CHAPTER 11

Setting Up a Serial (SMDI, MCI, or MD-110) PIMG Integration with Cisco Unity

For detailed instructions for setting up a serial (SMDI, MCI, or MD-110) PIMG integration with Cisco Unity, see the following sections in this chapter:

Task List to Create a Serial (SMDI, MCI, or MD-110) PIMG Integration

Before doing the following tasks to integrate Cisco Unity with the phone system by using PIMG units (media gateways), confirm that the Cisco Unity server is ready for the integration by completing the applicable tasks in the applicable Cisco Unity installation guide. If you are installing a new Cisco Unity server by using the applicable Cisco Unity installation guide, you may have already completed some of the following tasks.

1. Review the system and equipment requirements to confirm that all phone system and Cisco Unity server requirements have been met. See the "Requirements" section on page 11-2.
2. Plan how the voice messaging ports will be used by Cisco Unity. See Chapter 2, "Planning How the Voice Messaging Ports Will Be Used by Cisco Unity."
3. Program the phone system and extensions for a serial integration with Cisco Unity. See the "Programming the Phone System for a Serial Integration with Cisco Unity" section on page 11-3.
4. Set up the analog PIMG units for a serial integration. See the "Setting Up the Analog PIMG Units for a Serial Integration" section on page 11-4.
5. Create the integration. See the "Creating an Integration with the Phone System" section on page 11-19.

Caution Do not edit the phone configuration file (also known as the switch ini file) to customize this integration. If you change the settings in this file, the integration may not function correctly.

6. Test the integration. See Chapter 14, "Testing the Integration."
7. If you have a secondary server for Cisco Unity failover, integrate the secondary server. See Chapter 15, "Integrating a Secondary Server for Cisco Unity Failover with a PIMG Integration."

Requirements

The serial (SMDI, MCI, or MD-110) PIMG integration supports configurations of the following components:

Phone System

- A phone system that supports the SMDI, MCI, or MD-110 serial protocols.
- For a Centrex phone system only:
  - A Centrex service SMDI package, with one SMDI 4-wire private data link connected to the external modem.
  - A type 202T or 212A external modem, set to 1200 baud.
- One or more of the applicable PIMG units. For details, see Chapter 1, "Introduction."
- The serial data port on the phone system connected to the serial port on the master PIMG unit through an RS-232 serial cable (which is available from Cisco).

  Specifications for the serial cable are in *Connecting PBX-IP Media Gateway (PIMG) to the Serial Port of a PBX* at http://www.dialogic.com/support/helpweb/mg/tn117.htm.

  We recommend that the serial cable have the following construction:
  - A maximum of 50 feet (15.24 m) in length
  - 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
- The voice messaging ports in the phone system connected by analog lines to the ports on the PIMG units.

  We recommend that you connect the voice messaging ports on the phone system to the ports on the PIMG units in a planned manner to simplify troubleshooting. For example, the first phone system voice messaging port connects to the first port on the first PIMG unit, the second phone system voice messaging port connects to the second port on the first PIMG unit, and so on.
- The PIMG units connected to the same LAN or WAN that Cisco Unity is connected to.
- If the PIMG units connect to a WAN, the requirements for the WAN network connections are:
  - For G.729a codec formatting, a minimum of 32.76 Kbps guaranteed bandwidth for each voice messaging port.
  - For G.711 codec formatting, a minimum of 91.56 Kbps guaranteed bandwidth for each voice messaging port.
  - No network devices that implement network address translation (NAT).

  - A maximum 200 ms one-way network latency.
- The phone system ready for the integration, as described in the documentation for the phone system.

Cisco Unity Server

- Cisco Unity installed and ready for the integration, as described in the applicable Cisco Unity installation guide at http://www.cisco.com/en/US/products/sw/voicesw/ps2237/prod_installation_guides_list.html.
- A license that enables the applicable number of voice messaging ports.

Centralized Voice Messaging

Cisco Unity supports centralized voice messaging by supporting various inter-phone system networking protocols including, for example, proprietary protocols such as Avaya DCS, Nortel MCDN, or Siemens CorNet, and standards-based protocols such as QSIG or DPNSS. For details, see the "Centralized Voice Messaging" section in the "Integrating Cisco Unity with the Phone System" chapter of the *Cisco Unity Design Guide Release 5.x* at http://www.cisco.com/en/US/docs/voice_ip_comm/unity/5x/design/guide/5xcudgx.html.

Programming the Phone System for a Serial Integration with Cisco Unity

Instruct the phone system technician to set up the phone system in the manner directed in the following procedure.

Note Application notes for programming certain phone systems are available in the appendixes at the end of this guide.

To Program the Phone System for a Serial Integration with Cisco Unity

Step 1 Program the analog lines connecting to the voice messaging ports on the PIMG units as a multiline hunt group.

Make sure that the phone system sends calls only to Cisco Unity voice messaging ports that are set to Answer Calls. Calls sent to a voice port not set to Answer Calls cannot be answered by Cisco Unity and may cause other problems.

Step 2 Enable hookflash transfer capability on each analog line that connects to the voice messaging ports on the PIMG units.

Step 3 Enable caller ID (via SMDI, MCI, or MD-110) on each subscriber extension.

