationType: IdentifiedLine - No Special Treatment
>back
Not found.
```

When used with LRN-LNP, the implementation of the LNPTCT query enhancement modifies the trigger criteria type parameter response of the AINTRACE tool. The following figure shows the modified output when the LNPTCT is active.

The following figure shows an example of using AINTRACE. The originating call encounters an LNP trigger and sends an LNP query from the SSP to the SCP. The SCP sends a response message containing an LRN to the SSP.

Figure 39-22 Example of AINTRACE of an LNP call

```
CI:
>logutil
Current MODE setting is: EXTENDED

LOGUTIL:
>aintrace
AINTRACE:
>open aint 700
Done.
Log empty.
>select dn 4164671003
>start
Tracing started. Messages will be recorded using AINT 700 logs.
>stop
Tracing stopped. Messages were recorded using AINT 700 logs.
>open aint 700
Done.
COMD1CDN13AF     AINT700 SEP01 11:18:28 9500 INFO AINTrace Report

         TCAP Message recorded by AINTrace:
        Time: 00/09/01 11:18:28  Tid:   43   14
        Agent:                   HOST 05 1 00 13    DN 4164671003
        Direction:               from SCP or Adjunct (incoming)

                 ***** TCAP message in HEX format *****
                              E4 1D C7 04 00 00 01 00 E8 15 E9 13 CF 02 01
                              00 D1 02 65 01 30 09 8F 07 03 10 16 63 36 01
                                88

                 ***** TCAP message in TEXT format *****
        TCAP Package Type:       Response
            Origin ID:           NIL
            Respond ID:          00 00 01 00

        Component Sequence
        ==================

        COMPONENT:               1

        Component code:          E9
        Component Type:          Invoke (last) Component

        Invoke ID:               1
        Correlation ID:          0

        Operation Code
            Opcode Bytes:        65 01
            Operation Family:    Connection Control
            Operation Name:      Analyze_Route
```

Figure 39-22 Example of AINTRACE of an LNP call

```
            Parameter Tag:      30
        ====Parameter  Sequence====

            Parameter Id:       8F
            Contents:           03 10 16 63 36 01 88
        CalledPartyID:          6136631088
            Nature of Number:   National (significant) number
            Numbering Plan:     ISDN Numbering Plan
            Odd/Even Indicator: Even digits
>back
COMD1CDN13AF     AINT700 SEP01 11:18:28 9300 INFO AINTrace Report

         TCAP Message recorded by AINTrace:
        Time: 00/09/01 11:18:28  Tid:   43   14
        Agent:                  HOST 05 1 00 13    DN 4164671003
        Direction:              from SSP (outgoing)

                 ***** TCAP message in HEX format *****
                             E2 42 C7 04 00 00 01 00 E8 3A E9 38 CF 01 00
                             D1 02 64 03 30 2F BF 35 07 81 05 14 46 76 01
                             30 8D 01 00 8F 07 03 10 14 46 36 08 30 9F 34
                             01 25 93 07 03 10 14 46 76 01 30 92 07 03 13
                               14 46 76 01 30 94 01 00

                 ***** TCAP message in TEXT format *****
        TCAP Package Type:      Query with Permission
            Origin ID:          00 00 01 00
            Respond ID:         NIL

        Component Sequence
        ==================

        COMPONENT:              1

        Component code:         E9
        Component Type:         Invoke (last) Component

        Invoke ID:              0
        Correlation ID:         256

        Operation Code
            Opcode Bytes:       64 03
            Operation Family:   Request Instructions
            Operation Name:     Info_Analyzed

            Parameter Tag:      30
```

Figure 39-22 Example of AINTRACE of an LNP call

```
====Parameter  Sequence====

    Parameter Id:       BF 35
    Contents:           81 05 14 46 76 01 30
UserID:
DN:                     4164671003
--{ End of UserID }--

    Parameter Id:       8D
    Contents:           00
BearerCapability:       speech
Parameter Id:       8F
    Contents:           03 10 14 46 36 08 30
CalledPartyID:          4164638003
    Nature of Number:   National (significant) number
    Numbering Plan:     ISDN Numbering Plan
    Odd/Even Indicator: Even digits

    Parameter Id:       9F 34
    Contents:           25
TriggerCriteriaType:    localNumberPortability

    Parameter Id:       93
    Contents:           03 10 14 46 76 01 30
ChargeNumber:           4164671003
    Nature of Number:   ANI of the calling party; national number
    Numbering Plan:     ISDN Numbering Plan
    Odd/Even Indicator: Even digits

    Parameter Id:       92
    Contents:           03 13 14 46 76 01 30
CallingPartyID:         4164671003
    Nature of Number:   Unique national (significant) number
    Numbering Plan:     ISDN Numbering Plan
    Presentation Indicator: Presentation allowed
    Screen Indicator:   Network provided
    Odd/Even Indicator: Even digits

    Parameter Id:       94
    Contents:           00
ChargePartyStationType: IdentifiedLine - No Special Treatment
```

If the LNP00200 SOC is activated, and the LNPTCT tuple in table LNPOPTS is set to LNP, the TriggerCriteriaType is encoded as **localNumberPortability**. Otherwise, the TriggerCrteriaType is encoded as **NPANXXXXXX**

39.3 QDN

QDN displays ported-in and ported-out numbers for ported DNs. The following figures show the QDN output for a ported-out number, and output for a ported-in number.

Figure 39-23 Output from QDN shows a ported-out number

```
QDN 6221096
DN:     6221096           (Ported-out)
TYPE: NUMBER ON INTERCEPT PODN
```

Figure 39-24 Output from QDN for a ported-in DN

```
QDN 6255000
DN:     6255000           (Ported-in)
TYPE: SINGLE PARTY LINE
SNPA: 613   SIG: DT    LNATTIDX:  200
LINE EQUIPMENT NUMBER:     HOST  02 0 05 03
LINE CLASS CODE:      1FR
IBN TYPE: STATION
CUSTGRP:        RESG200     SUBGRP: 0  NCOS: 0
CARDCODE:  6X17AC    GND: N  PADGRP: STDLN  BNV: NL MNO: N
PM NODE NUMBER     :    37
PM TERMINAL NUMBER :    164
OPTIONS:
DGT
RES OPTIONS: NONE
CUSTOMER GROUP OPTIONS:
AIN CDPCODE
OFFICE OPTIONS:
AIN OFCTRIG U3WC
```

Query command output differs for Number Pooling subscribers. For more information please refer to Section "13.5.1. QDN" on page 52.

39.4 QLEN

QLEN displays ported-in and ported-out numbers for ported DNs. The following figures show the QLEN output for a ported-out number, and the output for a ported-in number.

Figure 39-25 Output from QLEN shows a ported-out number

