NORTEL NETWORKS

Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks

Product and Technology Basics

PT-AAL1/UA-AAL1/UA-IP

NN10028-111

Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks

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PT-AAL1/UA-AAL1/UA-IP

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About this document

This document provides a high-level overview of three solutions in the Succession portfolio:

- Packet Trunking - AAL1 (PT-AAL1)
- Universal Access - AAL1 (UA-AAL1)
- Universal Access - IP (UA-IP)

It also provides an overview of three of the components within these solutions:

- Nortel Networks Multiservice Switch 15000
- Media Gateway 15000
- Nortel Networks Preside Multiservice Data Manager (used to manage network elements)

The following topics are discussed in this section:

Who should read this document and why

This document is intended for people who want to learn about and understand the purpose and function of Nortel Networks Multiservice Switch 15000 equipment, Nortel Networks Media Gateway 15000 equipment and Preside Multiservice Data Manager servers within the Succession portfolio's PT-AAL1, UA-AAL1 and UA-IP solutions.

What you need to know

Before you read this document, it would be helpful to have a general understanding of the concept of the Succession portfolio, the solutions within that portfolio, and the role that ATM and IP switches can play in these solutions. For more information, see NN10320-100 *ATM Solutions Basics* and NN10300-100 *IP Solutions Basics*.

Some familiarity with the operating principles of Nortel Networks Multiservice Switch systems, Media Gateway 15000 systems, ATM and IP is also beneficial. For more information, see:

- NN10600-030 *Nortel Networks Multiservice Switch 7400/15000/20000 Overview*
- NN10600-780 *Nortel Networks Media Gateway 7480/15000 Technology Fundamentals*
- NN10600-700 *Nortel Networks Multiservice Switch 7400/15000/20000 ATM Technology Fundamentals*
- NN10600-800 *Nortel Networks Multiservice Switch 7400/15000/20000 IP Technology Fundamentals*

You should also have some familiarity with the operating principles of the Preside MDM toolset. For more information, see 241-6001-801 *Preside MDM Overview*.

How this document is organized

This document begins with a summary of what has changed in Nortel Networks Multiservice Switch for Succession documentation suite. The document then presents a high level description of three of the solutions within the Succession portfolio: Packet-Trunking - AAL1 (PT-AAL1), Universal Access - AAL1 (UA-AAL1) and Universal Access - IP (UA-IP). It

also includes detailed descriptions of the Multiservice Switch 15000 and Media Gateway 15000 network elements, and Nortel Networks Preside Multiservice Data Manager (MDM) software that manages network elements within these solutions. Finally, the document describes how elements are managed within the solutions and how calls progress through a Succession network.

This document contains the following sections:

- "What's new in Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM for Succession Networks documentation" (page 21)
- "Overview of the solutions and components within Succession portfolio" (page 27)
- "Multiservice Switch 15000 and Media Gateway 15000 hardware overview" (page 49)
- "Sun Fire™ V480 / V240 server hardware and software" (page 71)
- "Multiservice Switch 15000 and Media Gateway 15000 software overview" (page 83)
- "Preside Multiservice Data Manager software overview" (page 91)
- "OAM tasks and access for managing Multiservice Switch 15000 and Media Gateway 15000 nodes" (page 95)
- "Call progressions through Multiservice Switch 15000 nodes" (page 103)

What's new in this document

The following features were added to this document:

- "DS3 interface between Multiservice Switch 15000 and Media Gateway 9000 for Succession Networks UA-AAL1/UA-IP" (page 22)
- "Standardized configurations and nodal provisioning (NP) templates for Multiservice Switch 15000 and Media Gateway 15000 in a Succession Networks UA-IP solution" (page 24)

Note: For descriptions of the features listed above, see "What's new in Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM for Succession Networks documentation" (page 21).

DS3 interface between Multiservice Switch 15000 and Media Gateway 9000 for Succession Networks UA-AAL1

The following section was modified for this feature:

- "Media Gateway 9000" (page 41)

Standardized configurations and nodal provisioning (NP) templates for Multiservice Switch 15000 and Media Gateway 15000 in a Succession Networks UA-IP solution

The following sections were modified for this feature:

- "Communication Server 2000" (page 37)
- "Communications Server LAN" (page 39)
- "Media Gateway 9000" (page 41)
- "Multiservice Switch 15000" (page 43)
- "Universal Audio Server" (page 48)
- "Multiservice Switch 15000 function processors" (page 53)

The following sections were added for this feature:

- "Media Gateway 15000" (page 42)
- "What is the Universal Access - IP solution?" (page 34)
- "Call progression in the UA-IP solution" (page 116)

Text conventions

This document uses the following text conventions:

- `nonproportional spaced plain type`

  Nonproportional spaced plain type represents system generated text or text that appears on your screen.

- **nonproportional spaced bold type**

  Nonproportional spaced bold type represents words that you should type or that you should select on the screen.

- *italics*

  Statements that appear in italics in a procedure explain the results of a particular step and appear immediately following the step.

  Words that appear in italics in text are for naming.

- [optional_parameter]

  Words in square brackets represent optional parameters. The command can be entered with or without the words in the square brackets.

- <general_term>

  Words in angle brackets represent variables which are to be replaced with specific values.

- UPPERCASE, lowercase

  In Nortel Networks Preside Multiservice Data Manager, uppercase and lowercase letters that appear in UNIX commands and parameters must be matched exactly. The system matches upper and lowercase characters differently.

- UPPERCASE, lowercase

  Nortel Networks Multiservice Switch system commands are not case-sensitive and do not have to match commands and parameters exactly as shown in this document, with the exception of string options values (for example, file and directory names) and string attribute values.

- |

  This symbol separates items from which you may select one; for example, ON|OFF indicates that you may specify ON or OFF. If you do not make a choice, a default ON is assumed.

- ...

  Three dots in a command indicate that the parameter may be repeated more than once in succession.

The term absolute pathname refers to the full specification of a path starting from the root directory. Absolute pathnames always begin with the slash (/) symbol. A relative pathname takes the current directory as its starting point, and starts with any alphanumeric character (other than /).

Related documents

The following documents comprise the Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks documentation suite:

- NN10028-111 *Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Product and Technology Basics PT-AAL1/UA-AAL1/UA-IP*
- NN10185-461 *Upgrading Preside MDM in Succession Networks*
- NN10070-461 *Upgrading Nortel Networks Multiservice Switch 15000 in Succession Networks PT-AAL1/UA-AAL1*
- NN10419-461 *Upgrading Nortel Networks Multiservice Switch 15000 and Media Gateway 15000/20000 in Succession IP Solutions*
- NN10092-911 *Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Fault Management Overview PT-AAL1/UA-AAL1/UA-IP*
- NN10198-912 *Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Fault Management Troubleshooting PT-AAL1/UA-AAL1/UA-IP*
- NN10254-913 *Nortel Networks Multiservice Switch 15000 in Succession Networks Replacing an OC-3/STM-1 FP PT-AAL1/UA-AAL1*
- NN10114-511 *Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Configuration Overview PT-AAL1/UA-AAL1/UA-IP*

- NN10225-512 *Nortel Networks Multiservice Switch 15000 and Media Gateway 15000 in Succession Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*
- NN10158-711 *Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Performance PT-AAL1/UA-AAL1/UA-IP*
- NN10180-611 *Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Security and Administration PT-AAL1/UA-AAL1/UA-IP*

You can also refer to the following documents for related information:

- NN10600-700 *Nortel Networks Multiservice Switch 7400/15000/20000 ATM Technology Fundamentals* and NN10320-100 *ATM Solutions Basics*

  These documents contain additional overview information related to the Packet Trunking - AAL1 and Universal Access - AAL1 solutions.

- NN10600-800 *Nortel Networks Multiservice Switch 7400/15000/20000 IP Technology Fundamentals* and NN10300-100 *IP Solutions Basics*

  These documents contain additional overview information related to the Universal Access - IP solution.

- NN10600-030 *Nortel Networks Multiservice Switch 7400/15000/20000 Overview*

  This document contains more information about Nortel Networks Multiservice Switch 15000 hardware and software.

- NN10600-780 *Nortel Networks Media Gateway 7480/15000 Technology Fundamentals*

  This document contains more information about the Nortel Networks Media Gateway 15000.

- 241-6001-801 *Preside MDM Overview*

  This document contains more information about Nortel Networks Preside Multiservice Data Manager software.

How to get more help

For information on training, problem reporting, and technical support, see "Nortel Networks support services" section in NN10600-030 *Nortel Networks Multiservice Switch 7400/15000/20000 Overview*.

Chapter 1
What's new in Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM for Succession Networks documentation

Refer to the following sections for more information about recent changes in the Multiservice Switch for Succession Networks documentation suite for SN05:

- "New features in SN07" (page 21)
- "Changes to the documentation suite" (page 25)

New features in SN07

This section lists the new features in the SN07 release that have impacted the documentation suite. This section also provides a description of each feature and explains how it impacts the product and the user.

To find which feature information has been added into a document, refer to the "What's new in this document" section of that document. That section provides cross-references that lead you directly to the new information.

See the following sections for the descriptions of the new features.

- "DS3 interface between Multiservice Switch 15000 and Media Gateway 9000 for Succession Networks UA-AAL1/UA-IP" (page 22)
- "Recurring fan alarms for Multiservice Switch 15000 and Media Gateway 15000" (page 22)

- "Temperature alarms for Multiservice Switch 15000 and Media Gateway 15000" (page 23)
- "New performance measurements (PMs) for Multiservice Switch 15000 and Media Gateway 15000" (page 23)
- "Standardized configurations and nodal provisioning (NP) templates for Multiservice Switch 15000 and Media Gateway 15000 in a Succession Networks UA-IP solution" (page 24)
- "Preside MDM enhancements for Multiservice Switch 15000 and Media Gateway 15000" (page 24)

DS3 interface between Multiservice Switch 15000 and Media Gateway 9000 for Succession Networks UA-AAL1/UA-IP

The UA-AAL1 and UA-IP solutions now support DS3 connectivity to the Nortel Networks Multiservice Switch 15000 ATM Core using a channelized OC3 interface and a fiber network that multiplexes/demultiplexes DS3 traffic.

Nodal Provisioning templates are available to provision the DS3 interface for connectivity between a Multiservice Switch 15000 and a Media Gateway 9000 over the fiber network.

Recurring fan alarms for Multiservice Switch 15000 and Media Gateway 15000

After an initial processor control alarm (7012 0051) is raised with a severity of MAJOR for a single fan failure, that alarm is repeated once every eight hours until the condition is cleared. After the alarm has been raised three times, the severity is changed to CRTITICAL.

The alarm repetition can be turned ON or OFF (base Multiservice Switch 15000 default is OFF).

- For Succession Networks, this attribute is set to ON, by means of nodal provisioning (NP) templates.
- Other Multiservice Switch 15000 users can leave this attribute OFF, in which case the fan alarm is not repeated.

This alarm no longer provides warning of a high shelf temperature.

Temperature alarms for Multiservice Switch 15000 and Media Gateway 15000

Fabric temperature

Formerly, when fabric temperature rose above 65°C, a processor control WARNING alarm of type EQUIPMENT was generated (7002 0003).

- The severity of this alarm has been changed from WARNING to MAJOR.
- The type of this alarm has been changed from EQUIPMENT to ENVIRONMENTAL.

Shelf temperature

Formerly, when the shelf temperature rose above 70 °C a WARNING alarm was generated.

- A new Multiservice Switch 15000/Media Gateway 15000 processor control system alarm code (7012 0059) has been added to provide warning of a high shelf temperature condition.
- The severity of this alarm is CRITICAL, since there may be limited time before the fabric reaches 72 °C and shuts itself off.

New performance measurements (PMs) for Multiservice Switch 15000 and Media Gateway 15000

5- and 30-minute performance measurements (PMs) for Succession VoIP and VoA

Performance measurements (PMs) provide a network-level view that can help recover from network outages and facilitate long range office planning:

- Multiservice Switch 15000 nodes use new PMs to report IP statistics for 4-port Gigabit Ethernet and ATM function processor (FP) cards.
- Media Gateway 15000 nodes use new PMs to report voice processing performance of the VSP3 and VSP3-o FP cards.

The new VoIP PM record format is backward compatible with the existing 5- and 30-minute PM record format for VoA.

5-minute performance measurement (PM) for shelf temperature

The maximum shelf temperature during a 5 minute interval is now supplied in a new 5-minute PM record.

These 5-minute PM records can be monitored by the OSS performance host so that appropriate pro-active action can be taken at the network level.

Standardized configurations and nodal provisioning (NP) templates for Multiservice Switch 15000 and Media Gateway 15000 in a Succession Networks UA-IP solution

Standard configurations are defined for Multiservice Switch 15000 and Media Gateway 15000 equipment in the UA-IP solution, and supported through nodal provisioning (NP) templates.

Nodal Provisioning (NP) templates simplify the initial commissioning in a UA-IP Succession solution and minimize operator error in applying Multiservice Switch 15000 and Media Gateway 15000 equipment attributes.

Preside MDM enhancements for Multiservice Switch 15000 and Media Gateway 15000

Preside MDM configuration and engineering for Succession UA-IP solution

Configuration and engineering practices for the Succession UA-IP solution comply with those in place for Succession UA-ALL1 and PT-AAL1 solutions.

Management Data Provider (MDP) configuration

Administration and configuration of Management Data Provider (MDP) is simplified through application of existing Preside MDM Administration tool services.

Preside MDM workstation synchronization

VoIP Succession networks include Multiservice Switch 15000 equipment in the packet core and Media Gateway 15000 equipment as a voice gateway. A single pair of Preside MDM workstations can be used to manage both of these network elements in more than one Succession office, thereby reducing the operating cost of a VoIP network.

One of the pair of redundant server workstations in the Succession network may have a failure that requires the data on the disk drive to be restored. Once the failed workstation has been recovered, an operator must synchronize the recovered workstation with the operational workstation.

The data synchronization procedure is also useful when installing a new redundant Preside MDM workstation, or after upgrading the operating system.

Graphical user interface (GUI) to set Succession release name

You can use a graphical user interface to set the current Succession release name in the Preside MDM toolset menu, and in the shelf comment text field of a Multiservice Switch 15000 or Media Gateway 15000.

Changes to the documentation suite

This section describes the following changes to the Multiservice Switch for Succession Networks documentation suite for the SN07 release:

Branding changes

The terms Passport 15000 and PVG have been rebranded in conjunction with the new Nortel Networks' brand simplified naming format:

- The Passport 15000 is now referred to as the Nortel Networks Multiservice Switch 15000.
- The packet voice gateway (PVG) is now referred to as the Media Gateway 15000.

The Multiservice Switch 15000 and Media Gateway 15000 network elements continue to share common hardware and software aspects. Hybrid systems can combine these network elements' capabilities, despite the fact that no specific brand exists for such hybrids.

For more information on the product rebranding, refer to NN10600-000 *Nortel Networks Multiservice Switch 7400/15000/20000 What's New in PCR6.1*.

New documents

The following document was added to the Multiservice Switch for Succession Networks documentation suite:

- NN10419-461 *Upgrading Nortel Networks Multiservice Switch 15000 and Media Gateway 15000/20000 in Succession IP Solutions*.

  This new document describes how to upgrade the Multiservice Switch 15000 (deployed as a packet switch) and a Media Gateway 15000 (deployed as a trunk gateway) in a UA-IP solution.

Restructured documents

The following document was restructured to support the troubleshooting of three Succession solutions: PT-AAL1, UA-AAL1 and UA-IP.

- NN10198-912 *Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Fault Management Troubleshooting PT-AAL1/UA-AAL1/UA-IP*

The following documents were renamed, reformatted and restructured to comply with evolving Succession Networks documentation practices.

- NN10070-461 *Upgrading Nortel Networks Multiservice Switch 15000 in Succession Networks PT-AAL1/UA-AAL1*
- NN10185-461 *Upgrading Preside MDM in Succession Networks*

To determine the specific changes made to each of these documents, refer to each document's "What's new in this document" section.

Other updates and changes

See "Related documents" (page 18) for a list of the NTPs in this suite that have been updated with technical information for the Succession Networks SN07 release.

Documents are frequently updated with changes that are not specific to a feature. To determine the other changes made in a particular document, read the section called "What's new in this document" in that document.

Chapter 2
Overview of the solutions and components within Succession portfolio

The Nortel Networks Succession portfolio is a set of solutions designed to provide carriers with an evolutionary path from circuit-switching networks to packet networks. This portfolio connects multiple Succession nodes that deliver both voice and data traffic over one network and provides for increased switching capacity because of the increased bandwidth and the off-loading of real time processing from the Communication Server 2000. In addition, it implements distributed switching because switching does not occur at one central location but is distributed to other nodes. As a result, the Succession portfolio allows customers to take advantage of the cost-effectiveness and open standards of packet networks without sacrificing the value of traditional telephony.

Three solutions within this portfolio are:

- Packet Trunking - AAL1 (PT-AAL1), described in “What is the Packet Trunking - AAL1 solution?” (page 28)
- Universal Access - AAL1 (UA-AAL1), described in “What is the Universal Access - AAL1 solution?” (page 31)
- Universal Access - IP (UA-IP), described in “What is the Universal Access - IP solution?” (page 34)

For more information on the components within these solutions, see “What are the components in Succession portfolio?” (page 37).

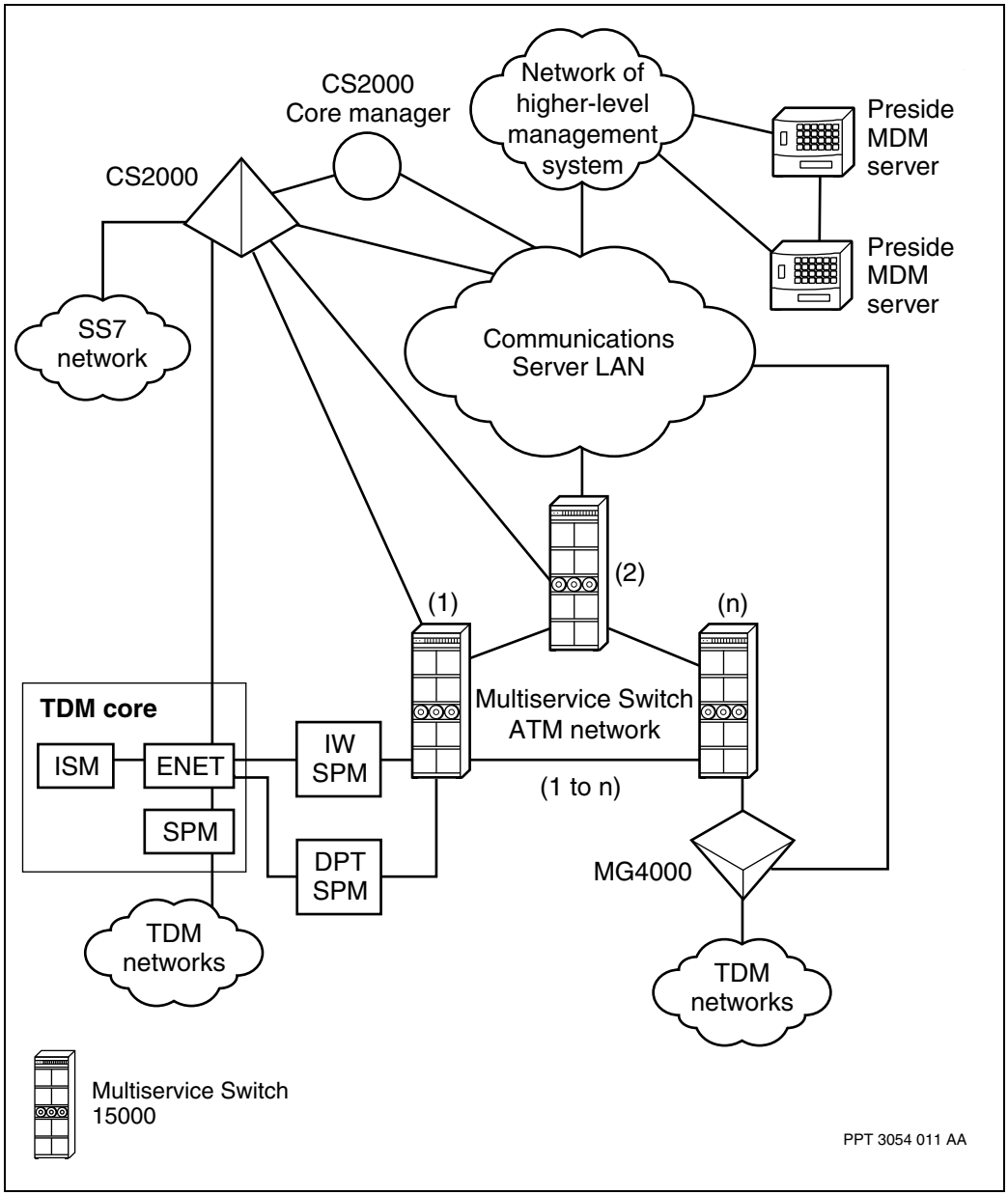
What is the Packet Trunking - AAL1 solution?

One of the solutions in the Succession portfolio is the Packet Trunking - AAL1 (PT-AAL1) solution. PT-AAL1 provides a solution for the public switched telephone networks Class 4 tandem office by integrating voice and data networks through asynchronous transfer mode (ATM) broadband switching technology. As a result, voice calls being routed through a PT-AAL1 network can be routed over the ATM fabric instead of through the traditional time division multiplexing (TDM) equipment. Because ATM technology can support many different services on the same unified network, the transmission of calls over this technology facilitates the integration of service providers' voice and data networks. In addition, ATM, when used in conjunction with other equipment, reduces the equipment footprint and increases the Busy Hour Call Attempts (BHCA) throughput when compared to the throughput of the TDM equipment.

