# Extension Mobility Roaming Across Clusters

**Note**    To deploy Extension Mobility Roaming Across Clusters, you must be running a minimum release of Cisco Unified Communications Manager 12.0(1)SU1.

## Extension Mobility Roaming Across Clusters Overview

Extension Mobility Roaming Across Clusters gives users the ability to roam across multiple cluster and make or receive calls even when the user's home cluster is down. This feature leverages the Intercluster Lookup Service (ILS) to replicate Extension Mobility users' directory numbers across all the clusters.

When a user logs in to a roaming cluster, their phone registers to the roaming cluster using the directory number. Unlike Extension Mobility Cross Cluster (EMCC), where the phone from the visiting cluster registers to the home cluster, the roaming feature allows the user to maintain their registration in whichever cluster they are visiting.

**Configuration Overview**

To deploy this feature, you must do the following:

- Set up an ILS network—ILS is used to synchronize directory number across the clusters.

  For details on configuring ILS, see the Configure Intercluster Lookup Service chapter in the System Configuration Guide for Cisco Unified Communications Manager.

- Set up a uniform dial plan—you require a uniform dial plan across the ILS network.

  To set up a dial plan, see Configure the Dial Plan chapter in the System Configuration Guide for Cisco Unified Communications Manager.

• Device profile and user information must be synced in all the clusters.

• Configure Extension Mobility.

• Configure Roaming access to your Extension Mobility users.

# System Requirements for Extension Mobility Roaming Across Clusters

The following system requirements exist for Cisco Unified Communications Manager:

• Cisco Unified Communications Manager, Release 12.0(1)SU1 or higher.

• Cisco Extension Mobility service must be running.

• Intercluster Lookup Service must be running.

# Extension Mobility Roaming Across Clusters Login

**Login Terminology**

The following figure depicts the home cluster versus a roaming cluster in Extension Mobility Roaming across Cluster.

*Figure 1: Home Cluster vs. Roaming Cluster*



**Home Cluster**
> Home cluster is a cluster, where the user configuration such as User Device profile, Dial Plans reside here.

**Roaming Cluster**
> Roaming cluster is a cluster, where users can do the Extension Mobility login to any Extension Mobility capable phone just like in their home cluster.

**Superuser**
> A superuser is a user, who is associated to the **Standard EM Roaming Across Clusters Super Users** access control group. This user has a privilege to do the Extension Mobility login from a roaming cluster and can make or receive calls.

**Note**   Superuser information must be shared across all the clusters irrespective of the cluster in which the user is logging-in.