```
QLEN 6221096
TYPE: NUMBER ON INTERCEPT PODN
```

Figure 39-26 Output from QLEN for a ported-in DN

```
QLEN 6255000
DN:     6255000           (Ported-in)
TYPE: SINGLE PARTY LINE
SNPA: 613   SIG: DT    LNATTIDX:  200
LINE EQUIPMENT NUMBER:     HOST  02 0 05 03
LINE CLASS CODE:      1FR
IBN TYPE: STATION
CUSTGRP:        RESG200     SUBGRP: 0  NCOS: 0
CARDCODE:  6X17AC    GND: N  PADGRP: STDLN  BNV: NL MNO: N
PM NODE NUMBER     :    37
PM TERMINAL NUMBER :    164
OPTIONS:
DGT
RES OPTIONS: NONE
CUSTOMER GROUP OPTIONS:
AIN CDPCODE
OFFICE OPTIONS:
AIN OFCTRIG U3WC
```

Query command output differs for Number Pooling subscribers. For more information please refer to Section "13.5.2. QLEN" on page 53.

39.5 Test query

TSTQUERY is supported as described in 297-5161-022, Advanced Intelligent Network Service Enablers Service Implementation Guide.

This tool allows maintenance personnel to initiate test queries to the service control point (SCP) and receive responses from the SCP. TSTQUERY lets you ensure that the AIN service is fully operational before it processes telephone calls.

To accommodate the new trigger criteria type as part of the TSTQUERY SetMsg command, a new localNumberPortability value has been added to the list see Figure "39-27. TSTQUERY Command Syntax" on page 22. When this option is set, the output of all trigger criteria types now include localNumberPortability in the list.

Figure 39-27 TSTQUERY Command Syntax

The command syntax from the MAPCI level is:

>MAPCI
>TESTTOOL
>TSTQUERY

Setup the query parameters:

>SetAppl R01
>SeTrnsp SS7 LNPGT Default
>SetMsg Info_Analyzed
>ListParm

A list of available message parameters will be displayed.

Figure 39-28 TstQuery Call Parameters Example

Setup call parameters:
.
>TriggerCriteriaType LocalNumberPortability
>CallingPartyID 3 1 0 3 61366331001
>CalledPartyID 3 1 6136639021
>ChargeNumber 3 1 6136630000

Figure 39-29 Verifying TstQuery Call Parameters

```
Verify call parameters:
.
>seeparm all

Application:          R01
Transport:           SS7
   Gtt Name: LNPGT
   Gtt Source:       Default
Message:             Info_Analyzed

WARNING - The ACGEncountered parameter may be added
to any outgoing query by the ACG Database. Use the
ACGDISPLAY command in the AINCI directory to list
active ACG controls.
CalledPartyID:       6136639021
   Nature of Number:  National (significant) number
   Numbering Plan:    ISDN Numbering Plan
TriggerCriteriaType:  localNumberPortability
ChargeNumber:        6136630000
   Nature of Number:  ANI of the calling party; national number
   Numbering Plan:    ISDN Numbering Plan
CallingPartyID:      6136633101
   Nature of Number:  Unique national (significant) number
   Numbering Plan:    ISDN Numbering Plan
   Presentation Indicator: Presentation allowed
   Screen Indicator:  Network provided
```

Figure 39-30 Launching a test query

```
Launch a test query:

>send

Transaction ID:        65
Elapsed Time Between Query And Response:
0 minute(s) 0 second(s) 564 millisecond(s)

SCP Response Message:   Analyze_Route
Called Party ID:        6136631099
   Nature of Number:    National (significant) number
   Numbering Plan:      ISDN Numbering Plan
```

AIN logs AIN600 and AIN601 will also be generated by the DMS log subsystem. See Figure "39-31. Example of AIN600 log" on page 24 for details.

Figure 39-31 Example of AIN600 log

```
Ofc_Name AIN600 JAN14 15:01:45 2234 INFO Test Query Attempt
        User Name:              CMAP9
        SessionID:              16554
        Application:            R01
        T1 Timer:               3
        Transport:              SS7
            Gtt Name: LNPGT
            Gtt Source:         Default
        Message:                Info_Analyzed
        CalledPartyID:          6136639021
            Nature of Number:   National (significant) number
            Numbering Plan:     ISDN Numbering Plan
        TriggerCriteriaType:    localNumberPortability
        ChargeNumber:           6136631234
            Nature of Number:   ANI of the calling party; national number
            Numbering Plan:     ISDN Numbering Plan
        CallingPartyID:         6136631001
            Nature of Number:   Unique national (significant) number
            Numbering Plan:     ISDN Numbering Plan
            Presentation Indicator: Presentation allowed
            Screen Indicator:   Network provided
```

Figure 39-31 Example of AIN601 log

