



# CHAPTER 12

## Third-Party Voicemail Design

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**Last revised on: February 13, 2008**

This chapter discusses various options for deploying third-party voicemail systems with Cisco Unified CallManager.



**Note**

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This chapter does not discuss how to size a voicemail system for ports and/or storage. For this type of information, contact your voicemail vendor, who should be better able to discuss the individual requirements of their own system based upon specific traffic patterns.

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There are many voicemail vendors, and it is not uncommon for customers to want to continue to use an existing voicemail system when deploying Cisco Unified CallManager. With this requirement in mind, Cisco provides support for the industry standard voicemail protocol known as Simplified Message Desk Interface (SMDI). SMDI is a serial protocol that provides all the necessary call information required for a voicemail system to answer calls appropriately.

There are also other options for integrating Cisco Unified CallManager to voicemail systems, such as digital set emulation, Microsoft TAPI, QSIG, and so forth. Each method has its own pros and cons, and the method you employ will largely depend on how your voicemail system is integrated to your current PBX.

This section covers the following aspects of integrating third-party voicemail systems with Cisco Unified CallManager:

- [SMDI, page 12-1](#)
- [Digital Set Emulation, page 12-4](#)
- [Dual PBX Integration, page 12-5](#)
- [Centralized Voicemail, page 12-6](#)
- [Positive Disconnect Supervision, page 12-11](#)
- [Summary of Third-Party Voicemail Integration, page 12-12](#)

## SMDI

Cisco Unified CallManager supports use of SMDI through either of the following methods:

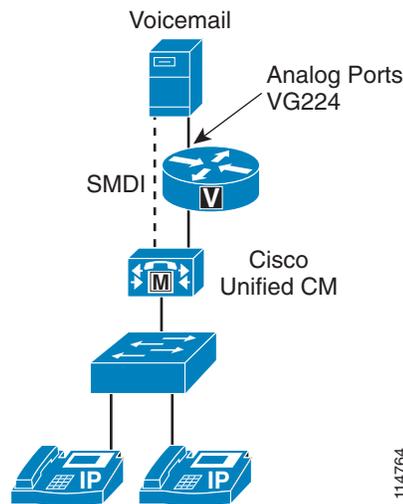
- [Cisco Messaging Interface, page 12-2](#)
- [Cisco VG248, page 12-2](#)

## Cisco Messaging Interface

The Cisco Messaging Interface (CMI) is a Cisco CallManager service that should be run only on the publisher server. This service intercepts calls destined for voicemail and generates appropriate SMDI messages, which are then delivered to one of the server's Component Object Model (COM) ports. The CMI service is compatible with any MGCP gateway that supports analog FXS ports or T1 CAS E&M; however, the WS-X6624 and VG224 modules are two of only three gateways that support positive disconnect supervision (see [Positive Disconnect Supervision, page 12-11](#)) and are therefore the only gateways currently recommended for use with the CMI service.

Figure 12-1 illustrates the use of SMDI through the CMI service in Cisco Unified CallManager.

**Figure 12-1 SMDI via Cisco Unified CallManager**



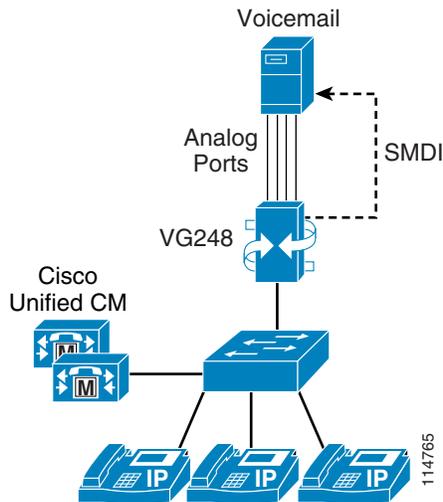
Through the CMI, Cisco Unified CallManager supports integration with virtually any voicemail system that can provide SMDI with analog FXS ports, including (but not limited to) the following:

- Octel 100, 200/300, and 250/350
- Intuity Audix
- Siemens PhoneMail
- Centigram/BayPoint (OnePoint and NuPoint Messenger)
- Lyrix ECS
- IBM Message Center

## Cisco VG248

The Cisco VG248 is an SCCP gateway that supports 48 analog FXS ports and generates SMDI locally (that is, it runs independent of the CMI service). As with the WS-X6624 and VG224 modules, the VG248 also supports positive disconnect supervision.