Refer to the figure "Succession portfolio Packet Trunking - AAL1 solution" (page 29) to review the components involved in this solution. For more information on this solution, see NN10320-100 *ATM Solutions Basics*.

Note: This figure does not represent the redundant links between components. For more information about actual connection links and redundancy between links, see NN10114-511 *Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Configuration Overview PT-AAL1/UA-AAL1/UA-IP*.

Figure 1
Succession portfolio Packet Trunking - AAL1 solution



The PT-AAL1 solution consists of the following components:

- "Communication Server 2000" (page 37)
- "Communications Server LAN" (page 39)
- "CS2000 Core Manager" (page 39)
- "Dynamic Packet Trunking Spectrum Peripheral Module" (page 40)
- "Interworking Spectrum Peripheral Module" (page 40)
- "Multiservice Gateway 4000" (page 42)
- "Multiservice Switch 15000" (page 43)
- "Preside Multiservice Data Manager" (page 44)
- "TDM core" (page 48)

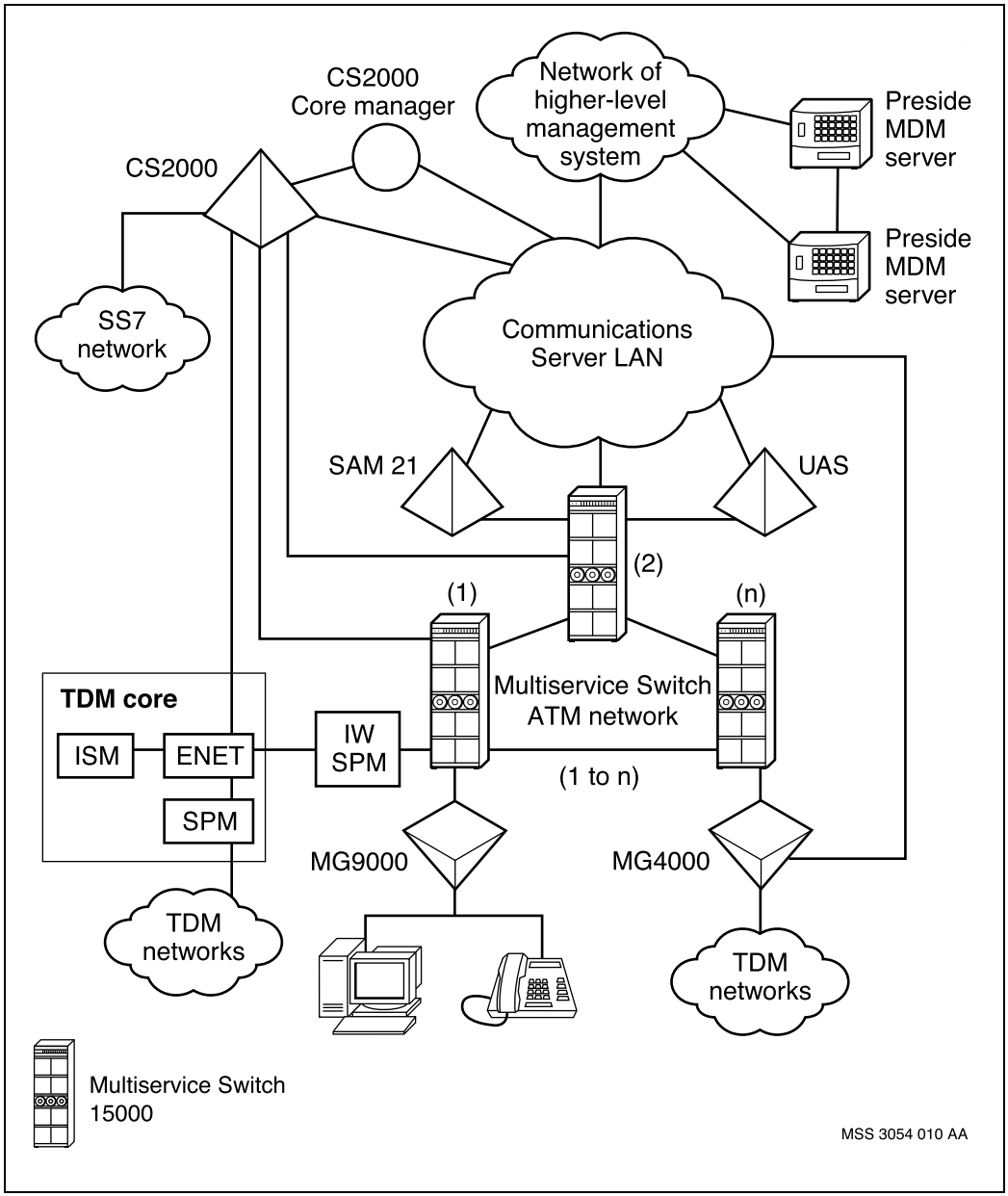
What is the Universal Access - AAL1 solution?

Another solution in the Succession portfolio is the Universal Access - AAL1 (UA-AAL1) solution. This solution facilitates a Class 5 end office replacement program by integrating voice and data networks through ATM broadband switching technology. In this solution, the end office is built on a distributed ATM core network that provides end office voice services using UA-AAL1 for voice transmission. It supports interworking with legacy ENET-based line and trunk services and peripherals. Because ATM technology can support many different services on the same unified network, this solution is the first step to evolving a multi-service end office. In addition, ATM, when used in conjunction with other equipment, reduces the equipment footprint and increases the BHCA throughput when compared to the throughput of the TDM equipment.

Refer to the figure "Succession portfolio Universal Access - AAL1 solution" (page 32) to review the components involved in this solution and their interconnectivity. For more information on this solution, see NN10320-100 *ATM Solutions Basics*.

Note: This figure does not represent the redundant links between components. For more information about actual connection links and redundancy between links, see NN10114-511 *Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Configuration Overview PT-AAL1/UA-AAL1/UA-IP*.

Figure 2
Succession portfolio Universal Access - AAL1 solution



The UA-AAL1 solution consists of the following components:

- "Communication Server 2000" (page 37)
- "Communications Server LAN" (page 39)
- "CS2000 Core Manager" (page 39)
- "Interworking Spectrum Peripheral Module" (page 40)
- "Media Gateway 9000" (page 41)
- "Multiservice Gateway 4000" (page 42)
- "Multiservice Switch 15000" (page 43)
- "Preside Multiservice Data Manager" (page 44)
- "TDM core" (page 48)
- "Universal Audio Server" (page 48)

What is the Universal Access - IP solution?

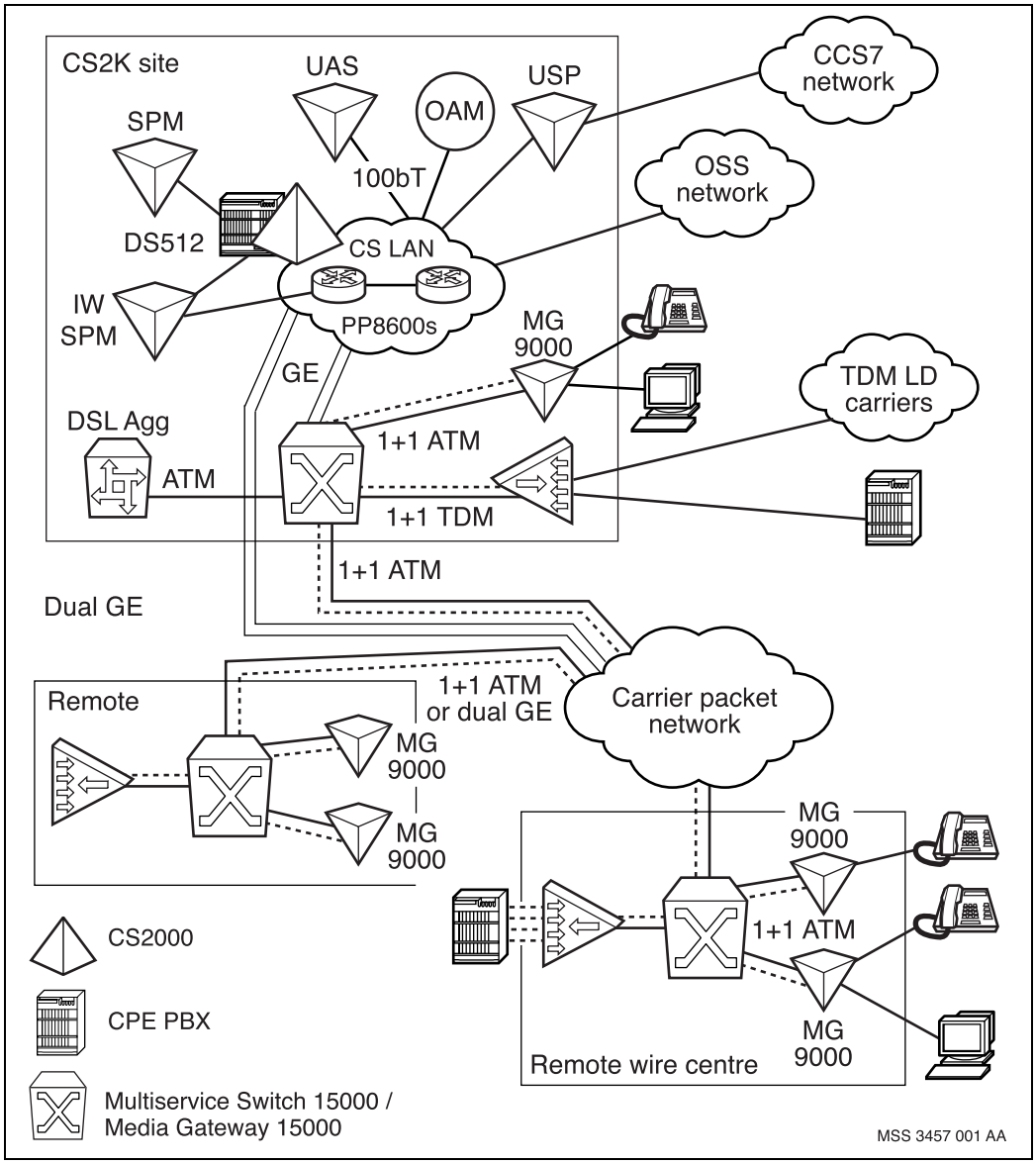
One of the solutions in Succession portfolio is the Universal Access - IP (UA-IP) solution. UA - IP provides an end-office solution, including plain old telephone service (POTS) and other access services (for example, DSL) that use internet protocol (IP) as the packet technology. A Nortel Networks Multiservice Switch 15000 is the IP aggregation router.

Succession Networks UA-IP technology retains the concept of a PSTN Central Office, while allowing several offices to be collapsed due to higher capacity and distributed architecture. The solution supports evolution to blended services, since wireline, wireless and data connections can all run on the same core network.

Refer to the figure "Succession portfolio Universal Access - IP solution" (page 35) to review the components involved in this solution. For more information on this solution, see NN10300-100 *IP Solutions Basics*.

Note: This figure does not represent all the redundant links between components. For more information about actual connection links and redundancy between links, see NN10114-511 *Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Configuration Overview PT-AAL1/UA-AAL1/UA-IP*.

Figure 3
Succession portfolio Universal Access - IP solution



The UA-IP solution consists of the following components:

- "Communication Server 2000" (page 37)
- "Communications Server LAN" (page 39)
- "CS2000 Core Manager" (page 39)
- "DSL aggregator" (page 40)
- "Interworking Spectrum Peripheral Module" (page 40)
- "Media Gateway 9000" (page 41)
- "Media Gateway 15000" (page 42)
- "Multiservice Gateway 4000" (page 42)
- "Multiservice Switch 15000" (page 43)
- "Preside Multiservice Data Manager" (page 44)
- "TDM core" (page 48)
- "Universal Audio Server" (page 48)

What are the components in Succession portfolio?

Refer to the following sections for more information about the components involved in the PT-AAL1, UA-AAL1 and UA-IP solutions:

Communication Server 2000

The Communication Server 2000 (CS2000) is the primary network intelligence component for these solutions. It processes all call requests within the network and provides centralized call control between the media gateways (MG4000, MG15000 and MG9000 nodes), the Time Division Multiplexing-based nodes, and the ATM core. It also provides service transaction logic, including translations, routing control, network signaling, and the creation of billing records. In addition, the CS2000 directs access gateways to establish and tear down switched virtual circuits for the delivery of packetized voice and data traffic across the ATM core network.

For more information on the CS2000 in the Packet Trunking - AAL1 (PT-AAL1) solution, see NN10206-111 *Communication Server 2000 Basics*. For more information on the CS2000 in the Universal Access - AAL1 (UA-AAL1) and Universal Access - IP (UA-IP) solutions, see NN10019-111 *Communication Server 2000 Basics*.

The CS2000 is composed of several sub-platforms:

- Extended Architecture Core (XA-Core), which is the computing platform for the CS2000 call processing and service logic. It provides signalling for the Peripheral Processor Virtual Machine (PPVM) network and call feature processing for the voice network.
- Gateway Controller (GWC), which acts as a call processing protocol converter between proprietary XA-Core messages and the open standard H.248 messages used by the MG9000 and MG15000 media gateways.
- Input/Output Module (IOM), which provides communication interfaces, storage media, and data interfaces to the voice messaging systems.
- Integrated Services Module (ISM), which provides conference circuits, Enhanced Digital Recorded Announcement Machine (EDRAM) announcements, and line test, trunk test, and office alarm unit interfaces.
- Link Peripheral Processor or Fiberized Link Peripheral Processor (LPP/FLPP), which serves as the signaling interface to the SS7 network.
- Message Switch (MS), which delivers messages between the XA-Core and the LPP/FLPP, Input/Output Module equipment, the Enhanced Network (ENET), and the CS2000 Core Manager.
- Service Application Module 21 (SAM21), which is the computing platform for the Gateway Controllers (GWCs) required by the MG9000s in the UA-AAL1 solution, and by the MG9000 and MG15000 nodes in the UA-IP solution. In the UA-AAL1 solution only, each SAM21 shelf has two redundant shelf controllers, each of which has a link into the Multiservice Switch 15000 ATM core network. The shelf controllers carry the H.248 Media Gateway Control Protocol to the MG9000 and MG15000 nodes.

  For more information, see NN10025-111 *SAM21 Shelf Controller Basics*.

The CS2000-Compact can be used in the UA-IP solution even though it does not support interworking with legacy TDM switches. It can be deployed only in a UA-IP network where such interworking is not required.

The principal components of the CS2000-Compact are:

- two Service Application Module 21 (SAM21) shelves
- one Service Application Module 16 (SAM16) shelf
- a Service Application Module 21 (SAM21), with the gateway controllers (GWCs) required by the MG9000 and MG15000 nodes in the UA-IP solution.

Communications Server LAN

The Communications Server (CS) LAN provides the backbone for the OAM&P network, and comprises a redundant pair of Passport 8600 nodes or (for the PT-AAL1 solution only) customer-supplied equipment.

The CS LAN provides connectivity:

- between the primary components in a solution and their element management platforms (for example, between Multiservice Switch 15000 / Media Gateway 15000 nodes and the Preside Multiservice Data Manager servers)
- among subcomponents of the CS2000 / CS2000-Compact, the Core Packet Network and the media gateways for messaging and call signaling

Physical connectivity is provided either through 100-baseT or Gigabit Ethernet (LX or SX).

Separate virtual local area networks (VLANs) are configured for voice traffic, call processing, OAM&P traffic, OSS access, and for the Gigabit Ethernet links between the redundant pair of Passport 8600 nodes.

CS2000 Core Manager

The CS2000 Core Manager is another of the network management tools used by Succession portfolio. It resides on the SuperNode Data Manager (SDM) platform and performs fault management, configuration management, data collection, performance management, and security management for the CS2000s, IW SPMs, and MG4000s.

You can engineer the network so that the CS2000 Core Manager receives Nortel Networks Multiservice Switch log information from Preside Multiservice Data Manager servers, as has been done in the PT-AAL1 solution.

DSL aggregator

A DSL aggregator (such as a Nortel Networks Services Edge Router, formerly known as Nortel Networks Shasta BSN) collects all of the ATM DSL traffic from Media Gateway 9000 nodes and maps it to the appropriate internet service provider (ISP).

The Multiservice Switch 15000 supports DS3 IMA, DS3 clear channel, OC-3c and OC-12c ATM interfaces for the DSL aggregator network interface. Only PVCs, PVPs, SPVCs or SPVPs are supported between the Media Gateway 9000 nodes and the DSL aggregator. SVCs are not supported and no IP forwarding is done by the Multiservice Switch 15000 nodes for DSL traffic.

Dynamic Packet Trunking Spectrum Peripheral Module

The Dynamic Packet Trunking Spectrum Peripheral Module (DPT SPM) is a high-speed platform in the PT-AAL1 solution that allows direct call routing from legacy equipment to the ATM core across a dynamic packet trunk (DPT). A DPT establishes on-demand virtual connections between end offices rather than using permanent connections.

For more information, see NN10016-111 *DPT SPM ATM Basics*.

Interworking Spectrum Peripheral Module

The Interworking Spectrum Peripheral Module (IW SPM) platform provides bearer traffic interconnection between the TDM-core ENET (using DS512 connections) and the ATM core (using OC-3c connections). This bridging capability provides end-to-end connectivity between the digital trunk controller (DTC) or the SPM TDM and the MG4000 trunks or MG9000 lines. Bridging also provides the MG4000 trunks and MG9000 lines with the ability to connect to ENET-based integrated service modules (ISMs) for tones and digital recorder announcer module (DRAM) based announcements.

The primary functions of the IW SPM include collecting and grooming standard TDM trunk traffic for the ATM core, extending existing trunk services from the original DMS-200 or DMS-250 offices to the TDM trunks terminating at the CS2000, and providing tandem-level announcements to end-users.

For more information, see *NN10014-111 IW SPM ATM Basics*.

Media Gateway 9000

The Media Gateway 9000 (MG9000) is a multi-service media gateway in the UA-AAL1 and UA-IP solutions which supports switched lines and Digital Subscriber Line (DSL) service for voice and data services. The MG9000 has OC-3c, STS-1 or DS1-IMA interfaces to the packet core which it uses to carry call control and maintenance messaging to the SAM21 shelf controllers. The internal ATM switching fabric of the MG9000 allows calls that originate and terminate on the same MG9000 to intra-switch. For calls connecting to another gateway in the UA-AAL1 solution, the MG9000 establishes SVCs across the packet core.

In the UA-AAL1 and UA-IP solutions, a 12-port DS3 function processor (FP) can connect to the ATM backbone through an MG9000 interface without requiring an OC-3 infrastructure, but while still meeting carrier-grade bandwidth requirements. Only one DS3 channel is used between the MG9000 and a Multiservice Switch 15000 node. If that channel is lost, the MG9000 will be in ESA until the channel is returned to service.

The MG9000 digitizes voice using G.711 encoding and convert it to packets using the ATM Adaptation Layer 1 (AAL1) protocol. They convert data running across the DSL lines to packets using the ATM Adaptation Layer 5 (AAL5) protocol. The MG9000 supports the plain old telephone system (POTS), coin, ground start, Meridian Business Set and integrated DSL lines, a broad range of line class codes, and an industry-leading set of end-office residential, business, and network services.

For more information, see NN10011-111 *MG9000 Product and Technology Basics*.

Media Gateway 15000

In the UA-IP solution, the Media Gateway 15000 is the trunk gateway between the TDM-based network and the IP network. The Media Gateway 15000 equipment is used to trunk calls between MG9000 nodes and the TDM network, or to provide PRI or V5.2 access to large enterprises with their own private branch exchange (PBX) telephone switches.

Call signaling between the Media Gateway 15000 and the gateway controller (GWC) is performed through either H.248 (Megaco) or ASPEN, a Nortel proprietary version of MGCP. The call signaling and all voice traffic are carried by the core packet network.

The Media Gateway 15000 is deployed as pairs of 1+1 VSP FP cards with the Multiservice Switch 15000 FP cards performing the IP aggregation function.

There are two types of VSP cards supported for Succession UA-IP:

- VSP3
  TDM access is provided by a 1+1 pair of 4pOC3 TDM FP cards. The TDM OC-3 interfaces are typically connected through a channel bank to access individual DS1 circuits. Each pair of VSP3 cards supports 2016 DS0 trunks using G.711 with either 10 msec or 20 msec packetization, or 1512 DS0 trunks using G.729a.
- VSP3-o
  This card provides an OC-3 TDM interface (which makes another a pair of slots available), and can generate 2016 voice calls into the network when configured for G.711 or G.729a. The card supports only H.248.

For more information, see NN10600-780 *Nortel Networks Media Gateway 7480/15000 Technology Fundamentals*.

Multiservice Gateway 4000

The Multi-Service Gateway 4000 (MG4000) is the trunk gateway between the TDM-based network and the ATM core. In the PT-AAL1 solution, the MG4000 collects TDM traffic from the TDM-based high-speed (OC-3) connections and carries it to the OC-3c interfaces in the ATM core. In the UA-AAL1 solution, the MG4000 trunks calls between the MG9000s and the TDM network. In both solutions, two permanent virtual circuit (PVC) connections are configured between a CS2000 and an MG4000 to provide for

peripheral processor virtual machine (PPVM) control signalling. In addition, there are peer-to-peer switched virtual circuit (SVC) connections for control traffic.