### Login Process

Cisco Unified Communications Manager supports the Extension Mobility login for a superuser created across multiple clusters. Extension Mobility login, in the roaming cluster allows superuser to access their phone settings, such as line appearances, services, dial plans. A superuser can make or receive calls from the roaming cluster, in the same way as they do in the home cluster.
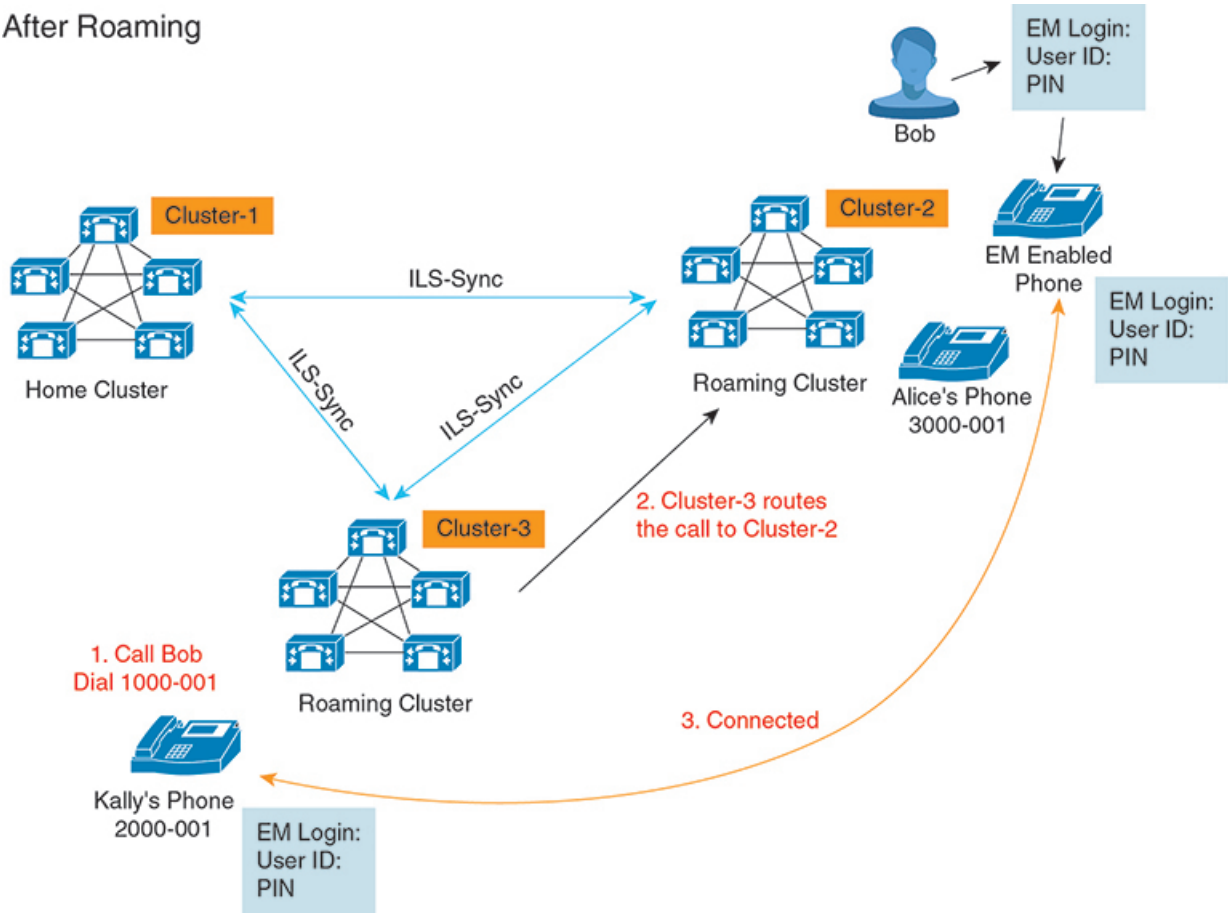
*Figure 2: Call Flow When a User Is in Home Cluster*
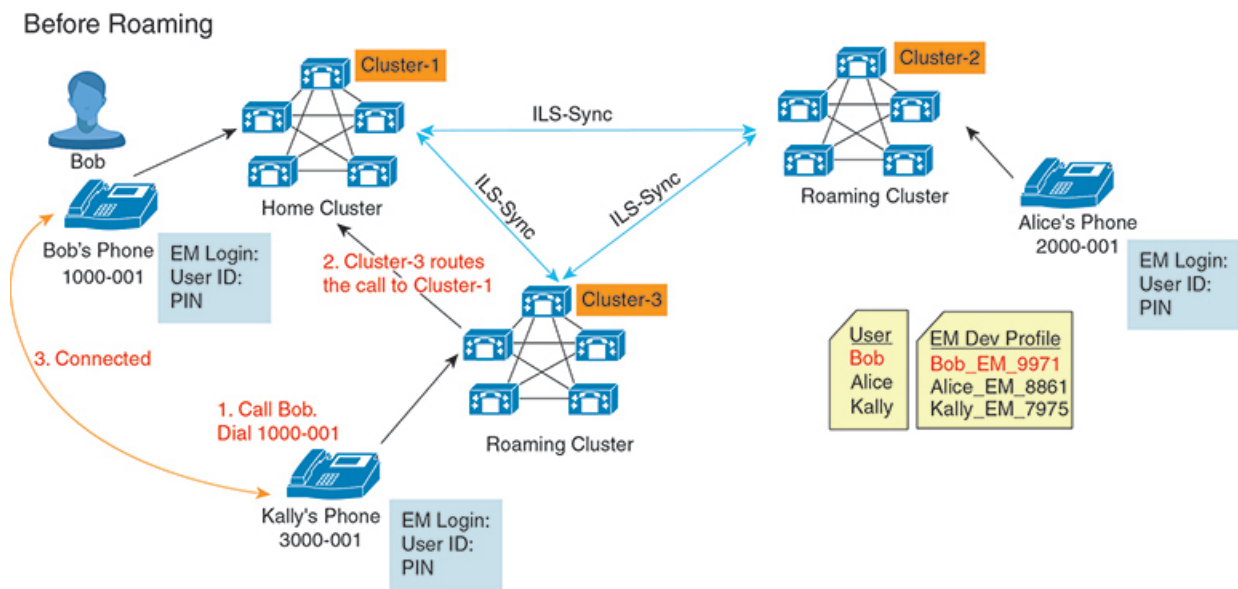