Figure 12-2 illustrates the use of SMDI with the VG248.

**Figure 12-2 SMDI via the VG248**

Voicemail integration through the VG248 provides the following features and advantages:

- Multiple SMDI links per Cisco Unified CallManager
- SMDI failover capability
- Independence from the location of the voicemail system

The VG248 is also capable of supporting two other serial protocols that are sometimes used for voicemail integration: NEC Message Center Interface (MCI) and Ericsson MD110 proprietary protocol.

## Considerations When Using FXS Ports

If your voicemail system is equipped with analog FXS ports, use the following Cisco gateways to integrate with the voicemail system:

- WS-X6624  
Use this module when there is a slot available for it in the Catalyst 6500 chassis.
- VG224  
Use this gateway when there is no physical Catalyst 6500 chassis slot available and when automatic failover of the serial port is not deemed necessary.
- VG248  
Use this gateway when full failover is required for the serial port as well as voice ports, when serial protocols other than SMDI are required (such as NEC MCI or Ericsson MD110), or when no Catalyst 6500 chassis slot is available.

## Digital Set Emulation

Digital set emulation (DSE) is another method of integrating PBXs to voicemail systems. In this mode, the voicemail ports look like proprietary digital handsets to the PBX. This integration method has the following advantages over the use of SMDI with analog FXS ports:

- The circuit is completely digital for both the voice path and signaling of call information.
- There is no out-of-band signaling because the voice and signaling are both transported over the same physical circuit.
- Overall quality of the call is generally better.

### Digital PBX Adapter (DPA)

Cisco developed the Digital PBX Adapter (DPA) specifically to integrate Cisco Unified CallManager with third-party voicemail systems via digital set emulation. The DPA essentially functions as a number of digital PBX extensions on one side, with IP connectivity on the other. The DPA enables you to maintain your existing voicemail system, as well as its interfaces, while connecting to Cisco Unified CallManager.

The DPA is available in two variants:

- DPA 7630 for emulating the Avaya Definity G3 7400 series digital telephone set
- DPA 7610 for emulating the Nortel Meridian 1 2616 digital telephone set

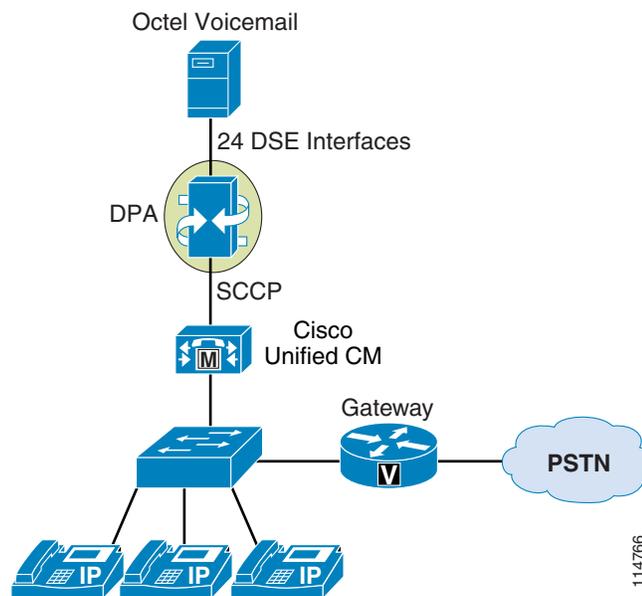


#### Note

The DPA will work with Octel Aria 250/350 or Serenade 200/300 voicemail systems only when using either Lucent/Avaya or Nortel digital set emulation.

