297-8991-580

DMS-100 Family

DMS SuperNode SSP/STP Integrated Node

SSP to MNA7 Conversion Guide

TL12 Standard 04.02 August 1999

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DMS SuperNode SSP/STP Integrated Node

SSP to MNA7 Conversion Guide

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About this document

When to use this document

This document provides the procedures for converting a service switching point into a multiple CCS7 network address DMS signaling transfer point/service switching point integrated node (MNA7 DMS STP/SSP INode). This guide is intended for personnel who are involved in planning, engineering, and administering this conversion.

> ***Note:*** Throughout this document, the MNA7 DMS STP/SSP INode product name is abbreviated and referred to as MNA7 INode.

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 one of the following documents:

- *DMS-100 Product Documentation Directory,* 297-8991-001
- *Digital Switching Systems DMS-300 Document Index,* 297-2301-001
- *Digital Switching Systems UCS DMS-250 Document Index,* 297-2643-001
- *DMS-250 Master Index of Publications,* 297-2521-001
- *Wireless Systems DMS-MTX Master Index of Publications,* 411-2131-001

References in this document

The following documents are referenced in this document:

- *Software Optionality Control User Manual*, 297-8991-901
- *Translations Guide*, 297-yyyy-350

  Note: The document layer number, yyyy, denotes the product computing module load (PCL).
- *One Night Process Software Delivery Procedures*, 297-8991-303
- *Common Channel Signaling 7 Maintenance Reference Manual*, 297-1001-531
- *Common Channel Signaling 7 Maintenance Guide*, 297-8991-545

What precautionary messages mean

The types of precautionary messages used in Nortel (Northern Telecom) 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

Attention

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.

DANGER Possibility of personal injury task

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.

WARNING 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.

CAUTION Possibility of service interruption or degradation

CAUTION
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.

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

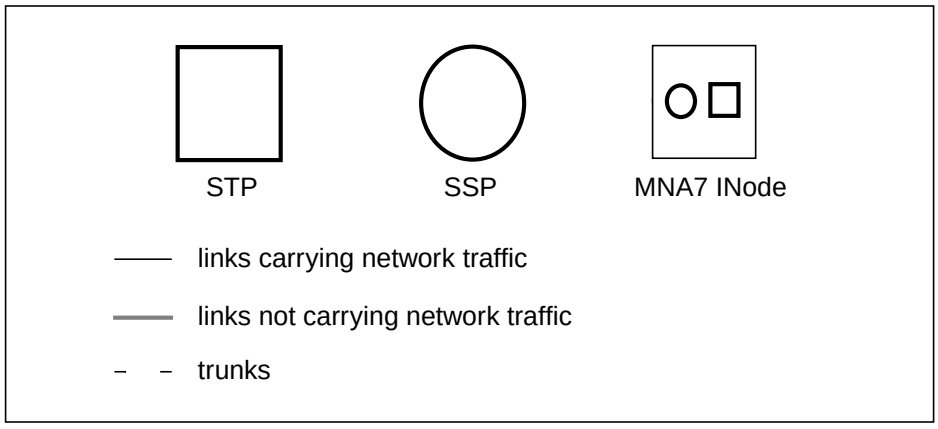
ctrl_no is the number of the CTRL (0 or 1)

Example of a MAP response:

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

How nodes and links are represented

Illustrations used in this document contain node symbols identified in the following legend.



Chapter 1: Introduction

This document provides the procedures for converting a service switching point into a multiple CCS7 network address DMS signaling transfer point/ service switching point integrated node (MNA7 DMS STP/SSP INode). This document is intended for personnel who are involved in planning, engineering, or administering this conversion. Throughout this document, the MNA7 DMS STP/SSP INode is abbreviated and referred to as MNA7 INode.

This document contains the following chapters:

- Chapter 1: Introduction, which states the purpose of this document and provides an overview of the conversion procedures
- Chapter 2: Material requirements, which identifies the hardware and software requirement that must be met before the conversion
- Chapter 3: Precautions and preparations, which describes the precautions and the preparatory effort to be completed before the conversion
- Chapter 4: SSP to MNA7 INode conversion procedure for converting two stand-alone SSPs to a mated pair of MNA7 INodes

Background

The DMS-INode was developed to allow operating companies to combine the functionality of an SSP and an STP in a single physical location. Combining the SSP and STP in one location lowers operating costs.

There are two types of INodes: the single network address (SNA7) INode and the multiple network address (MNA7) INode. The SNA7 INode was developed first. In the SNA7 INode, the SSP and the STP portions share one point code. Traffic received by the SSP portion is routed directly to the STP portion of the same INode.

The MNA7 INode provides separate point codes for the SSP and the STP. In an MNA7 INode, traffic received by the SSP can be routed either to the STP portion of the same INode or to the STP portion of the mate INode, depending on traffic requirements. Because it can route traffic to either of the STPs, the MNA7 INode provides the load balancing capabilities of separate SSP and STP sites, and retains the lower cost advantages of the SNA7 INode.

This document provides the procedures that operating company personnel must follow to convert two SSP nodes to a mated pair of MNA7 INodes in which the SSPs and STPs have their own CCS7 network addresses. The procedure for converting an SNA7 INode to an MNA7 INode is not included in this publication.

> ***Note:*** The diagrams in this conversion guide depict two SSPs being converted to a mated pair of MNA7 INodes. There are, however, many configurations that can use this conversion procedure. For example, an SSP to be converted may be connected to many SSPs, or one of the STPs may be connected to many STPs or an existing INode.
>
> If the configuration to be upgraded is other than two SSPs, contact your Nortel regional customer support to determine if the configuration can be upgraded using this procedure.

A typical office to be converted has both CCS7 trunks, such as CCS7 user part (C7UP) and ISDN user part (ISUP) trunks, and signaling connection control part (SCCP) applications, such as Custom Local Area Signaling Services (CLASS), Enhanced 800 service (E800), Wireless Intelligent Networks (WIN), and advanced intelligent network (AIN). Both the SSPs and the STPs in a typical office have CCS7 links, linksets, and routesets to route application messages through the network to their destination.

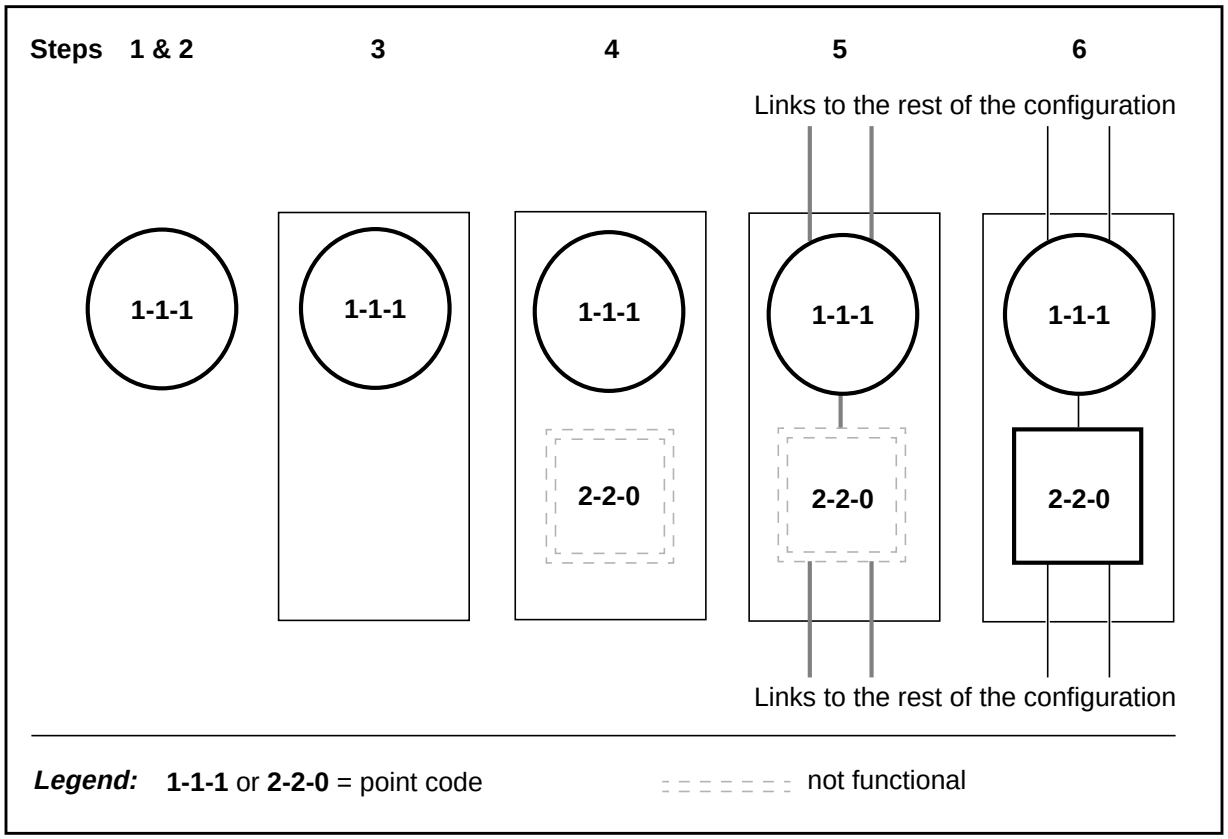
SSP to MNA7 INode conversion overview

In this procedure, two SSP nodes are upgraded simultaneously to form a mated pair of MNA7 INodes. To convert both SSPs, perform this procedure only once.

