

NN10006-100

Succession Multimedia Communications Portfolio

MCP Basics

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MCP Basics

Introduction

The *MCP Basics* provides a high-level overview of the entire Multimedia Communications Portfolio (MCP) and the various network elements of which it is comprised. It provides the Overview, Upgrades, Fault, Configuration, Accounting, and Performance, Security and Administration (OUFCAPS) information for the overall MCP. The following list shows how the *MCP Basics* is organized:

- Overview on page 3
- Upgrades on page 49
- Fault management on page 53
- Configuration management on page 59
- Accounting management on page 65
- Performance management on page 67
- Security and Administration on page 71
- Appendix A List of acronyms on page 77



Overview

How this chapter is organized

Overview is organized as follows:

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Functional description

The Nortel Networks Multimedia Communications Portfolio (MCP) offers a wide range of next generation multimedia services in a variety of network configurations. The IMS SIP solution, which is the core of the MCP, provides a powerful platform for hosting a full set of SIP features, a diverse range of Internet Protocol (IP)-based clients, and gateway and media server components for Session Initiation Protocol (SIP) interoperability.

The MCP includes both subscriber-oriented clients as well as network-oriented servers, and is positioned to

- bring multimedia services to subscribers over an IP network
- integrate the communication experience with other familiar devices, such as Personal Computer (PC) applications and Universal Serial Bus (USB) devices
- integrate IP network resources with real-time oriented conversation, thus allowing subscribers to converse over an IP network
- provide enhanced terminal devices and applications to enrich and simplify subscriber experiences
- provide a full range of services to meet all communication needs, such as call forwarding/redirect, forking/distribution, Call Processing Language (CPL) script execution, and basic presence monitoring and management services

The carrier grade Multimedia Communications Portfolio opens a new realm of opportunities by unifying voice, video, and data over a single packet infrastructure.

Session Initiation Protocol

Session Initiation Protocol (SIP) is a service-enabling protocol defined by the Internet Engineering Task Force (IETF). SIP was proposed as a standard on February 2, 1999, and is published as an RFC (RFC 3261). SIP is a text-based protocol similar to the Hypertext Transfer Protocol (HTTP) that can initiate real-time, multimedia sessions, which seamlessly integrate voice, data, and video.

This protocol's text-based architecture speeds access to new services with greater flexibility and more scalability than many alternative multimedia communication protocols in use today.

SIP enables simplified, interactive multimedia services and opens the way to expand service provider revenue streams with a new breed of differentiating services. With the emerging Session Initiation Protocol (SIP), a range of personalized, media-rich services can be delivered anytime, anywhere. These SIP-enabled services increase productivity, expand mobility, and enhance interactive communication.

IP communication

The MCP focuses on meeting the communications needs between subscribers on IP access client endpoints. MCP endpoints can communicate directly with each other or with endpoints that reside on other access networks with which the MCP interoperates.

Due to dynamic addressing schemes, such as Dynamic Host Configuration Protocol (DHCP), and the desire to avoid limiting a subscriber to a particular device, the MCP uses the IP “domain” concept to define networks of subscribers. A domain is an overlay in the IP network defining a subset of all subscribers that are generally served by a single IMS system.

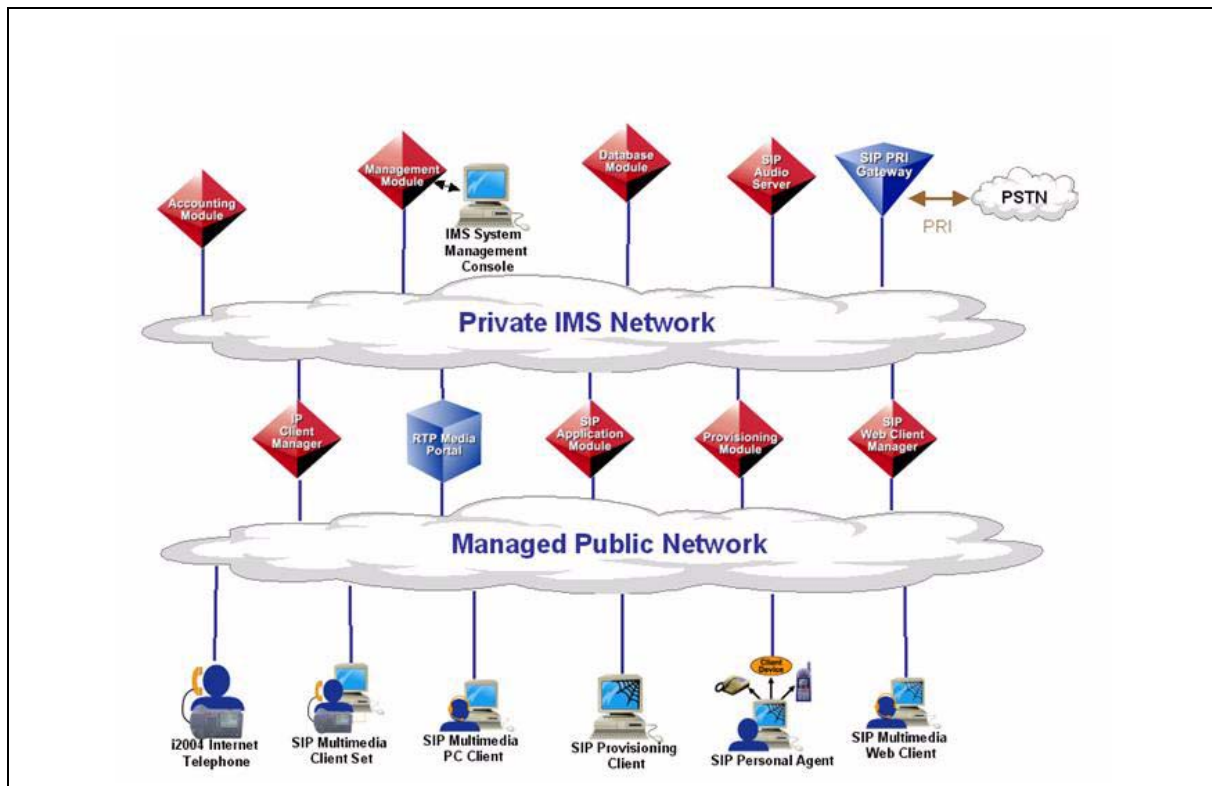
Examples of common domain servers currently in use include email servers and Web servers. For real-time communication needs, the MCP Interactive Multimedia Server (IMS) maintains information related to the actual locations or “presence” of subscribers in the network, and then proxies communication requests to those locations in order to reach the particular subscriber. The IMS system can also be called upon to provide services for a subscriber for various reasons even when the subscriber is not present on a device in the network.

Once the signaling communication path is established, the endpoints can transmit desired data or media between them as indicated during the setup of the communication path.

In addition to providing client devices and applications, and supporting network servers, the MCP also supports gateways to bridge the IP and existing PSTN networks, thus enabling voice communication between IP endpoints and traditional PSTN devices.

MCP component network

Figure 1, “MCP component network,” gives a high-level view of the Multimedia Communications Portfolio network showing all required and optional components.

Figure 1 MCP component network

In service provider network deployments, access clients and application servers reside on different IP networks—the Private IMS Network and the Managed Public Network.

The Private IMS Network is an IP network that has the following characteristics:

- It is owned and managed by the service provider.
- It is the address space that hosts the MCP network-based servers.

The Managed Public Network is an IP network that has the following characteristics:

- It is any IP-based network other than the Private IMS Network.
- It provides the network connection for access clients to receive services hosted by the Interactive Multimedia Server (IMS).

Note: Dual-homed MCP components interface with this network. (A dual-homed MCP component has an interface to both Private IMS Network and Managed Public Network.)

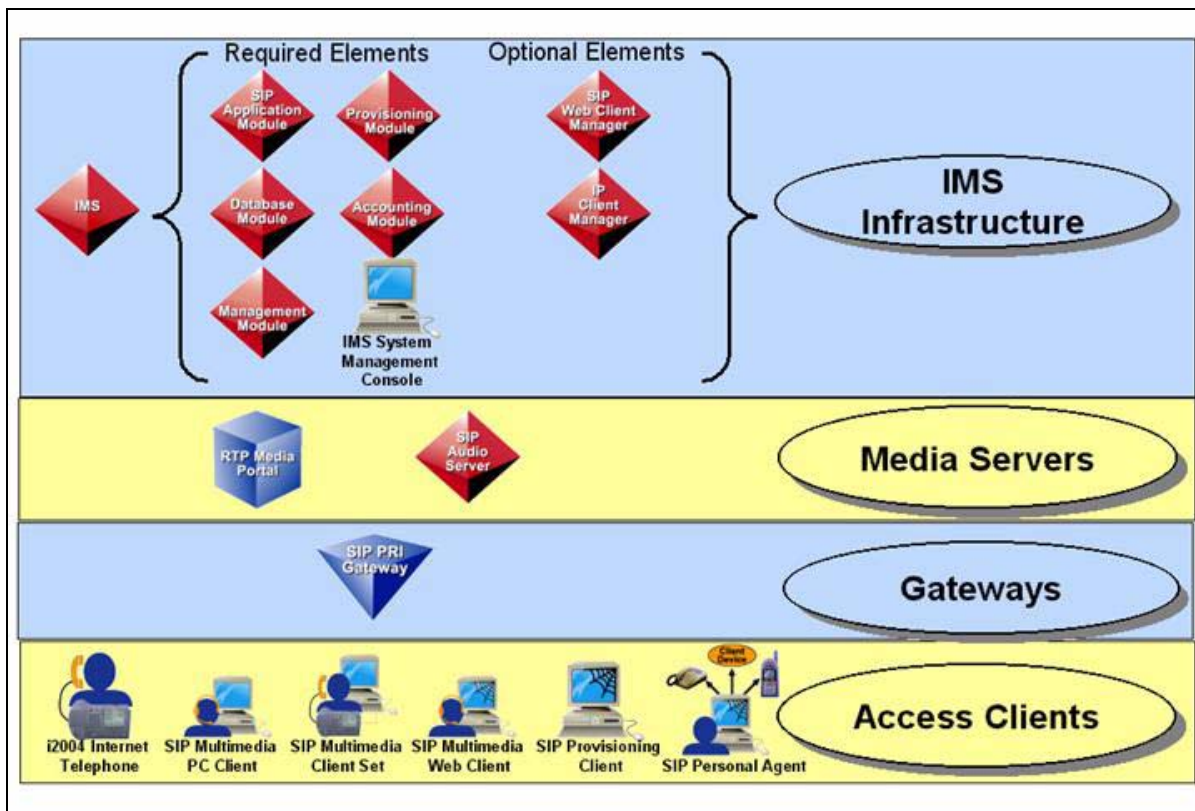
Examples of the type of IP networks that are considered to be public networks include the following:

- the Internet
- any Local Area Network (LAN)
- any Wide Area Network (WAN)

Building blocks

The Multimedia Communications Portfolio (MCP) is a collection of building blocks that can be combined in different ways to create a variety of SIP-based IP network solutions. Figure 2, "Multimedia Communications Portfolio," shows the categories of SIP-enabled building blocks that comprise the overall portfolio offering.

Figure 2 Multimedia Communications Portfolio



The following sections describe each of the categories of SIP-enabled network elements that comprise the Multimedia Communications Portfolio:

- IMS infrastructure
- Media servers
- Gateways
- Access clients

IMS infrastructure

At the core of the MCP is the Interactive Multimedia Server (IMS), which is a collection of software modules created to offer a wide range of next generation multimedia services in a variety of network configurations.

The IMS is the core building block of the MCP and is required in all MCP network deployments. The IMS is a Java-based application platform that runs on commercially available hardware.

The IMS enables the delivery of multimedia services to communication devices over any access medium, including wireline, wireless, carrier, and enterprise networks. Used with other components in the MCP, the IMS functions as a complete network for delivering SIP-based services. The IMS application includes several functional components, some of which are required and some of which are optional as shown in the following sections.

Required functional components

The required functional components that comprise the SIP IMS application are shown in Table 1, "SIP IMS functional components."

Table 1 SIP IMS functional components

SIP IMS components	Description
SIP Application Module 	The SIP Application Module is the IMS service execution engine that provides the following software functionality: • SIP Proxy Server • Back-to-Back User Agent (BBUA) • SIP Registrar • CPL Interpreter • address resolution and routing capabilities The SIP Application Module is dual-homed. As an optional software feature of the SIP Application Module, the SIP Presence Module processes information for presence subscription and notification. For more information, refer to the <i>MCP SIP Application Module Basics</i>, and <i>MCP SIP Presence Basics</i>.
Management Module 	The Management Module enables communication between the System Management Console, Database Module, and the various application servers. It provides the software functionality that • manages the following functions for the IMS components, media server, and the gateways: — faults — configuration — performance • collects operations, administration, and maintenance (OAM) information for display on the System Management Console The Management Module is located in the private IMS network. The System Management Console is the administrators interface to the Management Module. For information on the Management Module, refer to <i>MCP Management Module Basics</i>. For information on the System Management Console, refer to the <i>MCP System Management Console Basics</i>.