Figure 12-3 illustrates the DPA integrating an Octel voicemail system with Cisco Unified CallManager.

**Figure 12-3** DPA Integrating Octel Voicemail with Cisco Unified CallManager



# Dual PBX Integration

Dual PBX integration is a useful option for enterprises that want to maintain existing voicemail services while migrating from their current PBX to IP Telephony.

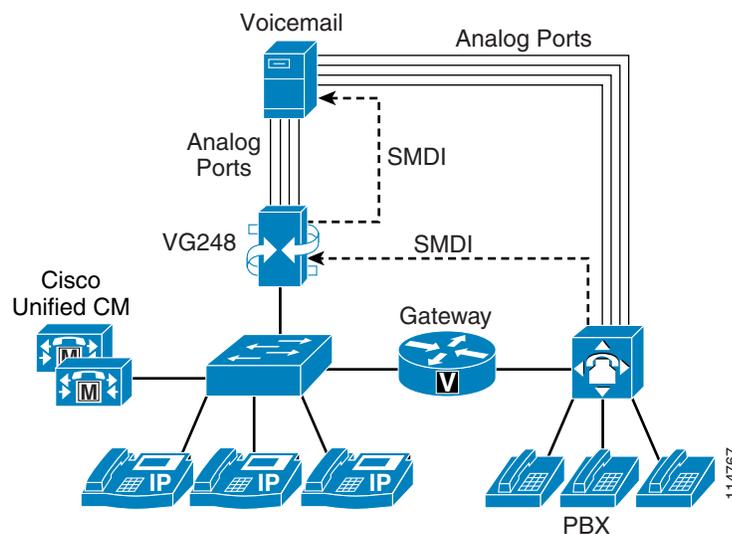


## Note

Most voicemail vendors do not support this scenario due to its complex nature, but some will provide support on a "site-specific" basis if requested. Consult with your voicemail vendor before attempting to implement this solution.

The Cisco VG248 has inherent multiplexing capabilities that enable it to provide dual integration. The VG248 can combine information from an existing serial link with its own link, and then present a single serial stream to the voicemail system. (See [Figure 12-4](#).)

**Figure 12-4** Dual Integration via the VG248 and SMDI

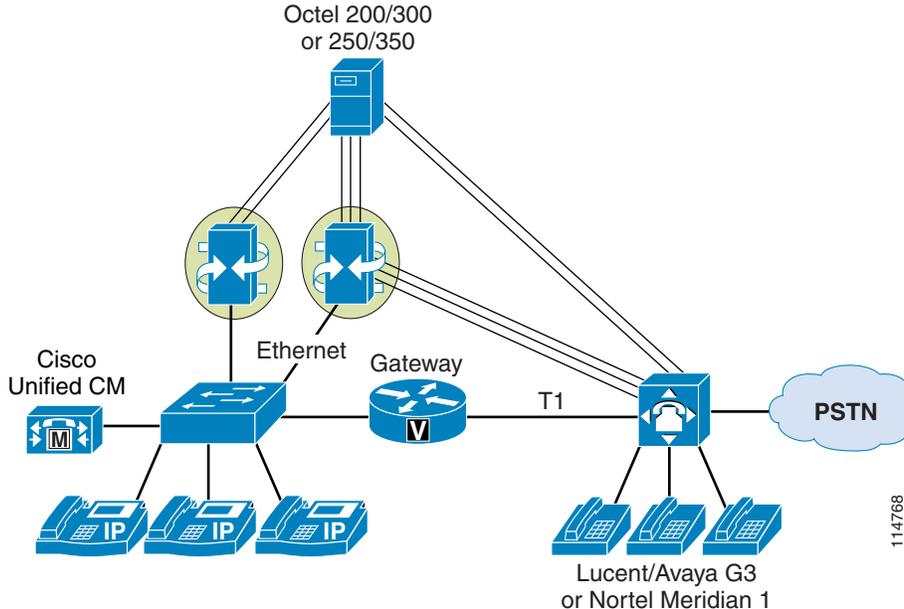


The VG248 works with any voicemail system that has SMDI capability and analog FXS ports. The following prerequisites are required prior to implementation, assuming a dual integration is required:

- Uniform dial plan
- Transfer and reconnect sequences
- Connectivity between the PBX and Cisco Unified CallManager

The Cisco DPA also has the capability to provide dual integration through digital set emulation, as illustrated in [Figure 12-5](#).