Only one network type can be converted at a time. Complete the conversion procedure on one network type, such as National (NATL) or National Spare (NATLSPARE), before beginning the conversion on another type.

Figure 1-1 shows the progression of one SSP to an MNA7 INode over the six-step conversion procedure.

Figure 1-1 Conversion of an SSP to an MNA7 INode



Note: This figure shows the conversion of one SSP; the same conversion happens simultaneously on the second SSP.

Conversion procedure overview

1 Determine the hardware requirements. Add hardware to support the new links required for the new point code. Repeat for the second SSP.

2 Take an image of both existing SSP offices.

3 Upgrade the existing SSP software to INode software using the standard one-night process (ONP) and activate the STP SOC on INode and the MNA7 software using software optionality control (SOC). Repeat for the second SSP.

4 Datafill the new logical STPs.

Note: To add a logical STP to the network, use the procedure for adding a stand-alone STP to the network as follows:

a. Add new STP point code to C7NETWRK table.

b. Add LIU7s to LIUINV table.

c. Add linksets for STPs and SSPs as required.

d. Add links for STPs and SSPs as required.

e. Add routesets for STPs and SSPs as required.

f. Add network subsystem numbers (SSN) in C7NETSSN table.

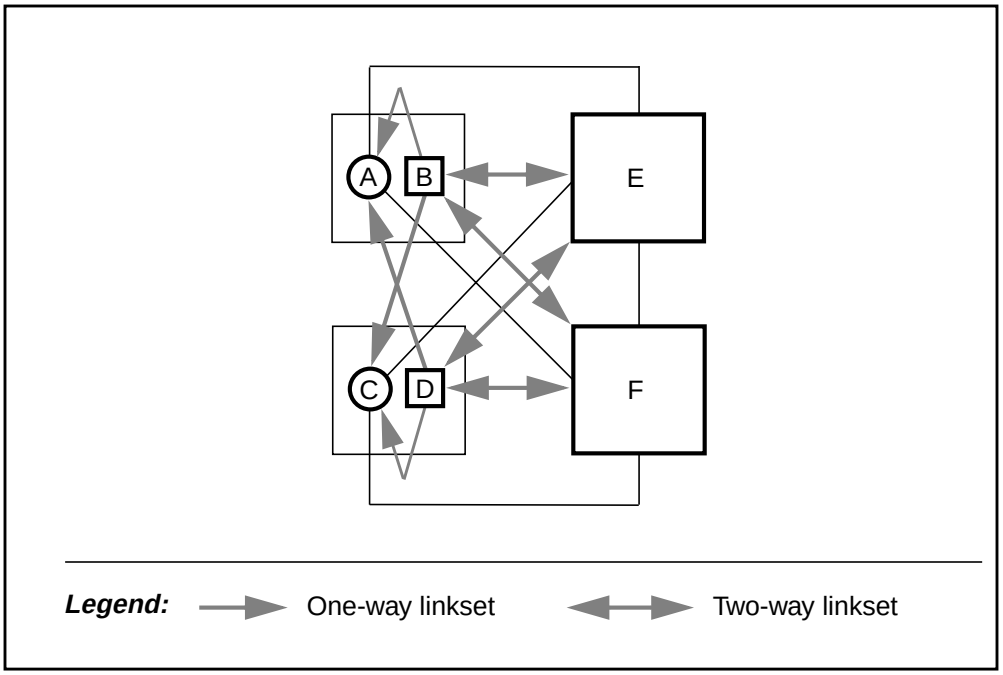
g. Add network SSNs in C7RPLSSN table.

h. On the external nodes (E and F), datafill the link, linkset, and routeset.

i. Repeat step 4 for the second SSP.

Figure 1-2 shows the office configuration when the new logical STPs are datafilled.

Figure 1-2 Configuration after datafilling the new logical STPs (step 4)



Note: The arrows in Figure 1-2 represent linksets that are not carrying traffic but have been datafilled. One arrow indicates that the linkset has been datafilled one way. Two arrows indicate that the linkset has been datafilled both ways.

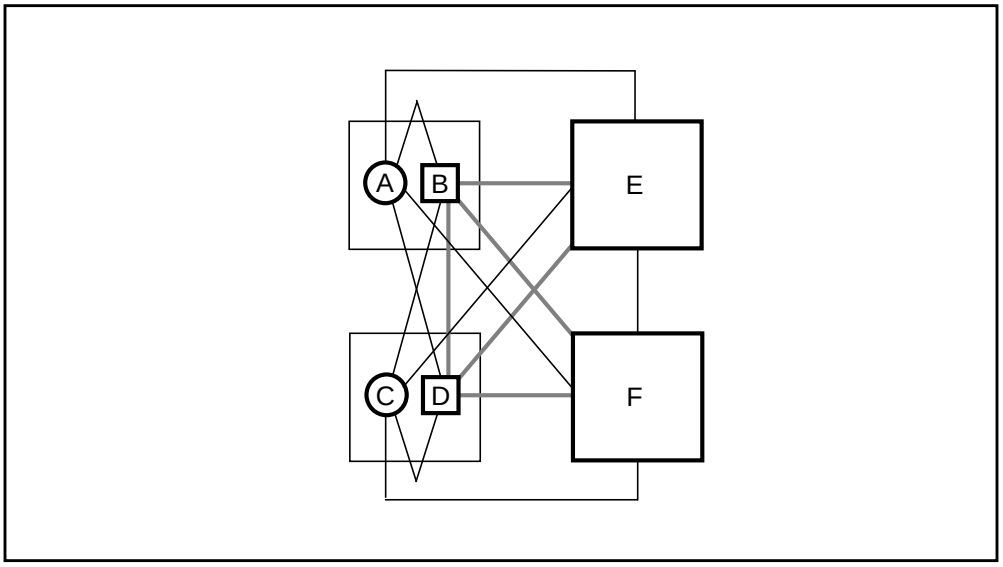
5 Establish message transfer part (MTP) and SCCP connectivity with the network as follows:

a. Make physical link connections to the STP.

b. Return to service and activate the links and routesets that connect the adjacent nodes. There is no impact on existing office traffic when the STP node is added. At this step, you can return to the original stand-alone SSP configuration, with no effect on traffic.

Figure 1-3 shows the office configuration when MTP and SCCP connections are established.

Figure 1-3 Configuration after establishing MTP and SCCP connectivity with the network (step 5)



Note: The grey lines in figure 1-3 represent links that have been datafilled. They do not represent physical links. No additional hardware is required at this point.

6 Redirect traffic on available links, as follows:

a. Redirect SSP traffic to the logical STP node.

b. Datafill the changes on SSP nodes using the STP.

c. Change the SSP routesets to route traffic through the new logical STP.

