Configure Intercluster Lookup Service

- ILS Overview, on page 1
- ILS Configuration Task Flow, on page 2
- ILS Interactions and Restrictions, on page 6

ILS Overview

The Cisco Intercluster Lookup Service (ILS) makes it easy to create a multi-cluster network of remote Cisco Unified Communications Manager clusters that share data.

ILS eliminates the need for an administrator having to configure connections between clusters manually. Once you have ILS configured on a hub cluster, you can connect new clusters by enabling ILS on the new cluster and pointing the new cluster to an existing hub. ILS connects the clusters automatically and lets both clusters know the topology of the larger ILS network.

ILS Network Components

An ILS network comprises the following components:

- **Hub clusters**—Hub clusters form the backbone of an ILS network using automesh functionality to create a full mesh topology with the other hub clusters. Hub clusters relay and share information across the ILS network for a variety of features.
- **Spoke clusters**—Spoke clusters connect only to their local hub cluster and never contact other hub or spoke clusters directly. Spoke clusters rely on their local hub to share and relay information across the network.
- **Global dial plan imported catalogs**—This optional component applies if you have Global Dial Plan Replication configured, and you are interoperating with a Cisco TelePresence Video Communications Server, or a third-party call control system. Import a directory URI or +E.164 number catalog manually from a CSV file that was exported from the other system, thereby allowing users in the ILS network to call users from the other system.

Cluster View

The remote cluster view functionality of ILS can be used to map the network. Each cluster exchanges update messages, called peer info vectors, that inform remote clusters of the status of each cluster in the network. The update messages contain information about the known clusters in the network, including:

- Cluster IDs
- Peer IDs for the publisher
- Cluster descriptions and versions
- Fully Qualified Domain Name (FQDN) of the host
- IP addresses and host names for the cluster nodes that have ILS activated

Feature Support

Features such as Global Dial Plan Replication and Extension Mobility Roaming are dependent on ILS to create intercluster networks where the clusters share dial plan information. This lets you set up intercluster call networks with video calling, URI dialing, and intercluster mobility.

ILS is also used by Centralized Deployments of the IM and Presence Service if you are connecting the IM and Presence central cluster to multiple telephony clusters. ILS is used to create the connections between the IM and Presence central cluster and the telephony clusters.

ILS Networking Capacities

Following are recommended capacities to keep in mind when planning an ILS network:

- ILS networking supports up to 10 hub clusters with 20 spoke clusters per hub, up to a 200 total cluster maximum. A hub and spoke combination topology is used to avoid many TCP connections created within each cluster.
- There may be a performance impact with utilizing your hub and spoke clusters at, or above, their maximums. Adding too many spoke clusters to a single hub creates extra connections that may increase the amount of memory or CPU processing. We recommend that you connect to a hub cluster with no more than 20 spoke clusters.
- ILS networking adds extra CPU processing to your system. The CPU utilization and sync time is dependent on the number of records that are being synced across the cluster. When planning your hub and spoke topology, make sure that your hub clusters have the CPU to handle the load.

Note These recommendations are based on system testing and taking resource utilization into account. Although the system does not prevent you from exceeding these recommendations, by doing so you would risk the overutilization of resources. Cisco recommends the above capacities for optimal performance.

ILS Configuration Task Flow

Complete these tasks to set up your ILS network.

Before you begin

Make sure to plan our your ILS topology so that you know which clusters will be hub clusters and which will be spoke clusters.

Procedure

	Command or Action	Purpose
Step 1	Configure Cluster IDs, on page 3	Each cluster within the ILS network must have a unique Cluster ID
Step 2	Configure ILS, on page 3	Configure and activate ILS in the various clusters of your network.
Step 3	Verify that ILS is Running, on page 4	Confiirm that the ILS network is up and running.
Step 4	Configure Remote Cluster View, on page 5	Configure the remote cluster view for your ILS network.

Configure Cluster IDs

Each cluster within the ILS network must have a unique Cluster ID. ILS does not work if your remote clusters retain the default **StandAloneCluster** value for the cluster ID.

Procedure

Step 1 Log in to Cisco Unified CM Administration on the publisher node.

Step 2 Choose **System** > **Enterprise Parameters**.

Step 3 Set the value of the **Cluster ID** to a value that uniquely identifies the cluster.

Step 4 Click **Save**.

Step 5 Repeat this procedure on the publisher node of each cluster.

Configure ILS

Use this procedure to activate and configure the Intercluster Lookup Service (ILS) in your network.

Note The first cluster that you configure must be a hub cluster.

Procedure

Step 1 Log into Cisco Unified CM Administration on the publisher node.

Step 2 Choose **Advanced Features** > **ILS Configuration**.

Step 3 From the **Role** drop-down list box, select **Hub Cluster** or **Spoke Cluster** depending on which type of cluster you are setting up.

Step 4 If you want to enable Global Dial Plan Replication, check the **Exchange Global Dial Plan Replication Data with Remote Clusters** check box.

Note
When advertising URI patterns (`user@domain`), in the **SIP Profile Configuration** window, make sure that the **Dial String Interpretation** field is set to **Always treat all dial strings as URI addresses** to prevent the devices to dial URI learned patterns with only numbers in the user section as Directory Number patterns. Alternatively, you can advertise only URI patterns with text strings in the user section through ILS.