Table 1 SIP IMS functional components

SIP IMS components	Description
Database Module 	The MCP Database Module is an Oracle Replication Server that provides storage and retrieval for: • subscriber location information • registration status based on information received with SIP client registration • routing and translation entries • system configuration data The Database Module is located on the private IMS network. For more information, refer to <i>MCP Database Module Basics</i>.
Accounting Module 	The Accounting Module provides a mechanism for collecting, storing, formatting, and transmitting accounting information for billing purposes. The Accounting module is located on the private IMS network. For more information, refer to <i>MCP Accounting Module Basics</i>.

Table 1 SIP IMS functional components

SIP IMS components	Description
Provisioning Module 	The Provisioning Module provides the interface for the SIP Multimedia PC Client to securely access the network address book stored on the Database Module for performing the following tasks: • service provider provisioning through the SIP Provisioning Client • customer domain provisioning through the SIP Provisioning Client • subscriber self provisioning through the SIP Personal Agent • setting up network services functions, such as the network address book Within the Provisioning Module, a Sun ONE Web Server* processes HTTP requests from the SIP Multimedia Web Client, Personal Agent, and Provisioning Client to support self provisioning and network-based services. The Provisioning Module is dual-homed. For more information about the Provisioning Module, refer to <i>MCP Provisioning Module Basics</i> and <i>SIP Provisioning Client User Guide</i>. For more information on provisioning tasks which will be processed by the Provisioning Module, see the following documents: • <i>SIP Provisioning Client User Guide</i> • <i>SIP Multimedia PC Client Getting Started User Guide</i> • <i>SIP Multimedia Web Client Getting Started User Guide</i> • <i>i2004 Internet Telephone User Guide</i>

Table 1 SIP IMS functional components

SIP IMS components	Description
System Management Console  System Management Console	The System Management Console is the element manager graphical user interface (GUI) for IMS. With this GUI you can: • administer system, database, and service components • configure MCP system sites, servers, modules/components, and services • monitor the MCP system using alarms, logs, and performance measurements • manage collection of operations, administration, accounting, and maintenance information The System Management Console runs on a PC and communicates with the Management Module on the private IMS network. For more information about the System Management Console, refer to the <i>MCP System Management Console Basics</i>.

Optional functional components

The optional functional components that comprise the SIP IMS application are shown in Table 2, "SIP IMS functional components (optional)."

Table 2 SIP IMS functional components (optional)

SIP IMS component	Description
IP Client Manager 	The IP Client Manager manages i2004 Internet Telephones and provides them access to IMS SIP services. Through the use of i2004 Internet Telephones, the IP Client Manager provides access to the following features: • instant messaging • information delivery services • session-handling services • call management services The IP Client Manager is dual-homed. It performs the SIP to UNISim conversion that enables the interworking of i2004s with the SIP Application Module. For more information on the IP Client Manager, refer to the <i>MCP IP Client Manager Basics</i>.
SIP Web Client Manager 	The SIP Web Client Manager manages the SIP Multimedia Web Client and enables subscribers to access IMS SIP services from a browser. The SIP Web Client Manager also provides the SIP Multimedia Web Client feature set and enables the interworking of the SIP Multimedia Web Client and the SIP Application Module. The SIP Web Client Manager is deployed from the System Management Console as part of the Web software bundle. For more information on the SIP Web Client Manager, refer to the <i>MCP SIP Web Client Manager Basics</i>.

Media servers

Table 3, "Media servers (optional)," provides a high-level description of the MCP media servers.

Table 3 Media servers (optional)

Media servers	Description
SIP Audio Server 	The SIP Audio Server provides network-wide, ad hoc audio conferencing capabilities for MCP access clients. These capabilities include: • support for up to 32 port audio conferences • SIP BYE-ALSO/REFER messaging • independent Coder/Decoder (CODEC) negotiation for each conference call port • mid-session broadcast of SIP info signals to all conference parties (for example, a Web page URL) • hold/retrieve • round-robin resource allocation (for selecting media resources for conference calls) • long call service • call transfer • ability to chain conferences together • authentication of the SIP Application Module sending request The SIP Audio Server is located on the private IMS network. For more information on the SIP Audio Server, refer to the <i>MCP SIP Audio Server Basics</i>.
RTP Media Portal 	The RTP Media Portal is a network-distributed component that provides the following functions: • performs media-stream network address translation and network address port translation (NAT/NAPT) • provides a media firewall • provides third-party media controls • enables a client firewall/NAPT traversal mechanism The RTP Media Portal is dual-homed. It handles media streams using the Real-time Transport Protocol (RTP) and Real-time Transport Control Protocol (RTCP). For more information on the RTP Media Portal, refer to the <i>MCP RTP Media Portal Basics</i>.

Gateways

Table 4, "MCP PSTN gateway," includes a high-level description of the MCP PSTN gateway.

Table 4 MCP PSTN gateway

PSTN gateway	Description
SIP PRI Gateway 	The SIP PRI Gateway converts packet-based voice streams to circuit-based voice streams to allow SIP endpoints the ability to connect to PSTN devices. Some of its functions include: • PRI call handling • CODEC negotiation • calling party name and number delivery to SIP • parameter mapping between SIP and PRI protocols The SIP PRI Gateway is located on the IMS private network. For more information on the SIP PRI Gateway, refer to the <i>MCP SIP PRI Gateway Basics</i>.

Access clients

The MCP access clients include SIP user agents that provide subscribers access to the IMS SIP network, administrator and subscriber provisioning interfaces, and an interface for administrative system management. User agents can be hardware components, such as an IP phone, software applications running on a Personal Computer (PC), or software applications executed from a Web browser.

Table 5, “MCP access clients (optional),” provides a high-level description of the SIP access clients.

Table 5 MCP access clients (optional) (Sheet 1 of 4)

Access client	Description
SIP Multimedia PC Client 	The SIP Multimedia PC Client is a stand-alone SIP-enabled user agent installed on a Personal Computer (PC) that provides access to SIP features and services such as: • traditional telephone services • multimedia communications such as — video calls — instant messaging — file sharing/file transferring — whiteboard session — Web page push The SIP Multimedia PC Client is located on the managed public network. It accesses the SIP services network through the SIP Application Module. The MCP also offers the Converged Desktop, which allows the customers to use their existing desktop telephone for voice calls and SIP Multimedia PC Client for multimedia communication. For more information on this multimedia client, see the <i>SIP Multimedia PC Client User Guide</i>.
Note: Subscriber access to the SIP services network requires one of the following clients: SIP Multimedia PC Client, i2004 Internet Telephone, SIP Multimedia Web Client, or SIP Multimedia Client Set.	

Table 5 MCP access clients (optional) (Sheet 2 of 4)

Access client	Description
SIP Multimedia Client Set  SIP Multimedia Client Set	The i2004 Internet Telephone provides voice services, while the PC provides all other services. When the SIP Multimedia PC Client is configured to control the i2004 Internet Telephone, the configuration is known as the SIP Multimedia Client Set. The SIP Multimedia PC Client Set provides access to SIP features and services such as: • traditional telephone services • multimedia communications such as — video calls — instant messaging — file sharing/file transferring — whiteboard session — Web page push For more information on the Multimedia Client Set, see the <i>SIP Multimedia PC Client Getting Started User Guide</i> and <i>i2004 Internet Telephone User Guide</i>.
i2004 Internet Telephone  i2004 Internet Telephone	The i2004 Internet Telephone is a Nortel Networks MCP hard client device that provides a traditional looking telephone set enhanced with multimedia features for accessing IP-based IMS SIP services. Some of the i2004 Internet Telephone advanced features include: • instant messaging • stock query • bulletins • Quality of Service (QoS) information The IP-based i2004 Internet Telephone is located on the managed public network and is managed by the IP Client Manager (IPCM). For more information on the i2004 Internet Telephone, see the <i>i2004 Internet Telephone User Guide</i>.
Note: Subscriber access to the SIP services network requires one of the following clients: SIP Multimedia PC Client, i2004 Internet Telephone, SIP Multimedia Web Client, or SIP Multimedia Client Set.	

Table 5 MCP access clients (optional) (Sheet 3 of 4)

Access client	Description
SIP Provisioning Client  SIP Provisioning Client	The SIP Provisioning Client is a browser-based tool that allows service providers to provision: • administrators • domains • gateways • IP Client Managers • voice mail servers • service packages • telephony routing translations The SIP Provisioning Client is accessed from the public network. It is accessible by administrators for communicating provisioning data to the IMS network. For more information on the SIP Provisioning Client, see the <i>SIP Provisioning Client User Guide</i>.
Note: Subscriber access to the SIP services network requires one of the following clients: SIP Multimedia PC Client, i2004 Internet Telephone, SIP Multimedia Web Client, or SIP Multimedia Client Set.	

Table 5 MCP access clients (optional) (Sheet 4 of 4)

Access client	Description
 SIP Personal Agent	The SIP Personal Agent is a browser-based client that allows users to perform network-based management with their own IMS services and communication preferences. Features include: • Preference Settings • Directory Management — manage key contact information • Call Management — define how incoming calls will be treated — “push” Web pages — block anonymous callers For more information on the SIP Personal Agent, see the <i>SIP Personal Agent User Guide</i>.
 SIP Multimedia Web Client	The SIP Multimedia Web Client is a Web-based access client that provides various multimedia and telephony features such as: • traditional telephone services • picture caller ID • instant messaging • video calls/conferencing • personal network-based address book The SIP Multimedia Web Client is located on the managed public network. Because this multimedia client is browser-based, it is easy to add and deploy new services as they become available. When the SIP Web Client Manager is updated, subscribers automatically have access to any updated SIP Multimedia Web Client functionalities. For more information on the SIP Multimedia Web Client, see the <i>SIP Multimedia Web Client User Guide</i>.
Note: Subscriber access to the SIP services network requires one of the following clients: SIP Multimedia PC Client, i2004 Internet Telephone, SIP Multimedia Web Client, or SIP Multimedia Client Set.	

MCP interworking

As an open standard, SIP allows interoperability with other Nortel Networks products. The IMS can interwork with

- Communications Server 2000 (CS 2000) through SIP-T
- DMS-100 switch through SIP PRI gateway
- Meridian SL-100 switch through SIP PRI gateway

Additionally, the IMS supports the Converged Desktop, which allows users to use their PCs for multimedia communication, while using the existing telephony system for voice. These capabilities are available when using the IMS in conjunction with TDM switching products, including the DMS-100 and Meridian SL-100 switches.

For more information on interworking, refer to *MCP Interworking*.

Hardware

This section provides information on the following topics:

- MCP hardware platform
- MCP hardware server frame layouts
- Minimum baseline configuration

MCP hardware platform

The MCP is extremely scalable and supports a variety of hardware and software configurations depending on the specific network solution and services to be deployed. The MCP SIP-based IP network uses the Sun Netra t 1400 line of servers as the platform for most of the IMS infrastructure. These servers include the Netra t 1400, which runs on DC power, and the Netra t 1405, which runs on AC power. The Management/Accounting server uses Sun Netras t D1000 RAID disk arrays to store accounting information. The RTP Media Portal, SIP Audio Server, and the SIP PRI Gateway use the Motorola Service Application Module-16 (SAM16) CPX8216T chassis.