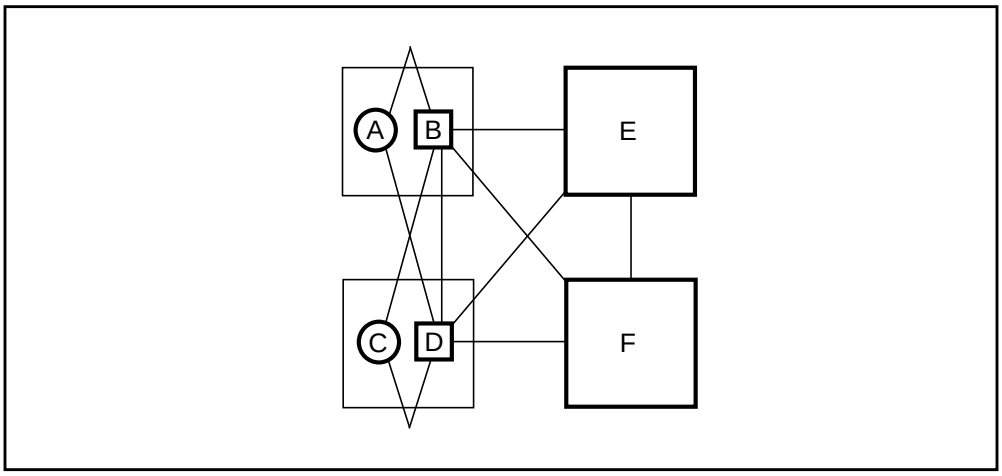
d. Monitor the site.

e. Repeat steps d and e for the mate MNA7 INode.

f. Take an image of both new MNA7 offices.

Figure 1-4 shows the office configuration when traffic is redirected and the conversion procedure is finished.

Figure 1-4 Configuration after finishing the conversion procedure



Chapter 2: Material requirements

No special equipment is required for the conversion of an SSP to an MNA7 INode. However, the new MNA7 INode configuration requires new CCS7 signaling links. The operating company is responsible for obtaining the new hardware that is required to support the new CCS7 links. New hardware can include additional cross-connects or CCS7 link interface units (LIU7). Additional LIU7s are required for LIU7 routing and INode internal A-links.

Both nodes to be upgraded must be release version CSP09.

Contact your first level of support to determine if additional materials or documents are required to support the conversion on your configuration.

This procedure requires passwords to activate LIU7 routing and software optionality control (SOC) options. Contact your Regional Customer Support service representative to obtain your C7RTR, STP SOC on INode, and MNA7 SOC right-to-use (RTU) key codes. Refer to sections “Software upgrade and SOC activation” and “Activating routeset expansion” in Chapter 4 for more information.

Chapter 3: Precautions and preparations

This chapter contains the precautions and preparations for the SSP-to-MNA7-INode conversion procedure. If all limitations, precautions, and steps are adhered to, no traffic loss or service outage will occur.

Precautions

Ensure that the network to be converted and all connecting nodes and network connections are in service. The network and connecting nodes must be in service to allow alternate routing during the conversion.

Review and coordinate the upgrade procedure with the other operating companies in the network that are involved in the conversion procedure.

Review this whole document before starting the conversion procedure.

Additional links, routesets, and linksets are required to perform the upgrade. Allow the new hardware to soak before it carries live traffic.

Upgrade two SSP nodes to form an MNA7 INode pair. Do not mate an SSP with an MNA7 INode.

> ***Note:*** Some routes are out of service during the conversion. While they are out of service, alternate routes carry all CCS7 traffic.

Preparation

It is recommended that the traffic cutover, described in the section “Rerouting CCS7 trunks traffic and repositioning linksets” in this document, be performed during off-peak hours.

Before starting the conversion procedure, arrange all materials, tools, and test equipment at the work location. Ensure that all new hardware required for the conversion is on site.

Obtain a new point code for each new logical STP from the network operator.

Take an image of the existing office before the conversion. Take another image after the conversion has been completed.

Where additional links are required to perform the conversion, and before beginning any procedural steps, ensure that link interface units (LIU) are either equipped in the link interface shelf (LIS) or have been engineered for the conversion.

The following tables for the MNA7 INode and connected nodes are affected by this procedure:

- C7NETWRK
- C7LKSET
- C7NETSSN
- C7RPLSSN
- LIUINV
- C7RTESET
- C7LOCSSN
- C7GTTYPE
- C7LINK
- C7ALIAS
- C7RSSCRN
- C7GTT

This procedure requires passwords to activate LIU7 routing and software optionality control (SOC) options. Contact your Regional Customer Support service representative to obtain your C7RTR, STP SOC on INode, and MNA7 SOC right-to-use (RTU) key codes. Refer to sections “Software upgrade and SOC activation” and “Activating routeset expansion” for more information.

Limitations

All tables affected by this procedure have a limited capacity, which must not be exceeded by this conversion.

The STP SOC on INode option affects the size of tables C7GTT and C7TRKMEM. When the STP SOC on INode is turned ON,

- the maximum number of tuples in table C7GTT increases to 60 000 from the SSP limit of 25 000, and
- the maximum number of tuples in table C7TRKMEM decreases to 20 000 from the SSP maximum limit of 100 000.

The maximum number of routesets on an SSP or on an MNA7 INode is 2047 if LIU7 routing is enabled, and 255 if LIU7 routing is not enabled.

During the conversion, the number of tuples in tables C7NETSSN, C7NETWRK, C7RTESET, and C7LKSET increases up to double the pre-conversion amounts. Ensure that sufficient resources are available before beginning the conversion procedure.

> ***Note:*** The number of tuples in table C7NETSSN doubles during the conversion. Ensure that the table is at less than half capacity before beginning the conversion. It is possible to eliminate some SCCP data in this table, but eliminating the SCCP data can also eliminate alternate routing. Eliminating SCCP data in the C7NETSSN table is therefore not recommended.

Network conversion planning and coordination

From a network perspective, this conversion is similar to adding a new stand-alone STP to the network. The conversion requires operating company personnel to be present at each office that is affected by a link change during any step of the procedure. Nortel recommends that you appoint a conversion project manager to coordinate all the steps for the conversion.

When planning the conversion, review each step and outline the procedures that apply to the network being converted.

Chapter 4: SSP to MNA7 INode conversion procedure

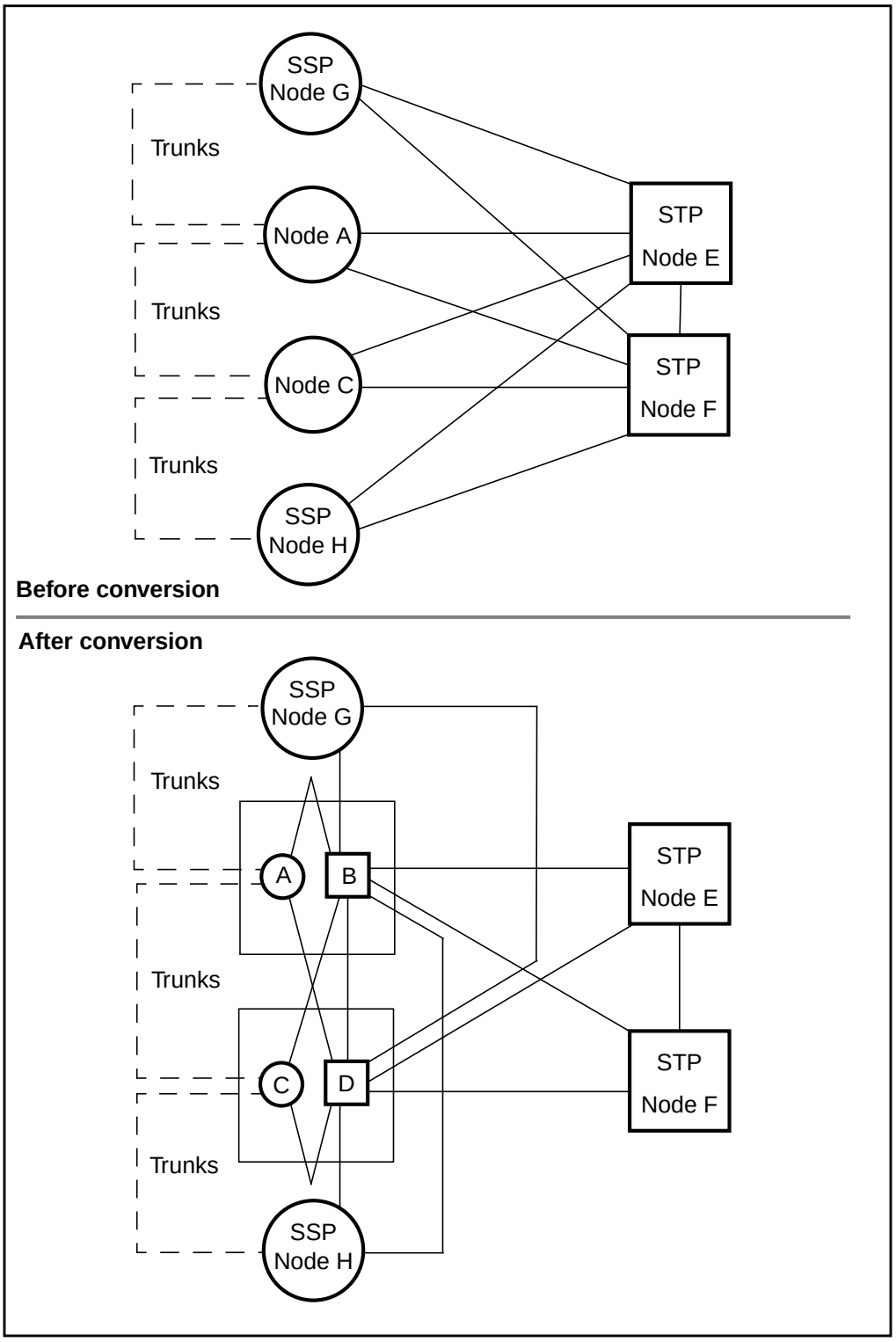
This chapter provides the procedures used to upgrade two SSPs to a mated pair of MNA7 INodes with a software release of CSP09.

