

## Chapter 8: Selecting Hardware

### Cisco Unity Server

Cisco Unity servers must be selected from the *Cisco Unity Supported Platforms List (CUSPL)*, available at [http://www.cisco.com/en/US/products/sw/voicesw/ps2237/products\\_data\\_sheets\\_list.html](http://www.cisco.com/en/US/products/sw/voicesw/ps2237/products_data_sheets_list.html). Support from the Cisco Technical Assistance Center (TAC) is available only for servers listed in the CUSPL.

### RAID Volumes

All multiprocessor servers on the CUSPL include multiple RAID volumes, as follows:

Configuration	Description
Three RAID volumes	A multiprocessor server that includes three RAID volumes is optimized for installation of Cisco Unity in a Voice Messaging configuration with Exchange 2000 or Exchange 2003 on the Cisco Unity server. This configuration allows binaries, transaction logs, and databases to be stored on separate disks.
Two RAID-1 volumes (for example, Dell PowerEdge-6650 or Hewlett-Packard DL580) in platform overlays 4 and 5	A multiprocessor server that includes two RAID-1 volumes is optimized for configurations in which the message store is not installed on the Cisco Unity server. Binaries and transaction logs can still be separated, but there is no need for a third RAID volume for Exchange databases.
Two RAID volumes in platform overlay 3	A multiprocessor server in this configuration can be used with Exchange 2000 or Exchange 2003 on the Cisco Unity server or on a separate server.

### Cisco Unity Server Issues

When deciding which Cisco Unity server to use, consider the following hardware-related issues:

- **Voice cards and slots:** Take note of the number of slots in the server for voice cards (for integration with a circuit-switched phone system only). If there are fewer slots available than needed for all cards, an expansion chassis is required.



All analog loopstart cards shipped prior to Cisco Unity 4.0 were 5Vdc-only PCI cards. Beginning with Cisco Unity 4.0, new analog loopstart PCI cards are available. The new cards, which are compatible with both 3.3Vdc and 5Vdc PCI or PCI-X buses, are called Universal PCI (uPCI) cards. The new cards, which supersede the cards that appeared on price lists for earlier versions of Cisco Unity, are not compatible with Cisco Unity 3.1 or earlier. The old cards will function with Cisco Unity 4.0, but cannot be ordered for new Cisco Unity 4.0 installations. (The D/240PCI-T1 is still a 5Vdc-only PCI card.)

All voice cards qualified for use with Cisco Unity have a 33MHz clock speed. In some servers, slots are paired, so that inserting a 33MHz card in one slot will cause the clock speed on the paired slot to slow down to 33MHz. This could negatively affect the operation or performance of the card in the second slot (for example, a RAID controller or a NIC). Ensure that the voice cards you select are appropriate for use in the available slots in the server you select.

- **Number of processors:** Cisco Unity systems with more than 32 voice ports or with failover require Microsoft SQL Server for the Cisco Unity database. SQL Server is licensed per processor, so a server with multiple processors has a higher SQL Server license fee than a server with a single processor.
- **Number of voice ports.**
- **Disk size and RAID configuration:** This includes calculating an approximate requirement for message storage (in minutes).

## Subscriber-Related Issues

When deciding which Cisco Unity server to use, consider the following subscriber-related issues:

- **Number of Cisco Unity Inbox sessions:** If the recommended number of Cisco Unity Inbox sessions is exceeded, Cisco Unity Inbox performance will suffer, and end users will see “server busy” messages more often. (Note that in version 3.1 and earlier, the Cisco Unity Inbox was known as the Visual Messaging Interface, or VMI.)
- **Number of users.**
- **Number of Text to Speech (TTS) sessions.**
- **Whether Cisco Unity will be configured for Voice Messaging or for Unified Messaging.**

## Multiple Network Interface Controllers (NICs)

Cisco Unity supports the use of multiple NICs for Adapter Fault Tolerance (AFT), which is also referred to by some server manufacturers as Network Fault Tolerance (NFT). AFT/NFT provides an additional backup link between the server and the hub or switch, and is implemented with a primary NIC and a backup (secondary) NIC. During normal operation, if the primary NIC fails, the link to the secondary NIC automatically takes over. To use AFT/NFT, two NICs must be installed in the Cisco Unity server and they must be linked to the same network segment. A single IP address is assigned to the two NICs, and only one NIC is identified by the operating system.