Step 4 For each subscriber extension, set the call forwarding options to the following:

- Unrestricted source
- Forward when the extension is not answered
- Forward when the extension is busy

Setting Up the Analog PIMG Units for a Serial Integration

Do the following procedures to set up the analog PIMG units that are connected to the phone system for a serial integration by using the SMDI, MCI, or MD-110 protocol.

These procedures require that the following tasks have already been completed:

- The phone system is connected to the PIMG units by using analog lines and the applicable RS-232 serial cable.
- The PIMG units are ready to be connected to the LAN or WAN.
- The PIMG units are connected to a power source.

Fields that are not mentioned in the following procedures must keep their default values. For the default values of all fields, see the manufacturer documentation for the PIMG units.

To Download the PIMG Firmware Update Files for Analog PIMG Units

Step 1 On a Windows workstation with a high-speed Internet connection that will have access to the PIMG units, go to the Voice and Unified Communications Downloads page at http://tools.cisco.com/support/downloads/pub/Redirect.x?mdfid=278875240.

Note To access the software download page, you must be logged on to Cisco.com as a registered user.

This procedure describes the steps when using Internet Explorer as your web browser. If you are using a different web browser, the steps may differ.

Step 2 In the tree control on the Downloads page, expand **Unified Communications Applications > Voice Mail and Unified Messaging > Cisco Unity**, and click **Cisco Unity Telephony Integration**.

Step 3 On the Log In page, enter your user name and password, then click **Log In**.

Step 4 On the Select a Release page, under Latest Releases, click the most recent release.

Step 5 In the right column, click the version of the firmware for analog PIMG units.

Step 6 On the Download Image page, click **Download**.

Step 7 On the Supporting Document(s) page, click **Agree**.

Step 8 In the File Download dialog box, click **Save**.

Step 9 In the Save As dialog box, browse to the Windows workstation that will have access the PIMG units, browse to a directory where you want to save the file, and click **Save**.

Step 10 In the Download Complete dialog box, click **Open**. The window for extracting the PIMG firmware update files appears.

Step 11 Click **Extract**.

Step 12 In the Extract dialog box, browse to the directory where you want the extracted files, and click **Extract**.

Step 13 Close the window for the extracting application.

To Set Up the Analog PIMG Units (Firmware Version 6.x)

Step 1 On the Windows workstation, add a temporary route to enable access to the PIMG units.

a. On the Windows Start menu, click **Run**.

b. Enter **cmd**, and press **Enter**. The Command Prompt window appears.

c. At the command prompt, enter **route add 10.12.13.74 <IP Address of Workstation>**, and press **Enter**.

For example, if the IP address of the workstation is 198.1.3.25, enter “route add 10.12.13.74<space>198.1.3.25” in the Command Prompt window.

d. Close the Command Prompt window.

Step 2 Connect a PIMG unit to the network.

Step 3 In the web browser, go to **http://10.12.13.74**.

Step 4 To log in, enter the following case-sensitive settings.

Table 11-1 Login Settings

Field	Setting
Username	Enter **admin**.
Password	Enter **IpodAdmin**.

Step 5 Click **OK**.

Step 6 On the System menu, click **Upgrade**.

Step 7 On the Upgrade page, click **Browse**.

Step 8 In the Choose File dialog box, browse to the directory on the Windows workstation that has the extracted PIMG firmware update files.

Step 9 Click **Ls_<xx>.app** (where <xx> is multiple digits), and click **Open**.

Step 10 On the Upgrade page, click **Install File**.

Step 11 After the file is installed, a message prompting you to restart the PIMG unit appears. Click **Cancel**.

Caution Do not restart the PIMG unit until you are instructed to do so later in this procedure, even if the file installation fails. Restarting the PIMG unit at this step may prevent the PIMG unit from functioning correctly.

Step 12 Repeat Step 6 through Step 11 for the file Run_<xx>.dsp.

Step 13 On the System menu, click **Upgrade**.

Step 14 On the Upgrade page, under Import, click **Browse**.

Step 15 In the Choose File dialog box, browse to the file Ls_<xx>.fsh.

Step 16 Click **Ls_<xx>.fsh**, and click **Open**.

Step 17 On the Upgrade page, click **Install File**.

Step 18 After the file is installed, a message prompting you to restart the PIMG unit appears. Click **OK**.

Step 19 In the web browser, go to **http://10.12.13.74**.

Step 20 To log in, enter the following case-sensitive settings.

Table 11-2 Login Settings

Field	Setting
Username	Enter **admin**.
Password	Enter **IpodAdmin**.

Step 21 Click **OK**.

Step 22 On the System menu, click **Password**.

Step 23 On the Change Password page, enter the following settings.

Table 11-3 Change Password Page Settings

Field	Setting
Old Password	Enter **IpodAdmin**. (This setting is case sensitive.)
New Password	Enter your new password. (This setting is case sensitive.)
Confirm Password	Enter your new password. (This setting is case sensitive.)

Step 24 Click **Change**.

Step 25 On the Configuration menu, click **Mgmt Protocols**.

Step 26 On the Management Protocols page, enter the following settings.

Table 11-4 Management Protocols Page Settings

Field	Settings
E-mail Alarms Enabled	Click **No**.
SNMP Traps Enabled	Click **No**.