```
.Ofc_Name AIN601 JAN14 15:01:45 2837 INFO Test Query Response
        User Name: User_terminal
        SessionID:              16554
        Elapsed Time Between Query And Response:
         0 minute(s) 0 second(s) 132 millisecond(s)
        Conversation:           No
        Trans ID:               66
        Far End Trans ID:       4261281277
        Corr ID:                1
        SCP Response Message:   Analyze_Route
        Called Party ID:        6136631099
            Nature of Number:   National (significant) number
            Numbering Plan:     ISDN Numbering Plan
```

39.6 QPDN

QPDN is used to list all ported-in DNs, to list all ported-out DNs, or to list both ported-in and ported-out DNs. It can also generate a summary of the totals which include the number of ported-in, ported-out DNs or both; and the number of native NPANXX, non-native NPANXX or both.

Query command output differs for Number Pooling subscribers. For more information please refer to Section "13.5.3. QPDN" on page 54.

Note: QPDN may not be executed when SOC option LNP00200 is IDLE.

39.6.1 QPDN syntax

QPDN accepts two mandatory parameters.The first parameter specifies what to be listed - all ported-in DNs, all ported-out DNs, all ported DNs, or ported DNs of a NPANXX. The second parameter specifies the format of the listing - detail or summary. The syntax of QPDN is:

QPDN <output_type> {I,O,B, S<NPANXX> 6-digits} <report_type> {D,T}

where

O - ported-out DNs

I - ported-in DNs

B - both ported-in and ported-out DNs

S - ported DNs of a NPANXX

D - list the DNs

T - list the total(s) only

QPDN prompts for parameters until the values of the parameters match the values shown in the following table.

Table 39-1 QPDN parameter definitions

Parameter	Value	Definition
list_type	I,O,B	I - ported in
	S <NPANXX> STRING	O - ported out
		B - both ported-in and ported-out
		S- ported DN of a NPANXX
		NPANXX - area code + office code
report_type	D, T	D -detail
		T- Totals only

39.6.2 QPDN warnings

Warning responses from QPDN are as follows:

- It may take a long time to execute the request. Do you want to continue? Please confirm (“YES”, “Y”, “NO”, or “N”):

  Used to warn the user that it may take a number of minutes to execute the request. Type “Y” to continue and “N” to abort.

- NPANXX should be 6 digits in North America.

  The number of digits does not match. The system prompts for a valid NPANXX.

- ERROR: Invalid NPANXX entered.

  The NPANXX cannot be found in table TOFCNAME. The system prompts for a valid NPANXX.

- ERROR: UNABLE TO READ DN FROM DN TABLES

  Occurs on a SWERR and terminate QPDN. Check table DNINV or DNROUTE.

- ERROR: CANNOT GET NPANXX FROM TABLE TOFCNAME

  Occurs on a SWERR and terminate QPDN. Check table TOFCNAME.

39.6.3 Using QPDN to list all ported-in DNs

User executes “QPDN I D”. QPDN displays a warning message and you type “Y” to continue the execution. QPDN finds and lists the ported-in DNs, then

prints the total of non-native NPANXXs and the total of ported-in directory numbers.

The following figure shows an example of using QPDN to list all ported-in DNs.

Figure 39-32 Using QPDN to list all ported-in DNs

```
> QPDN I D
Warning: It may take a long time to execute the request. Do
you want to continue ?
Please confirm (“YES”, “Y”, “NO”, or “N”): Y
-----------------------------------------------
Ported in numbers:
4164671001
....
4164679999
4164681003
4164681005
Total number of non-native NPANXX: 2
Total number of ported-in numbers is: 1000
```

39.6.4 Using QPDN to list all ported-out DNs

User executes: “QPDN O D”. QPDN displays a warning message and the user types “Y” to continue the execution. QPDN finds and lists the ported-out DNs then prints the total number of native NPANXX(s) and the total number of ported-out directory numbers.

The following figure shows an example of using QPDN to list all ported-out DNs.

Figure 39-33 Using QPDN to list all ported-out DNs

```
> QPDN O D
Warning: It may take a long time to execute the request. Do
you want to continue ?
Please confirm (“YES”, “Y”, “NO”, or “N”): Y
-----------------------------------------------
Ported out numbers:
6136631001
6136631002
....
6136779999
Total number of native NPANXX is: 2
Total number of ported out numbers is: 5000
```

39.6.5 Using QPDN to list totals of ported-out DNs and native NPANXXs

User executes: “QPDN O T”. QPDN displays a warning message and the user types “Y” to continue the execution. QPDN counts all the native NPANXXs and all the native ported-out directory numbers.

The following figure shows an example of using QPDN to list totals of ported-out DNs and native NPANXXs.

Figure 39-34 Using QPDN to show totals of ported-out DNs and NPANXXs