Cisco Unity does not support the use of multiple NICs for load balancing, either full or half duplex. If a Cisco Unity server has dual NICs and each NIC is configured for different network segments, Exchange 2000 or Exchange 2003 cannot reliably deliver messages. Additionally, a caller may hear Cisco Unity prompts, but will not hear the caller speaking.

## Gigabit Ethernet Ports

Use of gigabit Ethernet is recommended on the Cisco Unity server for general connectivity, and in particular for the heartbeat link between Cisco Unity failover nodes, but it is not required.

## IBM xSeries-345 Slot Descriptions

The IBM specifications for an xSeries-345 server indicate that it has five slots. However, note the following qualifications:

- Two slots are low-profile slots that stand vertically in this 2U server, so they can be used only by selected aftermarket PCI cards. One of these slots is used for the IBM ServeRAID-5i RAID controller.
- One slot is a half-length 33MHz slot. It is most useful for either the IBM RSA management card or for a host card that is shipped with the PCI expansion chassis.
- The remaining two slots are full-length 33-133MHz (3.3Vdc) PCI-X slots. These two slots can be used only for the new Intel Universal-PCI (uPCI) voice cards that will be released with Cisco Unity 4.0. They cannot be used with earlier versions of Cisco Unity.

If you want to use the xSeries-345 server to integrate Cisco Unity 4.0 with a circuit-switched phone system, by using an analog loopstart connection, the two full length slots can be used with the new uPCI analog loopstart cards (UNITY-D/41U-LS, UNITY-D/41U-EU, UNITY-D/120U-LS or UNITY-D/120U-EU).

If you want to use the xSeries-345 server to integrate Cisco Unity 4.0 with an NEC NEAX 2400 or an Intecom E14 Millenium, by using a dry-T1 connection, an expansion chassis must be used. The only T1 PCI card supported by Cisco Unity 4.0 is 5Vdc only (UNITY-D/240PCI-T1).

## Failover Configuration

The Cisco Unity secondary failover server must be from the same platform overlay in the CUSPL as the primary failover server, and the primary and secondary servers must have the same number of voice ports. In the event that something happens to the primary server, this allows the secondary server to temporarily support the load that the primary server supports. This also allows the secondary server to be converted into the primary if the primary suffers a catastrophic failure.

When setting up Cisco Unity failover, the message store must be installed on a separate server regardless of the number of Cisco Unity subscribers, thus ensuring that messages will be available even when one Cisco Unity server is down.

Cisco Unity failover requires Microsoft SQL Server for the Cisco Unity database. (MSDE is not supported for a failover configuration regardless of the number of ports.) SQL Server is licensed per processor, so a server with multiple processors has a higher SQL Server license fee than a server with a single processor.



For detailed information on cabling requirements for Cisco Unity failover, refer to:

- The Cisco Unity integration guide for the applicable phone system, available at [http://www.cisco.com/en/US/products/sw/voicesw/ps2237/prod\\_configuration\\_guides\\_list.html](http://www.cisco.com/en/US/products/sw/voicesw/ps2237/prod_configuration_guides_list.html).
- The *Cisco Unity Failover Configuration and Administration Guide*, available at [http://www.cisco.com/univercd/cc/td/doc/product/voice/c\\_unity/fail/fail401/ex/index.htm](http://www.cisco.com/univercd/cc/td/doc/product/voice/c_unity/fail/fail401/ex/index.htm).

