Understanding Cisco Unified CallManager Trunk Types

In a distributed call-processing environment, Cisco Unified CallManager communicates with other Cisco Unified CallManager clusters, the public switched telephone network (PSTN), and other non-IP telecommunications devices, such as private branch exchanges (PBXs) by using trunk signaling protocols and voice gateways.

This section covers the following topics:

Cisco Unified CallManager Trunk Configuration

Trunk configuration in Cisco Unified CallManager Administration depends on the network design and call-control protocols that are used in the IP WAN. All protocols require that either a signaling interface (trunk) or a gateway be created to accept and originate calls. For some IP protocols, such as MGCP, you configure trunk signaling on the gateway. You specify the type of signaling interface when you configure the gateway in Cisco Unified CallManager. For example, to configure QSIG connections to Cisco Unified CallManager, you must add an MGCP voice gateway that supports QSIG protocol to the network. You then configure the T1 PRI or E1 PRI trunk interface to use the QSIG protocol type. For more information about configuring gateways, see the "Understanding Cisco Unified CallManager Voice Gateways" chapter.

Related Topics

- Trunks and Gatekeepers in Cisco Unified CallManager, page 42-2
- Trunk Types in Cisco Unified CallManager Administration, page 42-2

Trunks and Gatekeepers in Cisco Unified CallManager

In addition to using gateways to route calls, you can configure trunks in Cisco Unified CallManager Administration to function in either of the following ways:

- Gatekeeper-Controlled Trunks, page 42-2
- Non-Gatekeeper-Controlled Trunks, page 42-2

Gatekeeper-Controlled Trunks

Gatekeepers that are used in a distributed call-processing environment provide call routing and call admission control for Cisco Unified CallManager clusters. Intercluster trunks that are gatekeeper-controlled can communicate with all remote clusters. Similarly, an H.225 trunk can communicate with any H.323 gatekeeper-controlled endpoints including Cisco Unified CallManager clusters. Route patterns or route groups can route the calls to and from the gatekeeper. In a distributed call-processing environment, the gatekeeper uses the E.164 address (phone number) and determines the appropriate IP address for the destination of each call, and the local Cisco Unified CallManager uses that IP address to complete the call.

For large distributed networks where many Cisco Unified CallManager clusters exist, you can avoid configuring individual intercluster trunks between each cluster by using gatekeepers.

When you configure gatekeeper-controlled trunks, Cisco Unified CallManager creates a virtual trunk device. The gatekeeper changes the IP address of this device dynamically to reflect the IP address of the remote device. Specify these trunks in the route patterns or route groups that route calls to and from the gatekeeper.

Refer to the *Cisco Unified Communications Solution Reference Network Design* guide for more detailed information about gatekeeper configuration, dial plan considerations when using a gatekeeper, and gatekeeper interaction with Cisco Unified CallManager.

Non-Gatekeeper-Controlled Trunks

With no gatekeepers in the distributed call-processing environment, you must configure a separate intercluster trunk for each remote device pool in a remote cluster that the local Cisco Unified CallManager can call over the IP WAN. You also configure the necessary route patterns and route groups to route calls to and from the various intercluster trunks. The intercluster trunks statically specify the IP addresses of the remote devices.

Related Topics

- Trunk Types in Cisco Unified CallManager Administration, page 42-2
- Trunk Configuration Checklist, page 42-6

Trunk Types in Cisco Unified CallManager Administration

Your choices for configuring trunks in Cisco Unified CallManager depend on whether the IP WAN uses gatekeepers to handle call routing. Also, the types of call-control protocols that are used in the call-processing environment determine trunk configuration options.

You can configure these types of trunk devices in Cisco Unified CallManager Administration:

H.225 Trunk (Gatekeeper Controlled)

In an H.323 network that uses gatekeepers, use an H.225 trunk with gatekeeper control to configure a connection to a gatekeeper for access to other Cisco Unified CallManager clusters and to H.323 devices. An H.225 trunk can communicate with any H.323 gatekeeper-controlled endpoint. When you configure an H.323 gateway with gatekeeper control in Cisco Unified CallManager Administration, use an H.225 trunk. To choose this method, use **Device > Trunk** and choose **H.225 Trunk (Gatekeeper Controlled)**.

You also configure route patterns and route groups to route calls to and from the gatekeeper. For more information about, see the "Gatekeepers and Trunks" section on page 8-6.

Intercluster Trunk (Gatekeeper Controlled)

In a distributed call-processing network with gatekeepers, use an intercluster trunk with gatekeeper control to configure connections between clusters of Cisco Unified CallManager systems. Gatekeepers provide call admission control and address resolution for intercluster calls. A single intercluster trunk can communicate with all remote clusters. To choose this method, use **Device > Trunk** and choose **Inter-Cluster Trunk (Gatekeeper Controlled)** in Cisco Unified CallManager Administration.