For more information, see NN10013-111 *MG 4000 Basics*.

Multiservice Switch 15000

In the PT-AAL1 and UA-AAL1 solutions, the Nortel Networks Multiservice Switch 15000 nodes are an ATM-based switching platform that can be used to build the ATM core of a network. When engineering the ATM core, you can include multiple Multiservice Switch 15000 nodes. The nodes provide the ATM core with general routing and ATM switching as well as connectivity for a variety of services including voice, multimedia, and data. They also offer multiprotocol routing services, intelligent traffic management, full redundancy, scalable high capacity, high-speed access and trunking, exceptional Quality of Service (QoS), SONET/SDH integration, and inverse multiplexing for ATM (IMA).

In the UA-IP solution the Multiservice Switch 15000 switch is used as the edge router to aggregate the following kinds of MG9000 and MG15000 traffic within an office:

- voice bearer traffic between all intra- and inter-office gateways, and from line and trunk gateways to the universal audio server (UAS)
- voice signaling traffic, from each gateway to its respective gateway controller (GWC)
- management traffic from MG9000 line gateways and in-band managed Multiservice Switch 15000 and Media Gateway 15000 nodes, to their respective element managers
- multi-service traffic (DSL) carried as ATM traffic from MG9000 through the Core packet network to the DSL aggregator

The existing IP Core network is used to carry Dynamic Packet Trunk (DPT) calls between offices.

Multiservice Switch 15000 nodes can be engineered with any number of distributed Multiservice Switch 15000 nodes. The nodes are managed by Nortel Networks Preside Multiservice Data Manager servers that are connected to them through the Communications Server LAN.

For more information see “Multiservice Switch 15000 and Media Gateway 15000 hardware overview” (page 49) and “Multiservice Switch 15000 and Media Gateway 15000 software overview” (page 83).

Preside Multiservice Data Manager

Nortel Networks Preside Multiservice Data Manager (MDM) is one network element management tool used by Succession portfolio. It performs fault management, configuration management, data collection, performance management, and security management for Multiservice Switch 15000 and Media Gateway 15000 nodes. In addition, Preside MDM servers can be configured to forward the performance management and fault management directly to the OSS, or to the SDM for aggregation of the Succession fault and performance feeds to the OSS.

For more information, see “Preside Multiservice Data Manager software overview” (page 91).’

Customers can use one of the following options as an operator desktop to connect to Preside MDM servers:

- Sun workstation (Sun Fire or Sun Blade)
- PC with X11 emulation software (Hummingbird Exceed version 6.2 on a PC with a minimum PIII 866 MHz with 256MB RAM)
- X11 terminal

Operator desktops connect to Preside MDM servers using X11 R5 compatible interface software from Sun Microsystems. While Nortel Networks does recommend Hummingbird Exceed X11 emulation software (because this software has been tested and engineered), any other X11 R5 Sun-compatible emulation software should work on a PC acting as a Preside MDM operator desktop. However, if you are using one of these other software packages, replicate any problems with the Preside MDM presentation on a Sun system

prior to contacting Nortel Networks. By replicating the problem on a Sun system you ensure that it is not the fault of the untested X11 R5 Sun-compatible X11 emulation software.

Two network management approaches, dedicated and centralized, are supported for deploying Preside MDM servers in your Succession network. These network management approaches are deployed either during an initial installation of Preside MDM servers or as part of an in-service migration. In the dedicated network management approach, each Succession office requires a pair of Preside MDM servers, while in the centralized network management approach a single pair of Preside MDM servers can manage the Multiservice Switch 15000 and Media Gateway 15000 nodes in several Succession offices.

For task flows showing how to deploy the dedicated and centralized network management approaches, see "Overview of Preside MDM server configuration" in NN10114-511 *Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Configuration Overview PT-AAL1/UA-AAL1/UA-IP*.

Preside MDM servers are deployed in pairs to provide redundancy in your management solution in case of failure. There are four configurations for Preside MDM servers.

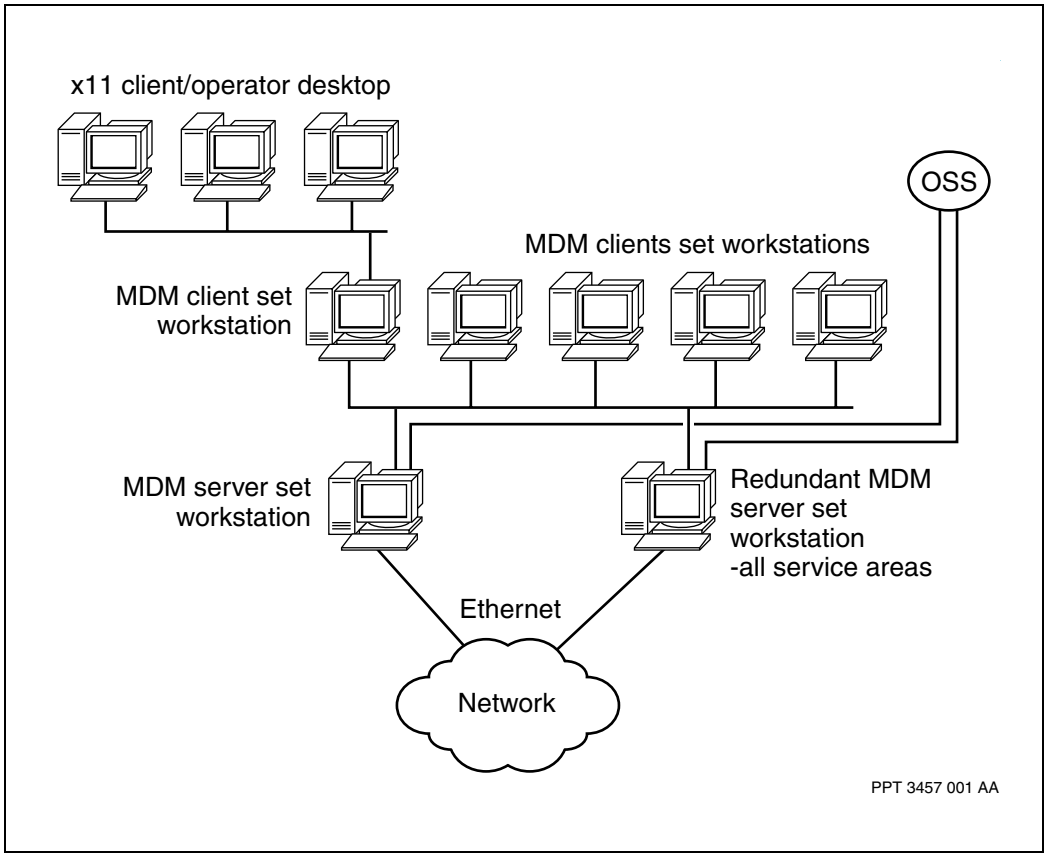
- Standalone server, which provides Multiservice Switch 15000 and Media Gateway 15000 node connectivity, SDM or OSS interworking (fault and performance), operator desktop support for all fault, configuration, accounting, performance and security (FCAPS) services
- Server-set, which provides Multiservice Switch 15000 node connectivity, SDM or OSS interworking (fault and optionally, performance), client-set support (fault, configuration, accounting, and security)
- Client-set, which provides operator desktop support (connects to server-set for Multiservice Switch 15000 node connectivity, optimally to PM server for performance)
- PM server provides Multiservice Switch 15000 node connectivity, SDM or OSS interworking (performance), client-set or standalone server for performance

Deploying Preside MDM servers in a client-server arrangement, however, provides the following advantages:

- reduces the amount of traffic crossing between your network operation centre, and the location of the Preside MDM server sets by deploying the GUIs locally to your operator base
- provides redundancy in your network workstations by having multiple client-set sessions running
- monitors the integrity of the server set, ensuring that the performance measures (PMs) and alarms feeds to a higher level management system are not compromised

The figure "Typical Preside MDM client-set/server-set configuration" (page 47) shows a configuration with two server set workstations, and several client-set workstations. You must set up the server set workstations as redundant server-set workstations to provide client workstations with an alternate service source. See NN10185-461 *Upgrading Preside MDM in Succession Networks* for the required migration procedures.

Figure 4
Typical Preside MDM client-set/server-set configuration



Sun Fire™ V480 / V240 servers

The Sun Fire™ V480 / V240 servers are the certified platforms for Nortel Networks Preside Multiservice Data Manager (MDM) software. Preside MDM software is installed on redundant servers that communicate through IP connectivity to the Multiservice Switch 15000 and Media Gateway 15000 nodes that they are managing. Sun Fire™ servers must be obtained directly from Sun Microsystems.

Sun Fire™ servers are located in network operations centers (NOCs). It is no longer necessary for both servers running Preside MDM be co-located in the same NOC.

For more information, see "Sun Fire™ V480 / V240 server hardware and software" (page 71).

TDM core

The Time Division Multiplexing (TDM) core consists of the Enhanced Network (ENET), which is a TDM switched network, and all of its peripheral devices. The ENET provides a TDM switching fabric for access to TDM line, trunk, and service circuit peripherals.

Universal Audio Server

The Universal Audio Server (UAS) is a SAM16 shelf-based peripheral used in the UA-AAL1 solution to facilitate the lawful intercept of call content for MG9000-based targets in compliance with the Communications Assistance for Law Enforcement Act (CALEA). Under the direction of H.248 call control messages from the CS2000, targeted MG9000 call content is captured at the UAS and replicated for delivery to law enforcement.

The UAS provides an OC-3c network interface to the ATM core for AAL1 bearer path connections. In addition, a 100BaseT Ethernet connection to the CS LAN provides a path for H.248 protocol call control messaging with the CS2000 and for SNMP protocol OA&M messaging with the CS2000 Core Manager.

The UAS is also used in the UA-IP solution, where all H.248 signaling and voice traffic is carried through Ethernet interfaces connected to each Passport 8600 node in a redundant pair.

For more information, see NN10010-111 *Universal Audio Server Basics*.

Chapter 3
Multiservice Switch 15000 and Media Gateway 15000 hardware overview

Nortel Networks Multiservice Switch 15000 nodes provide the PT-AAL1 and UA-AAL solutions with the distributed ATM core network required to route voice and data. Within these solutions, you can engineer multiple, distributed Multiservice Switch 15000 shelves and connect them to other Succession components.

To review the base hardware components of a Multiservice Switch 15000 node, see "Base hardware components" (page 49). For more specific information about Multiservice Switch 15000 hardware used in the Succession solutions, see "Multiservice Switch 15000 hardware in the PT-AAL1 and UA-AAL1 solutions" (page 65).

Base hardware components

Nortel Networks Multiservice Switch 15000 nodes are housed in a single frame assembly that is compliant with the network equipment building system (NEBS). This frame assembly contains a breaker interface panel (BIP), up to two Multiservice Switch 15000 shelf assemblies, and cable management guides.

The figure "Multiservice Switch 15000 shelf (front view)" (page 51) displays the front view. The back view of the frame is displayed in the figure "Multiservice Switch 15000 shelf (back view)" (page 52).

For more information on the base hardware, see the following:

- "Multiservice Switch 15000 control processors" (page 53)

Figure 5
Multiservice Switch 15000 shelf (front view)

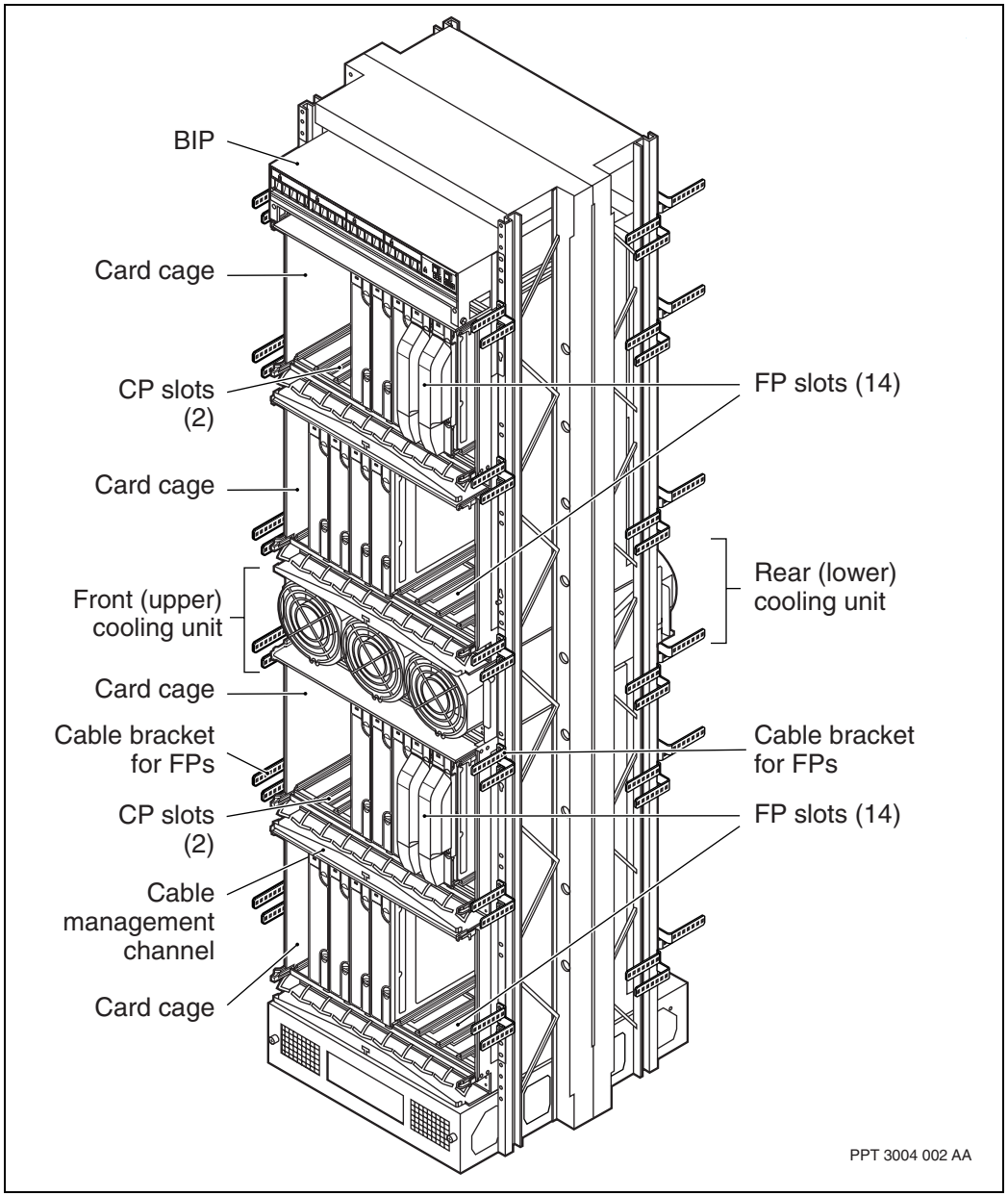
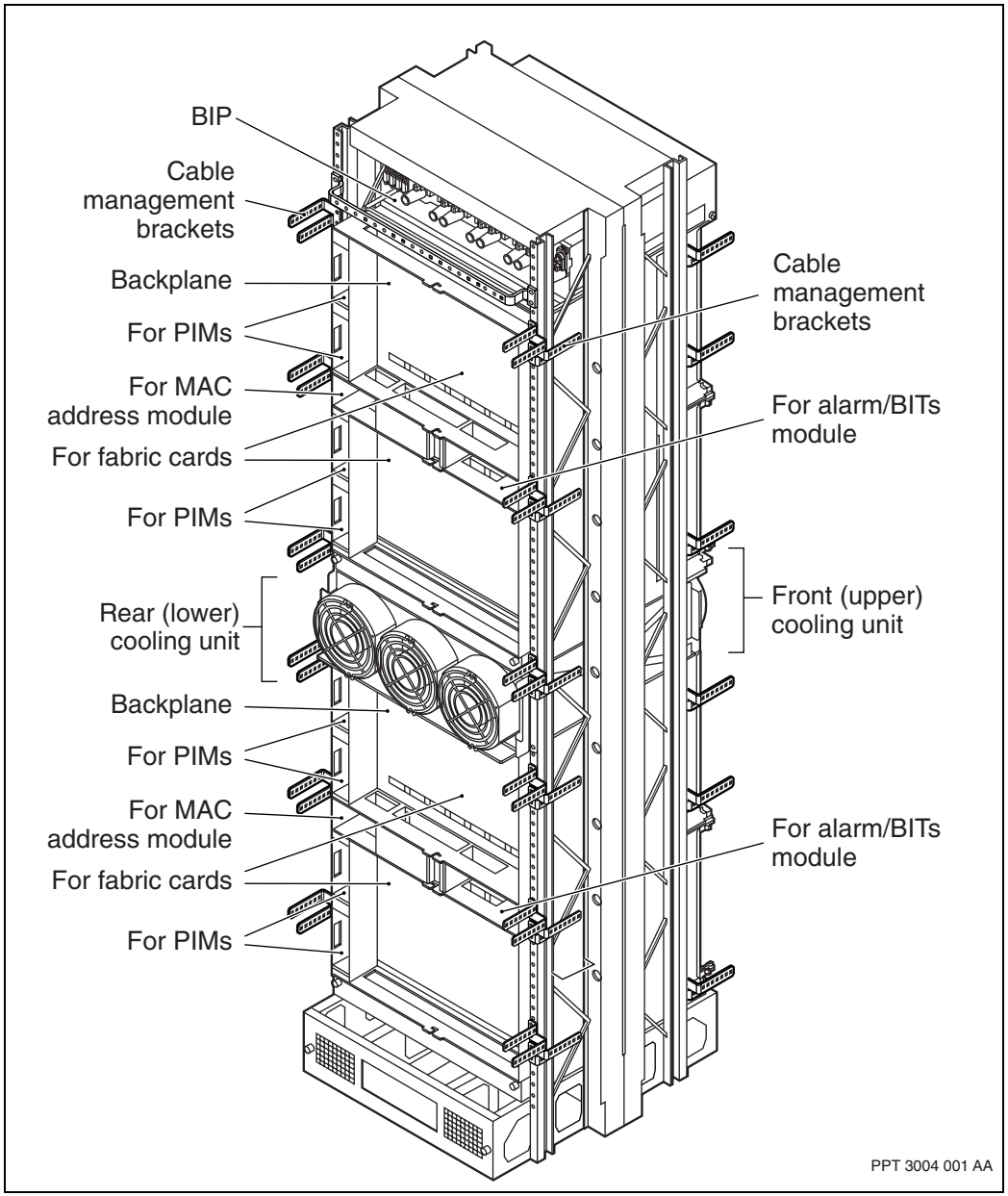


Figure 6
Multiservice Switch 15000 shelf (back view)



Multiservice Switch 15000 control processors

Control processor (CP) cards control overall processing in the node. They connect to the shelf backplane, providing an interface to both fabric modules, while their hard disks store the Nortel Networks Multiservice Switch software, configuration data, and spooled information. Some other functions they perform include sequencing function processor (FP) startup, downloading new software, collecting and maintaining shelf inventory, statistical data, and routing tables, providing system timing, and monitoring alarms and hardware status. As well, through their OAM Ethernet port, they provide an interface and out-of-band connectivity to Nortel Networks Preside Multiservice Data Manager servers.

Within the Succession portfolio, CP3s are installed in slots 0 and 1 of the Multiservice Switch 15000 shelf. The supported version of CP3, CPeD, provides DS1 BITS timing in conjunction with the DS1-based Alarm/BITS card and a wire-wrap terminal block.

For more information on control processors, see the NN10600-120 *Nortel Networks Multiservice Switch 15000/20000 Hardware Description*.

Multiservice Switch 15000 function processors

Function processor (FP) cards terminate the physical links and provide the interface ports that connect the network communications facilities and Nortel Networks Multiservice Switch 15000 nodes. FPs support and execute real-time processes that impact service delivery. Up to fourteen FPs can be connected to two fabrics with redundant links enabling distributed and high-capacity scalable call processing. For all FPs, both the line and equipment are spared.

The following FPs are supported in the PT-AAL1 solution:

- NTHR21 (PQC2 technology) or NTHW15 (PQC12 technology), the 4-port OC-3/STM-1 single-mode intermediate reach ATM FP (with software name 4pOC3SmIrAtm)
- NTHW21, the 16-port OC-3/STM-1 ATM FP with MT-RJ connectors (with software name 16pOC3SmIrAtm)
- NTHW31, the 16-port OC-3c/STM-1 ATM FP with LC connectors (with software name 16pOC3SmIrAtm)

- NTHW11, the 4-port OC-12c/STM-4 ATM FP with PQC2 (PQC6v2) technology (with software name 4pOC12SmIrAtm)
- NTHW86, the 4-port OC-12c/STM-4 ATM FP with PQC12 technology (with software name 4pOC12SmIrAtm)

Note 1: The 4-port OC-3/STM-1, 4-port OC-12c/STM-4, and 16-port OC-3/STM-1 ATM FPs come in two versions: PQC2 and PQC12. The PQC2-based FPs are not suitable for networks that may want to evolve to multi-services or to nodes configured with PNNI trunks.

