Critical Release Notice

Publication number: 297-8991-100
Publication release: Standard 03.03

The content of this customer NTP supports the SN06 (DMS) and ISN06 (TDM) software releases.

Bookmarks used in this NTP highlight the changes between the baseline NTP and the current release. The bookmarks provided are color-coded to identify release-specific content changes. NTP volumes that do not contain bookmarks indicate that the baseline NTP remains unchanged and is valid for the current release.

Bookmark Color Legend

Black: Applies to new or modified content for the baseline NTP that is valid through the current release.

Red: Applies to new or modified content for NA017/ISN04 (TDM) that is valid through the current release.

Blue: Applies to new or modified content for NA018 (SN05 DMS)/ISN05 (TDM) that is valid through the current release.

Green: Applies to new or modified content for SN06 (DMS)/ISN06 (TDM) that is valid through the current release.

Attention!
Adobe® Acrobat® Reader™ 5.0 is required to view bookmarks in color.

Publication History

March 2004

Standard release 03.03 for software release SN06 (DMS0 and ISN06 (TDM).

Change of phone number from 1-800-684-2273 to 1-877-662-5669, Option 4 + 1.

297-8991-100

DMS-100 Family

DMS-INode

Functionality Description Reference Manual

TL12 Standard 03.02 August 1999

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DMS-100 Family

DMS-INode

Functionality Description Reference Manual

Publication number: 297-8991-100
Product release: TL12
Document release: Standard 03.02
Date: August 1999

Publication history

August 1999

Standard 03.02. Revised to reflect INode development (TL09 to TL12 releases).

October 1997

Standard 02.01. Editorial updates.

August 1997

Standard 01.01. First release of this document.

About this document

When to use this document

This document describes the DMS integrated node (INode) and how the DMS-INode communicates with other nodes in a Common Channel Signaling 7 (CCS7) network. It also provides an overview of CCS7 functionality on a DMS-INode.

A DMS-INode is a DMS switch that combines the functionality of a signaling transfer point (STP) and a service switching point (SSP) in one physical node. This document does not describe SSP functionality, but rather how STP functionality affects SSP functionality on a DMS-INode. The document is intended for personnel involved in planning, engineering, administering, or maintaining the DMS-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 *DMS-100 Product Documentation Directory*, 297-8991-001.

How this document is organized

This document contains four chapters. The following list provides the chapter names and a brief explanation of each chapter:

- **Understanding the DMS-INode** provides an introduction to the DMS-INode and explains the layered structure of the CCS7 protocol on which the DMS-INode is based.
- **DMS-INode network communications** describes basic elements and concepts of communications in a CCS7 network.
- **CCS7 functionality and limitations on a DMS-INode** describes CCS7 functionality, specifically, how STP functionality affects SSP functionality in a DMS-INode.
- **DMS-INode software and hardware** describes the specific provisioning limitations for a DMS-INode.

References in this document

This section lists the documents that are referenced in this document. The document layer number, xxxx, represents a generic product load.

- *Bellcore GR-82-CORE Signaling Transfer Point Generic Requirements, Issue 2, Revision 1, December 1997*
- *Bellcore GR-246-CORE Specification of Signaling System Number 7; Issue 2, December 1997*
- *DSM-100 Log Report Reference Manual,* 297-xxxx-840
- *DMS-100 Recovery Procedures,* 297-xxxx-545
- *DMS-100 Software Optionality Control User Manual,* 297-8991-901
- *DMS SuperNode STP/SSP Integrated Node SSP to MNA7 Conversion Guide,* 297-8991-580
- *DMS-100 Translations Guide,* 297-xxxx-350
- *ITU-T Specifications of Signaling System No. 7 Q700 to Q709 (03/93–White Book)*
- *Peripheral Module Maintenance Guide,* 297-1001-592
- *Product Documentation Directory,* 297-8991-001

What precautionary messages mean

The types of precautionary messages used in Nortel 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

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

WARNING

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:

1 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.
```

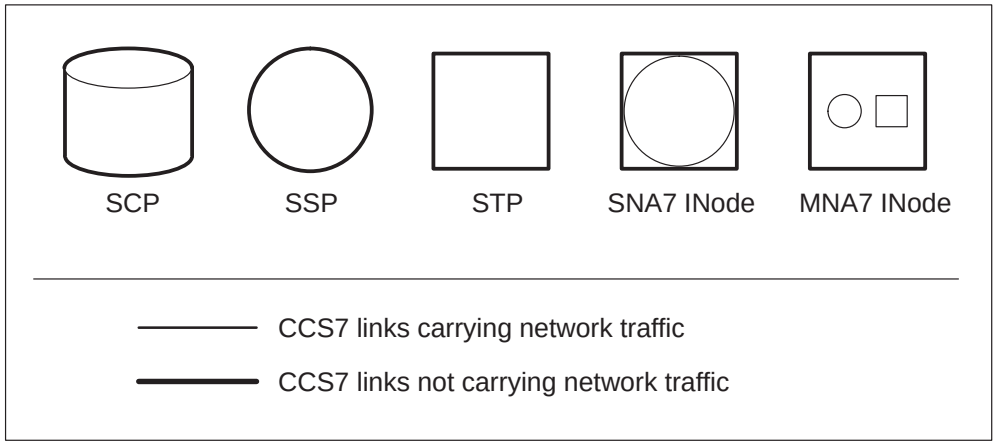
How nodes are represented

A CCS7 network consists of the following nodes:

- service control point (SCP)
- service switching point (SSP)
- signaling transfer point (STP)
- CCS7 single network address integrated node (SNA7 INode)
- CCS7 multiple network address integrated node (MNA7 INode)

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

FW-31546



Understanding the DMS-INode

This chapter provides an introduction to the Digital Multiplex System (DMS) Integrated Node (DMS-INode) and explains the layered structure of the CCS7 protocol on which the DMS-INode is based. CCS7 protocol is discussed in subsequent sections of this chapter.

Components of a telephone call describes the two components of a telephone call: the signaling component and the voice and data component.

DMS-INode and elements of a CCS7 network describes the DMS-INode with respect to the elements in a CCS7 network.

CCS7 protocol and open systems interconnection models describes the various layers of protocol text that are part of the CCS7 protocol and compares the CCS7 protocol model to the open systems interconnection (OSI) model.

Components of a telephone call

A telephone call has two components: a signaling component, and a voice and data component.

The signaling component of a telephone call contains the supervisory and address signals that switching offices use to control the setting up, monitoring, and taking down of the call.

The voice and data component contains the information being transferred between the initiator and the recipient of the call.

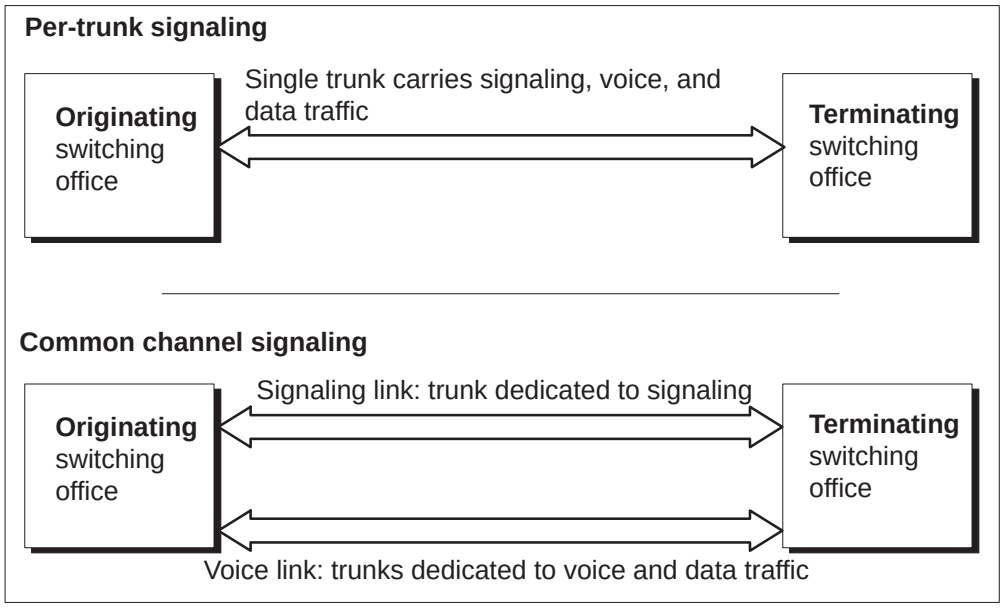
Per-trunk signaling

In a conventional call, the signaling component is transmitted on the same trunk that is used for the voice and data signal. This type of signaling is referred to as per-trunk signaling (PTS).

The top half of Figure 1-1 illustrates a PTS call between an originating switching office and a terminating switching office. Both the signaling traffic and the voice and data traffic are transmitted over a single trunk that is dedicated to the call.

The bottom half of Figure 1-1 illustrates a common channel signaling (CCS) call between an originating switching office and a terminating switching office. Two trunks transmit signaling traffic and voice and data traffic; the signaling link transmits signaling traffic, and the voice link transmits voice and data traffic.

Figure 1-1
Comparison of per-trunk signaling to common channel signaling



Common channel signaling

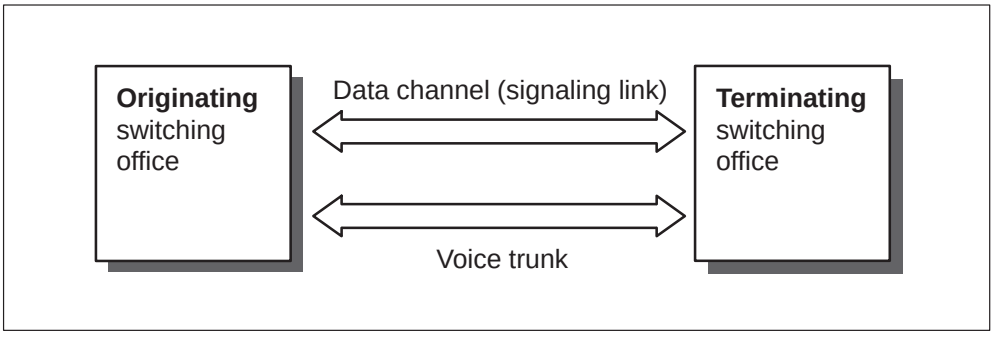
CCS separates the signaling component from the voice and data component of a call and puts these two components on different facilities, as shown in Figure 1-2. The facility that is used for signaling is called a signaling link (SL) or a signaling data link (SDL). The facility that is used for voice and data traffic is called a voice trunk.

The amount of signaling information required for one call is small compared to that required for the voice and data component of the call. However, the physical facilities available for both SLs and voice trunks are usually the same. The signaling information for many voice calls can be transmitted over one SL. The SL can also carry signaling that is not directly associated with a call without any loss of call processing capabilities.

CCS is a method of trunk signaling in which call control messages can be exchanged between two switching offices over a separate communications channel (see Figure 1-2). This separate data channel can contain the signaling for hundreds of digital trunk circuits. All types of CCS provide the same basic functionality. However, the CCS system known as CCS7 is faster, more reliable, more flexible, and more efficient than any of its predecessors.

CCS7 allows faster call setup, which reduces trunk holding times and node provisioning. It enhances the manner in which signals are exchanged between network elements, and therefore permits the transmission of more than just basic call control information. For example, because CCS7 can transmit information such as the identity of the calling party, the subscriber can determine which calls to accept by invoking selective call acceptance. Also, CCS7 allows operating companies to expand the range of available database services.

Figure 1-2
CCS7 trunk and control signal links



DMS-INode and elements of a CCS7 network

DMS-INode communications are achieved using the CCS7 network. The CCS7 network consists of a number of switching and processing devices that are interconnected by SLs. Each of these interconnected devices is referred to as a node.

The CCS7 network shown in Figures 1-3 and 1-4 consists of the following types of nodes:

- SSP
- STP
- MNA7 and SNA7 INode
- SCP
- SP
- SL

Service switching point

An SSP is equipped with software for communicating to other CCS7 nodes. Trunk signaling transmits calls between SSPs. Transaction capabilities application part (TCAP) signaling transmits information between SSPs and SCPs.

Signaling transfer point

An STP is a packet switching node that routes messages between CCS7 nodes. Many nodes are linked to a single STP and, in turn, all STPs are interconnected. This arrangement of nodes is less expensive than interconnecting all SSP nodes to each other.

STPs transfer messages between incoming and outgoing SLs, but, with the exception of network management information, do not originate or terminate messages. An STP functions like a tandem office, by routing signals instead of voice data.

STPs are deployed in pairs. If one STP fails, the mate takes over, ensuring that service continues without interruption.

MNA7 and SNA7 INode

A DMS-INode refers to any DMS switch that combines the functionality of an STP and an SSP in one physical node. This combining of functions allows the use of a single site and reduces the number of frames and cabinets. By integrating CCS7 elements into a single node, operating companies can accrue cost savings that result from shared equipment, reduced transmission facilities, and integrated operations, administration, and maintenance.

A multiple CCS7 network address (MNA7) INode has two network addresses for each network. On an MNA7 INode, links can be datafilled for

either SSP or STP functionality, with one network address used for the SSP and another used for the STP. For more information about MNA7 INode, refer to the *DMS SuperNode STP/SSP Integrated Node SSP to MNA7 Conversion Guide,* 297-8991-580, and the *Software Optionality Control User Manual,* 297-8991-901.

A single CCS7 network address (SNA7) INode has one network address for each network. From a CCS7 network perspective, STP and SSP traffic share the same CCS7 link and network address.

Service control point

An SCP provides the database storage and processing required to implement enhanced centralized services. The SCP accepts a query for information, retrieves the requested information from the appropriate database, and sends a response message to the originator of the request. SCP functionality can be enhanced without affecting any other node in the CCS7 network.

Signaling point

A signaling point is a node in any CCS7 network that originates, terminates, or transfers signaling messages from one signaling link to another.

Signaling link

An SL consists of signaling terminal equipment and a transmission facility. SLs are used to exchange information between nodes in a CCS7 network. The number and types of links depends on node capacity, network configuration, and network traffic levels.

The different types of SLs shown in Figures 1-3 and 1-4 are

- A-links, which connect SPs, SSPs, and SCPs to STPs. A-links are assigned in pairs, one link to each STP in a mated pair.
- B-links, which connect mated STP pairs in an SL quad. This quad structure provides complete STP redundancy.
- C-links, which connect two STP nodes to create an STP pair
- E-links, which connect SPs, SSPs, and SCPs to remote STP pairs
- F-links, which connect SPs, SSPs, and SCPs to each other

Note: For these SL definitions, an STP node can represent a stand-alone STP, an SNA7 INode, or the STP logical node of an MNA7 INode.

Note: D-links, which connect primary and secondary STP pairs, are not included in Figures 1-3 and 1-4.

The size and complexity of a signaling network depends on the volume of traffic and the degree of redundancy required.

Figure 1-5 shows the SNA7 DMS-INode and other types of nodes in a CCS7 network configuration. Figure 1-6 shows the MNA7 DMS-INode and other types of nodes in a CCS7 network configuration.

Figure 1-3
SNA7 CCS7 signaling links

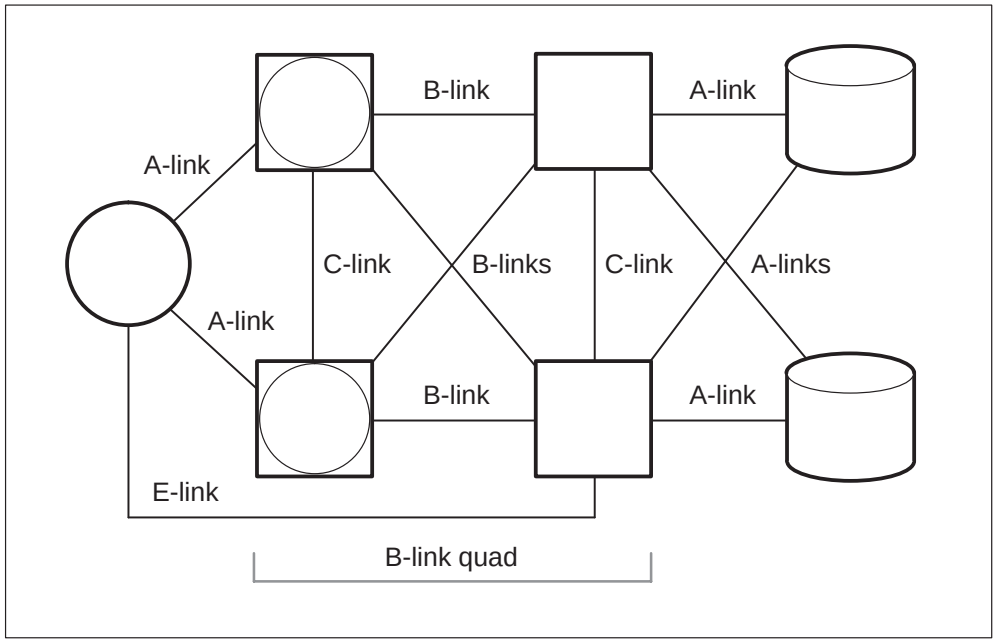


Figure 1-4
MNA7 CCS7 signaling links

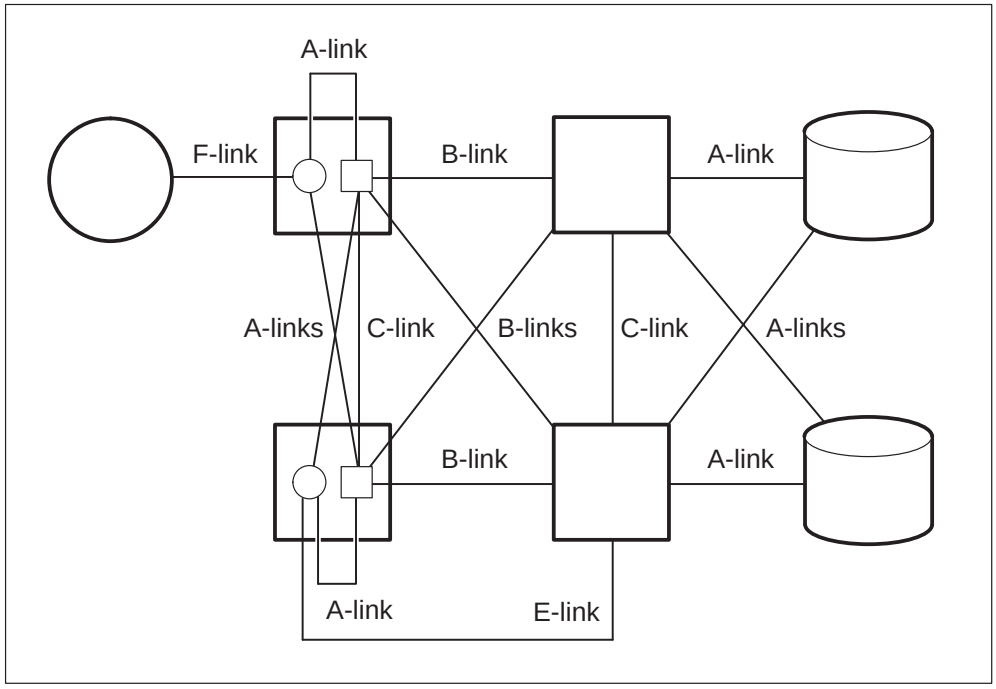


Figure 1-5
SNA7 DMS-INode within a typical CCS7 network

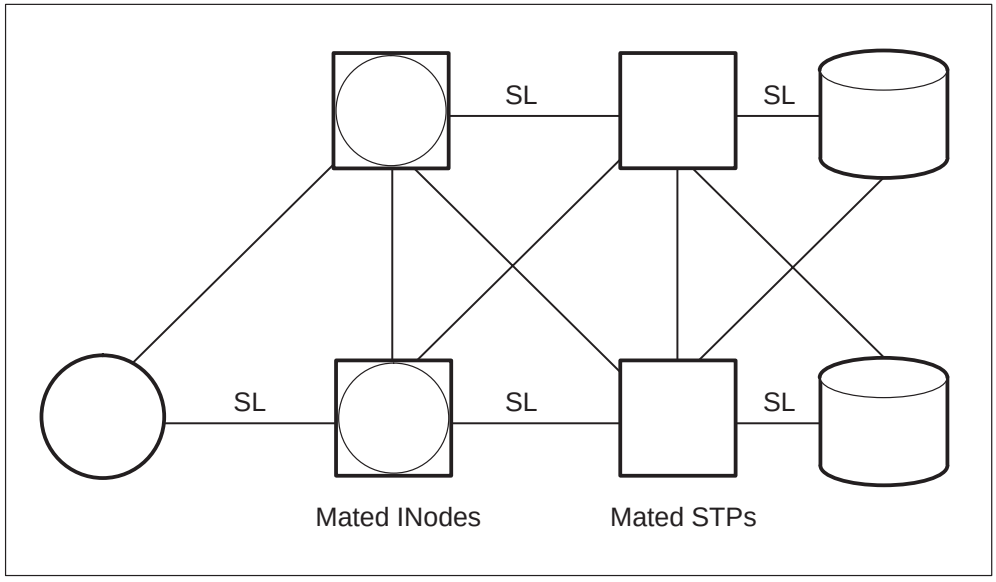
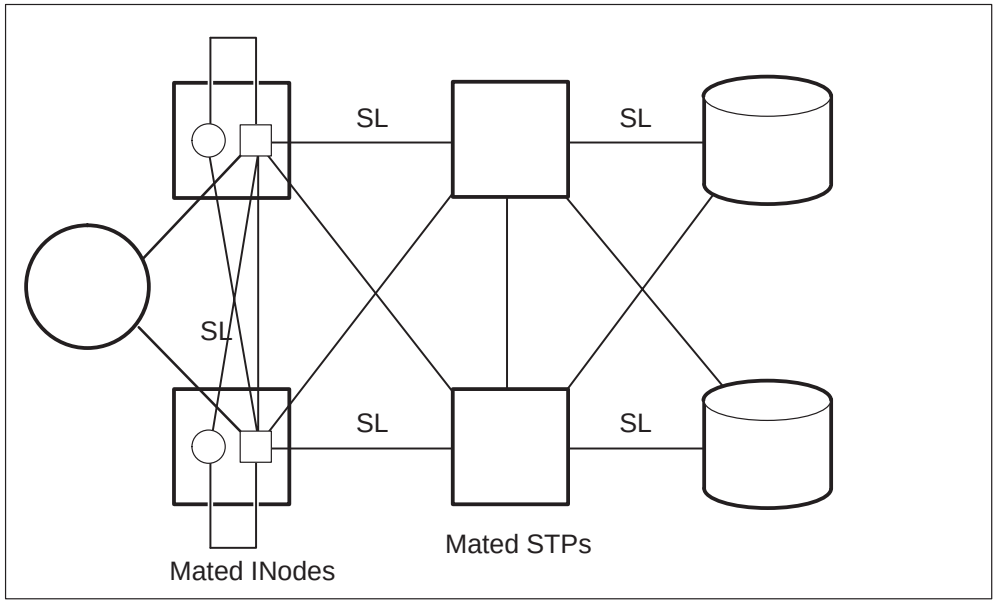


Figure 1-6
MNA7 DMS-INode within a typical CCS7 network