In the preceding figure, let us assume Bob's DN as 1000-001, Alice's DN as 2000-001 and Kally's DN as 3000-001 registered with Cluster 1, 2 and 3 respectively. When Kally dials Bob's DN 1000-001, Cluster 3 routes the call to Cluster 1 and Bob and Kally are connected.

*Figure 3: Call Flow When User Is in Roaming Cluster*



Let us assume Bob's home cluster is down and Bob is configured as superuser who can roam across the clusters. When Bob moves to Cluster 2 and does Extension Mobility Login, hosting phone gets re-registered with Bob's settings. Once the login is successful, all other clusters are updated with Bob's new location. Now when Kally dials Bob's DN 1000-01, Cluster 3 routes the call to Cluster 2 and Bob and Kally are connected. Similarly, Bob can call Kally by dialing DN 3000-001.

**Note**
- If a superuser did the Extension Mobility login to another cluster, user will automatically log out from the home cluster. If the cluster is down, it waits until the cluster is up to log out from the user's previous login.

- Extension Mobility Roaming Across Clusters supports the multi login behavior. Hence, superuser can login from multiple devices within the same cluster but not across the clusters.

**Extension Mobility Roaming Across Clusters**

ILS Interaction

# ILS Interaction

In Cisco Unified CM Administration, you can configure ILS on a pair of clusters and then join those clusters to form an ILS network. Once you have established the ILS network, you can join additional clusters to the network without having to configure the connections between each cluster.

Whenever Extension Mobility login or logout occurs, ILS sync starts to update the available information to other clusters.

**Note** Configuring user as superuser automatically initiates the ILS sync irrespective of Directory Number configuration for ILS.

For more information, see the Configure Intercluster Lookup Service chapter in the *System Configuration Guide for Cisco Unified Communications Manager* at https://www.cisco.com/c/en/us/support/unified-communications/unified-communications-manager-callmanager/products-installation-and-configuration-guides-list.html.

# Extension Mobility Roaming Across Clusters Task Flow

**Procedure**

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | Generate a Phone Feature List | Generate a report to identify devices that support the Extension Mobility feature. |
| **Step 2** | Configure Extension Mobility by completing, the following subtasks in order:<br>• Activate Extension Mobility Services<br>• Configure the Cisco Extension Mobility Phone Service<br>• Create an Extension Mobility Device Profile for Users<br>• Associate a Device Profile to a User<br>• Subscribe to Extension Mobility | Configure Extension Mobility to allow users to temporarily access their phone settings, such as line appearances, services, and speed dials, from other phones when they login from remote cluster. Perform this task flow on both home and remote clusters, so that users will be able to access settings from either a home or remote cluster. |
| **Step 3** | Configure Roaming for Extension Mobility Users, on page 9 | Use this procedure to give Extension Mobility users the ability to roam between different clusters in an ILS network, while using the same login credentials. |

# Generate a Phone Feature List

Generate a phone feature list report to determine which devices support the feature that you want to configure.