Step 27 Click **Submit**.

Step 28 On the Configuration menu, click **Routing Table**.

Step 29 On the Routing Table page, under Router Configuration, click **VoIP Host Groups**.

Step 30 Under VoIP Host Groups, enter the following settings for the first VoIP Host Group.

Table 11-5 First VoIP Host Group Settings

Field	Settings
Name	Accept the default or enter another descriptive name of the VoIP host group.
Load-Balanced	*(Cisco Unity without failover)* Click **False**. *(Cisco Unity with failover configured)* Click **False**.
Fault-Tolerant	*(Cisco Unity without failover)* Click **False**. *(Cisco Unity with failover configured)* Click **True**.

Step 31 For Cisco Unity without failover, under Host List, enter the host name or IP address of the Cisco Unity server and the server port in the format <host name or IP address>:<server port>.

For Cisco Unity with failover configured, under Host List, confirm that field contains the host name or IP address of the primary Cisco Unity server and the server port in the format <host name or IP address>:<server port>.

For the server port of the first PIMG unit, enter a value (which is typically 5060) that matches the setting in UTIM of the SIP Port field for the PIMG unit. When you configure more than one PIMG unit, increase this setting by 1 for each successive unit. For example, unit 2 will be 5061, unit 3 will be 5062, and so on. This setting must match the setting in UTIM of the SIP Port field for the PIMG unit.

Step 32 For Cisco Unity without failover, continue to Step 34. For Cisco Unity with failover configured, under Host List, click **Add Host**.

Step 33 In the second field, enter the host name or IP address of the secondary Cisco Unity server and the server port in the format <host name or IP address>:<server port>.

For the server port of the first PIMG unit, enter a value (which is typically 5060) that matches the setting in UTIM of the SIP Port field for the PIMG unit. When you configure more than one PIMG unit, increase this setting by 1 for each successive unit. For example, unit 2 will be 5061, unit 3 will be 5062, and so on. This setting must match the setting in UTIM of the SIP Port field for the PIMG unit.

Caution Do not add a third host under Host List or a second host group under VoIP Host Groups. Otherwise, failover may not function correctly.

Step 34 Click **Submit**.

Step 35 Under Router Configuration, click **TDM Trunk Groups**.

Step 36 Under TDM Trunk Groups, click **Add Trunk Group**.

Step 37 Under TDM Trunk Groups, enter the following settings for the first TDM trunk group.

Table 11-6 First TDM Trunk Group Settings (All Calls)

Field	Settings
Name	Enter **All_Calls** or another unique name. This TDM trunk group will handle all calls to and from the phone system.
Selection Direction	Click **Ascending**.

Table 11-6 First TDM Trunk Group Settings (All Calls) (continued)

Field	Settings
Selection Mode	Click **Linear**.
Port/Channel Content	Enter the numbers of the PIMG ports that will handle all calls. For example, enter "*" for all PIMG ports, or enter "1-6" for the first six PIMG ports.

Step 38 Click **Submit**.

Step 39 Under Router Configuration, click **Inbound VoIP Rules**.

Step 40 Under Inbound VoIP Rules, uncheck the **Enabled** check box for the default rule.

Step 41 Click **Add Rule**.

Step 42 Under Inbound VoIP Rules, enter the following settings for the first new inbound VoIP rule.

Table 11-7 First New Inbound VoIP Rule Settings (All Calls)

Field	Settings
Enable	Check this check box.
Rule Label	Do one of the following: • If you will use CPID manipulation, enter **All_UC_Calls** or another name. This inbound VoIP rule will handle all outbound calls from Cisco Unity. • If you will not use CPID manipulation, enter **UC_Calls_and_Messages** or another name. This inbound VoIP rule will handle all outbound calls and MWI calls from Cisco Unity.
Request Type	Do one of the following: • If you will use CPID manipulation, Click **Call**. • If you will not use CPID manipulation, click **Any**.
Originating VoIP Host Address	Enter *.

Step 43 Under Inbound VoIP Request Matching, enter the following settings.

Caution The rule that you created in Step 42 must be selected. Otherwise, any changes you make will apply to another rule.

Table 11-8 Inbound VoIP Request Matching Settings

Field	Settings
Calling Number	Enter the applicable matching rule that will be used. For example, enter "*" for all.
Calling Name	Enter the applicable matching rule that will be used. For example, enter "*" for all.
Called Number	Enter the applicable matching rule that will be used. For example, enter "*" for all.
Called Name	Enter the applicable matching rule that will be used. For example, enter "*" for all.
Redirect Number	Enter the applicable matching rule that will be used. For example, enter "*" for all.
Redirect Name	Enter the applicable matching rule that will be used. For example, enter "*" for all.

Step 44 Under Outbound Routes, enter the following settings.

Caution The rule that you created in Step 42 must be selected. Otherwise, any changes you make will apply to another rule.

Table 11-9 Outbound Routes Settings

Field	Settings
Device Selection	
Outbound Destination	Click **TDM**.
Trunk Group	Click the name of the TDM trunk group that you created for outbound calls in Step 37. For example, click "All_Calls."
CPID Manipulation	
Calling Number	Enter **S**.
Calling Name	Enter **S**.
Called Number	Enter **D**.
Called Name	Enter **D**.
Redirect Number	Enter **R**.
Redirect Name	Enter **R**.
Select Primary/Alternate Route	
Primary	Click **Primary**.