CCS7 protocol and open systems interconnection models

The functional software of the CCS7 system is partitioned into four layers. These layers correspond to the levels of activity required to support the interconnection and exchange of information among the many users of a communications system. Because of the modular nature of these layers, CCS7 provides sufficient flexibility to serve a diversity of applications.

The OSI model represents a generic communication system. It is partitioned into seven functional layers.

The CCS7 model is structured to be compatible with the data transfer part (layers 1, 2, and 3) and the user part (layer 7) of the OSI model in order to interface with other computer networks.

Figure 1-7 illustrates the relationship between the seven-layer OSI model and the four-layer CCS7 model.

Figure 1-7
OSI and CCS7 model comparison

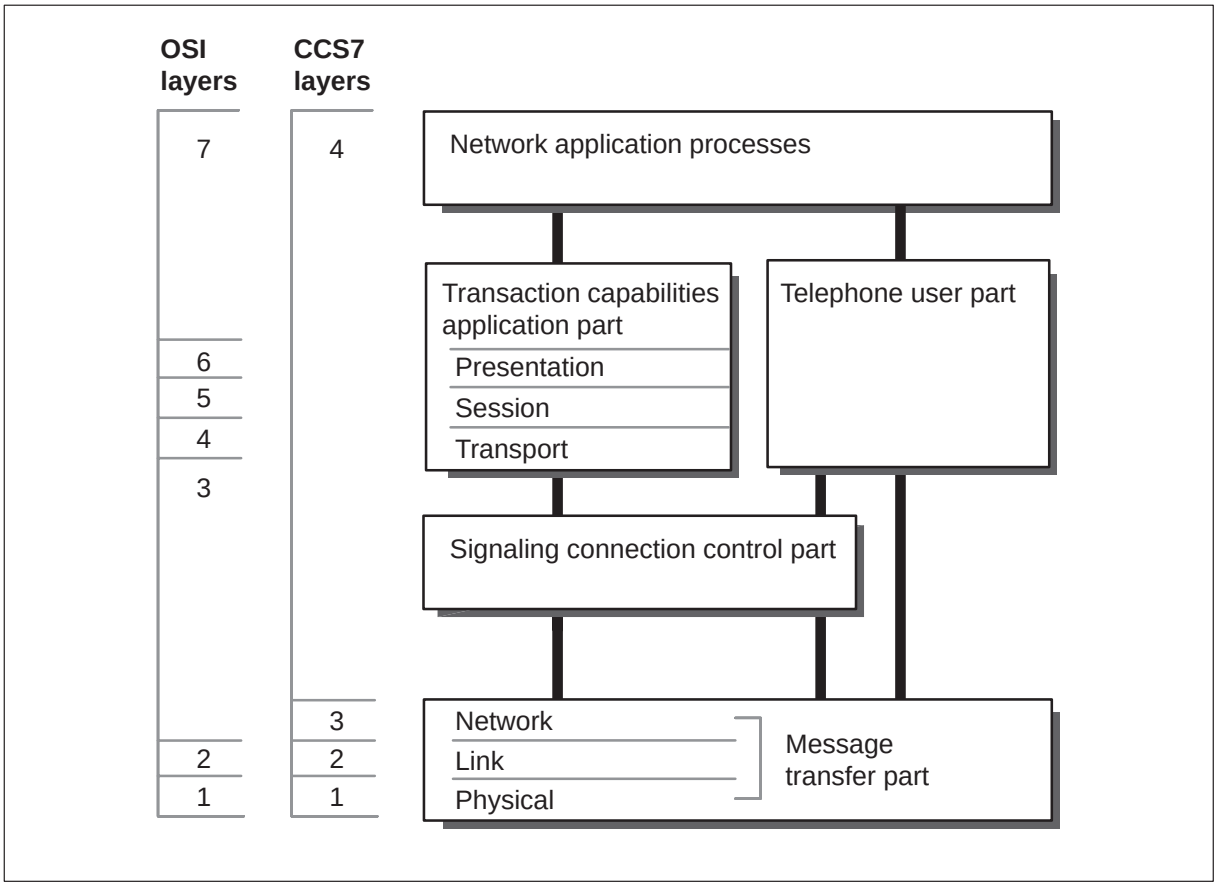


Table 1-1 provides a description and comparison of OSI and CCS7 models.

Table 1-1
Comparison of OSI and CCS7 models

Layer	**OSI model layer description**	**CCS7 model layer description**
1	Physical layer transmits a bit stream over a connection between users.	MTP serves as a transport system for signals between nodes. Equivalent to OSI layer 1.
2	Data link layer detects transmission errors and contains error recovery procedures.	MTP. Equivalent to OSI layer 2.
3	Network layer provides the routing procedures for data transfer	MTP. CCS7 layer 3 and part of layer 4 are equivalent to OSI layer 3.
4	Transport layer provides the procedures for data transfer between end users.	SCCP provides MTP with additional function for both connectionless and connection-oriented application. TCAP provides a set of procedures for transaction-based applications. Telephone user part sets up, monitors and takes down CCS7 calls.. Network application processes are CCS7-based services involving inter-process transactions. Part of CCS7 layer 4 forms OSI layers 4 to 7, and can be used depending on the application being processed.
5	Session layer is the user's interface to the network for establishing and managing a connection.	
6	Presentation layer contains the procedures for trans-forming the data into a suitable form for the application	
7	Application layer is the application process used by the computer.	

CCS7 message transfer part

The message transfer part (MTP) serves as a transport system to transfer signaling messages between nodes in the network.

The MTP has the following layers:

- Physical layer

  The physical layer handles the raw transmission of bits over a bidirectional path that consists of two data channels operating in opposite directions but at the same data rate. The physical layer also defines the physical, electrical, and procedural characteristics of the signaling data link. MTP layer 1 is a hardware function under software control.

- Data link layer

  The data link layer handles both incoming and outgoing signaling messages. Major functions at this layer include: signal unit alignment and delimitation, error detection and correction, SL alignment, and SL error monitoring and flow control.

- Network layer

  The network layer transfers messages between CCS7 offices in a signaling network. Messages are routed to their destination using full or partial destination point codes (DPC). Software used in this layer distributes traffic across the available links and prevents message congestion.

CCS7 signaling connection control part

The signaling connection control part (SCCP) resides above the MTP and provides the MTP with additional functions to accommodate both connectionless and connection-oriented services. The SCCP performs the following functions:

- provides application addressing and management through global title translation (GTT)
- keeps track of the status of applications
- informs operating company personnel when an application is unavailable

Note: Most of the specifications used by the MTP and SCCP are defined according to the following Bellcore, ANSI, and ITU specification documents:

- *Bellcore GR-82-CORE Signaling Transfer Point Generic Requirements, Issue 2, Revision 1, December 1997*
- *Bellcore GR-246-CORE Specification of Signaling System Number 7; Issue 2, December 1997*
- *ITU-T Specifications of Signaling System No. 7 Q700 to Q709 (03/93–White Book)*

CCS7 transaction capabilities application part

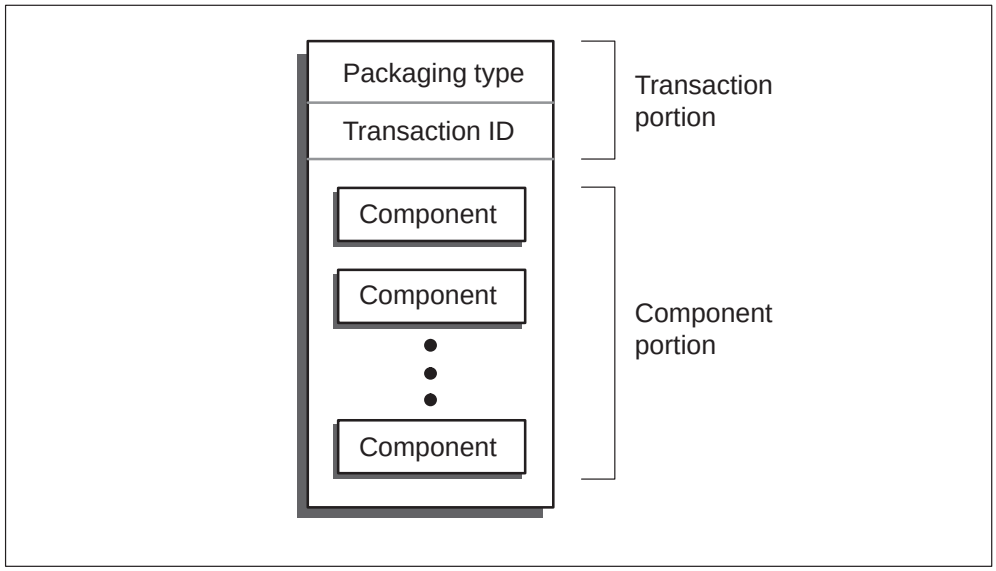
Transaction capabilities application part (TCAP) provides a set of generic procedures for transaction-based applications and controls the transfer of information that is not circuit related between two or more nodes in a signaling network. TCAP is used to provide services to support database transaction-type applications.

A TCAP message has a transaction portion and a component portion. Figure 1-8 illustrates the parts of a TCAP message.

The transaction portion contains the package type and the transaction ID. Package types such as Query with Permission or Response are used for directory number (DN) validation.

The component portion consists of a sequence of one or more TCAP components. A component can invoke an operation on a remote node, return the results of an operation, or report TCAP protocol or application errors.

Figure 1-8
TCAP message parts



DMS-INode network communications

This chapter describes some basic elements and concepts of communications in a CCS7 network.

Modes of operation describes the relationship between the signaling component and the voice and data component of a CCS7 call.

Communication among nodes across the network describes the role of links, linksets, routes, and routesets in a CCS7 network.

CCS7 message handling in a CCS7 network describes the basic format of a signaling message and how a message is discriminated, distributed, and routed.

Signaling message paths through a DMS-INode describes how a message travels through the DMS-INode.

Modes of operation

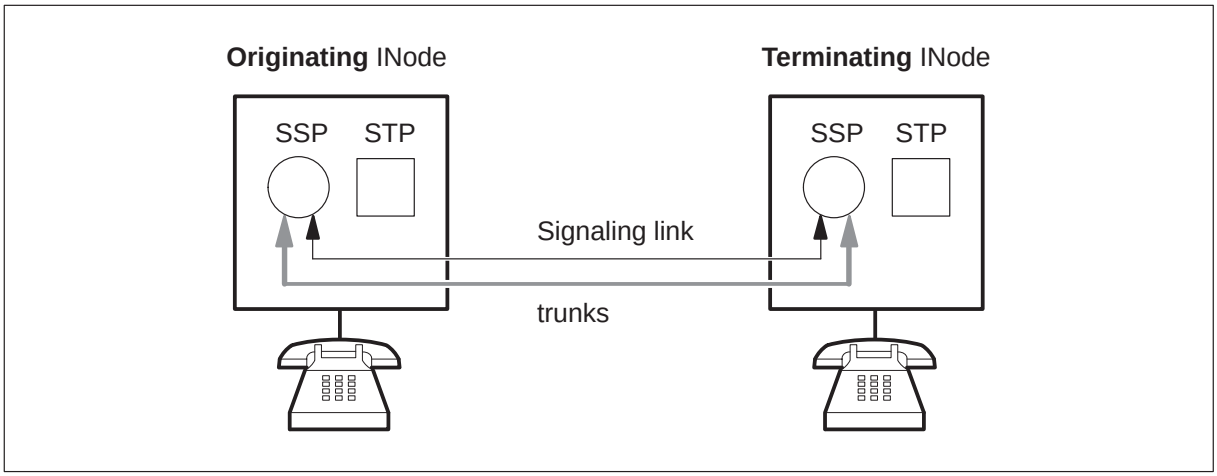
The term common channel signaling mode refers to the relationship between the signaling component and the voice and data component of a call. CCS7 uses two signaling modes: associated signaling and quasi-associated signaling.

Associated signaling

In associated signaling, the signaling links (SL) follow the same route as the trunk for a call. Trunks are interoffice circuits that carry the voice and data traffic between originating and terminating signaling points (SP) or service switching points (SSP).

Associated signaling does not require a signaling transfer point (STP) and can be used to initiate low-volume applications. Figure 2-1 illustrates a low-cost, simple configuration of two connecting multiple CCS7 network address (MNA7) DMS-INodes.

Figure 2-1
Associated signaling in a simple configuration



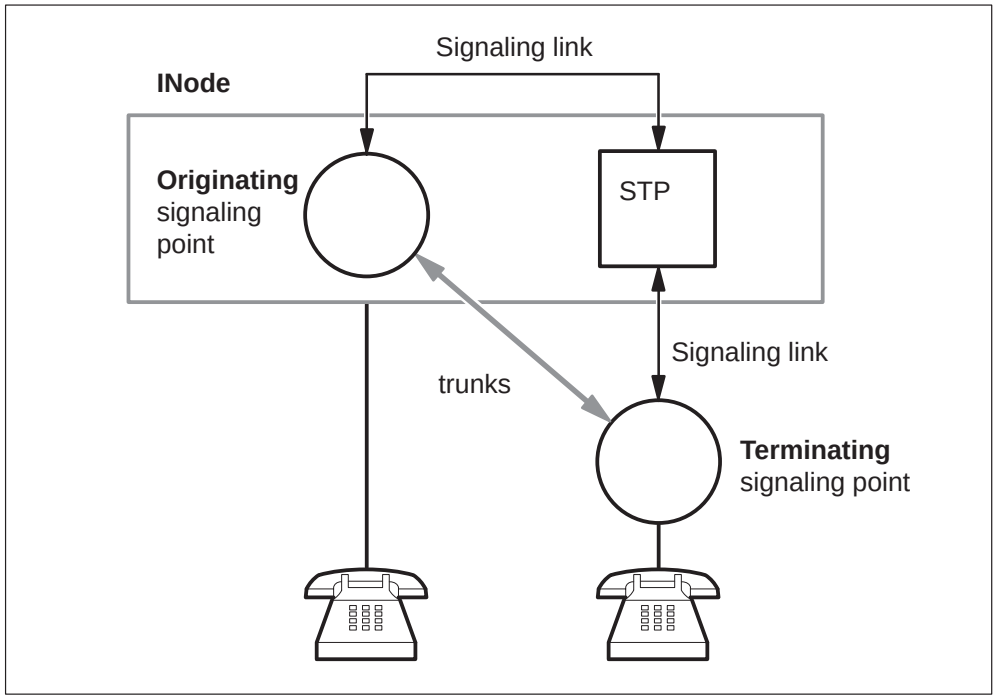
Note: The DMS-INode is performing an SSP function in this configuration.

Quasi-associated signaling

In quasi-associated signaling, the signaling information is routed along links that do not follow the same route as the trunk for a call. Instead, signaling is carried through the signaling network along indirect routes on two or more SLs.

Figure 2-2 illustrates an example of quasi-associated signaling in which the signaling is routed from the originating SP, through an MNA7 DMS-INode, to the terminating SP. Voice and data traffic is placed on a trunk that directly connects the originating and terminating SPs.

Figure 2-2
Quasi-associated signaling mode



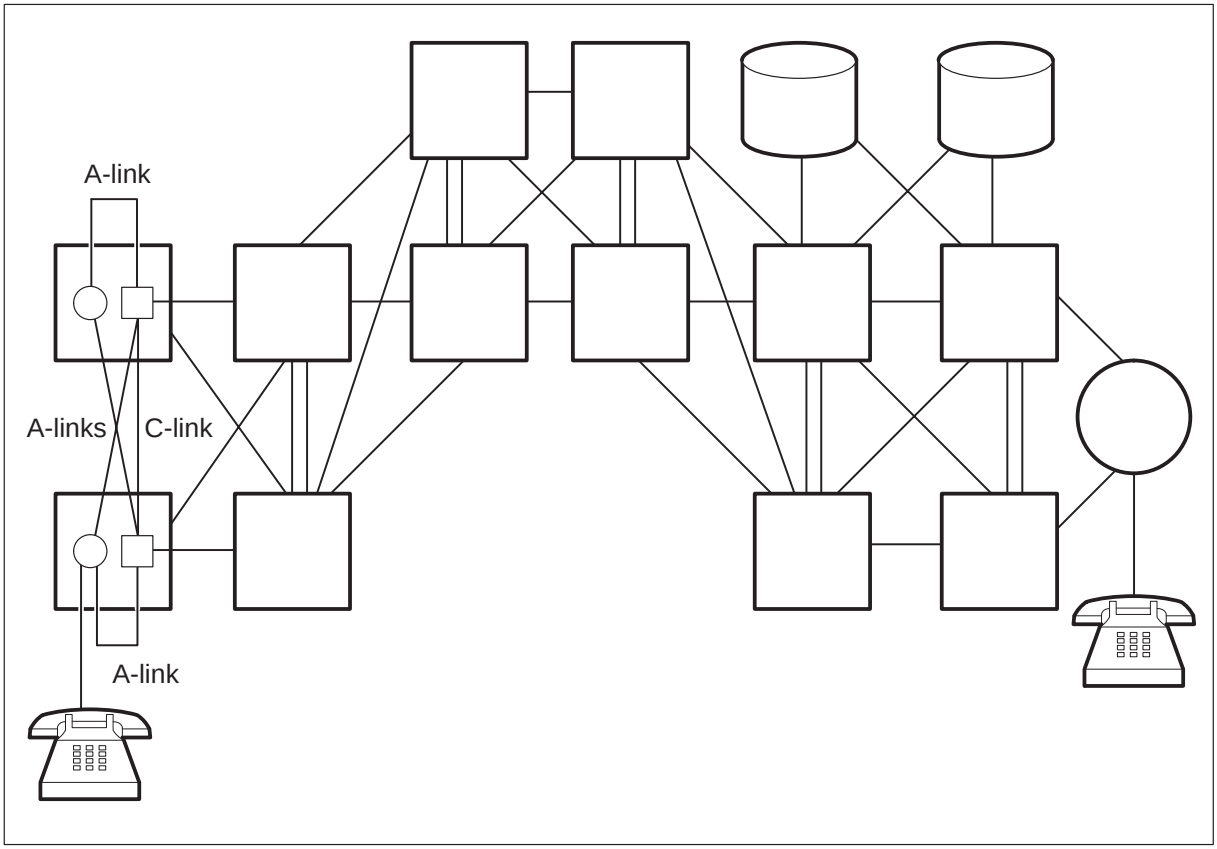
Note: The DMS-INode is performing an STP function in this configuration.

The DMS-INode relies on quasi-associated signaling to provide volume applications, and can be configured to meet the needs of operating companies with varying degrees of sophistication.

The DMS-INode supports ANSI and ITU based protocols.

Figure 2-3 illustrates a complex network of STPs, SCPs, SP/SSPs, and DMS-INode. The figure shows one possible location for an MNA7 DMS-INode within the network.

Figure 2-3
Quasi-associated signaling in a complex configuration



Communication among nodes across the network

Nodes in a CCS7 network communicate with each other through associated and quasi-associated signaling. Signaling messages travel communication paths called links and routes.

Link and linkset

A link is a communication channel between two adjacent nodes in a signaling network. A linkset is a set of links that is used as a group to carry signaling traffic between two nodes in a signaling network. Combined linksets are two linksets that are used to load balance signaling traffic. The maximum number of links on a combined linkset is 16.

Route and routeset

A route is a signaling path that follows a linkset into the signaling network that accesses a destination. Multiple routes to the same destination form a routeset.

Figure 2-4 shows two examples of CCS7 network communications.

