Carrier VoIP

USP Basics

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Feature changes

No feature changes affect this document in this release.

USP Basics

Platform

The Universal Signaling Point (USP) is a scalable, distributed processing, multitasking system with redundant ATM architecture. The USP platform has one or more shelves. Each shelf has a passive backplane and a removable fan unit. The backplane distributes -48 VDC and provides a point-to-point connection matrix for ATM messaging and essential control signals.

Each shelf has duplicated Communications Applications Module (CAM) Controller system nodes, which contain ATM switches. The CAM Controller (CC) system nodes implement a redundant ATM fabric within the shelf (that is, a dual-plane ATM backplane).

USP applications

The USP supports the following functions:

- Signaling Transfer Point (STP)
  - with ANSI UNPM capability
  - with ITU UNPM capability
  - with SLR capability
- Signaling Gateway (SG)
- RouteMaster
- Combined STP and SG

Signaling Transfer Point (STP)

When a USP is configured as an STP, that system identity will route SS7 to SS7 messages in addition to terminating SS7 links. This includes the SS7 Virtual links which were introduced in USP 6.0. These Virtual links allow two System Identities to be interconnected without requiring physical SS7 links. Note that a combined linkset, or a single linkset cannot contain both virtual and real links.

Universal Number Portability Master (UNPM)

The Universal Number Portability Master application provides a Number Portability database (NPDB) to support the deployment of service provider number portability. The UNPM facilitates the deployment of number portability in both ANSI and ETSI/ITU network environments.

The NPDB functions can be described in two parts:

- a database schema added to the USP itself
- a local service management system (LSMS) or Network Services Manager (NSM) that is used to populate the database with ported number information

  An LSMS is used in an ANSI network environment and an NSM is used in an ETSI/ITU network environment

UNPM features include the following: scalable query capacity and scalable ported number record capacity in an N+1 configuration, real-time processing of updates from the LSMS/NSM to the NPDB, ANSI and ITU local subsystem support, enhanced network routing options to deliver number portability traffic and ensure compatibility with existing network architectures, and support for EDR number pooling.

Service Location Register (SLR)

The Service Location Register application is used to enhance the flexibility and effectiveness of Home Location Register (HLR) installations. The SLR provides additional message routing capabilities beyond those provided by Signaling Connection Control Point (SCCP) Global title translation (GTT). The SLR allows routing based on the MSISDN and IMSI message fields in the TCAP portion of MAP messaging to provide extremely granular control of how messages are routed to HLRs. This allows wireless service providers some flexibility to assign subscribers' query messages to any available HLR. Provisioning of the SLR is provided through Nortel's Service Management Interface (SMI) open protocol and will be supported on Nortel's Univity HLR provisioning system for integrated provisioning between the HLRs and SLRs as subscribers are added, deleted, or modified.

Signaling Gateway (SG)

When configured as a Signaling Gateway, a USP allows a number of Nortel

Solutions to interconnect with the PSTN SS7 network. The main functions of the USP acting as a Signaling Gateway are:

- encapsulates and routes or distributes SS7 messages over an IP network to an Application Server (AS) using the SigTran protocols
- routes received IP encapsulated SS7 messages from an Application Server (AS) to an SS7 Network

The USP provides a bidirectional message switching function between nodes in an SS7 network and application servers in a VoIP switch. USP functions include message routing, message discrimination, and signaling link and network management, supported by link error detection and correction. The USP functionality deals with SS7 Message Transfer Part (MTP) Levels 1, 2, and 3 through software in the local SS7 link system nodes, IP link system nodes, and Real-time Controller (RTC) system nodes.

Copies of the USP software can be backed up to the OAMP workstation for complete office recovery (COR) purposes. In addition, copies of the control programs and associated data reside on the SCSI Disk drive associated with the RTC system nodes.

The USP communicates with one or more application server clusters over an IP network. An application server cluster can have a maximum of six application servers. Each application server consists of a primary and an optional secondary application server process. The USP communicates with application server processes over logical IP paths.

A USP SS7 link node inspects incoming SS7 messages to determine the destination address. If the destination address is not the USP, the message is forwarded to an outgoing IP link system node using the internal ATM network. The IP link processor receives the message, encapsulates it using sigtran protocols, and sends it to the proper application server process in the site.

MTP Level 3 information is encapsulated along with ISUP information using sigtran protocols. The IP link system node software in the USP uses MTP information to route application server messages to the SS7 network using the proper SS7 link.

RouteMaster Application (RM)

The RouteMaster application enables the transparent consolidation of two end offices with separate point codes to a single end office, retaining the original point codes. The RouteMaster provides a single SS7 front end to the offices being collapsed, which enables the craftsperson to perform a hitless migration of lines and trunks between the 2 offices. The RouteMaster application will support the collapse of up to 8 point codes simultaneously without impact to service or the SS7 network.

Combined STP and SG

The STP and SG applications can run concurrently on one system.

Hardware Basics

The USP includes the following components:

- Communications Applications Module Shelves (CAM shelves)
- System nodes
- OAMP workstation
- Remote access server (RAS)
- Ethernet hubs
- Cables for each card

A USP system consists of one or more CAM shelves: a single Control CAM shelf; or a control CAM shelf plus optional extension CAM shelves.

The USP supports the datafill of up to eight shelves: one control CAM shelf and seven extension shelves. Shelves in a dual-shelf configuration can be interconnected using OC3 cables or the InterCAM Communication Medium (ICCM). Shelves in a configuration of more than two shelves must be connected using the ICCM.

The introduction of ATM high-speed links (HSL) on E1 and T1 interfaces, SS7 IP HSLs (M2PA over SCTP), and E1 MTP2 HSLs reduces the number of links per link system node from four to one; however, it actually increases node capacity because each high-speed link provides the capacity equivalent to a minimum of eight low-speed links.

The following list details the configuration limits of the USP in the eight-shelf configuration:

- 124 application nodes (SS7 link, IPS7 Gateway, NP)
- 16 IPS7 gateway nodes
- 64 SS7 IP HSLs
- 752 SS7 links; 752 linksets; 752 linkset groups; and 376 combined linksets (DS0, V.35 or E1 channelized)

ATTENTION

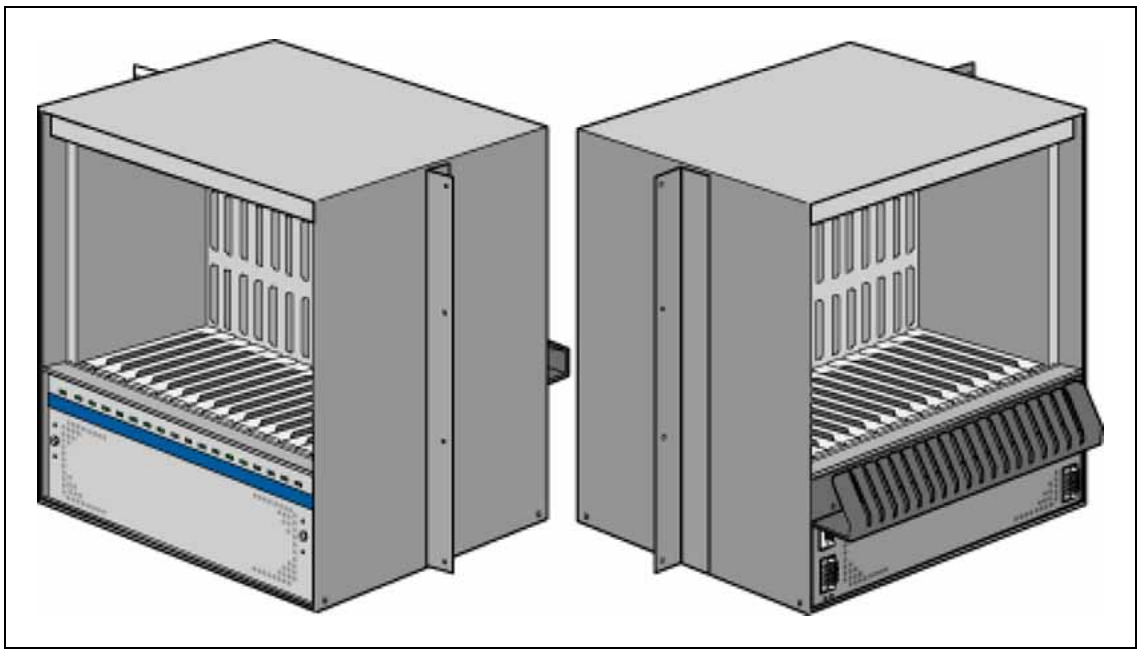
To configure an eight shelf system with 752 links requires the use of Multi-link T1E1 cards (NTST10CA/NTST81BA or NTST10FA/NTST81BA). PP5 RTCs (NTST11DB/NTST09AC) are required for provisioning beyond 512 links.

- 124 ATM or E1 MTP2 HSLs
- 16 ATM, IP, or E1 MTP2 HSLs per linkset

CAM shelves

The USP CAM shelf includes 18 front and 18 rear slots. The cards in the front of the CAM shelf are called mission cards. The cards in the rear of the CAM shelf are called transition modules (TM).

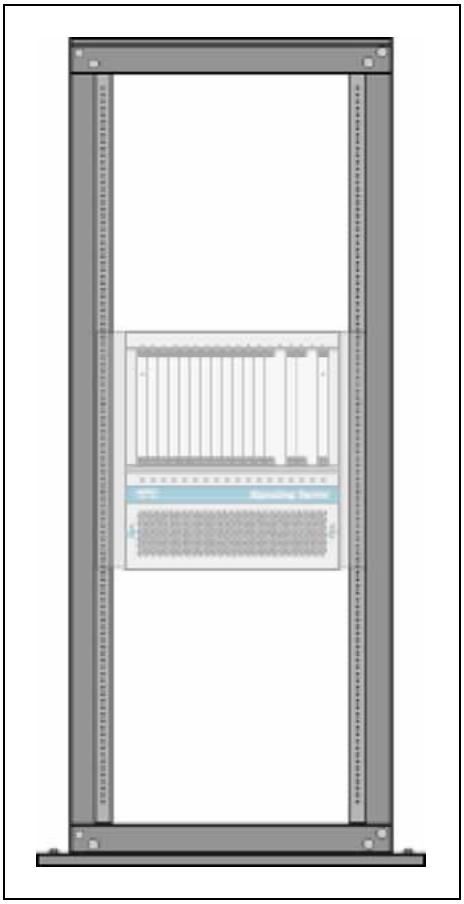
USP CAM shelf



The CAM shelf is a stand-alone unit that provides its own cooling and electromagnetic compatibility (EMC).

Each CAM shelf measures 21 x 17 x 20 in. and is mounted using two metal, adjustable mounting plates. One mounting plate orientation allows the shelves to be mounted in a 19-inch rack. The second mounting plate orientation allows the shelves to be mounted in a 25-inch Nortel frame/cabinet. By using rack-level reducer brackets, CAM shelves can be mounted in various racks. For more information about installing the CAM shelves, refer to the following Installation Methods: *USP Physical Installation (IM 12-9072)* and *COAM Frame Configuration Physical Installation (IM 04-0766)*.

Frame mounting



Control CAM shelf

The control CAM shelf serves as the communication hub of the USP system, and provides basic functionality for the entire system.