MCP hardware server frame layouts

The MCP is available for systems powered with either alternating current (AC) or direct current (DC) and is comprised of the following three unique frames:

- Management/Accounting and Database Server frame
- SIP Application Server frame
- RTP Media Portal, SIP PRI Gateway, and SIP Audio Server frame

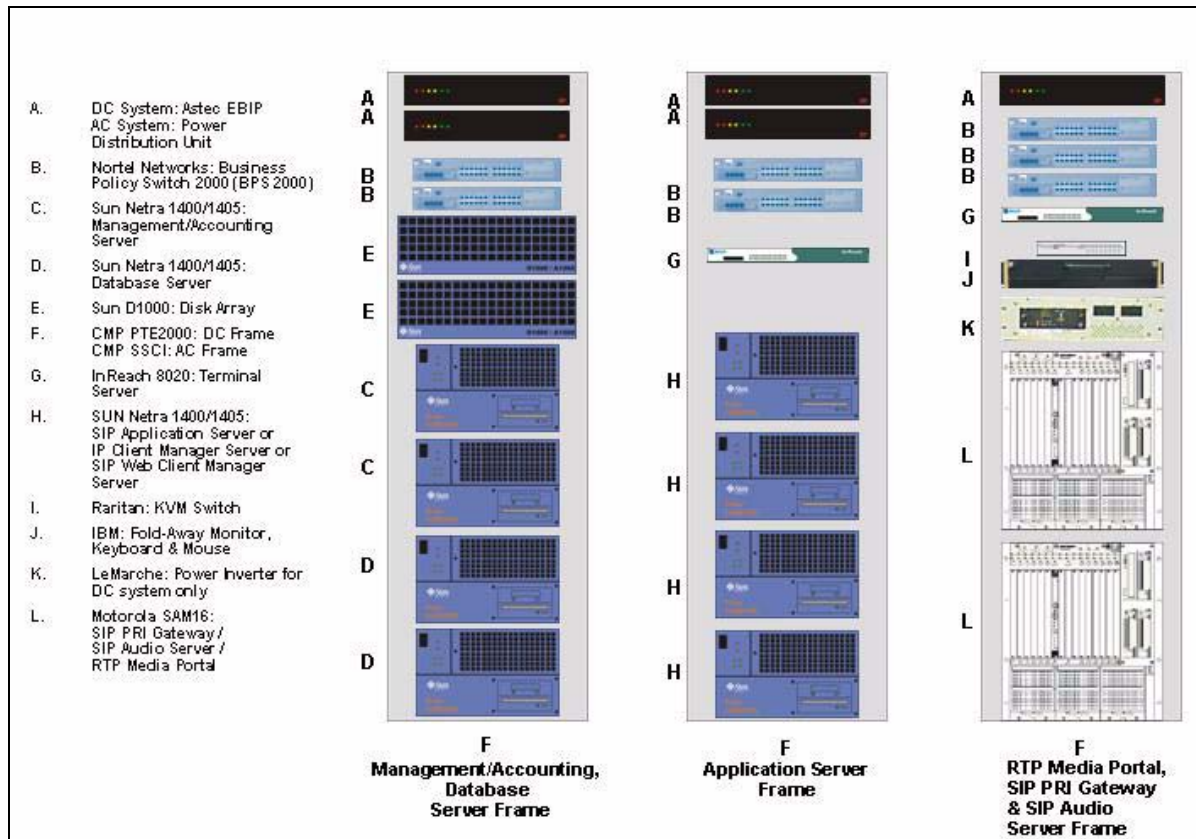
The DC system supports thirteen unique hardware components. The AC systems support only twelve unique components since it does not require the LeMarche power rectifier to provide AC power to the Raritan KVM switch and IBM fold-away monitor, keyboard, and mouse.

The MCP requires only one Management/Accounting and Database Server frame for each IMS system (network deployment). The number of SIP Application Server frames required depends on the functionality and capacity required by the customer.

The number of RTP Media Portal, SIP PRI Gateway, and SIP Audio Server frames required also depends on the functionality and capacity required by the customer. That is, the number of these Server frames required depends on how much of the MCP audio conferencing, PRI Gateway, and RTP Media Portal functionality the customer wants to support.

Figure 3, “MCP hardware components and frame layout for the DC system,” shows the overall layout of the three MCP hardware server frames for the DC system.

Figure 3 MCP hardware components and frame layout for the DC system



AC versus DC powered systems

The following equipment is required for AC powered systems:

- Two Astec Enhanced Breaker Interface Panel EBIPs (A) for the Management/Accounting, Database Server frame are replaced with three Power Distribution Units.
- Two Astec Enhanced Breaker Interface Panel EBIPs (A) for the Application Server frame are replaced with three Power Distribution Units.
- Astec Enhanced Breaker Interface Panel EBIP (A) for the RTP Media Portal, SIP PRI Gateway, and SIP Audio Server frame is replaced with three Power Distribution Units.
- The Sun Netra t 1400 (C) for the Management/Accounting, Database Server frame and Application Server frame is replaced with a Sun Netra t 1405.
- The CMP PTE 2000 frames (F) are replaced with the CMP SCC1 frames.

Note: The LeMarche Power Inverter (K) is for DC powered systems only.

Management/Accounting and Database Server frame

The MCP requires only one Management/Accounting and Database Server frame for each IMS system. In addition, the following elements apply:

- The BPS 2000 structure (B) provides a demarcation point between the IMS system and the Telco's WAN/LAN infrastructure. The BPS's are configured with the 10/100 Ethernet interface modules.
- The Disk Array (E) is used to store accounting information.

Application Server frame

The number of Application Server frames depends on the customer capacity required. The minimum configuration requires one Application Server frame that contains two Sun Netras each of which is configured with a SIP Application Module. In addition, the following elements apply:

- The BPS 2000 structure (B) provides a demarcation point between the IMS system and the Telco's WAN/LAN infrastructure. The BPS 2000's are configured with the 10/100 Ethernet interface modules.
- The In-Reach 8020/8040 Terminal Server provides dial-up support for network elements when the network is down.

RTP Media Portal, SIP PRI Gateway, and SIP Audio Server frame

The number of RTP Media Portal, SIP PRI Gateway, and SIP Audio Server frames depends on the functionality and customer capacity required. In addition, the following elements apply:

- The BPS 2000 structure (B) provides a demarcation point between the IMS system and the Telco's WAN/LAN infrastructure. Two of the BPS 2000s can be configured with the optional Gigabit Ethernet interface modules (dependent on engineering requirements).
- The In-Reach 8020/8040 Terminal Server provides dial-up support for network elements when the network is down.
- On the initially configured frame, the RTP Media Portal, SIP PRI Gateway, and SIP Audio Server chassis (L) can be configured as follows:
 - 1/2 shelf SIP Audio Server + 1/2 shelf SIP PRI Gateway
 - or
 - full shelf SIP Audio Server
 - or

- full shelf SIP PRI Gateway
- or
- full shelf RTP Media Portal

Note: The configuration of the above components determines the card type and software load.

- Additional chassis (L) can be configured as follows:
 - 1/2 shelf SIP Audio Server + 1/2 shelf SIP PRI Gateway
 - or
 - full shelf or 1/2 shelf SIP Audio Server
 - or
 - full shelf or 1/2 shelf SIP PRI Gateway
 - or
 - full shelf or 1/2 shelf RTP Media Portal

Note: The configuration of the above components determines the card type, card fill, and software load.

Minimum baseline configuration

The baseline configuration for this release is as follows:

- 6 Sun Netra t 1400/1405 servers deployed as
 - 2 SIP Application Servers
 - 2 SIP Management/Accounting Servers with accounting data storage
 - 2 SIP Database Servers

The baseline configuration supports only the SIP Multimedia PC Client for providing SIP service access. For additional support, you can configure SIP IMS components, media servers, PSTN gateway, and access clients as shown in Table 6, "Additional configuration."

Table 6 Additional configuration (Sheet 1 of 2)

To support	Configure
i2004 Internet Telephone	• IP Client Manager
SIP Multimedia Web Client	• SIP Web Client Manager

Table 6 Additional configuration (Sheet 2 of 2)

To support	Configure
firewall traversal	• RTP Media Portal
calls to PSTN numbers	• SIP PRI Gateway • RTP Media Portal
conference calls	• SIP Audio Server • RTP Media Portal

Software

For information on software delivery and on software maintenance upgrades strategy, refer to the Upgrades chapter.

Software deployment on hardware components

Figure 4, “Software deployment,” shows the distribution of software on the various hardware components.

Figure 4 Software deployment

Hardware \ Software	Database Server	Management and Accounting Server	SIP Application Server	IP Client Manager Server (optional)	SIP Web Client Manager Server (optional)	IP Client Manager and SIP Web Client Manager Server (optional)
Database Module	X					
Management Module		X				
Accounting Module		X				
SIP Application Module			X			
Provisioning Module			X		X	X
SIP Provisioning Client			X			
SIP Web Client Manager					X	X
IP Client Manager				X		X
SIP Personal Agent			Optional		Optional	Optional
SIP Multimedia Web Client					X	X

Fault tolerance

This section describes the MCP Solution strategy for hardware and software fault tolerance for the:

- Management Module and Accounting Module
- SIP Application Module
- Database Module
- Provisioning Module
- SIP PRI Gateway, SIP Audio Server, and RTP Media Portal
- Web Client Manager
- IP Client Manager

Management Module and Accounting Module

The Management Module and Accounting Module both use 1+1 (active/standby) redundancy for fault tolerance. The failover for these modules is a manual process. Failure is indicated by alarms.

SIP Application Module

The Application Module uses the N+M redundancy for fault tolerance. It supports automatic failover through the IP Takeover. This means that when one of the active SIP Application Modules fails, the passive Module takes over the IP address. The passive Module has now become active and assumes the responsibilities of the failed Module.

Database Module

The Database Module uses the database replication strategy for fault tolerance (that is, 1+1). The failover for this module is automatic. Failure is indicated by alarms on the Management Console.

Provisioning Module

The failover for the Provisioning Module is a manual process.

SIP PRI Gateway, SIP Audio Server, and RTP Media Portal

The SIP PRI Gateway, SIP Audio Server, and RTP Media Portal are shared resources with redundancy provided through network engineering.

Web Client Manager

The Web Client Manager uses a load sharing strategy for fault tolerance. The Web Client Manager can be treated as a pooled resource by front ending it with a web switch. The failover is automatic.

IP Client Manager

The IP Client Manager uses 1+1 (active/standby) redundancy for fault tolerance. The failover for this manager is automatic. When an active IP Client Manager loses service, the standby manager takes over to manage the i2004 Internet Telephone and subscribers and begins processing SIP and UNISim messages.

OAM&P strategy

With the exception of some database administration functions that are managed through the Oracle Enterprise Manager (OEM), all operation, administration, maintenance, and provisioning (OAM&P) functions are performed by the Management Module.

The Management Module provides the services that support communication between MCP components and the System Management Console, which is the user interface to the Management Module. All management functions are performed through this user interface except for the database administration functions that are managed through the OEM. All provisioning functions are performed through the Provisioning Client except for the user provisioning functions that are managed through the OEM.

In conjunction with the System Management Console, the Management Module provides the following functionality:

- system operations administration
- system software management
- system configuration
- system maintenance
- fault monitoring
- system performance monitoring
- network management interfaces

Interfaces

This section provides information on the following topics:

- Signaling interfaces
- Network protocols
- User interfaces

Signaling interfaces

Multiple protocols can share access through a common NIC interface. Protocols must allocate different ports for sending and receiving signaling packets.

Network protocols

Table 7, "Network protocols," shows the protocols that the MCP uses to communicate with its components and network elements. MCP uses these network protocols to report logs and alarms, to allow provisioning of services, and to communicate configuration data.

Table 7 Network protocols (Sheet 1 of 3)

Network protocol	Protocol function
Data Transfer Protocol	The data transfer protocol uses socket-based TCP/IP communication to transmit collected accounting information from the SIP Application Module to the Accounting Module and to provide acknowledgment of the information received from the Accounting Module to the SIP Application Module.
Hypertext Transfer Protocol/HTTP Secure (HTTP/HTTPS)	The Web-based access clients use HTTP/HTTPS to communicate with the Web server portion of the Provisioning Module to enable browser-based communication sessions. Information transmitted in these sessions includes service provider provisioning, customer domain provisioning, subscriber self provisioning, and user network-based service capabilities.
Media Gateway Control Protocol ⁺ (MGCP ⁺)	MGCP ⁺ is an augmented version of the MGCP protocol used for communication between the RTP Media Portal and the SIP Application Module for establishing and maintaining required media sessions.
Open management interface (OMI)	The Management Module uses OMI to communicate management and configuration data to each of the managed network elements. OMI uses Extensible Markup Language (XML) over Transmission Control Protocol (TCP).
Perfect Channel Protocol (PCP)	Each of the managed network elements uses PCP to report performance data, logs, and alarms to the Management Module for viewing on the System Management Console.