Finally, consider the following failover-related issues:

- **Ring Equivalency Numbers (RENs):** If Cisco Unity is being integrated with a circuit-switched phone system, devices other than those described in the Cisco Unity documentation should not be connected to the analog voice lines for any voice messaging port. Otherwise, the REN may be exceeded and the primary and secondary servers may not receive sufficient ring current to answer calls.
- **Analog line splitters:** If Cisco Unity is being integrated with a circuit-switched phone system, the analog lines between the phone system and the voice cards in the Cisco Unity servers must be broken into two lines by using line splitters or a punchdown cross-connect block (for example, 66-type) so that each line connects to both servers. Y-type line splitters can be ordered by the dozen from the Cisco Unity price list.
- **RS-232 cable splitter (serial integrations only):** If Cisco Unity is being integrated with a circuit-switched phone system by using a serial (or SMDI) integration, the RS-232 cable that connects the phone system (or, for some integrations, connects the PBXLink box) to a serial port on the Cisco Unity servers must be split so that data packets go to both servers. A data splitter is shipped with all failover orders, so it is not necessary to purchase a separate device.
- **Maximum cable length (serial integrations only):** The maximum combined length of the cable between the phone system and a serial port on either Cisco Unity server must not exceed 50 feet (15.2 meters).

## Tax Impulse Metering

Tax impulse metering is used for public phones in Austria, Belgium, the Czech Republic, Germany, Spain, and Switzerland. It is rarely used for private lines. Cisco Unity is not affected by tax impulse metering because the frequency of tax impulses (about 12 to 16 KHz) is substantially higher than the frequency bandpass switched by the phone system (typically 4 KHz bandwidth). As a result, it is never necessary to deploy inline impulse RF filters for Cisco Unity or Cisco Unity Bridge servers facing the station side of a phone system. It is also extremely unlikely that a PSTN-facing Bridge server would need inline RF filters.

No detrimental effects have been reported from using filters.



## Cisco Unity Bridge Server

Cisco Unity Bridge servers must be selected from the *Cisco Unity Supported Platforms List*, available at [http://www.cisco.com/en/US/products/sw/voicesw/ps2237/products\\_data\\_sheets\\_list.html](http://www.cisco.com/en/US/products/sw/voicesw/ps2237/products_data_sheets_list.html). Support from Cisco TAC is available only for servers that are listed as qualified for use as Cisco Unity Bridge servers.

Ensure that the server includes enough slots for the required number of fax cards. If there are fewer slots available than are needed for all cards, an expansion chassis is required.

### Voice-Fax Cards in the Cisco Unity Bridge Server

- **Selecting the correct card for the country or region:** *Cisco Unity Bridge System Requirements, and Supported Hardware and Software* lists supported voice-fax cards and the countries in which they can be used. There are significant differences between versions of the same card, and these differences prevent cards from being used in countries for which they are not qualified. The document is available at [http://www.cisco.com/en/US/products/sw/voicesw/ps2237/prod\\_pre\\_installation\\_guides\\_list.html](http://www.cisco.com/en/US/products/sw/voicesw/ps2237/prod_pre_installation_guides_list.html).
- **Connecting cards in the Cisco Unity Bridge server with the phone system:** The Brooktrout Technology voice-fax cards that are required in the Cisco Unity Bridge server are each bundled with a cable for connecting the card with the phone system. The connectors on the cable differ depending on which country the card is for, as follows:
  - United Kingdom and Hong Kong cards ship with a cable that has an RJ-45 connector on the end that connects to the card, and BT431A connectors on the end that connects to the phone system.
  - The TBR-21-compliant card that ships to European countries other than the United Kingdom uses the same cable as the card that ships to the US and Canada.
  - The Australia cable uses the same connectors as the US and Canada cable, but the RJ-45 connector is wired differently—the four tip-and-ring connections are reversed.
  - The Japan cable uses the same connectors as the US and Canada cables, but it is marked for Japanese telecom approval; a US and Canada cable cannot be substituted.

## Message Store Servers and Domain Controllers/Global Catalog Servers

When selecting Domino servers, follow IBM Lotus recommendations.

