CHAPTER 27

Media Termination Points

A Media Termination Point (MTP) software device allows Cisco CallManager to relay calls that are routed through SIP or H.323 endpoints or gateways.

This section covers the following topics:

Note For information on hardware MTP, which act as transcoders, see the "Transcoders" section on page 25-1.

Understanding Media Termination Points

Media Termination Points extend supplementary services, such as call hold, call transfer, call park, and conferencing, that are otherwise not available when a call is routed to an H.323 endpoint. Some H.323 gateways may require that calls use an MTP to enable supplementary call services, but normally, Cisco IOS gateways do not.

The Cisco IP Voice Media Streaming Application MTP accepts two full-duplex G.711 Coder-Decoder (CODEC) stream connections. MTPs bridge the media streams between two connections. The streaming data that is received from the input stream on one connection passes to the output stream on the other connection and vice versa. In addition, the MTP trancodes a-law to mu-law (and vice versa) and adjusts packet sizes as required by the two connections.

Each MTP belongs to a device pool, which specifies, in priority order, the list of Cisco CallManagers to which the devices that are members of the device pool should attempt to register. This list represents a Cisco CallManager group. The first Cisco CallManager in the list specifies a device primary Cisco CallManager.

An MTP device always registers with its primary Cisco CallManager if that Cisco CallManager is available and informs the Cisco CallManager about how many MTP resources it supports. The Cisco CallManager controls MTP resources. You can register multiple MTPs with the same Cisco CallManager. When more than one MTP is registered with a given Cisco CallManager, that Cisco CallManager controls the set of resources for each MTP. You can also distribute the MTPs across a networked system as desired.

For example, consider MTP server 1 as configured for 48 MTP resources, and the MTP server 2 as configured for 24 resources. If both MTPs register with the same Cisco CallManager, that Cisco CallManager maintains both sets of resources for a total of 72 registered MTP resources.

When the Cisco CallManager determines that a call endpoint requires an MTP, it allocates an MTP resource from the MTP that has the least active streams. That MTP resource gets inserted into the call on behalf of the endpoint. MTP resource use remains invisible to both the users of the system and to the endpoint on whose behalf it was inserted. If an MTP resource is not available when it is needed, the call connects without using an MTP resource, and that call does not have supplementary services.

Make sure that the Cisco IP Voice Media Streaming application is activated and running on the server on which the MTP device is configured.

The Cisco IP Voice Media Streaming application, which is common to the MTP, Conference Bridge, annunciator, and Music On Hold applications, runs as a CM service.

You can add an MTP device in two ways:

- You automatically add an MTP device when you activate the Cisco IP Voice Media Streaming Application service from Cisco CallManager Serviceability.
- You can manually install the Cisco IP Voice Media Streaming Application on a networked server and configure an MTP device on that server through Cisco CallManager Administration.

SIP and MTP

Cisco CallManager requires an RFC 2833 DTMF-compliant MTP device to make SIP calls. The current standard for SIP uses inband payload types to indicate DTMF tones, and Cisco IP telephony components such as SCCP IP phones support only out-of-band payload types. Thus, an RFC 2833-compliant MTP device monitors for payload type and acts as a translator between inband and out-of-band payload types.

With the MTP device, any service that requires a media change (such as call hold) happens transparently. No need exists to send any media update signal to the SIP proxy server.

Managing MTPs with the Media Resource Manager

The Media Resource Manager (MRM), a software component in the Cisco CallManager system, primarily functions for resource registration and resource reservation. Each MTP device that is defined in the database registers with the MRM. The MRM keeps track of the total available MTP devices in the system and of which devices have available resources.

During resource reservation, the MRM determines the number of resources, identifies the media resource type (in this case, the MTP), and the location of the registered MTP device. The MRM updates its shared resource table with the registration information and propagates the registered information to the other Cisco CallManagers within the cluster.

The MRM enhances the Cisco CallManager MTP, Music On Hold, Conference Bridge, and Transcoder devices by distributing the resources throughout the Cisco CallManager cluster, which makes the features more efficient and economical.

MRM also supports the coexistence of an MTP and transcoder within a Cisco CallManager.

MTP Types in Cisco CallManager Administration

The media termination point types in Table 27-1 exist in Cisco CallManager Administration.

