Media Termination Points

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

This section covers the following topics:

- Software MTP Configuration Checklist, page 27-1
- Understanding Media Termination Points, page 27-2
- Managing MTPs with the Media Resource Manager, page 27-3
- MTPs and Call Throttling, page 27-4
- MTP Types in Cisco Unified Communications Manager Administration, page 27-5
- Planning Your Software MTP Configuration, page 27-6
- MTP System Requirements and Limitations, page 27-7
- MTP Failover and Fallback, page 27-8
- Dependency Records, page 27-8
- Software MTP Performance Monitoring and Troubleshooting, page 27-9
- Where to Find More Information, page 27-9

Note

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

Software MTP Configuration Checklist

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

Table 27-1 provides a checklist to configure MTP. For more information, see the “Where to Find More Information” section on page 27-9.
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. For H.323 supplementary services, MTPs are only required for endpoints that do not support Empty Capability Set (ECS) or FastStart. All Cisco endpoints and most other endpoints do support ECS and FastStart, so an MTP is not required for them. See the “Cisco Unified CM Trunks: chapter of the Cisco Unified Communications Solution Reference Network Design (SRND) document for additional details.

MTP resources accept 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 transcodes 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 Unified Communications Managers to which the devices that are members of the device pool should attempt to register. This list represents a Cisco Unified Communications Manager group. The first Cisco Unified Communications Manager in the list specifies a device primary Cisco Unified Communications Manager.

An MTP device always registers with its primary Cisco Unified Communications Manager if that Cisco Unified Communications Manager is available and informs the Cisco Unified Communications Manager about how many MTP resources it supports. The Cisco Unified Communications Manager controls MTP resources. You can register multiple MTPs with the same Cisco Unified Communications Manager.

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### Table 27-1 MTP Configuration Checklist

<table>
<thead>
<tr>
<th>Configuration Steps</th>
<th>Procedures and Related Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Determine the number of MTP resources that are needed and the number of MTP devices that are needed to provide these resources.</td>
</tr>
<tr>
<td>Step 2</td>
<td>Verify that the Cisco IP Voice Media Streaming Application service is activated and running on the server to which you are adding an MTP.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Add and configure the MTPs.</td>
</tr>
<tr>
<td>Step 4</td>
<td>Add the new MTPs to the appropriate media resource groups.</td>
</tr>
<tr>
<td>Step 5</td>
<td>Restart the MTP device.</td>
</tr>
</tbody>
</table>

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When more than one MTP is registered with a given Cisco Unified Communications Manager, that Cisco Unified Communications Manager 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 Unified Communications Manager, that Cisco Unified Communications Manager maintains both sets of resources for a total of 72 registered MTP resources.

When the Cisco Unified Communications Manager 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 service of Cisco Unified Communications Manager.

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 Unified 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 Unified Communications Manager Administration.

**Additional Information**


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**Managing MTPs with the Media Resource Manager**

The Media Resource Manager (MRM), a software component in the Cisco Unified Communications Manager 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 Unified Communications Managers within the cluster.

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

MRM also supports the coexistence of an MTP and transcoder within a Cisco Unified Communications Manager.

**Additional Information**

MTPs and Call Throttling

The MTP and Transcoder Resource Throttling Percentage service parameter, which supports the Cisco CallManager service, defines a percentage of the configured number of MTP or transcoder resources and allows Cisco Unified Communications Manager to extend the call to an MTP/transcoder that offers the best chance of successfully connecting the call. When the number of active MTP or transcoder resources is equal to or greater than the percentage that is configured for this parameter, Cisco Unified Communications Manager throttles (stops sending) calls to this MTP/transcoder. Cisco Unified Communications Manager hunts through the Media Resource Group List (MRGL) one time to find a MTP/transcoder that uses matching codecs on both sides of the call. If Cisco Unified Communications Manager cannot find an available MTP/transcoder with matching codecs, Cisco Unified Communications Manager returns to the top of the MRGL to repeat the search, which then includes those MTPs/transcoders that are in a throttled state and that match a smaller subset of capabilities for the call. Cisco Unified Communications Manager extends the call to the MTP/transcoder that is the best match for the call when Cisco Unified Communications Manager determines that a resource may be available; the call fails when the MTP/transcoder cannot allocate a resource for the call. In some cases, Cisco Unified Communications Manager perceives that a resource on a hardware MTP/transcoder is available, but the actual port on the hardware is not available.