Step 45 If you will not use CPID manipulation, skip to Step 49. Otherwise, under Inbound VoIP Rules, click **Add Rule**.

Step 46 Under Inbound VoIP Rules, enter the following settings for the second new inbound VoIP rule.

Table 11-10 Second New Inbound VoIP Rule Settings (MWIs)

Field	Settings
Enable	Check this check box.
Rule Label	Enter **UC_MWIs** or another name. This inbound VoIP rule will handle all MWIs from Cisco Unity.
Request Type	Click **Message**.
Originating VoIP Host Address	Enter *.

Step 47 Under Inbound VoIP Request Matching, enter the following settings.

Caution The rule that you created in Step 46 must be selected. Otherwise, any changes you make will apply to another rule.

Table 11-11 Inbound VoIP Request Matching Settings

Field	Settings
Calling Number	Enter the applicable matching rule that will be used. For example, enter "*" for all.
Calling Name	Enter the applicable matching rule that will be used. For example, enter "*" for all.
Called Number	Enter the applicable matching rule that will be used. For example, enter "*" for all.
Called Name	Enter the applicable matching rule that will be used. For example, enter "*" for all.
Redirect Number	Enter the applicable matching rule that will be used. For example, enter "*" for all.
Redirect Name	Enter the applicable matching rule that will be used. For example, enter "*" for all.

Step 48 Under Outbound Routes, enter the following settings.

Caution The rule that you created in Step 46 must be selected. Otherwise, any changes you make will apply to another rule.

Table 11-12 Outbound Routes Settings

Field	Settings
Device Selection	
Outbound Destination	Click **TDM**.
Trunk Group	Click the name of the TDM trunk group that you created for outbound calls in Step 37. For example, click "All_Calls."

Table 11-12 Outbound Routes Settings (continued)

Field	Settings
CPID Manipulation	
Calling Number	Enter **S**.
Calling Name	Enter **S**.
Called Number	Enter **D**.
Called Name	Enter **D**.
Redirect Number	Enter **R**.
Redirect Name	Enter **R**.
Select Primary/Alternate Route	
Primary	Click **Primary**.

Step 49 Click **Submit**.

Step 50 Under Router Configuration, click **Inbound TDM Rules**.

Step 51 Under Inbound TDM Rules, enter the following settings for the first inbound TDM rule.

Table 11-13 First Inbound TDM Rule Settings

Field	Settings
Enable	Check this check box.
Rule Label	Enter **Inbound_Rule_1** or another name. This inbound TDM rule will handle all incoming calls from the phone system.
Request Type	Click **Call**.
Trunk Group	Click the name of the TDM trunk group that you created for incoming calls from the phone system in Step 37. For example, click “All_Calls.”

Step 52 Under Inbound TDM Request Matching, enter the following settings.

Caution The rule that you created in Step 51 must be selected. Otherwise, any changes you make will apply to another rule.

Table 11-14 Inbound TDM Request Matching Settings

Field	Settings
Calling Number	Enter the applicable matching rule that will be used. For example, enter “*” for all.
Calling Name	Enter the applicable matching rule that will be used. For example, enter “*” for all.
Called Number	Enter the applicable matching rule that will be used. For example, enter “*” for all.

Table 11-14 Inbound TDM Request Matching Settings (continued)

Field	Settings
Called Name	Enter the applicable matching rule that will be used. For example, enter "*" for all.
Redirect Number	Enter the applicable matching rule that will be used. For example, enter "*" for all.
Redirect Name	Enter the applicable matching rule that will be used. For example, enter "*" for all.

Step 53 Under Outbound Routes, enter the following settings.

Caution The rule that you created in Step 51 must be selected. Otherwise, any changes you make will apply to another rule.

Table 11-15 Outbound Routes Settings

Field	Settings
Device Selection	
Outbound Destination	Click **VoIP**.
Host Group	Click the name of the VoIP host group that you created for Cisco Unity in Step 30.
CPID Manipulation	
Calling Number	Enter **S**.
Calling Name	Enter **S**.
Called Number	Enter **D**.
Called Name	Enter **D**.
Redirect Number	Enter **R**.
Redirect Name	Enter **R**.
Select Primary/Alternate Route	
Primary	Click **Primary**.

Step 54 If you want to create more Inbound TDM rules, under Inbound TDM Rules, click **Add Rule**. Otherwise, continue to Step 56.

Note that additional Inbound TDM rules are not necessary if you will not use CPID manipulation.

Step 55 Repeat Step 51 through Step 54 for all remaining inbound TDM rules that you want to create.

Step 56 Click **Submit**.

Step 57 On the Configuration menu, click **TDM > General**.

Step 58 On the TDM General Settings page, enter the following settings.

Table 11-16 TDM General Settings Page Settings

Field	Settings
PCM Coding	Click **uLaw**.
Minimum Call Party Delay (ms)	Enter **500**.
Maximum Call Party Delay (ms)	Enter **2000**.
Dial Digit on Time (ms)	Enter **100**.
Dial Inter-Digit Time (ms)	Enter **100**.
Dial Pause Time (ms)	Enter **2000**.
Turn MWI On FAC	Leave this field blank.
Turn MWI Off FAC	Leave this field blank.
Outbound Call Connect Timeout (ms)	Enter **10000**.
Wait for Ringback/Connect on Blind Transfer	Click **Yes**.
Hunt Group Extension	Enter the pilot number of the Cisco Unity voice messaging ports.