When selecting Exchange 2000, Exchange 2003, or Exchange 5.5 servers, ensure that the servers meet Microsoft minimum requirements. If you purchase the servers from Cisco, refer to the *Cisco Unity Supported Platforms List*, available at [http://www.cisco.com/en/US/products/sw/voicesw/ps2237/products\\_data\\_sheets\\_list.html](http://www.cisco.com/en/US/products/sw/voicesw/ps2237/products_data_sheets_list.html).

If the customer wants Cisco Unity failover, note that the message store must be installed on a separate server regardless of the number of Cisco Unity subscribers.



## Voice Cards

Voice cards are required only when Cisco Unity is being integrated with a circuit-switched phone system.

For a list of the voice cards supported for Cisco Unity version 4.0, including information on the countries in which they are supported, refer to *Cisco Unity System Requirements, and Supported Hardware and Software*, available at [http://www.cisco.com/univercd/cc/td/doc/product/voice/c\\_unity/sysreq/40\\_sysrq.htm](http://www.cisco.com/univercd/cc/td/doc/product/voice/c_unity/sysreq/40_sysrq.htm). If you need voice cards for a country that is not listed, contact Cisco Systems ECSBU.

Also consider the following voice card issues:

- **D/120JCT-LS voice cards.** There are two versions of the Intel Dialogic D/120JCT-LS voice cards:
  - The D/120JCT-LS revision 1 card: This card (Intel voice card part number 96-0685-nnn, top assembly number 99-3931-nnn) requires Intel Dialogic voice card software version DNA 3.3. The revision 1 card is supported for use with all versions of Cisco Unity, however the card cannot be ordered for new Cisco Unity version 4.0(x) installations. In addition, the revision 1 card can only be used when it is appropriate for the available slots (5.0 Vdc slots required) in the Cisco Unity server or expansion chassis.
  - The D/120JCT-LSU revision 2 card: This card (Intel voice card part number 96-0853-nnn, top assembly number 99-5371-nnn) requires a version of Intel Dialogic voice card software (SR 5.01 or greater) that is compatible only with Cisco Unity 4.0 and later. This is a Universal PCI card, so it can be installed in either 3.3 Vdc or 5.0 Vdc slots.
- **Selecting the correct card for the country or region:** Cisco Unity System Requirements, and Supported Hardware and Software lists supported voice-fax cards and the countries in which they can be used. There are significant differences between versions of the same card, and these differences prevent cards from being used in countries for which they are not qualified. If you need voice cards for a country that does not appear on the list, contact your Cisco sales representative.
- **Japanese and Mainland Chinese versions of D/41JCT and D/120JCT voice cards:** Intel produces D/41JCT and D/120JCT cards specifically for Japan and for the People's Republic of China. These cards do not appear on the Cisco Unity price list. Please contact your Cisco sales representative for additional information.
- **Intel Dialogic D/240PCI-T1 voice cards:** The D/240PCI-T1 is not a universal PCI card. The card is supported only for integrating with NEC NEAX-2400 or Intecom E14 Millennium phone systems.
- **T1 cable length limitation:** Dialogic does not publish a specification for maximum DSX-1 cable length (the card has a 3.0Vdc nominal signal level). When using shielded, low-capacitance cable, we recommend that cable length not exceed 200 meters (655 feet), which is a typical maximum cable length for a DSX-1. The electrical environment and the quality of the cable may adversely affect performance. Extending the maximum length by adding a CSU/DSU (Channel Service Unit/Data Service Unit) has not been tested and is not supported.
- **Cabling multiple voice cards together:** All Cisco Unity Intel voice cards that we ship have an H.100 bus connector on the top edge of the card. If more than one card is installed in the Cisco Unity server



or in an expansion chassis, the cards must be connected by using an H.100 cable, or the Intel firmware and driver will not load. Refer to the Cisco Unity price list for cables with four, eight, and twelve connectors.