This chapter contains the following procedures:

- Determining new hardware requirements
- Software upgrade and SOC activation
- Datafilling internal STP nodes
- Adding new CCS7 network datafill
- Establishing associated routeset connectivity
- SCCP provisioning and connectivity
- Rerouting CCS7 trunks traffic and repositioning linksets
- Activating routeset expansion
- Backing out

Figure 4-1 shows the office configuration before and after two SSPs are upgraded to a mated pair of MNA7 INodes.

Figure 4-1 Upgrade of SSP nodes to MNA7 mated INode



Determining new hardware requirements

Before starting the conversion procedure, determine the new hardware requirements.

> ***Note:*** All hardware used during this conversion procedure remains in service after the procedure is finished. Apart from the requirements of the final configuration, no additional hardware is required to complete the procedure.

Install the new hardware and allow soaking time. Once the new hardware is installed, take an image of the office.

Software upgrade and SOC activation

Upgrade the existing SSP software to an INode load using the standard one-night process (ONP). After the ONP is finished, activate the STP software optionality control (SOC) on INode option and the MNA7 SOC option.

One-night process

During the ONP table transfer (TABXFER) step, the tuples in table C7NETWRK are automatically copied from the previous load to the inactive computing module (CM). Perform the TABXFER step before performing the switch of activity (SWACT) to the new load. Refer to the *One Night Process Software Delivery Procedures*, 297-8991-303. After step TABXFER is completed, but before the PRESWACT procedure takes place, verify that the C7NETWRK node type data in the new load matches the data in the previous load.

> ***Note:*** If the PRESWACT procedure acknowledges that the C7NETWRK tables on the inactive and active planes do not match, verify that the data on the inactive plane, including the SSP node type, is correct. If the data is correct, ignore the warning and continue with the PRESWACT procedure.

When the ONP is finished, the tuples in table C7NETWRK contain node type SSP. Node type SSP indicates that the internal node provides SSP functions only.

Figure 4-2 Sample C7NETWRK table after an SSP office to INode load upgrade

```
NETNAME NODETYPE PTCODE NI SLSROT TFR MCS CLUSTERS RCTEST MTPRES
NATL_NET SSP ANSI7 73 72 71 NATL Y Y 3 N Y Y
```

STP SOC on INode activation

When the ONP is finished and the new load is active, activate the STP SOC on INode option. This step is required to activate the STP links, which are required later in this procedure. To activate STP SOC on INode option, the state of the option must be ON. Refer to the *Software Optionality Control User Manual*, 297-8991-901, for instructions on how to change the usage state.

Note: The STP SOC on INode order code is STPE0300.

Enable STP SOC on INode as follows:

1 Access SOC by typing

> SOC

2 Display the current status of the MNA7 option by typing

SOC**> SELECT OPTION TEL00010**

3 Change the SOC state by typing

SOC**> ASSIGN RTU <KEYCODE> TO TEL00010**

SOC**> ASSIGN STATE ON TO TEL00010**

4 Exit SOC by typing

SOC**> QUIT**

STP SOC on INode activation

When the ONP is finished and the new load is active, activate the MNA7 software optionality control (SOC). This step is required to activate the STP links, which are required later in this procedure. Refer to the *Software Optionality Control User Guide*, 297-8991-901, for instructions on changing the usage state.

Note: The MNA7 SOC order code is TEL00010.

Enable MNA7 SOC as follows:

1 Access SOC by typing

> SOC

2 Display the current status of the MNA7 option by typing

SOC**> SELECT OPTION TEL00010**

3 Change the SOC state by typing

SOC**> ASSIGN RTU <KEYCODE> TO TEL00010**

SOC**> ASSIGN STATE ON TO TEL00010**

4 Exit SOC by typing

SOC**> QUIT**

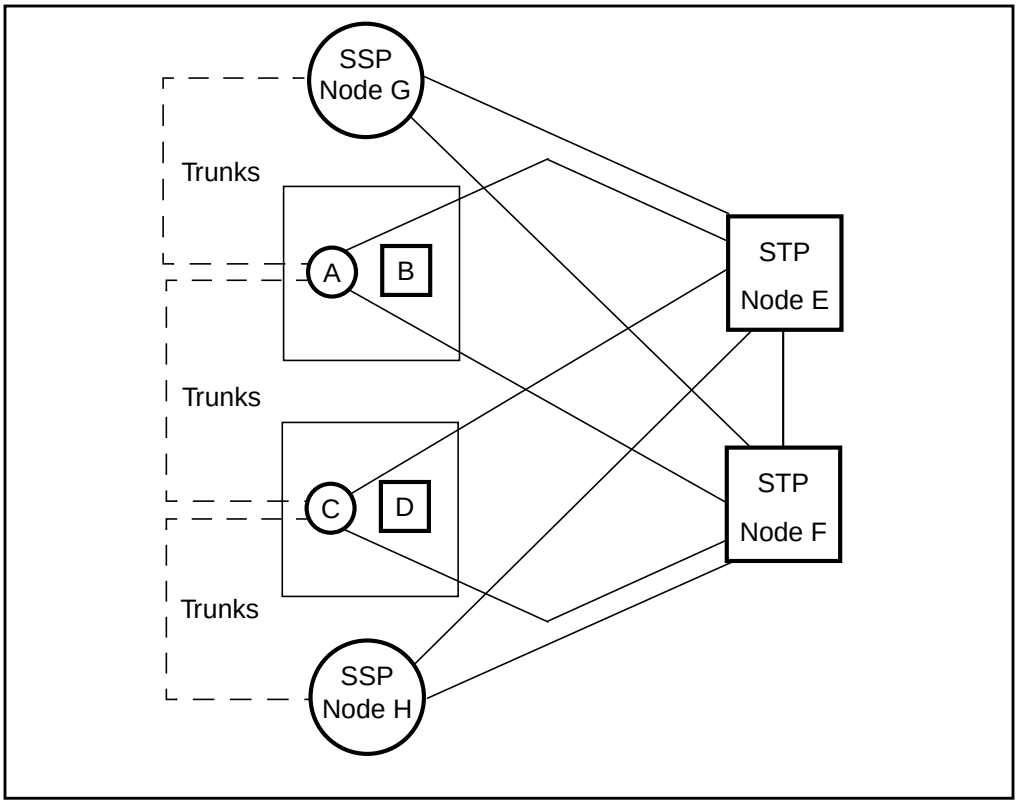
Backing out

To back out at this point, refer to the section “Backing out” at the end of this chapter.

Datafilling internal STP nodes

This procedure datafills the new internal STP. Figure 4-3 shows the configuration after this step is complete.

Figure 4-3 Logical configuration after STP nodes are datafilled



Note: This diagram reflects only the newly added STP network datafill. At this point, no links have been added.

Add the STP nodes to table C7NETWRK. At this point two nodes, each with a different point code, exist on the switch. One node is the active SSP, which performs only SSP functions. The other node is the new STP.