Example A in Figure 2-4 shows a route that consists of three linksets. The route originates from the SSP and terminates at the SCP.

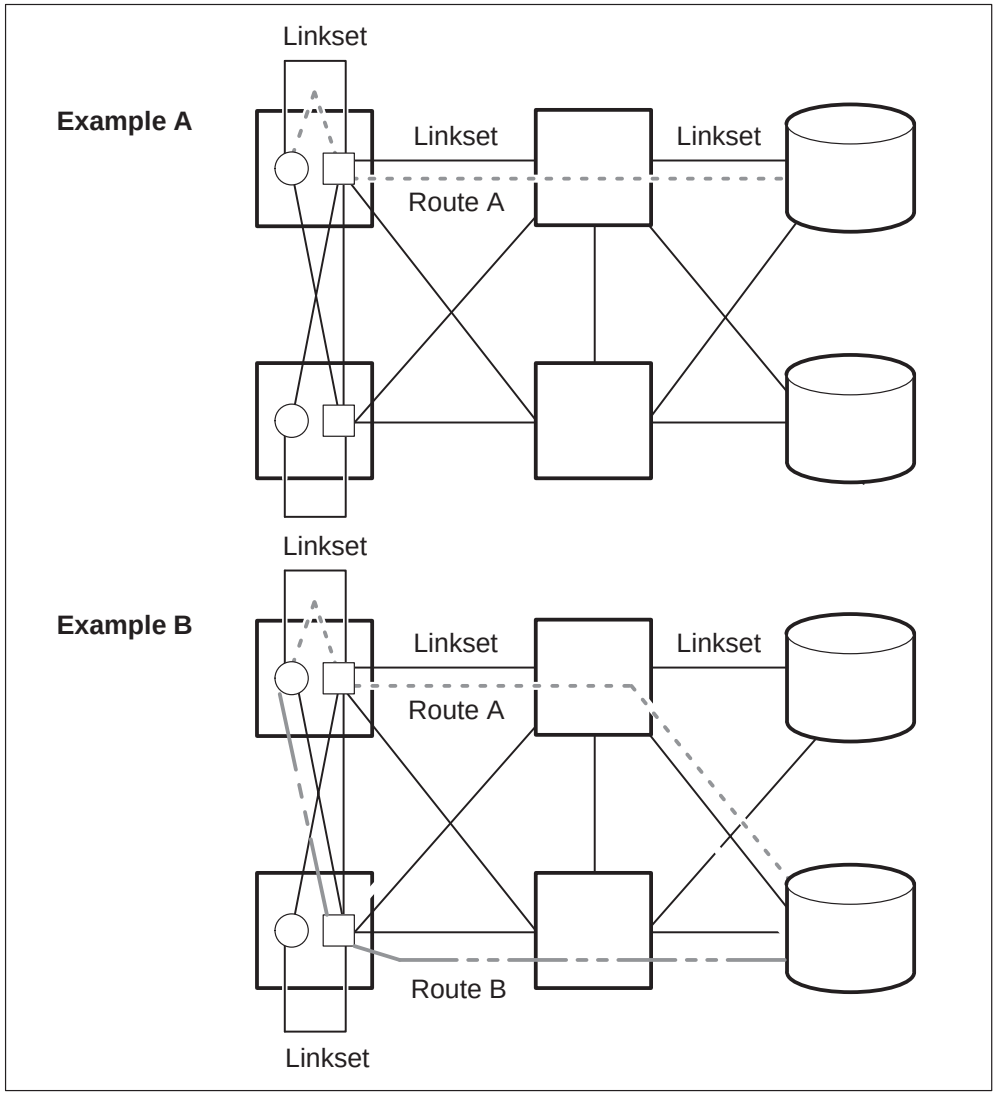
Example B in Figure 2-4 shows two routes. Both routes originate from the same node and terminate at the same destination node in the network. Together, route A and route B form a routeset that originates from the same SSP and terminates at the same SCP.

The maximum number of routes in a routeset is one of the following combinations:

- one associated and five quasi-associated routes
- six quasi-associated routes

The minimum configuration for a node is one routeset that has one route. In this configuration, the route consists of one linkset that contains one link.

Figure 2-4
CCS7 network communications



CCS7 message handling in a CCS7 network

CCS7 is a packet-switched network based on transmitting and receiving information packets called message signal units (MSU). Each node can format and transmit MSUs to other nodes in the network.

CCS7 signaling message format

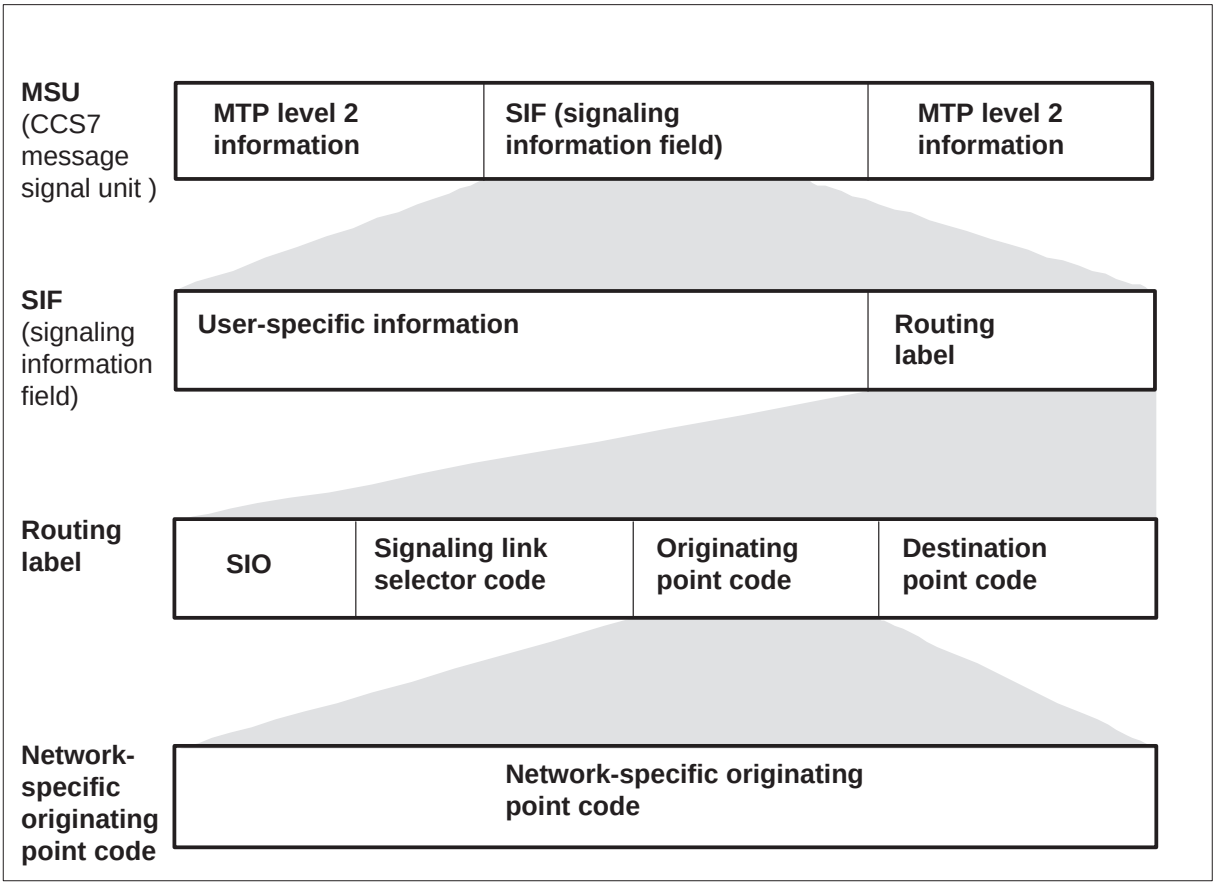
Each MSU contains a signaling information field (SIF). In the standard SIF, the portion that is used for routing is called the routing label, as shown in Figure 2-5.

The routing label contains the following information:

- an originating point code (OPC), which indicates the originator node for an MSU
- a destination point code (DPC), which indicates the final destination node of the MSU
- an SL selector code that the message routing function uses to distribute loading evenly
- a signaling information octet (SIO) determines which user part the MSU is to be delivered to

The standard routing label assumes that each SP in a signaling network is allocated a code according to a labeling code plan. MSUs that are labeled according to international and national code plans are identified by the DPC that is included in each message.

Figure 2-5
CCS7 message routing label



Message discrimination

Message discrimination is the process that determines whether an MSU has been delivered to its intended destination point. This decision is based on an analysis of the DPC that is in the routing label of the MSU. If the SP to which the MSU is delivered is the destination point, the MSU is delivered to the message distribution function of the SP. If this SP is not the intended destination point, the MSU is delivered to the routing function of the SP for further transfer on an SL.

Message distribution

Message distribution is the process of analyzing the source indicator in the MSU when the MSU arrives at the destination point. The signaling information octet (SIO) determines which user part the MSU is to be delivered to, for example, the signaling connection control part (SCCP).

Message routing

Message routing selects an appropriate SL for each MSU. The route an MSU takes is determined through an analysis of information that is contained in the routing label of the MSU and routing data that is provided at the SP.

Message routing is determined by a destination code and an additional load-sharing element that allows the signaling traffic to a particular destination to be distributed over two or more SLs. This traffic distribution can be limited to different links within a linkset or it can be applied to links in different linksets.

The route that is taken by an MSU with a particular routing label is predetermined and is normally fixed at a given time. If failures occur in the signaling network, MSUs that would have taken the route that has failed are rerouted in a predetermined manner, under control of the signaling traffic management function at level 3 of the message transfer part (MTP).

Although there are advantages to using standard routes for MSUs that belong to different user parts, the service indicator that is included in each message provides the potential for using different routing plans for different user parts.

Signaling message paths through a DMS-INode

The STP (tandem) traffic within a DMS-INode can take one of several internal paths. Which path the traffic takes depends on the hardware platform used to house the LIU7s. These paths consists of:

- intra-link peripheral processor (LPP) (messages destined for a link on the same LPP)
- inter-LPP (messages destined for a link on a different LPP)
- the bidirectional path between a computing module (CM) and an LIU7
- the bidirectional path between an LIU7 and a digital trunk controller (DTC)
- direct LIU7-to-LIU7 communication over the DMS-bus for SSLPP and SuperNode SE LIS platforms

The DMS-INode communicates with the CCS7 network using the CCS7 link interface unit (LIU7) application specific unit (ASU). The LIU7 has three parts: a DS-0A, V.35, or channelized access card, a signaling terminal (ST) card, and an integrated processor and frame transport bus (F-bus) interface (IPF) card.

An LIU7 can exist on three platforms as follows:

- an LPP platform
- a single shelf link LPP (SSLPP), also known as a fiber link interface shelf (FLIS) platform
- a DMS SuperNode SE link interface shelf (LIS) platform

These platforms can be combined within a node.

STP traffic on all three platforms is discussed below.

LPP, ELPP, or FLPP platform

This section applies to the LPP, enhanced LPP (ELPP), and fiberized LPP (FLPP).

An LPP is an equipment frame or cabinet that contains the local message switch (LMS) and the LIU7. The LMS exchanges traffic between the LIU7s and provides access to the DMS-bus. Signaling traffic enters the LIU7 of the LPP. The LPP platform can support up to 36 LIU7s.

Intra-LPP and inter-LPP CCS7 traffic enters the DMS-INode on an SL terminated by a DS-0A, V.35, or channelized access card within the LIU7. After the message is removed from the link, the message is passed to the ST card, which is also part of an LIU7. MTP functions, such as error detection and correction, are performed. The message is then passed to the IPF card. If required, SCCP routing functions are performed, including global title translation (GTT).

The SCCP routing functions determine the destination code of the message. For tandem traffic, the destination code indicates the outgoing SL. For an LPP platform, the message is queued for transport along the F-bus to the local message switch (LMS) of the LPP. Figure 2-6 shows the STP logical message path for both inter-LPP and intra-LPP traffic.

SSLPP platform

An SSLPP occupies a single shelf within a remote equipment frame. The SSLPP is connected directly to the DMS-bus with fiber optic cables and provides the F-bus connection required to support up to 12 LIU7s. A maximum of two SSLPP resources can be configured in an office, allowing a total of 24 LIU7s to be connected to the DMS-bus.

The SSLPP relies on the DMS-bus to provide the routing functions of the local message switch (LMS). Signaling messages can travel between an SSLPP-based LIU7 and any other LIU7 in the office, but the messages must traverse the DMS-bus.

Figure 2-7 shows the STP logical message path on a SSLPP platform.

SuperNode SE LIS platform

The SuperNode SE LISes are contained within the single SuperNode SE cabinet. The SuperNode SE cabinet houses a DMS-core, an enhanced network (enet), a DMS-bus, and a LIS. The LIS supports up to 12 LIU7s. The shelf that contains the enet can support two additional LIU7s, allowing a total of 14 LIU7s to be connected to the DMS-bus. Both shelves are connected directly to the DMS-bus with ribbon cables.

Only one SSLPP resource can be connected to the DMS-bus if the SuperNode SE LIS is provisioned.

The SuperNode SE LIS relies on the DMS-bus to provide the routing functions of the LMS. Signaling messages can travel between a SuperNode SE LIS-based LIU7 and any other LIU7 in the office, but the messages must traverse the DMS-bus.

Figure 2-8 shows the STP logical message path on a SuperNode SE LIS platform.

Note: For more information about LPP, SSLPP, or SuperNode SE LIS platforms, refer to the *Recovery Procedures*, *Card Replacement Procedures*, and *Peripheral Module Maintenance Guide*, 297-1001-592.

Figure 2-6
STP logical message flow in a DMS-INode for LPP, ELPP, or FLPP platform

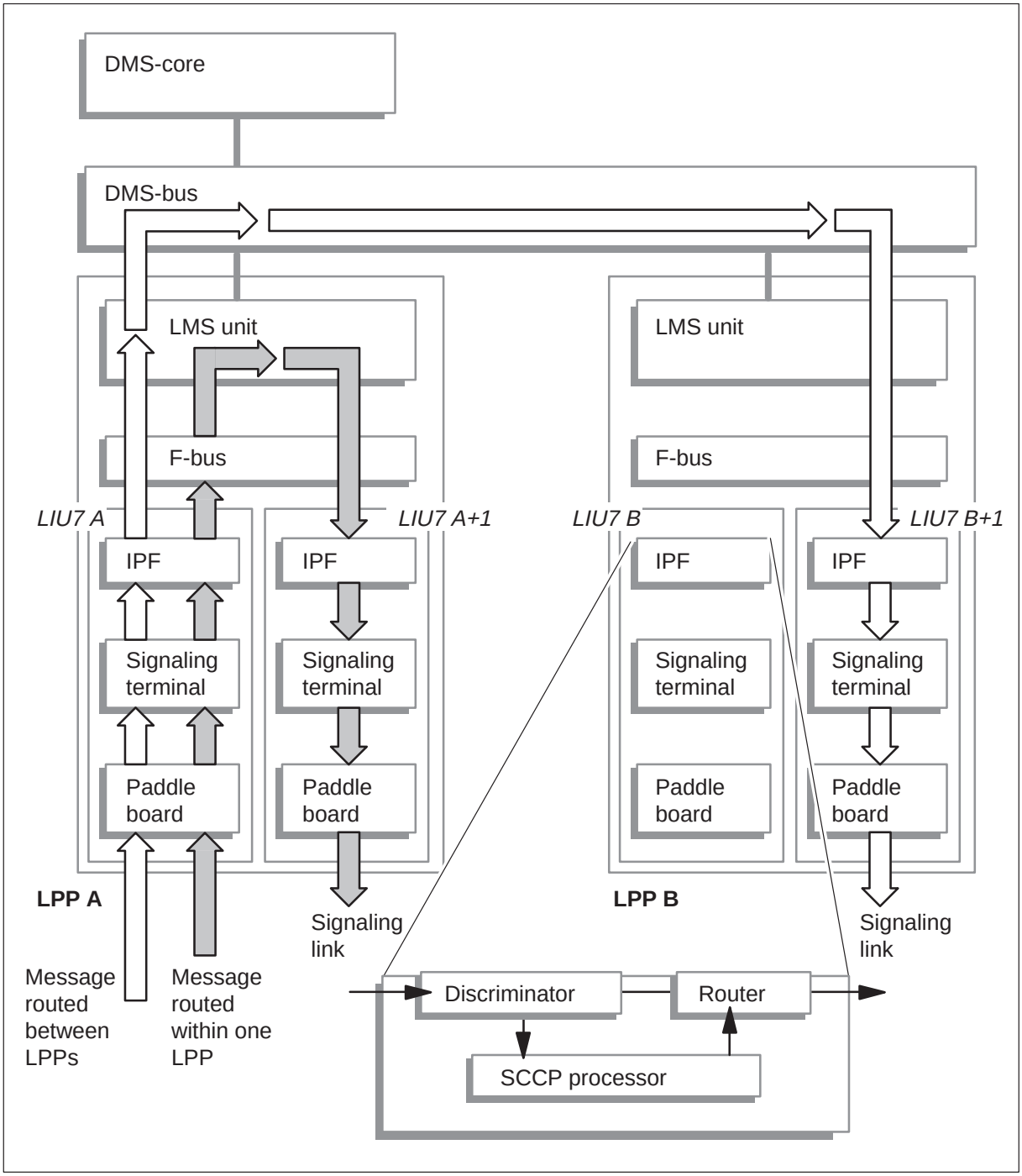


Figure 2-7
STP logical message flow in a DMS-INode for an SSLPP platform

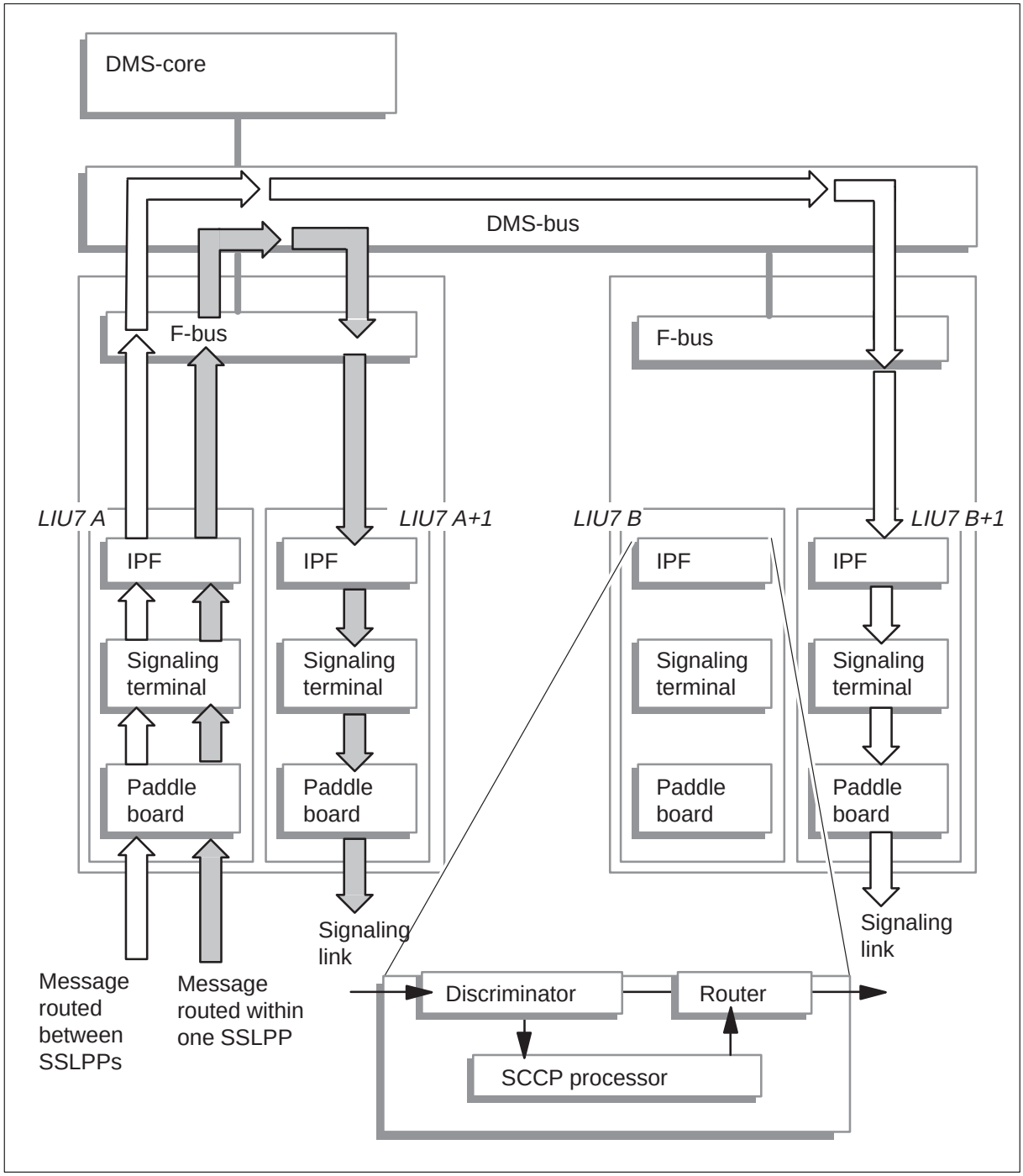
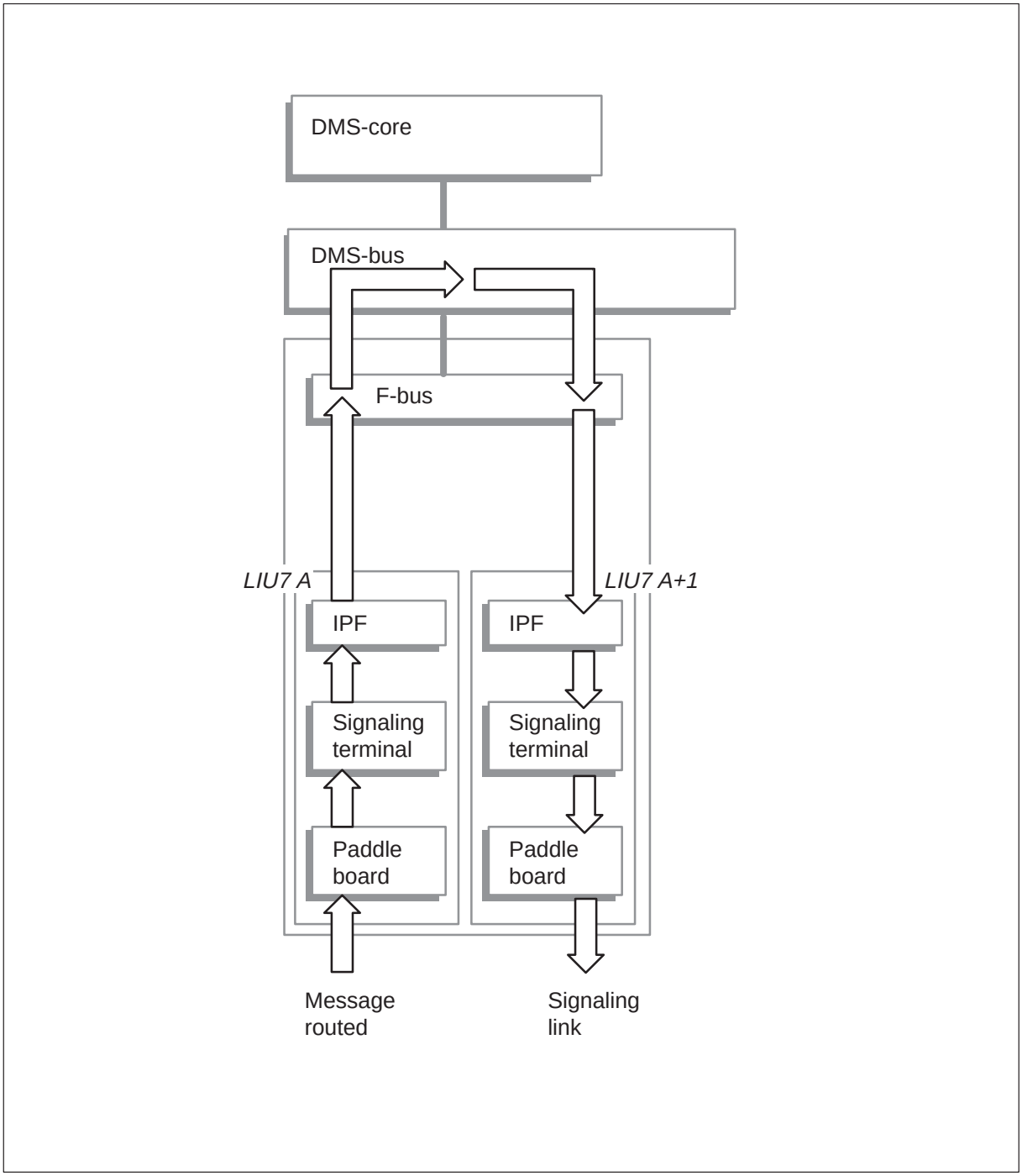


Figure 2-8
STP logical message flow in a DMS-INode for a SuperNode SE LIS platform



CCS7 functionality on a DMS-INode

This chapter explains CCS7 functionality and limitations for DMS-INodes.

Functionality describes the basic CCS7 functionality for a DMS-INode office.

Functional limitations describes the limitations of CCS7 functionality for a DMS-INode office.

Functionality

This section describes some of the basic CCS7 functionality, specifically signaling transfer point (STP) functionality and how it affects service switching point (SSP) functionality on a DMS-INode.