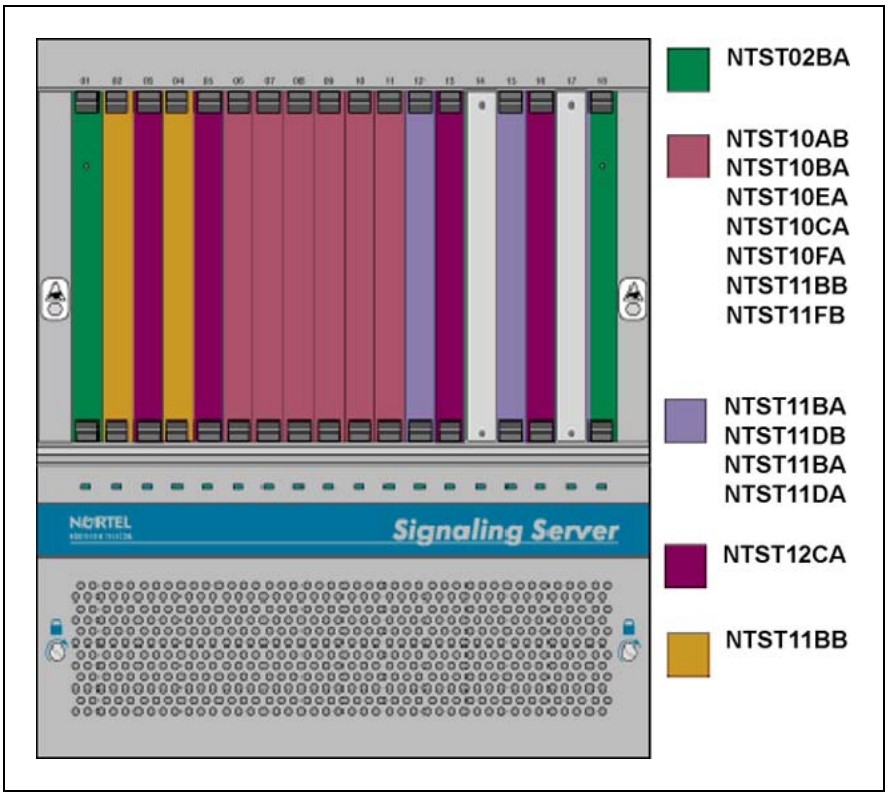
A control CAM shelf supports the following components:

- two RTC system nodes
- two CC system nodes
- filler cards
- a fan cooling unit
- a backplane
- up to 14 application system nodes

ATTENTION

The following four figures show an example of the system configuration. RTC (slots 12 and 15) and CC (slots 1 and 18) system nodes have fixed slots, but all the other system nodes can be provisioned on any available slots on the control and extension shelves.

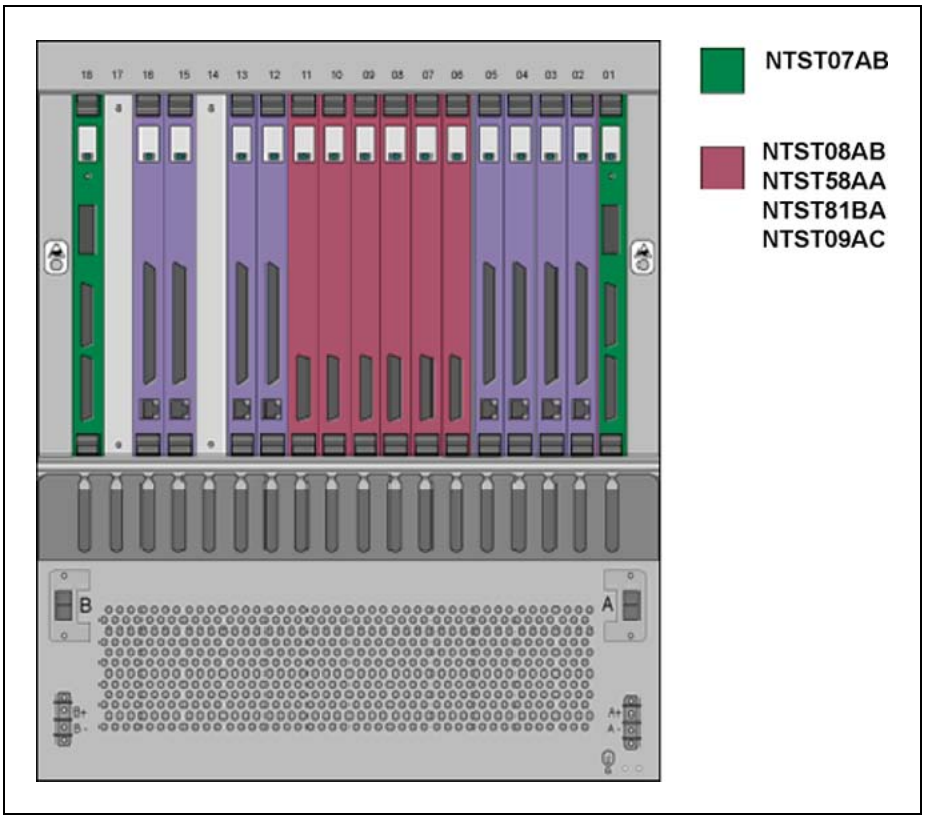
Control CAM shelf - front



Refer to the table "CAM shelf PEC codes and descriptions" (page 14) for the list of PEC codes shown in these figures and a description of each.

The current release does not support co-residence of NPx and IPS7 gateway nodes.

Control CAM shelf - rear



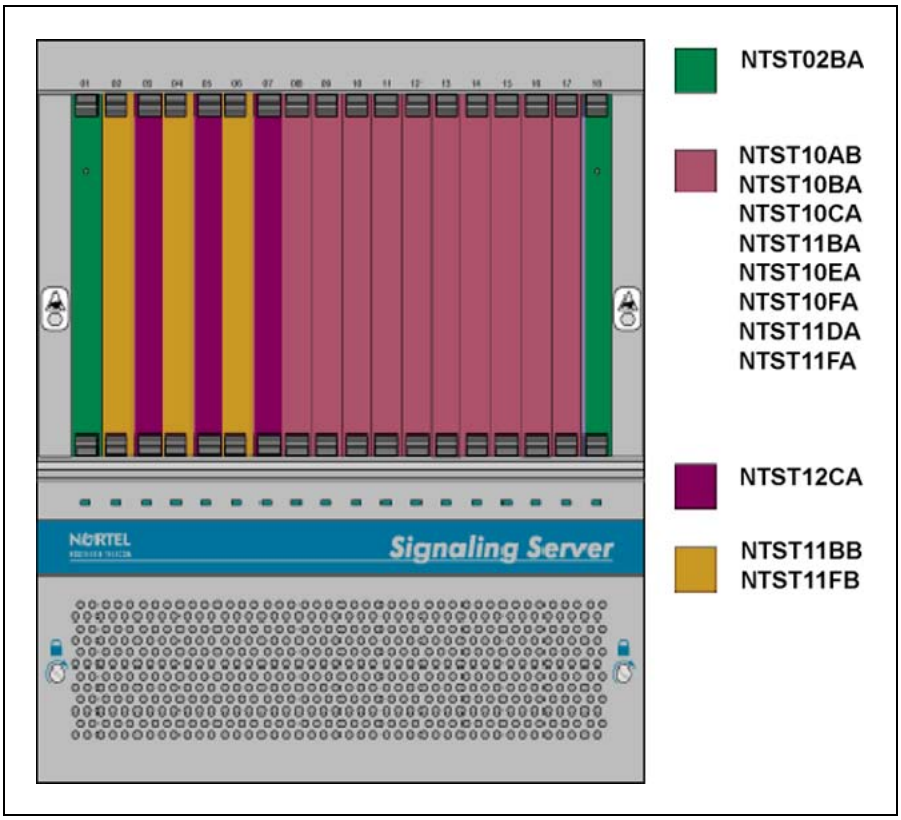
Extension CAM shelf

The extension CAM shelf provides capacity for up to 16 SS7 system nodes.

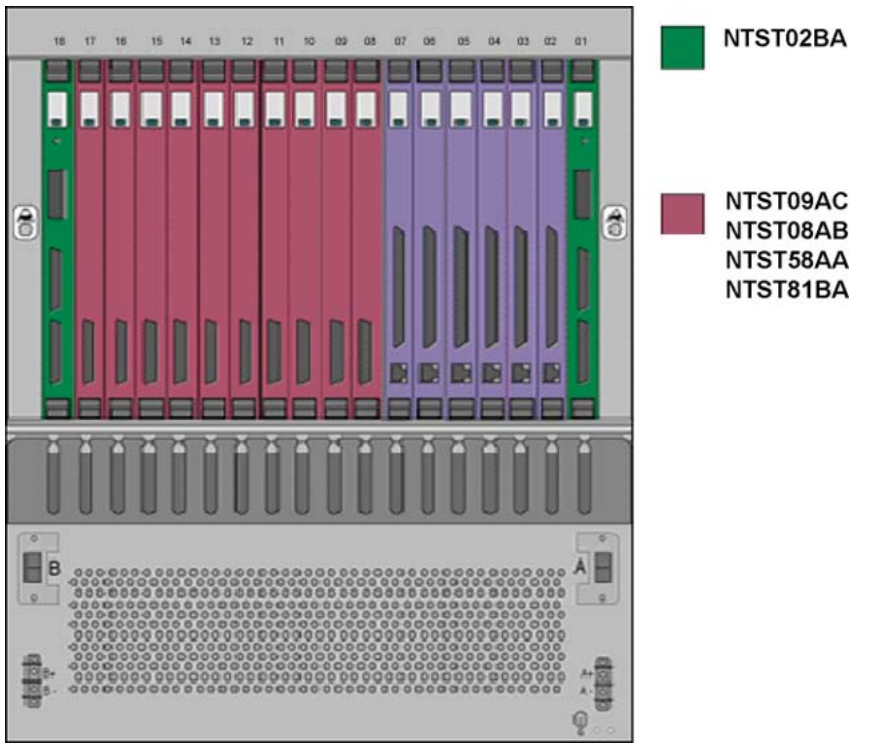
An extension CAM shelf always contains the following components:

- two CC system nodes
- a fan cooling unit
- a backplane
- up to 16 application system nodes

Extension CAM shelf - front



Extension CAM shelf - rear



The following table lists all the PEC codes shown in the figures and provides a brief description of each.

CAM shelf PEC codes and descriptions

PECs	PEC Description
NTST02BA	CC mission card, single or dual-shelf system
NTST10AB	Link mission card (LE2)
NTST10BA	Link mission card (LE3) for ATM HSL T1/E1 channelized
NTST10EA	Link mission card (LE3N) for ATM HSL T1/E1 channelized
NTST10CA	Link mission card (LE4) for multi-link T1/E1Channelized card (8-channel); also used for E1 MTP2 HSLs (rel3), and Japan multi-link
NTST10FA	Link mission card (LE4N) for multi-link T1/E1, E1 MTP2 HSLs and Japan multi-link
NTST11BB	Number Portability Expansion (NPE) mission card (slots 2-11, 14, 17)
NTST11FA	NPE mission card (CE6)
NTST11BA	Real-time Controller (RTC) mission card (CE3)

PECs	PEC Description
NTST11DB	Real-time Controller (RTC) mission card (CE4D)
NTST11BA	IPS7 or SS7 IP HSL link mission card
NTST11DA	IPS7, SS7 IP HSL link, or SIP IP link mission card (CE4)
NTST12CA	SCSI Disk single slot 20G HD
NTST11BB	Number Portability Server (NPS) or Number Portability Controller (NPC) mission card (slots 2-11)
NTST07AB	OC-3 transition module (TM)
NTST08AB	DS0A transition module (TM)
NTST58AA	V.35 transition module (TM)
NTST81BA	E1/T1 transition module (TM)
NTST09AC	IPS7 gateway or SS7 IP HSL PSE and Power/SCSI/Ethernet (PSE) TM
NTST11FB	NPS or NPC mission card (CE6D)

CAM shelf component PECs

The following table details the Nortel ordering codes for the components of the USP.