Table 27-1 Media Termination Point Types

MTP Type	Description
Cisco IOS Enhanced Software Media Termination Point	This type supports Cisco 2600XM, Cisco 2691, Cisco 3725, Cisco 3745, and Cisco 3660 Access Routers and the following MTP cases: • For software-only implementation that does not use DSP but has the same packetization time for devices that support G.711 to G.711 or G.729 to G.729 codecs, this implementation can support up to 500 sessions per gateway. • For a hardware-only implementation with DSP for devices that use G.711 codec only, 200 sessions can occur per NM-HDV2 and 48 sessions can occur per NM-HD. **Tip** Cisco IOS Software Enhanced Media Termination Point does not support RFC 2833 (DTMF relay). This type can support Network Address Translation in a service provider environment to hide the private address. In Cisco CallManager Administration, ensure that you enter the same MTP name that exists in the gateway Command Line Interface (CLI).
Cisco Media Termination Point Software	A single MTP provides a default of 48 MTP (user configurable) resources, depending on the speed of the network and the network interface card (NIC). For example, a 100-MB Network/NIC card can support 48 MTP resources, while a 10-MB NIC card cannot. For a 10-MB Network/NIC card, approximately 24 MTP resources can be provided; however, the exact number of MTP resources that are available depends on the amount of resources that other applications on that PC are consuming, the speed of the processor, network loading, and various other factors.

Planning Your Software MTP Configuration

Provisioning represents a crucial aspect that needs consideration when MTP resources are deployed. Provisioning requires attentive analysis of the call load patterns and the network topology.

Consider the following information when you are planning your MTP configuration:

- An improper setting can result in undesirable performance if the workload is too high.
- A single MTP provides a default of 48 MTP (user configurable) resources, depending on the speed of the network and the network interface card (NIC). For example, a 100-MB Network/NIC card can support 48 MTP resources, while a 10-MB NIC card cannot.
- For a 10-MB Network/NIC card, approximately 24 MTP resources can be provided; however, the exact number of MTP resources that are available depends on the amount of resources that other applications on that PC are consuming, the speed of the processor, network loading, and various other factors.

  Consider the following formula to determine the approximate number of MTPs that are needed for your system, assuming that your server can handle 48 MTP resources (you can substitute 48 for the correct number of MTP resources that your system supports):

  A number divided by 48 = number of MTP applications that are needed (*n*/48 = number of MTP applications).

  where:

  n represents the number of devices that require MTP support for H.323 and SIP calls.

  If a remainder exists, add another server with Cisco IP Voice Streaming Application server with MTP.
- If one H.323 or SIP endpoint requires an MTP, it consumes one MTP resource. Depending on the originating and terminating device type, a given call might consume more than one MTP resource. The MTP resources that are assigned to the call get released when the call terminates.
- Use Performance Monitor to monitor the usage of MTP resources. The Performance Monitor counter, Media TermPoints Out of Resources, increments for each H.323 or SIP call that connects without an MTP resource when one was required. This number can assist you in determining how many MTP resources are required for your callers and whether you have adequate coverage.
- Identical system requirements apply for the Cisco IP Voice Media Streaming Application and MTP and the Cisco CallManager system.
- Cisco CallManager requires an RFC 2833 DTMF-compliant MTP device to make SIP calls.

Software MTP Device Characteristics

The Full Streaming Endpoint Duplex Count, a number of MTP resources that a specific MTP supports, represents a device characteristic that is specific to MTP device configuration. Refer to the "Related Topics" section in the *Cisco CallManager Administration Guide* for a detailed description of all MTP device settings.

Avoiding Call Failure/User Alert

To prevent call failure or user alert, avoid the following conditions:

- Although the Cisco IP Voice Media Streaming Application service can run on the same PC as the Cisco CallManager, we strongly recommend against this arrangement. If the Cisco IP Voice Media Streaming Application is running on the same PC as the Cisco CallManager, it can adversely affect the performance of the Cisco CallManager.

- When you configure the MTP, a prompt asks you to reset MTP before any changes can take effect. This action does not result in disconnection of any calls that are connected to MTP resources. If you choose **Reset**, as soon as the MTP has no active calls, the changes take effect.

Note When you make updates to the MTP and you choose **Restart**, all calls that are connected to the MTP get dropped.

MTP System Requirements and Limitations

The following system requirements and limitations apply to software MTP devices:

- You can activate only one Cisco IP Voice Streaming Application per server. To provide more MTP resources, you can activate the Cisco IP Voice Streaming application on additional networked Windows NT servers.
- Each MTP can register with only one Cisco CallManager at a time. The system may have multiple MTPs, each of which may be registered to one Cisco CallManager, depending on how your system is configured.
- Cisco strongly recommends that you do not activate the Cisco IP Voice Streaming Media Application on a Cisco CallManager with a high call-processing load because it can adversely affect the performance of the Cisco CallManager.
- Up to 128 half-duplex configurable streams must exist.
- With 128 configured streams, 64 full-duplex resources must exist for media termination point application.