Figure 4-4 Sample C7NETWRK table after adding the STP internal node

```
NETNAME NODETYPE PTCODE NI SLSROT TFR MCS CLUSTERS RCTEST MTPRES
------------------------------------------------------------------
NATL_NET SSP ANSI7 73 72 71 NATL Y Y 3 N Y Y
NATL_NETX STP ANSI7 76 75 75 NATL Y Y 3 N Y Y
```

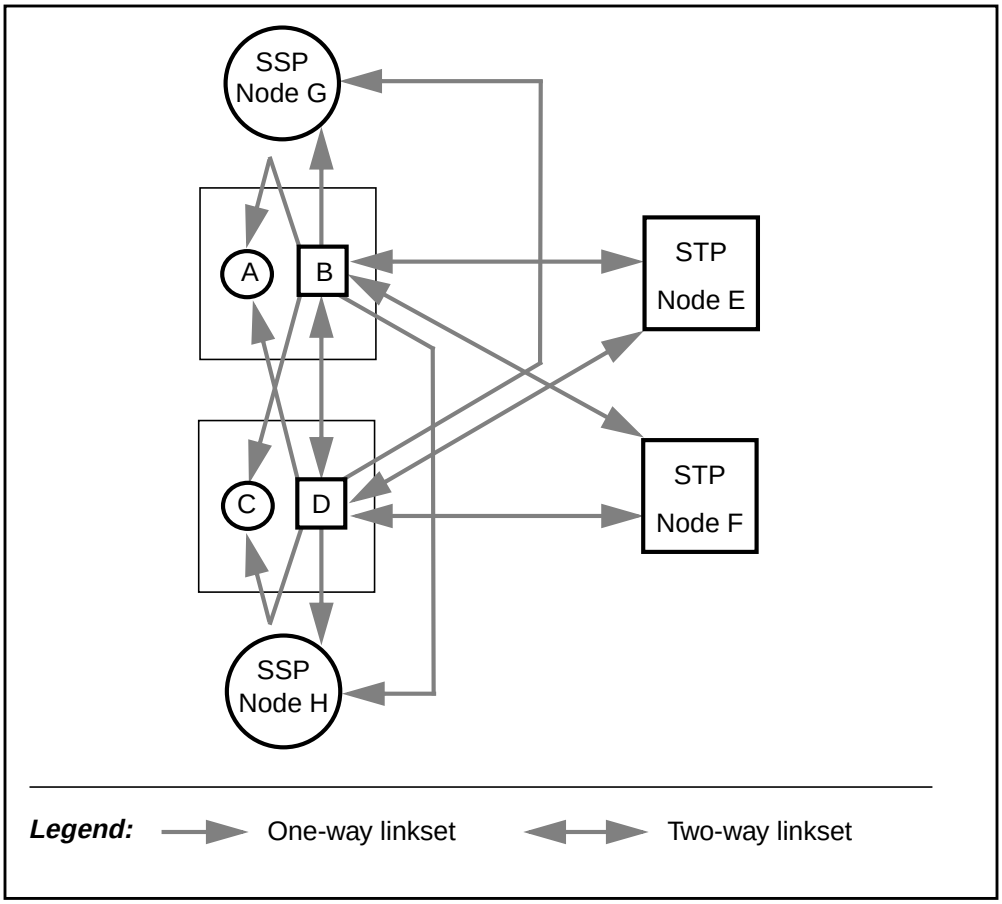
Backing out

To back out at this point, refer to the section “Backing out” at the end of this chapter.

Adding new CCS7 network datafill

This procedure adds the new STP network datafill. Figure 4-5 shows an example of a network configuration.

Figure 4-5 New STP links provisioned in this section



Note 1: This figure does not show previously existing SSP links; it shows only newly added links.

Note 2: The arrows in Figure 4-5 represent linksets that are not carrying traffic but have been datafilled. One arrow indicates that the linkset has been datafilled one way. Two arrows indicate that the linkset has been datafilled both ways.

Provisioning new linksets

The maximum number of links supported across all linksets for SSPs and MNA7 INodes is 72 for a 68 K SuperNode switch and 108 for a BRISC switch.

Provision the new linksets as follows:

1 For node F, datafill new B-links (linksets FB and FD) to MNA7 STP nodes B and D, respectively.

2 For node E, datafill new B-links (linksets EB and ED) to MNA7 STP nodes B and D, respectively.

3 For node D (mate internal STP), datafill new B-links (linksets DE and DF) to adjacent STP nodes E and F, respectively.

Datafill new A-links to nodes DC, DA, DH, and DG.

Datafill a new C-link to linkset DB.

4 For node B (internal STP), datafill new B-links (linksets BF and BE) to the adjacent STP nodes F and E, respectively.

Datafill new A-links to nodes BC, BA, BH, and BG.

Datafill a new C-link (linkset BD) to the mate MNA7 STP node D.

Provisioning new links

A new linkset requires new hardware. One LIU7 and one CCS7 link are required for each new datafilled link.

Attention

Routeset expansion on an MNA7 INode requires that all SSP links be datafilled on the same link peripheral processor (LPP). To ensure that routeset expansion can be enabled, datafill all new or modified SSP links to use LIU7s on the same LPP.

Provision the new links as follows:

1 For node F, datafill as many CCS7 links as required against the newly defined linksets FB and FD.

2 For node E, datafill as many CCS7 links as required against the newly defined linksets ED and EB.

3 For node D, datafill as many links as required against the newly defined linkset DB. Datafill links DH, DA, DF, DE, DC, and DG.

Linkset DA must have the same number of links as linkset EA.

Linkset DH must have the same number of links as linkset EH.

Linkset DF must have the same number of links as linkset FD.

Linkset DE must have the same number of links as linkset ED.

Linkset DC must have the same number of links as linkset EC.

Linkset DG must have the same number of links as linkset EG.

4 For node B, datafill a new CCS7 link for each CCS7 link datafilled on nodes D, F, and E (links DB, FB, and EB, respectively).

Linkset BD must have the same number of links as linkset DB.

Linkset BH must have the same number of links as linkset EH.

Linkset BA must have the same number of links as linkset EA.

Linkset BF must have the same number of links as linkset FB.

Linkset BE must have the same number of links as linkset EB.

Linkset BC must have the same number of links as linkset EC.

Linkset BG must have the same number of links as linkset EG.

Provisioning new routesets

Careful planning is required at this point. The maximum number of supported routesets on an MNA7 INode is 255, or 511 with routeset expansion enabled. The total number of routesets datafilled on internal nodes C and D combined (or A and B combined) cannot exceed this maximum. Refer to the section "Activating routeset expansion" in this chapter.

Provision the new routesets as follows:

1 For node F, add new routesets to node D using linksets FD and FB, and to node B using linksets FB and FD.

2 For node E, add new routesets to node D using linksets ED and EB, and to node B using linksets EB and ED.

3 For node D, duplicate all routesets from node F, except routesets to nodes C, A, H, and G. Replace the routes in routesets C, A, H, and G with linksets DB, DF, and DE.

4 Add the following routesets:

a. Add routeset DC using linksets DC and DB.

b. Add routeset DA using linksets DA and DB.

c. Add routeset DF using linksets DF and DE.

d. Add routeset DE using linksets DE and DF.

e. Add routeset DH using linksets DH and DB.

f. Add routeset DG using linksets DG and DB.

g. Add routeset DB using linksets DB, DE, and DF.

5 For node B, duplicate all routesets from node E, except routesets to nodes C, A, H, and G. Replace the routes in routesets C, A, H, and G with linksets BD, BF, and BE.

6 Add the following routesets:

a. Add routeset BC using linksets BC and BD.

b. Add routeset BA using linksets BA and BD.

c. Add routeset BF using linksets BF and BE.

d. Add routeset BE using linksets BE and BF.

e. Add routeset BH using linksets BH and BD.

f. Add routeset BG using linksets BG and BD.

g. Add routeset BD using linksets BD, BE, and BF.

Datafilling table C7ALIAS

If required by the network, create new C7ALIAS data for nodes D and B. Place the new data in table C7ALIAS of the new STP.