Figure 12-5 Dual Integration via DPA



The DPA works with Octel digital set emulation. The following prerequisites are required prior to implementation, assuming a dual integration is required:

- Uniform dial plan
- Transfer and reconnect sequences
- Connectivity between the PBX and Cisco Unified CallManager

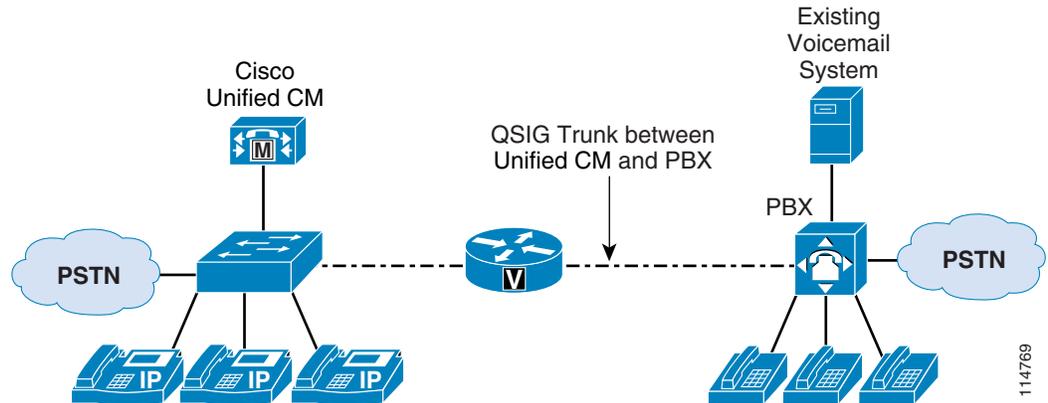
## Centralized Voicemail

In a centralized voicemail deployment, two or more PBXs share a single voicemail system. The sharing is achieved by integrating the voicemail system to only one PBX and then utilizing an inter-PBX private networking protocol to extend voicemail services to remote subscribers. The networked PBXs look and act like one large PBX to the voicemail system. Various PBX manufacturers have developed proprietary protocols that enable the delivery of such services as well as providing feature transparency to subscribers across a large network (for example, Avaya DCS, Nortel MCDN, Siemens CorNet, Alcatel ABC, NEC CCIS, and Fujitsu FIPN).

The primary motivation for using a centralized voicemail system stems from the desire to offer voicemail services to IP Telephony subscribers from the existing voicemail system so that the subscribers do not have to learn a new telephony user interface (TUI).

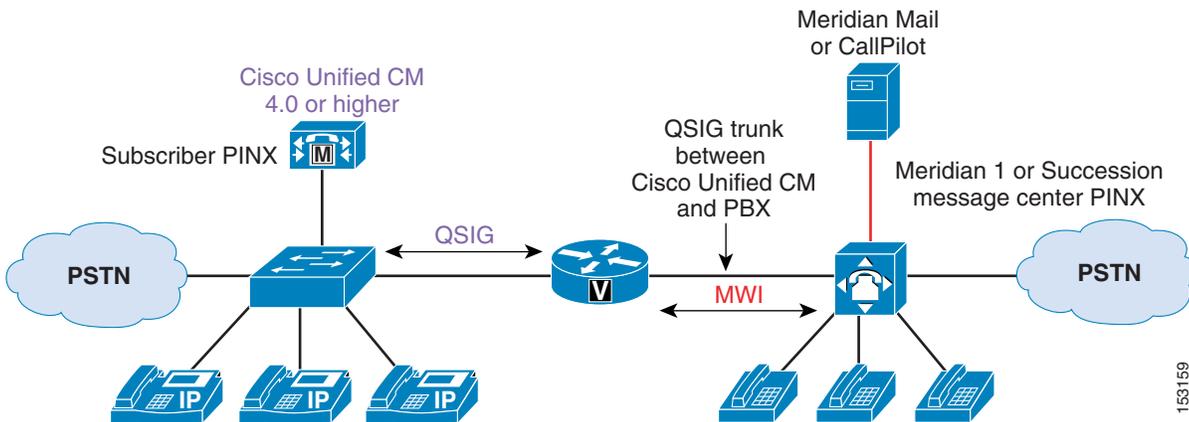
Some voicemail systems are capable of supporting multiple PBXs (dual PBX integration) via protocols such as Simple Messaging Desktop Interface (SMDI). Other solutions have been introduced, such as the Cisco Digital PBX Adapter (DPA), which also allow for dual integration. In some circumstances, these solutions are either not possible because the voicemail vendor may choose not to support this configuration, or a dual integration is simply not technically possible because the voicemail system cannot support dissimilar PBX integrations simultaneously. In such circumstances, a centralized voicemail deployment provides an alternative solution to dual integration. (See [Figure 12-6](#).)

