Clustering

The clustering feature of Cisco Unified CallManager provides a mechanism for seamlessly distributing call processing across the infrastructure of a converged IP network. Clustering provides transparent sharing of resources and features and enables system scalability.

This section covers the following topics:

Clusters

A cluster comprises a set of Cisco Unified CallManager servers that share the same database and resources. You can configure the servers in a cluster in various ways to perform the following functions:

- Database server (only one database server in the cluster)
- TFTP server
- Application software server

Before you install the Cisco Unified CallManager software on subsequent servers, you must define the nodes in Server Configuration in Cisco Unified CallManager Administration.

Using the Service Activation window in the Cisco Unified CallManager Serviceability application, you can specify which server performs which function for the cluster. You can dedicate a particular server to one function or combine several functions on one server, depending on the size of your system and the level of redundancy that you want.

Each cluster can have only one database server (first node) and usually one TFTP server (either separate or combined).

Tip In a very large cluster, simultaneous initialization, the process that occurs after a Cisco Unified CallManager failure, can cause an overload of the database server. To limit the number of Cisco Unified CallManager services that will simultaneously initialize, you can configure the “Max

Simultaneous Cisco CallManager Initializations" service parameter. This parameter defaults to 0 and, with this value, the number of Cisco Unified CallManager services that can initialize simultaneously is unlimited. Any non-zero value will limit the number of services to that specific value.

Tip Another service parameter that should be configured is the "Restart Cisco CallManager on Initialization Exception" parameter. This parameter determines whether the Cisco CallManager service restarts if an error occurs during initialization. This parameter defaults to TRUE and, with this value, the Cisco CallManager initialization will abort when an error occurs during initialization. Setting the value to FALSE allows initialization to continue when an error is encountered. These parameters are clusterwide and can be located in the System - General subsection. Refer to "Service Parameters Configuration" in the *Cisco Unified CallManager Administration Guide* for detailed information on configuring service parameters.

For details on cluster size and recommended configurations, refer to the *Cisco Unified Communications Solution Reference Network Design Guide*.

For details of the Service Activation window, refer to the *Cisco Unified CallManager Serviceability System Guide* and to the *Cisco Unified CallManager Serviceability Administration Guide*.

Intercluster Communication

In very large environments, you might have to configure more than one cluster to handle the call-processing load. Communication between the clusters typically occurs by means of intercluster trunks or gatekeeper trunks. Most large systems use one of two main types of multicluster configurations:

- Large, single campus, or metropolitan-area network (MAN)
- Multisite WAN with distributed call processing (one or more Cisco Unified CallManagers at each site)

Because intercluster trunks in a MAN usually have sufficient bandwidth, they do not require any call admission control mechanism. Multisite WANs with distributed call processing typically use gatekeeper technology for call admission control.

Intracluster Communication

Cisco Unified CallManager also supports intracluster communication, which is a multisite WAN with centralized call processing (no Cisco Unified CallManager at the remote site or sites). Multisite WANs with centralized call processing use the locations feature in Cisco Unified CallManager to implement call admission control.

Most features of Cisco Unified CallManager do not extend beyond a single cluster, but the following features do exist between clusters:

- Basic call setup
- G.711 and G.729 calls
- Multiparty conference
- Call hold
- Call transfer

- Call park
- Calling line ID

For more information about intercluster communication and call admission control, refer to the *Cisco Unified Communications Solution Reference Network Design Guide.*

Balanced Call Processing

After installing the Cisco Unified CallManagers that form a cluster, you should, as much as possible, evenly balance the call-processing load across the system by distributing the devices (such as phones, gateways, CTI route points, CTI ports, and route lists) among the various Cisco Unified CallManagers in the cluster. To distribute the devices, you configure Cisco Unified CallManager groups and device pools and then assign the devices to the device pools in a way that achieves the balance you want.

Cisco Unified CallManager groups and device pools represent logical groupings of devices that you can arrange in any way that you want. For ease of administration, make sure that all the devices in a group or pool share a common and easily identified characteristic, such as their physical location on the network.