**Procedure**

| | |
|---|---|
| **Step 1** | From Cisco Unified Reporting, choose **System Reports**. |
| **Step 2** | From the list of reports, click **Unified CM Phone Feature List**. |
| **Step 3** | Perform one of the following steps: |

- Choose **Generate New Report** (the bar chart icon) to generate a new report.
- Choose **Unified CM Phone Feature List** if a report exists.

| | |
|---|---|
| **Step 4** | From the **Product** drop-down list, choose **All**. |
| **Step 5** | Click the name of the feature that you want to configure. |
| **Step 6** | Click **Submit**, to generate the report. |

# Activate Extension Mobility Services

**Procedure**

| | |
|---|---|
| **Step 1** | From Cisco Unified Serviceability, choose **Tools** > **Service Activation**. |
| **Step 2** | From the **Server** drop-down list, choose the requried node. |
| **Step 3** | Activate the following services: |

a) Cisco CallManager
b) Cisco Tftp
c) Cisco Extension Mobility
d) ILS Service

> **Note**      You must choose publisher node to activate the ILS services.

| | |
|---|---|
| **Step 4** | Click **Save**. |
| **Step 5** | Click **OK**. |

# Configure the Cisco Extension Mobility Phone Service

Configure the extension mobility IP phone service to which users can later subscribe to access extension mobility.

**Procedure**

| | |
|---|---|
| **Step 1** | From Cisco Unified CM Administration, choose **Device** > **Device Settings** > **Phone Services**. |
| **Step 2** | Click **Add New**. |
| **Step 3** | In the **Service Name** field, enter a name for the service. |

**Step 4**    In the **Service URL** field, enter the Service URL.

The format is `http://<IP Address>:8080/emapp/EMAppServlet?device=#DEVICENAME#`. `IP Address` is the IP address of the Unified Communications Manager where Cisco Extension Mobility is activated and running.

It can either be a IPv4 or a IPv6 address.

**Example:**

`http://123.45.67.89:8080/emapp/EMAppServlet?device=#DEVICENAME#`

**Example:**

`http://[2001:0001:0001:0067:0000:0000:0000:0134]:8080/emapp/EMAppServlet?device=#DEVICENAME#`

This format allows a user to sign-in using User ID and PIN. You can configure more sign-in options for IP phone users who have subscribed to the extension mobility service. To configure more sign-in options, append the `loginType` parameter to the Service URL, in the following formats:

- `loginType=DN` enables users to sign in using Primary Extension and PIN.

  The Service URL format is:`http://<IP Address>:8080/emapp/EMAppServlet?device=#DEVICENAME#&loginType=DN`.

- `loginType=SP` enables users to sign in using Self Service User ID and PIN.

  The Service URL format is:`http://<IP Address>:8080/emapp/EMAppServlet?device=#DEVICENAME#&loginType=SP`.

- `loginType=UID` enables users to sign in using User ID and PIN.

  The Service URL format is:`http://<IP Address>:8080/emapp/EMAppServlet?device=#DEVICENAME#&loginType=UID`.

If you do not append `loginType` to the end of the URL, the default sign-in option displayed is User ID and PIN.

**Step 5**    In the **Service Type** field, choose whether the service is provisioned to the Services, Directories, or Messages button.

**Step 6**    Click **Save**.

# Create an Extension Mobility Device Profile for Users

Configure an extension mobility device profile. This profile acts as a virtual device that maps onto a physical device when a user logs in to extension mobility. The physical device takes on the characteristics in this profile.

**Procedure**

**Step 1**    From Cisco Unified CM Administration, choose **Device** > **Device Settings** > **Device Profile**.

**Step 2**    Perform one of the following tasks:

- Click **Find** to modify the settings and choose an existing device profile from the resulting list.

> • Click **Add New** to add a new device profile and choose an option from the **Device Profile Type**. Click **Next**.
>
> • Choose a device protocol from the **Device Protocol** drop-down list and click **Next**.

**Step 3**    Configure the fields. For more information on the fields and their configuration options, see Online Help.

**Step 4**    Click **Save**.

**Step 5**    From the **Association Information** section, click **Add a new DN**.

**Step 6**    In the **Directory Number** field, enter the directory number and click **Save**.

**Step 7**    Click **Reset** and follow the prompts.

# Associate a Device Profile to a User

Associate a device profile to users so that they can access their settings from a different phone. You associate a user device profile to a user in the same way that you associate a physical device.

**Tip**    You can use the Bulk Administration Tool (BAT) to add and delete several user device profiles for Cisco Extension Mobility at one time. See the Bulk Administration Guide for Cisco Unified Communications Manager.