CAM shelf component PECs

Component Name	PECs
Control or extension CAM shelf with fan assembly and power filters	NTST14AC
Control or extension CAM shelf with power filters	NTST00AC
Control or extension CAM shelf assembly (non-European markets)	NTST00AB
Fan unit	NTST01AC
Power filter left side B feed	NTTD29AA
Power filter right side A feed	NTTD30AA
CC mission card	NTST02BA
OC-3 TM	NTST07AB
RTC mission card	NTST11BA NTST11DB
PSE TM	NTST09AC
Single-slot SCSI Disk card (requires RTC card NSTS11AB, BA, or NPC or NPS card NTST11BB)	NTST12CA
Filler card	NTST13AA
SS7 link mission card (DS0, V.35)	NTST10AB

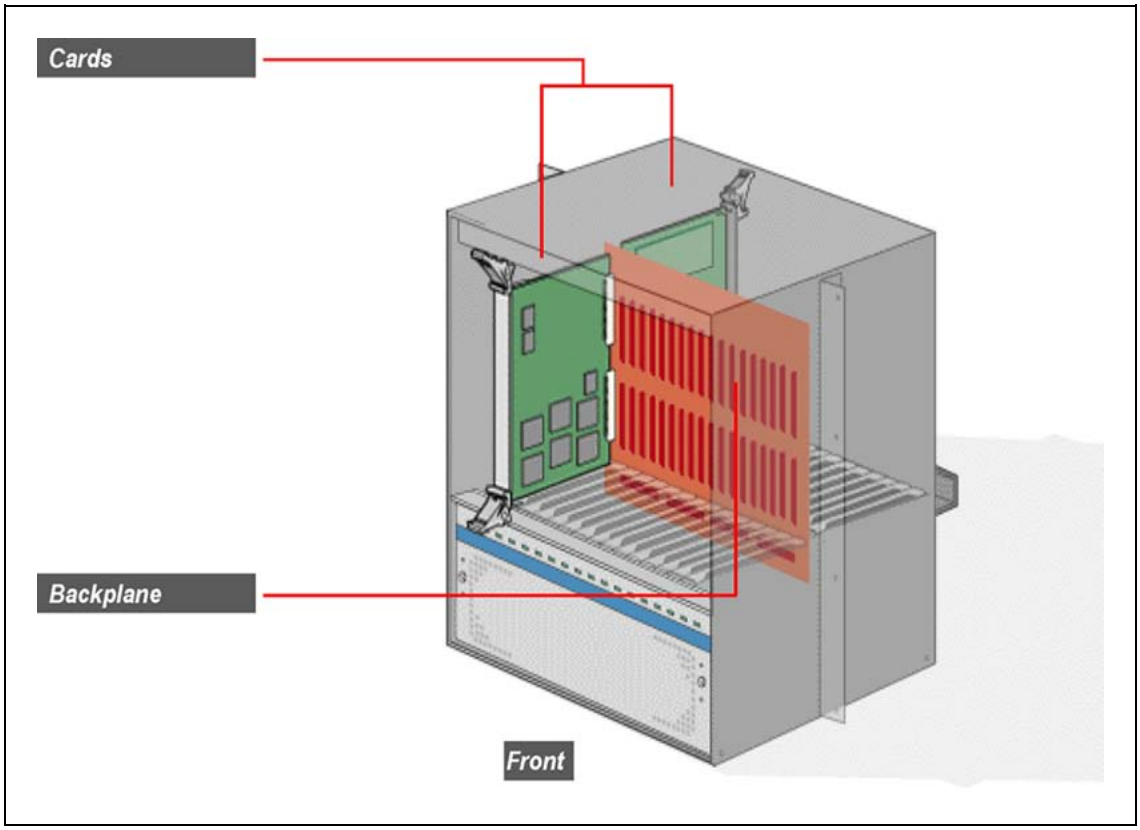
Component Name	PECs
DS0A TM	NTST08AB
V.35 TM	NTST58AA
IPS7 Gateway or SS7 IP HSL link mission card	NTST11BA NTST11DA
Number Portability Controller (NPC)	NTST11BB NTST11FB
Number Portability Server (NPS)	NTST11BB NTST11FB
Number Portability Extension (NPE)	NTST11BB NTST11FA
ATM HSL mission card	NTST10BA NTST10EA
E1 Channelized card (4-channel)	NTST10BA
T1/E1Channelized card (8-channel); also used for E1 MTP2 HSLs	NTST10CA NTST10FA
T1/E1Transition module	NTST81BA
Air filter	NTST35AB
19-inch frame	NTST34AA

Backplane

The backplane is in the middle of each CAM shelf. It performs the following functions:

- acts as bridge between the front and rear cards
- provides the connection from all shelf system nodes to the CC system nodes
- provides power to the individual cards

CAM back plane

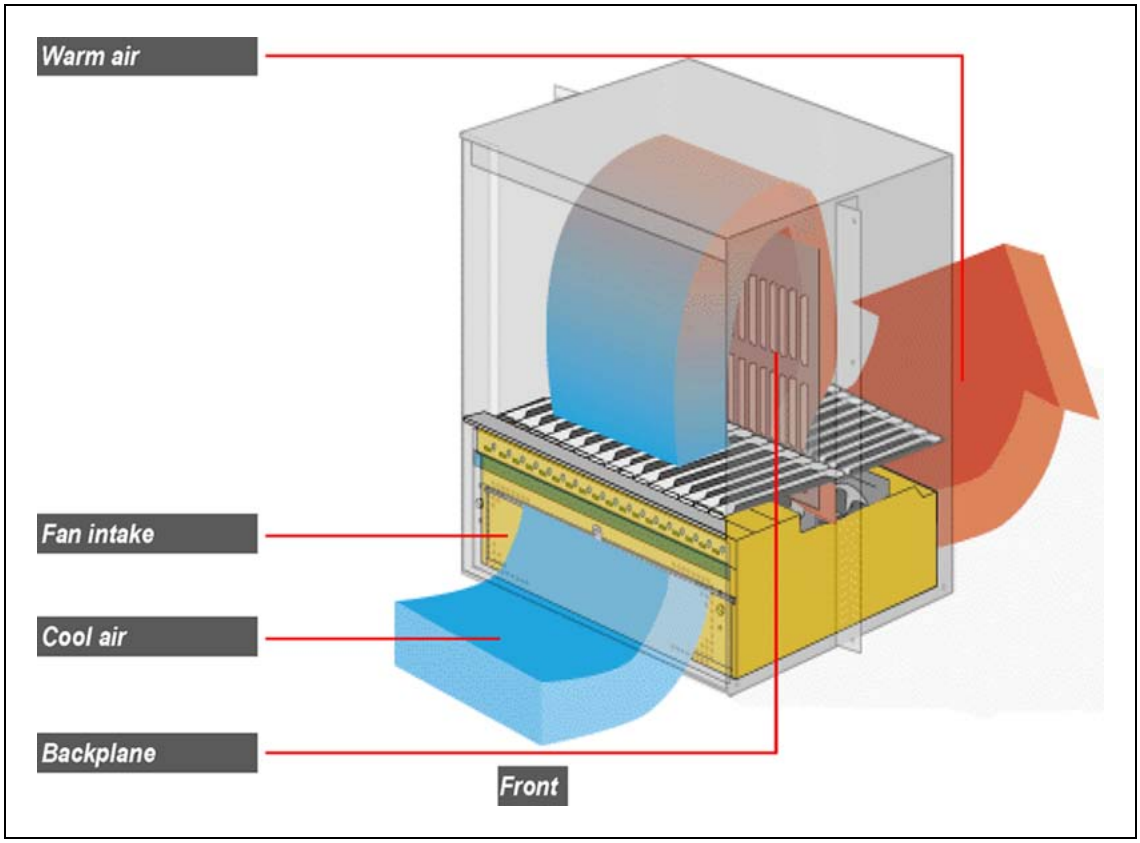


Cooling unit

CAM shelves are cooled with forced air. The cooling unit takes in air from the front bottom of the shelf and exhausts it at the rear bottom of the shelf.

The cooling unit contains a fan tray, five fans, two front lock screws, a center latch, and a fan filter.

CAM cooling unit



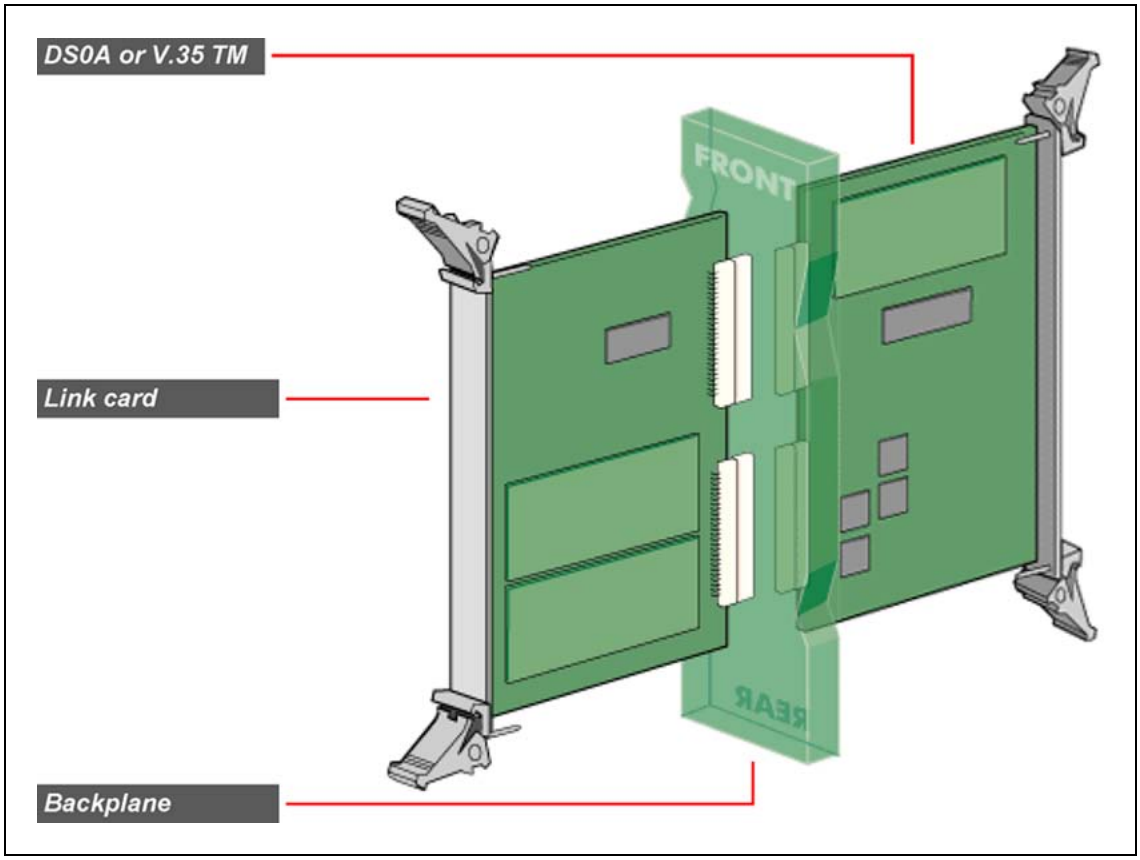
The system can function indefinitely with any single failure. The cooling unit's modular design allows you to remove and replace it, if necessary, while the system is running. Access the cooling unit from the front of the shelf.

System nodes

Each CAM shelf has front and rear slots, numbered 1 through 18. When filled with the appropriate card combination, a front and rear slot join to provide a specific system node to the USP.

For example, an SS7 link card in a front slot and a DS0A transition module (TM) in the corresponding rear slot combine to provide DS0A link functionality.