**Figure 12-6** Centralized Voicemail with Cisco Unified CallManager and QSIG



If you want to use an existing voicemail system, consider the make and model of that system. If the voicemail system in question is from the same manufacturer as the PBX system, then full voicemail functionality is typically available to Cisco Unified CallManager subscribers. See [Figure 12-7](#) for an example of a Nortel system and [Figure 12-8](#) for an Avaya system.

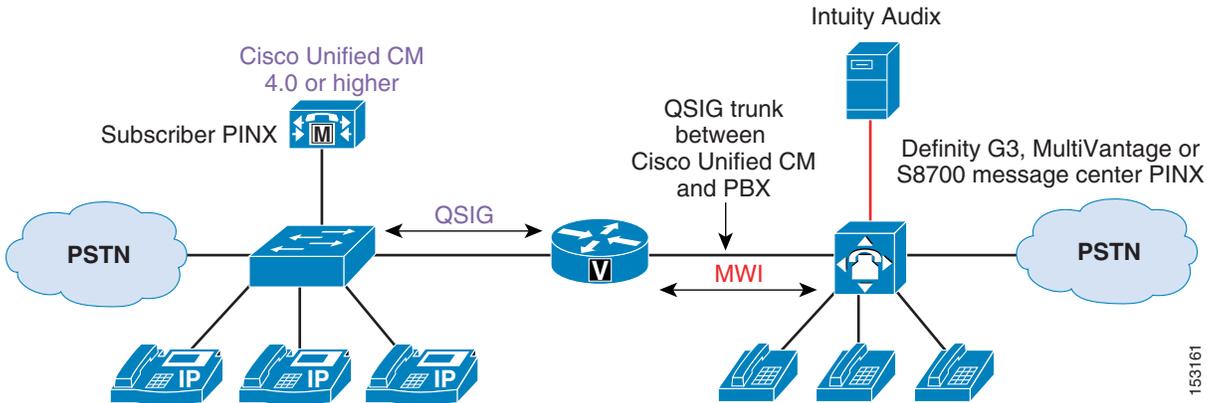
**Figure 12-7** Nortel M1 Centralized Voicemail with Meridian Mail or CallPilot



The system in [Figure 12-7](#) has the following characteristics:

- Voicemail services are available to all subscribers.
- Voicemail is hosted on the message center PINX.
- QSIG MWI works only with Meridian Mail or CallPilot.