The following function processor (FP) cards are supported in the UA-AAL1 solution:

- NTHR23, the 12-port DS3 ATM FP (with software name 12pDS3Atm)
- NTHR31, the 4-port DS3 Channelized ATM FP with IMA (with software name 4pDS3ChAtm)
- NTHR21 (PQC2 technology) or NTHW15 (PQC12 technology), the 4-port OC-3/STM-1 single-mode intermediate reach ATM FP (with software name 4pOC3SmIrAtm)
- NTHW21, the 16-port OC-3/STM-1 ATM FP with MT-RJ connectors (with software name 16pOC3SmIrAtm)
- NTHW31, the 16-port OC-3c/STM-1 ATM FP with LC connectors (with software name 16pOC3SmIrAtm)
- NTHW11, the 4-port OC-12c/STM-4 ATM FP with PQC2 (PQC6v2) technology (with software name 4pOC12SmIrAtm)
- NTHW86, the 4-port OC-12c/STM-4 ATM FP with PQC12 technology (with software name 4pOC12SmIrAtm)

Note 1: The 4-port OC-3/STM-1 ATM FP and the 4-port OC-12c/STM-4 ATM FP have two versions: PQC2 and PQC12. The PQC2-based FP is not suitable for networks that may want to evolve to multi-services or to nodes configured with PNNI trunks.

Note 2: The 16pOC3 FPs are the only FPs that support hitless software migration for unprotected SONET interface pairs.

The following function processor (FP) cards are supported in the UA-IP solution:

- NTHR23, the 12-port DS3 ATM FP (with software name 12pDS3Atm)
- NTHW15, the 4-port OC-3/STM-1 single-mode intermediate reach ATM FP with PQC12 technology (with software name 4pOC3SmIrAtm)
- NTHW86, the 4-port OC-12c/STM-4 ATM FP with PQC12 technology (with software name 4pOC12SmIrAtm)
- NTHW70, the 4-port OC-3 TDM FP (with software name 4pOC3ChSmIr)

  Note: This FP is specific to the UA-IP solution in the Media Gateway 15000.

- NTHR31, the 4-port DS3 Channelized ATM FP with IMA (with software name 4pDS3ChAtm)
- NTHW49, the 4-port Gigabit Ethernet FP (with software name 4pGe)
- NTHW84, the 2-port Gigabit Ethernet VSP3 FP (with software name 2pGeMmSrVsp3).

  Note: This FP is specific to the UA-IP solution in the Media Gateway 15000.

- NTHW77, the 2-port optical OC-3 TDM VSP3-o FP (with software name 2pOC3ChSmIrVsp3)

  Note: This FP is specific to the UA-IP solution in the Media Gateway 15000.

The following function processor (FP) card is supported in the UA-IP solution in order to offer multiservice traffic on the UA-IP Multiservice Switch 15000 ATM core:

- NTHR23, the 12-port DS3 unchannelized ATM FP for DSL ISP handoff (with software name 12pDS3Atm)

For the description of the FPs, see NN10600-120 *Nortel Networks Multiservice Switch 15000/20000 Hardware Description* and for the software configuration of the FPs, see NN10600-551 *Nortel Networks Multiservice Switch 7400/15000/20000 FP Configuration Reference*.

4-port DS3 sparing panel NTHR79

In the UA-AAL1 and UA-IP solutions, a one-for-one 4-port DS3 sparing panel is installed. This enables equipment protection:

- between two 4-port DS3 function processors (FPs)
- between two 12-port DS3 FPs, using only ports 0 to 3 by connecting a single panel to P0 (data) and P3 (control)

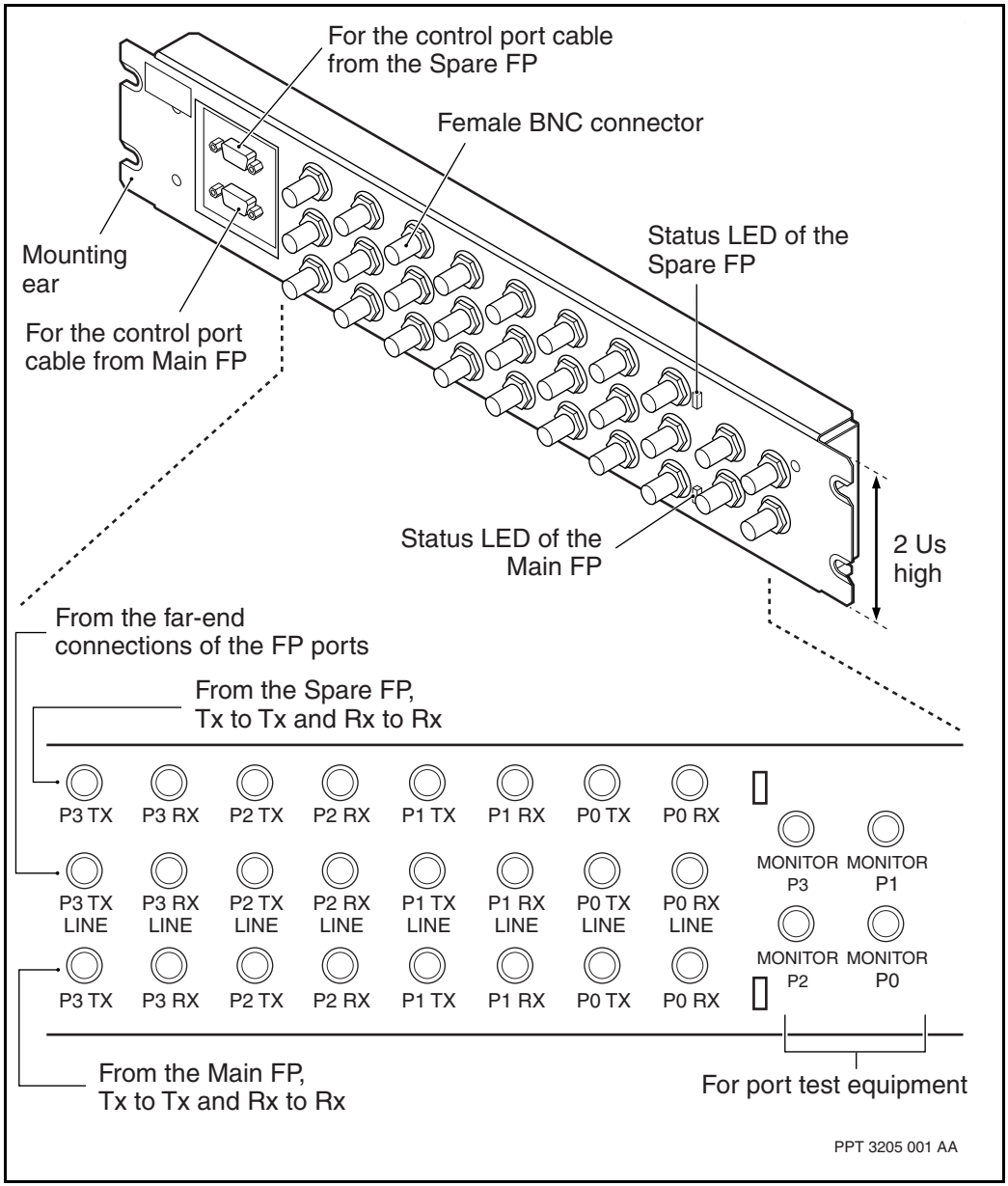
The product engineering code (PEC) of the sparing panel is NTHR79. For a view of its faceplate, see the figure "A 4-port DS3 one-for-one sparing panel NTHR79" (page 57).

The sparing panel transfers traffic between a main DS3 FP and a spare DS3 FP of the same type and compatible vintage. When the main FP connected to a sparing panel fails, the control processor (CP) detects that the FP has failed and instructs the panel to switch the relay contacts from the failed FP to the spare FP. Traffic then switches from the failed FP to the spare.

For information about:

- the behavior and specifications of sparing panels, see the chapter on termination panels in NN10600-120 *Nortel Networks Multiservice Switch 15000/20000 Hardware Description*
- configuring the software to facilitate DS3 equipment protection (sparing), see NN10600-550 *Nortel Networks Multiservice Switch 7400/15000/20000 Common Configuration Procedures*
- installing the sparing panel and cabling it, see the section on installing a 19-inch sparing panel in the NEBS 2000 frame (NTRU04) in NN10600-130 *Nortel Networks Multiservice Switch 15000/20000 Hardware Installation, Maintenance, and Upgrade*
- replacing the sparing panel or one of its cables, see NN10600-130 *Nortel Networks Multiservice Switch 15000/20000 Hardware Installation, Maintenance, and Upgrade*

Figure 7
A 4-port DS3 one-for-one sparing panel NTHR79



Breaker interface panel

The breaker interface panel (BIP) provides single or dual (redundant) DC power and frame-level alarm indicators to the node. It is in a central location where redundant input dc power feeds are connected and routed to two or four breaker interface modules (BIMs). Power is then distributed from the BIMs to the shelves and cooling units.

Cable management guides

In the PT-AAL1, UA-AAL1 and UA-IP solutions, Nortel Networks Multiservice Switch 15000 nodes use fiber and shielded twisted pair cables for carrying SONET and Ethernet. In addition, in the UA-AAL1 and UA-IP solutions, coaxial cable is used to carry DS3.

In general, these cables are routed in exclusive bundles on different paths against the frame of the node using specific hardware subassemblies for protecting, routing, and securing cables. Cable routing is located at the front of the shelf, while the wiring trough is located at the bottom of each card cage. Power and alarm cables are cabled at the rear.

Cooling units

The two cooling units are located in the middle of the frame, between the upper and lower shelf assemblies. The front cooling unit cools the upper shelf assembly, while the back cooling unit cools the lower shelf assembly. Each cooling unit consists of three fans and a cooling unit backplane, and each unit is controlled by temperature sensors located within the shelf assembly.

Multiplexor

In the UA-AAL1 and UA-IP solutions, the EdgeLink 100 multiplexor is a self-contained broadband multiplexor made by Telco Systems. This multiplexor

- provides multiplexing of up to 28 DS1 channels onto a single DS3 channel
- transmits and receives up to 28 DS1 signals on a DS3 interface using standard M13 or C-bit framing
- offers one-for-one sparing of its M13 multiplexor card

To install an EdgeLink100, refer to Telco Systems' documentation, starting with the document *EdgeLink 100 Digital Multiplexer General Description, section 825-102-001.*

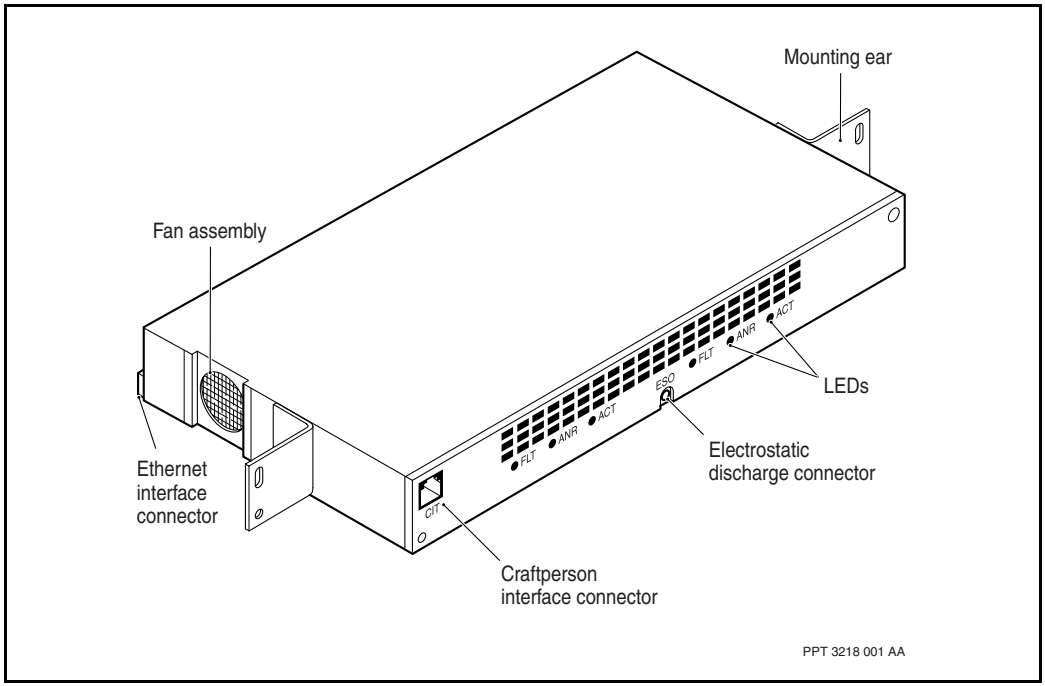
If you have DS-1 IMA interfaces using the Edgelink100 MUX, ensure that you use the Edgelink100 MUX software (R3.3). Contact Telco Systems to get the Edgelink100 MUX software and upgrade procedures:

- http://www.telco.com/products/Transport/M13Multiplexers/EdgeLink100/

For more information on connecting Multiservice Switch 15000 node to an EdgeLink 100, see:

- NN10600-130 *Nortel Networks Multiservice Switch 15000/20000 Hardware Installation, Maintenance, and Upgrade*
- NN10114-511 *Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Configuration Overview PT-AAL1/UA-AAL1/UA-IP*

Figure 8
EdgeLink 100 multiplexor



Shelf assembly

Nortel Networks Multiservice Switch 15000 frames support two shelf assemblies: an upper and a lower. Each shelf assembly contains all the components that make up a single Multiservice Switch 15000 shelf.

The shelf assembly components include

- the media access control (MAC) address module

  The MAC address module provides the shelf with media access control (MAC) addresses for the control and function processors. The module also communicates the shelf type to the control processors.

- the backplane

  The backplane is the point across which all processor cards and fabric cards in a shelf intercommunicate. The backplane provides redundant serial links and power and signal distribution between processor cards and fabric cards.

- the card cages

  The shelf is divided into two card cages located one above the other. Each card cage holds a maximum of eight processor cards, which manage the node and provide interfaces for connection to high-speed data networks. There are two types of processor cards in the node: control processors (CP) and function processors (FP).

  The CP and FP cards are the processing elements for performing and managing node functions. For more information, see "Multiservice Switch 15000 control processors" (page 53) and "Multiservice Switch 15000 function processors" (page 53).

- power interface modules (PIMs)

  Each shelf assembly contains four PIMs: two for A power feeds and two for B power feeds. Each of the power cables from the BIP is connected to one of these PIMs. Each PIM also provides separate power filtering for the portions of the shelf it supports and terminates the shelf clocks and the secondary control bus.

- alarm/BITS module with wire-wrap terminal support

  The alarm/BITS module terminates cables carrying alarm signals from the cooling unit and the BIP, as well as cables carrying BITS signals. It passes this information over the shelf backplane to the control processors.

- fabric cards

  Fabric cards provide the shelf with two redundant 16x16 switching elements for interconnecting up to 16 processor cards. Both fabrics are used to carry traffic. Under normal circumstances, half the processors that each processor card transmits to and receives from are connected to

the upper fabric (usually labeled the X fabric), while the other half of the processors that the processor card transmits to and receives from are connected to the lower fabric (the Y fabric). The fabrics normally loadshare the data traffic, but each is capable of handling full line capacity if one of them fails.

Optional in-band OAM management topology

Two types of OAM management topologies exist: out-of-band OAM and in-band OAM.

A Succession out-of-band topology is generally regarded as the typical management topology. Out-of-band management uses dedicated interfaces for management connectivity access via CP Ethernet links.

In a Succession in-band management topology, a Nortel Networks Multiservice Switch 15000 node can act as an OAM gateway node to other remote nodes for the purpose of sending or receiving OAM data. The key elements of an in-band topology are defined as follows:

- an OAM gateway node

  Multiservice Switch 15000 (GW-PP15000) has an out-of-band connectivity path to Nortel Networks Preside Multiservice Data Manager servers, and is the OAM gateway to a set of “remote” Multiservice Switch 15000 nodes that are managed by way of in-band connectivity.

  There are typically two gateways configured for each Succession office for redundancy; one is designated as the preferred gateway and the other is designated as the alternate gateway.

- multiple remote nodes

  Remote nodes are managed via in-band connectivity to each other and to the preferred and alternate OAM gateways. Note that where multiple gateways exist for redundancy, one gateway can appear as a remote to another.

  In-band connectivity is supported using ATMMPE (ATM Multi-Protocol

Encapsulation) to encapsulate the OAM IP traffic over PNNI trunks.

Remote nodes have an in-band connectivity path to Preside MDM servers, accessible from one or more “gateway” nodes, and possibly by way of one or more “intermediate” nodes, if there is no direct PNNI link from the GW-nodes

- intermediate nodes

  An intermediate node is any node, gateway or remote, through which OAM management data must traverse to reach a destination node.

- at least two Preside MDM servers

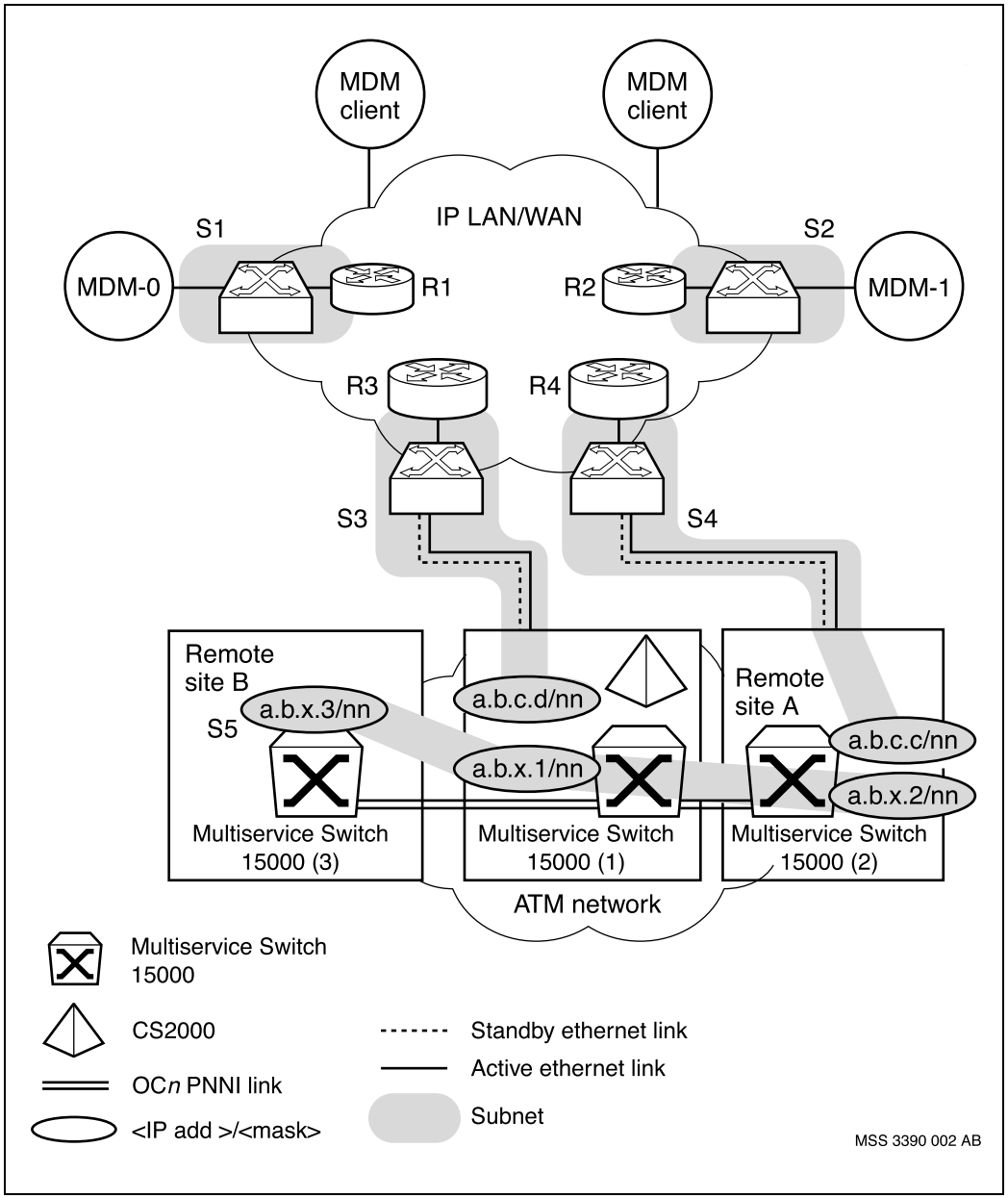
  Each Preside MDM server is capable of performing all aspects of element management for the Multiservice Switch network. For example, each node sends alarms to both servers, which are configured for the fault management function

  — The chosen server is the server that the operator uses as a launching point for Preside MDM applications, such as Succession ATM Software Migration (SASM) or Command Console.

  — The alternate server is another server that could have been used to perform the same set of tasks, but that wasn't chosen.

The figure “An in-band management topology” (page 64) illustrates a typical in-band OAM topology.

Figure 9
An in-band management topology



Multiservice Switch 15000 hardware in the PT-AAL1 and UA-AAL1 solutions

Within both the PT-AAL1 and UA-AAL1 solutions, you can engineer multiple Nortel Networks Multiservice Switch 15000 nodes within the solutions and connect them to various Succession components. Consider the following rules when deciding how to place the Multiservice Switch 15000 hardware for the PT-AAL1 and UA-AAL1 solutions:

- When only one Multiservice Switch 15000 device is installed, it goes in the lower half of the frame assembly with a filler panel installed in the top half. If two devices are installed, one is in the bottom half of the frame assembly and the other shelf is in the upper half of the frame assembly.