Example USP system node: Link system node



The following sections provide details on each of the types of USP system nodes. The available system nodes are shown in the following table

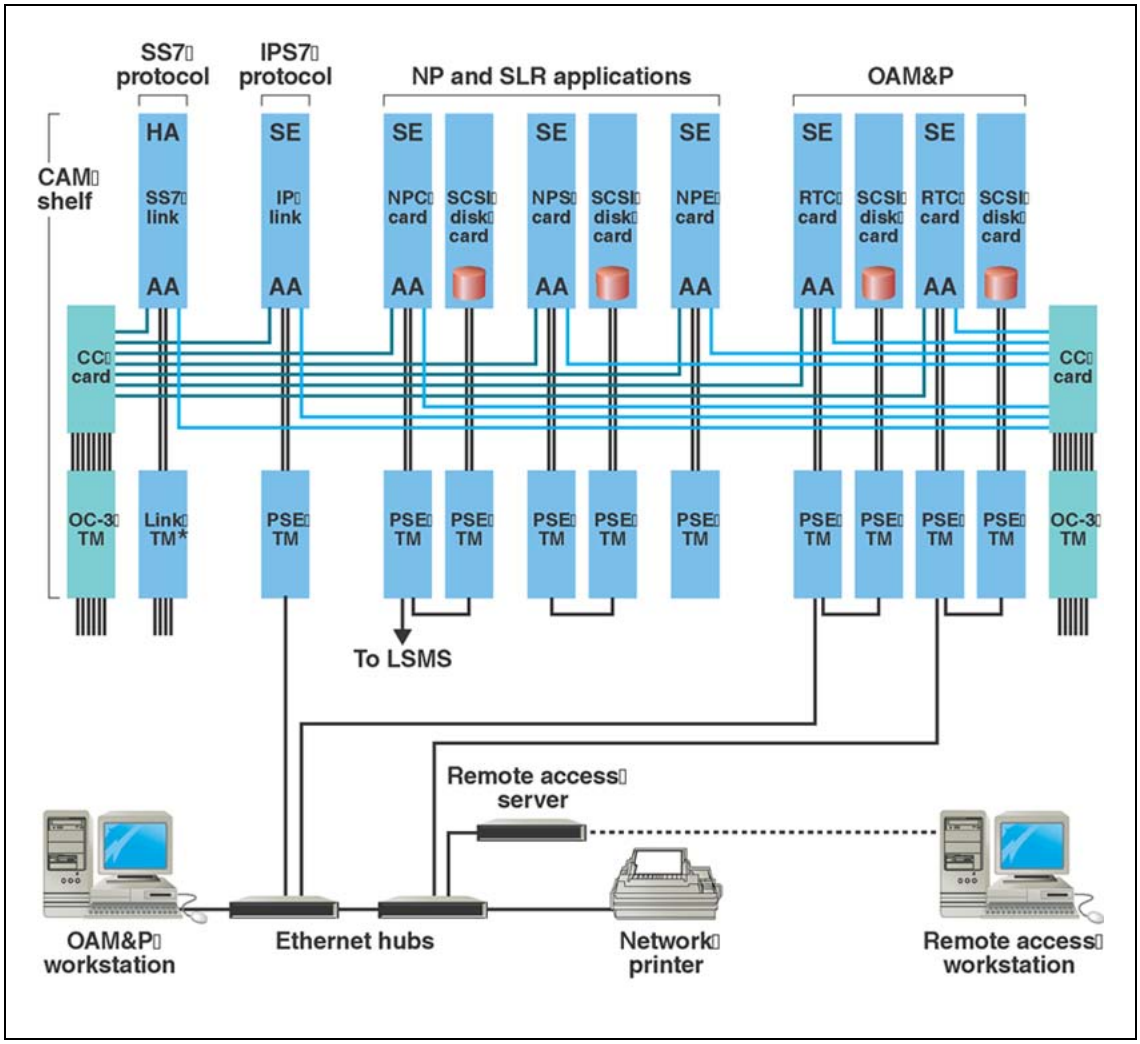
System nodes

Type	System Node	Combination of:
RTC	Real-time Controller (RTC)	RTC mission card SCSI Disk mission card Power/SCSI/Ethernet (PSE) TM Filler card

Type	System Node	Combination of:
CC	CAM Controller (CC)	CC mission card OC-3 TM
Link	SS7 DS0A link	LE2 or LE2N link mission card DS0A TM
	SS7 V.35 link	LE2 or LE2N link mission card V.35 TM
	ATM HSL	LE3 or LE3N link mission card T1/E1 TM
	SS7 IP HSL	CE3 link mission card PSE TM
	T1/E1 Channelized link (8-channel) (also includes E1 channelized links supporting 4 channels)	LE4 or LE4N link mission card T1/E1 TM
	E1 MTP2 HSL	LE4 or LE4N link mission card T1/E1 TM
IPS7	IPS7 Gateway Node	CE3 or CE4 link mission card PSE TM

Type	System Node	Combination of:
NPC	Number Portability Controller	NP/SLR mission card (CE3 or CE6D) SCSI Disk mission card The SCSI disk mission card is not needed if the NP/SLR mission card is CE6D. PSE TM
NPS	Number Portability Server	NP/SLR mission card (CE3 or CE6D) SCSI Disk mission card The SCSI disk mission card is not needed if the NP/SLR mission card is CE6D. PSE TM
NPE	Number Portability Extension The NPE system node is only required for systems running NP that require more than 10 million records or for systems running SLR that require more than 14 million records.	NP/SLR mission card (CE3 or CE6) PSE TM

USP system nodes



USP can be provisioned with different types of link nodes: DS0A, V35, ATM, and IP.

The SCSI Disk card is not needed for NPC/NPS CE6D mission cards.

CAM Controller system node

A CAM Controller (CC) mission card (CC card) and an OC-3 transition module (OC-3 TM) create a CC system node. Each CAM shelf has two CC system nodes (slots 1 and 18).

The CC system nodes combine to provide dual internal ATM planes on both the control CAM shelf and the extension CAM shelf. The ATM planes facilitate SS7 and OAMP data transfer between the SS7 link and RTC system nodes.

The CC system nodes also distribute the network clock to all SS7 link cards on each shelf that require the clock.

CC cards

CC cards are the front cards in the CC system nodes. They are located at each end of a control or an extension CAM shelf, in slots 1 and 18. The CC card uses the Motorola MPC8260 microprocessor CPU.

The primary role of each CC card is an ATM switching matrix that carries SS7 and OAMP packet data. In addition, the CC cards can provide a network clock source, a CAM shelf maintenance processor, and a dedicated ATM interface to and from each of the SS7 link and RTC cards.

OC-3 TMs

OC-3 TMs are the rear cards seated opposite the CC cards on either CAM shelf. They perform the following functions:

- network clock interface
- shelf telemetry contacts
- fan failure detection interface
- point-of-use power supply (PUPS) for the CC system node (A & B -48 VDC power feeds)

Both A (primary) and B (secondary) composite clock timing references terminate on the OC-3 TM. The composite clock timing reference originates from the network providers standard BITS system. This clocking source is required if any of the link system nodes have a DS0A TM, an E1 channelized TM, or an E1/T1 channelized TM.

The OC-3 TM also contains CAM shelf alarm contacts (critical, major, and minor status) that can be used by network control centers for monitoring purposes. The telemetry point alarm contacts have a rating of a maximum of 1 Amps for driving devices.

Telemetry cables connect to the cards four telemetry contact closures and transport the CAM shelf alarm signals to a distribution frame for cross connection. The alarm information is then sent to a telemetry alarm monitor box at a network control center.

In a dual-shelf system, fiber-optic cables attached to the OC-3 TMs on each shelf connect the extension CAM shelf to the control CAM shelf.

Real-time Controller (RTC) system node

Each control CAM shelf houses two RTC system nodes (active and inactive) for redundancy. RTC system nodes reside on control CAM shelves only; they are not found on extension CAM shelves.

Both RTC system nodes simultaneously process each event and store a complete record of all system data. This built-in redundancy prevents data loss if one RTC system node is removed from service.

Each RTC system node occupies two slots (front and rear): slot 12 and slot 15.

The RTC system nodes control the SS7 link system nodes on both the control CAM shelf and the extension CAM shelf. The RTC system nodes boot all resident CAM shelf cards on the control and extension CAM shelves, and download the operating data images.

The RTC system nodes also:

- support the OAMP workstation
- monitor the status of all system nodes
- generate alarms when appropriate for certain system-wide events
- collect system logs and OMs

The RTC system consists of the following cards:

- one Real-time Controller (RTC) mission card (RTC card)
- one single-slot SCSI Disk card
- two Power/SCSI/Ethernet (PSE) cards (PSE TMs)
- one Filler card

RTC cards

The RTC card is an interface to the internal ATM switch, a SCSI interface to the associated disk drive, and an Ethernet interface for communication to the external OAMP workstation.

RTC cards can be seated in front slots 12 and 15 on the control CAM shelf. The RTC card is a generic PowerPC platform card (PP card) that has an ATM adaptor PMC module (AA module) and a SCSI/Ethernet adaptor PMC module (SE module). Each RTC system node requires one RTC card.

SCSI Disk cards Each CE3 RTC system node also contains a single-slot SCSI Disk card. Like the RTC card, it is also on the front of the control CAM shelf. RTC SCSI Disk cards occupy slots 13 and 16.

ATTENTION

The SCSI Disk cards are not needed if the RTC mission card is NTST11DB (CE4D).

ATTENTION

If the RTC Mission Card is NTST11DB (CE4D), application nodes can be provisioned in slots 13 and 16. However USP software limits the total number of application nodes (SS7 link, IPS7 Gateway, NP,ATM,E1 MTP2 HSLs) to 124 for an eight-shelf system

The SCSI hard disk drive stores system data such as:

- software release images
- system configuration data
- log and alarm data
- operational measurements (OMs)

PSE TMs Every RTC card and every hard drive has an associated PSE TM; therefore, each CE3 RTC system node contains two PSE TMs, in slots 12, 13, 15, and 16. Each CE4D RTC system node contains one PSE TMs, in slots 12 and 15. Each of these TMs provides:

- one Ethernet interface point
- one SCSI interface point
- point-of-use power supply (PUPS)

Filler cards These cards act as an air dam device to ensure proper air flow for cooling purposes.

You must use Filler cards in any unused slot, front or rear, on the CAM shelves. Filler cards do not have active LEDs.

SS7 link system node

An SS7 link mission card combined with either a DS0A transition module (DS0A TM) or a V.35 transition module (V.35 TM) create SS7 link system nodes. SS7 signaling messages are transferred using SS7 link system nodes.

An individual SS7 link system node supports up to four SS7 ports. The control CAM shelf supports up to 14 SS7 link system nodes, one per slot in slots 2-11, 14,17. Each extension CAM shelf supports up to 16 SS7 link system nodes, one per slot in slots 2-17.

The following cards create an SS7 link system node:

- one SS7 link mission card
- one DS0A TM or one V.35 TM
- one T1/E1 TM for ATM HSL or E1 Channelized or E1 MTP2 channelized
- one PSE TM for IPS7 or SS7 IP HSL links

SS7 link cards

The link card provides an ATM and HDLC interface.

Link cards can occupy front slots 2-11, 14, 17 on the control CAM shelf or slots 2-17 on an extension CAM shelf. The link card is a generic PowerPC platform (PP) card with an ATM Adaptor (AA) module and an HDLC adaptor PMC (HA) module.

DS0A TM DS0A TMs can occupy rear slots 2-11, 14, 17 on the control CAM shelf and rear slots 2-17 on an extension CAM shelf. A DS0A port provides the following features:

- four DS0A ports
- PUPS for the SS7 link system node (A & B -48 VDC power feeds)
- power fault detection

For DS0A TMs, A and B composite clock timing is distributed through the backplane to each system node. The SS7 link system node determines which source to use (A or B) and the DS0A TM switches the sources in the case of a fault. If a CAM shelf does not have any DS0A TMs, no composite clock input to that CAM shelf is necessary.