Table 7 Network protocols (Sheet 2 of 3)

Network protocol	Protocol function
Primary rate interface (PRI)	The SIP PRI Gateway performs SIP-to-PRI and PRI-to-SIP protocol conversions to provide access to and from PSTN and PBX callers.
Real-time Transport Protocol/Real-time Transport Control Protocol (RTP/RTCP)	The RTP Media Portal is used to provide audio and video streaming capabilities for all SIP call sessions. RTCP is used to pass statistical data about SIP call session connections between endpoints.
Web Client Session Control Protocol (WCSCP)	WCSCP uses socket messaging sent by way of a TCP connection to enable communication between the SIP Multimedia Web Client and the Web Client Manager for session control.
Session Initiation Protocol (SIP)	SIP is a service-enabling protocol used for real-time, multimedia sessions to integrate voice, data, and video. The SIP Application Module uses SIP to communicate with the SIP Audio Server, SIP PRI Gateway, Provisioning Module, SIP Web Client Manager, IP Client manager, SIP Multimedia PC Client, and SIP Multimedia Client Set.
Session Initiation Protocol for Telephony (SIP-T)	SIP-T uses SIP to facilitate the interconnection of PSTN and IP networks. In the MCP, SIP-T is used for the required signaling between the SIP Application Module and the CS 2000.
Structured Query Language (SQL)	SQL is used over a Java database connectivity (JDBC) to communicate subscriber location information, routing and translation data, and system configuration data from the Database Module to the network elements.
Unified Network IP Stimulus (UNISim) Protocol	UNISim is a Nortel Networks proprietary protocol used to provide communication from i2004 Internet Telephone devices to the IP Client Manager for SIP-based services. The IP Client Manager performs UNISim-to-SIP and SIP-to-UNISim protocol conversion, which enables i2004 Internet Telephones to access SIP services.

Table 7 Network protocols (Sheet 3 of 3)

Network protocol	Protocol function
Simple Object Access Protocol (SOAP)	SOAP is an XML-based lightweight protocol for the exchange of information in a decentralized, distributed environment. It is used between the Provisioning Module and the SIP Multimedia PC Client (and the SIP Multimedia Client Set) to transfer address book information and service package information. It is also used by the Command Line Interface and 3rd party provisioning applications to transfer provisioning data to the system.
Open Provisioning Interface (OPI)	Based on the SOAP protocol message structure, encoding style and messaging rules, the OPI is a web service that exposes XML remote procedure calls, enabling the provisioning clients to access the provisioning data. HTTP/HTTPS functions as its transport protocol. The Command Line Interface (a command line provisioning client), 3rd party applications and the PC Client that need to retrieve, modify, or store provisioning data use OPI. Additionally, OPI is used to integrate the provisioning server with non-MCP applications, such as customer records management (CRM) systems.
File Transfer Protocol (FTP)	FTP is used for transferring data from the Management Module to a northbound management system for logs and Operational Measurements/Performance Measurements (OMs/PMs). It is also used for transferring accounting data from the Accounting Module to a northbound management system.
Simple Network Management Protocol version 2 (SNMPv2)	Network elements use SNMPv2 to transmit traps using the reliable fault management information base (MIB) to the northbound network management system.

Table 8, "MCP component protocol usage," shows which MCP components use which network protocols.

Table 8 MCP component protocol usage (Sheet 1 of 2)

Network protocol	MCP components using this protocol
Data transfer protocol	SIP Application Module and Accounting Module
HTTP/HTTPS	Provisioning Module, SIP Provisioning Client, Personal Agent, and SIP Multimedia Web client
MGCP ⁺	RTP Media Portal and SIP Application Module
OMI	Management Module, Accounting Module, Database Module, SIP Application Module, SIP Audio Server, SIP PRI Gateway, IP Client Manager, RTP Media Portal, Provisioning Module, and SIP Web Client Manager
PCP	Management Module, Accounting Module, Database Module, SIP application Module, SIP Audio Server, SIP PRI Gateway, IP Client Manager, RTP Media Portal, Provisioning Module, and SIP Web Client Manager
PRI	SIP PRI Gateway
RTP/RTCP	RTP Media Portal, i2004 Internet Telephone, SIP Multimedia PC Client, SIP Multimedia Client Set, SIP Audio Server, SIP PRI Gateway, SIP Multimedia Web Client, and CS 2000 interworking communication
WCSCP	SIP Multimedia Web Client and SIP Web Client Manager
SIP	SIP Application Module, SIP Audio Server, SIP PRI Gateway, Provisioning Module, SIP Web Client Manager, IP Client Manager, SIP Multimedia PC Client, and SIP Multimedia Client Set
SIP-T	SIP Application Module and CS 2000 interworking communication
SOAP	Provisioning Module, SIP Multimedia Client, and SIP Multimedia PC Client Set

Table 8 MCP component protocol usage (Sheet 2 of 2)

Network protocol	MCP components using this protocol
SQL over JDBC	Database Module, Management Module, SIP Application Module, IP Client Manager, Provisioning Module, and SIP Web Client Manager
UNISTim	IP Client Manager, i2004 Internet Telephone, and SIP Multimedia Client Set

User interfaces

MCP provides the user interfaces shown in Table 9, “MCP user interfaces,” for deploying, configuring, managing, and monitoring network elements, and for performing provisioning tasks.

Table 9 MCP user interfaces

User interface	Function
System Management Console	This is the primary MCP graphical user interface (GUI). Use it to deploy, configure, manage, and monitor MCP network elements.
Oracle Enterprise Manager (OEM)	Use this Oracle GUI to monitor replication and the nightly batch jobs that are run to back up the database. Note: Use the System Management Console to monitor database activity.
Command Line Interface (CLI)	Use this basic CLI to bulk provision subscribers and domains. This user interface is primarily used by service providers and domain administrators. Note: The Bulk Provisioning tool enables tasks, such as the query/import of data to/from flat files and to update/delete data based on flat file input. This interface will change in the future release. For more details on the interface, please contact the support group.
SIP Provisioning Client	Use this Web-based GUI to perform overall provisioning of the MCP. This user interface is used by service providers to provision administrators, domains, gateways, IP Client Managers, voice mail servers, and service packages.

Features and services

The MCP offers a wide variety of multimedia and telephony features to the subscriber. The availability of these features and services depends on the client devices deployed. The following sections list features and services associated with each client device.

SIP Personal Agent features and services

The SIP Personal Agent is a Web-based self-provisioning interface that enables subscribers to customize their SIP services. The features and services associated with the SIP Personal Agent are as follows:

- Web-based Administration and User Account Profile
- Subscriber provisioned Call Screening and Routing (follow me, sequential ringing)
- Network-based Address Book
- Presence
 - User-initiated Presence functions include:
 - User can create a list of Buddies.
 - User can view, add to, and remove from the list of Buddies.

Note: From the SIP Personal Agent the user can add a name to the list of buddies only if it already exists in the Address Book.

For information on using the SIP Personal Agent, refer to the *SIP Personal Agent User Guide*.

SIP Multimedia Web Client features and services

The SIP Multimedia Web Client provides subscribers with access to SIP services through a Web browser. The features and services associated with the SIP Multimedia Web Client are as follows:

- Real time call screening (answer, pass, reject, transfer)
- Call waiting, call hold
- Information Delivery Services (calling name, number, subject, picture)
- Conference Calling (three-way client-based conferencing and server-based conferencing with many more ports)
- Web Push, Co-browsing
- Video Calls
- Instant messaging

- Easy access to voicemail
- Presence
 - User-initiated Presence functions include:
 - User can add to and remove from the list of Buddies.
 - User can change their Presence status.
 - User can view the status of Buddies.
 - Automatic Presence functions include automatic detection for “inactive” and “on the phone” status of the user.

Note: From the SIP Multimedia Web Client the user can add a name to the list of buddies only if it already exists in the Address Book.

For information on using the SIP Multimedia Web Client, refer to the *SIP Multimedia Web Client User Guide*.

SIP Multimedia PC Client features and services

The SIP Multimedia PC Client is a downloadable software client that provides subscribers with access to SIP services. The features and services associated with the SIP Multimedia PC Client are as follows:

- Real time call screening (answer, redirect, decline, ignore)
- Call waiting, call hold
- Incoming and outgoing call log
- Information Delivery Services (calling name, number, subject, picture)
- Conference Calling (three-way client-based conferencing and server-based conferencing with many more ports)
- Web Push, Co-browsing
- Video Calls
- Collaboration (Clipboard/White Board/file transfer)
- Click to Call using integration with MS Outlook to initiate calls
- Easy access to voicemail
- Instant messaging

- Three-way calling
- Presence
 - User-initiated Presence functions include:
 - User can add to and remove from the list of Buddies.
 - User can change their Presence status.
 - User can view the status of Buddies.
 - Automatic Presence functions include automatic detection for “inactive” and “on the phone” status of the user.

Note: From the SIP Multimedia PC Client the user can add a name to the list of buddies only if it already exists in the Address Book.

For information on using the SIP Multimedia PC Client, refer to the *SIP Multimedia PC Client User Guide*.

SIP Multimedia PC Client Set features and services

The SIP Multimedia PC Client Set is a downloadable software client that provides subscribers with access to SIP services. The features and services associated with the SIP Multimedia PC Client Set are as follows:

- Real time call screening (answer, redirect, decline, ignore, transfer)
- Call waiting, call hold
- Inbox and outbox
- Information Delivery Services (calling name, number, subject, picture)
- Conference calling
- Web Push, Co-browsing
- Video calls
- Collaboration (Clipboard/White Board/file transfer)
- Click to Call using integration with the Microsoft Outlook to initiate calls
- Easy access to voicemail
- Instant messaging
- Import contact information from Microsoft Outlook 2000

- Presence (user initiated and automatic presence)
 - User-initiated Presence functions include:
 - User can add to and remove from the list of Buddies.
 - User can change their Presence status.
 - User can view the status of Buddies.
 - Automatic Presence functions include automatic detection for “inactive” and “on the phone” status of the user.

Note: From the SIP Multimedia PC Client Set the user can add a name to the list of buddies only if it already exists in the Address Book.

For information on using the SIP Multimedia PC Client, refer to the *SIP Multimedia PC Client User Guide*.

i2004 Internet Telephone features and services

The i2004 Internet Telephone is a hard client that provides subscribers with access to SIP services. The features and services associated with the i2004 Internet Telephone are as follows:

- Real time call screening (answer, redirect, reject, pass)
- Call waiting, call hold, call forward, call transfer
- Incoming and Outgoing Call Log
- Information Delivery Services (calling name, number, subject)
- Conferencing calling
- Automatic registration on activation of the device
- Multiple Users Logon
- Handset, handsfree, headset support
- Inbox and outbox
- Address book
- Presence
 - User-initiated Presence functions include:
 - User can change their Presence status.
 - User can view their Presence status.
 - User can view the Presence status of Buddies (by scrolling horizontally in the list).
 - Automatic Presence functions include automatic detection for “inactive” and “on the phone” status of the user.

- Instant messaging
- Stock query (obtain stock quotes directly on the i2004 Internet Telephone display)
- Bulletins (receive messages from your Service Provider, such as news of an upcoming system upgrade, directly on the display screen of your i2004 Internet Telephone)
- QoS (view RTCP information for the media stream of the call on your i2004 Internet Telephone. Your Service Provider can use this information to analyze network performance.)

For information on using the i2004 Internet Telephone, refer to the *i2004 Internet Telephone User Guide*.

Feature and services interworking

The IMS can interwork with the Nortel Networks Communications Server 2000 (CS 2000). For more information on interworking with CS 2000, refer to *MCP Interworking*.

Additionally, the IMS supports the Converged Desktop, which allows users to use their PCs for multimedia communication, while using the existing telephony system for voice. A Converged Desktop consists of a Time Division Multiplex (TDM) telephone and a PC running the SIP Multimedia PC Client software with the following capabilities:

- Redirected call based on SIP Personal Agent screening rules
- Incoming call log
- Video Calling Line ID (see who is calling you with the picture being assigned by the receiver of the call)
- Real-time call screening (answer, redirect, answer, pass)
- Collaboration (Clipboard/White Board/file transfer)
- Web Co-browsing
- Instant Messaging and Presence state indications

For more information on interworking with TDM switching products, including the DMS-100 and Meridian SL-100 switches, refer to *MCP Interworking*.

Basic call flows

The following sections provide an explanation of SIP signaling as well as sample diagrams and descriptions of some basic MCP call flows. These flows outline the general flow for basic IMS messaging scenarios and may omit some details in order to emphasize the overall concepts

involved in IMS call processing. The following sections describe the flows for the following types of calls:

- SIP to SIP call
- SIP to PSTN call
- PSTN to SIP call

For more information, refer to the messaging information in the *MCP SIP Application Module Basics*, which includes information on database lookup, registration, authentication, and persistent acknowledge messages (PRACK).