For example, if you enter 40 for the Call Count service parameter, which supports the Cisco IP Voice Media Streaming Application service, for a software MTP or transcoder (or for hardware resources, if the maximum sessions is configured at 40, for example), and you set the MTP and Transcoder Resource Throttling Percentage service parameter to 95 percent, Cisco Unified Communications Manager throttles calls to the MTP/transcoder when 38 resources are used on this MTP/transcoder (.95 x 40 = 38). When a new request for an MTP or transcoder arrives, Cisco Unified Communications Manager checks whether the number of resources has dropped to 38 or less, and if so, extends the call to the MTP/transcoder.

For the maximum, minimum, and default values for this service parameter, click the question mark help in the Service Parameter Configuration window in Cisco Unified Communications Manager Administration.
## MTP Types in Cisco Unified Communications Manager Administration

The media termination point types in Table 27-2 exist in Cisco Unified Communications Manager Administration.

### Table 27-2 Media Termination Point Types

<table>
<thead>
<tr>
<th>MTP Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco IOS Enhanced Media</td>
<td>This type supports Cisco 2600XM, Cisco 2691, Cisco 3725, Cisco 3745, and Cisco 3660 Access Routers and the following MTP cases:</td>
</tr>
<tr>
<td>Termination Point</td>
<td>• 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</td>
</tr>
<tr>
<td></td>
<td>G.729 to G.729 codecs, this implementation can support up to 500 sessions per gateway.</td>
</tr>
<tr>
<td></td>
<td>• For a hardware-only implementation with DSP for devices that use G.711, G.729a, and G.729b codecs, 200 sessions can occur per NM-HDV2, and</td>
</tr>
<tr>
<td></td>
<td>48 sessions can occur per NM-HD.</td>
</tr>
<tr>
<td>Note</td>
<td>For more information on using G.729 codecs over SIP trunks, see Chapter 40, “Understanding Session Initiation Protocol.”</td>
</tr>
<tr>
<td></td>
<td>This type can support Network Address Translation in a service provider environment to hide the private address.</td>
</tr>
<tr>
<td></td>
<td>In Cisco Unified Communications Manager Administration, ensure that you enter the same MTP name that exists in the gateway Command Line</td>
</tr>
<tr>
<td></td>
<td>Interface (CLI).</td>
</tr>
<tr>
<td></td>
<td>See the “Configuring Enhanced Conferencing and Transcoding for Voice Gateway Routers” section of the Cisco Unified Communications Manager and</td>
</tr>
<tr>
<td></td>
<td>Cisco IOS Interoperability Configuration Guide for more information.</td>
</tr>
</tbody>
</table>

| Cisco Media Termination Point     | A single MTP provides a default of 48 MTP (user configurable) resources, depending on the speed of the network and the network interface   |
| Software                          | 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 resources that other applications on that PC are consuming, the speed of the processor, network loading, and  |
|                                  | various other factors.                                                                                                                   |

### Additional Information

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) streams, and two streams make one resource because you need one stream for each side (send/receive) of the MTP. 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 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 streams (you can substitute 48 for the correct number of MTP resources that your system supports):

\[
\frac{n}{48} = \text{number of MTP applications}
\]

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 service 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 the Serviceability Real Time Monitoring Tool (RTMT) to monitor the usage of MTP resources. The perfmon 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, the MTP resources, and the Cisco Unified Communications Manager system.

- To optimize performance of DTMF signaling, use Cisco IOS release 12.4(11)T or later. This Cisco IOS release supports RFC 2833 DTMF MTP Passthrough of digits.