V.35 TM V.35 TMs can occupy rear slots 2-11, 14,17 on the control CAM shelf and rear slots 2-17 on an extension CAM shelf. A V.35 TM provides the following features:

- four 15-wire V.35 ports
- PUPS for the SS7 link system node (A & B -48 VDC power feeds)
- power fault detection
- link diagnostics (BERT, loopback)

A V.35 TM does not require an external composite clock timing source. Unlike the DS0A TM, the V.35 TM can support two signaling rates, 56Kbps and 64Kbps. Each of the four V.35 ports on this TM can be independently configured as DTE or DCE.

E1/T1 channelized (eight channels) link system node

An E1/T1 multichannel link node provides eight selectable channels over T1 or E1 interfaces to carry SS7 signaling messages.

An E1/T1 channelized link node consists of the following cards:

- one NTST10CA/FA: a link engine (LE4/LE4N) mission card
- one NTST81BA: transition module (TM)

Use RJ45 J1 connector to physically terminate the E1/T1 physical link to the E1/T1 TM.

You can provision up to 14 E1/T1 channelized link nodes on the control CAM shelf and up to16 channelized link nodes on the extension shelf.

E1/T1 link mission card

The E1/T1 link mission card can occupy slots 2 to 11, 14, and 17 on the front of the control CAM shelf and slots 2 to 17 on the extension CAM shelf.

The E1/T1 link card is a generic PowerPC platform (PP) card that has an ATM adaptor (AA) and a High-level Data Link Controller (HDLC) adaptor (HA) PMC module.

E1/T1 TM

The E1/T1 TM can occupy rear slots 2 to 11, 14, and 17 on the control CAM shelf and slots 2 to 17 on the extension CAM shelf.

The NTST81BA TM provides the following features:

- terminates one DS-1 link (T1) or one PCM30 link (E1)
- PUPS for the E1/T1 link system node (A & B -48 VDC power feeds)
- power fault detection

A and B composite clock timing from a timing signal generator (TSG) is distributed through the backplane to each system node. The link system node determines which source to use (A or B) and the E1/T1 switches the sources if a fault occurs.

E1 MTP2 HSL system node

The E1 MTP2 HSL system node supports MTP2-based HSLs over the E1 interface.

You can provision up to 14 E1 MTP2 HSL system nodes on the control CAM shelf and up to16 nodes on the extension shelf.

The E1 MTP2 HSL system node consists of the following cards:

- one NTST10CA/NTST10FA: a link engine (LE4/LE4N) mission card (rel3)
- one NTST81BA: transition module (TM)

The cards in the E1 MTP2 HSL system node are identical to those in the E1/T1 channelized link system node; however, you must use physical connector J2 instead of J1 to terminate the E1 MTP2 HSL on the E1/T1 TM. For more information on these cards, see section "E1/T1 channelized (eight channels) link system node" (page 26).

IPS7 or SS7 IP HSL system node

The IPS7 and IP HSL nodes use identical hardware, but they perform different functions: the IPS7 node provides an M3UA interface to a call server acting as an Application Server, while the IP HSL node provides an M3UA peer-to-peer and M2PA interface, which allow SS7 connectivity over IP.

For IPS7 links, SS7 signaling messages are transferred to the application server processes using the IP link system nodes. IP HSLs, including M3UA peer-to-peer and M2PA, act as point-to-point signaling connections to peer SS7 nodes running IP, and allow an alternative to TDM-based SS7 connectivity. The USP supports a maximum of 16 IPS7 or IP HSL nodes combined on a shelf, a maximum of 16 IPS7 nodes per shelf, a maximum of 16 IP HSL nodes per shelf and a maximum of 126 IPS7 or IP HSL nodes per system combined.

The following cards create an IPS7 or IP HSL link system node:

- one IP link card
- one PSE TM

IP link cards

The IP link card provides an ATM interface and an Ethernet interface.

The IP link card is a generic PowerPC platform card (PP card) that has an ATM adaptor PMC module (AA module) and an SCSI/Ethernet adaptor PMC module (SE module).

PSE TM Every IP link card has an associated PSE TM. Each of these TMs provide:

- one Ethernet interface point
- one SCSI interface point
- PUPS

ATTENTION

The SCSI interface point is not used for the IP link system node.

NPC system node

The NPC system node handles the data management of the Number Portability (NP) or Service Location Register (SLR) service and provides high-rate SLR and NP query processing (2500 queries per second).

ATTENTION

For an NP in an ETSI/ITU network, the limit is up to 2000 queries per second.

NPC system nodes are configured as a mated pair (one active and one inactive). All NP or SLR updates, data audits, and query processing are driven from the active NPC system node.

The active NPC system node also communicates with one of the following service provider's database provisioning systems:

- Local Service Management System (LSMS) - for NP in an ANSI network
- Network Service Manager (NSM) - for NP in an ETSI/ITU network
- Home Location Register Provisioning System - for SLR

The provisioning system receives database updates from either a GUI user or an external regional database and updates the information in the NP or SLR local database. The USP database stores ported numbers locally for querying and routing purposes.

A pair of NPC system nodes must reside on the same CAM shelf (four slots total), on either the control CAM shelf or the first extension CAM shelf.

The following cards create an NPC system node:

- one NP mission card
- one single-slot SCSI Disk mission card
- two Power/SCSI/Ethernet (PSE) TMs

NP mission card

The NP mission card, also referred to as a Computing Engine (CE3) card, consists of a PP4 base card configured with AA1 and SE1 PMC modules. This card has the following interfaces:

- to the internal ATM switch
- an SCSI interface to the associated disk drive
- an Ethernet interface to communicate with an external database provisioning system

An NPC mission card performs the following roles:

- SLR or NP query processing
- SLR or NP update processing and distribution
- database provisioning system management

Single-slot SCSI disk card

The single-slot SCSI disk (HD2) resides in a single front slot and is connected to the appropriate NP mission card. The SCSI hard disk drive stores system data, such as database records. The card has a storage capacity of 6 GB or 20 GB (for system exceeding 10 million records).

PSE TMs

PSE TMs occupy rear slots behind every NP mission card and its associated SCSI Disk mission card. Each PSE TM provides:

- one Ethernet 10BaseT (10 Mbit/s) interface point
- one SCSI interface point
- point-of-use power supply (PUPS) for the NPC system node

NPS system node

NPS system node provides high-rate SLR and NP query processing (2500 queries per second).

ATTENTION

For an NP in an ETSI/ITU network, the limit is up to 2000 queries per second.

Each NPS occupies two slots on either the control or extension CAM shelf.

The following cards create an NPS system node:

- one NP mission card
- one single-slot SCSI Disk mission card
- two Power/SCSI/Ethernet (PSE) TMs

The cards in the NPS system node are identical to those in the NPC system node; however, the Ethernet port on the NPS system node is not active. For more information on these cards, see section "NPC system node" (page 28).

NPE system node

NPE system nodes provide increased database record capacity for NP and SLR query processing. The NPE system node supports up to 5000 queries per second (qps). Each NPE system node provides an additional database capacity of 10 million records for NP and 14 million records for SLR.

NPE cards are organized in chains. Each chain supports up to two NPC or NPS cards. This configuration provides redundancy: if one chain fails, the other takes over.

To ensure that query capacity is not lost when a shelf fails, Nortel recommends that you provision NPE nodes on the same shelf as the master or alternate NPC and NPS nodes. You can provision NPE cards on control or extension CAM shelf.

The following cards create an NPE system node:

- one NPE mission card
- one PSE TM

NPE mission card

The CE3 (NP) mission card consists of a PP4 base card configured with an AA PMC module. The NPE mission card has an ATM adaptor module for messaging with the ATM backplane.

An NPE mission card performs the following functions:

- SLR and NP query processing
- database record expansion

PSE TM

The NPE PSE TM occupies the rear slot behind the NPE mission card. Each PSE TM provides

- one Ethernet 10BaseT (10 Mbit/s) interface point
- point-of-use power supply (PUPS) for the NPS system node.

Inter-CAM Communication Medium (ICCM)

The USP uses the ICCM, an external ATM switch fabric, to interconnect shelves in the multi-shelf configuration.

To maintain the existing redundancy and availability of the Signaling Server platform, the USP deploys two ICCMs: one for Plane 0 and one for Plane 1.

The ICCMs interconnect Plane 0 OC3 transition module (CC1 in slot 1) to ICCM 0 and Plane 1 OC3 transition module (CC1 in slot 18) to ICCM 1. This configuration allows full redundancy of SS7 messaging and the in-service upgrade and servicing of the ICCMs to ensure no impact on SS7 traffic due to upgrade or service to the ICCMs.

The ICCM can be mounted on a standard 19 in. rack. The main ICCM box measures 6.4 (h) x 15.6 (d) x 17.3 (w). Each ICCM supports up to eight OC3 ports for eight CAM shelves. The basic system is provisioned with one OC3 network module.

ATTENTION

For USP 10.0, Nortel will continue to ship the older NEC ICCM ATM Switch (NTST87AA) until the supply is depleted. After the supply is exhausted on the older version, the new Marconi ICCM ATM Switch (NTST87BA) will become the shipping baseline.

The ICCM system package contains the following components:

- ICCM basic system
- ICCM with a maximum of eight OC3 ports
- OC3 fibre cable

For details of the ICCM system elements, see *Marconi TNX-210 ATM Switch Installation and Maintenance Manual*. For details on adding an ICCM to an existing USP, see *Nortel USP Upgrades* (NN10045-461).

Channelized E1 Timing Signal Generator (TSG)

A TSG receives an E1 clock source, and provides 64KHz Composite Clocks to the USP. The E1 clock sources can be referenced to a primary reference clock (PRC) or to another slave clock.

The TSG outputs two independent composite clocks to all shelves of the USP.

BALUN converter

The T1/E1 transition module requires the BALUN converter (NTTD13AA) to enable the E1 links to be transported over 75 Ohm unbalanced coaxial cables.

The BALUN (balanced to unbalanced) system converts signals from 120 Ohm balanced twisted pair cabling to coaxial 75 Ohm unbalanced cabling. It also provides conversion of physical connectors between RJ45 to two types of coaxial interfaces, including female BNC and BT43 connectors.

The BALUN system consists of two parts: The rack enclosure for 16 paths and the BALUN module. The number of BALUN required is based on the number of T1/E1 TMs required for conversion. Divide the number of T1/E1 TMs required for conversion by 16 to find out the number of BALUN required.

The BALUN converter is a passive device (it has no power requirements).

OAMP workstation

The OAMP workstation is the user console for your system. From the OAMP workstation, you can perform tasks such as managing the CAM shelves and configuring the functionality of your system. For more information on minimum requirements for both Windows and UNIX based OAMP workstations, refer to the USP Product Specification.

PC configuration for customer supplied PCs, workstations, and printers

The following are the recommended minimum specifications for customer supplied and supported PCs and workstations:

- Windows 2000-based PC: 2.0GHz+ Intel Pentium 4 Processor, 20 GB hard drive, 256 MB RAM, 48X CD-ROM
  - — System backup software capable of restoring file data, registry and Windows licensing information.
  - — Disaster recovery capabilities are also recommended.

— The PC must boot straight to the desktop and must not stop booting at the login window. If the PC stops booting, it will prevent the alternate boot functionality in the case of a power interruption or PC reboot.

— IIS (specifically the Microsoft FTP server) must be disabled.

— Optional printer: Most standard PC printers that support Windows 2000 are suitable

- Sun workstation: 650-MHz UltraSPARC-lli, 512-KB On-chip L2 Cache, PGX64 Onboard Graphics, 512MB SDRAM, 80GB 7200RPM Hard Drive, SmartCard Reader (optional), 1.44MB (optional), CD-RW drive for backup, and Solaris 9.0.

  — Optional printer: Printers that support Solaris 9.0 are suitable. At the time this document was released, the recommended set of printers supported with Solaris 9.0 is listed at www.sun.com.

Remote access server

A remote access server (RAS) (NTST32BA or DM1401E69) provides the necessary signal format conversions to connect a remote OAMP workstation to the CAM shelves through a dial-up phone connection.