  Refer to the figures "Multiservice Switch 15000 equipment installed: single shelf installation (front view)" (page 66) and "Multiservice Switch 15000 equipment installed: dual shelf installation (front view)" (page 67) to see how the equipment is installed.

- The CS2000 Core Manager must be co-located with the CS2000.
- At least one Multiservice Switch 15000 node must be co-located with the CS2000 Core Manager, the CS2000, and the ENET.
- In a network using in-band OAM, the node with out-of-band connectivity to Nortel Networks Preside Multiservice Data Manager (MDM) server, which is co-located with the CS2000 does not connect to the CS LAN but rather, connects directly to the IP LAN/WAN.
- The nodes must be connected through the CS LAN to Preside MDM software servers.
- The Preside MDM software servers are located in the network operations centers (NOCs).

  The figures "Footprint for single shelf installation" (page 68) and "Footprint for a dual shelf installation" (page 69) provide you with the footprints for the installation of Multiservice Switch 15000 nodes and Preside MDM servers in the Succession solutions.

Figure 10
Multiservice Switch 15000 equipment installed: single shelf installation (front view)

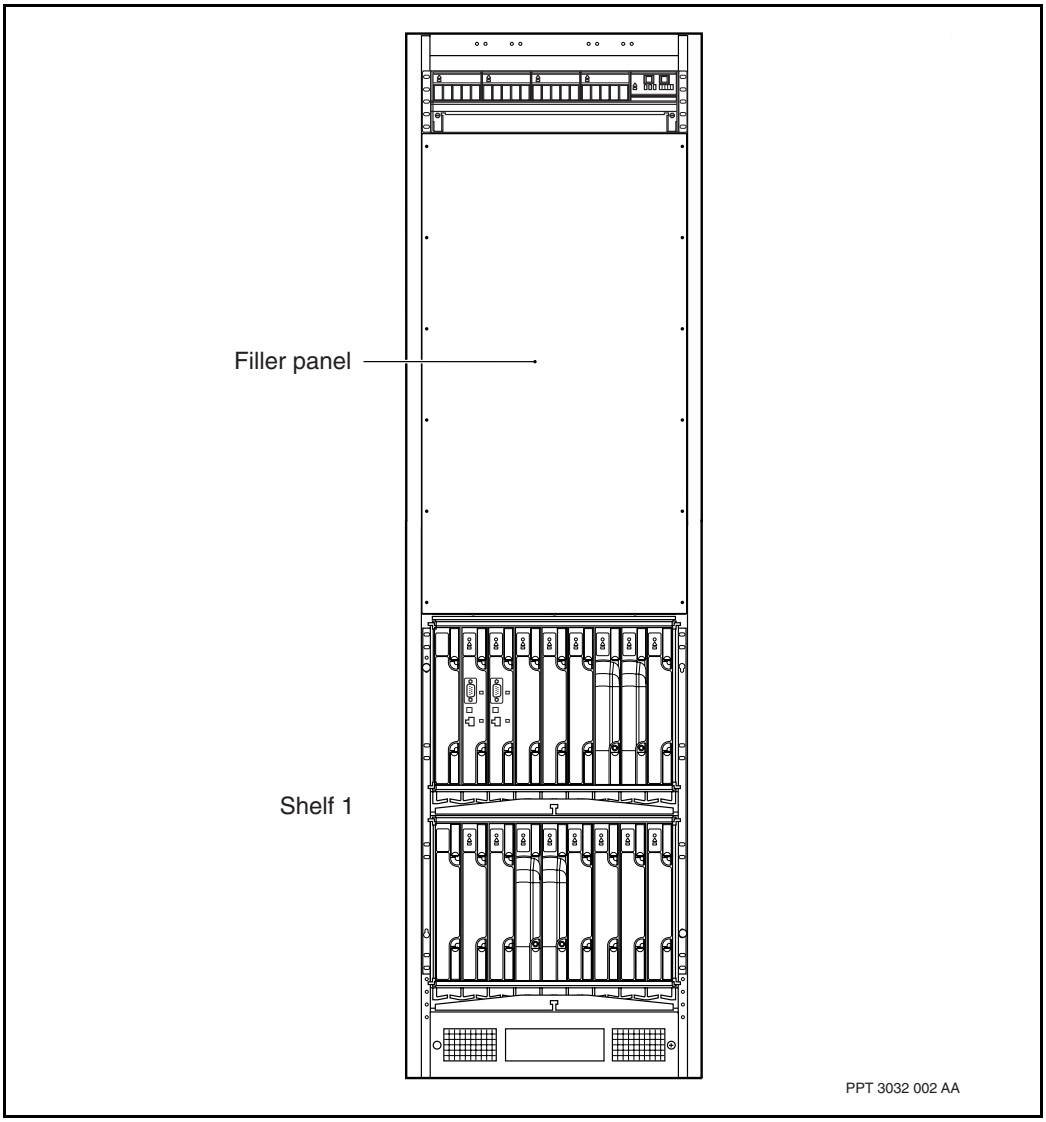


Figure 11
Multiservice Switch 15000 equipment installed: dual shelf installation (front view)

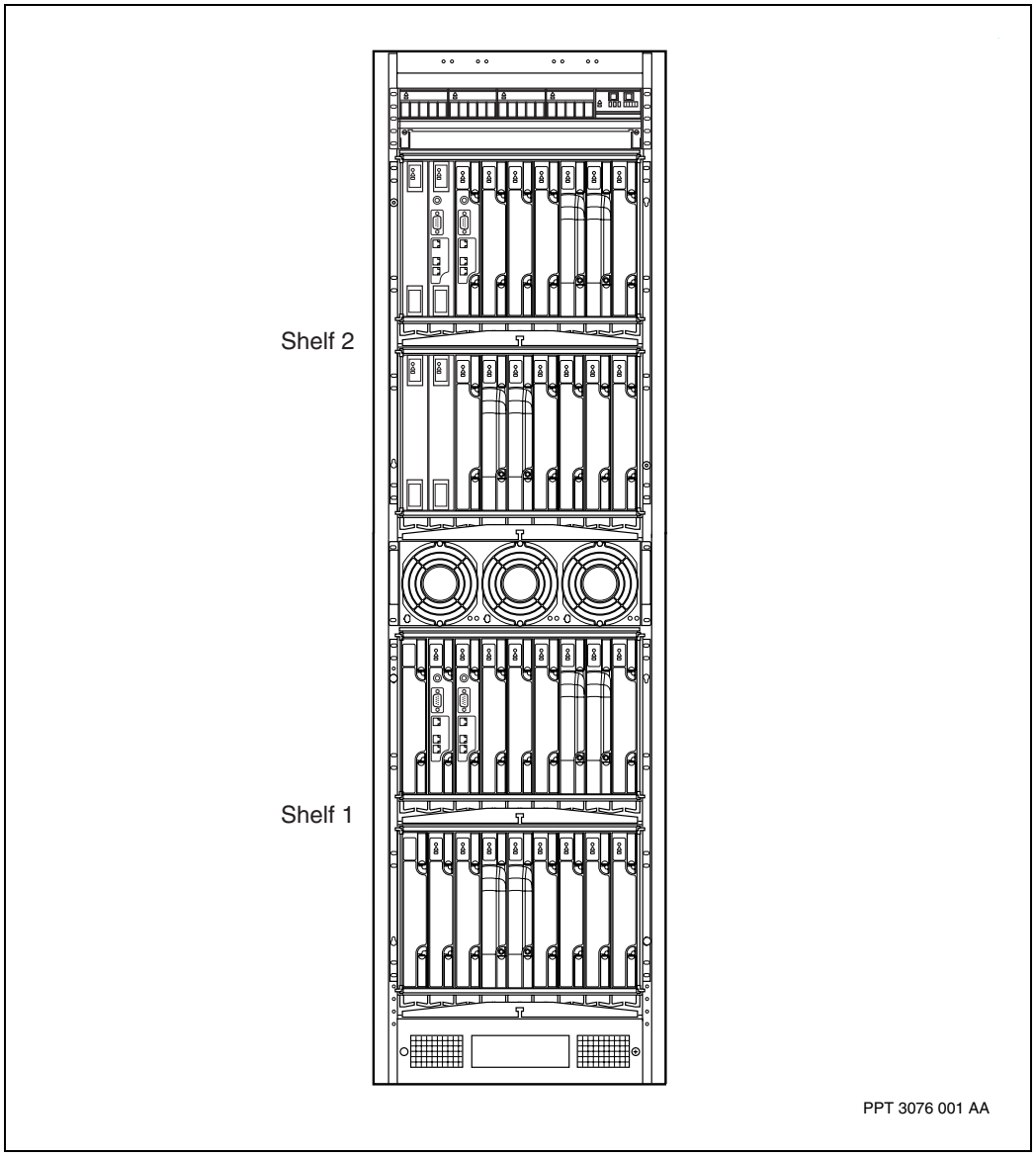


Figure 12
Footprint for single shelf installation

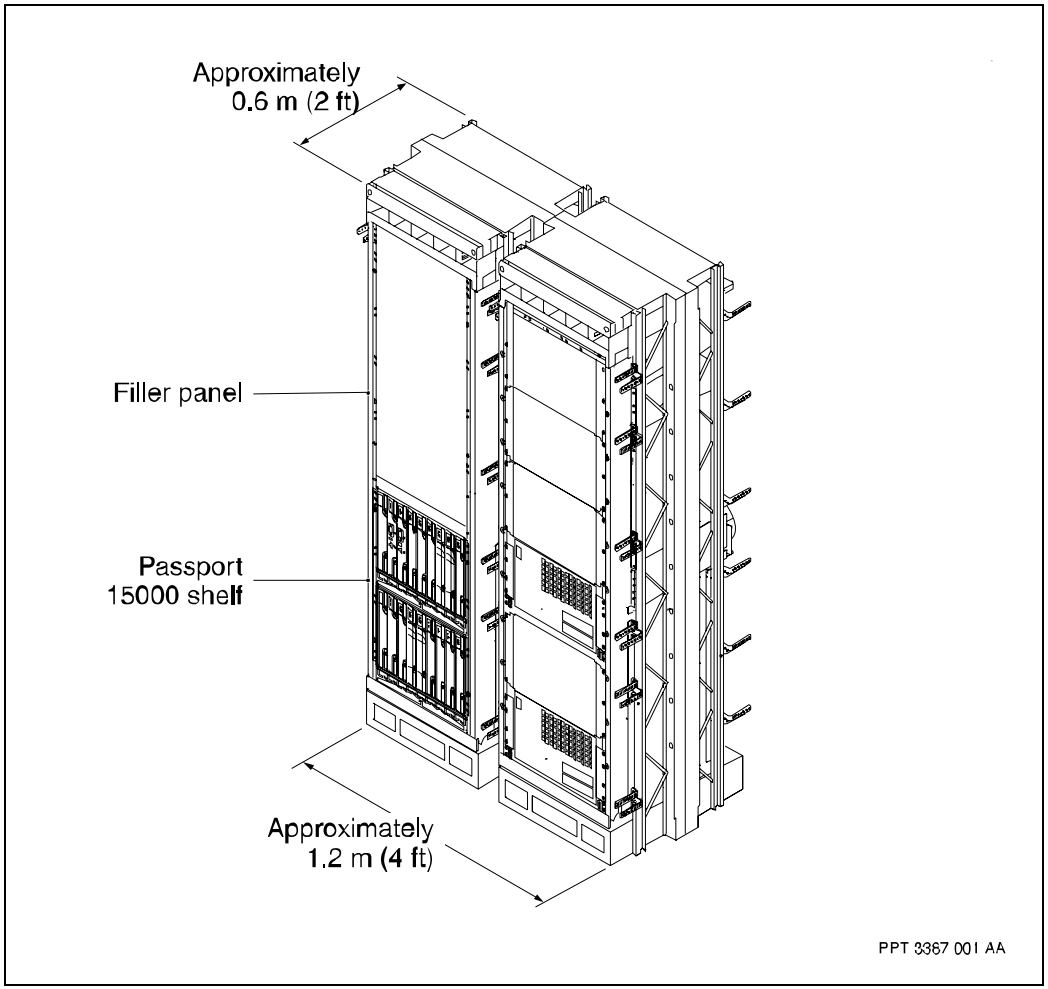
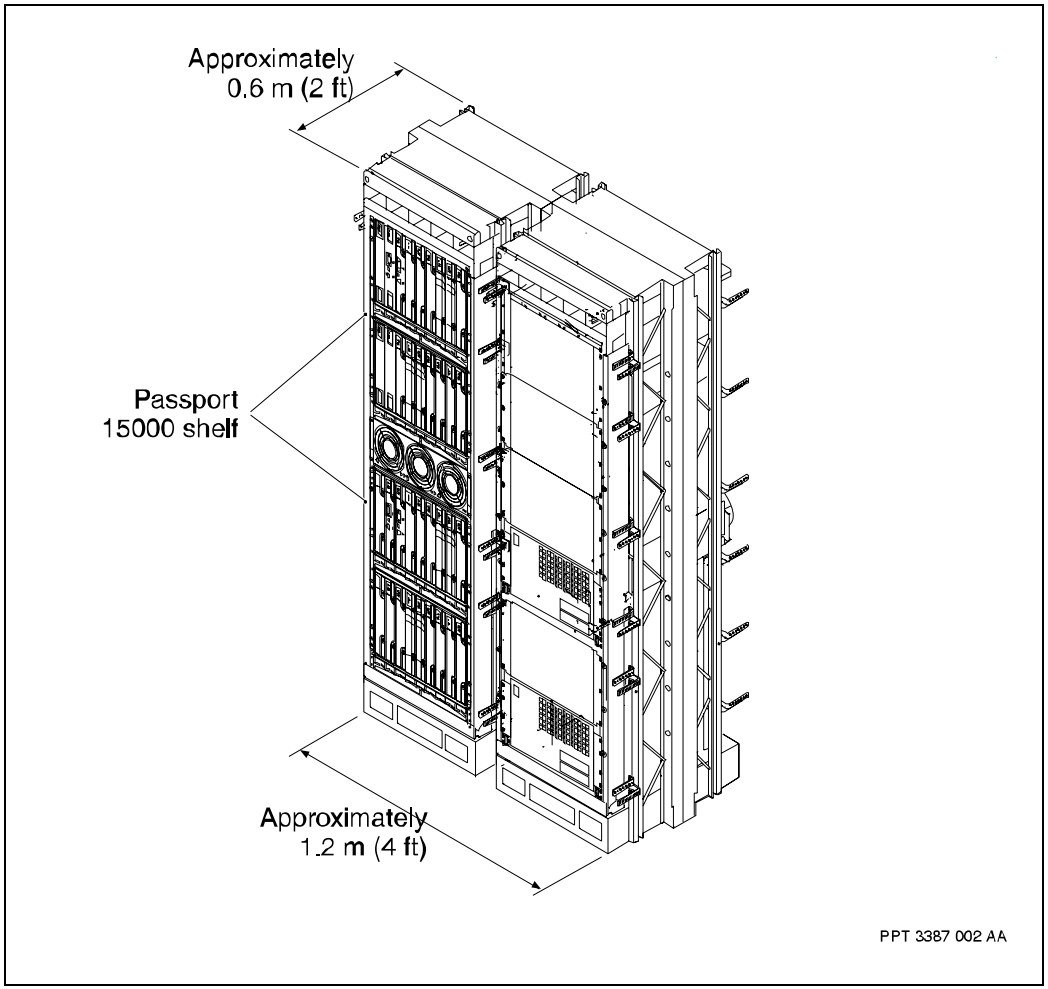


Figure 13
Footprint for a dual shelf installation



Chapter 4
Sun Fire™ V480 / V240 server hardware and software

This following sections describe hardware, software and disk partitioning requirements for the supported hardware configurations of Preside Multiservice Data Manager for the PT-AAL1, UA-AAL1 and UA-IP solutions described in this document:

Use this information to determine all hardware and software requirements you need to meet in order to run Nortel Networks Preside Multiservice Data Manager (MDM) software on Sun Fire™ V480 / V240 servers in the PT-AAL1, UA-AAL1 and UA-IP solutions.

> ***Note:*** Sun Fire™ V480 / V240 servers must be obtained directly from Sun Microsystems. For information about specific network configurations, see the Sun and Nortel Development Certified Platforms page (http://www.sun.com/oem/nortel/) at the Sun Microsystems website.

MDM Standalone/server-set with two 36 GB disks

Hardware requirements

For the hardware requirements for Preside MDM servers with two 36 GB disks configured in the standalone/server-set deployment, see the table "Hardware requirements for MDM Standalone/server-set with two 36 GB disks" (page 72).

Table 1
Hardware requirements for MDM Standalone/server-set with two 36 GB disks

Hardware	Details
Sun product number A37-WSPF2-04GQB	Sun Fire™ V480 Server 2 @ 900 Mhz CPU
	4 GB memory
	2 36 GB (1.0" at 10,000 RPM) FC-AL disks[1]
	1 DVD
	2 power supplies
	2 Ethernet ports
Note: A monitor and keyboard are optional depending on customer deployment.	
Note: The hardware fits into a standard 19 inch wide rackmount kit that complies with EIA-310-D 1992 standard.	
Sun product number X311L	localized power cord kit North American/Asian
Sun product number X9631A	optional rack mount kit
Sun StorEdge rack	optional cabinet the fit the rack-mountable hardware
Note: The Sun cabinet supports six Sun Fire™ V480 servers.	
Optional Tape drive	- Sun StorEdge DDS-3 4MM tape drive

(Sheet 1 of 2)

Table 1 (Continued)
Hardware requirements for MDM Standalone/server-set with two 36 GB disks

Hardware	Details
PCI card X2156A Serial Async Interface (SAI/P) 3.0	This card provides 8 DB25 serial ports on an external bracket.
Note 1: If you want emergency dial up access to your Preside MDM server, the PCI card is required and must be purchased directly from Sun Microsystems. Emergency dial up using a modem to access a serial port is an optional configuration and not part of the core Succession solution.	
Note 2: The information in this table is subject to change. For the latest information on Succession Network configurations including the Sun Fire™ V480 server, see http://sun.com/oem/nortel/.	
(Sheet 2 of 2)	

Software requirements

For the software requirements for Preside MDM servers with two 36 GB disks configured in the standalone/server-set deployment, see the table "Software requirements for MDM Standalone/server-set with two 36 GB disks" (page 73).

Table 2
Software requirements for MDM Standalone/server-set with two 36 GB disks

Software	Details
Sun product number SOLZS-080B9AY9	Solaris 8 (02/02) English only CD media kit
Sun patches (patches can be found on the Sun website at http://www.sun.com)	Solaris 108528 (latest version)
Note: For a list of Solaris prerequisites, see the Preside MDM 14.2 Release Supplement.	
Netscape 4.78	The official version can be found on the Sun website at http://wwws.sun.com/software/solaris/netscape/getnetscape478.html
Note: The information in this table is subject to change. For the latest information on Succession Network configurations including the Sun Fire™ V480 server, see http://sun.com/oem/nortel/.	

Partitioning two 36 GB disks for MDM Standalone/server-set

When you are partitioning your first disk, use the values in the table, "Disk partitioning for the first 36 GB disk (standalone server-set)" (page 74).

Table 3
Disk partitioning for the first 36 GB disk (standalone server-set)

Partition	File system	Size
0	/	11 GB
1	/swap	4.000 GB
2	overlap	default
3	/localdisk	13 GB
4	/var	8 GB
7	MDDB State DB Replica (if using mirrored disks)	256 MB

When you are partitioning your second disk, use the values in the table, "Disk partitioning for the second 36 GB disk (standalone server-set)" (page 74).

Table 4
Disk partitioning for the second 36 GB disk (standalone server-set)

Partition	File system	Size
0	/upgrade	11 GB
2	overlap	default
5	/data	remaining space

MDM Standalone/server-set with two 73 GB disks

Hardware requirements

For the hardware requirements for Preside MDM servers with two 73 GB disks configured in the standalone/server-set deployment, see the table, "Hardware requirements for MDM Standalone/server-set with two 73 GB disks" (page 75).

Table 5
Hardware requirements for MDM Standalone/server-set with two 73 GB disks

Hardware	Details
Sun product number A37-WTPF2-04GRB	Sun Fire™ V480 Server 2 @ 1.05GHz CPU (each with 8 MB Ecache) 4 GB memory 2 73 GB (10,000 RPM) FC-AL disks[1] 1 DVD-ROM 2 (N+1 redundant power) supplies 2 10/100/1000Base-T Ethernet ports 1 serial port 2 USB ports 6 PCI slots
Sun product number X311L	localized power cord kit North American/Asian
Note 1: Emergency dial up using a modem to access a serial port is an optional configuration and not part of the core Succession solution.	
Note 2: The information in this table is subject to change. For the latest information on Succession Network configurations including the Sun Fire™ V480 server, see http://sun.com/oem/nortel/.	

Software requirements

For the software requirements for Preside MDM servers with two 73 GB disks configured in the standalone/server-set deployment, see the table, "Software requirements for MDM Standalone/server-set with two 73 GB disks" (page 76).

Table 6
Software requirements for MDM Standalone/server-set with two 73 GB disks

Software	Details
Sun product number SOLZS-080B9AY9	Solaris 8 (02/02) English only CD media kit
Sun patches (patches can be found on the Sun website at http://www.sun.com)	Solaris 108528 (latest version)
Note: For a list of Solaris prerequisites, see the Preside MDM 15.1 Release Supplement.	
Netscape 4.78	The official version can be found on the Sun website at http://www.sun.com/software/solaris/netscape/getnetscape478.html
Note: The information in this table is subject to change. For the latest information on Succession Network configurations including the Sun Fire™ V480 server, see http://sun.com/oem/nortel/.	