You also configure route patterns and route groups to route the calls to and from the gatekeeper. In this configuration, the gatekeeper dynamically determines the appropriate IP address for the destination of each call, and the local Cisco Unified CallManager uses that IP address to complete the call

For more information about gatekeepers, see the "Gatekeepers and Trunks" section on page 8-6.

Intercluster Trunk (Non-Gatekeeper Controlled)

In a distributed network that has no gatekeeper control, you must configure a separate intercluster trunk for each device pool in a remote cluster that the local Cisco Unified CallManager can call over the IP WAN. The intercluster trunks statically specify the IP addresses or host names of the remote devices.To choose this method, use **Device > Trunk** and choose **Inter-Cluster Trunk (Non-Gatekeeper Controlled)** in Cisco Unified CallManager Administration.

Note You must specify the IP addresses of all remote Cisco Unified CallManager nodes that belong to the device pool of the remote non-gatekeeper-controlled intercluster trunk.

You also configure the necessary route patterns and route groups to route calls to and from the intercluster trunks.

SIP Trunk

In a call-processing environment that uses Session Initiation Protocol (SIP), use SIP trunks to configure a signaling interface with Cisco Unified CallManager for SIP calls. SIP trunks (or signaling interfaces) connect Cisco Unified CallManager clusters with a SIP proxy server. A SIP signaling interface uses

port-based routing, and Cisco Unified CallManager accepts calls from any gateway as long as the SIP messages arrive on the port that is configured as a SIP signaling interface. The SIP signaling interface uses requests and responses to establish, maintain, and terminate calls (or sessions) between two or more endpoints.

To choose this method, use **Device > Trunk** and choose **SIP Trunk** in Cisco Unified CallManager Administration.

You must also configure route groups and route patterns that use the SIP trunks to route the SIP calls.

For more information about SIP and configuring SIP trunks, see the "SIP and Cisco Unified CallManager" section on page 41-2.

Related Topics

- Trunk Configuration Checklist, page 42-6
- Dependency Records for Trunks and Associated Route Groups, page 42-6

Transferring Calls Between Trunks

Using Cisco Unified CallManager Administration, you can configure trunks as OnNet (internal) trunks or OffNet (external) trunks by using Trunk Configuration or by setting a clusterwide service parameter. Used in conjunction with the clusterwide service parameter, Block OffNet to OffNet Transfer, the configuration determines whether calls can be transferred over a trunk.

To use the same trunk to route both OnNet and OffNet calls, associate the trunk with two different route patterns. Make one trunk OnNet and the other OffNet with both having the Allow Device Override check box unchecked.

Configuring Transfer Capabilities Using Trunk Configuration

Using Cisco Unified CallManager Administration Trunk Configuration, you can configure a trunk as OffNet or OnNet. The calls coming to the network through that trunk are considered OffNet or OnNet, respectively. Use the Trunk Configuration window field, Call Classification, to configure the trunk as OffNet, OnNet, or Use System Default. See Table 42-1 for description of these settings.

The Route Pattern Configuration window provides a drop-down list box called Call Classification, which allows you to configure a route pattern as OffNet or OnNet. When Call Classification is set to OffNet and the Allow Device Override check box is unchecked, the system considers the outgoing calls that use this route pattern as OffNet (if configured as OnNet and check box is unchecked, then outgoing calls are considered OnNet).

The same trunk can be used to route both OnNet and OffNet calls by associating the trunk with two different route patterns: one OnNet and the other OffNet, with both having the Allow Device Override check box unchecked. For outgoing calls, the outgoing device setting classifies the call as either OnNet or OffNet by determining if the Allow Device Override check box is checked.

In route pattern configuration, if the Call Classification is set as OnNet, the Allow Device Override check box is checked, and the route pattern is associated with an OffNet Trunk, the outgoing call is considered OffNet.

Table 42-1 Trunk Configuration Call Classification Settings

Setting Name	Description
OffNet	This setting identifies the trunk as being an external trunk. When a call comes in from a trunk that is configured as OffNet, the outside ring gets sent to the destination device.
OnNet	This setting identifies the trunk as being an internal trunk. When a call comes in from a trunk that is configured as OnNet, the inside ring gets sent to the destination device.
Use System Default	This setting uses the Cisco Unified CallManager clusterwide service parameter Call Classification.