Figure 12-8 Avaya G3 Centralized Voicemail with Intuity Audix



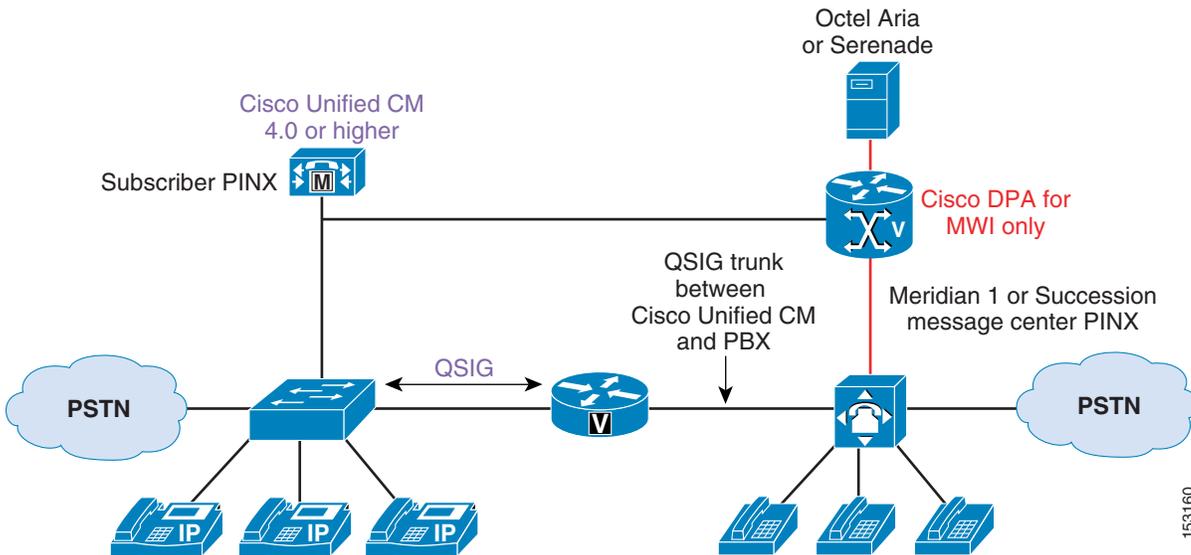
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The system in Figure 12-8 has the following characteristics:

- Voicemail services are available to all subscribers.
- Voicemail is hosted on the message center PINX.
- QSIG MWI works only with Avaya Intuity Audix.

If the voicemail system originates from a different manufacturer than the PBX system, then some functionality might not be passed back through the QSIG trunk to Cisco Unified CallManager. In this instance, the Cisco Digital PBX Adapter (DPA) may be used specifically to deliver MWI directly to Cisco Unified CallManager. See Figure 12-9 for an example of a Nortel system and Figure 12-10 for an Avaya system.