You can also use Cisco Unified CallManager groups to establish redundancy (backup call processors) for the primary Cisco Unified CallManager in the group. A Cisco Unified CallManager group comprises an ordered list of up to three Cisco Unified CallManager servers. During normal operation, the first (primary) Cisco Unified CallManager in the group controls all device pools and devices that are assigned to that group. If the primary Cisco Unified CallManager in a group fails, control of the device pools and devices that are registered with the primary Cisco Unified CallManager transfers to the next Cisco Unified CallManager in the group list.

For example, assume a simplified system that comprises three Cisco Unified CallManagers in a cluster, with 300 existing Cisco Unified IP Phones and provisions to auto-register new phones as they are added later.

- The configuration includes four Cisco Unified CallManager groups: group G1 assigned to device pool DP1, group G2 assigned to device pool DP2, group G3 assigned to device pool DP3, and group G4 assigned to device pool DP4. Group G4 serves as the default group for devices that auto-register.
- Unified CM1 serves as the primary Cisco Unified CallManager for the devices in DP1 and DP2, first backup for DP3, and second backup for the devices in DP4.
- Unified CM2 serves as the primary Cisco Unified CallManager for the devices in DP3 and DP4, first backup for DP1, and second backup for the devices in DP4.
- Unified CM3 serves as the first backup Cisco Unified CallManager for the devices in DP2 and DP4 and second backup for the devices in DP1 and DP3.

Cluster Configuration Checklist

Table 6-1 provides an overview of the steps that are required to install and configure a Cisco Unified CallManager cluster.

Table 6-1 Cluster Configuration Checklist

Configuration Steps		Procedures and Related Topics
Step 1	Install the database server (first node).	Refer to the installation documentation for the hardware components that you are installing.
Step 2	Gather the information that you need to install Cisco Unified CallManager and any other software applications on the first node and subsequent servers. Also, determine how you will allocate the servers in the cluster.	*Cisco Unified Communications Solution Reference Network Design Guide* *Installing Cisco Unified CallManager Release 5.0(4)* *Cisco Unified IP-IVR Installation Guide*
Step 3	Install Cisco Unified CallManager and any additional software applications on the subsequent servers. **Note** Before installing the subsequent servers, you must define the nodes in Server Configuration in Cisco Unified CallManager Administration.	*Installing Cisco Unified CallManager Release 5.0(4)* *Cisco Unified IP-IVR Installation Guide* Server Configuration, *Cisco Unified CallManager Administration Guide*
Step 4	Configure device pools and use them to assign specific devices to a Cisco Unified CallManager group.	Device Pool Configuration, *Cisco Unified CallManager Administration Guide*
Step 5	If you are using an intercluster trunk, install and configure it as an intercluster trunk, either gatekeeper-controlled or non-gatekeeper-controlled.	*Cisco Unified Communications Solution Reference Network Design Guide* Configuring a Trunk, *Cisco Unified CallManager Administration Guide* Trunk Configuration Settings, *Cisco Unified CallManager Administration Guide*
Step 6	If you want to provide call admission control for an intercluster trunk, configure either a gatekeeper-controlled intercluster trunk or Cisco Unified CallManager locations.	*Cisco Unified Communications Solution Reference Network Design Guide* Trunk Configuration, *Cisco Unified CallManager Administration Guide* Location Configuration, *Cisco Unified CallManager Administration Guide*

Where to Find More Information

Related Topics

- Cisco Unified CallManager Group Configuration, *Cisco Unified CallManager Administration Guide*
- Device Pool Configuration, *Cisco Unified CallManager Administration Guide*
- Trunk Configuration, *Cisco Unified CallManager Administration Guide*
- Location Configuration, *Cisco Unified CallManager Administration Guide*

Additional Cisco Documentation

- *Cisco Unified Communications Solution Reference Network Design Guide*
- *Installing Cisco Unified CallManager Release 5.0(4)*
- *Cisco Unified IP-IVR Installation Guide*
- *Cisco Unified CallManager Serviceability System Guide*
- *Cisco Unified CallManager Serviceability Administration Guide*