## Compatibility of Slots and Voice Cards

When selecting a Cisco Unity server from the *Cisco Unity Supported Platforms List* for integration with a circuit-switched phone system, ensure that the following conditions are met:

1. The server is qualified for use for a circuit-switched phone system integration. Note that some servers cannot be used for integrations with circuit-switched phone systems because voice cards are too tall to fit in the case.
2. The server contains enough slots compatible with the type of voice cards that will be used, or the server contains a slot compatible with the card for the expansion chassis that will be used. All voice cards must be able to be installed in the same computer or in the same expansion chassis. If all the voice cards do not fit in the Cisco Unity server, then you must install all of them in an expansion chassis.

The slots in the servers on the *Cisco Unity Supported Platforms List* have a signaling voltage of either 3.3 Vdc or 5 Vdc. Some servers have one or more slots of each type, while some servers have only one type or the other. All supported voice cards can be used in 5 Vdc slots. Universal PCI voice cards are the only cards that can be used in 3.3 Vdc slots. (The Cisco Unity System Requirements, and Supported Hardware and Software indicates which cards are Universal PCI cards.)

All supported voice cards are 32-bit/33-MHz cards, which may affect the clock speed of cards in adjacent slots. The servers on the *Cisco Unity Supported Platforms List* have a segmented PCI bus, typically with two slots per segment. In most of the supported servers, the clock speed of most slots is 66 MHz or greater. (Some servers also have a slot that is in a segment by itself.) If there are cards in both slots in a segment and the clock speed of one card is slower than the clock speed of the other card, the clock speed of both slots is reduced to the clock speed of the slower card. This can adversely affect the performance of the faster card (for example, RAID controllers and NICs).

The *Cisco Unity Supported Platforms List* is available at [http://www.cisco.com/en/US/products/sw/voicesw/ps2237/products\\_data\\_sheets\\_list.html](http://www.cisco.com/en/US/products/sw/voicesw/ps2237/products_data_sheets_list.html).

## PBXLink Box (Avaya Definity Gx and Nortel Meridian 1 Integrations Only)

A PBXLink box is a digital set emulation unit that translates call information from digital ports on certain phone systems into SMDI (simplified message desk interface) data packets that the Cisco Unity server receives through a serial port. Depending on the number of digital ports installed on the phone system and on the number of voice messaging ports on the Cisco Unity server, one or more PBXLink boxes are connected by digital lines to the phone system and by an RS-232 serial cable to the Cisco Unity server.

One or more PBXLink boxes are used to integrate Cisco Unity with the Avaya Definity Gx and the Nortel Meridian 1 phone systems.



- **Avaya Definity Gx:** In a PBXLink integration with an Avaya Definity Gx phone system, it is highly recommended that one or more analog port(s) on the Cisco Unity server be used for MWI dialouts. However, if the analog port density is low, for example four ports, Cisco Unity can pass MWI requests to the PBXLink via SMDI. The PBXLink would then use a single digital port for MWI dialouts. The Avaya Definity G3 can be integrated with Cisco Unity by using either PBXLink boxes or a DTMF integration.
- **Nortel Meridian 1:** In an integration with a Nortel Meridian 1 phone system, Cisco Unity sets message waiting indicators (MWIs) through the PBXLink boxes. However, each digital port on the PBXLink box must be set either for calls or for MWIs, but should not be set for both. Digital ports that are set for calls can handle call information for up to 24 voice messaging ports. For example, if you are integrating a 24-port Cisco Unity server with a Nortel Meridian 1 phone system, we recommend that you use a PBXLink-48 box, and set Port A for MWIs only and Port B for calls only. A single digital port set for both MWI and calls should be used only for very low-density systems, for example, four ports.

For more information on integrating Cisco Unity with Avaya Definity Gx or Nortel Meridian 1 phone systems by using PBXLink boxes, refer to the applicable Cisco Unity integration guide, available at [http://www.cisco.com/en/US/products/sw/voicesw/ps2237/prod\\_configuration\\_guides\\_list.html](http://www.cisco.com/en/US/products/sw/voicesw/ps2237/prod_configuration_guides_list.html).