```
> QPDN O T
Warning:
It may take a long time to execute the request.
Do you want to continue ?
Please confirm (“YES”, “Y”, “NO”, or “N”): Y
-----------------------------------------------
Total number of native NPANXX is: 2
Total number of ported out numbers is: 1000
```

40 Trouble locating for LRN-LNP

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

This chapter provides advanced troubleshooting information and procedures for LRN-LNP.

DANGER

Possible loss of service

The information and procedures in this chapter are for experienced maintenance personnel only. You must know how to use tools for troubleshooting translations problems. You must also know how to use and interpret the reporting subsystems for logs and OMs.

The following tools are useful in investigating and troubleshooting LRN-LNP problems:

- AINTRACE
- CALLTRAK
- DISPCALL
- QLRN
- QPDN
- TRAVER
- TSTQuery
- XPMIST

40.1 LRN-LNP advanced trouble locating procedures

This section provides advanced troubleshooting procedures for LRN-LNP.

40.1.1 Task list

The following list provides the names of all the procedures in this document. To find the appropriate trouble locating procedure, look for the name in the left column and go to the page number in the right column.

Table 40-1

Procedure	Page
“Calls to a portable NXX do not complete”	page 3
"Calls to a number in transition do not complete"	page 6
"Incoming trunk LNP calls to a portable NXX do not complete"	page 9

This chapter contains procedures for locating and clearing troubles in LNP. For each trouble, there is a procedure containing the following:

- explanatory and context-setting information
- summary flowchart
- step-action instructions

40.1.1.1 Explanatory and context-setting information

In each procedure, the sections titled “Application,” “Definition,” and “Action” contain important explanatory notes and context-setting information. Read these sections before you try to clear the trouble. The section titled “Common procedures” lists the names of common procedures that you may be asked to perform as you follow the step-action instructions. Go to these common procedures only when directed to do so.

40.1.1.2 Summary flowchart

The flowchart is only a summary of the main actions, decision points, and possible paths you can take. Do not use the summary flowchart to perform the procedure. Instead, use it to preview what you will be doing and to help prepare for it. For example, if you see that these instructions involve another office, you know to advise that office before you begin the step-action instructions.

40.1.1.3 Step-action instructions

The step-action instructions tell you how to locate and clear a trouble. Normally, you perform the steps in order, but you may be directed to return to a previous step and repeat a sequence. The successful completion of a step may depend on previous steps; therefore, always perform the steps in the order specified.

The step-action instructions provide the command syntax and machine output you use or see while performing this procedure. For help on DMS commands or output (for example, problems logging into a utility), see Commands Reference Manual.

40.2 Calls to a portable NXX do not complete

The following sections provide a definition and a procedure for handling a problem in which a call to a portable NXX does not complete.

40.2.1 Application

Use this procedure to troubleshoot a problem in which a call to a portable NXX does not complete.

CAUTION

Possible loss of service

The information and procedures in this chapter are for experienced maintenance personnel only. You must know how to use tools for troubleshooting translations problems. You must also know how to use and interpret the reporting subsystems for logs and OMs.

40.2.2 Definition

This condition indicates that the subscriber cannot complete outgoing calls using the features of AIN software and the SCP database to query for routing and billing information. This situation occurs when an originating call is to a portable NXX, and the dialed number may not be ported. To route the call, the network must complete the following:

- a database query to find the local routing number (if the number is ported out)
- stop a database query if the number is resident
- return original dialed number if the number is not ported out

If the SCP does not reply within a certain period of time, the system invokes network time-out and sends the call to AIN final treatment.

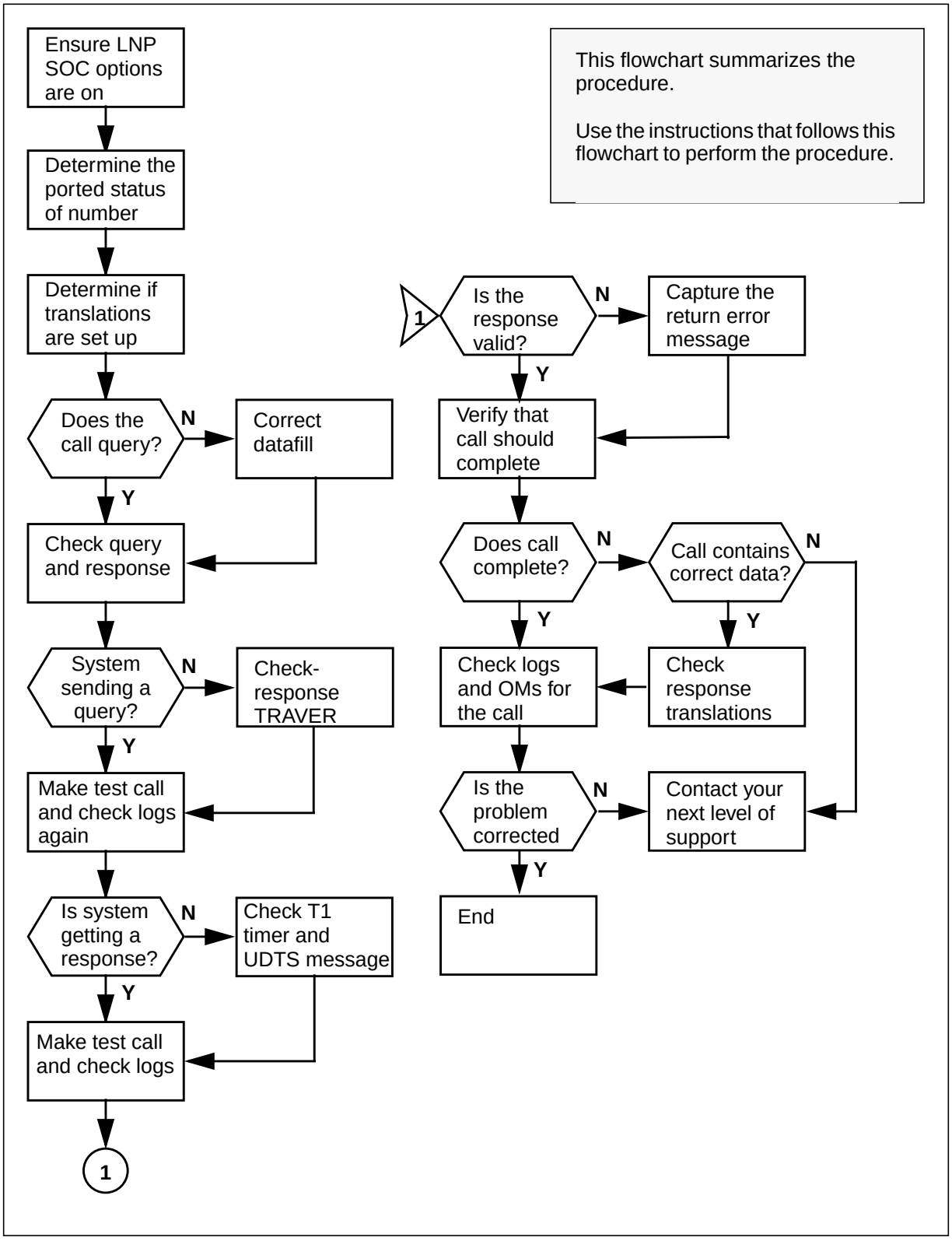
40.2.3 Common procedures

None

40.2.4 Action

This procedure contains a summary flowchart and a list of specific steps for checking a “calls to a portable NXX do not complete” trouble report for an AIN subscriber. Use the following flowchart as an overview of the procedure. Follow the specific steps to perform the procedure.

Figure 40-1 Summary of Calls to a portable NXX do not complete



Procedure 40-1 Calls to a portable NXX do not complete

StepAction and response

1 Verify that the LNP SOC options are in the ON state.

If one or more LNP SOC options are not on, do step 2.

If all options are on, do step 3.