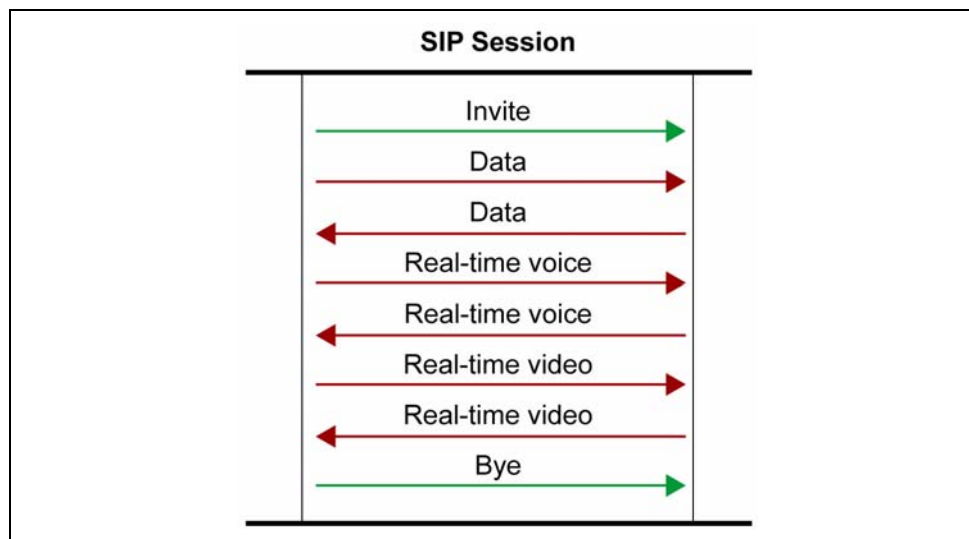
SIP signaling

To facilitate Voice over IP (VoIP) and integrate multimedia services, the MCP uses SIP as the signaling protocol to establish a communication path between endpoints. Since SIP uses a simple text-based command structure with HTTP syntax and URL addressing, it is well-equipped to work with both Internet and Web-based applications.

The focus of SIP transaction signaling is to open a dialog between endpoints agreed to by the initiator and by the receiver. Once SIP establishes a signaling path, any form of dialog can occur between the participants. For example, the dialog can be used to transfer data such as files or whiteboarding, or to communicate in real-time audio as in the case of conference calls.

With SIP, it is possible to set up media simultaneously between the participants during the session. Refer to Figure 5, “Basic SIP session.”

Figure 5 Basic SIP session



SIP signaling is transaction-based. An Invite transaction opens the session and a Bye transaction closes the session. The MCP uses the abbreviated form of headers in its SIP messages. The key to the abbreviated SIP message headers used in the MCP is shown in Table 10, "SIP message header abbreviations."

Table 10 SIP message header abbreviations

Abbreviation	Meaning
t:	To:
f:	From:
i:	Call-ID
k:	Supported:
m:	Contact:
c:	Content-Type:
l:	Content-Length:
v:	Via:

The following example shows a sample SIP message that is an Invite message for a call from user 353 on an i2004 Internet Telephone to user 14 on another i2004 Internet Telephone. It is the Invite message forwarded on behalf of user 353 from the SIP Application Server to the IP Client Manager hosting the i2004 Internet Telephone for user 14.

Example
Sample SIP message header

```
INVITE sip:14@lab3.org:5070;action=proxy;maddr=47.104.12.140 SIP/2.0
t: 14 <sip:14@lab3.org>
f: 353 <sip:353@lab3.org>;tag=1947342603
i: 3eee9628_ee3e2052d9@test3_app
Allow: REFER,ACK,BYE,CANCEL,INVITE,OPTIONS,INFO,MESSAGE
Max-Forwards: 19
k: com.nortelnetworks.superclient,com.nortelnetworks.firewall,100rel
m:
<sip:353@47.104.12.140:5060;nt_end_point=ZaBCAIBBFLFCFEFCCBFFF
GEPFAFBFFEPFAFDEPFAFFBFLFEFBFGFB>
c: application/sdp
```

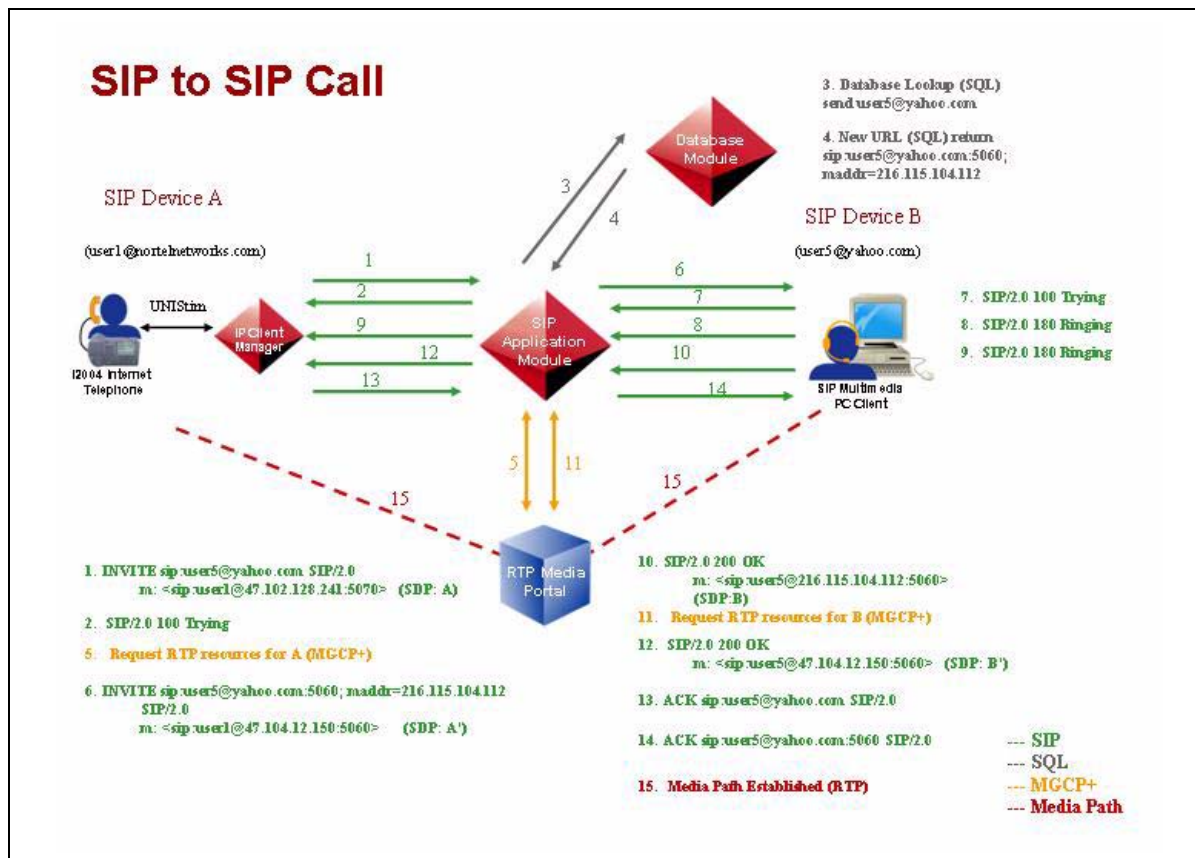
l: 313
 v: SIP/2.0/UDP
 47.104.12.140:5060;branch=bba919f84defc995e821d1f7453668e4.1
 CSeq: 49826 INVITE

SIP to SIP call

Figure 6, "SIP to SIP call," shows a basic call flow for a SIP to SIP call. A detailed, step-by-step description follows the illustration.

In the SIP to SIP call shown, SIP Device A is calling SIP Device B and each device is located in a different domain. Consequently, the RTP Media Portal is used.

Figure 6 SIP to SIP call



Steps for SIP to SIP call:

1. Invite (SIP)—INVITE sip:user5@yahoo.com SIP/2.0
 m: <sip:user1@47.102.128.241:5070>(SDP: A)
2. Trying (SIP) — SIP/2.0 100 Trying

3. Database Lookup (SQL) — send user5 @ yahoo.com (See “Database Lookup 2.”)
4. (New URL (SQL) — return sip:user5@yahoo.com:5060;
maddr=216.115.104.112
5. Request RTP resources for A (MGCP+) (A', B')(Map A to A')
6. Invite (SIP) — INVITE sip:user5@yahoo.com:5060;
maddr= 216.115.104.112 SIP/2.0
m: <sip:user1@47.104.12.150:5060>(SDP: A')
7. Trying (SIP) — SIP/2.0 100 Trying
8. Ringing (SIP) — SIP/2.0 180 Ringing
9. Ringing (SIP) — SIP/2.0 180 Ringing
10. OK (SIP) — SIP/2.0 200 OK
m: <sip:user5@ 216.115.104.112:5060> (SDP: B)
11. Update RTP resources for B (MGCP+)(Map B to B')
12. OK (SIP) — SIP/2.0 200 OK
m: <sip:user5@47.104.12.150:5060> (SDP: B')
13. ACK (SIP) — ACK sip:user5@yahoo.com SIP/2.0
(Note: Originating client will start sending packets.)
14. ACK(SIP)—ACKsip:user5@yahoo.com:5060SIP/2.0
(Note: Terminating client will start sending packets.)
15. Media Path Established (RTP) (A sends media packets to B', Portal double NATs the packets (both SRC & DEST), and forwards to B from A'.)

SIP to PSTN call

Figure 7, “SIP to PSTN call,” shows a basic call flow for a SIP to PSTN call. A detailed, step-by-step description follows the two illustrations.

In the SIP to PSTN call shown, SIP Device A is calling PSTN Device B. The SIP PRI Gateway always sends a 183 message and includes SDP in the message body. Therefore, early media is sent to provide the ringing tones to Device A.

Figure 7 SIP to PSTN call

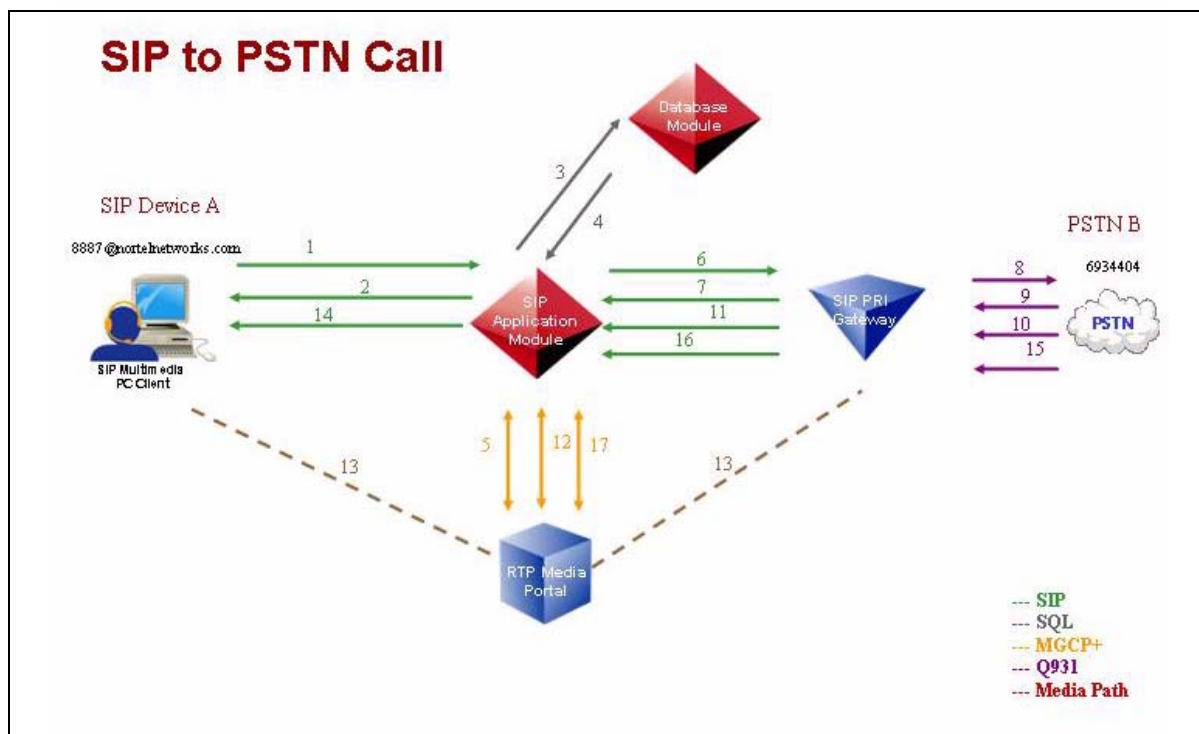
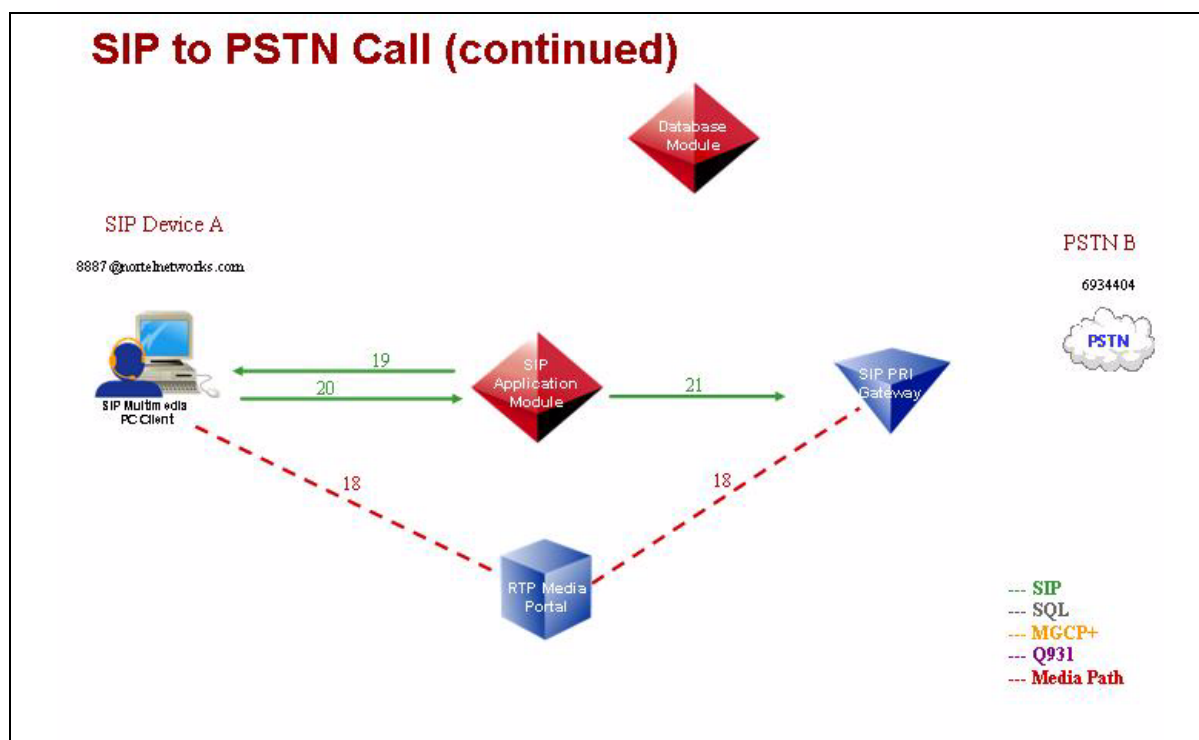