## Expansion Chassis

An expansion chassis is required in the following situations:

- Cisco Unity is being integrated with a circuit-switched phone system and the Cisco Unity server does not have enough slots for the required voice cards.
- A Cisco Unity Bridge server does not have enough slots for the required voice-fax cards.

Two high-speed I/O PCI cards are associated with the PCI expansion sub-system. The host card is installed in the Cisco Unity server, and the other card is installed in a designated slot on the passive backplane in the expansion chassis.

The host card is a 33 MHz Universal PCI card, and it can be inserted into any PCI or PCI-X slot regardless of the maximum clock speed of the slot. If the host card is installed in the same bus segment as a faster card, the card in the other slot in the segment will also run at 33 MHz, which can adversely affect the performance of the faster card (for example, RAID controllers and NICs). Because different Cisco Unity servers have different system resources available, and because of potential conflicts with other customer-selected hardware, it may be necessary to run tests to identify a PCI slot in the Cisco Unity server that interoperates with the host card so that the voice or voice-fax cards in the expansion chassis will work as expected.

The chassis can be used to integrate 5 Vdc D/240PCI-T1 cards to servers without 5 Vdc PCI slot(s).

The chassis is 4 RU in height and can accommodate four-post rack rails, which must be purchased separately.



The autoranging power supply of the chassis operates from single-phase 100-240 Vac and does not support redundant power.

## Cables

### Connecting the Cisco Unity Server to the Network

If the Cisco Unity server will be connected to the network—as required for most Cisco Unity configurations and when Cisco Unity will be integrated with Cisco CallManager or SIP—Ethernet cable is required to connect the server to the network. At transmission rates of up to 1 gigabit per second (Gbps), the maximum segment length is 328 feet (100 meters), and Category 5 Unshielded Twisted Pair (UTP) cable is sufficient. At a transmission rate of 1 Gbps, Category 5E or Category 6 UTP cable is preferable.

### Connecting the Cisco Unity Server to a Circuit-Switched Phone System

If Cisco Unity is integrated with a circuit-switched phone system, the type of cabling required depends on the type of integration

Note: DTMF and serial integrations are integrations with circuit-switched phone systems and are grouped under the term “traditional” in the CUSPL. “Dual” integrations in the CUSPL refer to integrating Cisco Unity with two phone systems in one of the following configurations: Cisco CallManager with a supported circuit-switched phone system; Cisco CallManager with a SIP proxy server; or a SIP proxy server with a supported circuit-switched phone system.

#### DTMF (Analog) Integrations

If Cisco Unity is integrated with a circuit-switched phone system by using a DTMF integration, analog lines wired for RJ-11 or RJ-14 are required to connect the phone system with voice cards in the Cisco Unity server or in an expansion chassis. These lines carry phone connections and call information.

For pinout diagrams for voice card connectors, refer to “Appendix A: Voice Cards” in the *Cisco Unity Installation Guide*, available at [http://www.cisco.com/en/US/products/sw/voicesw/ps2237/prod\\_installation\\_guides\\_list.html](http://www.cisco.com/en/US/products/sw/voicesw/ps2237/prod_installation_guides_list.html).



## Serial (SMDI) Integrations

Serial (or SMDI) integrations require the following cables:

- For integrations with most phone systems, analog lines wired for RJ-11 or RJ-14 to connect the phone system with voice cards in the Cisco Unity server or in an expansion chassis. These lines carry phone connections.

Integrations with Intecom E14 Millennium phone systems (and optionally for NEC NEAX 2400 phone systems, depending on the type of voice card installed in the Cisco Unity server) require cables wired for RJ-48C for Digital Service Level 1 (DSX-1, also known as short-haul or dry T1). These cables carry encoded voice channels. The maximum length is 655 feet (200 meters).