- Cisco IOS MTP supports media interoperation between IPv4 and IPv6 networks. Be aware that the software MTP component in the Cisco IP Voice Media Streaming Application does not support IPv6. For information on how IPv6-capable MTPs work with Cisco Unified Communications Manager and IPv6, see the “Internet Protocol Version 6 (IPv6)” in the Cisco Unified Communications Manager Features and Services Guide.

Additional Information

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. See the “Cisco IOS Media Termination Point Configuration Settings” section in the Cisco Unified Communications Manager Administration Guide for a detailed description of all MTP device settings.

Additional Information


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 Unified Communications Manager, Cisco strongly recommends against this arrangement. If the Cisco IP Voice Media Streaming Application is running on the same PC as the Cisco Unified Communications Manager, it can adversely affect the performance of the Cisco Unified Communications Manager.

- 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.

Additional Information


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 servers.

- Each MTP can register with only one Cisco Unified Communications Manager at a time. The system may have multiple MTPs, each of which may be registered to one Cisco Unified Communications Manager, 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 Unified Communications Manager with a high call-processing load because it can adversely affect the performance of the Cisco Unified Communications Manager.

Additional Information

MTP Failover and Fallback

This section describes how MTP devices failover and fallback when the Cisco Unified Communications Manager 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 Unified Communications Manager Becomes Inactive, page 27-8
- Resetting Registered MTP Devices, page 27-8

Additional Information

Active Cisco Unified Communications Manager Becomes Inactive

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

- If the primary Cisco Unified Communications Manager fails, the MTP attempts to register with the next available Cisco Unified Communications Manager in the Cisco Unified Communications Manager Group that is specified for the device pool to which the MTP belongs.
- The MTP device reregisters with the primary Cisco Unified Communications Manager 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 Unified Communications Manager and the register acknowledgment is never received, the MTP registers with the next Cisco Unified Communications Manager.

Additional Information

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 Unified Communications Manager.

Additional Information

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 Unified Communications Manager 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, see “Accessing Dependency Records” and “Tips About Deleting Media Termination Points” in the Cisco Unified Communications Manager Administration Guide.

**Additional Information**


### 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 Unified Communications Manager 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, see the Cisco Unified Serviceability Administration Guide.

Cisco Unified Communications Manager writes all errors for the media termination point to the Local SysLog. In Cisco Unified 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 Unified Communications Manager generates registration and connection alarms for media termination point in Cisco Unified Serviceability. For more information on alarms, see the Cisco Unified Serviceability Administration Guide.

If you need technical assistance, locate and review software MTP logs before you contact your Cisco Unified Communications partner or the Cisco Technical Assistance Center (TAC).

Use the following CLI commands to access the software MTP logs:

- `file list activelog cm/trace/cms/sdi/*.txt`
- `file get activelog cm/trace/cms/sdi/*.txt`
- `file view activelog cm/trace/cms/sdi/cms00000000.txt`
- `file tail activelog cm/trace/cms/sdi/cms00000000.txt`

**Additional Information**


### Where to Find More Information

#### Related Topics

- Software MTP Configuration Checklist, page 27-1
- Understanding Media Termination Points, page 27-2
- Managing MTPs with the Media Resource Manager, page 27-3
Where to Find More Information

- MTPs and Call Throttling, page 27-4
- MTP Types in Cisco Unified Communications Manager Administration, page 27-5
- Planning Your Software MTP Configuration, page 27-6
- MTP System Requirements and Limitations, page 27-7
- MTP Failover and Fallback, page 27-8
- Dependency Records, page 27-8
- Software MTP Performance Monitoring and Troubleshooting, page 27-9
- 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 Unified Communications Manager Administration Guide*

- Tips About Configuring Media Resource Groups, *Cisco Unified Communications Manager Administration Guide*

- *Cisco Unified Communications Solution Reference Network Design (SRND) Based on Cisco Unified Communications Manager*

- *Cisco Unified Communications Manager and Cisco IOS Interoperability Configuration Guide*