Configuring Transfer Capabilities by Using Call Classification Service Parameter

To configure all trunks to be OffNet (external) or OnNet (internal), perform the following two steps:

1. Use the Cisco Unified CallManager clusterwide service parameter Call Classification.
2. Configure individual trunks to Use System Default in the Call Classification field that is on the Trunk Configuration window.

Blocking Transfer Capabilities by Using Service Parameters

Block transfer restricts the transfer between external devices, so fraudulent activity gets prevented. You can configure the following devices as OnNet (internal) or OffNet (external) to Cisco Unified CallManager:

- H.323 gateway
- MGCP FXO trunk
- MGCP T1/E1 trunk
- Intercluster trunk
- SIP trunk

If you do not want OffNet calls to be transferred to an external device (one that is configured as OffNet), set the Cisco Unified CallManager clusterwide service parameter, Block OffNet to OffNet Transfer, to True.

If a user tries to transfer a call on an OffNet trunk that is configured as blocked, a message displays on the user phone to indicate that the call cannot be transferred.

Related Topics

- Route Pattern Configuration, *Cisco Unified CallManager Administration Guide*
- Gateway Configuration, *Cisco Unified CallManager Administration Guide*
- Trunk Configuration, *Cisco Unified CallManager Administration Guide*

Dependency Records for Trunks and Associated Route Groups

To find route groups that use a specific trunk, click the Dependency Records link that is provided on the Cisco Unified CallManager Administration Trunk Configuration window. The Dependency Records Summary window displays information about route groups that are using the trunk. To find out more information about the route group, click the route 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, in the *Cisco Unified CallManager Administration Guide*.

Related Topics

- Trunk Configuration Checklist, page 42-6
- Trunk Types in Cisco Unified CallManager Administration, page 42-2

Trunk Configuration Checklist

Table 42-2 provides an overview of the steps that are required to configure trunk interfaces in Cisco Unified CallManager, along with references to related procedures and topics.

Table 42-2 Trunk Configuration Checklist

Configuration Steps		Procedures and Related Topics
Step 1	Gather the endpoint information, such as IP addresses or host names, that you need to configure the trunk interface.	*Cisco Unified Communications Solution Reference Network Design*
Step 2	For gatekeeper-controlled trunks, configure the gatekeeper. For SIP trunks, perform proxy configuration.	Gatekeeper and Trunk Configuration Checklist, page 8-10 SIP Trunk Configuration Checklist, page 41-13
Step 3	Add the appropriate trunks in Cisco Unified CallManager Administration. • H.225 trunks (gatekeeper controlled) • Intercluster trunks (gatekeeper controlled) • Intercluster trunks (non-gatekeeper controlled) • SIP trunks	Configuring a Trunk, *Cisco Unified CallManager Administration Guide* Trunk Configuration Settings, *Cisco Unified CallManager Administration Guide* SIP Trunk Configuration Checklist, page 41-13
Step 4	Configure the gatekeeper-controlled intercluster trunks or H.225 trunks to specify gatekeeper information. Configure the non-gatekeeper-controlled trunks with the IP address or host name for the remote Cisco Unified CallManager server.	Trunk Configuration Settings, *Cisco Unified CallManager Administration Guide*

Table 42-2 Trunk Configuration Checklist (continued)

Configuration Steps		Procedures and Related Topics
Step 5	Configure a route pattern or route group to route calls to each gatekeeper-controlled trunk. Configure a route pattern or route group to route calls to each non-gatekeeper-controlled trunk.	Route Pattern Configuration,*Cisco Unified CallManager Administration Guide* Route Group Configuration, *Cisco Unified CallManager Administration Guide* SIP Trunk Configuration Checklist, page 41-13
Step 6	Reset the trunk interface to apply the configuration settings.	Resetting a Trunk, *Cisco Unified CallManager Administration Guide*

Related Topics

- Cisco Unified CallManager Trunk Configuration, page 42-1
- Trunks and Gatekeepers in Cisco Unified CallManager, page 42-2
- Trunk Types in Cisco Unified CallManager Administration, page 42-2
- Dependency Records for Trunks and Associated Route Groups, page 42-6

Where to Find More Information

Related Topics

- Gatekeepers and Trunks, page 8-6
- Cisco Voice Gateways, page 39-1
- Gateways, Dial Plans, and Route Groups, page 39-12
- Understanding Session Initiation Protocol (SIP), page 41-1
- Trunk Configuration, *Cisco Unified CallManager Administration Guide*
- Gatekeeper Configuration, *Cisco Unified CallManager Administration Guide*

Additional Cisco Documentation

- *Cisco Unified Communications Solution Reference Network Design*
- *Cisco ICS 7750 System Description*
- *Configuring Cisco Unified Communications Voice Gateways*