For pinout diagrams for voice card connectors, refer to “Appendix A: Voice Cards” in the *Cisco Unity Installation Guide*, available at

[http://www.cisco.com/en/US/products/sw/voicesw/ps2237/prod\\_installation\\_guides\\_list.html](http://www.cisco.com/en/US/products/sw/voicesw/ps2237/prod_installation_guides_list.html).

- An RS-232 cable to connect the phone system with a serial port on the Cisco Unity server. The maximum length is 50 feet (15.2 meters). Serial cables carry call information and MWI requests.

## Integrations That Use PBXLink Boxes

Integrations that use PBXLink boxes require the following cables:

- Digital lines wired for RJ-14 that connect digital phone ports on the phone system with the PBX ports on the PBXLink box. Refer to the phone system documentation for information on wiring the digital port connectors.
- Analog lines wired for RJ-11 or RJ-14 to connect the phone system with voice cards in the Cisco Unity server or in an expansion chassis.
- An RS-232 cable that connects the PBXLink box and the Cisco Unity server. The maximum length is 50 feet (15.2 meters).
- For multiple PBXLink boxes, RS-232 cables that connect the PBXLink boxes to one another. The maximum length is 50 feet (15.2 meters).

## Lighting MWIs on Non-Integrated Phone Systems (Cisco CallManager Integrations Only)

If Cisco Unity is integrated with Cisco CallManager, MWIs can be lit on a non-integrated phone system.

The cabling requirements are:

- An RS-232 cable connecting the Cisco Unity server and the non-integrated phone system for sending MWI requests. The maximum length is 50 feet (15.2 meters).
- A trunk connection between the non-integrated phone system and the gateway for sending calls between the non-integrated phone system and the Cisco CallManager phone system.



## Constructing an RS-232 Cable

An RS-232 cable is required for several types of integrations with circuit-switched phone systems. You can purchase a serial I/O kit that includes a 50-foot shielded RS-232 cable, a null modem adapter, a 9- to 25-pin gender changer, a 25- to 9-pin gender changer, and a simple RS-232 line activity monitor.

The published cable length limitation of the RS-232 protocol standard is 10 feet (3.05 meters). Carefully constructed, high quality RS-232 cable assemblies should perform as expected in a normal environment with a cable length up to 50 feet (15.2 meters) at up to 9600 baud.

We recommend that the RS-232 cable be constructed with the following characteristics:

- A maximum length of 50 feet (15.2 meters)
- 24 AWG stranded conductors
- Low capacitance—for example, no more than 12 pF/ft (39.4 pF/m) between conductors
- At least 65 percent braided shield over aluminized polymer sleeve around conductors
- UL-recognized overall cable jacket insulation with low dielectric constant
- Braided shield fully terminated to and enclosed by a metal connector backshell
- Gold-plated connector contacts

For more information on cabling for integrations, refer to the applicable integration guide, available at [http://www.cisco.com/en/US/products/sw/voicesw/ps2237/prod\\_configuration\\_guides\\_list.html](http://www.cisco.com/en/US/products/sw/voicesw/ps2237/prod_configuration_guides_list.html).

## Connecting the Cisco Unity Server or Cisco Unity Bridge Server to an Expansion Chassis

If an expansion chassis is required because voice cards will not fit in the Cisco Unity server or voice-fax cards will not fit in the Cisco Unity Bridge server, a cable is required to connect the expansion chassis card in the server with the expansion chassis. The required cable is shipped with the expansion chassis.

## Connecting the Cisco Unity Bridge Server to the Phone System

For the Cisco Unity Bridge, cables are required to connect the phone system with voice-fax cards in the Cisco Unity Bridge server or in an expansion chassis. The cable that ships with the card has an RJ-45 connector on one end and four single-pair RJ-14 connectors on the other end.

## Cisco TAC Remote Access

Cisco strongly recommends that at least a V.34 modem be installed with each Cisco Unity server for Cisco TAC remote access. We recommend external modems over internal modems because external modems do not use either a slot in the server or the PCI sub-system resources (for example, DMA and memory space) that an internal modem could require. This is particularly an issue when Cisco Unity is integrated with a circuit-switched phone system, which requires voice cards. An external modem does use system resources, but only a single IRQ and an I/O port map allocation.