2 Turn the LNP options on so that functionality is available.

3 Determine the ported status of the dialed number. You can get this information from the SCP database, QLRN, and the Service Order group. You need to determine the following information:

a the status according to office records

b the status according to the SCP database

4 Use TRAVER to determine if translations are set for the call to query.

If the call does not query, do step 5.

If the call does query, do step 6.

5 Correct datafill.

6 Use the AINTRACE tool to verify that the system is sending a query message and is receiving a valid response.

If the system is not sending the query, do step 7.

If the system is sending the query, do step 8.

7 Input the response TRAVER command with data from the SCP that you obtained at step 3.

8 Make a test call.

9 Check the LNP, C7SCCP, EXT, and AIN OM groups. Correct any software resource problems or problems with the SS7 network.

If a query launches and the system does not receive a response message, do step 10.

If a query launches and the system receives a response, do step 11.

10 Check the LNP OM group to determine if the T1 timer is expiring. If the T1 timer is not expiring check the C7SCCP OM group to determine if the system receives a UDTS message. If the system is receiving a UDTS message, use C7TU to capture the UDTS message.

11 Make a test call.

12 Check the LNP OMs to verify that the system is receiving a valid response message.

If LNP OMs indicate an invalid response message, do step 13.

If there is no indication of a problem with the response message, do step 14.

13 Use C7TU or a protocol analyzer to capture the return error message.

Go to step 15.

14 Use information from the response TRAVER in step 6 to create a response TRAVER to verify that the call should complete.

If the response TRAVER output indicates that the call does not complete, do step 15.

If the response TRAVER output indicates that the call does not complete and the response contains the correct data, do step 16.

If the response TRAVER output indicates that the call completes, do step 17.

15 If the response TRAVER indicates that the call cannot complete with the information that the far-end sends back in the response message, verify that the response message contains the correct data.

Go to step 19.

16 Correct the response translations.

Go to step 19.

17 Make a test call.

18 Check for log reports generated for the call. If the system generates no logs, check the EXT OM group for overflow counts.

Go to step 20.

19 Contact your next level of support.

If any of the previous steps do not indicate any problems, then the problem probably resides somewhere else in the network. The last step is to use XPMIST or CALLTRAK (MSGTRACE) to capture the outgoing IAM message to verify that the switch correctly populates the IAM message with LNP information.

20 You have completed this procedure.

40.3 Calls to a number in transition do not complete

The following sections provide a definition and a procedure for handling a problem in which calls to a number in transition do not complete.

40.3.1 Application

Use this procedure to troubleshoot a problem in which a call to a number in transition fails to complete.

CAUTION

Possible loss of service

The information and procedures in this chapter are for experienced maintenance personnel only. You must know how to use tools for troubleshooting translations problems. You must also know how to use and interpret the reporting subsystems for logs and OMs.

40.3.2 Definition

This condition means that the subscriber cannot receive incoming calls using the features of LNP software and the SCP database to query for routing and billing information. This situation occurs when the subscriber is in the process of moving from one service provider to another.

From a maintenance point of view, the operating company personnel needs to know the following:

- the location of the physical jumper in the switch
- the port option

If the SCP does not reply within a certain period of time, the system invokes a network time-out and sends the call to AIN final treatment.

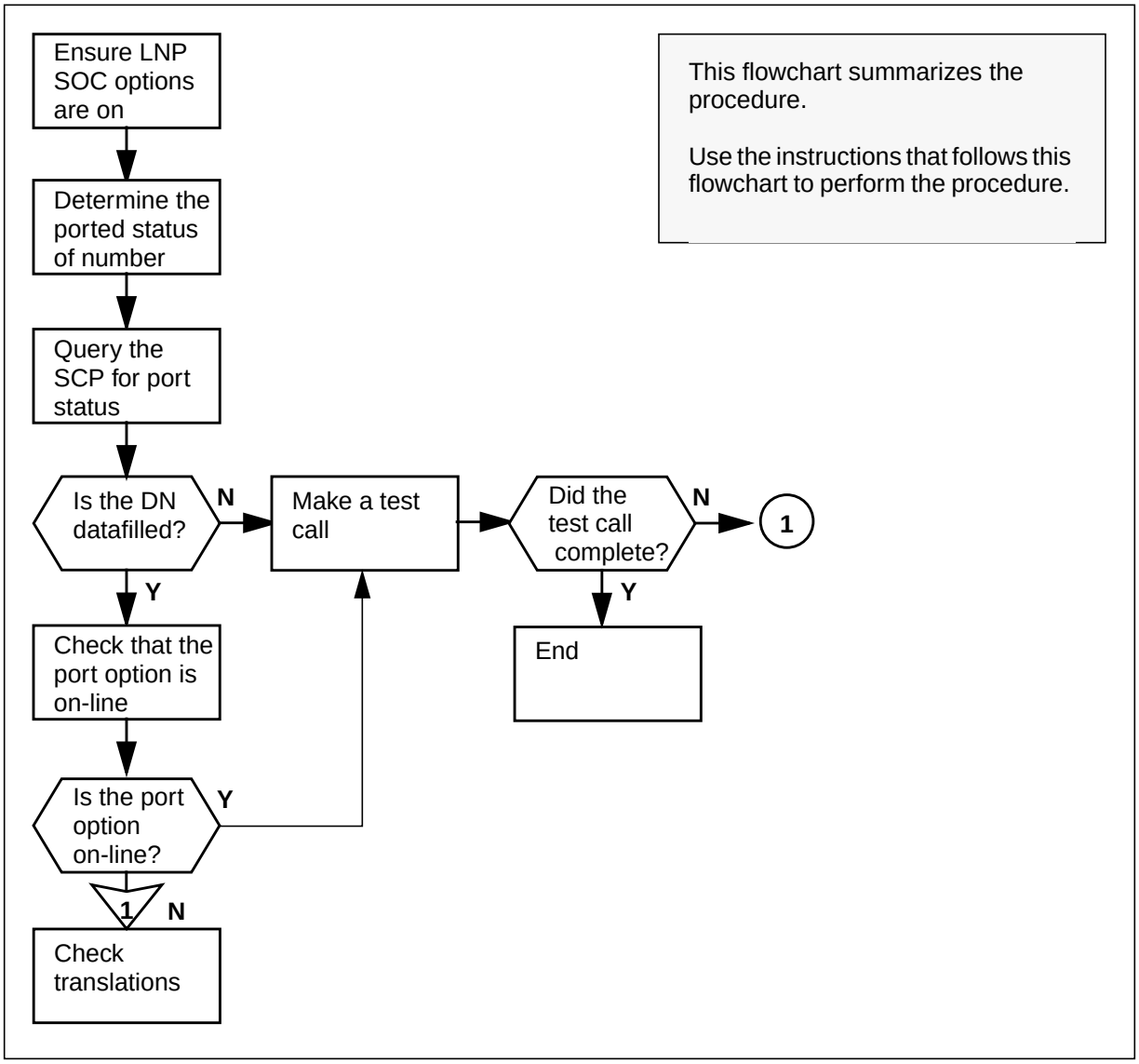
40.3.3 Common procedures

None

40.3.4 Action

This procedure contains a summary flowchart and a list of specific steps for checking a “calls to a number in transition do not complete” trouble report for an LNP subscriber. Use the flowchart as an overview of the procedure. Follow the specific steps to perform the procedure.

Figure 40-2 Summary of Calls to a number in transition do not complete



Procedure 40-2 Calls to a number in transition do not complete

StepAction and response

1	Verify that the LNP SOC options are in the ON state. If one or more LNP SOC options are not on, do step 2. If all options are on, do step 3.
2	Turn the LNP options on so that functionality is available.

3 Determine the ported status of the dialed number. You can get this information from the SCP database, QLRN, and the Service Order group. You need to determine the following information:

a the status according to office records

b the status according to the SCP database