The RAS contains either two or eight modems and a terminal server. The RAS modem converts an incoming voice frequency signal to a serial message. The terminal server then converts the serial message to an Ethernet signal, which is used by the CAM shelves.

The standard configuration for this device includes two internal modems. The alternate configuration includes eight internal modems.

Ethernet hubs

Two 10Base-T/10Base-2 Ethernet hubs (NTST31AA) provide compatibility between 10Base-T and 10Base-2 Ethernet messages. This ensures that the Ethernet connections between the CAM shelves (PSE TM) and the OAMP workstation are compatible.

Cables

CAM shelf cables

PEC	Description	Quantity	Maximum Length
	Power cable (RO112716)	4 per shelf	N/A
	Frame Ground cable (RO113513)	1 per shelf	N/A

PEC	Description	Quantity	Maximum Length
NTST88AA	OC3 Cable (ICCM to OC-3 TM) ICCM Power and return cables (RO115095 / RO119975) ICCM Frame grounding cable (RO119976)	4 (for 4 shelf system)	100
NTST17AA	Telemetry cable	2 per control shelf	500 feet
NTST18AA	Composite Clock cable	2 per shelf	500 feet
NTST20AA	OC-3 cable (dual-shelf system only)	2 per dual-shelf system	3.3 feet
NTST21AA	SCSI Plug Module	1 per RTC or NP system nodes	N/A
NTST22BA	Crossover IP Cable	2 per shelf	300 feet
NTST22CA	Straight CAT 5 IP Cable	2 per shelf	300 feet
NTST23AA	DS0A cable	1 per DS0A TM	500 feet
NTST60AA	V.35 cable (without connectors)	2 per V.35 TM	300 feet
NTST82AA	V.35 cable (with connectors)	2 per V.35 TM	300 feet
NTST91AA	T1/E1 cable (1 connector) Use physical connector J2 for E1 MTP2 HSLs, and J1 for other link types.	1 per T1/E1 TM	600 feet
NTST92AA	T1/E1 cable (2 connector) used with BALUN NTST13AA	1 per T1/E1 TM	600 feet
NTTD32AA	Timing signal generator cable	2 per timing signal generator	500 feet
NTTD38AA	USP shelf alarm cable for PTE2000/BIP	2 per timing signal generator	500 feet

ATTENTION

Power cables and Frame Ground cables do not have a maximum length. They are configured individually depending on your system needs.

Power cables

Four power cable assemblies connect each CAM shelf to its power source:

- One carries the -48VDC A feed.
- One carries the -48VDC B feed.

- One carries the A feed return.
- One carries the B feed return

Each cable terminates at the rear of a CAM shelf using a one-hole, insulated terminal lug.

Frame ground cables

Each CAM shelf receives its frame (chassis) grounding through the Frame Ground cable. The cable attaches to the rear of a CAM shelf using a double-hole, non-insulated lug.

Telemetry cables

Telemetry cables transport CAM shelf alarm signals from the OC-3 TM to a distribution frame for cross connection. Each OC-3 TM has four telemetry contact closures. Use the telemetry cable to connect to a telemetry alarm monitor box.

Telemetry cables terminate at the rear of a control CAM shelf using a standard 15-pin, D-sub style, female connector. They are wire-wrapped at the distribution frame end.

Composite clock cable

The Composite Clock cable connects each CAM shelf to a timing source generator (TSG) device, such as the network providers BITS system. This cable terminates at the rear of a CAM shelf using a 15-pin, D-sub style, male connector.

SCSI plug module

The SCSI plug module is not a cable, but it provides the same functionality. It joins the RTC card and SCSI Disk card by physically connecting the corresponding PSE TMs. This module terminates at the rear of the CAM shelf using a 68-pin micro D-sub style, male connector.

Ethernet twisted pair cables

Ethernet cables connect the CAM shelf and the Ethernet hubs. The cables physically connect the PSE TMs (behind the RTC cards) to the Ethernet hubs. These cables use RJ-45 connectors to terminate at the rear of the CAM shelf.

DS0A cables

DS0A cables carry four DS0A port signals from the distribution frame to a CAM shelf. These cables terminate at the rear of a CAM shelf using 25-pin, D-sub style, male connectors.

V.35 cables

Two types of cables support V.35 functionality: cables with connectors and cables without connectors.

V.35 cables without connectors carry two V.35 port signals in one cable from the distribution frame to a CAM shelf.

V.35 cables with connectors carry two V.35 port signals in two separate cables with standard V.35 (M34) connectors. These cables provide standard V.35 connections to other system equipment or connector interfaces.

Both types of V.35 cables terminate at the rear of the CAM shelf using 44-pin, miniature, D-sub-style male connectors.

T1/E1 cables

Two types of cables support T1/E1 functionality: cables with RJ45 connectors at both ends, and cables with an RJ45 connector at one end and open ended at the other.

The open ended cable is used to connect ATM HSL (T1) or Channelized E1 links from the TM to an MDF panel.

The two connector cable is used to connect ATM HSL (T1) or Channelized E1 links from the T1/E1 TM to a BALUN converter. This permits ATM HSL or Channelized E1 links to be terminated with 75 ohm coaxial cabling.

ATTENTION

The total length of the T1/E1 cable and coaxial cable can not exceed 600 feet.

When using NTST91AA cable for E1 MTP2 HSLs, use physical connector J2. Use connector J1 for other link types.

OC-3 cables

These cables are designed to carry ATM traffic at an emitter frequency of 62.5 microns.

In a dual-shelf system, two fiber-optic cables connect the control CAM shelf to the extension CAM shelf. The first cable connects the CC system node in slot 1 of the control CAM shelf to the CC system node in slot 1 of the extension CAM shelf. The second cable connects the two CC system nodes in slot 18 of each shelf.

OAMP workstation cables

The following cables are part of the standard OAMP workstation supplied with your system:

- CAT-5 patch cables (one 3-m cable and two 1-m cables)

- one six-port surge protector

Timing signal generator cables

These cables carry composite clock information from the timing signal generator to all shelves on the USP.

ATTENTION

The total length of the cable between the timing signal generator and the CC system node can not exceed 500 feet.

Software Basics

Software loads

The USP software is delivered in a universal load, which includes the basic software functionality, as well as value-added (optional) packages.

Basic USP software

The following table explains the basic USP software:

Basic USP software packages

Order Code	Functionality	Description
USP00011	NCL	Provides the basic USP software media, and includes all software features on CDROM or ESD
SSAS0001	Basic Signaling Server Platform	
SSAS0002	Basic OAMP	Provides support for five OAMP workstations

Value-added software

The following table lists the value-added USP software:

Value-added USP software packages

Order Code	Functionality	Description
SSAS0003	ATM HSL	Provides ATM high speed link support
SSAS0004	IP HSL	Provides IP high speed link support
SSAS0005	Special Studies Operational Measurements	Allows the customer to provision performance indicators specific to the system
SSAS0007	OAMP workstation continuation	Provides support for three additional workstations
SSAS0008	GTT expansion 60000 - 100 000	Supports additional GTT records
SSAS0009	GTT expansion 100000 - 150 000	Supports additional GTT records
SSAS0010	GTT expansion 150000 - 200 000’	Supports additional GTT records

Order Code	Functionality	Description
SSAS0011	Routeset expansion 256 - 511	Supports additional routesets
SSAS0012	Routeset expansion 512 - 767	Supports additional routesets
SSAS0013	Routeset expansion 768 - 1023	Supports additional routesets
SSAS0014	Routeset expansion 1024 - 1279	Supports additional routesets
SSAS0015	Routeset expansion 1280 - 1535	Supports additional routesets
SSAS0016	Routeset expansion 1536 - 1791	Supports additional routesets
SSAS0017	Routeset expansion 1792 - 2047	Supports additional routesets
SSAS0018	Routeset expansion 2048 - 4000	Supports additional routesets
SSAS0019	E1 ITU MTP2 HSL	Provides E1/ITU MTP2 HSL support
SSAS0021	OSS Access to CLI Interface	Provides command line interface (CLI) to access USP tables.
USP00701	Basic Signaling Gateway Functionality	Basic Signaling Gateway
USP00703	RouteMaster Signaling Mediation	End-office replacement application.
BSTP0711	Basic Co-resident STP	Basic Signaling Transfer Point
BSTP0015	Network Indicator Interworking	
BSTP0304	Multiple Replicated Subsystems	
UNPM0001	Basic Number Portability (600 queries per second, 10 updates per second, 2 million records)	Provides basic number portability (NP) functionality
UNPM0002	NP queries per second (qps) upgrade (600 to 1200 qps)	Supports increased query rate
UNPM0003	NP qps upgrade (1200 to 2400 qps)	Supports increased query rate
UNPM0004	NP qps upgrade (2400 to 3600 qps)	Supports increased query rate
UNPM0005	NP qps upgrade (3600 to 5000 qps)	Supports increased query rate

Order Code	Functionality	Description
UNPM0006	NP qps upgrade (5000 to 7500 qps)	Supports increased query rate
UNPM0007	NP qps upgrade (7500 to 10 000 qps)	Supports increased query rate
UNPM0008	NP qps upgrade (10000 to 12 500 qps)	Supports increased query rate
UNPM0030	NP records capacity upgrade (2 million to 5 million records)	Supports additional ported number records in NPDB
UNPM0032	NP records capacity upgrade (5 million to 10 million records)	Supports additional ported number records in the NPDB
UNPM0033	NP message relay, non-call related	Provides routing support for network services affected by the NP functionality
UNPM0034	NP mobile SRF, call related	Supports the routing of call-related, wireless, ETSI/ITU NP messages using the mobile signaling relay function (SRF)
UNPM0035	NP ITU overlap outpulsing	Supports the overlap outpulsing, a digit handling functionality that allows the sending and collection of digit strings in parts
UNPM0036	NP hexadecimal digit support, INAP	Enables the use of hexadecimal digits A-F in routing numbers (RN) when intelligent network application protocol (INAP) is employed
UNPM0037	NP hexadecimal digit support, SCCP	Enables the SCCP to support RNs that include hexadecimal digits A-F
UNPM0052	Tariff non-transparency	Provides support with applying the appropriate tariffs to calls
UNPM0053	Flexible number routing	Supports flexible number routing
UNPM0056	SS7 NP database bulk load export	Provides electronic bulk load interface
UNPM0072	NP records capacity upgrade (10 million to 20 million)	Supports additional ported number records in NPDB
UNPM0071	NP records capacity upgrade (20 million to 30 million)	Supports additional ported number records in NPDB

Order Code	Functionality	Description
UNPM0068	NP records capacity upgrade (30 million to 40 million)	Supports additional ported number records in NPDB
UNPM0074	SLR application package (12 500 qps, 50 million records)	Provides Service Location Register functionality
USP00704	IN/SIP Conversion/ Interworking	Provides IN/SIP interworking functionality

Upgrade patch system

USP customers receive upgrades within major release through maintenance releases.

Requests for maintenance releases

A maintenance, or point, release is requested through an internal Nortel process. Point releases can be requested by one of the following groups:

- Design--If software designers determine that a software change must be propagated to an earlier release, a maintenance release is requested. Software designers can also request a special release to add small features.
- Customer support--A customer support group can request a maintenance release on behalf of a customer, or on the basis of issues that arise from testing or installation in a verification office.

Delivery of maintenance releases

Nortel recommends that every maintenance release issued be applied. Prior to the application of a new maintenance release, Nortel requires that the customer switch be loaded with the highest previous maintenance release.

For example, if Nortel releases maintenance release USP 9.0.4, the customer site should be running maintenance release USP 9.0.3 before upgrading to the USP 9.0.4 release.