STP functionality for a DMS-INode switching office is controlled by software optionality control (SOC). SOC is a utility that controls the state or usage of feature options. The feature that controls STP functionality on a DMS-INode is STP SOC.

The STP SOC option has two states: IDLE and ON. If the STP SOC state is IDLE, STP functionality is not activated and the switching office functions as a stand-alone SSP office. If the STP SOC state is ON, STP functionality is activated and the switching office functions as a DMS-INode office. The STP SOC order code is STPE0300.

The following CCS7 functionalities are discussed in this section:

- Multiple CCS7 Network Addresses
- 2K Routeset Expansion
- Enhanced Cluster Routing
- Gateway Screening
- Message Transfer Part (MTP) Circular Routing Prevention
- CCS7 Alias Point Code

Multiple CCS7 Network Addresses

Multiple CCS7 Network Addresses (MNA7) allows the DMS-INode to function within the CCS7 network as two separate logical nodes. Separate CCS7 network addresses can be assigned so that one CCS7 network address can be designated for the service switching point (SSP) and one network address for the signaling transfer point (STP). For more information about MNA7, refer to the *DMS SuperNode STP/SSP Integrated Node SSP to MNA7 Conversion Guide,* 297-8991-580.

MNA7 is SOC controlled. To activate STP and SSP links simultaneously, set the MNA7 SOC state to ON. The MNA7 SOC order code is TEL00010.

Note: To activate STP links, set the STP SOC state to ON. The STP SOC order code is STPE0300.

2K Routeset Expansion

2K Routeset Expansion increases the number of routeset tuples for a DMS-INode to 2047 tuples. 2K Routeset Expansion is SOC controlled. The SOC order code for 2K Routeset Expansion is TEL00004.

2K Routeset Expansion requires LIU7 external routing functionality. External routers are dedicated LIU7s that route signaling traffic.

External routing is activated by

1 datafilling table C7ROUTER

2 using the MAPCI command C7ROUTER to bring the external routers into service

3 using the CI command C7RTR to activate the external routers

For more information about table C7ROUTER, refer to the *Translations Guide.* For more information about commands C7ROUTER and C7RTR, refer to the *CCS7 Maintenance Guide,* 297-8991-545.

Enhanced Cluster Routing

Enhanced Cluster Routing (ECR) enhances message transfer part (MTP) cluster routing. ECR allows a DMS CCS7 node to maintain routing availability status of individual remote signaling points that have been datafilled as partial point-code (PPC) routes. The route availability status of a member of a PPC route is maintained when the member has a status that is more restrictive than the datafilled cluster status.

When the cluster routes are datafilled in table C7RTESET, the ECR function is active. ECR is valid for ANSI networks only.

Gateway Screening

Gateway Screening uses network provider-specified combinations of data from the message transfer part (MTP) and service connection control part (SCCP) levels to monitor and control incoming CCS7 messages. The integrated processor F-bus interface (IPF) performs the necessary screening of CCS7 routing data.

MTP screening provides data needed to deliver selected signaling messages between nodes in a CCS7 network. MTP screening uses the point codes assigned to each node and other MTP information to determine which signaling points in other networks can have access to a given network and to what signaling points a particular message can be delivered.

SCCP screening uses application-specific routing information to provide an additional level of network security. SCCP screening allows a selected message to access a particular application residing at a node in the CCS7 network.

MTP Circular Routing Prevention

MTP Circular Routing Prevention enhances MTP to prevent circular routing of MTP messages when complex CCS7 networks involving E-links are

deployed. This feature conforms to Network Reliability Council (NRC) item 1.6 and is controlled through SOC order code STPE0200. This feature is available only in ANSI networks.

Alias Point Code

Alias point codes, also referred to as capability codes, are alternate point codes that can be used to address the DMS-INode by other than its existing network address.

Functional limitations

This section describes some of the basic CCS7 functional limitations for the DMS-INode office.

SSP and STP link activation

There are two SOC options that affect CCS7 link activation in a DMS-INode; they are STP SOC and MNA7 SOC.

Before STP links can be activated, the STP SOC state must be set to ON. Operating company personnel can datafill CCS7 link activation tables with STP tuples, but they cannot activate any STP links, linksets, routes, or routesets until the STP SOC option is set to ON.

Before link activation can occur for both logical SSP and STP node links in the same CCS7 network, the MNA7 SOC option must be set to ON. Operating company personnel can datafill the CCS7 link activation tables, but they cannot simultaneously activate any STP or SSP links, linksets, routes or routesets in the same CCS7 network until the MNA7 SOC option is set to ON.

The CCS7 link activation datafill tables are

- C7NETWRK
- C7LKSET
- C7LINK
- C7RTESET
- C7ALIAS

Note: If STP network tuples are datafilled in table C7NETWRK before the STP SOC state is set to ON, a warning message is displayed.

For information about tables C7ALIAS, C7NETWRK, C7LINK, C7LKSET, and C7RTESET, refer to the *Translations Guide*.

Call Processing

Provisioning the DMS-INode must be performed with the requirements of both the SSP and the STP in mind. STP functionality uses very little computing module (CM) CPU time unless service affecting faults occur, upon which the STP's maintenance activities in the CM are invoked. These activities result in more intensive usage of the CM CPU time by the STP functionality. As a result, the total call processing capacity for the SSP is reduced by approximately 30% in a DMS-INode compared to a standalone SSP. This assures STP recovery under all scenarios.

SEAS

Signaling, Engineering, and Administration System software is not supported for DMS-INode offices.

8-bit SLS

8-bit SLS is SSP functionality that is not supported for DMS-INode offices. If 8-bit SLS is activated in an SSP office, the STP SOC state cannot be changed from IDLE to ON.

200K GTT Expansion

200K GTT Expansion is not supported for DMS-INode offices.

LIU7 Auto-imaging

LIU7 Auto-imaging is not supported for DMS-INode offices, but Integrated Services Node (ISN) Auto-imaging is supported for DMS-INode.

High-speed link

High-speed link (HSL) is SSP functionality that is not supported for DMS-INode offices. If HSL is activated in an SSP office, the STP SOC state cannot be changed from IDLE to ON.

Multiple link interface unit

Multiple link interface unit (MLIU) is SSP functionality that is not supported for DMS-INode offices. If MLIU is activated in an SSP office, the STP SOC state cannot be changed from IDLE to ON.

DMS-INode software and hardware

The DMS-INode has specific CCS7 provisioning limits because the service switching point (SSP) and signaling transfer point (STP) functions are integrated into a single physical node.

This chapter identifies the sotware and hardware provisioning limits for the DMS-INode. All other datafill values remain the same for stand-alone DMS-STP and DMS-SSP nodes (refer to the *Translations Guide*).

Basic DMS-INode configuration gives the software limits for the maximum number of links, channelized access links, linksets, routesets, global title translations (GTT), trunks, capability codes, and signaling networks that can be provisioned through software datafill on the DMS-INode.

DMS-INode gateway screening table datafill limits gives the datafill limits for the gateway screening for tables in the DMS-INode.

Basic supported hardware configurations provides the hardware configurations for the DMS-INode.

System recovery provides reference for DMS-INode system recovery.

Basic DMS-INode configuration

Table 4-1 indicates the basic configuration supported on the DMS-INode and identifies the data schema tables that require datafill to support the configuration. The basic configuration includes the number of links, linksets, routesets, and routes that can be supported on the DMS-INode.

Table 4-1
Software limits

Item	Maximum configuration	Comments
Links	108 180 (see Note 1)	1 per LIU7 Table: C7LINK
Channelized access links	90	Table: C7LINK
Linksets	108 180 (see Note 1)	Maximum 8 links per linkset and 16 links per combined linkset Table: C7LKSET
Routesets	2047 with MNA7	Table: C7RTESET
Routes	6 routes per routeset	Table: C7RTESET
GTT (see Note 2)	60 000 25 000 for SSP	Table: C7GTT
Trunks (see Note 2)	58 000 100 000 with LIU7 external routing	Table: C7TRKMEM

Note 1: The following restrictions apply:

- the software load is a World Trade (GT) or GSM product
- there are no digital trunk controllers (DTC) datafilled in table LTCINV (LIU7 external routing is not required)
- if DTCs exist in table LTCINV, LIU7 external routing must be active