**Procedure**

**Step 1**    From Cisco Unified CM Administration, choose **User Management** > **End User**.

**Step 2**    Perform one of the following tasks:

> • Click **Find** to modify the settings for an existing user, enter search criteria, and choosing an existing user from the resulting list.
>
> • Click **Add New** to add a new user.

**Step 3**    Under **Extension Mobility**, locate the device profile that you created and move it from **Available Profiles** to **Controlled Profiles**.

**Step 4**    Check the **Home Cluster** check box.

**Step 5**    Click **Save**.

# Subscribe to Extension Mobility

Subscribe IP phones and device profiles to the extension mobility service so that users can log in, use, and log out of extension mobility.

**Procedure**

**Step 1**    Perform one of the following tasks from Cisco Unified CM Administration:

- Choose **Device** > **Phone**, specify search criteria, click **Find**, and choose a phone which users will use for extension mobility.
- Choose **Device** > **Device Settings** > **Device Profile**, specify search criteria, click **Find**, and choose the device profile that you created.

**Step 2** From the **Related Links** drop-down list, choose **Subscribe/Unsubscribe Services**, and then click **Go**.

**Step 3** From the **Select a Service** drop-down list, choose the **Extension Mobility** service.

**Step 4** Click **Next**.

**Step 5** Click **Subscribe**.

**Step 6** Click **Save** and close the popup window.

# Configure Roaming for Extension Mobility Users

Use this procedure to give Extension Mobility users the ability to roam between different clusters in an ILS network, while using the same login credentials. To do this, you must assign the selected users to the **Standard EM Roaming Across Clusters Super Users** access control group.

**Before you begin**

An ILS network must have been set up as ILS is used to replicate user and login information across the clusters.

**Procedure**

**Step 1** From Cisco Unified CM Administration, choose **User Management** > **User Settings** > **Access Control Group**.

**Step 2** Click **Find** and select the **Standard EM Roaming Across Clusters Super Users** group.

**Step 3** Click **Add End Users to Group** button. The **Find and List Users** pop-up window appears.

**Step 4** Click **Find** and select all the users to whom you want to provide roaming ability.

**Step 5** Click **Add Selected**.

# Extension Mobility Roaming Across Clusters Interactions and Restrictions

### Extension Mobility Roaming Across Clusters Interactions

This section lists the interactions of the Extension Mobility Roaming across Cluster with other Cisco Unified Communications Manager Administration components.

- Extension Mobility

- Inter-Cluster Lookup Service (ILS)

**Extension Mobility Roaming Across Clusters Restrictions**

This section lists the restrictions of the Extension Mobility Roaming across Cluster with other Cisco Unified Communications Manager Administration components.

• If the hub ILS is down, the spokes connected to it will not synchronize until the hub is back.

# Different Types of Extension Mobility

The following table lists the different types of Extension Mobility features available in Cisco Unified Communications Manager and their differences.

*Table 1: Differences Between EM, EMCC, and Extension Mobility Roaming Across Cluster*

| | Extension Mobility (EM) | Extension Mobility Cross Cluster (EMCC) | Extension Mobility Roaming Across Cluster |
|---|---|---|---|
| Description | Allows users to temporarily access their phone settings from other phones in the same cluster. | Allows users to access their phone settings from a phone in another cluster. | Allows user to roam across other clusters using own login credentials. |
| When the user logs in to a phone in another cluster | N/A | The remote cluster phone registers to the user's home cluster, accessing the settings in the home cluster. | The roaming cluster phone registers in the roaming cluster only. |
| Intercluster | Single cluster only | Multiple clusters | Multiple clusters |
| Configuration | Single cluster only | EMCC must be configured in the home cluster and each cluster that the user visit. | Extension Mobility Roaming must be configured in all the cluster. |
| User Information | Single cluster only | Must be maintained in all clusters. | Superuser information maintained in all the cluster. |

# Extension Mobility Roaming Across Clusters Troubleshooting

This section provides information about error codes for EMApp and EMService.

# Authentication Error

**Problem** "Error 201 Authentication Error" appears on the phone.

**Solution** The user should check that the correct user ID and PIN were entered; the user should check with the system administrator that the user ID and PIN are correct.