Step 59 Click **Submit**.

Step 60 On the Configuration menu, click **TDM > Port Enable**.

Step 61 On the TDM Port Enabling page, click **No** for the ports that you want to disable on the PIMG unit.

Step 62 Confirm that **Yes** is selected for all other ports on the PIMG unit.

Step 63 Click **Submit**.

Step 64 On the Configuration menu, click **VoIP > General**.

Step 65 On the VoIP General Settings page, enter the following settings.

Table 11-17 VoIP General Settings Page Settings

Field	Setting
User-Agent	
Host and Domain Name	Enter the domain name of the PIMG unit.
Transport Type	Click **UDP**.
Call as Domain Name	Click **No**.
Invite Expiration (sec)	Enter **120**.
Server	
DNS Server Address	Enter the IP Address of the Domain Name Server that the PIMG unit will use.

Table 11-17 VoIP General Settings Page Settings (continued)

Field	Setting
Registration Server Address	Leave this field blank.
Registration Server Port	Enter **5060**.
Registration Expiration (sec)	Enter **3600**.
TCP/UDP	
UDP/TCP Transports Enabled	Click **Yes**.
TCP/UDP Server Port	Enter **5060**.
Proxy	
Primary Proxy Server Address	Leave this field blank.
Primary Proxy Server Port	Not applicable. Leave the default setting.
Backup Proxy Server Address	Not applicable. Leave the default setting.
Backup Proxy Server Port	Not applicable. Leave the default setting.
Proxy Query Interval	Enter **10**.
Timing	
T1 Time (ms)	Enter **400**.
T2 Time (ms)	Enter **3000**.
Monitoring	
Monitor Call Connections	Click **No**.

Step 66 Click **Submit**.

Step 67 On the Configuration menu, click **VoIP > Media**.

Step 68 On the VoIP Media Settings page, enter the following settings.

Table 11-18 VoIP Media Settings Page Settings

Field	Settings
Audio	
Audio Compression	Click the preferred codec for audio compression.
RTP Digit Relay Mode	Click **RFC2833**.
Signaling Digit Relay Mode	Click **Off**.
Voice Activity Detection	Click **Off**.

Table 11-18 VoIP Media Settings Page Settings (continued)

Field	Settings
Frame Size	Click the applicable setting: • G.711—**20** • G.729AB—**10** **Caution** Failure to use the correct setting will result in recorded messages containing nothing but silence.
Frames Per Packet	Click the applicable setting: • G.711—**1** • G.729AB—**2** **Caution** Failure to use the correct setting will result in recorded messages containing nothing but silence.

Step 69 Click **Submit**.

Step 70 On the Configuration menu, click **VoIP > QOS**.

Step 71 On the VoIP QOS Configuration page, enter the following settings.

Table 11-19 VoIP QOS Configurative Page Settings

Field	Settings
Call Control QOS Byte	Enter **104**.
RTP QOS Byte	Enter **184**.

Step 72 Click **Submit**.

Step 73 On the Configuration menu, click **IP**.

Step 74 On the IP Settings page, enter the following settings.

Table 11-20 IP Settings Page Settings

Field	Settings
Client IP Address	Enter the new IP address you want to use for the PIMG unit. (This is the IP address that you enter in UTIM when you create the integration.)
Client Subnet Mask	Enter the new subnet mask, if the subnet mask is different from the default IP address.
Default Network Gateway Address	Enter the IP address of the default network gateway router that the PIMG units will use.
BOOTP Enabled	Click **No**.

Step 75 Click **Submit**.

Step 76 On the Configuration menu, click **Serial > General**.

Step 77 On the Serial Port, COM 1 page, enter the following settings.

Table 11-21 Serial Port, COM 1 Page Settings

Field	Settings
Serial Port Baud Rate	Click the setting that is configured on the phone system. The default setting is 9600.
Serial Port Parity	Click the setting that is configured on the phone system. The default setting is None.
Serial Port Data Bits	Click the setting that is configured on the phone system. The default setting is 8.
Serial Port Stop Bits	Click the setting that is configured on the phone system. The default setting is 1.

Step 78 Click **Submit**.

Step 79 On the Configuration menu, click **Serial > Switch Protocol**.

Step 80 On the Switch Protocol page, enter the following settings.

Table 11-22 Switch Protocol Page Settings

Field	Settings
Serial Port, COM 1	
Serial Mode	Click the applicable setting: • **Master**—Click this setting when this PIMG unit is connected to the data link serial cable from the phone system. There can be only one master PIMG unit in a phone system integration. • **Slave**—Click this setting when this PIMG unit is not connected to the data link serial cable from the phone system. There can be multiple slave PIMG units in a phone system integration.
Serial Interface Protocol	Click the serial protocol that your phone system uses: • **SMDI** • **MCI** • **MD-110**
Cpid Len	• Click the applicable setting. Typically, the settings are 7 or 10.
Cpid Padding String	Enter the applicable string or leave this field blank. Typically, the setting is one of the following: • A string of zeros, where the number of zeros matches the setting of the Cpid Len field. • A prefix that is provided by the Centrex service.