4 Use the QLRN CI command to query the SCP for port status.

If the DN is datafilled on the switch and the subscriber is in the process of porting to the new service provider, do step 5.

If the DN is blank, do step 6.

5 Check that the port option is on-line.

If the port option is not on-line, do step 7.

If the port option is on-line, do step 6.

6 Make a test call.

If the test call completes, do step 9.

If the test call does not complete, do step 7.

7 Refer to the translations group within your company to place the port option on-line.

Go to step 9.

8 Contact the next level of support.

9 You have completed this procedure.

40.4 Incoming trunk LNP calls to a portable NXX do not complete

The following sections provide a definition and a procedure for handling a problem in which incoming trunk LNP calls to a portable NXX do not complete.

40.4.1 Application

Use this procedure to troubleshoot a problem in which an incoming trunk call fails to complete.

CAUTION

Possible loss of service

The information and procedures in this chapter are for experienced maintenance personnel only. You must know how to use tools for troubleshooting translations problems. You must also know how to use and interpret the reporting subsystems for logs and OMs.

40.4.2 Definition

This condition means that the subscriber cannot complete outgoing calls using the features of AIN software and the SCP database to query for routing and billing information.

If the SCP does not reply within a certain period of time, the system invokes a network time-out and sends the call to AIN final treatment.

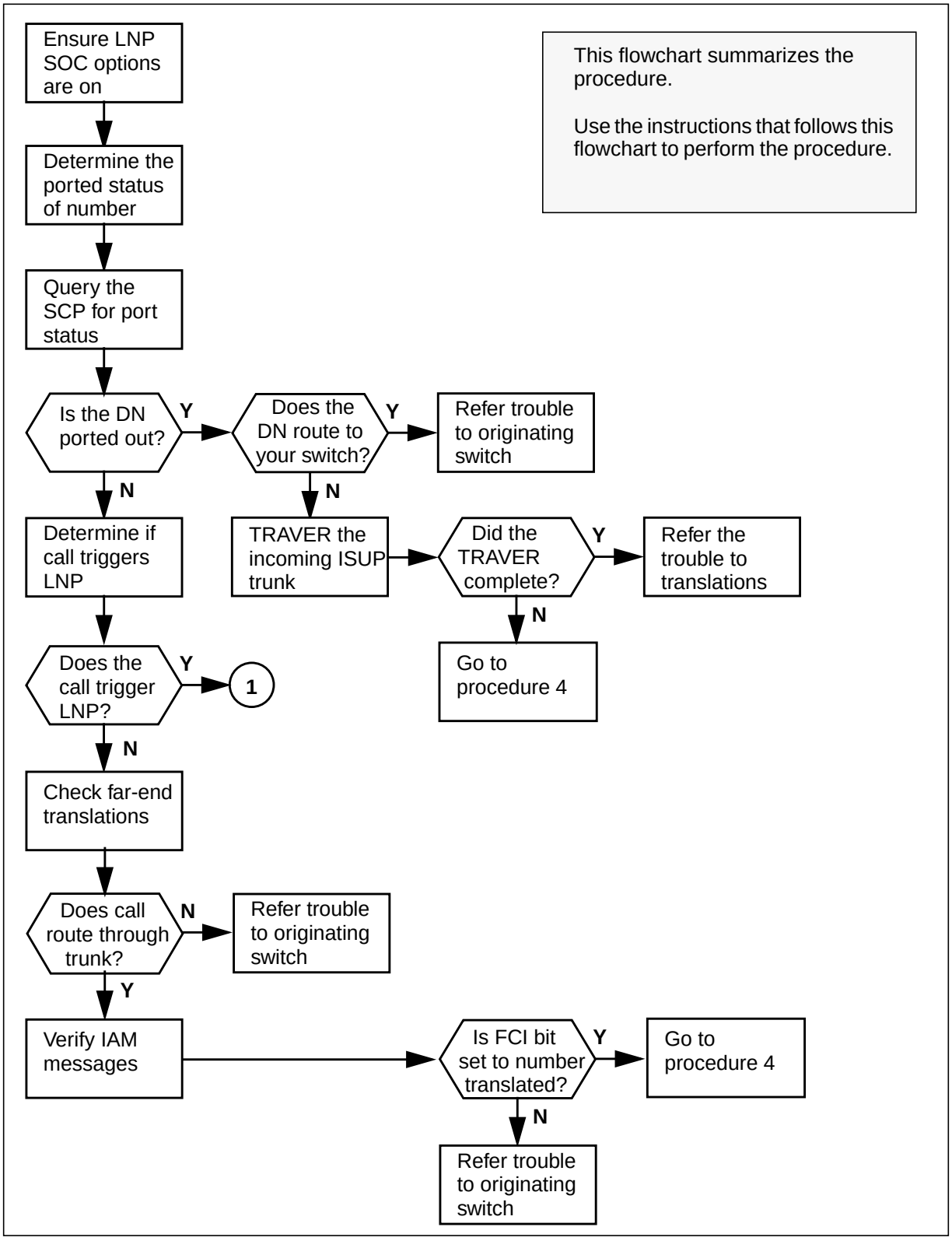
40.4.3 Common procedures

None

40.4.4 Action

This procedure contains a summary flowchart and a list of specific steps for checking an “incoming trunk LNP calls to a portable NXX do not complete” trouble report for an AIN subscriber. Use the flowchart as an overview of the procedure. Follow the specific steps to perform the procedure.

Figure 40-3 Summary of Incoming trunk LNP calls to a portable NXX do not complete



Procedure 40-3 Incoming trunk LNP calls to a portable NXX do not complete

StepAction and response

1 Verify that the LNP SOC options are in the ON state.

If one or more LNP SOC options are not on, do step 2.

If all options are on, do step 3.

2 Turn the LNP options on so that functionality is available.

3 Determine the ported status of the dialed number. You can get this information from the SCP database, QLRN, and the Service Order group. You need to determine the following information:

a the status according to office records

b the status according to the SCP database

If the SCP indicates that the DN is ported out and the LRN does not route through your switch, do step 4.

If the SCP indicates that the DN is ported out and the LRN should route through your switch, do step 5.

If the SCP indicates that the DN is not ported out and the LRN should route through your switch, do step 8.

4 Refer the problem back personnel at the originating switch.

Go to step 14.

5 Use TRAVER on the incoming ISUP trunk. The results are different, depending on the roll of your switch in call routing:

a if your switch is the recipient, the TRAVER completes to the dialed DN

b if your switch is the intermediate, the TRAVER completes to the trunk agent

If the TRAVER does not complete, do step 6.

If the TRAVER completes, do step 7.

6 Refer the problem to your translation group.

Go to step 14.

7 Use "Calls to a portable NXX do not complete" on page 3 to complete trouble locating.

8 Use TRAVER to determine if the call completes normally without encountering the LNP trigger.

If the call completes without encountering the LNP trigger, do step 9.

If the TRAVER gets any other result, do step 13.

9 Use the LNP test call feature (LNPTST line option) to verify far end LNP translations.

If the call does not route through the incoming trunk and SCP data returns an LRN that should route through your switch, do step 12.

If the call routes through the incoming trunk, do step 10.

10 Verify IAM message contents for LNP-related parameters.

If the FCI bit is not set to number translated, do step 12.

If the FCI bit is set to number translated and TRAVER shows the call should complete, do step 11.

11 Use "Calls to a portable NXX do not complete" on page 3 to complete trouble locating.

12 Refer the problem back to translations personnel at the originating switch.

Go to step 14.

13 Contact your next level of support.

14 You have completed this procedure.

41 Logs for LRN-LNP

ATTENTION

LNP is based on AIN Essentials. You must be familiar with AIN before using this document. For a list of relevant AIN documents, please see "About this document".

This chapter describes the log reports associated with LRN-LNP. The following log reports provide useful information for maintaining LNP:

- LNP300
- LNP301
- LNP302
- LNP303
- LNP304
- LNP305
- LNP306
- LINE150
- LINE151

41.1 LNP logs

The following table lists the log report for each LNP log, including the cause of the log and the recommended maintenance response. More information on