MTP Failover and Fallback

This section describes how MTP devices failover and fallback when the Cisco CallManager to which they are registered becomes unreachable. This section also explains conditions that can affect calls that are associated with an MTP device, such as MTP reset or restart.

- Active Cisco CallManager Becomes Inactive, page 27-5
- Resetting Registered MTP Devices, page 27-6

Active Cisco CallManager Becomes Inactive

The following description gives the MTP device recovery methods when the MTP is registered to a Cisco CallManager that goes inactive:

- If the primary Cisco CallManager fails, the MTP attempts to register with the next available Cisco CallManager in the Cisco CallManager Group that is specified for the device pool to which the MTP belongs.
- The MTP device reregisters with the primary Cisco CallManager as soon as it becomes available after a failure and is currently not in use.

- The system maintains the calls or conferences that were active in call preservation mode until all parties disconnect. The system does not make supplementary services available.
- If an MTP attempts to register with a new Cisco CallManager and the register acknowledgment is never received, the MTP registers with the next Cisco CallManager.

Resetting Registered MTP Devices

The MTP devices will unregister and then disconnect after a hard or soft reset. After the reset completes, the devices reregister with the Cisco CallManager.

Dependency Records

To find what media resource groups a specific media termination point is using, choose Dependency Records from the drop-down list box and click **Go** from the Cisco CallManager Administration Media Termination Point Configuration window. The Dependency Records Summary window displays information about media resource groups that are using the media termination point. To find out more information about the media resource group, click the media resource group, and the Dependency Records Details window displays. If the dependency records are not enabled for the system, the dependency records summary window displays a message.

For more information about Dependency Records, refer to Accessing Dependency Records and Deleting a Media Resource Group in the *Cisco CallManager Administration Guide*.

Software MTP Performance Monitoring and Troubleshooting

The Real Time Monitoring Tool counters for media termination point allow you to monitor the number of media termination points that are currently in use, the number of media termination points that are currently registered with Cisco CallManager but are not currently in use, and the number of times that a media termination point was requested for a call, but no resources were available. For more information about Real Time Monitoring Tool counters, refer to the *Cisco CallManager Serviceability System Guide* and the *Cisco CallManager Serviceability Administration Guide*.

Cisco CallManager writes all errors for the media termination point to the Local SysLog. In Cisco CallManager Serviceability, you can set traces for the Cisco IP Voice Media Streaming Application service; to troubleshoot most issues, you must choose the Significant or Detailed option for the service, not the Error option. After you troubleshoot the issue, change the Debug Trace Level back to the Error option.

Cisco CallManager generates registration and connection alarms for media termination point in Cisco CallManager Serviceability. For more information on alarms, refer to the *Cisco CallManager Serviceability Administration Guide* and the *Cisco CallManager Serviceability System Guide*.

If you need technical assistance, locate and review software MTP logs from /var/log/active/cm/trace/cms/sdi/cms*.* and /var/log/active/cm/trace/ccm before you contact your Cisco IP telephony partner or the Cisco Technical Assistance Center (TAC).

Software MTP Configuration Checklist

Table 27-2 provides a checklist to configure MTP.

Table 27-2 MTP Configuration Checklist

Configuration Steps		Procedures and Related Topics
Step 1	Determine the number of MTP resources that are needed and the number of MTP devices that are needed to provide these resources.	Planning Your Software MTP Configuration, page 27-3
Step 2	Verify that the Cisco IP Voice Media Streaming Application service is activated and running on the server to which you are adding an MTP.	*Cisco CallManager Serviceability Administration Guide* *Cisco CallManager Serviceability System Guide*
Step 3	Add and configure the MTPs.	Configuring a Media Termination Point, *Cisco CallManager Administration Guide*
Step 4	Add the new MTPs to the appropriate media resource groups.	Media Resource Management, page 22-1 Media Resource Group Configuration Settings, *Cisco CallManager Administration Guide*
Step 5	Restart the MTP device.	Configuring a Media Termination Point, *Cisco CallManager Administration Guide*

Where to Find More Information

Related Topics

- Media Resource Management, page 22-1
- Transcoders, page 25-1
- Cisco DSP Resources for Transcoding, Conferencing, and MTP, page 28-1

Additional Cisco Documentation

- Media Resource Group Configuration, *Cisco CallManager Administration Guide*
- Media Resource Group Configuration Settings, *Cisco CallManager Administration Guide*
- *Cisco IP Telephony Solution Reference Network Design Guide*