Backing out

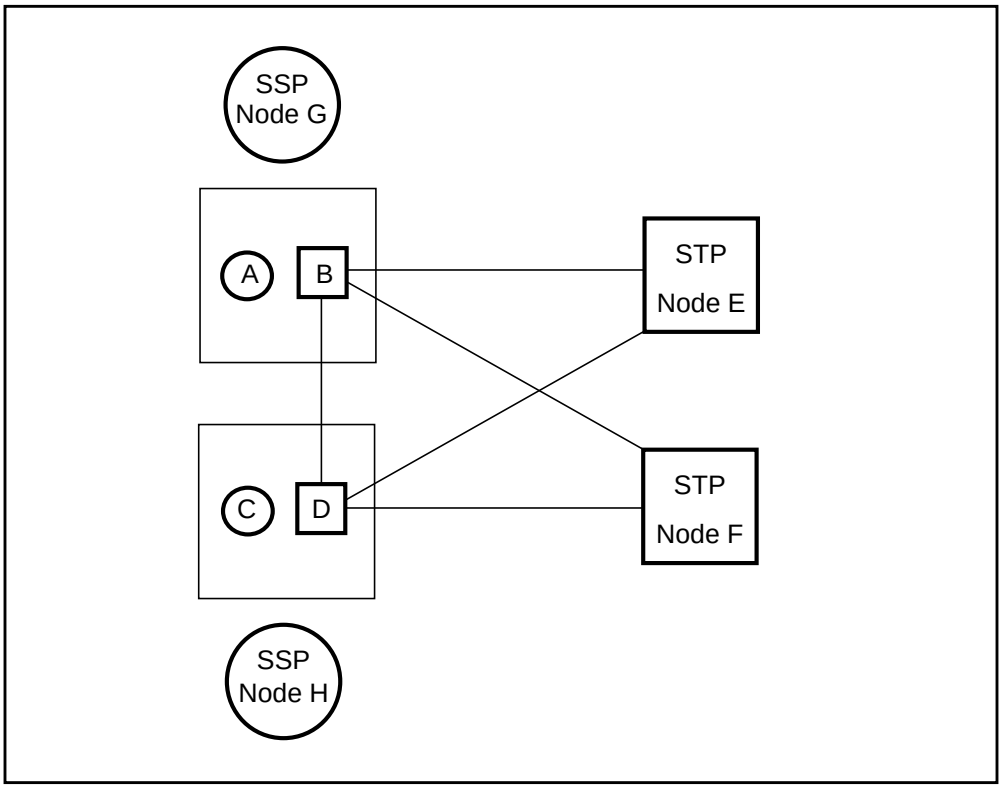
To back out at this point, refer to the section “Backing out” at the end of this chapter.

Establishing associated routeset connectivity

This procedure brings all newly datafilled linksets into service. It also brings all fully associated routesets using these linksets into service.

Figure 4-6 shows the configuration of the datafilled routesets when this step is finished.

Figure 4-6 New routesets brought into service by this procedure



Note: This figure does not show previously existing SSP links; it shows only newly added routesets.

Bringing newly associated linksets into service

1 Bring the C-link into service by manually busying, activating, and returning to service all links in the newly defined linksets DB and BD.

Bring the routesets into service by manually busying and returning to service the newly defined routesets DB and BD.

2 For node D, bring the linksets into service by manually busying, activating, and returning to service all links in the newly defined linksets DE and DF.

Bring the routesets into service by manually busying and returning to service the newly defined routesets DE and DF.

Note: The routesets, linksets, and links remain system busy until the corresponding routesets and links on node F and node E are in service.

3 For node B, bring the linksets into service by manually busying, activating, and returning to service all links in the newly defined linksets BE and BF.

Manually busy and return to service routesets FD and FB.

Note: The routesets, linksets, and links remain system busy until the corresponding routesets and links on node F and node E are in service.

4 For node F, bring the linksets into service by manually busying, activating, and returning to service all new links on the newly defined linksets FD and FB.

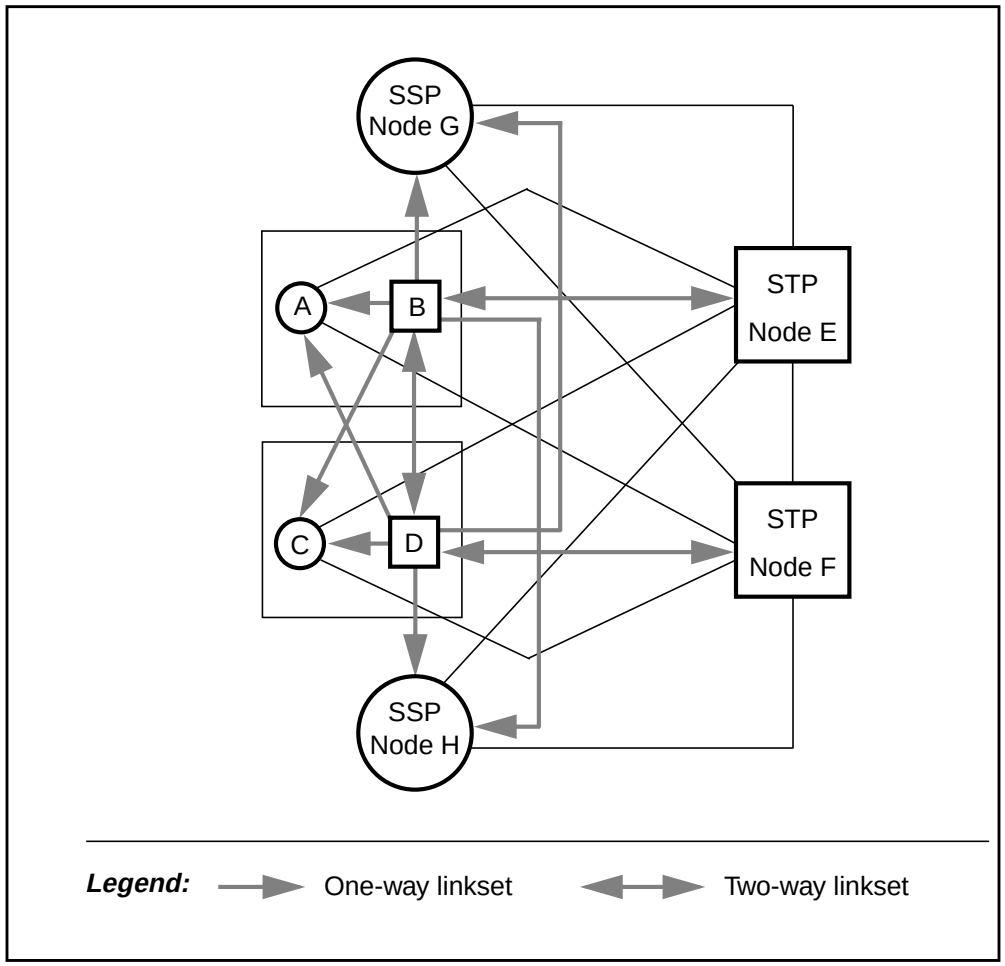
Bring the routesets into service by manually busying, activating, and returning to service all links on the newly defined linksets FD and BF.

5 For node E, bring the linksets into service by manually busying, activating, and returning to service all links on the newly defined linksets ED and EB.

Bring the routeset into service by manually busying and returning to service the newly defined routesets that contain linksets ED and EB as routes.

Figure 4-7 shows the traffic and datafill of the office after associated routeset connectivity is established.

Figure 4-7 Traffic and datafill after establishing routeset connectivity



Note: The arrows in figure 4-7 represent linksets that are not carrying traffic but have been datafilled. One arrow indicates that the linkset has been datafilled one way. Two arrows indicate that the linkset has been datafilled both ways.

Verifying MTP CCS7 connectivity

At this point, all new routesets and linksets are in service, but only the SSPs are carrying traffic. To ensure that all MTP functionality is available for the following steps, verify that no MTP-related alarms or negative CCS logs are active. Allow soaking time before starting the next procedure.

Backing out

To back out at this point, refer to the section “Backing out” at the end of this chapter.

SCCP provisioning and connectivity

Provisioning table C7NETSSN

The current number of tuples in table C7NETSSN must be less than one-half the maximum total subsystem number (SSN) tuples.

Note: After the following steps, the SSP and STP subsystem data in table C7NETSSN must be identical in order to support SCCP alternate routing functionality correctly.

Provision the SCCP table C7NETSSN as follows:

1 For node F, add node D and node B with no subsystems. Bring these remote point codes into service at the SCCPRPC MAP level.

2 For node E, add node D and node B with no subsystems. Bring these remote point codes into service at the SCCPRPC MAP level.

3 For node D, duplicate all SSP subsystems that are on node C. Replace each SSP far-end point code (node C routeset) with its corresponding STP point code (node D routeset). Bring all the remote point codes into service at the SCCPRPC MAP level. Bring all subsystems into service at the SCCPRSS MAP level. Then add SSPs C, A, H, and G, and their corresponding subsystems.