the individual log reports, and on the CCS7 logs that support LRN-LNP, are in the Log Reports Reference Manual , 297-8003-840.

Table 41-1 LNP log descriptions (Sheet 1 of 3)

Log	Cause	Action
LNP300	The system generates the LNP300 log whenever the node cannot complete digit manipulation on the GAP parameter for the outgoing IAM. This condition only applies to outgoing MF trunks or outgoing ISUP trunks with the provisioned SPN option. In both cases, the system uses the ported DN for signaling instead of using the LRN. For more information on Digit Manipulation see the appropriate section in the LRN-LNP Service Implementation Guide. Whatever switch in the network, originating or intermediate, that needs to manipulate the GAP before outpulsing or signaling generates this log if the GAP cannot be safely manipulated.	Verify the translations that the LRN goes through. The system has determined that these translations are ambiguous. As a result of this ambiguity, the system is unable to make appropriate comparisons between the LRN and the GAP.
LNP301	The LNP301 log is generated when an LRN on an incoming IAM is not 10 digits and the full ten digits cannot be determined. It is possible that the LRN can be signaled from the previous switch in a manipulated form. When an LRN is present in an incoming IAM, it is compared against the HLRN of the office. This can only be accomplished if it is ten digits in length. So, for example, if a seven-digit LRN is received, it must be assumed that the NPA was stripped off and has to be derived in the current switch. If it is impossible to correctly determine what the NPA should be, an LNP301 log is generated.	If the LRN is less than seven digits, make sure that the preceding switch sends at least a seven-digit LRN. If the LRN is seven digits, make sure datafill is in place in table FNPA7DIG to generate the NPA. The switch bases the NPS on the NXX of the LRN and on the datafilled STS against the incoming trunk group. This log is only generated on intermediate or recipient switches where an LRN was signaled in on an incoming ISUP IAM and it cannot be expanded to ten digits successful

Table 41-1 LNP log descriptions (Continued) (Sheet 2 of 3)

Log	Cause	Action
LNP302	The system generates the LNP302 log whenever the querying switch receives an ISUP release message with cause_value of 26, “Misrouted call to a ported number”. This log is generated in the scenario when User B dials User A, but the SCP doesn't know that User A has ported. The SCP when queried, incorrectly returns the LRN of the donor switch from which User A has ported. The originating switch accordingly attempts to route the call to the donor switch which receives an unallocated number treatment when it attempts to complete the call to User A. An ISUP Release message is then sent back to the originating switch with a cause value of “Misrouted call to a ported number”. Upon receiving this ISUP Release message, the originating switch applies treatment and generates an LNP302 log to alert the technician of the database inconsistency.	Verify that the number dialed by the calling party is a ported number and that the SCP database has up-to-date datafill to reflect that configuration.
LNP303	The system generates the LNP303 log whenever a call attempts to route to a ported number in the recipient switch but receives unallocated number treatment. This is the same scenario that generates the LNP302 log above, but this log is generated at the recipient switch instead of the querying switch.The information that is contained in this log includes the calling party, the ported number, and the LRN.	Verify that the number dialed by the calling party is a ported number and that the SCP database has up-to-date datafill to reflect that configuration.
LNP304	The system generates the LNP304 log whenever an LNP call encounters a VFG on a non-terminating switch and there is digit manipulation specified for the call.	Verify that the route to the VFG is set up properly. In order for an LNP call, which is not terminating at this switch, to encounter the VFG the digit manipulation specified in the routing table must have a value of zero.
LNP305	The LNP305 information log indicates a mismatch in the LATAXLA results of the pre-LNP query translations, as compared to the post-LNP query translations.	This is an information log and requires no action by the operating company personnel.

Table 41-1 LNP log descriptions (Continued) (Sheet 3 of 3)

Log	Cause	Action
LNP306	The system generates the LNP306 log when the native status of the originating or the redirecting agent cannot be determined, or cannot be supported by LNP.	Action required only when there are problems. Verify that the NPANXX of the agent has an entry in TOFCNAME.

AIN Essentials SSP-specific logs may also be generated upon some error conditions during LRN-LNP call processing. AUD logs may be generated in the case of software errors. These error conditions are limited to software and not protocol errors. AIN Essentials SSP-specific logs are also generated to report Automatic Code Gapping events.

41.2 LNP log examples

The following figures are examples of LNP logs.

Figure 41-1 Example of LNP300 log