Partitioning two 73 GB disks for MDM Standalone/server-set

When you are partitioning your first disk, use the values in the table, "Disk partitioning for the first 73 GB disk (standalone server-set)" (page 76).

Table 7
Disk partitioning for the first 73 GB disk (standalone server-set)

Partition	File system	Size
0	/	11 GB
1	/swap	4.0 GB
2	overlap	default
3	/localdisk	49 GB
4	/var	8 GB
7	MDDB State DB Replica (if using mirrored disks)	256 MB

When you are partitioning your second disk, use the values in the table, "Disk partitioning for the second 73 GB disk (standalone server-set)" (page 77).

Table 8
Disk partitioning for the second 73 GB disk (standalone server-set)

Partition	File system	Size
0	/upgrade	11 GB
1	Swap	4 GB
2	overlap	default
7	/data	58.0 GB

MDM Client-Set (large)

Hardware requirements

For the hardware requirements for Preside MDM servers configured in the Preside MDM client-set (large) deployment, see the table "Hardware requirements for MDM Client-Set (large)" (page 78).

Table 9
Hardware requirements for MDM Client-Set (large)

Hardware	Details
Sun product number N32-XUB2-9S-204AV2	Sun Fire™ V240 Server 2 @ 1.0GHz CPU
	2 GB memory
	2 36 GB (10,000 RPM) disks
	ALOM Remote Manager
	3 PCI slots
	N+1 redundant power supply
	4 10/100/1000Base-T Ethernet ports
Sun product number X311L	localized power cord kit North American/Asian
Sun product number X7403A	2 1-GB memory expansion kits
Sun product number X7410A	X-Option - Internal DVD-ROM drive Slimline
Note 1: If you want emergency dial up access to your Preside MDM server, the PCI card is required and must be purchased directly from Sun Microsystems. Emergency dial up using a modem to access a serial port is an optional configuration and not part of the core Succession solution.	
Note 2: The information in this table is subject to change. For the latest information on Succession Network configurations including the Sun Fire™ V240 server, see http://sun.com/oem/nortel/.	

Software requirements

For the software requirements for Preside MDM servers configured in the Preside MDM client-set (large) deployment, see the table "Software requirements for MDM Client-Set (large)" (page 79).

Table 10
Software requirements for MDM Client-Set (large)

Software	Details
Sun product number SOLZS-080B9AY9	Solaris 8 (02/02) English only CD media kit
Sun patches (patches can be found on the Sun website at http://www.sun.com)	Solaris 108528 (latest version)
Note: For a list of Solaris prerequisites, see the Preside MDM 15.1 Release Supplement.	
Netscape 4.78	The official version can be found on the Sun website at http://www.sun.com/software/solaris/netscape/getnetscape478.html
Note: The information in this table is subject to change. For the latest information on Succession Network configurations including the Sun Fire™ V240 server, see http://sun.com/oem/nortel/.	

Partitioning two 36 GB disks for MDM Client-Set (large)

When you are partitioning your first disk, use the values in the table, “Disk partitioning for the first 36 GB disk (Client-Set large)” (page 79).

Table 11
Disk partitioning for the first 36 GB disk (Client-Set large)

Partition	File system	Size
0	/	11 GB redundant
1	/swap	4.0 GB
2	overlap	default
3	/localdisk	13 GB
4	/var	8 GB
7	MDDB State DB Replica (if using mirrored disks)	11 MB

When you are partitioning your second disk, use the values in the table, “Disk partitioning for the second 36 GB disk (Client-Set large)” (page 80).

Table 12
Disk partitioning for the second 36 GB disk (Client-Set large)

Partition	File system	Size
0	/root	11 GB
1	swap	4 GB
2	overlap	default
3	/data	remaining space

MDM Client-Set (small)

Hardware requirements

For the hardware requirements for Preside MDM servers configured in the Preside MDM client-set (small) deployment, see the table "Hardware requirements for MDM Client-Set (small)" (page 81).

Table 13
Hardware requirements for MDM Client-Set (small)

Hardware	Details
Sun product number N32-XUB2-9S-204AV2	Sun Fire™ V240 Server 2 @ 1.05GHz CPU
	8 MB Ecache
	4 GB memory
	2 73 GB (10,000 RPM) FC-AL disks[1]
	1 DVD-ROM
	2 power supplies
	2 10/100/1000Base-T Ethernet ports
Sun product number X311L	localized power cord kit North American/Asian
PCI card X2156A Serial Async Interface (SAI/P) 3.0	This card provides 8 DB25 serial ports on an external bracket.
Note 1: If you want emergency dial up access to your Preside MDM server, the PCI card is required and must be purchased directly from Sun Microsystems. Emergency dial up using a modem to access a serial port is an optional configuration and not part of the core Succession solution.	
Note 2: The information in this table is subject to change. For the latest information on Succession Network configurations including the Sun Fire™ V240 server, see http://sun.com/oem/nortel/.	

Software requirements

For the software requirements for Preside MDM servers configured in the Preside MDM client-set (small) deployment, see the table "Software requirements for MDM Client-Set (small)" (page 82).

Table 14
Software requirements for MDM Client-Set (small)

Software	Details
Sun product number SOLZS-080B9AY9	Solaris 8 (02/02) English only CD media kit
Sun patches (patches can be found on the Sun website at http://www.sun.com)	Solaris 108528 (latest version)
Note: For a list of Solaris prerequisites, see the Preside MDM 15.1 Release Supplement.	
Netscape 4.78	The official version can be found on the Sun website at http://www.sun.com/software/solaris/netscape/getnetscape478.html
Note: The information in this table is subject to change. For the latest information on Succession Network configurations including the Sun Fire™ V240 server, see http://sun.com/oem/nortel/.	

Partitioning the 36 GB disk for MDM Client-Set (small)

When you are partitioning your disk, use the values in the table, “Disk partitioning for the 36 GB disk (Client-Set small)” (page 82).

Table 15
Disk partitioning for the 36 GB disk (Client-Set small)

Partition	File system	Size
0	/	11 GB
1	/swap	4.0 GB
2	overlap	default
3	/localdisk	13 GB
4	/var	8 GB

Chapter 5
Multiservice Switch 15000 and Media Gateway 15000 software overview

The PT-AAL1 and UA-AAL1 solutions use Nortel Networks Multiservice Switch software to manage Multiservice Switch 15000 nodes. This software is divided into several classes:

- "Multiservice Switch 15000 and Media Gateway 15000 base software" (page 83)
- "Multiservice Switch 15000 ATM networking software" (page 85)
- "Multiservice Switch 15000 IP networking software" (page 85)
- "Multiservice Switch 15000 access service software" (page 86)

Multiservice Switch 15000 and Media Gateway 15000 base software

Multiservice Switch 15000 and Media Gateway 15000 base software provides the basic system functions that support the remainder of the software. The base software can be divided into the following systems:

- command processing system

  The base software controls and processes commands and enables you to configure the node. Components represent the hardware, software, and services in Multiservice Switch and Media Gateway systems. Network operators and administrators use the base software commands to change the values of these components. Changing the values of these components, their subcomponents, and their attributes modifies the configuration data.

- data collection system

  The data collection system collects real-time statistics and data before transferring it for analysis. The data collected by this system includes alarms and state change notifications, performance measurements, and security logs.

- file system

  The file system stores all the software and configuration files that run on the node, and stores all the data generated by the node.

- network management interface system

  The network management interface system (NMIS) enables you to access a node through a network management application, for example Nortel Networks Preside Multiservice Data Manager (MDM). The NMIS also provides network management access security. Multiservice Switch systems support three types of network management interfaces:

  — an FMIP interface, which is a Nortel Networks proprietary management information protocol. An FMIP interface operates between Multiservice Switch nodes and Preside MDM servers.

  — a local operator serial interface, which allows an ASCII terminal to act as a local operator or allows emergency access by a terminal.

  — an FTP interface, which allows file transfers to and from local disks.

- processor control system

  The processor control system manages the processor cards. The processor control system sequences system start-up, determines when cards are available for service, loads the appropriate software, monitors cards for problems, and supports processor card sparing.

- software control system

  The software control system facilitates the download of software from a distribution site and manages the versions of software, applications, and patches on Multiservice Switch and Media Gateway nodes. After the software is loaded, this system allows you to configure software services and applications on the processor cards.

- backplane control system

  The backplane control system controls both of the Multiservice Switch 15000 and Media Gateway 15000 fabric cards. The backplane control system provides a fabric component interface that allows users to monitor and maintain the fabric cards. It also controls any operator commands that impact the fabric.

- port management system

  The port management system manages the ports and channels on each processor card.

Multiservice Switch 15000 ATM networking software

Nortel Networks Multiservice Switch 15000 networking software provides the routing capabilities and congestion management necessary for forwarding a packet of information from its source to its destination. Multiservice Switch 15000 nodes support both connectionless and connection-oriented routing. In the PT-AAL1 and UA-AAL1 solutions, Multiservice Switch networking software includes the ATM routing system and private network-to-network interface (PNNI) networking.

The ATM routing system is a connection-oriented system that provides dynamic runtime connection setup between Multiservice Switch 15000 nodes and allows them to interwork with other ATM nodes. In Succession Networks, Multiservice Switch 15000 ATM routing provides the addressing, signaling, and routing facilities to support permanent virtual connections (PVCs) and switched virtual connections (SVCs). These networking capabilities allow you to set up ATM connections in real time.

For more information on the ATM routing system, see the NN10600-700 *Nortel Networks Multiservice Switch 7400/15000/20000 ATM Technology Fundamentals* and NN10600-702 *Nortel Networks Multiservice Switch 7400/15000/20000 ATM Routing and Signalling Fundamentals*.

Multiservice Switch 15000 IP networking software

Nortel Networks Multiservice Switch 15000 Virtual Router (VR) system supports industry-standard IP networking for connectionless networking.

The Succession UA-IP solution supports static routing as well as the dynamic open shortest path first (OSPF) routing protocol. With OSPF, Multiservice Switch 15000 nodes learn dynamically, from neighboring routers, which routes through a network are available. A node therefore adapts to faults elsewhere in the network dynamically, and calculates the most efficient path for all IP packets.

The Succession UA-IP solution also supports hitless OSPF for CP equipment protection. Hitless OSPF allows FP cards to continue forwarding, uninterrupted, over OSPF calculated routes, during any of the following:

- hitless software migration (HSM)
- CP equipment failure (including failure of the OAM Ethernet port or link)
- any maintenance actions resulting in a CP switchover

When provisioned, hitless OSPF for CP equipment protection continuously synchronizes the OSPF routing database of the standby CP with the routing database of the active CP.

Multiservice Switch 15000 nodes support protected default routes. Using protected default routes, you can specify two next hops, reachable through two different 4pGE FP cards, as the default route. This allows a node to change packet forwarding from one next hop to the other in under a second if a 4pGE card, a link, or an adjacent router fails.

For more information, see NN10600-800 *Nortel Networks Multiservice Switch 7400/15000/20000 IP Technology Fundamentals*

Multiservice Switch 15000 access service software

Nortel Networks Multiservice Switch access service software involves the services supported on Multiservice Switch 15000 nodes. For the PT-AAL1 and UA-AAL1 solutions, the supported service is ATM. For more information, see “Multiservice Switch 15000 ATM service overview” (page 87) and “Multiservice Switch 15000 inverse multiplexing for ATM” (page 88).

Multiservice Switch 15000 ATM service overview

Asynchronous transfer mode (ATM) is a cell-based switching and multiplexing technology that is a general purpose, connection-oriented data transfer mode. Nortel Networks Multiservice Switch 15000 ATM core is interoperable with the bearer services of other public ATM networks.

ATM on Multiservice Switch 15000 nodes support both static and dynamic networking. Static networking uses permanent virtual circuits (PVC) that you provision on a hop-by-hop basis from end-point to end-point. Dynamic networking uses switched virtual circuits (SVC), which are fully dynamic and require no end-point provisioning.

In Succession Networks, Multiservice Switch 15000 nodes support the following ATM interfaces:

- User-to-network interface (UNI 4.0, user and network side).

  UNI uses an integrated local management interface (ILMI) for dynamic address registration, as well as for link and physical layer status, configuration, and control.

  Within the PT-AAL1 and UA-ALL1 solutions, Multiservice Switch UNIs provide dynamic address registration across the interface because of the use of ILMI control procedures. The address formats supported are network service access point (NSAP)-international code designator (ICD) and NSAP-data country code (DCC).

- Private network-to-network interface (PNNI 1.0).

  PNNI supplies the interface between Multiservice Switch 15000 nodes and other ATM nodes. It makes routing in a dynamic network, and in-band OAM connectivity possible. It also increases network scalability and efficient address summarization.

The specific ATM service used in Succession Networks is Multiservice Switch ATM bearer service. This service provides sequence-preserving, connection-oriented cell transfer between a source and destination with an agreed upon quality of service and throughput. An ATM bearer service connection can be part of a connection that extends into an external ATM core network.

In Succession Networks, an ATM virtual channel connection (VCC) provides the Multiservice Switch 15000 ATM bearer service between two external ATM users. The external connection can be made with a Multiservice Switch node or an external network.

For more information about ATM on Multiservice Switch 15000 nodes, see one of the following documents:

- NN10600-700 *Nortel Networks Multiservice Switch 7400/15000/20000 ATM Technology Fundamentals*
- NN10600-702 *Nortel Networks Multiservice Switch 7400/15000/20000 ATM Routing and Signalling Fundamentals*
- NN10600-710 *Nortel Networks Multiservice Switch 7400/15000/20000 ATM Configuration Management*
- NN10600-715 *Nortel Networks Multiservice Switch 7400/15000/20000 ATM Fault and Performance Management*.

Multiservice Switch 15000 inverse multiplexing for ATM

In the UA-AAL1 and UA-IP solutions, Nortel Networks Multiservice Switch ATM bearer service includes inverse multiplexing for ATM (IMA). IMA supports the transparent transmission of ATM cells over a combination of multiple DS1 links (an IMA link group), which allows ATM to operate over lower speed connections. The link group uses the inverse multiplexing process to transmit a single stream of ATM layer traffic across multiple links. IMA then combines the traffic back into the original cell sequence at the remote end.

IMA on Multiservice Switch nodes supports the use of synchronized and non-synchronized links within an IMA link group. IMA link groups within a Multiservice Switch network provide access to external ATM networks. IMA is available to both private and public user-to-network (UNI) or private network-to-network (PNNI) interfaces. Also, Multiservice Switch system's traffic management capabilities apply to ATM connections served by IMA link groups.

IMA provides reliability and robustness of cell traffic. When you remove a link, if there is sufficient bandwidth on the remaining links, no traffic loss will occur. You can remove or add links without removing the link group or the

ATM interface served by the IMA link group. If a link fails, Multiservice Switch nodes maintain ATM connections served by the link group at a reduced capacity.

Multiservice Switch software follows the ATM Forum *Inverse Multiplexing for ATM (IMA) Specification.* For more information about IMA, see NN10600-730 *Nortel Networks Multiservice Switch 7400/15000/20000 Inverse Multiplexing for ATM Operations*.

Chapter 6
Preside Multiservice Data Manager software overview

Nortel Networks Preside Multiservice Data Manager (MDM) software is a workstation-based network management system that you can use to maintain and monitor a complete network. This system consists of a set of tools with a graphical user interface (GUI) that can access data from multiple network elements simultaneously and present the operator with a unified view of the network. This view can either be a hierarchal view of the components in the network or an organizational view in which the network components are grouped by area or function.

Within the PT-AAL1, UA-AAL1 and UA-IP solutions, Preside MDM provides the network element management for Nortel Networks Multiservice Switch nodes. Within the UA-IP solution, Preside MDM also provides the network element management for the Media Gateway 15000.

As the element manager, it performs fault management, configuration management, data collection, performance management, and security management for the ATM core. In addition, all of the ATM core's operations, maintenance, administration, and provisioning data is routed through Preside MDM. Preside MDM servers can be configured to forward the performance management and fault management information directly to the OSS.

The primary Preside MDM window is the Preside MDM window. Menus on this window provide access to tools or applications you use to manage faults, configure components, set up security, administer node software, and plan, monitor, and adjust the performance of network elements.

The table "Summary of tools and utilities" (page 92) summarizes Preside MDM tools and utilities that you use to manage Multiservice Switch and Media Gateway 15000 nodes within the PT-AAL1, UA-AAL1 and UA-IP solutions.

Table 16
Summary of tools and utilities

Tool or utility	Area of application	Point of access
Network Viewer	fault management	Preside MDM window, Fault menu
Network Status Bar	fault management	Preside MDM window, Fault menu
Component Information Viewer	fault management	Preside MDM window, Fault menu
Alarm Display	fault management	Preside MDM window, Fault menu
Query Historical Alarms	fault management	Preside MDM window, Fault menu
Passport Shelf View	fault management	Preside MDM window, Fault menu
Command Console	all areas	Preside MDM window, System -> Utilities menu
Nodal Provisioning	configuration and administration	Preside MDM window, Configuration -> Passport menu Preside MDM window, System -> Administration menu
Passport Service Data Backup/ Restore	configuration and administration	Preside MDM window, Configuration -> Passport -> Administration menu
Software Download and Configuration	configuration and administration	Preside MDM window, Configuration -> Passport -> Administration menu

(Sheet 1 of 2)

Table 16 (Continued)
Summary of tools and utilities

Tool or utility	Area of application	Point of access
Data Viewer	performance management and security management	Preside MDM window, Performance menu
Solaris admintool	security management (Preside MDM only)	UNIX command line (xterm window)
Global Data Manager	security management	UNIX command line (xterm window)
Server Administration	Preside MDM OAM tasks	Preside MDM window, System -> Administration menu
GMDR Administration	Preside MDM OAM tasks	Preside MDM window, System -> Administration menu
System Log Display	Preside MDM OAM tasks	Preside MDM window, System -> Administration menu

(Sheet 2 of 2)

Chapter 7
OAM tasks and access for managing Multiservice Switch 15000 and Media Gateway 15000 nodes

OAM tasks and access for managing Multiservice Switch 15000 and Media Gateway 15000 nodes

The management of elements within the PT-AAL1, UA-AAL1 and UA-IP solutions is based upon the International Telecommunications Union (ITU) M.3400 specification Telecommunications Management Network (TMN) model (also known as FCAPS). This model describes the exchange of management data between network elements and consists of five functional areas:

- fault management, which is the process that detects, analyzes, and corrects network faults
- configuration and administration, which involves the configuration and maintenance of Multiservice Switch 15000 and Media Gateway 15000 nodes and their software and services
- accounting, which is the process of collecting accounting data
- performance monitoring, which is the process of planning, monitoring, and adjusting the performance of network devices
- security management, which is the process of establishing, maintaining, and controlling network management permission levels and requirements for network access

Nortel Networks Preside Multiservice Data Manager (MDM) toolset is organized and grouped according to the same model. In addition, multiple tools may be used within each of the functional areas. For more information, see "Summary of tools and utilities" (page 92).

Within the context of the PT-AAL1, UA-AAL1 and UA-IP solutions, note the following about the exchange of management data between Multiservice Switch 15000 nodes, Media Gateway 15000, Preside MDM servers, and the OSS:

- Fault management

  In these solutions, fault management information is collected on Multiservice Switch 15000 and Multiservice Switch 15000 nodes. The fault management information collected includes alarms and state change notifications (SCNs). These events can be used for historical analysis, and the key variables can be used by troubleshooting personnel.

  You can configure Preside MDM server to forward fault management information directly to the OSS.

  Alarms can be transferred from the Preside MDM server to a higher level management system, which can translate them into switch control center 2 (SCC2) formatted logs. SCC2 format is the format typically required by OSS fault applications:

  Note: For the PT-AAL1 and UA-AAL1 solutions, fault information can be transferred only to the CS2000 Core Manager

Note: For the UA - IP solution, fault information can be transferred only to the Integrated Element Management System (IEMS). Fault information cannot be transferred to the CS2000 Core Manager.

For more information about SCC2-formatted logs, see NN10092-911 *Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Fault Management Overview PT-AAL1/UA-AAL1/UA-IP*.

You can use the Query Historical Alarms GUI to display the node's historical alarms.

For more information on managing faults on Multiservice Switch 15000, Media Gateway 15000 and Preside MDM equipment in the PT-AAL1, UA-AAL1 and UA-IP solutions, see NN10198-912 *Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Fault Management Troubleshooting PT-AAL1/ UA-AAL1/UA-IP*.

- Configuration and administration

  The majority of node configuration occurs during the initial hardware and software installation and commissioning. Additional configuration or changes to the configuration are not recommended. There are two exceptions. The first exception is in the UA-AAL1 and UA-IP solutions, where DSL links are configured on an ongoing basis after initial installation. The second is network growth where new trends are added.

  Multiservice Switch components remain comparatively static from the perspective of daily operations and maintenance, with a primary focus on the administration and maintenance of the hardware and software. Additional installation and commissioning is required on an incremental basis only.

  For more information on configuring Multiservice Switch 15000 nodes, Media Gateway 15000 and Preside MDM servers in the PT-AAL1, UA-AAL1 and UA-IP solutions, see NN10114-511 *Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Configuration Overview PT-AAL1/UA-AAL1/UA-*

IP and NN10225-512 *Nortel Networks Multiservice Switch 15000 and Media Gateway 15000 in Succession Networks Configuration Attribute Summary PT-AAL1/UA-AAL1/UA-IP*.