4 For node B, duplicate all SSP subsystems that are on node A. Replace each SSP far-end point code (node A routeset) with its corresponding STP point code (node B routeset). Bring all the remote point codes into service at the SCCPRPC MAP level. Bring all subsystems into service at the SCCPRSS MAP level. Then add SSPs C, A, H, and G, and their corresponding subsystems.

Provisioning table C7LOCSSN

No changes are necessary.

Provisioning table C7RSSCRN

This table is used for STP nodes only. If changes are necessary, make them during the MTP cutover.

Provisioning table C7RPLSSN

Change table C7RPLSSN to use STP routesets.

Provisioning table C7GTTYPE

No changes are necessary.

Provisioning table C7GTT

Note: If the data modification order process (DMOPRO) is used to convert GTT tuples, perform the conversion of GTT tuples in sets of 200 or fewer. If you use a larger number of tuples, the DMOPRO may not finish the task because of system limitations.

1 For each tuple in table C7GTT, convert the destination routesets from node C to the corresponding STP routesets in node D.

2 Copy the datafill from node F that translated GTT messages from nodes A, H, and G. The new GTT on the INode should route messages to nodes F and E.

3 For each tuple in table C7GTT, convert the destination routesets from node A to node B.

4 Copy the datafill from node E that translated GTT messages from nodes C, H, and G. The new GTT on the INode should route messages to nodes F and E.

Backing out

To back out at this point, refer to the section “Backing out” at the end of this chapter.

Rerouting CCS7 trunks traffic and repositioning linksets

Rerouting SSP traffic from STP E to STP B

1 Manually busy and offline routesets EC and CE.

2 Manually busy, deactivate, and offline linksets CE and EC.

3 Add linksets EB and ED to routeset EC and change linksets to a higher cost.

4 Delete linkset EC from routeset EC.

5 Delete routeset CE.

6 Manually busy and return to service routeset EC.

7 Change the far-end point code of linkset CE to node B.

8 Move the physical links of linkset CE to node B.

9 Datafill routeset CB with linksets CB and CF.

10 Add a tuple to table C7RSSCRN on node B, with routeset BC. Broadcast to routesets BE and BF.

11 Manually busy, activate, and return to service linksets CB and BC.

12 Manually busy and return to service routesets BC and CB.

13 On node C at MAP level SCCPRPC, manually busy and return to service routeset CB.

14 On node B at MAP level SCCPRPC, manually busy and return to service routeset BC.

15 On node B at MAP level SCCPRSS, manually busy and return to service all subsystems.

16 Allow soaking time.

Rerouting SSP traffic from STP F to STP D

1 Manually busy and offline routesets FC and CF.

2 Manually busy, deactivate, and offline linksets CF and FC.

3 Add linksets FB and FD to routeset FC and change linksets to a higher cost.

4 Delete linkset FC from routeset FC.

5 Delete routeset CF and linkset FC.

6 Manually busy and return to service routeset FC.

7 Change the far-end point code of linkset CF to Node D. Move physical links of linkset CF to node D.

8 Datafill routeset CD with linkset CD.

9 Add a tuple to table C7RSSCRN on node D, with the concerned node being routeset DC. Broadcast to routesets DE and DF.

10 Manually busy, activate, and return to service linksets CD and DC.

11 Manually busy and return to service routeset DC.

12 On node C at MAP level SCCPRPC, manually busy and return to service routesets CD and DC.

13 On node D at MAP level SCCPRPC, manually busy and return to service routeset DC.

14 On node D at MAP level SCCPRPC, manually busy and return to service all subsystems.

15 Allow soaking time.

Rerouting traffic on SSPs A, H, and G

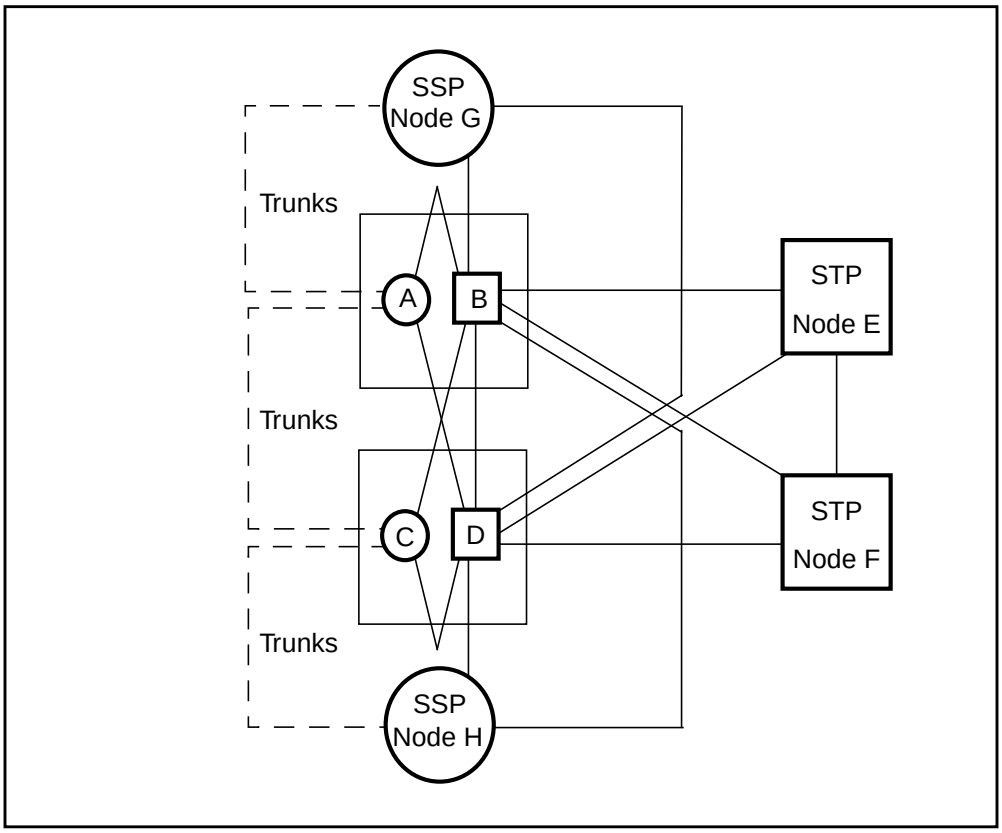
Repeat the section “Rerouting traffic from STP E to STP B” and the section “Rerouting traffic from STP F to STP D.” For each step, replace node C with node A.

Repeat the section “Rerouting traffic from STP E to STP B” and the section “Rerouting traffic from STP F to STP D.” For each step, replace node C with node H.

Repeat the section “Rerouting traffic from STP E to STP B” and the section “Rerouting traffic from STP F to STP D.” For each step, replace node C with node G.

Figure 4-8 shows the office configuration when the conversion is finished.

Figure 4-8 Configuration after conversion is finished



Backing out

To back out at this point, refer to the section “Backing out” at the end of this chapter.

Activating routeset expansion

This procedure activates routeset expansion. Activation of routeset expansion allows a maximum of 511 routesets to be datafilled on the MNA7 INode; otherwise, 255 is the maximum.

Bringing LIU7s into service

To activate LIU7 routing, at least two LIU7s must be dedicated to the routing function. Select the LIU7s and bring them into service for the routing function as follows:

1 Datafill the LIU7s in table C7ROUTER.

2 Post the LUI7s by typing

>MAPCI;MTC;MTC;PM;POST LIU7 #

3 Busy, load, and return to service the LIU7s.

For more information on bringing LIU7s into service, refer to the *Common Channel Signaling 7 Maintenance Reference Manual*, 297-1001-531.

Enabling LIU7 routers

Enable the LIU7 routers as follows:

1 Add LIU7s to table C7ROUTER.

For more information on datafilling table C7ROUTER, refer to the *DMS-100 Translations Guide*.

2 Access LIU7 routers by typing

MAPCI;MTC;CCS;CCS7;C7ROUTER

3 Manually post, busy, and return to service all LIU7 routers.

Activating LIU7 routing

Activate LIU7 routing and disable the routing function of the CCS7 digital trunk controller (DTC7) as follows:

1 Access Tools Support by typing

CI> TOOLSUP

2 Access table C7ROUTER by typing

CI> ACCESS ON C7RTR

3 Activate access to C7RTR by typing the passcode of the day. Contact your next level of support to obtain the passcode.

4 Enable LIU7 routing using the C7RTR utility.

CI> C7RTR

5 Set routeset limits by typing

CI> SET_MAX_ROUTESETS TO 511

6 Activate LIU7 routing by typing

C7RTR> ACTIVATE

7 Remove MTP Databases from CCS7 DTCs by typing

C7RTR> REMOVE_MTP

8 Query the state of LIU7 routing by typing

C7RTR> QUERY_EXT_ROUTING

For more information on command C7RTR, refer to the *Common Channel Signaling 7 Maintenance Guide*, 297-8991-545.