Figure 12-9 Nortel M1 Centralized Voicemail with Octel Aria or Serenade

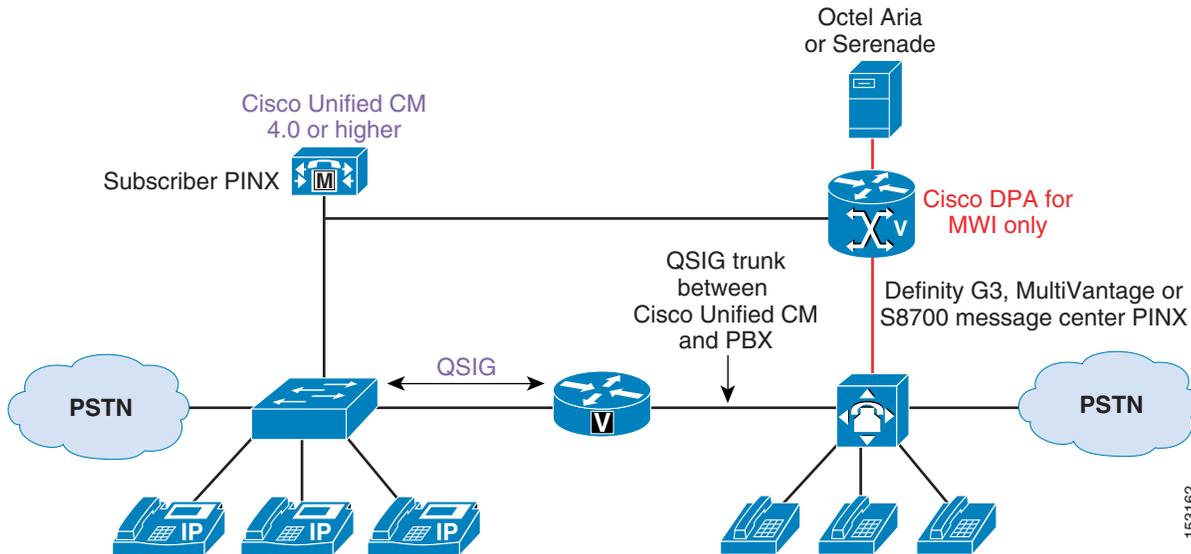


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The system in Figure 12-9 has the following characteristics:

- Voicemail services are available to all subscribers.
- Station-invoked message center functionality is not mapped to QSIG MWI.
- The Cisco DPA is used for MWI to Cisco Unified CallManager only.

**Figure 12-10 Avaya G3 Centralized Voicemail with Octel Aria or Serenade**



The system in Figure 12-10 has the following characteristics:

- Voicemail services are available to all subscribers.
- Leave Word Calling (LWC) is not mapped to QSIG MWI.
- The Cisco DPA is used for MWI to Cisco Unified CallManager only.

Note that the term *centralized voicemail* does not refer to the voicemail system itself. Centralized voicemail is a function of the PBX's inter-PBX networking protocol (either a proprietary protocol such as Avaya DCS, Nortel MCDN, or Siemens CorNet or a standards-based protocol such as QSIG or DPNSS), which is needed to deliver the voicemail features.

The following important terms and concepts apply to centralized voicemail:

- Message center Private Integrated Services Network Exchange (PINX) — This is the PBX that is "hosting" the voicemail system (the PBX directly connected to the voicemail system).
- Subscriber PINX — This is the PBX that is "remote" from the voicemail system (not directly connected to the voicemail system).

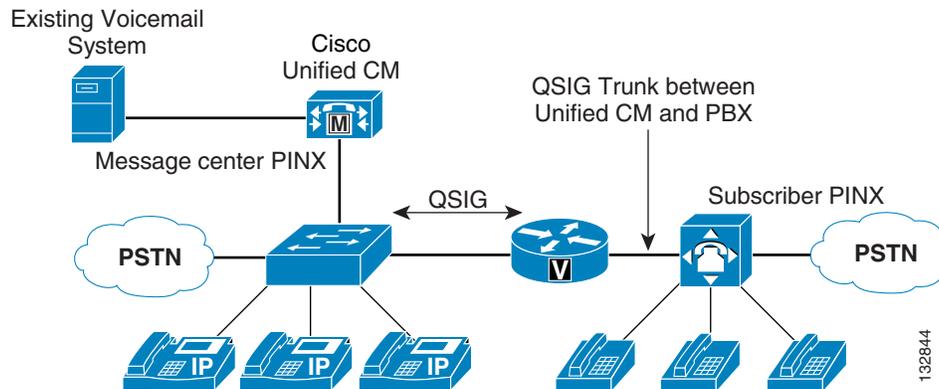
A centralized voicemail configuration requires a suitable inter-PBX networking protocol such as QSIG. This protocol must also deliver the following minimum level of feature support:

- Message Waiting Indication (MWI)
- Transfer — Needed to ensure that the correct calling and called party IDs are delivered to the voicemail system.
- Divert — Needed to ensure that the correct calling and called party IDs are delivered to the voicemail system.

Other features might also be required, depending on how the voicemail system will be used. For example, if the voicemail system is also serving as an automated attendant, then the Path Replacement feature is needed to prevent calls from hair-pinning.

Not all PBXs are capable of serving as the message center PINX. In this case, consider relocating the voicemail system to Cisco Unified CallManager and have Cisco Unified CallManager act as the message center PINX, with the PBX acting as the subscriber PINX. (See Figure 12-11.)

**Figure 12-11** Centralized Voicemail with Cisco Unified CallManager Acting as Message Center PINX



### Support

Cisco cannot guarantee that another vendor's product will act in a particular manner, nor can Cisco specify what is required in terms of configuration changes or upgrades to another vendor's product. It is the responsibility of the customer to ask these questions and seek confirmation directly from the supplier and/or vendor of each product.