```
RTPT ** LNP300 SEP0312:12:08 1100 TBL GAP Digit Manpulation Error
    LRN 9198712131    TRANS LRN   8722131
    GAP 9198703112
    ORIG CKT    9198703000
    TERM CKT    TRUNK_OUT_GO 12
    Unable to perform LNP digit manipulation on the GAP
```

Figure 41-2 Example of LNP301 log

```
RTPT ** LNP301 JUL 10 10:41:32  0420 TBL LRN reconstruction failed
    LRN     8712131
    ORIG CKT  TRUNK_IN_COME 12
    NPA can not be determined for LRN
```

Figure 41-3 Example of LNP302 log

```
RTPT  ** LNP302 JUL 10 10:41:32 0420 TBL Misrouted Call to Ported DN
  LRN = 2132760000
  PORTED DN = 2781234
  CALLING PTY = 6192785544
  Unable to route call to Ported DN from Querying Switch.
```

Figure 41-4 Example of LNP303 log

```
RTPT  ** LNP303 JUL 10 10:41:32 0420 TBL Unable to Terminate to Ported DN
  LRN = 2132760000
  PORTED DN = 2781234
  CALLING PTY = 6192785544
  Unable to route call to Ported DN at Recipient Switch.
```

Figure 41-5 Example of LNP304 log

```
**  LNP304 JUN17 14:25:36 1800 TBL  Unable to pass LNP info through VFG
        Called Pty   6136631088
        Ported DN    4164638001
        Orig Ckt     HOST 02 1 10 10    DN 4164631001
        DMI          88
        Table        IBNRT2
        Index        111
        LNP call cannot be routed through VFG because DMI > 0
```

Figure 41-6 LNP305 log example

```
 COMD1CDN13AX   **   LNP305 JAN01 03:16:01 9000 TBL   LRN LATAXLA marking
 mismatch
         LRN            6136631088
         Ported DN      4164631111
         Orig LATA NAME LATA1
         LATAXLA markings for Ported DN do not match LRN
```

Figure 41-7 LNP306 log example

```
 INDY0  **   LNP306  JUL09  03:41:02  5720  INFO  native  status  of  agent
 unsupported
          CPID            HOST 01 0 10 08   DN 4164738051
         Native Status   unsupported_case
          Unable to determine the native status of the agent
```

41.3 LINE logs

There are two COT-related logs that require modification to interwork with LNP:

- LINE150—generated as a result of a successful trace
- LINE151—generated as a result of a partial trace

Two new fields are added to these logs:

- Jurisdiction Information Parameter (JIP)—the first field that displays the six-digit JIP
- JIP SOURCE—the second field is a text field that explains how the JIP digits are obtained

The following table provides a summary of the possible scenarios for the population of JIP and JIP SOURCE fields

Table 41-2 Population of JIP and JIP SOURCE fields

Scenario			Reason	JIP	JIP SOURCE
	switch is LNP active	Intraswitch caller	Homelrn found	SITE HOMELRN based on SITE information	HOMELRN USED
			Redirection encountered	000000	REDIRECTION ENCOUNTERED-JIP UNRELIABLE
North American load		interswitch caller	SS7 signaling all the way	JIP	JIP SIGNALED
			SS7 signaling all the way, no JIP present	000000	NO SIGNALED JIP PRESENT (see Note)
			SS7 signaling all the way, JIP assigned to trunk	000000	NO SIGNALED JIP PRESENT
			interworking encountered	000000	INTERWORKING ENCOUNTERED JIP UNRELIABLE
	switch is non-LNP			000000	LNP NOT APPLICABLE
non-North Amercan load	not applicable	not applicable	not applicable	000000	LNP NOT APPLICABLE

Note: In this case the HOME Location Routing Number (HLRN) is used.

The following table lists the log report for each LINE log, including the cause of the log and the recommended maintenance response More information on the individual log reports, and on the CCS7 logs that support LRN-LNP, are in the Log Reports Reference Manual 297-8003-840

Table 41-3 LINE log descriptions

Log	Cause	Action
LINE150	The LINE subsystem generates this report when a customer originated trace(COT) has been performed successfully. A subscriber with the COT feature dialed the COT access code and thus initiated a trace of the last call received. LINE150 provides a dump of the incoming memory slot (IMS) associated with the COT subscriber. The field JIP displays the six digit value that uniquely identifies the originator's service provider. The JIP SOURCE field explains how the JIP digits were obtained.	No immediate action is required. This log provides call traces and is to be used as desired by the operating company.
LINE151	The LINE subsystem generates this report when a subscriber with the customer originated trace (COT) feature dials the COT access code and initiates a trace of the last call received. However, because the traced call was out-of-area or because the traced directory number was not a 7- or 10-digit number, the call trace information is incomplete. Other reasons for a LINE151 log out are outlined in the table at the end of this log.	No immediate action is required. This log provides call traces and is to be used as desired by the operating company.

41.3.1 LINE log examples

The following figures are examples of LINE logs.

Figure 41-8 Example of LINE150 log

```
LINE150   mmmdd  hh:mm:ss  ssdd   INFO FULL COT TRACE

SUBSCRIBER LEN: len    SUBSCRIBER DN: dn

TRACE DUMP  TIME CALL RCVD: mmmdd  hh:mm:ss  DN: dn

INTRAOFFICE: x  ORIG ADDR TYPE: nnn typetxt

OUT OF AREA: x  CWT: x  PRIVATE: x  GIC: x

JIP: nnnnnn

JIP SOURCE: jipsrctxt
```

where

JIP — is the 6-digit JIP from the originating switch
JIP SOURCE — is the text reason explaining how the JIP digits are obtained

Figure 41-9 Example of LINE151 log

```
LINE151 mmmdd hh:mm:ss ssdd INFO PART COT TRACE

SUBSCRIBER LEN: len    SUBSCRIBER DN: dn

TRACE DUMP  TIME CALL RCVD: mmmdd hh:mm:ss

DN/LEN/TRK: dn/len

INTRAOFFICE: x   ORIG ADDR TYPE: nnn typtxt

OUT OF AREA: x  CWT: x  PRIVATE: x  GIC: x

JIP: nnnnnn

JIP SOURCE: jipsrctxt

REASON: rsntxt
```

where

JIP — is the 6-digit JIP from the originating switch
JIP SOURCE — is the text reason explaining how the JIP digits are obtained

41.3.2 LINE logs restrictions and limitations

The following restrictions and limitations apply:

- This feature relies upon the integrity of the signaled JIP.
- When LNP is not active, the JIP is still included with the incoming signaling for the interswitch case. If the call originates as an intraswitch and LNP is not active the JIP is displayed as 000000.
- If an LRN is assigned against an incoming trunk, it is not used, since it may not accurately reflect the JIP of the originating switch.
- When a trunk encounters interworking the JIP will be considered unreliable.
- If an intraswitch call encounters a redirection in an LNP active office the JIP will be considered reliable and populated.
- When SOC option LNP00200 is not enabled the JIP digits will be displayed as 000000.

DMS-100 Family

Location Routing Number - Local Number Portability

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