For more information on how to upgrade Multiservice Switch 15000 nodes in a PT-AAL1 or UA-AAL1 Succession solution, see NN10070-461 *Upgrading Nortel Networks Multiservice Switch 15000 in Succession Networks PT-AAL1/UA-AAL1*.

For more information on how to upgrade Multiservice Switch 15000 and Media Gateway 15000 nodes in a UA-IP Succession solution, see NN10419-461 *Upgrading Nortel Networks Multiservice Switch 15000 and Media Gateway 15000/20000 in Succession IP Solutions*.

For more information on how to upgrade Preside MDM servers in any Succession solution, see NN10185-461 *Upgrading Preside MDM in Succession Networks*.

- Accounting

  In these solutions, accounting activities are not supported on Multiservice Switch 15000 or Media Gateway 15000 nodes.

- Performance monitoring

  Network traffic management (NTM) statistics are collected from control and function processors on Multiservice Switch 15000 nodes and from VSP cards on Media Gateway 15000 nodes by the data collection system (DCS). This collection occurs at 5-minute intervals using the rtstats (real-time statistics) data stream. Each node forwards the records to Preside MDM servers where six 5-minute interval data records, are aggregated into a single 30-minute interval data record.

  The Preside MDM Performance Measurement Stream Processor (PMSP) application converts the 5- and 30- minute data records into ASCII CSV-formatted records. These records can be viewed either on-switch using

the Preside MDM Data Viewer tool, if they are required for troubleshooting purposes. You can configure Preside MDM to forward these records directly to the OSS.

For more information on performance management on Multiservice Switch 15000 nodes and Preside MDM servers in the PT-AAL1, UA-AAL1 and UA-IP solutions, see NN10158-711 *Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Performance PT-AAL1/UA-AAL1/UA-IP*.

- Security management

  In these solutions, user IDs are configured on both Multiservice Switch 15000 and Media Gateway 15000 nodes, as well as the Preside MDM servers. To log directly into a server, you need the standard Preside MDM authentication (valid UNIX user ID and password), which provides access to the UNIX platform and allows the user to launch the Preside MDM toolset. When you access a Multiservice Switch 15000 or Media Gateway 15000 node through a Preside MDM tool, node authentication is required in the form of valid user ID and password. These are configured using the Preside MDM Nodal Provisioning tool.

  In Succession, you can also install Distributed Computing Environment (DCE) client software to work with Preside MDM. With this option, Preside MDM uses DCE security functionality to validate a user's password when they log into Preside MDM. After a user logs in, the user has full access to all of the Preside MDM tools that their profile allows. To order this option, contact Nortel Global Professional Services.

  Network nodes log all non-passive commands executed on the node. These logs can be sent to the Preside MDM Management Data Provider (MDP) application where they are converted to bulk data format (BDF) for viewing using Data Viewer or sending to an OSS.

  For more information on security on Multiservice Switch 15000, Media Gateway 15000 nodes and Preside MDM servers, see NN10180-611 *Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Security and Administration PT-AAL1/UA-AAL1/UA-IP*.

Types of access to perform OAM tasks

To undertake OAM tasks, users can access Nortel Networks Multiservice Switch 15000 and Nortel Networks Multiservice Switch 15000 nodes in the following ways:

- OSS access, which is the higher-level machine-to-machine access within the architecture of a node.
- craft access, which is human-to-machine interface, which is the subject of the Multiservice Switch for Succession Network documentation suite.
- emergency access

OSS access

OSS access typically is a machine-to-machine type of interface, which consists of several sub-systems and is used to integrate many functions. OSS access comprises:

- the integration and consolidation of log delivery across the cluster of devices in the Succession portfolio.

  Events and alarms occurring within the cluster are gathered at the CS2000 Core Manager, converted to alarm logs in the NTSTD/SCC2 format, merged into a single stream, and delivered to the customer OSS (log sub-system).

- network surveillance or first alert management through the surveillance of the whole network and the operator notification of potential problems.

  An operator uses the element managers of the applicable components to correct the problem.

- the gathering of performance data from devices across the clusters in the Succession portfolio, and the presentation and delivery of this data to the OSS by the CS2000 Core Manager.

Craft access

Craft access is used for specialized functions that include the following:

- diagnostics

- tests that cannot be automated through another interface (for example, because the tests require tight supervision and frequent and timely interactions with a human operator)
- infrequent activities that lie outside the scope of daily activities and are expensive to integrate (for example, commissioning activities)

The craft access comprises:

- Nortel Networks Preside Multiservice Data Manager toolset
- Command Console CLI for Nortel Networks Multiservice Switch 15000 nodes
- Nortel Networks Preside Multiservice Data Manager (MDM) client set
- Preside MDM server set, if the client set is not available
- Multiservice Switch both the client set and server set are not available

Emergency access

If connectivity between Nortel Networks Multiservice Switch 15000 and Nortel Networks Multiservice Switch 15000 nodes and the Preside MDM server is severed, emergency access to the node is possible through the command line interface (CLI), which is accessible through the serial ports on the control processors (for example, using a terminal server).

- direct connection to the network element's serial port
- Telnet to the network element

OAM tasks and access for managing Passport 8600 nodes

Within the context of the PT-AAL1, UA-AAL1 and UA-IP solutions, please note the following about the exchange of fault management data between Nortel Networks Passport 8600 nodes and Preside Multiservice Data Manager (MDM) servers:

- Passport 8600 nodes generate SNMPv2c traps that are sent to Preside MDM servers. The information in these traps is then presented on the standard Preside MDM fault applications and northbound interfaces. It can also be forwarded to SDM for conversion to SCC2 and subsequent

forwarding to an OSS. For more information about SCC2-formatted logs, see 241-6003-110 *Preside, Passport 8600 Device Integration Cartridge User Guide*.

- The commands used to managed Passport 8600 nodes are issued from the Preside MDM Command Console tool.
- Passport 8600 nodes are discovered using the IP Discovery tool on Preside MDM servers.
- Preside MDM servers need to be configured to communicate with Passport 8600 nodes. For information on how to configure Preside MDM servers for Passport 8600 fault management, see NN10114-511 *Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Configuration Overview PT-AAL1/UA-AAL1/UA-IP*.

Chapter 8
Call progressions through Multiservice Switch 15000 nodes

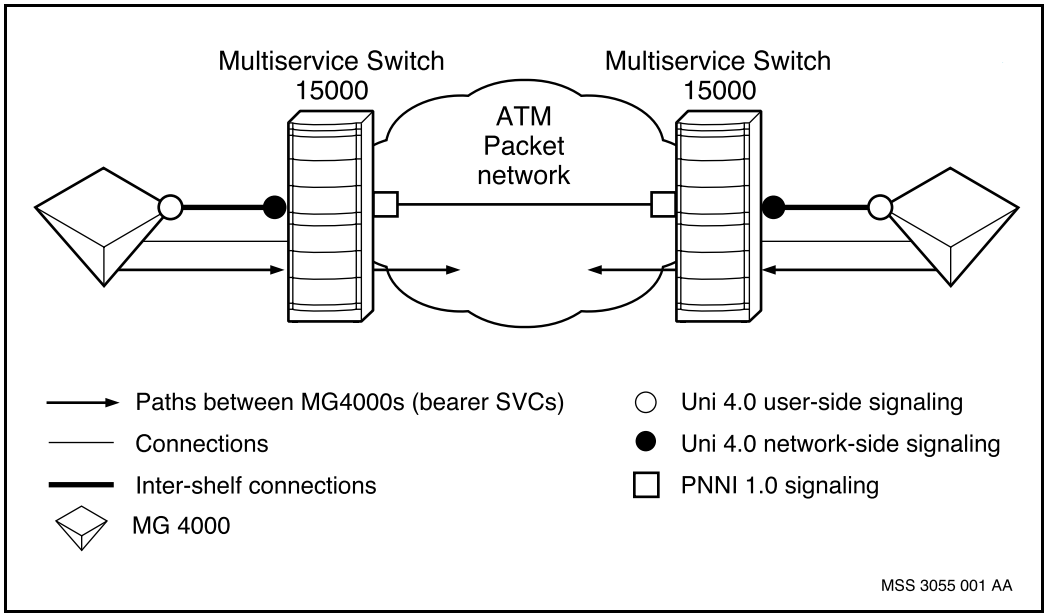
Refer to one of the following sections involving call progressions in the PT-AAL1, UA-AAL1 and UA-IP solutions:

- "Call progression in the PT-AAL1 solution" (page 103)
- "ISUP signaling in the PT-AAL1 solution" (page 107)
- "Call progression in the UA-AAL1 solution" (page 112)
- "Call progression in the UA-IP solution" (page 116)

Call progression in the PT-AAL1 solution

The figure "Example network: Multiservice Switch base configuration" (page 104) illustrates a configuration in which the terminating nodes are positioned at the network edge, with an MG4000 supported by each node. This configuration is characterized as MG4000s connected to different shelves in different Succession nodes.

Figure 14
Example network: Multiservice Switch base configuration



At the originating Succession node, the network directs the call through a backbone link on the Nortel Networks Multiservice Switch 15000 node that supports the MG4000 that originates the call.

A walk-through of a successful call is illustrated in the figure "ATM call walk-through: success path for a base configuration" (page 106). This figure shows call progression of an ATM connection between two MG4000s, where the connection is established from node to node across the ATM backbone. Call progression assumes that the protocol is either UNI 4.0 or PNNI 1.0 as defined by the ATM Forum.

Characteristics: Multiservice Switch 15000 base call setup and tear down

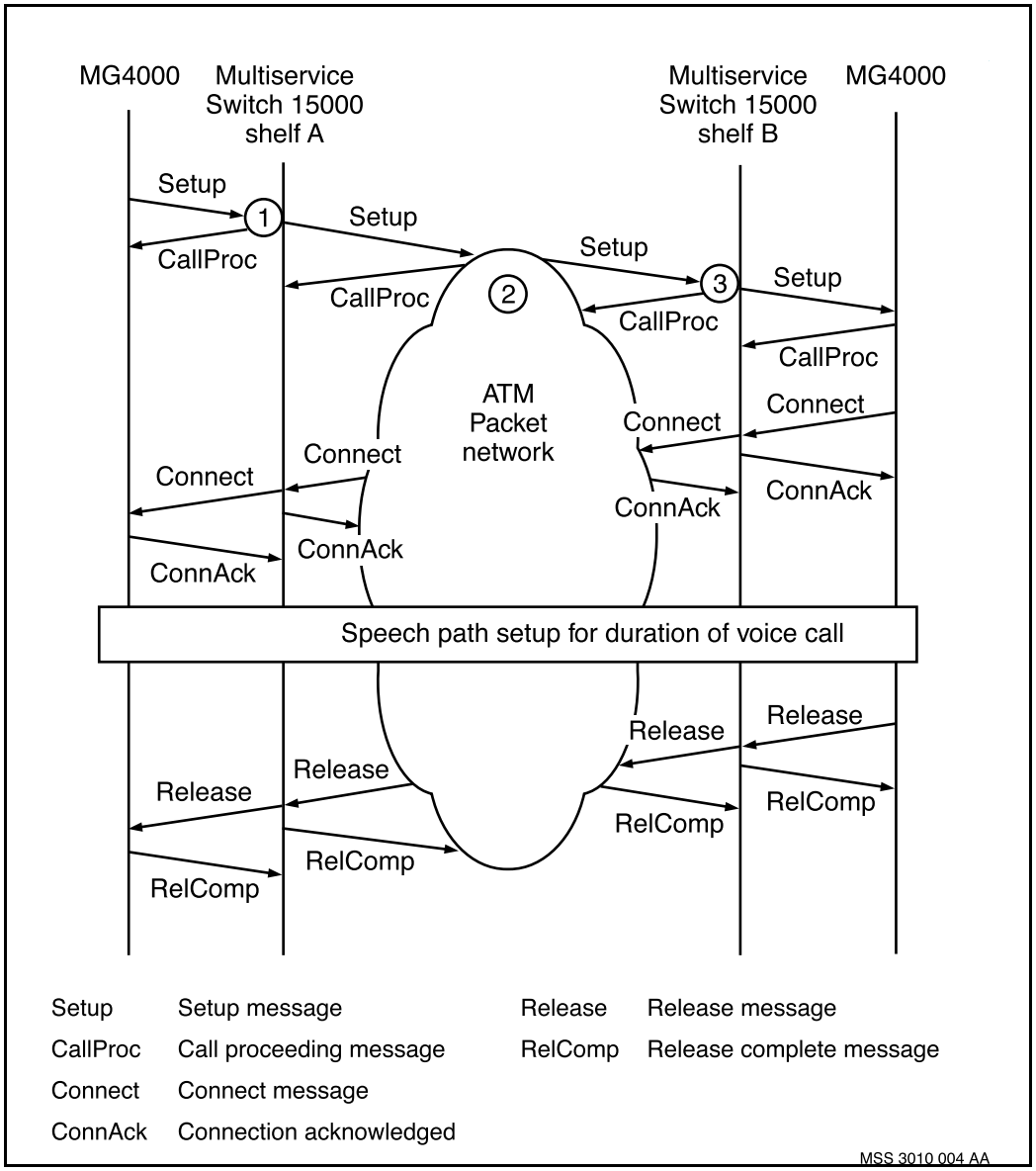
To establish any segment of the connection, the MG4000 or node sends a SETUP message to the adjacent node (or terminating MG4000 at the end point). When the adjacent node or MG4000 receives and correctly parses the SETUP message, and the network-side UNI allocates the VPI.VCI for the

call, the adjacent node or MG4000 replies with a CALL PROCEEDING message. The node or MG4000 has four seconds in which to generate the CALL PROCEEDING message otherwise the originator assumes that the call cannot be completed and clears the SVC.

When the terminating MG4000 accepts the call, it replies with a CONNECT message. This message is sent back through network along the call path. Each node activates the connection when it receives the CONNECT message and acknowledges with a CONNECT ACKNOWLEDGE message.

When the call is released, the MG4000 that originates the release sends a RELEASE message to the adjacent node on the call path. This node releases all resources associated with the call, acknowledges the RELEASE with a RELEASE COMPLETE message and sends a RELEASE message to the next node on the call path. When the terminating MG4000 receives the RELEASE message and returns a RELEASE COMPLETE message, call clearing is complete.

Figure 15
ATM call walk-through: success path for a base configuration



Call progression and signaling includes the following events and characteristics:

1 Multiservice Switch 15000 shelf A receives a SETUP message and complete PNNI route selection. The route selection process inserts the designated transit list (DTL) when the SETUP message is transmitted onto the selected PNNI link.

2 The ATM backbone routes the call to a terminating Succession node based on the DTL, in this example shelf B.

3 Multiservice Switch 15000 shelf B matches the called party address in the SETUP message with the MG4000 attached to it.

ISUP signaling in the PT-AAL1 solution

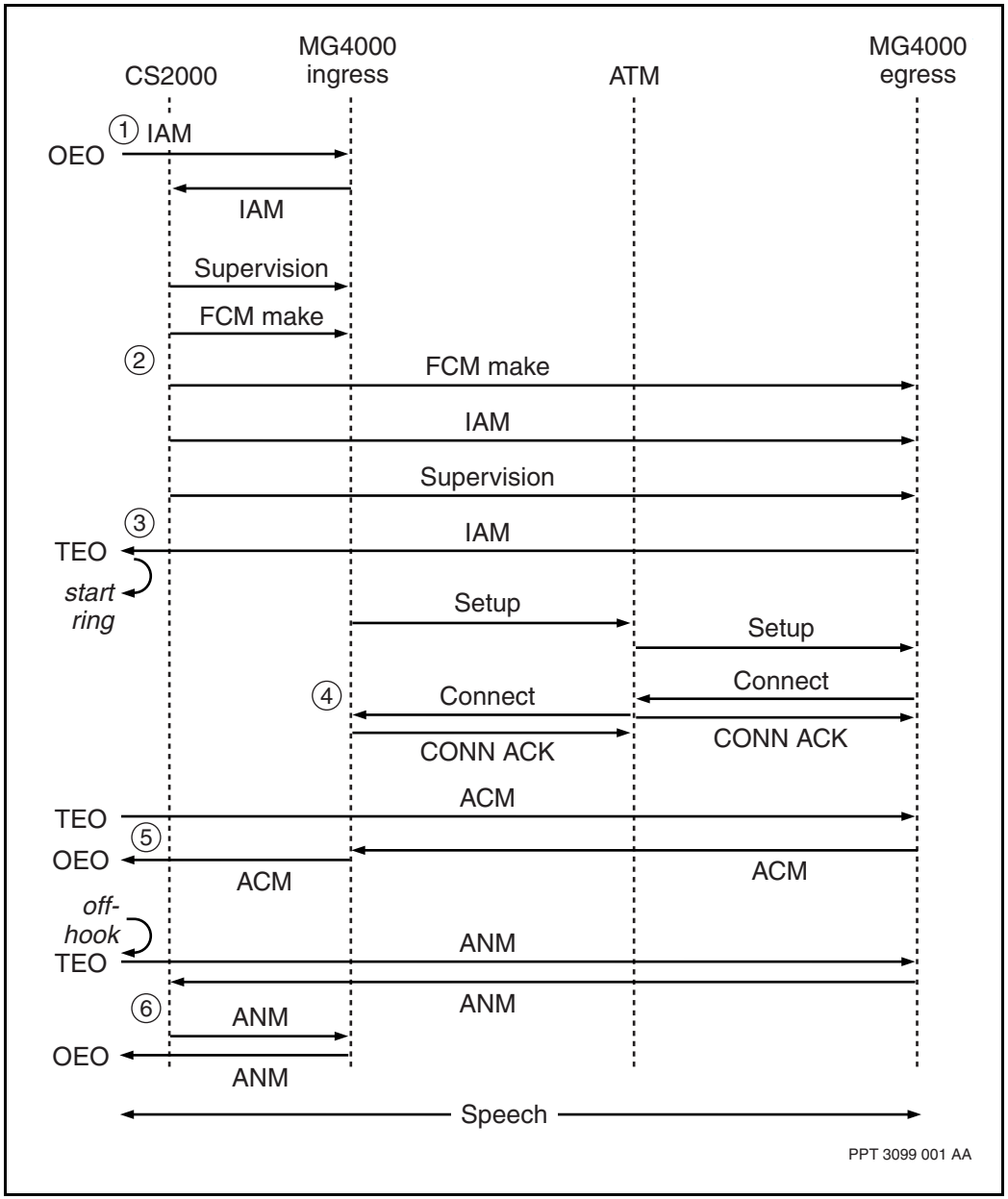
To setup a voice call between two end-offices through a Succession portfolio, both legacy SS7 and ATM signaling are used. The interworking between the two is performed by the MG4000 gateways, under the control of the CS2000 Communication Server. The MG4000 and CS2000 use a proprietary Media Gateway Control Protocol to communicate control information.

The Succession portfolio supports calls between many different trunk types, including PRI, ISUP, and PTS for calls between Succession portfolio offices over an ATM packet network. Interworking is also provided through the IW SPMs so that calls can still use ATM trunks, even if they are brought into the Succession portfolio tandem office on legacy tandem peripherals, such as Spectrum Peripheral Modules (SPMs), connected to the ENET.

Intra-Succession office tandem calls

The following figure shows an example of an ISUP call between an originating end-office (OEO) and a terminating end-office (TEO). Both end-offices have MG4000 gateways connected to the same Succession portfolio tandem office.

Figure 16
Call walk-through for an intra-Succession ISUP call



The call is established using the following signaling:

1 The IAM message is received from the OEO and is sent to the ingress MG4000, which in turn reports it to the CS2000. The CS2000 translates the incoming digits in the IAM message and selects the outgoing trunk and egress MG4000.

2 The CS2000 sends a Fabric Control Message (FCM) and supervision messages to the MG4000s, and forwards the IAM message to the egress MG4000.

3 The egress MG4000 sends the IAM message to the TEO, which will start ringing the called party's telephone.

4 A Q.2931 SETUP message is sent from the ingress MG4000 across the ATM core network to the egress MG4000. The two nodes complete the necessary Q.2931 signaling and establish an AAL1 bearer path between them.

5 The ACM message is sent by the TEO to the egress MG4000, which passes the ACM message to the ingress MG4000 by using the AAL5 peer connection between the two nodes. The ingress MG4000 sends the ACM message back to the OEO.