Cisco can assist you in determining which particular questions to ask your supplier and/or vendor, such as: "What do I have to do to my PBX to enable remote PBX users, connected via QSIG, to have a mailbox as well as full access to all voicemail features such as MWI?"

To help with PBX interoperability, Cisco has tested a number of different PBXs with Cisco Unified CallManager and has documented these tests in the form of Application Notes. These documents, while not a guarantee of success, do provide some level of guidance in terms of features supported as well as configuration details for both Cisco Unified CallManager and the PBX. Application Notes for Cisco Unified CallManager have already been written for the leading PBXs, and they cover the scenario of centralized voicemail with Cisco Unified CallManager acting as the message center PINX. The Application Notes are available at

<http://www.cisco.com/go/interoperability>



### Note

It is not feasible for Cisco to test other vendors' PBXs acting as the message center PINX. Cisco has neither the facilities nor the expertise to configure these systems, therefore customers must request this information directly from their supplier and/or vendor.

**Summary**

- Centralized voicemail is a function of the inter-PBX networking protocol, not the voicemail system itself.
- Not all PBXs can act as the message center PINX. Customers *must* confirm this feature with their PBX supplier and/or vendor; Cisco cannot provide or support this feature on the PBX.
- Cisco Unified CallManager can act as the message center PINX, thus providing customers with an alternative if their PBX cannot perform this function.
- Confirm if Path Replacement is needed. Cisco Unified CallManager Release 4.1 and later supports this feature.

## Positive Disconnect Supervision

Positive disconnect supervision is a signal sent from a PBX port to the voicemail system to indicate that the far-end device has gone on-hook. This signal typically takes the form of a drop in loop current for approximately 600 ms, causing the voicemail system to terminate the session.

Without this signal, the voicemail system would be unaware that the far-end device has gone on-hook and would continue to record whatever supervisory tones the PBX provides under this condition. (For example, some PBXs play dial tone while others play busy tone.) The voicemail system would continue to record these tones until the maximum message time has expired. (For example, if the mailbox has a limit is 3 minutes per message and a caller hangs up after 30 seconds, then the voicemail system would continue to record such tones for another 2.5 minutes in the absence of positive disconnect supervision.) This unnecessary recording can be annoying to subscribers and can impact system performance by increasing disk usage as well as causing higher port usage times. Some voicemail systems are able to deal with this scenario by monitoring for known tones and then deleting them, but system performance is still impacted in this case.

A similar issue exists when subscribers call into their mailboxes to check for messages. If a user simply hangs up without disconnect supervision, the voicemail system will stay on the line waiting for a valid response before any activity timers eventually expire. In this scenario, the main impact is from the additional port usage time incurred.

For these reasons, positive disconnect supervision must be provided by the analog ports connecting to the voicemail system.

## Summary of Third-Party Voicemail Integration

There are other methods for connecting voicemail systems to Cisco Unified CallManager (such as Microsoft TAPI and PRI ISDN trunks in conjunction with SMDI), but these methods are uncommon. The vast majority of third-party voicemail integrations use the Cisco VG248 or the Digital PBX Adapter (DPA), therefore they are the recommended solutions.

The method of integrating Cisco Unified CallManager to the voicemail system depends on how the voicemail system is currently integrated to the PBX. If analog ports are currently in use, then the Cisco VG248 or the VG224 provides the best integration method. However, if Avaya or Nortel digital set emulation is currently in use, then the Cisco DPA can provide a solution at lower cost by integrating with your current voicemail system without the need to re-engineer it for analog FXS ports.

**Note**

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Cisco does not test or certify any third-party voicemail systems. Within the industry, it is generally considered to be the responsibility of the voicemail vendor to test and/or certify their products with various PBX systems. Cisco does, of course, test its interfaces to such equipment and will support these interfaces regardless of which third-party voicemail system is connected.

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