Once LIU7 routing is enabled, up to 511 routesets can be datafilled in table C7RTESET.

Backing out

The conversion procedure can be reversed at any time.

To back out at any point, follow all steps in the reverse order. Begin with the last part of the procedure that has been completed and work backwards to the first part. Within each part, follow the steps in reverse order.

For each step, replace each command with its opposite. Commands and their opposites are listed in the table that follows.

Table 4-1 Commands and their opposites used for backing out of the conversion procedure

Command	Opposite
activate (ACT)	deactivate (DEACT)
deactivate (DEACT)	activate (ACT)
delete (DEL)	add (ADD)
offline (OFFL)	return to service (RTS)
return to service (RTS)	offline (OFFL)

Note: The BUSY and POST commands do not have opposite commands.

For example, to back out of the step

> Manually busy, deactivate, and offline linksets CF and FC.

do the following:

> Manually busy, activate, and return to service linksets CF and FC.

List of terms

AIN *See* advanced intelligent network.

advanced intelligent network (AIN) A set of Bellcore standards for software and hardware that enhance switch call processing capabilities to use centralized databases. These databases determine how AIN calls should proceed for further call processing. AIN also allows operating companies to design and deploy their own features and make these features available across private and public networks.

CCS7 *See* Common Channel Signaling 7.

CCS7 link interface unit (LIU7) A peripheral module (PM) that processes messages entering and leaving a link peripheral processor (LPP) through an individual signaling data link. Each LIU7 consists of a set of cards and a paddle board provisioned in one of the link interface shelves of the LPP.

CLASS *See* Custom Local Area Signaling Services.

CM *See* computing module.

Common Channel Signaling 7 (CCS7) A digital message-based network signaling standard, defined by the CCITT, that separates call signaling information from voice channels so that interoffice signaling is exchanged over a separate signaling link.

computing module (CM) The processor and memory of the dual-plane combined core (DPCC) used by DMS SuperNode. Each CM consists of a pair of central processing units with associated memory that operate in a isochronous matched mode on two separate panes. Only one plane is active; it maintains overall control of the system while the other plane is on standby.

Custom Local Area Signaling Services (CLASS) A set of call features that provides the ability to supply Calling Line Identification (CLI) to the call destination, store information on the last incoming and last outgoing call, and monitor the status of a destination line.

data modification program (DMOPRO) A DMS-100 Family program that utilizes the table editor (TE), service orders, the Business Network Management (BNM) system, or the Signaling, Engineering, and Administration System (SEAS) to add, change, delete, or query information about directory numbers (DN), lines, trunks, routing, system parameters, and hardware.

Digital Multiplex System (DMS) A central office (CO) switching system in which all external signals are converted to digital data and stored in assigned time slots. Switching is performed by reassigning the original time slots.

CCS7 digital trunk controller A peripheral module (PM) that connects DS30 links from the network with digital trunk circuits.

DMOPRO *See* data modification program.

DMS *See* Digital Multiplex System.

DTC 7 *See* CCS7 digital trunk controller.

E800 *See* Enhanced 800 Service.

ECR *See* enhanced cluster routing.

Enhanced 800 Service (E800) A Common Channel Signaling 7 (CCS7) feature that allows interexchange carriers equal access to the Basic 800 Service. E800 Service presents network intelligence at an access tandem office or an end office (EO) using an online database query system.

enhanced cluster routing (ECR) Optional software than enhances message transfer part (MTP) cluster routing. ECR also supports XLIST management and routing of signaling between adjacent CCS7 networks.

FEPC Far-end point code.

I/O Message System (IMS) A system that organizes the transmission and reception of internal messages between components of the DMS-100 Family switches. IMS defines the structure, protocol, and maintenance features of internal message handling.

IMS *See* I/O Message System.

INode *See* integrated node.

Integrated Node (INode) A DMS-100 product which combines the functionality of an SSP and an STP in a single node.

integrated services digital network (ISDN) A set of standards proposed by the CCITT to establish compatibility between the telephone network and various data terminals and devices. ISDN is a fully digital network, in general evolving from a telephone integrated digital network. It provides end-to-end connectivity to support a wide range of services, including circuit-switched voice, circuit-switched data, and packet-switched data over the same local facility.

ISDN *See* integrated services digital network.

ISDN user part (ISUP) A Common Channel Signaling 7 (CCS7) message-based signaling protocol that acts as a transport carrier for ISDN services. The ISUP provides the functionality in a CCS7 network for voice and data services.

ISUP *See* ISDN user part.

link interface shelf (LIS) A physical housing unit for the LIU7.

link interface unit (LIU) A peripheral module (PM) that processes messages entering and leaving a link peripheral processor (LPP) through an individual signaling data link.

link peripheral processor (LPP) The DMS equipment frame or cabinet that contains two types of peripheral modules (PM): a link interface module (LIM) and one or more application-specific units (ASU).

LIS *See* link interface shelf.

LIU *See* link interface unit.

LIU7 *See* CCS7 link interface unit.

LPP *See* link peripheral processor.

Maintenance and administration position A group of components that provides a user interface between operating company personnel and the DMS-1 Family switches. The interface consists of a video display unit (VDU) and a keyboard, a voice communications module, test facilities, and special furniture.

MAP *See* Maintenance and administration position.

MAPCI MAP command interpreter.

message transfer part (MTP) A CCITT no. 7 signaling (N7) protocol that provides a connectionless transport system for carrying common channel interoffice signaling no. 6 (CCIS6) and Common Channel Signaling 7 (CCS7)

signaling messages between user locations or applications functions. Also known as message transport part.

MNA7 *See* multiple CCS7 network address (MNA7).

MTP *See* message transfer part.

multiple CCS7 network address (MNA7) A feature for DMS-INode that allows for separate network addresses by function so that one CCS7 point code can be assigned for the service switching point (SSP) and one point code for the signal transfer point (STP).

ONP *See* one-night process.

one-night process A process for upgrading software on DMS-100 Family switches. Refer to *One-Night Process Software Delivery Procedure* 297-8991-303.

PRESWACT A set of procedures performed prior to the switch of activity when completing an ONP.

right-to-use Right-to-use (RTU) for a SOC option must be granted to the operating company in order for the operating company to be able to change the state of the SOC option with a password for the option supplied by Nortel.

RTU *See* right-to-use.

SCCP *See* signaling connection control part.

service switching point (SSP) A Common Channel Signaling 7 (CCS7) signaling node that interacts with the service control point (SCP) to implement special service code features.

signaling connection control part A level of Common Channel Signaling 7 (CCS7) layered protocol. It supports advanced services such as E800 and service switching point (SSP) and the Automatic Calling Card Service (ACCS) feature. The main functions of the SCCP include the transfer of signaling units with or without the use of a logical signaling connection and the provisioning of flexible global title translations (GTT) for different applications.

signaling transfer point (STP) A node in the Common Channel Signaling 7 (CCS7) network that routes messages between nodes. Signaling transfer points transfer messages between incoming and outgoing signaling links but, with the exception of network management (NWM) information, do not originate or terminate messages. Signaling transfer points are deployed in pairs. If one STP fails, the mate takes over, ensuring that service continues without interruption.

single CCS7 network address (SNA7) A feature on a DMS-INode that allows an SSP and STP to function together with a single point code.

SNA7 *See* single CCS7 network address (SNA7).

SOC *See* software optionality control.

software optionality control (SOC) A tool used to deliver the optional functionality available in a product computing module load (PCL). Refer to *Software Optionality Control User Manual*, 297-8991-901.

SSN *See* subsystem number.

SSP *See* service switching point.

STP *See* signaling transfer point.

subsystem number The identification of a subsystem located at a Common Channel Signaling 7 (CCS7) point code that can supply data.

SWACT *See* switch of activity.

switch of activity (SWACT) In a DMS fault-tolerant system, a reversal of the states of two identical devices devoted to the same function. A SWACT makes an active device inactive and an inactive device active.

TABXFR The data transfer procedure used in completing a one-night process (ONP).

DMS SuperNode SSP/STP Integrated Node

SSP to MNA7 Conversion Guide

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