Table 11-22 Switch Protocol Page Settings (continued)

Field	Settings
Voice Mail Port Len	If the setting of the Serial Interface Protocol field is MD-110, enter **2**. Otherwise, accept the default of **7**.
System Number	Enter the applicable setting. Typically, the setting is 1.
MWI Response Timeout	Enter **2000**.
IP Address of Serial Server	If the PIMG unit is the master, this field is for display only. If the PIMG unit is a slave, enter the IP address of the master PIMG unit (the PIMG unit that is connected to the data link serial cable from the phone system).
Serial Cpid Expiration	Enter **2000**.
Logical Extension Number	
1	If the setting of the Serial Interface Protocol field is MCI or MD-110, enter the extension number for each port on the PIMG unit. If the setting of the Serial Interface Protocol field is SMDI, enter the logical port number. Typically, the setting is 1 for port 1, 2 for port 2, and so on beginning with the master PIMG unit and continuing through each of the slave PIMG units.
2	
3	
4	
5	
6	
7	
8	

Step 81 Click **Submit**.

Step 82 On the Configuration menu, click **Tone Detection**.

Step 83 On the Tone Detection page, under Call Progress Tone - Learn, in the Learn Tone Event field, click **Busy** and do the following substeps to verify that the tone is correct.

a. From a available phone, call a second phone.

b. Answer the second phone when it rings, and leave both handsets off so that both phones are busy.

c. From a third phone, dial one of the busy phones.

d. Confirm that you hear a busy tone.

e. Hang up the third phone but leave the handsets for the other two phones off.

Step 84 Under Call Progress Tone - Learn, in the Dial String field, enter the extension that you dialed in Step 83c. from the third phone.

Step 85 Click **Learn**.

Step 86 On the Tone Detection page, under Call Progress Tone - Learn, in the Learn field, click **Error** and do the following substeps to verify that the tone is correct.

a. From an available phone, dial an extension that does not exist.

b. Confirm that you hear the reorder or error tone.

c. Hang up the phone.

Step 87 Under Call Progress Tone - Learn, in the Dial String field, enter the extension that you dialed in Step 86a.

Step 88 Click **Learn**.

Step 89 On the Tone Detection page, under Call Progress Tone - Learn, in the Learn field, click **Ringback** and do the following substeps to verify that the tone is correct.

a. From an available phone, dial an extension that does exist.

b. Confirm that you hear the ringback tone.

c. Hang up the phone.

Step 90 Under Call Progress Tone - Learn, in the Dial String field, enter the extension that you dialed in Step 89a.

Step 91 Click **Learn**.

Step 92 Click **Submit**.

Step 93 Hang up the phones that you used in Step 83.

Step 94 On the System menu, click **Restart**.

Step 95 On the Restart page, click **Restart Unit Now**.

Step 96 Repeat Step 2 through Step 95 on all remaining PIMG units.

If your Cisco Unity system must have an RTP port range of 16384 to 32767, do the following procedure.

Caution You must set the RTP port range for the PIMG units if your system uses an RTP port range of 16384 to 32767. Otherwise, Cisco Unity will not be able to answer calls, and callers will hear ringing or silence.

Note The default RTP port range for PIMG units is 49000 to 50000. Some Cisco Unity configurations require a different RTP port range.

To Set the RTP Port Range for PIMG Units

Step 1 On a Windows workstation that has access to the PIMG units, open a web browser and browse to the first PIMG unit.

Step 2 Log in to the PIMG unit.

Step 3 On the Configuration menu, click **Import/Export**.

Step 4 On the Import/Export page, under Export Files, click **Export All Settings**.

Step 5 In the File Download dialog box, click **Save**.

Step 6 In the Save As dialog box, browse to the Windows workstation that has access to the PIMG units, browse to a directory where you want to save the file, and click **Save**.

Step 7 In the Download Complete dialog box, click **Open**. Notepad opens the file Config.ini that you saved.

Step 8 Locate the line with the following parameter:

```
gwRTPStartPort
```

Step 9 Change the value of the parameter to **16384** so that the line reads as follows:

```
gwRTPStartPort = 16384
```

Step 10 Locate the line with the following parameter:

```
gwRTPEndPort
```

Step 11 Change the value of the parameter to **32767** so that the line reads as follows:

```
gwRTPEndPort = 32767
```

Step 12 Save the file, and exit Notepad.

Step 13 On the Configuration menu of the PIMG unit, click **Import/Export**.

Step 14 On the Import/Export page, under Browse for Import File, click **Browse**.

Step 15 In the Choose File dialog box, browse to the file Config.ini that you saved.

Step 16 Click **Config.ini**, and click **Open**.

Step 17 On the Import/Export page, click **Import File**.

Step 18 When prompted to restart the PIMG unit, click **OK**.

Step 19 Repeat this procedure for all remaining PIMG units.

Creating an Integration with the Phone System

After ensuring that the phone system, the PIMG units, and the Cisco Unity server are ready for the integration, do the following procedures to set up the integration and to enter the port settings.