Figure 7 SIP to PSTN call (continued)



Steps for SIP to PSTN call:

1. Invite(SIP)→INVITEsip:66934404@nortelnetworks.comSIP/2.0
m: <sip:8887@47.100.234.159:5060> (SDP: A)
2. Trying (SIP) — SIP/2.0 100 Trying
3. Database Lookup (SQL) — send 66934404@nortelnetworks.com
(See “Database Lookup 2.”)
4. New URL (SQL) — return sip:4404@nortelnetworks.com,
maddr=47.100.234.140, user=phone, norteldevice=pri,
norteltrkgrp=pria_t1_8000
5. Request RTP resources for A (MGCP+) (A', B') (Map A to A')
6. Invite (SIP) — INVITE
sip:4404@private.nortelnetworks.com:5060;
maddr=47.100.234.140; user=phone
norteltrkgrp=pria_t1_8000 SIP/2.0
m: <sip: 8887@47.104.12.150:5060>(SDP: A')
7. Trying (SIP) — SIP/2.0 100 Trying
8. SetUp (Q931)
9. Call Proceeding (Q931) — equates to the SIP Trying
10. Alerting or Progress (Q931) — depends on NT or TE mode
11. 183 Ringing (SIP) — SIP/2.0 183 Session Description(SDP: B)
(Note: The Terminating Gateway will start sending ringing tones.)
12. Update RTP resources — flag for one-way RTP media (MGCP+)
(Map B to B')
13. One-way Media Path Established for Early Media
Note: This is a one-way media path from the Gateway to Device A.
Information is not mapped in the reverse order.
14. 183 Ringing (SIP) — SIP/2.0 183 Session Description(SDP:B')
(Note: The originating client will start sending packets when it
receives the 183 with SDP information.)
15. Connect (Q931)
16. OK (SIP)—SIP/2.0 200 OK
m: <sip: 66934404@47.100.234.140:5060> (SDP: B)
17. Update RTP resources for B (MGCP+) — flag for 2-way RTP media
(This sets up the 2-way RTP path. If 16 contained new SDP for B,
then this new B would be mapped to B'. However, the Gateway will
send the same SDP.)
18. Media Path Established (RTP) (A to B', then NAPTed & forwarded
A' to B)

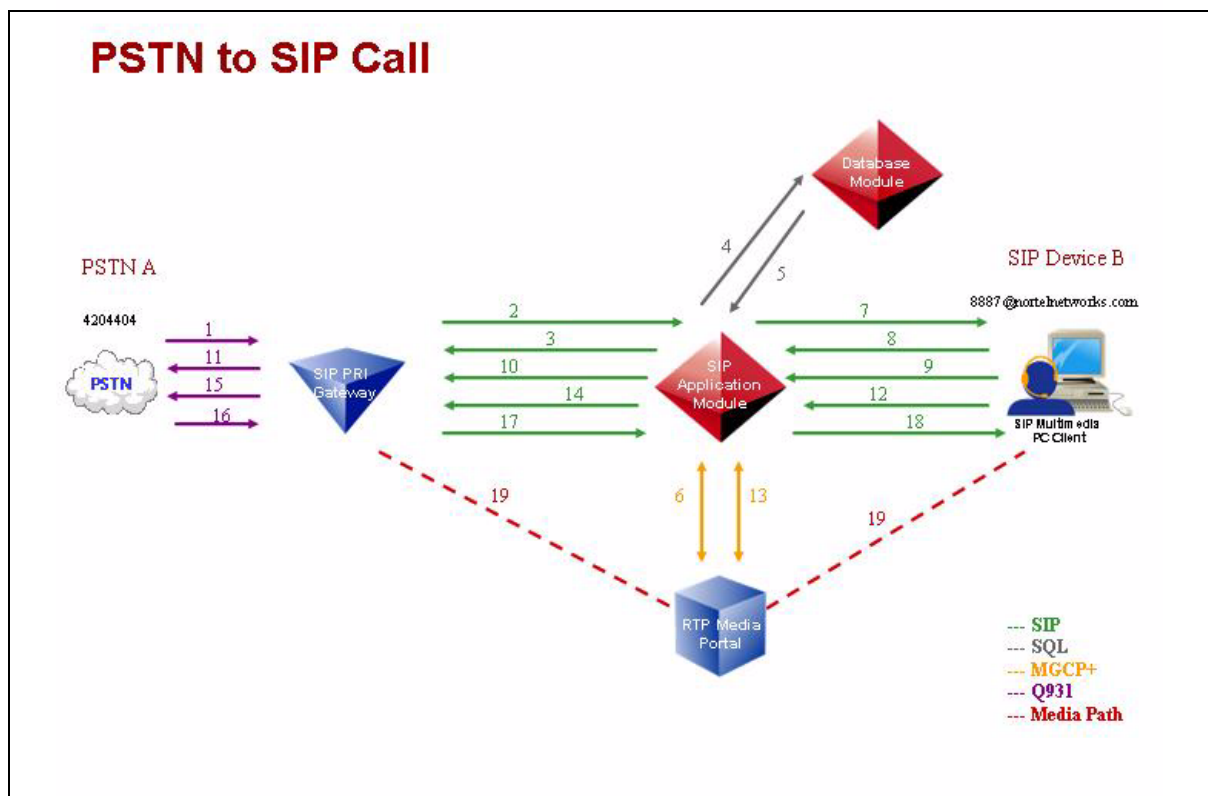
19. OK (SIP) — SIP/2.0 200 OK
m: <sip: 66934404@47.104.12.150:5060> (SDP: B')
(Note: If the OK contained new SDP information, the client would begin sending its packets to the new SDP.)
20. ACK (SIP) — ACK sip:66934404@47.104.12.150:5060 SIP/2.0
21. ACK (SIP) — ACK sip:4404@private.nortelnetworks.com:5060;
maddr=47.100.234.140; user=phone;
norteltrkgrp=pria_t1_8000 SIP/2.0

PSTN to SIP call

Figure 8, "PSTN to SIP call," shows a basic call flow for a PSTN to SIP call. A detailed, step-by-step description follows the illustration.

In the PSTN to SIP call shown, PSTN Device A is calling SIP Device B.

Figure 8 PSTN to SIP call



Steps for PSTN to SIP call:

1. SetUp (Q931).
2. Invite (SIP) — INVITE sip:8887@private.nortelnetworks.com;
maddr=47.104.12.150; transport=udp; user=phone;
nortelTrkGrp=pri_t1_8000 SIP/2.0
m: <sip: 4404@47.100.234.140:5060> (SDP: A)
3. Trying (SIP) — SIP/2.0 100 Trying
4. Database Lookup (SQL) — send 8887@nortelnetworks.com
5. New URL (SQL) — return sip:8887@nortelnetworks.com:5060;
maddr=47.100.234.159
6. Request RTP resources for A (MGCP+) (A', B') (Map A to A')
7. Invite (SIP) — INVITE sip:8887@nortelnetworks.com:5060;
maddr=47.100.234.159; ttl=1; transport=udp SIP/2.0
m: <sip: 4404@47.104.12.150:5060> (SDP: A')
8. Trying (SIP) — SIP/2.0 100 Trying
9. Ringing (SIP) — SIP/2.0 180 Ringing(SIP clients do not send SDP in the 180)
10. Ringing (SIP) — SIP/2.0 180 Ringing
11. Alerting (Q931)
12. OK (SIP) — SIP/2.0 200 OK
m: sip: 8887@47.100.234.159:5060 (SDP: B)
13. Update RTP resources for B (MGCP+)(Map B to B')
14. OK (SIP) — SIP/2.0 200 OK
m: <sip: 8887@47.104.12.150:5060>(SDP: B')
(Note: Originating Gateway will start sending packets.)
15. Connect (Q931)
16. Connect ACK (Q931)
17. ACK (SIP) — ACK sip:8887@private.nortelnetworks.com;
maddr=47.104.12.150; transport=udp; user=phone;
nortelTrkGrp=pria_t1_8000 SIP/2.0
18. ACK (SIP) — ACK sip:8887@nortelnetworks.com:5060;
transport=udp SIP/2.0
(Note: Terminating client will start sending packets.)
19. Media Path Established (RTP) (A to B', then NAPTEd & forwarded A' to B)

Customer information

This section describes the way in which Nortel Networks provides customers with the following types of information:

- Web site information
- Training and documentation
- Legal notices

Web site information

Nortel Networks Web site, www.nortelnetworks.com, is a valuable site for customer information, support, and services. From this site, you can get information on customer service, training and documentation, professional services, and other areas of business.

Training and documentation

How to contact Nortel Networks for help on customer information

Contact your Nortel Networks account prime for help on customer information.

Where to get customer documentation

Documentation for the Multimedia Communications Portfolio is delivered on the customer CD.

Where to get training information

All course descriptions, prerequisites, schedules and locations can be viewed at www.nortelnetworks.com.

Note: For the most recent curriculum information, please contact your Nortel Networks Training and Documentation representative. For enrollment assistance, please contact Training registration at 1-800-4-NORTEL (1-800-466-7835), express routing code #280.

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Upgrades

How this chapter is organized

Upgrades is organized as follows:

- Strategy on page 49
- Tools and utilities on page 50
- Task flows and sequencing on page 50

Strategy

Maintenance releases are supported for all Nortel Networks components of the MCP network. A maintenance release allows the current active software to be incremented in order to address emergency or general maintenance requirements. The update mechanism for the MCP 1.1 maintenance releases:

- supports migration of configuration data from one version to the next
- provides software rollback capability for use in the event of software or deployment failure
- bundles the maintenance release software into an upgrade package to decrease the time required to identify the differences between releases and reduce the time required for the overall upgrade process

Software upgrade delivery methods

Nortel Networks can deliver MCP software upgrade packages by FTP transfer over a network connection or on a compact disc (CD).

Once MCP software upgrade bundles are delivered, they are loaded onto the SIP Management Server where property definitions are unbundled to drive the System Management Console. Once this is accomplished, the upgrade software packages are deployed to the appropriate MCP components.

For instructions on updating component software, refer to the corresponding component documentation.