A typical Cisco Unity server has only two serial ports. However, for some configurations, three serial ports may be required, most typically for an external modem, an uninterruptable power supply, and a serial cable data link to the phone system. If the proposed configuration will require more serial ports than are available on the server, an internal modem may be substituted for the external modem. Modems are customer-provided.

However, for the most effective TAC remote access, a VPN over broadband or any other high-speed Internet connection is strongly recommended.

## Remote Centrex SMDI Connection

If Cisco Unity is being integrated with a circuit-switched phone system by using a serial (or SMDI) integration, and if the serial cable that connects the phone system and the Cisco Unity server is more than 50 feet long, two Bellcore 202T or 212A modems and a dedicated line between them are required. Otherwise, the length of the cable will seriously degrade signal integrity.

The 1200baud 202T and 212A modems are Bellcore standards for a leased line, dedicated, asynchronous serial interface for SMDI:

- The 202T standard is asynchronous half-duplex on a 2-wire circuit and full duplex on a 4-wire circuit.
- The 212A standard is asynchronous full duplex on a 2-wire circuit. 212A is equivalent to ITU V.22.

## Hardware for Backing Up Cisco Unity Data

If the customer does not already have a process for backing up servers, we strongly recommend that a process be established for backing up the Cisco Unity server. For detailed information on backing up and restoring a Cisco Unity system, refer to the applicable *Cisco Unity Maintenance Guide*, available at [http://www.cisco.com/en/US/products/sw/voicesw/ps2237/prod\\_maintenance\\_guides\\_list.html](http://www.cisco.com/en/US/products/sw/voicesw/ps2237/prod_maintenance_guides_list.html).

When choosing backup hardware, choose hardware that is supported by the manufacturer of the backup software that will be used to back up the Cisco Unity server.

For servers with moderate volume sizes, the customer can back up Cisco Unity data by using a digital audio tape (DAT) tape drive installed in the Cisco Unity or Cisco Unity Bridge server. The DDS-4 tape format can hold 20GB of data without hardware compression. When using compression, the same media can hold 40GB of data. Cisco sells DAT drive kits that are compatible with servers on the CUSPL.

Digital linear tape (DLT) can also be used.

For servers that have multiple RAID volumes to back up, the amount of data to be backed up could easily exceed the capacity of a single DAT or DLT tape. In this case, options include network backup to a dedicated backup server in the customer data center, or to a tape autoloader connected either to the Cisco Unity server or to a backup server. Cisco does not sell an autoloader; however, many suitable products are offered by both Hewlett-Packard and IBM that interoperate with Cisco servers.



Use of a separate backup server reduces the processing impact of disk-to-tape or tape-to-disk I/O operations on the Cisco Unity or Cisco Unity Bridge server, but such backups still require noticeable disk I/O and processor time on the server being backed up. We strongly recommend that the customer perform backups outside of peak business hours.

Backup of many dozens of gigabytes of data can take a long time. The typical DAT sub-system can write data to tape at approximately 8.6GB/hour; this figure needs to be considered when planning the implementation with the customer.

## External Storage

In Voice Messaging configurations with Exchange installed on the Cisco Unity server, the storage of any Cisco Unity-related data (SQL Server/MDSE database, Exchange data, and so on) on a storage area network is not supported.

In Unified Messaging configurations, the storage of the Cisco Unity SQL Server/MDSE database on a storage area network is not supported.

However, the storage of data on direct-attached storage (for example, external hard disks) is supported.

## Client Hardware

Cisco Unity can be configured to play and record voice messages over the phone, or to play and record messages by using computer speakers and a microphone or headset. If the customer wants Cisco Unity subscribers to use speakers, microphones, or headsets, client computers must be equipped with an audio controller and compatible devices.