Note 2: If table C7TRKMEM has more than 20 000 tuples, the table size limit for table C7GTT is 25 000. If table C7GTT has more than 25 000 tuples, the table size limit for table C7TRKMEM is 20 000 (with or without LIU7 external routing).

—continued—

Table 4-1
Software limits (continued)

Item	Maximum configuration	Comments
Capability codes	256 per internal STP node	Maximum of 1024 tuples for table C7ALIAS Table: C7ALIAS
Signaling networks	eight for MNA7 four for SNA7	Two network addresses per network indicator for MNA7 INode One network address per network indicator for SNA7 INode Table: C7NETWRK

Note 1: The following restrictions apply:

- the software load is a World Trade (GT) or GSM product
- there are no digital trunk controllers (DTC) datafilled in table LTCINV (LIU7 external routing is not required)
- if DTCs exist in table LTCINV, LIU7 external routing must be active

Note 2: If table C7TRKMEM has more than 20 000 tuples, the table size limit for table C7GTT is 25 000. If table C7GTT has more than 25 000 tuples, the table size limit for table C7TRKMEM is 20 000 (with or without LIU7 external routing).

—end—

For more information on the data schema tables, refer to the *Translations Guide*.

Note: For more information about SSP and STP link activation, refer to "SSP and STP link activation" in this document.

DMS-INode Gateway Screening table datafill limits

Table 4-2 lists the Gateway Screening datafill limits for data schema tables in a DMS-INode.

Table 4-2
Table datafill restrictions for DMS-INode

Table	Maximum tuples allowed with 8-Mbyte LIU7s
C7GTWLKS	108 180 (see Note 2)
C7AFTPC	0 to 2000
C7ALWDPC	0 to 2000
C7ALWGTT	0 to 2000
C7ALWOPC	0 to 2000
C7ALWSIO	0 to 2000 (ANSI) 0 to 200 (ITU)
C7BLKDPC	0 to 2000
C7BLKOPC	0 to 2000
C7BLKSIO	0 to 2000 (ANSI) 0 to 200 (ITU)
C7CGPA	0 to 400
C7CDPA	0 to 400
C7DSTFLD	0 to 2000

Note 1: The total number of tuples for all tables, excluding table C7GTWLKS, cannot exceed 2000 tuples.
Note 2: The following restrictions apply:

- the software load is a World Trade (WT) or GSM product
- there are no digital trunk controllers (DTC) datafilled in table LTCINV (LIU7 external routing is not required)
- if DTCs exist in table LTCINV, LIU7 external routing must be active

For more information on the data schema tables, refer to the *Translations Guide*.

Basic supported hardware configurations

INodes are currently supported on the following processor types:

- SuperNode series 50, 60, 70 (BRISC)
- SuperNode SE Series 50, 60, 70 (BRISC)

An LIU7 can exist on three platforms in a DMS-INode, as follows:

- a link peripheral processor (LPP), enhanced LPP (ELPP), or fiberized LPP (FLPP) platform
- a single shelf link peripheral processor (SSLPP), also known as a fiber link interface shelf (FLIS) platform
- a SNSE LIS platform

For more information about these platforms, refer to "Signaling message paths through a DMS-INode" in this document.

The DMS-INode supports both 8-Mbyte and 32-Mbyte LIU7s.

System recovery

For information on DMS-INode system recovery, refer to the *Recovery Procedures*.

List of terms

A-link

A signaling data link that connects service switching points (SSP) and service control points (SCP) to signaling transfer points (STP). *See also* service control point (SCP) or service switching point (SSP).

application-specific unit (ASU)

A combination of hardware and software components that carries out a particular function on the signals carried on the channel buses (C-buses) and frame transport buses (F-buses) in a link peripheral processor (LPP).

ASU

See application-specific unit (ASU).

capability code

An address that allows a Common Channel Signaling 7 (CCS7) node to identify itself by more than one point code. For example, each node of a signaling transfer point pair is identified by the same capability code and by individual capability codes. *See also* point code.

CCS

See common channel signaling (CCS).

CCS7

See Common Channel Signaling 7 (CCS7).

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. *See also* link interface unit (LIU), link peripheral processor (LPP).

CI

See command interpreter (CI).

C-link

The signaling data link (SDL) that connects the mates of a signaling transfer point (STP) pair. *See also* signaling data link (SDL).

CM

See communications module (CM), or computing module (CM), or connection memory (CM).

CMIC

See computing module inter-communications links.

combined linkset

Two linksets datafilled in table C7RTESET with the same cost. Traffic sent out on a combined linkset is evenly distributed across all links of both linksets.

command interpreter (CI)

A component in the Support Operating System (SOS) that functions as the main interface between machine and user. Its principal roles include the following:

- reading lines entered by a terminal user
- breaking each line into recognizable units
- analyzing the units
- recognizing command-item numbers on the input lines
- activating these commands

common channel signaling (CCS)

A signaling method in which information relating to many labeled messages is transmitted over a single channel using time-division multiplex (TDM) digital techniques.

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 CPUs with associated memory that operate in a synchronous matched mode on two separate planes. Only one plane is active; it maintains overall control of the system while the other plane is on standby.

computing module intercommunications links

Links used by computing module (CM) to CCS7 link interface unit (LIU7) traffic to access the DMS-bus.

connectionless signaling

A type of signaling in which no fixed end-to-end connection is associated with the call. The route followed by the information and signaling between the originating and terminating subscriber is not fixed and can change from one message to the next. For example, signaling used to access a database for 800-number translations and maintenance signaling messages between signaling points are considered connectionless signaling. Also known as transaction services.

connection-oriented signaling

A signaling process in which a fixed end-to-end path is established for the call. The signaling protocol establishes a fixed path although the signaling itself can travel by way of different paths for the duration of the call. All information associated with the call follows a fixed path even though the signaling itself is not connection-oriented. Also known as trunk signaling.

destination point code (DPC)

A Common Channel Signaling 7 (CCS7) term defining the termination of a signaling message. *See also* originating point code (OPC).

Digital Multiplex System

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

digital trunk controller 7 (DTC7)

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

digital trunk controller (DTC)

A peripheral module (PM) that connects DS30 links from the network with digital trunk circuits. *See also* Austrian digital trunk controller (ADTC), international digital trunk controller (IDTC).

directory number (DN)

The full complement of digits required to designate a subscriber's station within one numbering plan area (NPA)—usually a three-digit central office (CO) code followed by a four-digit station number.

D-link

A signaling data link that connects a secondary signaling transfer point (STP) of one STP pair to a primary STP pair in the network. *See also* signaling data link (SDL).

DMS-bus

The messaging control component of the DMS SuperNode processor. The DMS-bus components are a pair of message switches (MS).

DMS-core

The call management and system control portion of the DMS SuperNode processor. The DMS-core portion consists of a computing module (CM) and a system load module (SLM).

DMS-link

The networking software of the DMS SuperNode processor. The DMS-link software consists of open and standard protocols that allow the DMS SuperNode to function in a multivendor environment.

DMS SP/SSP

See signaling point/service switching point (SP/SSP).

DMS-STP

See DMS SuperNode Signaling Transfer Point (DMS-STP).

DMS-STP/SSP INode

See DMS SuperNode signaling transfer point/service switching point integrated node (DMS-STP/SSP INode).

DMS SuperNode

A central control complex (CCC) for the DMS-100 switch. The two major components of DMS SuperNode are the computing module (CM) and the message switch (MS). Both are compatible with the network module (NM), the input/output controller (IOC), and XMS-based peripheral modules (XPM).

DMS SuperNode SE

A smaller version of DMS SuperNode designed to service smaller offices (maximum 20 000 lines). It is based on existing SuperNode technology and can be used in all existing applications of SuperNode, including Common Channel Signaling 7 (CCS7) and international. SuperNode SE supports all SuperNode software features at a reduced call processing capacity.

DMS SuperNode signaling transfer point (DMS-STP)