Upgrade contents

Each MCP 1.1 upgrade package contains the following items:

- the compatible System Management Console to be transferred to the System Management Console PC
- a copy of the Installation Methods of Procedure (MOPs)
- a copy of the Release Notes for the maintenance release, which outline the contents of the maintenance release

Tools and utilities

All software maintenance release upgrades are implemented from the Management Module through the System Management Console. That is, the software upgrade bundles are loaded onto the Management Module and then are deployed through the System Management Console. Rollbacks are also accomplished from the System Management Console.

For information on the Management Module and System Management Console, refer to the *MCP Management Module Basics* and *MCP System Management Console Basics*. For information on instructions for performing component software updates (and rollbacks), refer to the corresponding component documentation.

Task flows and sequencing

This section provides information on the following topics:

- High-level upgrade tasks
- Deployment order

High-level upgrade tasks

Once the maintenance release upgrade software has been received, the following tasks must be performed before the software upgrade bundles can be deployed:

- Extract the upgrade software to the SIP Management Server.
- Install the upgraded System Management Console software on the PCs being used as administrator's workstation.

For information on installing the upgraded System Management Console, see the *MCP System Management Console Basics*.

Deployment order

The order in which software upgrades to MCP are deployed is extremely important. Failure to perform upgrades in the specified order will result in loss of service.

Upgrades to MCP software components must be performed in the following order:

- Third-party maintenance releases
- Management Module
- System Management Console PC
- Database Module
- Provisioning Module
- Accounting Module
- SIP Application Module
- RTP Media Portal
- IP Client Manager
- SIP Web Client Manager
- SIP PRI Gateway
- SIP Audio Server

**CAUTION**

If the upgrade contains changes to the tables in the Database Module, then the Database Module must be upgraded before the Management Module.

Fault management

How this chapter is organized

Fault Management is organized as follows:

- Strategy on page 53
- Tools and utilities on page 54
- Task flows on page 56

Strategy

The Management Module provides fault management for all IMS system components. Fault data is collected from each IMS core element and then sent to the Management Server. Software and application alarms are transmitted using the XML and consolidated at the Management Server. The Database Module, Provisioning Module, RTP Media Portal, SIP Audio Server, and SIP PRI Gateway send SNMP traps to the Management Server. The fault data is formatted into Nortel Networks STD logs as well as populated into the Nortel Networks' reliable fault management information base (MIB). The formatted data may be sent to the System Management Console and the Network Management System. A secure Open Management Interface (OMI) over Secure Socket Layer (SSL) interface is used by the System Management Console to receive these alarms. For additional information on the Management Module, refer to the *MCP Management Module Basics*.

The System Management Console, which is the interface to the Management Module, is used to view faults and manage the health of the IMS system and its components. For detailed instructions on using the System Management Console, refer to the *MCP System Management Console Basics*.

In addition to being monitored from the System Management Console, faults also can be pulled directly from the Management Module through the use of an SNMP stream or FTP session as outlined below:

- SNMPv2c/ip feed
- FTP pull
- TCP/IP stream

For a comprehensive list of all IMS system alarms, refer to the *MCP System Management Console Basics*.

For information about a specific component's faults, refer to the overview information for that specific component.

Tools and utilities

The System Management Console monitors all system level and server level MCP alarms and logs. You can access the Alarm and Log browsers from the Tools menu on the System Management Console menu bar or by right-clicking on the specific component for which you want to view alarm or log information.

The rest of this section provides general information on alarms and logs. For more information on alarms and logs and for information on using the System Management Console to monitor alarms and logs, refer to the *MCP System Management Console Basics*.

Alarms

During operation, services may detect faults that represent malfunctioning under certain conditions. As these faults occur, alarms are raised by the corresponding services in order to alert the user that a problem exists.

When an alarm is raised, it is added to a list of currently active alarms. The alarm remains on the active list until it is resolved. Once the problem is resolved, the alarm is cleared and removed from the list of active alarms. Until an alarm is cleared, it remains on the active list.

Note: The process of clearing alarms is automatic; you cannot clear alarms manually.

The information displayed in the alarm browser depends on the node selected in the System Management Console hierarchy tree. For example, if a server is selected, the alarm browser will show the alarms for all the components hosted on the server; if a component is selected only the alarms generated by its hosted services are displayed.

Administrators can launch more than one browser, allowing them to view alarms for specific nodes separately.

Table 11, "Alarm attribute," shows all the alarm fields viewed in the alarm browser with their descriptions.

Table 11 Alarm attribute

Alarm attribute	Description
Timestamp	The time when the alarm was raised.
Severity	The severity assigned to the alarm (see Table 12).
Originator	The service originating the alarm.
Alarm Name	The name of the alarm.
Probable Cause	The general problem causing the alarm.
Family Name	Managed object family originating the alarm.

There is a severity level associated with each alarm that indicates how serious the problem is. The severity levels that can be assigned to alarms are listed in Table 12, "Alarm severity levels."

Table 12 Alarm severity levels

Severity level (and #)	Meaning
Critical (5)	The application is malfunctioning and is incapable of continuing to provide the desired functionality. The application may not recover until the problems have been resolved.
Major (4)	The application is experiencing difficulties in providing the desired level of services and soon may not be able to provide the services any longer.
Minor (3)	The application has detected a problem that is not presently affecting services. Services provided by the application could be affected if the problem persists.
Warning (6)	A problem may have occurred. It is not affecting service or the service can recover by itself.

Alarm log

You can also view alarms through the Log Browser on the System Management Console.

SNMP alarm reporting

Alarm events are provided through an SNMP Management Information Base (MIB), which includes a local copy of an active alarms table for resynchronization.

For more information on alarms, refer to the *MCP System Management Console Basics*.

Logs

Logs capture and record information about events that occur during service component operation so that events can be analyzed at a later time.

Every log event is captured and archived in Standard (STD) format to disk on the Management Server.

Task flows

Perform all fault management tasks from the System Management Console. The following procedures outline high-level task flows, but do not include all possible tasks.

For more information and detailed procedures, refer to the overview information for each individual MCP component.

Procedure 1 Alarm analysis***At the System Management Console***

- 1 View alarms.
- 2 Analyze alarms.
- 3 View alarm history.
- 4 Respond to system faults that caused the alarms.
- 5 View logs.
- 6 Analyze logs.
- 7 View log history.
- 8 Respond to system faults and conditions captured in the logs.
- 9 Reload device.
- 10 Return device to service.

Disaster Recovery

This section gives an overview of what may be done in the event of hardware or software failure.

Hardware failure

The general rule for replacing any hardware is to follow the documentation that comes with the unit. The following hardware can be replaced:

- hard disk drive
- quad-fast Ethernet card
- power supply
- CPU and memory
- CD-ROM drive
- SCSI card
- task Blade
- BPS2000
- 10/100 MDA, Gigabit MDA and Cascade Module
- terminal server
- KVM
- monitor

Configuration management

How this chapter is organized

Configuration Management is organized as follows:

- Strategy on page 59
- Tool and utilities on page 60
- Task flows on page 60

Strategy

Nortel Networks delivers Multimedia Communications Portfolio SIP-based IP network solutions on a pre-configured basis. Process and tool development is geared to this strategy. As a result, custom engineering is only offered at an additional cost through Nortel Networks Services.

Nortel Networks performs standard installation and base commissioning for the customer. After the base commissioning is done by Nortel Networks, the customer takes over. Nortel Networks and the customer assume different responsibilities to make the network fully operational.

After installation and base commissioning is done by Nortel Networks, the customer can use the following checklist to verify completion:

- All appropriate hardware equipment and software loads have been installed and loaded as follows:
 - the network is cabled/ connected.
 - all cards are installed.
 - grounding is implemented for safety.
- All network topology (physical characteristics) is implemented as planned.
- Installation validation procedures are complete and components are found to be operational. (For example, when you install and load

software and turn pieces of equipment on, then the equipment is commissioned.)

- The sequence of translations, internal customer testing, and additional services, applications, and features have been planned.

Tool and utilities

The configuration of an MCP SIP-based IP network has three phases—deploying, configuring, and provisioning the MCP components and network elements.

The tool for deploying and configuring all Interactive Multimedia Server (IMS) components and MCP network elements is the System Management Console.

The tool for provisioning the MCP is the SIP Provisioning Client, which is a Web-based GUI. A command line interface (CLI) tool also is provided to enable bulk provisioning. The Bulk Provisioning Tool provides a command set for bulk provisioning tasks such as the query/import of data to/from flat files and to update/delete data based on flat file input. This interface will change in the future release. For more details on the CLI interface, please contact the support group.

Task flows

The configuration management and provisioning tasks to be performed can vary from one MCP deployment to another. However, most of these high-level tasks for configuring MCP components and network elements and for provisioning MCP domains are identified in the following sections:

- System Management Console configuration tasks
- SIP Provisioning Client provisioning tasks

When configuring a new MCP system at deployment, you should configure the managed objects on the different nodes and bring everything online before beginning provisioning tasks.

System Management Console configuration tasks

Table 13, “System Management Console configuration tasks sequence,” shows the sequence of the MCP component and network

element configuration tasks that a user must follow from the System Management Console.

Table 13 System Management Console configuration tasks sequence

Step	Description	Tasks
1.	Configure IMS system level elements (add/remove sites, servers, and IMS service components)	Add/remove sites, servers, and IMS service components Note: Before you can delete a server, you must delete all the service components for that server. Similarly, before you can delete a site, you must delete all the servers from that site.
2.	Configure the Accounting Server	Add component
		Select from the load list
		Configure Accounting Manager Service Component Name
		Configure the properties within the Central Accounting Manager tab
3.	Configure the SIP Application Server	Add component
		Select from the load list
		Configure SIP Application Server Service Component Name
		Configure the properties within all tabs of the SIP Application Server
4.	Configure the IP Client Manager	Add component
		Select from the load list
		Configure IP Client Manager Service Component Name
		Configure the properties within all tabs of the IP Client Manager

Table 13 System Management Console configuration tasks sequence

Step	Description	Tasks
		Configure the Web bundle (SIP Provisioning Client, SIP Provisioning Server, SIP Multimedia Web Client, SIP Multimedia Web Server, SIP Personal Agent) • add component • select from the load list • configure IPCM Service Component Name • configure SIP Provisioning Client, SIP Provisioning Server, SIP Multimedia Web Client, SIP Multimedia Web Server, and SIP Personal Agent deploy the UFTP bundle (required for i2004 Internet Telephone firmware downloads) by selecting • Components->Add->BaseSoftware (for the server to deploy the bundle to) • UFTP bundle from load list and then selecting the Apply button
5.	Configure RTP Media Portal	Add component Select from the load list Configure RTP Media Portal Service Component Name Configure the properties within all tabs of the RTP Media Portal
6.	Configure SIP PRI Gateway Note: Third-party gateways are configured from their own console. Third-party configuration is not part of Nortel Networks standard configuration procedures.	Add component Select from the load list Configure SIP PRI Gateway Service Component Name Configure the properties within all tabs of the SIP PRI Gateway

Table 13 System Management Console configuration tasks sequence

Step	Description	Tasks
7.	Configure SIP Audio Server	Add component
		Select from the load list
		Configure SIP Audio Server Service Component Name
		Configure the properties within all tabs of the SIP Audio Server

For more information about configuration management and for instructions for performing configuration tasks at the sites and server levels, refer to the *MCP System Management Console Basics*. For information on performing configurations tasks of MCP components, refer to the corresponding component documentation.

SIP Provisioning Client provisioning tasks

Table 14, "SIP Provisioning Client provisioning tasks sequence," shows the sequence of the provisioning tasks that a user must follow from the SIP Provisioning Client.

Table 14 SIP Provisioning Client provisioning tasks sequence

Step	Description	Task(s)
1.	Define roles and rights and use to create a new Administrator	Add role and assign rights
		Add Admin
2.	Define new domain(s)	Add domain(s)
		Add sub-domain(s) if required
3.	Define service parameters and assign to domain(s)	Define service parameters
		Assign services to domain
4.	Define domain service package	Create service package
		Assign service package(s) to domain(s) and sub-domain(s)
		Assign services to sub-domain(s)

Table 14 SIP Provisioning Client provisioning tasks sequence

Step	Description	Task(s)
5.	Define voice mail servers and assign to domain(s)	Add voice mail serve (SIP/Trunk/Line) and assign to domain(s)
6	If not deployed through System Management Console, add IPCM and assign to domain	Add IPCM
		Assign IPCM to domain
7	Add domain status reason(s)	Add reason
8	Add users to domain(s)	Add user(s)
		Add user(s) to sub-domains
		Add i2004 device properties
9	If not autoprovisioning, assign devices to domain(s)	Add device
		Assign users to a device
10	Define gateway, gateway routes, and trunk groups	Add gateway
		Add gateway route
		Add trunkgroup
11	Define domain telephony routes and parameters	Add routing Class of Service (COS)
		Add telephony routes: Private, SIP, or Gateway
		Change routing parameters
		Add route list
12	Define banned users for a domain	Ban users

For more information on SIP Provisioning Client provisioning tasks and instructions for using the SIP Provisioning Client to perform these tasks, see the *SIP Provisioning Client User Guide*.