Content of maintenance releases

There are three types of maintenance releases that the customer can receive:

- Emergency release--This release solves a critical or major customer issue in a timely manner. The contents of the release are normally limited, and Nortel recommends that customers install the maintenance release immediately.
- General release--This release can address several non-critical issues. Nortel recommends that customers install all general releases as a means of preventative maintenance.

- Special release--This release can provide customer-specific requirements or small features. This release is normally delivered to a limited number of customers and is optional to install.

The customer receives information about the point release through a set of release notes, containing information about the new features or updates in the release, and a readme file, that tells the user how to install the software.

Support for maintenance releases

Nortel supports product releases for two years after the release date. Point releases are normally generated for the latest two major releases that are generally available.

OAMP Basics

OAMP strategy

The USP uses a JAVA-based graphical user interface (GUI) or a command line interface.

The USP GUI is a communications interface that manages the USP. The GUI supports the following OAMP capabilities:

- SS7 translations database administration
- IP-related data provisioning
- system configuration database administration
- fault management
- log and OM collection, storage, and viewing
- alarm reporting
- software installation

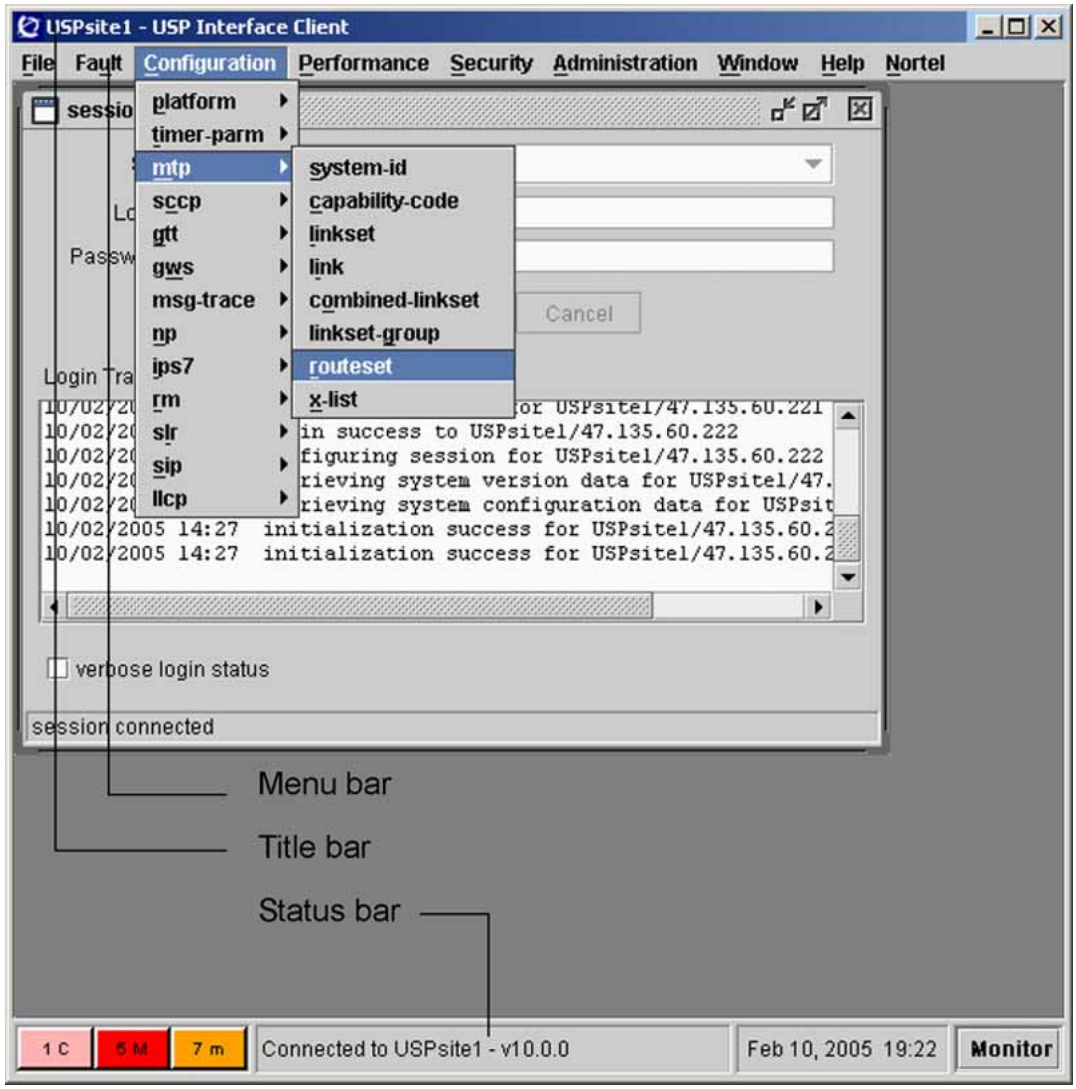
USP Java GUI

The GUI provides a complete multi-platform solution for managing the operation of the USP by providing user interface client to perform administration, system monitoring and reporting. The GUI client implements a consistent interface model to present all USP data to ensure ease-of-use and quick navigation of the data retrieved from the USP.

All communication with the USP is accomplished by establishing a standard TELNET connection to the USP Command Line Interface (CLI). There are no custom protocols or ports to configure. This simplifies interoperability and allows for all existing security restrictions and firewalls to be enforced. Local security is also enhanced by initiating idle session lockout and re-authentication if a session is left unattended for an extended period of time. Interoperability is enhanced through context-sensitive launching, using command line arguments, which allows external applications to control the launch sequence of the GUI to have it automatically navigate to the desired table and records using the supplied retrieval criteria.

The GUI is designed as a single encapsulating window manager to help organize and manage the layout of the large number of tables offered by the USP. Access to each table is achieved by a hierarchical menu structure. This structure provides fast and simple navigation to the desired table by simply clicking on the desired table from the pull down menus. See "USP JAVA GUI" (page 44) for an example of the main window of the GUI application. The USP supports up to 16 GUI sessions simultaneously.

USP JAVA GUI



Title bar

The title bar contains the following components:

- Site name - The name of the current USP site as defined in the site manager
- Application title - Identifies the window as the Universal Signaling Point Interface Client
- Window sizing buttons - Standard minimize, maximize/restore, and close buttons

Menu bar

The menu bar contains the following components:

- File - Session management, session login and exit
- Fault - Logs and alarm browser
- Configuration - Platform maintenance and provisioning, network provisioning and traffic control
- Performance - Operational measurements browser window and threshold provisioning
- Security - Administration of user accounts and remote access
- Administration - System administration, including backup, file manager, alternate boot server, scheduler, date, time, netping, SNMP, database usage, bulk input, bulk output and software upgrade
- Window - Tile and cascade commands for secondary windows within the GUI
- Help - Interface client information

Status bar

The status bar contains the following components:

- Alarm banner
- Status panel
- System date-time

Alarm banner

On the left side of the status bar, the alarm banner displays the current alarm status.

The alarm banner provides a count of active alarms in the system by alarm severity:

- C - critical
- M - major
- m - minor

If there are unacknowledged critical alarms, then the critical alarm panel will flash indicating this condition. Critical alarms should be resolved immediately. Alarms record system problems that require your attention. Minor alarms generally do not affect service.

Double clicking the alarm banner will automatically load the alarm table with the Realtime panel selected to show the current list of active alarms.

Status panel

The status panel of the main window provides overall session status, including connectivity status, software upgrade status and REx status.

- Connection status - Identifies the current connected site including version information and whether the session is connected in simplex or duplex mode
- Upgrade status - If the software upgrade is in progress, then the upgrade status panel will be visible and will show the current software upgrade state
- Rex status - If rex is in progress, then the rex status panel will be visible and will show the current rex state

System date-time

The date-time banner displays the current system time of the currently connected site. If no site is connected, then this field will be cleared.

Double clicking the date-time banner will automatically load the date-time table with the current system date-time settings.

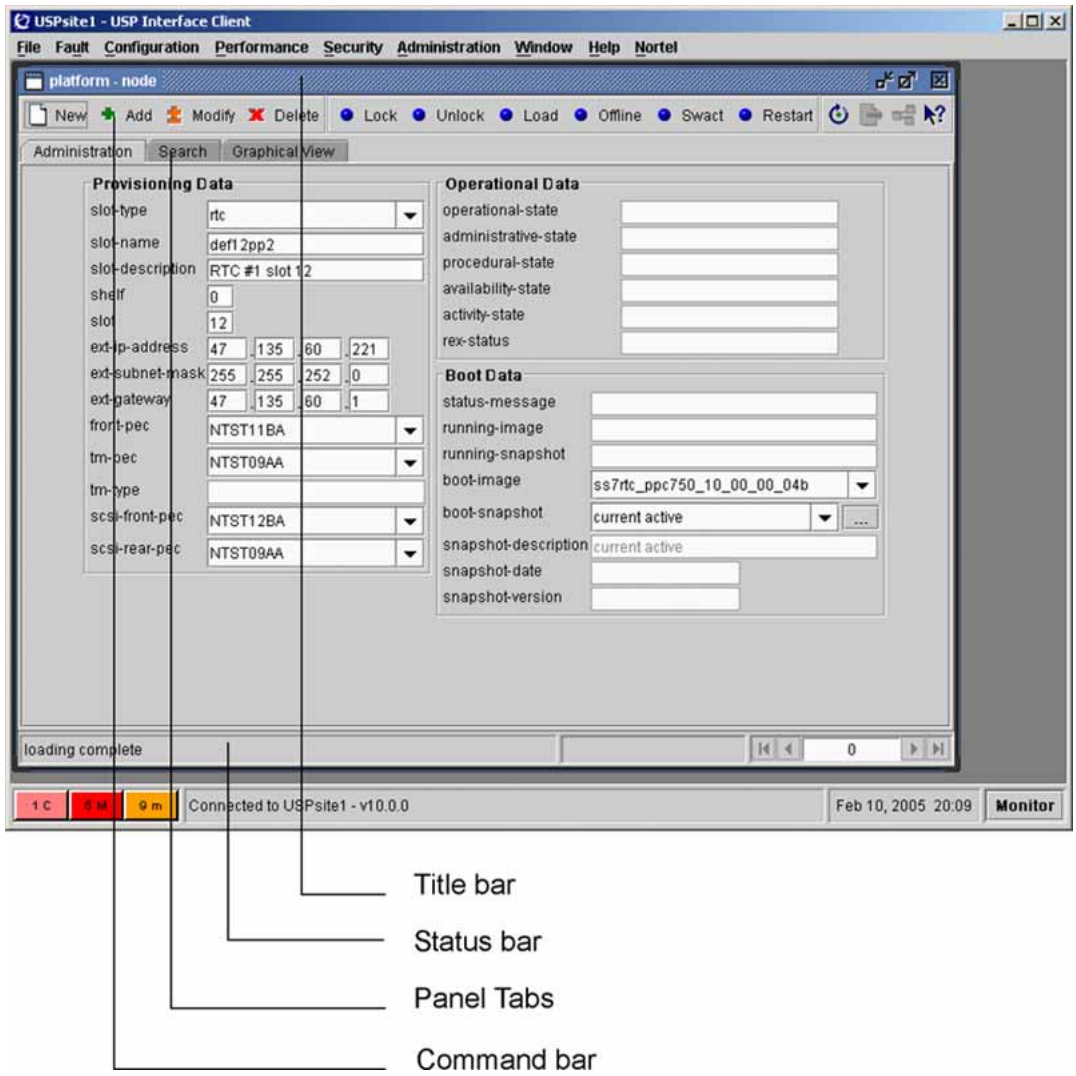
Monitor button

The monitor and restore button toggles between full and compact views of the current GUI session. The monitor mode provides a convenient way to switch to a smaller window that displays only alarm and system status information.