To Create an Integration

Step 1 If UTIM is not already open, on the Windows Start menu of the Cisco Unity server, click **Programs > Cisco Unity > Manage Integrations**. UTIM appears.

Step 2 In the left pane of the UTIM window, click **Cisco Unity Server**.

Step 3 On the Integration menu of the UTIM window, click **New**. The Telephony Integration Setup Wizard appears.

Step 4 On the Welcome page, click **Circuit-switched via Intel PIMG** and click **Next**.

Step 5 On the Name the Phone System Integration page, accept the default name or enter the phone system name to identify this integration, then click **Next**.

Step 6 On the Enter PIMG Settings page, click **Add**.

Step 7 In the Add PIMG dialog box, enter the following settings, then click **OK**.

Table 11-23 Settings for the Add PIMG Dialog Box

Field	Setting
Display Name	Accept the default name or enter another name to identify this PIMG unit.
IP Address	Enter the IP address of this PIMG unit.

Table 11-23 Settings for the Add PIMG Dialog Box (continued)

Field	Setting
SIP Port	For the first PIMG unit, enter **5060**. When you configure more than one PIMG unit, increase this setting by 1 for each successive unit. For example, unit 2 will be 5061, unit 3 will be 5062, and so on. This setting must match the server port setting on the VoIP Host Group page of the PIMG unit.
Phone Lines (Ports) Connected	Enter **8**. If you want to use fewer than eight voice messaging ports, enter the number of ports (or phone lines) that you want to use with this PIMG unit.

Step 8 Repeat Step 6 and Step 7 for each remaining PIMG unit that you are connecting to the Cisco Unity server.

You can press the following buttons to modify, delete, or verify the PIMG units that you are connecting to the Cisco Unity server.

Table 11-24 Buttons on the Enter PIMG Settings Page

Field	Setting
Add	Displays the Add PIMG dialog box to add another PIMG unit to the integration.
Modify	Displays the Modify PIMG dialog box so that you can modify the settings of the selected PIMG unit.
Delete	Deletes the selected PIMG unit from the integration.
Ping Servers	Confirms that the IP address is correct for all PIMG units.
Licensing	Displays a list of the licensed, used, and available voice messaging ports on the Cisco Unity server.

Step 9 On the Enter PIMG Settings page, click **Next**.

Step 10 On the PIMG Integration with the PBX page, click **Yes**.

Step 11 In the This PIMG Is the Serial Master field, click the name of the PIMG unit that is connected to the serial cable from the phone system, then click **Next**.

Step 12 On the Configure Cisco Unity SIP Settings page, enter the following settings, then click **Next**.

Table 11-25 Settings for the Configure Cisco Unity SIP Settings Page

Field	Setting
Contact Line Name	*(Cisco Unity without failover)* Enter the voice messaging line name that subscribers use to contact Cisco Unity and that Cisco Unity will use to register with the PIMG units. *(Cisco Unity with failover configured)* Enter the name the primary Cisco Unity server. This setting must match the Port X Endpoint parameter settings in the PIMG administration. This setting must be the same for both the primary and the secondary Cisco Unity servers.
Cisco Unity SIP Port	Enter the IP port on Cisco Unity that callers and the SIP server use to connect to voice mail. We recommend using the default setting.
Preferred Codec	Enter the codec that Cisco Unity will first attempt to use on outgoing calls.

Step 13 If other integrations already exist, the Enter Trunk Access Code page appears. Enter the extra digits that Cisco Unity must use to transfer calls through the gateway to extensions on the other phone systems with which it is integrated. Then click **Next**.

Step 14 On the Reassign Subscribers page, any subscribers whose phone system integration has been deleted and who are not currently assigned to a phone system integration will appear in the list.

If no subscribers appear in the list, click **Next** and continue to Step 15.

Otherwise, select the subscribers that you want to assign to this phone system integration and click **Next**. You can use the following selection controls for selecting subscribers.

Table 11-26 Selection Controls for the Reassign Subscribers Page

Selection Control	Effect
Check All	Checks the check boxes for all subscribers in the list.
Uncheck All	Unchecks the check boxes for all subscribers in the list.
Toggle Selected	For the subscribers highlighted in the list, toggles between checking and unchecking the check boxes. If some highlighted subscriber check boxes are checked and others are unchecked, clicking this button will check all the check boxes. Clicking again will uncheck all the check boxes.

Step 15 On the Reassign Call Handlers page, any call handlers whose phone system integration has been deleted and that are not currently assigned to a phone system integration will appear in the list.

If no call handlers appear in the list, click **Next** and continue to Step 16.

Otherwise, select the call handlers that you want to assign to this phone system integration and click **Next**. You can use the following selection controls for selecting call handlers.

Table 11-27 Selection Controls for the Reassign Call Handlers Page

Selection Control	Effect
Check All	Checks the check boxes for all call handlers in the list.

Table 11-27 Selection Controls for the Reassign Call Handlers Page (continued)

Selection Control	Effect
Uncheck All	Unchecks the check boxes for all call handlers in the list.
Toggle Selected	For the call handlers highlighted in the list, toggles between checking and unchecking the check boxes. If some highlighted call handler check boxes are checked and others are unchecked, clicking this button will check all the check boxes. Clicking again will uncheck all the check boxes.