# Blank User ID or PIN

**Problem** "Error 202 Blank User ID or PIN" appears on the phone.

**Solution**  Enter a valid user ID and PIN.

# Busy Please Try Again

**Problem** "Error 26 Busy Please Try Again" appears on the phone.

**Solution**  Check whether the number of concurrent login and logout requests is greater than the **Maximum Concurrent requests** service parameter. If so, lower the number of concurrent requests.

**Note**  To verify the number of concurrent login and logout requests, use the Cisco Unified Real-Time Monitoring Tool to view the Requests In Progress counter in the Extension Mobility object. For more information, see the Cisco Unified Real-Time Monitoring Tool Administration Guide at http://www.cisco.com/c/en/us/support/ unified-communications/unified-communications-manager-callmanager/products-maintenance-guides-list.html

# Database Error

**Problem** "Error 6 Database Error" appears on the phone.

**Solution**  Check whether a large number of requests exists. If a large number of requests exists, the Requests In Progress counter in the Extension Mobility object counter shows a high value. If the requests are rejected because of a large number of concurrent requests, the Requests Throttled counter also shows a high value. Collect detailed database logs.

# Dev Logon Disabled

**Problem** "Error 22 Dev Logon Disabled" appears on the phone.

**Solution**  Verify that you checked the **Enable Extension Mobility** check box in the **Phone Configuration** window (**Device** > **Phone**).

# Device Name Empty

**Problem** "Error 207 Device Name Empty" appears on the phone.

**Solution**  Check that the URL that is configured for Cisco Extension Mobility is correct. See the Related Topics section for more information.

**Related Topics**

Configure the Cisco Extension Mobility Phone Service

# EM Service Connection Error

**Problem** "Error 207 EM Service Connection Error" appears on the phone.

**Solution** Verify that the Cisco Extension Mobility service is running by selecting **Tools** > **Control Center—Feature** in Cisco Unified Serviceability.

# Host Not Found

**Problem** The "Host Not Found" error message appears on the phone.

**Solution** Check that the Cisco Tomcat service is running by selecting **Tools** > **Control Center—Network Services** in CIsco Unified Serviceability.

# HTTP Error

**Problem** HTTP Error (503) appears on the phone.

**Solution**

- If you get this error when you press the **Services** button, check that the Cisco IP Phone Services service is running by selecting **Tools** > **Control Center—Network Services** in Cisco Unified Serviceability.
- If you get this error when you select Extension Mobility service, check that the Cisco Extension Mobility Application service is running by selecting **Tools** > **Control Center—Network Services** in Cisco Unified Serviceability.

# Phone Resets

**Problem** After users log in or log out, their phones reset instead of restarting.

**Possible Cause** Locale change is the probable cause of the reset.

**Solution** No action is required. If the user locale that is associated with the logged-in user or profile is not the same as the locale or device, after a successful login the phone will restart and then reset. This pattern occurs because the phone configuration file is rebuilt.

# Phone Services Unavailable After Login

**Problem** After logging in, the user finds that the phone services are not available.

**Possible Cause** This problem occurs because the user profile had no services associated with it when it was loaded on the phone.

**Solution**

- Ensure that the user profile includes the Cisco Extension Mobility service.
- Change the configuration of the phone where the user is logged in to include Cisco Extension Mobility. After the phone is updated, the user can access the phone services.

# Phone Services Unavailable After Logout

**Problem** After a user logs out and the phone reverts to the default device profile, the phone services are no longer available.

**Solution**

- Verify that the **Synchronization Between Auto Device Profile and Phone Configuration** enterprise parameter is set to **True**.
- Subscribe the phone to the Cisco Extension Mobility service.

# User Logged in Elsewhere

**Problem** "Error 25 User Logged in Elsewhere" appears on the phone.

**Solution** Check whether the user is logged in to another phone. If multiple logins must be allowed, ensure that the **Multiple Login Behavior** service parameter is set to **Multiple Logins Allowed**.

# User Profile Absent

**Problem** "Error 205 User Profile Absent" appears on the phone.

**Solution** Associate a device profile to the user.