A high-throughput data packet switch providing connectivity between the nodes of a Common Channel Signaling 7 (CCS7) network.

DMS-INode

A CCS7 integrated node that combines the functionality of a signaling transfer point (STP) and a service switching point (SSP). The integrated node consists of the DMS-core, DMS-bus, I/O controller (IOC), office alarm system (OAS), JNET or ENET, link peripheral processors (LPP), and peripheral modules (PM) such as digital trunk controllers (DTC), line group controllers (LGC), and maintenance trunk modules (MTM).

DN

See directory number (DN).

DPC

See destination point code (DPC).

DS-0

A protocol for data transmission that represents one channel in a 24-channel DS-1 trunk.

DS-0A

An asynchronous DS-0. *See* DS-0.

DS-1

The 8-bit 24-channel 1.544-Mbit/s digital signaling format used in the DMS-100 Family switches. The DS-1 signal is the North American standard for digital trunks. It is a closely specified bipolar pulse stream. DS-1 is the standard signal used to interconnect Northern Telecom digital systems. DS-1 carries 24 information channels of 64 kbit/s each (DS-0s).

DS30

- A 10-bit 32-channel 2.048-Mbit/s speech-signaling and message-signaling link as used in the DMS-100 Family switches.
- The protocol by which DS30 links communicate.

DS30A

A 32-channel transmission link between the line concentrating module (LCM) and controllers in the DMS-100 Family switches. DS30A is similar to DS30, though intended for use over shorter distances.

DTC7

See digital trunk controller 7 (DTC7).

dual shelf network (DSN)

Also referred to as the junctored network (JNET).

FLIS

See single shelf link peripheral processor (SSLPP).

ECR

See enhanced cluster routing (ECR).

ELPP

See enhanced link peripheral processor (ELPP).

enhanced cluster routing (ECR)

Optional software that enhances message transfer part (MTP) cluster routing. Also supports XLIST management and routing of signaling between adjacent CCS7 networks.

enhanced link peripheral processor (ELPP)

An ELPP with triple F-bus configuration uses SR128 sub-rate fiber links. A separate F-bus is provided for each link interface shelf (LIS).

enhanced network (ENET)

A channel-matrixed time switch that provides pulse code modulated voice and data connections between peripheral modules (PM). ENET also provides message paths to the DMS-bus components.

global title (GT)

An application address that does not explicitly contain the necessary information that would allow routing by the signaling connection control part (SCCP) of the message transfer part (MTP). The SCCP global title translation (GTT) function is required to translate a GT into a valid network address.

global title translation (GTT)

The process that translates an application-specific address (such as a dialed 800 number) into the Common Channel Signaling 7 (CCS7) network address, usually that of the appropriate service control point (SCP).

GT

See global title (GT).

GTT

See global title translation (GTT).

Inter-link to link protocol

A level 2 Common Channel Signaling 7 (CCS7) protocol that is used to detect message losses between CCS7 link interface units (LIU7).

International Telecommunication Union (ITU)

The specialized telecommunication agency of the United Nations, established to provide standardized communication procedures and

practices, including frequency allocation and radio regulations, around the world.

INode

See integrated node (INode).

integrated node (INode)

A combination of a DMS SuperNode signaling transfer point (DMS-STP) and a DMS signaling point/service switching point (DMS SP/SSP). It has all the functions of both, and requires fewer frames and cabinets.

integrated processor and F-bus interface (IPF)

Part of the CCS7 link interface unit (LIU7). The IPF performs message transfer part (MTP) and service connection control part (SCCP) message processing, including GTT and gateway screening for CCS7 messages.

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.

IPF

See integrated processor and F-bus interface.

ISDN

See integrated services digital network (ISDN).

ITU

See International Telecommunication Union (ITU).

LCC

See line class codes (LCC).

LIDB

See line information database.

LIM

See link interface module (LIM).

line class codes (LCC)

An alphanumeric code that identifies the class of service assigned to a line.

line information database (LIDB)

A database used to query alternate billed intra-LATA calls. The LIDB relays information to the DMS, switch information regarding billing number verification for a given dialing number.

link

link interface module

A peripheral module that controls messaging between link interface units (LIU) in a link peripheral processor. The LIM also controls messages between the LPP and the DMS-bus component. A LIM consists of 2 LIM units and 2 frame transport buses. The 2 LIM units operate in a load-sharing mode with each other.

link interface shelf

A link interface shelf is contained within the link peripheral processor and provides the physical housing for the Common Channel Signaling 7 link interface unit (CCS7).

link interface unit for CCS7 (LIU7)

See CCS7 link interface unit (LIU7).

link peripheral processor (LPP)

The DMS SuperNode 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). *See also* application-specific unit (ASU), CCS7 link interface unit (LIU7), and link interface module (LIM).

linkset

- A group of links related to one application instance.
- A collection of links connecting two adjacent signaling points in CCITT no. 6 signaling (N6), common channel interoffice signaling no. 6 (CCIS6), and Common Channel Signaling 7 (CCS7).

LIS

See link interface shelf (LIS).

LIU7

See CCS7 link interface unit (LIU7).

LMS

See local message switch (LMS).

local message switch (LMS)

A shelf in the link peripheral processor (LPP) frame or cabinet. The LMS exchanges messages between application-specific units (ASU) in the LPP

and provides access to the DMS-bus. Also known as link interface module (LIM).

LPP

See link peripheral processor (LPP).

maintenance and administration position

See MAP.

maintenance trunk module (MTM)

In a trunk module equipment (TME) frame, a peripheral module (PM) that is equipped with test and service circuit cards and contains special buses to accommodate test cards for maintenance. The MTM provides an interface between the DMS-100 Family digital network and the test and service circuits.

MAP

Maintenance and administration position. A group of components that provides a user interface between operating company personnel and the DMS-100 Family switches. The interface consists of a video display unit (VDU) and keyboard, a voice communications module, test facilities, and special furniture.

MAPCI

MAP command interpreter

message signal unit (MSU)

A type of signal unit that contains signaling information. The MSUs are buffered until positive acknowledgement is received.

message switch (MS)

A high-capacity communications facility that functions as the messaging hub of the dual-plane combined core (DPCC) of a DMS SuperNode processor. The MS controls messaging between the DMS-bus components by concentrating and distributing messages and by allowing other DMS-STP components to communicate directly with each other.

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 INode

See multiple CCS7 network addresses for INodes (MNA7 INode).

MPC

See multiple point codes (MPC INode).

MPC INode

This is the preferred term to describe an INode with the MNA7 ability. *See* multiple CCS7 network addresses for INodes (MNA7 INode)

MS

See message switch (MS), message system (MS).

MSU

See message signal unit (MSU).

MTP

See message transfer part.

multiple CCS7 network addresses for INodes (MNA7 INode)

This is an original term and project name used to define the ability of an INode office to address itself with separate SSP and STP point codes for each network indicator.

multiple point codes (MPC INode)

The ability of an CCS7 office to address itself as more than one CCS7 point code (or network address) for each network indicator (for example, NATIONAL), regardless of the CCS7 function of the office (SSP, STP, or INode).

node

The terminating point of a link. The meaning of the term depends on its context. For example, a circuit can be a node in the context of another circuit within a module, the module itself can be a node in the context of another component of the network, and so forth. Some common applications are as follows:

- in network topology, a terminal of any branch of a network or a terminal common to two or more branches of a network
- in a switched communications network, the switching points, including patching and control facilities
- in a data network, the location of a data station that interconnects data transmission lines
- a unit of intelligence within a system; in a DMS switch, it includes the CPU, network module (NM), and peripheral modules (PM)

OPC

See originating point code (OPC).