Step 16 On the Completing page, verify the settings you entered, then click **Finish**.

Step 17 At the prompt to restart the Cisco Unity services, click **Yes**. The Cisco Unity services restart.

Alternatively, you can restart the Cisco Unity services in UTIM on the Tools menu by clicking **Restart Cisco Unity**.

To Enter the Voice Messaging Port Settings for the Integration

Step 1 After the Cisco Unity services restart, on the View menu, click **Refresh**.

Step 2 In the left pane of the UTIM window, expand the phone system integration that you are creating.

Step 3 In the left pane, click the name of the first PIMG unit.

Step 4 In the right pane, click the **Ports** tab.

Step 5 Enter the settings shown in Table 11-28 for the voice messaging ports.

For best performance, use the first voice messaging ports for incoming calls and the last ports to dial out. This helps minimize the possibility of a collision, in which an incoming call arrives on a port at the same time that Cisco Unity takes the port off-hook to dial out.

Caution In programming the phone system, do not send calls to voice messaging ports in Cisco Unity that cannot answer calls (voice messaging ports that are not set to Answer Calls). For example, if a voice messaging port is set only to Message Notification, do not send calls to it.

Table 11-28 Settings for the Voice Messaging Ports

Field	Considerations
Extension	Enter the extension for the port as assigned on the phone system.
Enabled	Check this check box to enable the port. The port is enabled during normal operation. Uncheck this check box to disable the port. When the port is disabled, calls to the port get a ringing tone but are not answered. Typically, the port is disabled only by the installer during testing.
Answer Calls	Check this check box to designate the port for answering calls. These calls can be incoming calls from unidentified callers or from subscribers.
Message Notification	Check this check box to designate the port for notifying subscribers of messages. Assign Message Notification to the least busy ports.

Table 11-28 Settings for the Voice Messaging Ports (continued)

Field	Considerations
Dialout MWI *(not used by serial or integrations)*	Do not check this check box. Otherwise, the integration may not function correctly.
AMIS Delivery *(available with the AMIS licensed feature only)*	Check this check box to designate the port for making outbound AMIS calls to deliver voice messages from Cisco Unity subscribers to users on another voice messaging system. Cisco Unity supports the Audio Messaging Interchange Specification (AMIS) protocol, which provides an analog mechanism for transferring voice messages between different voice messaging systems. This setting affects outbound AMIS calls only. All ports are used for incoming AMIS calls. Because the transmission of outgoing AMIS messages may tie up voice ports for long periods of time, you may want to adjust the schedule on the Network > AMIS > Schedule page so that outgoing AMIS calls are placed during closed hours or at times when Cisco Unity is not processing many calls.
TRAP Connection	Check this check box so that subscribers can use the phone as a recording and playback device in Cisco Unity web applications and e-mail clients. Assign TRAP Connection to the least busy ports.

Step 6 Click **Save**.

Step 7 Click the **SIP Info** tab.

Step 8 Uncheck the **Register with SIP Server** check box and click **Save**.

Step 9 At the prompt to restart the Cisco Unity services, click **No**.

Step 10 Repeat Step 3 through Step 9 for all remaining PIMG units.

Step 11 In the left pane, click **Properties** for the phone system.

Step 12 In the right pane, click the **PIMG** tab.

Step 13 Under Set Messaging Waiting Indicators (MWI) Using This Method, confirm that the **Out-of-Band - SIP NOTIFY** option is selected.

Step 14 Click **Save**.

Step 15 At the prompt to restart the Cisco Unity services, click **Yes**.

Step 16 After the Cisco Unity services restart, exit UTIM.

Caution Do not edit the phone configuration file (also known as the switch ini file) to customize this integration. If you change the settings in this file, the integration may not function correctly.

If the number of voice messaging ports on the Cisco Unity server is 72 or more, and the Cisco Unity server is running Windows Server 2003 or Exchange is the message store, do the following procedure.

To Adjust the Advanced Settings for 72 or More Voice Messaging Ports

Step 1 On the Cisco Unity server, on the Windows Start menu, click **Programs > Cisco Unity > Cisco Unity Tools Depot**.

Step 2 In the Tools Depot window, in the left pane, expand **Administration Tools** and double-click **Advanced Settings Tool**.

Step 3 If the Cisco Unity server is running Windows Server 2003, do the following substeps. Otherwise, continue to Step 4.

a. In the Cisco Unity Advanced Settings window, in the left pane, click **Messaging - 72 or More Voice Ports - Enable Low-Fragmentation Heap**.

b. In the New Value drop-down box, click **1** and click **Set**.

c. When prompted that the value has been set, click **OK**.

Step 4 If Exchange is the message store, do the following substeps. Otherwise, continue to Step 5.

a. In the Cisco Unity Advanced Settings window, in the left pane, click **Messaging - 72 or More Voice Ports - Number of MAPI Sessions Per Exchange Server**.

b. In the New Value drop-down box, click the applicable setting, then click **Set**.

Number of Voice Messaging Ports	Setting
72 to 83	Click **2**.
84 to 95	Click **3**.
96 to 119	Click **4**.
120 to 143	Click **5**.
144	Click **6**.

c. When prompted that the value has been set, click **OK**.

Step 5 Close the Tools Depot window.

Step 6 Restart the Cisco Unity server.