USP Java GUI secondary window-common elements

Management of all system operations and provisioning data is achieved through a common table interface. This common interface simplifies usability and reduces learning times by providing consistent presentation formats and navigation controls. See "USP JAVA GUI-secondary window" (page 47) for an example of the secondary window of the GUI application.

USP JAVA GUI-secondary window



Title bar

The title bar contains the following components:

- Panel name - The name of the current panel
- Window sizing buttons - Standard minimize, maximize/restore, and close buttons

Command bar

The command bar varies with the type of secondary window in use. Commands are:

- New
- Add

- Modify
- Delete
- Activate
- Deactivate
- Export
- Reload
- Loopback Set
- Loopback Clear
- Bert Start
- Bert Stop
- Test remote-authentication
- Force Out user-session
- Message user-session
- Activate remote-subsystem
- Deactivate remote-subsystem
- Activate local-subsystem
- Deactivate local-subsystem
- Activate lss-instance
- Deactivate lss-instance
- Activate linkset
- Deactivate linkset
- Activate link
- Deactivate link
- Test link
- Inhibit link
- Uninhibit link
- Activate routeset
- Deactivate routeset
- Start msu tracing
- Stop msu tracing
- Execute bulk-input
- Abort bulk-input

- Execute bulk-output
- Test abs
- Create a backup
- Run The Scheduled Task
- Lock node
- Unlock node
- Load node
- Offline node
- Swact node
- Restart node
- Start realtime logs
- Stop realtime logs
- Create new log period
- Acknowledge alarm
- Up application-server-process
- Down application-server-process
- Up application-server-process-path
- Down application-server-process-path
- ?- Context-sensitive help

Tabs

Tabs vary with the type of secondary window in use. The panel tabs are:

- Administration - Displays the administration panel
- Search - Displays the search panel
- Real-time - Displays the real time panel
- Graphical view - Displays a graphical representation of the system shelf, with clickable system nodes for configuration and provisioning
- Messages - Displays the message panel

Status bar

The status bar contains the following components:

- Status panel - Displays panel status
- Progress indicator - Displays progress of the requested tasks, for example, record retrieval

- Posted set control box - Enables browsing of the posted set

Navigating the GUI

This section explains basic navigation tips to help you move around the GUI using your mouse and your keyboard.

Mouse navigation

You can move among the active areas of the GUI by clicking them with your left mouse button.

Clicking your right mouse button on an active data box gives you typical Windows functions such as Cut, Copy, and Paste.

In several locations on the GUI, clicking the right mouse button also accesses shortcuts to certain system functions. For example, right-clicking the icon of a CAM shelf in the System Management window displays a shortcut to viewing active system alarms, provisioning links, and other functions.

Keyboard navigation tools

The keyboard navigation tools are described as follows.

Tab key

Within each GUI window, you can press your Tab key to move your cursor among boxes, buttons, and other active areas without using your mouse. Pressing Shift+Tab moves the cursor in reverse order.

Alt key

Many buttons and menu options on the system have underlined letters that provide keyboard access to them. To use this feature, hold down the Alt key while pressing the underlined letter on your keyboard.

Shortcuts using the alt key are not case-sensitive.

GUI buttons

The following list describes the most common types of buttons and their functions.

- Button (generic) - Used to access general functions such as Print, Close, Refresh, and Cancel
- Radio button or radio group - Used to select one option from a list
- Ellipsis (--) button - Used to open a new window, generally a file browser or a list of options
- Check box - Used to select one or more options from a list

- Inactive button - Appears as faded and does not respond when you click it. Its function is unavailable when the button appears in inactive mode.

Drop-down list boxes

Throughout the GUI, drop-down list boxes offer options.

To select an option in a drop-down list box, click it.

Many drop-down list boxes are context-sensitive, offering only those options that are valid at that particular time.

For example, when you select which type of alarms you want to view, Critical will not be offered in the list if there are no active critical alarms.

Other drop down list boxes are not context-sensitive, and offer options that may or may not be valid.

Command line interface

The Command Line Interface (CLI) allows a user or an Operation Support System (OSS) to manage system tables through a TELNET/TCP connection. Fault, configuration, performance and security, and administration are all supported through this interface.

The CLI is accessible through either Real Time Controller (RTC). To establish a connection the OSS must TELNET to either RTC using an IP address.

The CLI interface has two operating modes: human mode and machine mode. These modes control the format of output and command responses. In machine mode, additional information is added to the command responses to ensure that the CLI can be used as a reliable interface by a customer OSS.

For more information on the CLI, refer to the CLI Interface Specification.

Network interfaces and protocols

This section describes the protocols and interfaces used by the Universal Signaling Point.

SS7 protocol

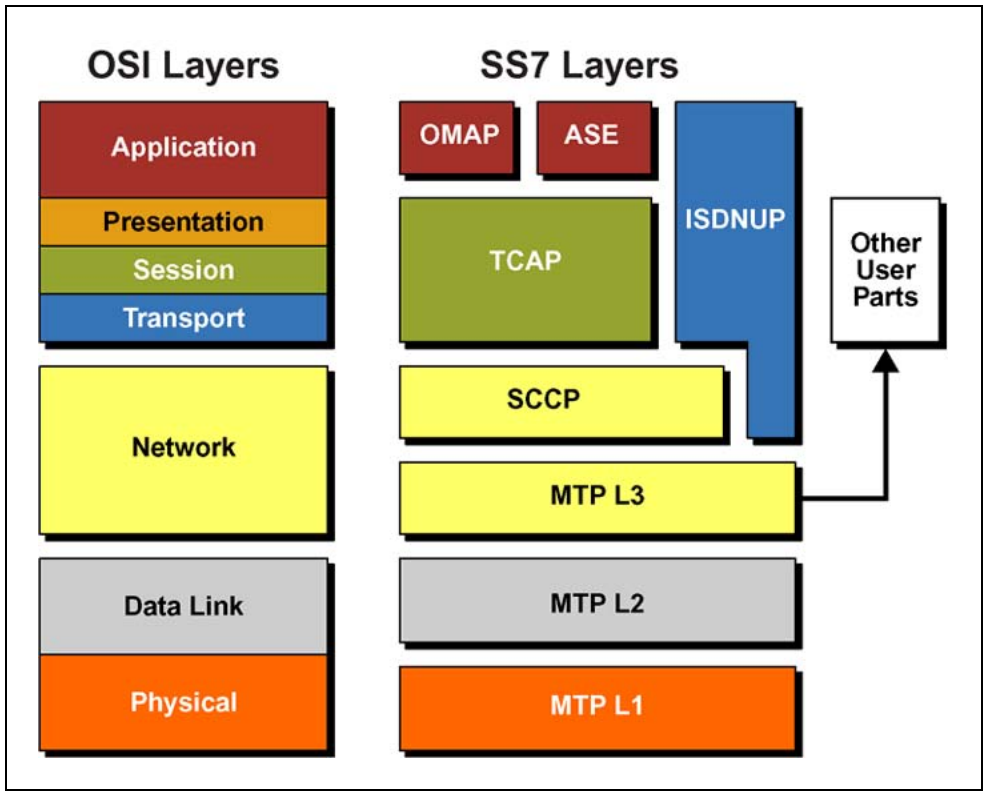
The SS7 protocol ensures that all parties communicate in the same language and provides many of the functions and services required by telephone service providers. SS7 software and hardware functions are determined by the specifications established in the SS7 protocol.

SS7 information elements are grouped into message signaling units (MSUs), which contain the signaling information used by connection-oriented signaling, connectionless signaling, and signaling network management (SNM).

ITU, Telcordia (Bellcore), and ANSI specifications adhere to the SS7 protocol. The SS7 protocol structure is layered, and maps to the seven-layer Open System Interconnection (OSI) networking model.

The following figure lists details the OSI layers and the corresponding SS7 protocols.

OSI and SS7 protocols



The SS7 protocol contains four sub-protocols called parts, which are mapped to the SS7 protocol levels:

- MTP (Message Transfer Part)
- SCCP (Signaling Connection Control Part)
- TCAP (Transaction Capabilities Application Part)
- ISUP (ISDN User Part)

MTP

MTP provides the functionality that enables information to be transferred reliably across the SS7 network, in the correct sequence, and without loss or duplication. In addition, MTP can overcome network or system failures. MTP consists of SS7 protocol Levels 1, 2, and 3.

MTP Level 1

MTP Level 1 is the physical level of the SS7 protocol, converting digital data into a bitstream, and specifying how the bits are transmitted over the network. Level 1 also defines the physical, electrical, and procedural characteristics of a 64-Kbps signaling data link that uses channels with an E1 or T1 carrier.

MTP Level 2

MTP Level 2 sets the functions and procedures for transmitting messages over a signaling data link. This includes creating the message packet (signaling unit), unit separation, error detection, and error correction. Level 2 also ensures a secure signaling link is maintained between a pair of signaling points.

MTP Level 2 provides the following capabilities:

- signal unit alignment, error detection and correction
- signaling link alignment
- signaling link error monitoring
- flow control

MTP Level 3

MTP Level 3 maintains the reliable transfer of messages between signaling nodes in an SS7 network, even in the event of signaling link or signaling point failures. MTP Level 3 provides the following functionality:

- signaling message handling
  - message routing
  - message discrimination
  - message distribution
- signaling network management
  - link management
  - traffic management
  - route management

You can perform the following MTP (Message Transfer Part) Level 3 provisioning and maintenance tasks:

- provisioning and maintaining linksets
- provisioning, maintaining, and testing links
- provisioning combined linksets
- provisioning linkset groups
- provisioning and monitoring routesets

SCCP

SCCP is a function of SS7 Level 4, providing additional functions to the message transfer and delivery activities of MTP.

SS7 uses SCCP to address and route information to a particular application that resides at an SS7 network node. SCCP also provides GTT (global title translation), which maps an application address such as dialed digits into an address that is recognized by the SS7 network.

SCCP management enables a user to track the status of an application at the network nodes and informs you when an application at another node is not available.

MTP and SCCP, combined, provide the Network Services Part (NSP). NSP supplies all network communications and delivers end-to-end transaction services.

In the cCS2k configuration all SCCP/TCAP functions are performed on the Core.

SCCP management

SCCP management provides the procedures required to maintain network performance by rerouting or controlling SCCP traffic when congestion or failures of SPs and subsystems occur in the SS7 network.

TCAP

TCAP is a function of SS7 Level 4. Working in conjunction with NSP, TCAP provides a set of generic procedures that allow SSPs and SCPs to communicate.

TCAP software exchanges query and response messages on the signaling network to control non-circuit related information transfer between two or more nodes. For example, TCAP can access network databases for E800 and AIN.

TCAP messages can also check the status of a line for a CLASS transaction service.

ISUP

ISUP is also a function of SS7 Level 4. ISUP uses connectionless signaling for call setup and takedown. This provides network-wide feature transparency for network services.

Customer Support

Contact Nortel for help

Nortel Networks provides product support using standard Customer Service Center and Global Product Support policies and procedures. For issues that cannot be resolved, contact Nortel regional Customer Services Center and a representative will open a Customer Case Report. If the regional representative cannot resolve the problem, the Customer Service Center representative refers the matter to the next level of support to provide either an answer to the problem or corrective action.

Corrective action can include the following:

- Amendment in a future software release
- Incremental software update (maintenance release)
- Customer information change
- Request for feature development to address new or changed functionality

When the problem is resolved, the customer is notified and the Case Report is closed.

Where to get customer documentation

Documentation for each Carrier Voice over IP Network solution is delivered on a Helmsman CD, through the Internet on Helmsman Lite. USP information is also available on-product. The customer information includes the following information types:

- Overview
- Fault Management
- Configuration Management
- Performance Management
- Security and Administration
- Software Upgrade

Training

Each Carrier Voice over IP Network Solution provides a curriculum that is specific to the solution. All course descriptions, prerequisites, schedules and locations are available at http://www.nortel.com/training.

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

Carrier VoIP

USP Basics

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