Accounting management

How this chapter is organized

Accounting Management is organized as follows:

- Strategy on page 65
- Tools and utilities on page 66
- Task flows on page 66

Strategy

The accounting management system for the MCP provides the framework for collecting, formatting, and transmitting accounting data from the Multimedia Communications Portfolio (MCP) System to the service provider's back-end billing system. It is comprised of two logically separate entities:

- the Local Accounting Manager (LAM), which resides on the SIP Application Module
- Central Accounting Manager (CAM), which resides on the Accounting Module

The primary function of the LAM is to collect raw accounting data from active sessions on the SIP Application Module and transport it to the CAM.

The functions of the CAM include:

- formatting the raw accounting data received from the LAM into IPDR/XML records
- store IPDR/XML records on disk until manually removed
- depending on configuration, transmit IPDR/XML records to pre-configured destinations through TCP/IP or FTP Push or Pull

To ensure high availability of the accounting management system, the minimum MCP network configuration includes two Accounting Modules deployed on two separate Management/Accounting Servers. One Accounting Module functions as the primary or active module; the other

Accounting Module functions as the secondary or backup module. The LAM only runs in the SIP Application Module. Since many SIP Application Modules can run in a site, there can be many LAMs connecting to the CAM.

For additional information on the Accounting Module, refer to the *MCP Accounting Module Basics*.

Tools and utilities

The MCP accounting management system is configured, monitored, and maintained through the System Management Console. For more information on the MCP accounting management system, refer to the *MCP Accounting Module Basics*. For information on using the System Management Console to configure, monitor, and maintain the accounting management system, refer to the *MCP System Management Console Basics*.

Task flows

This section identifies the high-level MCP accounting management tasks. The specific tasks you need to perform for your accounting management system will vary depending on the level of support purchased for your MCP.

Accounting management tasks

Configure the following accounting management system properties:

- Central Accounting Manager (CAM) communications channel
- Local Accounting Manager (LAM) communications channel
- OSS communication channel (TCP/IP and FTP-push)
- Manual Failover and Switchback of Accounting Manager if applicable

For details on all the task flows for MCP accounting management, detailed procedures for performing these tasks and details on the Accounting Records produced, refer to the *MCP Accounting Module Basics*.

Performance management

How this chapter is organized

Performance Management is organized as follows:

- Strategy on page 67
- Tools and utilities on page 68
- Task flows on page 68

Strategy

Performance measurements (PMs) are statistics collected about the system. Performance is measured by the use of Operational Measurements (OMs).

Operational measurements (OMs) provide statistical information on the server operations and performances. OMs are usually represented in terms of groups, which contain registers (counters and gauges) that provide performance related data. For example, call processing can provide an OM group related to call control and an OM group related to call progress. One group provides data such as number of successful calls, number of calls rejected, unauthorized attempts, while the other group provides data such as average call holding time, duration of a call, and so on.

There are two types of OMs: active and holding. Active OMs are displayed as they are reported by the server to the management server/management console. Holding OMs have already been archived to files on the Management Server.

As the OM group registers are updated, they are collected into an OM report. A snapshot of this report can be viewed through the OM Browser located on the System Management Console.

MCP OM data belongs to one of the following categories:

- Platform related OMs—Platform related OMs are obtained from the SNMP agent(s) at the MCP components and System Manager

Node. The OMs are then channeled through the management framework.

Note: This method applies only to the Database Module and the Provisioning Module, not to the entire system.

- MCP applications related OMs—application related OMs are obtained through the management framework.

Service provider can access OMs through FTP, or view OMs using the OM Browser in the System Management Console. IMS OMs are collected and archived at the Management Module in a comma separated value (CSV) file format. These files can then be accessed through FTP by a Performance Management (PM) System.

For more information on OMs and a comprehensive list of all MCP OMs, refer to the *MCP System Management Console Basics*.

Tools and utilities

The Management Module provides the performance management framework for all MCP components. The user can configure performance data collection and reporting from the Management Console by selecting the "OAM Configuration" menu item. The OAM Configuration menu option is available when the user has selected a deployed application or the "System" node in the System tree and then right clicks (which displays the popup menu). In addition, the user can monitor performance data from the OM browser on the System Management Console. For information on using the System Management Console to perform performance management tasks, refer to the *MCP System Management Console Basics*.

Task flows

Performance tasks for the various MCP components are documented in detail in the performance information provided for each individual MCP component. The following list of performance management tasks may not apply to every component. In addition, the order in which these tasks must be performed may vary from component to component. However, typical MCP performance management tasks include the following activities.

Procedure 2 Performing MCP Performance Maintenance Tasks

At the System Management Console

- 1 Retrieve/view current performance data
- 2 Retrieve/view archived performance data

- 3** Configure performance data collection
- 4** Configure performance data reporting



Security and Administration

How this chapter is organized

Security and Administration is organized as follows:

- Security on page 71
- Administration on page 71

Security

Security Strategy

The security strategy for the Multimedia Communications Portfolio is based on the IMS security strategy, which is implemented at both the IMS network and component levels. The network level is concerned with protecting the IMS serving system, while the component level is concerned with protecting the end users. For more information on the security strategy, refer to the *IMS Network Engineering Guide*.

Administration

Tools and utilities

The tools for performing MCP administration functions are as follows:

- System Manager Console—Depending on the level of administration access and security privileges, use this GUI to add sites and servers and also to deploy and configure MCP components.
- SIP Provisioning Client—Provisioning administrators use this tool to manage subscribers at the provider and Enterprise domain level.

Task flows

Use the administration tools to perform the following tasks. The tasks and the order in which they must be performed may vary from component to component. For detailed information on task flows, refer to the overview information for the individual MCP components or to the manufacturer's documentation that comes with the product, for example the Sun Microsystems's documentation on SOLARIS that comes with the Sun Netra t 1400s and 1405s.

Administration tasks for the System Management Console

An administrator who manages subscribers information may perform the following types of tasks:

- adding a user
- deleting a user
- editing user information
- reviewing audit trail
- changing passwords
- setting privileges
- modifying a user
- listing a user

Additionally, an administrator may perform the following tasks:

- accessing/starting an element
- configuration tasks, such as
 - deploying, monitoring, modifying, and restarting the element manager
 - changing system behavior
- performance monitoring tasks, such as
 - monitoring disk space usage
 - checking operational measurements
 - setting thresholds
 - checking alarms
- provisioning tasks, such as
 - Gateway routing changes
 - domain/subscribers information
 - device information
 - voice mail information
 - service packages
 - IP Client Manager
 - administrators

- Managing access control (user IDs and passwords)

Note: Only users configured as “system administrators” are allowed to add/delete/modify user information. This capability can be further extended to domain information administration.

- Backing up and restoring system and database, including the following:
 - Off-board, remote, and redundant remote for disaster recovery (client and/or server initiated)
 - Client software (i2004 firmware, Multimedia SIP, Multimedia Web loads)
 - Automated

Administration tasks for the SIP Provisioning Client

Administrators can create, or define, all the necessary provisioning roles to support their system. They can allow or restrict provisioning roles to carry out specific actions. Table 15, “Examples of roles and rights of administrators,” provides examples of several administrator provisioning roles and the “rights based” restrictions associated with various provisioning tasks.

Table 15 Examples of roles and rights of administrators

Provisioning role example	Rights given	Allowed tasks
User administrator	• User management with read, write, and delete access • Domain management with read access only	Can view domain details, and add, delete, or modify users. Does not have access to other parts of the system, for example voicemail, service packages, and so forth.

Table 15 Examples of roles and rights of administrators

Provisioning role example	Rights given	Allowed tasks
Device administrator	• Domain management with read access • Device management with read, write, and delete access	Cannot add or modify users. Allowed to add, modify or delete devices.
System administrator	Full domain access	Can see all domains, regardless of who created the domain, or the list of domains provisioned against the administrator.

Diagnostic tools

Use the following diagnostic tools to debug system problems:

- Unix commands such as “netstat -r” and “ping”
- Audits such as the Long Call Duration
- Loopback IP address testing on all physical ports provided by Sun Microsystems
- snoop (sniffer) or port mirroring on Ethernet switch, with sniffer connected to mirrored port, for monitoring messages



Appendix A List of acronyms

AC	alternating current
ACD	automatic call distribution
ADSL	asynchronous digital subscriber line
ATM	asynchronous transfer mode
BBUA	back-to-back user agent
CAM	central accounting manager
CAS	channel-associated signaling
CD	compact disc
CDS	converged desktop services
CGI	common gateway interface
CLI	command line interface
CODEC	coder/decoder

CoS	class of service
CPE	customer premise equipment
CPL	call processing language
CRM	customer records management
CS 2000	Communication Server 2000
CSV	comma separated value
DC	direct current
DHCP	dynamic host configuration protocol
DIGMAN	digit manipulation
DiffServ	Differentiated Service
DLCMI	data link control management interface
DLL	dynamic link library
DMS-100	Digital Multiplex System-100
DNS	domain name server
DSL	digital subscriber line
DSM	distributed software manager

DTMF	dual tone multi frequency
EBIP	enhanced breaker interface panel
EBN	Enterprise Business Networks
ERC	express routing code
FTP	file transfer protocol
GMT	Greenwich Mean Time
GUI	graphical user interface
HDLC	high-level data link control
HSC	hot swap controller
HTTP	Hyper-text Transfer Protocol
HTTPS	Hyper-text Transfer Protocol Secure
IETF	Internet Engineering Task Force
IM	instant messaging
IMS	Interactive Multimedia Server
I/O	input/output
IP	Internet Protocol

IPCM	Internet Protocol Client Manager
IPDR	Internet Protocol Data Records
IPMP	Internet Protocol Multi-pathing
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
JDBC	Java database connectivity
JPEG	joint photographic experts groupPNG (portable network graphic)
LAM	Local Accounting Manager
LAN	local area network
LCD	liquid crystal display
LI	Legal Intercept (also Lawful Intercept)
MAC	media access control
MAddr	media access control address
MCP	Multimedia Communications Portfolio
ME	managed element
MGCP	Media Gateway Control Protocol

MGCP+	Media Gateway Control Protocol with Extensions
MIB	management information base
MO	managed object
MOP	methods of procedure
Meridian SL-100	Meridian SuperNode Logic-100
MS	Microsoft
MSD	most significant digit
MWI	message waiting indicator
NAT	network address translation/translator
NAPT	network address port translation/translator
NIC	network interface controller
OAM&P	operations, administration, maintenance, and provisioning
OCM	originating call model
OEM	Oracle Enterprise Manager
OM	operational measurement
OMI	open management interface

OSN	on-site Notification
OSS	operations support system
PA	Personal Agent
PBX	private branch exchange
PC	personal computer
PCMA	Pulse Code Modulated (aLaw encoding)
PCMU	Pulse Code Modulated (μ Law encoding)
PCP	Perfect Channel Protocol
PDIL	partial dial
PM	performance measurement
PNG	portable network graphic
PRI	primary rate interface
PSEIZ	permanent seizure
PSTN	public switched telephone network
QFE	quad fast ethernet
QoS	quality of service

RFC	Request for Comment
RTCP	Real-time Transport Control Protocol
RTP	Real-time Transport Protocol
RU	recording units
SA	system administrator
SAM16	Service Application Module-16
SC	service consumer
SCTP	Signaling transport control point
SDP	Session Description Protocol
SE	service element
SIP	Session Initiation Protocol
SimRing	Simultaneous Ring
SIP-T	Session Initiation Protocol - Telephony
SMDI	simple message desk interface
SNMP	Simple Network Management Protocol
SOAP	Simple Object Access Protocol

SQL	structured query language
SS	service session
SS7	Signaling System 7
STD format	standard format
TCM	terminating call model
TDM	Time Division Multiplexer
TCP	Transmission Control Protocol
ToS	Type of service
UAS	Universal Audio Server
UDP	Universal Datagram Protocol
UE	usage entry
UFTP	UNISlim File Transfer Protocol
UM	unified messaging
UNISlim	Unified Network Internet Protocol Stimulus Protocol
URI	uniform resource identifier
URL	uniform resource locator

USB	universal serial bus
VMS	voice mail server
VPN	virtual private network
VoIP	Voice over Internet Protocol
WAN	wide area network
WCSCP	Web Client Session Control Protocol
XML	EXtensible Markup Language

MCP Basics

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