Step 5 Configure **ILS Authentication Details** between the various clusters in the network:

- For TLS authentication, check the **Use TLS Certificates** check box. Note that if you choose this option, you must also exchange CA-signed certificates between the nodes in your cluster.
- For password authentication (regardless of whether TLS is used), check the **Use Password** check box and enter the password details.

Step 6 Click **Save**.

Step 7 In the **ILS Cluster Registration** popup, configure your registration details:

a) In the **Registration Server** text box, enter the publisher node IP address or FQDN for the hub cluster to which you want to connect this cluster. If this is the first hub cluster in your network, you can leave the field blank
b) Make sure that the **Activate the Intercluster Lookup Service** on the publisher in this cluster check box is checked.
c) Click **OK**.

Step 8 Repeat this procedure on the publisher node of each cluster that you want to add to the ILS network. Add the new cluster as a hub or spoke cluster.

Note
Depending on the sync values that you configured, there may be a delay while the cluster information propagates throughout the network.

If you chose to use Transport Layer Security (TLS) authentication between clusters, you must exchange Tomcat certificates between the publisher node of each cluster in the ILS network. From Cisco Unified Operating System Administration, use the Bulk Certificate Management feature to:

- Export certificates from the publisher node of each cluster to a central location
- Consolidate exported certificates in the ILS network
- Import certificates onto the publisher node of each cluster in your network

For details, see the "Manage Certificates" chapter of the *Administration Guide for Cisco Unified Communications Manager*.

Verify that ILS is Running

Confirm that your ILS network is up and running.

Procedure

Step 1 Log in to the publisher node on any of your telephony clusters.

Step 2 From Cisco Unified CM Administration choose **Advanced Features** > **ILS Configuration**.

Step 3 Check the **ILS Clusters and Global Dial Plan Imported Catalogs** section. Your ILS network topology should appear.

Configure Remote Cluster View

Use this procedure to configure remote cluster view for the ILS network.

Procedure

Step 1 In Cisco Unified CM Administration, choose **Advanced Features** > **Cluster View**.

Step 2 In the **Find and List Remote Clusters** window, choose any previously created remote cluster.

Step 3 From the Remote Cluster Service Configuration window, check the appropriate check box to configure services such as Extension Mobility Cross Cluster, TFTP, and RSVP Agent for remote clusters.

Step 4 Click **Save**.

ILS Interactions and Restrictions

ILS Interactions

Table 1: ILS Interactions

Feature	Interaction
Cluster discovery	ILS cluster discovery allows Cisco Unified Communications Manager clusters to learn dynamically about remote clusters without the need for an administrator to manually configure connections between those clusters. Each cluster in an ILS network exchange update messages, called peer info vectors, that are designed to inform remote clusters of the status of each cluster in the network. The update messages contain information about the known clusters in the network, including: • Cluster IDs • Cluster descriptions and versions • Fully qualified domain name of the host • IP addresses and hostnames for the cluster nodes that have ILS activated The ILS cluster discovery feature automatically populates the list of remote clusters that can be viewed in Cisco Unified CM Administration by choosing **Advanced Features** > **Cluster View**. From this window, you can configure services such as Extension Mobility Cross Cluster, TFTP, and RSVP Agent for remote clusters. **Note** A fully qualified domain name of the remote cluster, as seen in the Cluster View, must be DNS resolvable for ILS discovery to work.
Global Dial Plan Replication	When Global Dial Plan Replication is enabled across an ILS network, remote clusters in an ILS network share global dial plan data, including the following: • Directory URIs • Alternate numbers • Alternate number patterns • Route strings • PSTN failover numbers
Block Inbound Calls	To block Inbound calls based on calling party number in an ILS-based network, you must include the SIP route pattern's partition in the calling party's CSS. For example, if the call originates from SIP Trunk then SIP trunk inbound CSS must have SIP route pattern's partition.

ILS Restrictions

Table 2: ILS Restrictions

Restriction	Description
ILS Service	The ILS Service runs only on the Unified Communications manager publisher node.
Clusters	A hub cluster can have many spokes but, a spoke cluster can have only one hub cluster.
ILS Network	You cannot connect a third-party call control system into an ILS network.
Cluster Import	You can import a third-party catalog into a hub cluster only.
Duplicated URI	If a learned ILS cluster contains duplicated URIs from a different remote cluster and when a call is placed to that URI, it will be routed to the cluster whose URI has been learned and inserted into the database first.
Database Replication Status	Although the Global dial plan data is exchanged successfully on the ILS Network, an ILS receiving cluster will not write learned information into the database until it completes its database replication status.
Import	For imported third-party directory URIs and patterns, the CSV file format must match the exact syntax as shown in the administration window sample file otherwise, the import fails.
ILS Hub	When adding an additional hub cluster into the ILS network ensure to verify the following conditions are met for the primary ILS hub node: • Cluster ID is unique across all the hub nodes in the ILS cluster. • Fully Qualified Domain Name (FQDN) is configured. • UDS and EM services are running on the all of the hub nodes in the ILS cluster • DNS primary and reverse resolution are working fine. • Import consolidated Tomcat certificates from all the hub nodes. Else, the "version" information will not get displayed in the **Find and List Remote Clusters** window even after rebooting the clusters or correcting the errors. The workaround is to remove the hub cluster from the ILS network, comply with the above requirements and add the hub cluster back into the ILS network.