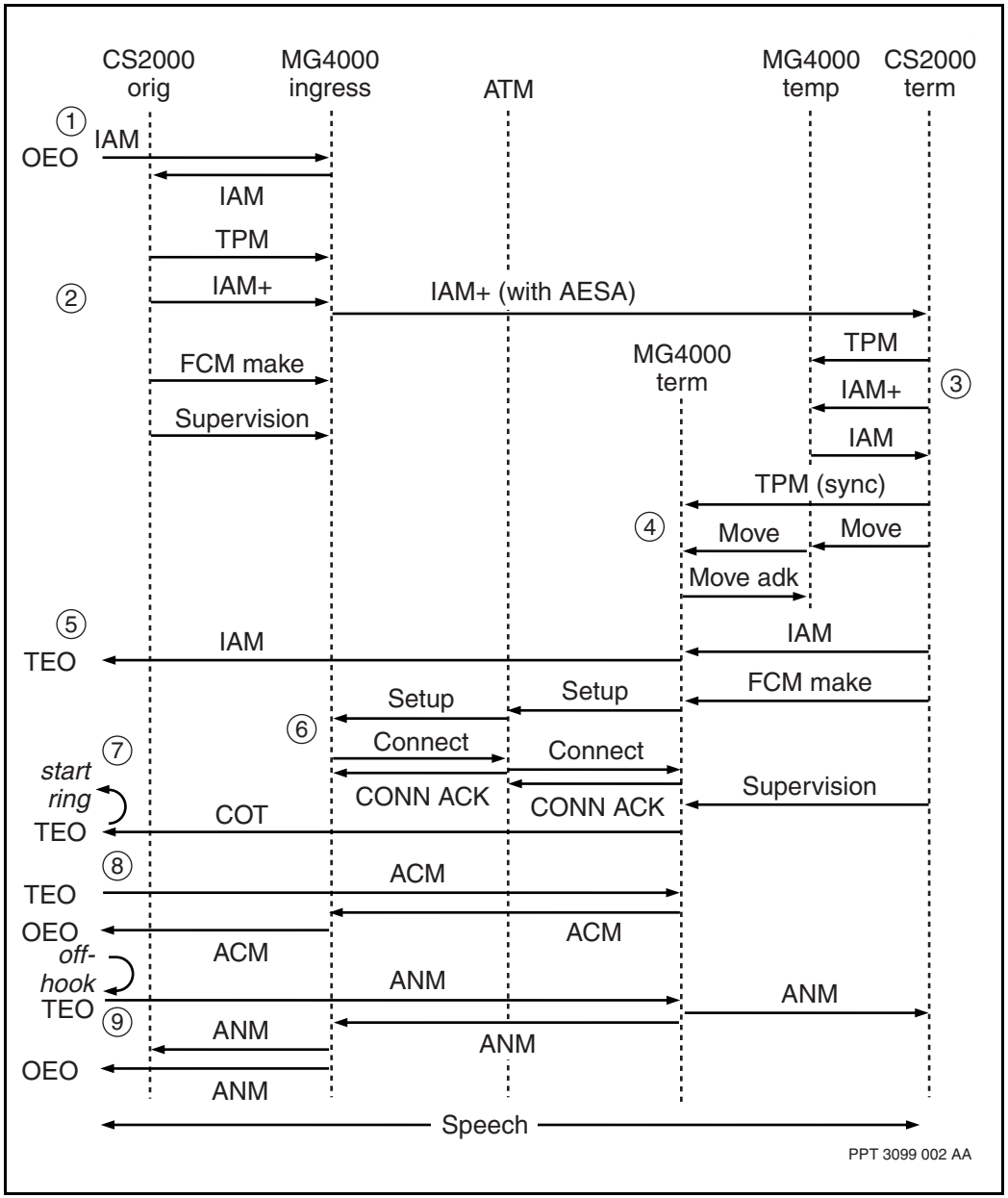
6 The ANM message is sent by TEO to the egress MG4000, which then sends the ANM message to the CS2000. The CS2000 marks the call as answered and begins billing the call. The CS2000 sends the ANM message to the ingress MG4000 which then sends the ANM message to the OEO.

Inter-Succession office tandem calls

Calls through a Succession portfolio can also take place between an originating end-office (OEO) and a terminating end-office (TEO) connected to different Succession portfolio tandem offices.

The following figure show an example of a Dynamic Packet Trunk (DPT) call, where two Succession portfolio tandem offices use an ATM trunk to place a call between them. The offices use the Bearer Independent Call Control (BICC) extension to ISUP for signaling. BICC includes extra information, such as an ATM End System Address (AESA) in the IAM message, required to establish an ATM call between the two MG4000s.

Figure 17
Call walk-through for an inter-Succession ISUP call using a dynamic packet trunk (DPT)



The call is established using the following signaling:

1 The IAM message is received from the OEO through the SS7 network and is sent to the MG4000 with the incoming TDM trunk. The ingress MG4000 forwards the IAM message to the CS2000 for digits translations and routing.

2 The CS2000 translates the incoming digits and determines that the outgoing trunk is DPT. The CS2000 sends a Trunk Profile Message (TPM) to the ingress MG4000. The TPM message provides the MG4000 with DPT setup information. The MG4000 adds the BICC parameters to the IAM message plus AESA, BNC_ID, and ATM Trunk Information (ATI) and sends it through the SS7 network to the terminating CS2000.

3 Trunk selection on the CS2000 randomly picks a DPT. The CS2000 then sends a TPM message to a temporary MG4000 that corresponds to the selected DPT. The temporary MG4000 returns an IAM message to the CS2000 to start normal call processing.

4 After route selection is done, it is determined that the terminating TDM trunk is on a different MG4000 than the one picked at random. A new DPT is picked on the correct terminating MG4000 and the TPM message is forwarded to it. The CS2000 sends a Move message to the temporary MG4000 to tell it to move the context of the call to the correct terminating MG4000.

5 The CS2000 sends an asynchronous IAM message to the terminating MG4000. The terminating MG4000 sends the IAM message to the TEO. This IAM message informs the TEO to delay ringing until a COT message is received.

6 The terminating MG4000 initiates the ATM AAL1 call setup to the MG4000 in the originating Succession office by sending a Q.2931 SETUP message. The two nodes complete the Q.2931 signaling and an AAL1 bearer path is created between the two nodes.

7 The terminating MG4000 sends a COT message to the TEO to inform it that the bearer path has been successfully established and tested. The TEO can start ringing the called party's telephone.

8 The TEO returns an ACM message to the terminating MG4000. The terminating MG4000 then makes its time-switch connection and forwards the ACM message through the SS7 network to the originating MG4000. The originating MG4000 make its time-switch connection and forwards the ACM message to the OEO.

9 The terminating MG4000 receives an ANM message from the TEO and forwards it to the CS2000 for billing, and to the originating MG4000. The originating MG4000 forwards the ANM message to the CS2000 for billing and to the OEO.

Call progression in the UA-AAL1 solution

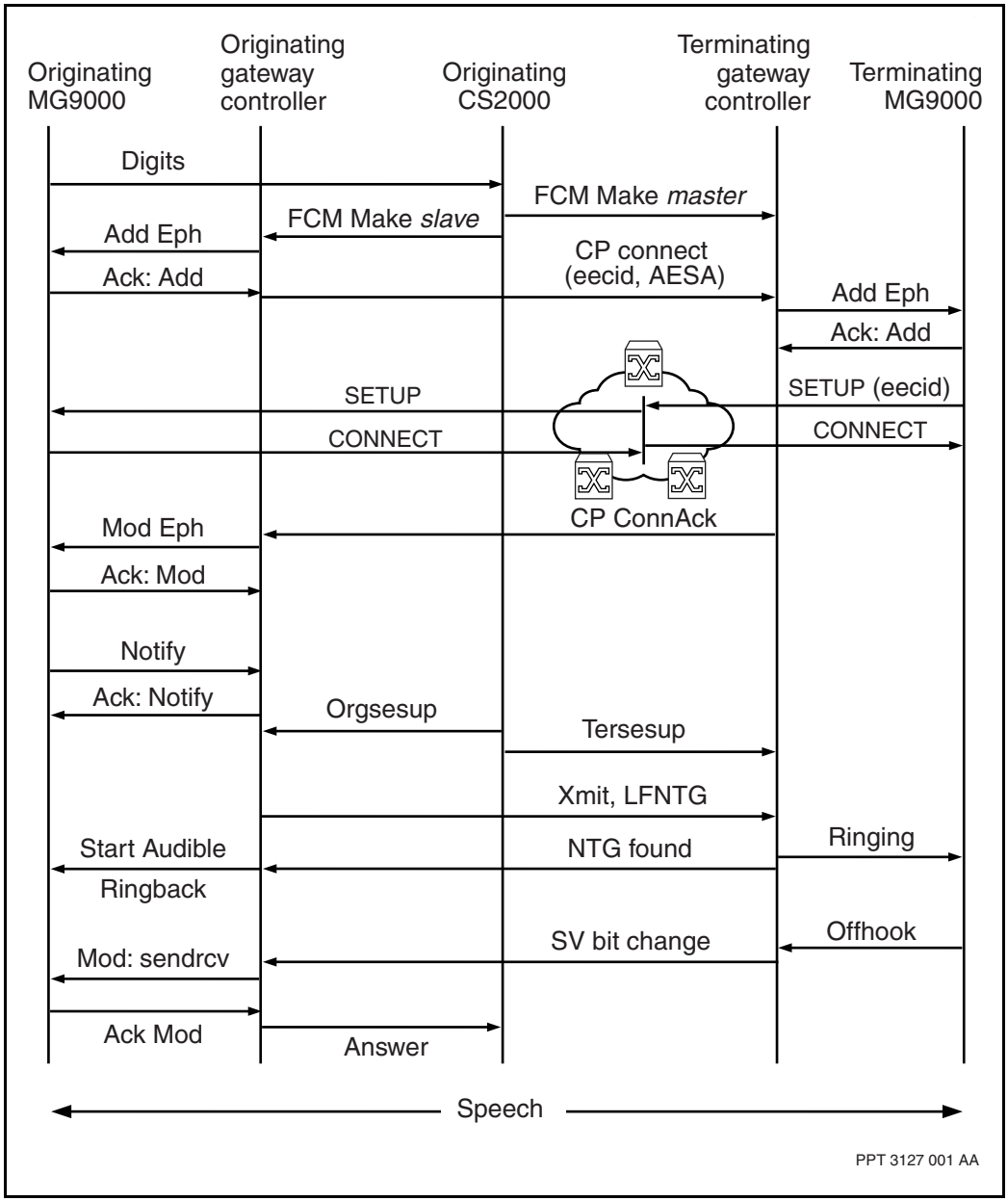
Refer to the following for information about how calls progress through Nortel Networks Multiservice Switch 15000 nodes within the UA-AAL1 solution:

- "Intra-Succession end office calls" (page 112)
- "Succession end office trunk calls" (page 114)

Intra-Succession end office calls

The following figure shows an example of a basic POTS to POTS call between two MG9000s in the same end office.

Figure 18
ATM call walk-through: UA-AAL1 intra-Succession end office call



Call progression and signaling includes the following events and characteristics:

1 The originating MG9000 provides the dial tone and collects digits. Digits are sent to the gateway controller (GWC) controlling the originating MG9000. This GWC then forwards them to the CS2000 for translation and routing.

2 The CS2000 sends a Fabric Control Message (FCM) to the GWC controlling the originating MG9000 and the GWC controlling the terminating MG9000. The originating GWC translates this into an H.248 "add ephemeral" message and sends it to the MG9000s. The originating GWC also forwards the originating MG9000's AESA and call correlation information to the terminating GWC.

3 An ATM Setup message is sent from the terminating MG9000 across the ATM core network to the originating MG9000. The two nodes complete the necessary ATM signalling and establish an AAL1 bearer path between them.

4 The terminating MG9000 notifies its GWC of the successful completion of the "add ephemeral" message. The terminating GWC then notifies the originating GWC through a "mod ephemeral" message.

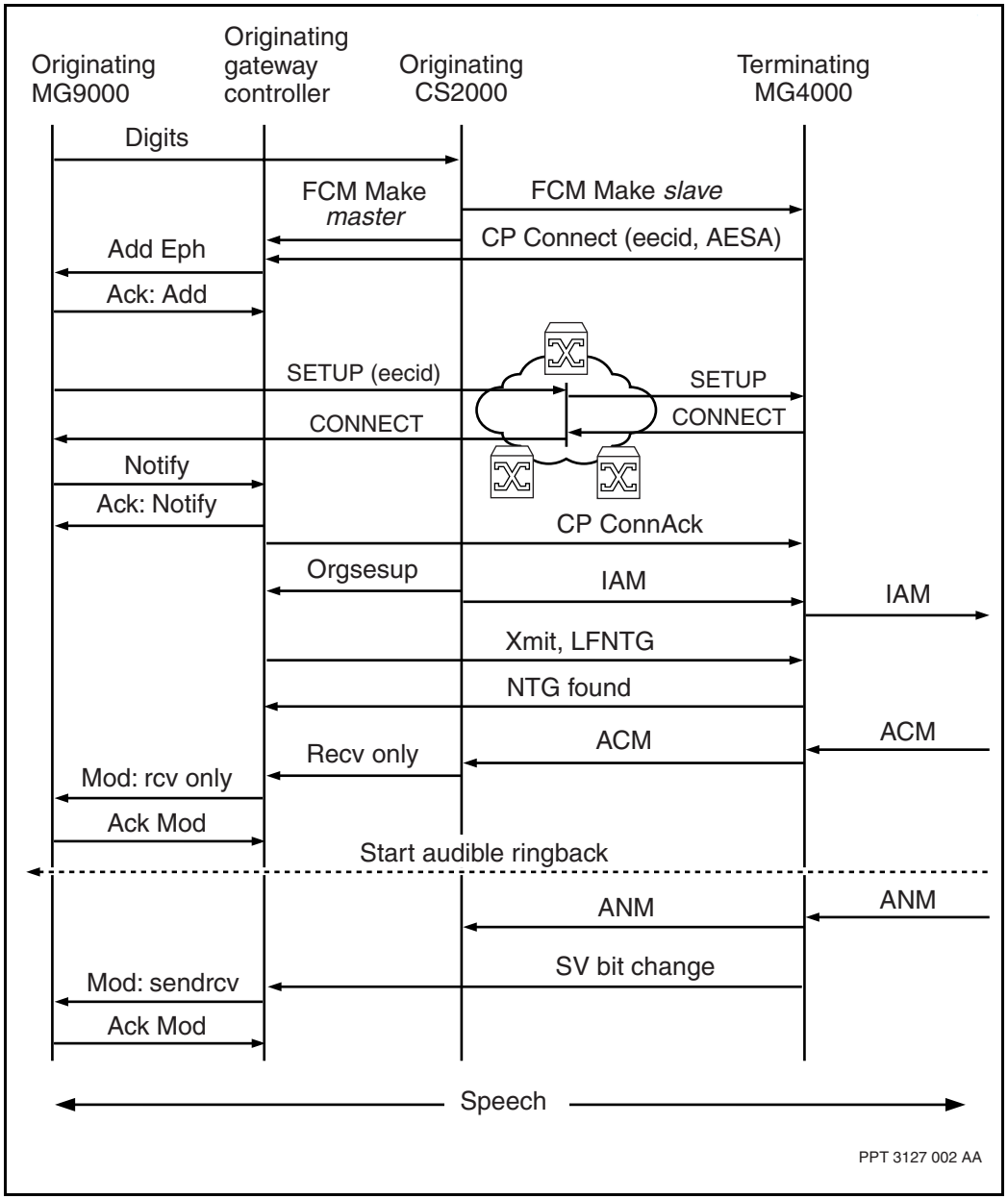
5 With the two GWCs synchronized, ringing is initiated on the terminating line and audible ringback is played on the originating line.

6 When the called party goes off-hook, the terminating MG9000 notifies its GWC, who notifies the originating GWC. The originating GWC then notifies the originating MG9000. Once two-way speech is enabled, the CS2000 is notified.

Succession end office trunk calls

The following figure shows an example of a basic POTS trunk call to an MG4000 trunk gateway in the same end office.

Figure 19
ATM call walk-through: Succession end office trunk call



Call progression and signaling includes the following events and characteristics:

1 The originating MG9000 provides the dial tone and collects digits. Digits are sent to the gateway controller (GWC), who forwards them to the CS2000 for translation and routing.

2 The CS2000 sends a Fabric Control Message (FCM) to the GWC controlling the originating MG9000 and the connection broker in the MG4000. The MG4000 acts as a slave and forwards its AESA to the GWC in the CP connect message. The GWC translates this into H.248 "add ephemeral" message and sends it to the MG9000.

3 An ATM Setup message is sent from the master MG9000 across the ATM core network to the MG4000. The two nodes complete the necessary ATM signalling and establish an AAL1 bearer path between them.

4 The terminating MG9000 notifies its GWC of the successful completion of the ATM SVC establishment. The GWC then acknowledges the CP Connect message. In parallel, the CS2000 initiates supervision, sending out the IAM message to the terminating the end office or to the tandem node. The CS2000 also checks integrity on the speech path.

5 When the ACM message is received from the terminating end office or from the tandem node, a "mod ephemeral" message is sent to cut through the ringing from the terminating node.

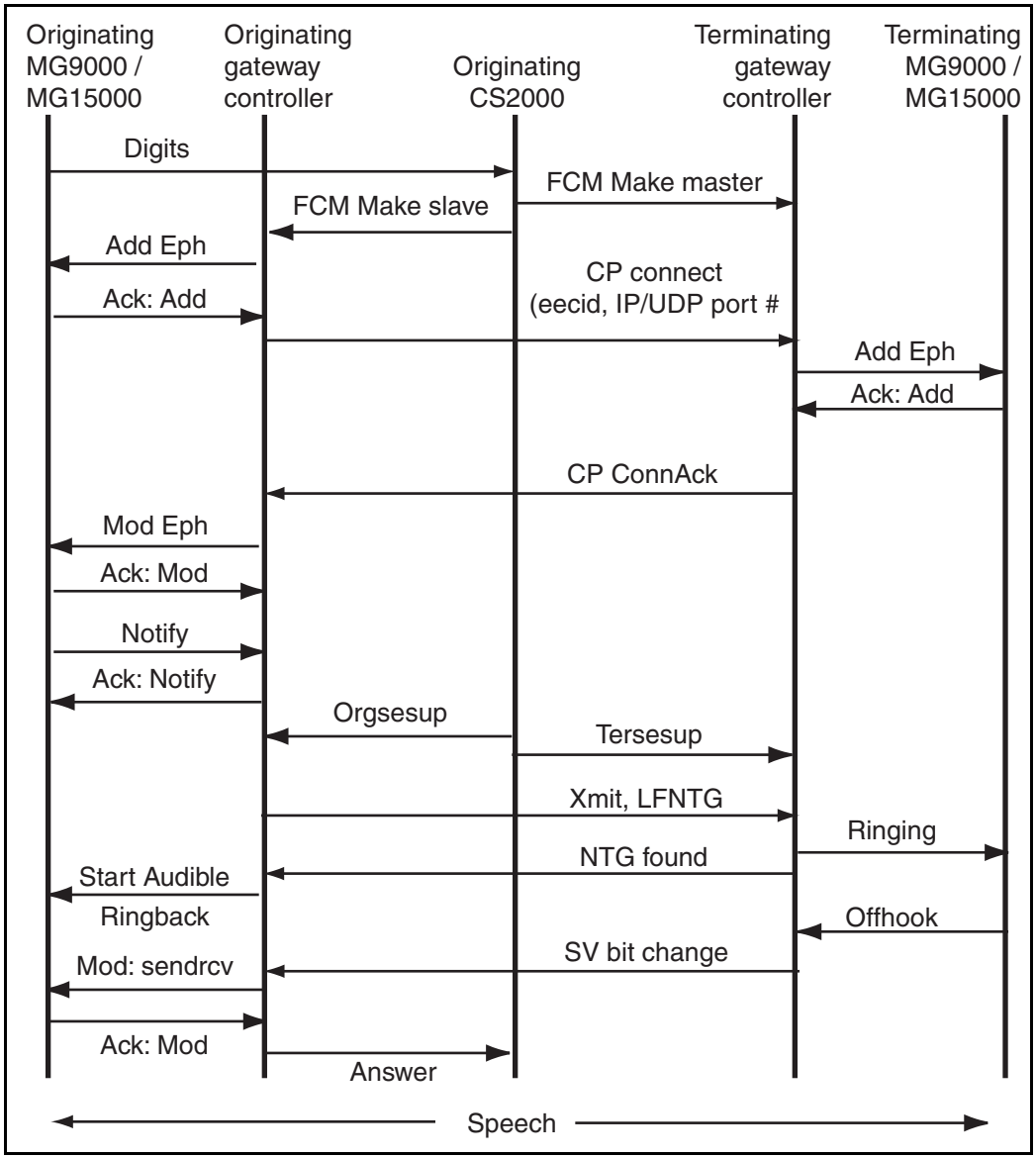
6 When the called party goes off-hook, an ANM message is received from the terminating office and the MG4000 sends the supervision message to the GWC telling it to initiate two-way speech path.

Call progression in the UA-IP solution

Intra-office signaling traffic from gateway to gateway controller

The following figure illustrates the basic call setup for a trunked call between two MG9000 nodes.

Figure 20
IP call walk-through: UA-IP intra-Succession end office call



Call progression and signaling includes the following events and characteristics:

1 The originating MG9000/MSS15000 gateway provides the dial tone and collects digits. Digits are sent to the gateway controller (GWC) of the originating MG9000. This GWC then forwards the digits to the CS2000 for translation and routing.

2 The CS2000 sends a Fabric Control Message (FCM) to the GWC controlling the originating MG9000 and the GWC controlling the terminating MG9000. The originating GWC translates this into an H.248 "add ephemeral" message and sends it to the MG9000/MSS15000. The originating GWC also forwards the originating MG9000's IDP/UDP port number and call correlation information to the terminating GWC.

3 The terminating MG9000 notifies its GWC of the successful completion of the "add ephemeral" message. The terminating GWC then notifies the originating GWC through a "mod ephemeral" message.

4 With the two GWCs synchronized, ringing is initiated on the terminating line and audible ringback is played on the originating line.

5 When the called party goes off-hook, the terminating MG9000 notifies its GWC, who notifies the originating GWC. The originating GWC then notifies the originating MG9000. Once two-way speech is enabled, the CS2000 is notified.

Nortel Networks Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks

Product and Technology Basics

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