open systems interconnection (OSI) reference model

Open systems interconnection (OSI) reference model for CCITT applications provides a defined structure for modeling the interconnection and exchange of information between users in a communication system.

originating point code (OPC)

A Common Channel Signaling 7 (CCS7) term defining the address of a signaling point (SP) that generated the message. *See also* destination point code (DPC).

OSI

See open systems interconnection (OSI) reference model.

OSS

See Operator Services System.

partial point code

The partial address of a signaling point. The address would consist of a network and a cluster but no member. *See also* point code.

per-trunk signaling (PTS)

A conventional telephony method of signaling that multiplexes the control signal of a call with voice or data over the same trunk.

point code

The address of a signaling point. The address consists of a network, cluster and member. *See also* capability code.

private virtual networking (PVN)

A service that uses the public and private switched network to provide private network features and capabilities.

PPC

See partial-point-code(PPC).

PTS

See per-trunk signaling (PTS).

PVN

See private virtual networking (PVN).

quasi-associated mode

A limited form of the nonassociated mode of CCITT no. 6 signaling (N6) and CCITT no. 7 signaling (N7) signaling in which signals are transferred between two exchanges over two or more signaling links in tandem, but only

over certain predetermined paths and through predetermined signaling transfer points (STP). *See also* dissociated mode, nonassociated mode.

route

A path that follows a linkset into the signaling network that accesses a destination.

routeset

A logical group of Common Channel Signaling 7 (CCS7) signaling paths with the same destination point.

routeset management (RSM)

A service that transfers messages over the signaling network and helps to maintain the network by checking for link problems through the use of an integrity source.

route table

A table of all possible routes to each node in the DMS-100 Family switch. The route table is maintained by the I/O system. Whenever a node or link is put into or taken out of service, the maintenance subsystem responsible for the node or link informs the I/O system. The I/O system then makes appropriate adjustments to the route table.

routing

A telephony function that selects and connects a path from the originating terminal to a destination based on an analysis of the digits received and the screening of a line as required.

SCCP

See signaling connection control part (SCCP).

SCP

See service control point (SCP).

SDL

See signaling data link.

SEAS

See Signaling, Engineering, and Administration System (SEAS).

service control point (SCP)

A node in a Common Channel Signaling 7 (CCS7) signaling network that supports application databases. The function of an SCP is to accept a query for information, retrieve the requested information from one of its application databases, and send a response message to the originator of the request.

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 (SCCP)

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, Engineering, and Administration System (SEAS)

The operations support system (OSS) that allows economical planning, provisioning, engineering, and administration of multiple CCS7 network nodes from a single, centralized administrative center provided by the network providers.

signaling data link (SDL)

A bidirectional transmission path for signaling. An SDL consists of two data channels operating together in opposite directions at the same data rate. It constitutes the lowest functional level (level 1) of CCITT no. 6 signaling (N6), Common Channel Interoffice Signaling no. 6 (CCIS6) and Common Channel Signaling 7 (CCS7) hierarchies.

signaling information field (SIF)

Part of the CCS7 message signal unit. The SIF contains the user-specific and routing label information for message transfer.

signaling information octet (SIO)

An octet within the CCS7 message signal unit. The SIO determines which user part the MSU is to be delivered to, either the ISUP or the signaling connection control part (SCCP).

signaling link (SL)

The term used to describe the first two levels of the Common Channel Signaling 7 (CCS7) protocol: the physical level (level 1) and the link level (level 2). Level 2 functions, combined with a level 1 signaling data link, constitute an SL used for the reliable transfer of signaling messages between two signaling points (SP).

Signaling Link Selection

A process used to distribute messages evenly over a linkset. SLS is determined by the SL.

signaling point (SP)

A node in a Common Channel Signaling 7 (CCS7) network that originates, terminates, or transfers signaling messages from one signaling link (SL) to another.

signaling point/service switching point (SP/SSP)

A signaling point (SP) or a service switching point (SSP).

An SP is a switching office that supports CCS7 voice trunk capability ISDN user part (ISUP) messaging. An SP provides an interface between subscriber lines and the CCS7 network.

An SSP is an SP with additional functionality to supports transaction capabilities application part (TCAP) messaging, which allows the SSP to access information from CCS7 databases.

signaling system 7 (SS7)

A version of signaling system #7 that was developed for North American use. *See also* CCITT no. 7 signaling (N7).

signaling system #7 (SS#7)

An international version of signaling system 7 (SS7) based on the CCITT specification of SS7.

signaling terminal (ST)

The hardware that performs error checking, coding, and decoding of signaling messages. In common channel interoffice signaling no. 6 (CCIS6) and CCITT no. 6 signaling (N6), it consists of a signaling terminal controller, a modem, and a modem interface card. In Common Channel Signaling 7 (CCS7), the signaling terminal is a single card.

signaling transfer point (STP)

A node in a 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 for INodes (SNA7)

An integrated node that uses one point code only for both its SSP and STP functions (as opposed to using separate point codes). From a network point of view, such INodes are primarily considered as STP nodes.

single shelf link peripheral processor (SSLPP)

An alternate LIU7 platform. The SSLPP allows the F-bus from a single link interface shelf to connect directly to the DMS-bus with a fibre optic cable.

SIF

See signaling information field.

SIO

See signaling information octet.

SL

signaling link

SLS

See Signaling Link Selection.

SNA7

See single CCS7 network address for INodes.

SOC

See software optionality control (SOC).

software optionality control (SOC)

A utility that provides the operating company with the ability to enable or disable SOC options. SOC is part of the DMS Evolution product delivery process.

SP

See signaling point (SP).

SPC INode

See single CCS7 network address for INodes (SNA7).

SS7

See signaling system 7 (SS7).

SSLPP

See single shelf link peripheral processor (SSLPP).

SSP

See service switching point (SSP).

SSN

See subsystem number (SSN).

ST

See signaling terminal (ST).

STP

See signaling transfer point (STP).

subsystem

An application in a node that uses the routing functions of the signaling connection control part (SCCP). Subsystems are addressable entities.

subsystem number (SSN)

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

TCAP

See transaction capabilities application part (TCAP).

telephone user part (TUP)

A CCITT no. 7 signaling (N7) protocol that provides signaling between a Common Channel Signaling 7 (CCS7) switching office and a designated customer setup.

transaction capabilities application part (TCAP)

A service that provides a common protocol for remote operations across the Common Channel Signaling 7 (CCS7) network. The protocol consists of message formatting, content rules, and exchange procedures. TCAP provides the ability for the service switching point (SSP) to communicate with a service control point (SCP). TCAP is used by the ISDN layer facility message to transport service information for transaction signaling, not associated with an active call, over primary rate interface (PRI) links.

transaction services

See connectionless signaling.

transmission link (TL)

In a CCS7 network, a T1 digital carrier terminating on a digital trunk controller (DTC). In the DMS switch, the TL is a single voice carrier on a DS30 link over connections through the network and into the message switch and buffer 7 (MSB7).

DMS-100 Family
DMS-INode
Functionality Description Reference Manual

Product Documentation–Dept 3423
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P.O. Box 13010
RTP, NC 27709–3010
1-877-662-5669, Option 4 + 1

Publication number: 297-8991-100
Product release: TL12
Document release: Standard 03.02
Date: August 1999
Printed in the United States of America

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