



## Synchronizing Mobility Services Engines

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This chapter describes how to synchronize Cisco WLCs and the Prime Infrastructure with Cisco Mobility Services Engines.



### Note

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The Mobility Services Engines, Synchronize Services, Synchronization History, High Availability, Context Aware Notifications, and MSAP pages on the Services tab are available in Release 7.3.101.0.

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## Synchronizing the Prime Infrastructure and Mobility Services Engines

This section describes how to synchronize the Prime Infrastructure and Mobility Services Engines manually and automatically.



### Note

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The Services > Synchronize Services page is available only in the virtual domain in Release 7.3.101.0 and later.

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After adding a MSE to the Prime Infrastructure, you can synchronize network designs (campus, building, floor, and outdoor maps), controllers (name and IP address), specific Catalyst 3000 series and 4000 series switches, and event groups with the MSE.

- **Network Design**—A logical mapping of the physical placement of access points throughout facilities. A hierarchy of a single campus, the buildings that comprise that campus, and the floors of each building constitute a single network design.
- **Cisco WLC**—A selected Cisco WLC that is associated and regularly exchanges location information with a MSE. Regular synchronization ensures location accuracy.
- **Wired Switches**—Wired Catalyst switches that provide an interface to wired clients on the network. Regular synchronization ensures that location tracking of wired clients in the network is accurate.
  - The MSE can be synchronized with Catalyst stackable switches (3750, 3750-E, 3560, 2960, IE-3000 switches), switch blades (3110, 3120, 3130, 3040, 3030, 3020), and switch ports.
  - The MSE can also be synchronized with the following Catalyst 4000 series switches: WS-C4948, WS-C4948-10GE, ME-4924-10GE, WS-4928-10GE, WS-C4900M, WS-X4515, WS-X4516, WS-X4013+, WS-X4013+TS, WS-X4516-10GE, WS-X4013+10GE, WS-X45-SUP6-E, and WS-X45-SUP6-LE.
- **Event Groups**—A group of predefined events that define triggers that generate an event. Regular synchronization ensures that the latest defined events are tracked. Event groups can also be created by third-party applications. For more information on third-party application created event groups, see the [Configuring Automatic Database Synchronization and Out-of-Sync Alerts, on page 5](#).
- **Third Party Elements**—When you synchronize elements with MSE, there might be event groups on the MSE that have been created by third-party applications. You can either delete the unused elements or mark them as third-party elements.
- **Service Advertisements**—Mobile Concierge Service provides service advertisements on mobile devices. This shows the service advertisement that is synchronized with the MSE.

## Prerequisites for Synchronizing Mobility Services Engine

- Be sure to verify software compatibility between the Cisco WLC, Prime Infrastructure, and the Mobility Services Engine before synchronizing. See the latest Mobility Services Engine release notes at the following URL: [http://www.cisco.com/en/US/products/ps9742/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/ps9742/tsd_products_support_series_home.html)
- Communication between the MSE, Prime Infrastructure, and the Cisco WLC is in Coordinated Universal Time (UTC). Configuring NTP on each system provides devices with UTC time. The MSE and its associated controllers must be mapped to the same NTP server and the same Prime Infrastructure server. An NTP server is required to automatically synchronize time between the controller, Prime Infrastructure, and the MSE. However, the timezone for MSE and controller should still be set to UTC. This is because wIPS alarms require MSE and controller time to be set to UTC.

## Working with Third-Party Elements

When you synchronize elements with MSE, there might be event groups on the MSE that have been created by third-party applications. You can either delete the unused elements or mark them as third-party elements.

## Deleting the Elements or Marking Them as Third-Party Elements

To delete the elements or mark them as third-party elements, follow these steps:

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- Step 1** Choose **Services > Synchronize Services**.  
The Network Designs page appears.
- Step 2** In the Network Designs page, choose **Third Party Elements** from the left sidebar menu.  
The Third Party Elements page appears.
- Step 3** Select one or more elements.
- Step 4** Click one of the following buttons:
- **Delete Event Groups**—Deletes the selected event groups.
  - **Mark as 3rd Party Event Group(s)**—Marks the selected event groups as third-party event groups.
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## Synchronizing Cisco WLC with a Mobility Services Engine

This section describes how to synchronize a Cisco WLCs, assign an MSE to any Cisco WLCs and also to unassign a network design, Cisco WLCs, wired switch, or event group from a Mobility Services Engine.

- [Assigning and Synchronizing Network Designs, a Cisco WLC, Catalyst Switch, or Event Group, on page 3](#)
- [Assigning an MSE to the Cisco WLC, on page 4](#)
- [Unassigning a Network Design, Wired Switch, or Event Group from MSE, on page 5](#)

## Assigning and Synchronizing Network Designs, a Cisco WLC, Catalyst Switch, or Event Group

To synchronize network designs, a Cisco WLC, a Catalyst switch, or event group with the Mobility Services Engine, follow these steps:

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- Step 1** Choose **Services > Synchronize Services**.  
The left sidebar menu contains the following options: **Network Designs**, **Controllers**, **Event Groups**, **Wired Switches**, **Third Party Elements**, and **Service Advertisements**.
- Step 2** From the left sidebar menu, choose the appropriate menu options.
- Step 3** To assign a network design to a MSE, in the Synchronize Services page, choose **Network Designs** from the left sidebar menu.

The Network Designs page appears.

- Step 4** Select all the maps to be synchronized with the MSE by selecting the corresponding **Name** check box.
- Note** Through Release 6.0, you can assign only up to a campus level to a MSE. Starting with Release 7.0, this option is granular to a floor level. For example, you can choose to assign floor1 to MSE 1, floor2 to MSE 2, and floor3 to MSE 3.
- Step 5** Click **Change MSE Assignment**.
- Step 6** Select the MSE to which the maps are to be synchronized.
- Step 7** Click either of the following in the MSE Assignment dialog box:

- **Synchronize**—Synchronizes the MSE assignment.
- **Cancel**—Discards the changes to MSE assignment and returns to the Network Designs page.

You can also click **Reset** to undo the MSE assignments.

**Note** A network design may include a floor in a campus or a large campus with several buildings, each monitored by a different MSE. Because of this, you may need to assign a single network design to multiple MSEs. The network design assignments also automatically pick up the corresponding Cisco WLC for synchronization.

- Step 8** Click **Synchronize** to update the MSE(s) database(s).  
When items are synchronized, a green two-arrow icon appears in the Sync. Status column for each synchronized entry. You can use the same procedure to assign wired switches or event groups to a MSE. To assign a Cisco WLC to a MSE, see the [Synchronizing Cisco WLC with a Mobility Services Engine](#) for more information.

**Note** It is important to have a clock sync between the WLC and MSE to ensure proper synchronization. If synchronization fails, check if the two devices share the same NTP clock source.

## Assigning an MSE to the Cisco WLC

To assign a Mobility Services Engine with any Cisco WLC on a per-service basis (CAS or wIPS), follow these steps:

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- Step 1** Choose **Services > Synchronize Services**.
- Step 2** In the Network Designs page, choose **Controller** from the left sidebar menu.
- Step 3** Select the Cisco WLCs to be assigned to the Mobility Services Engine by selecting the corresponding **Name** check box.
- Step 4** Click **Change MSE Assignment**.
- Step 5** Choose MSEs dialogue box appears. You can choose **CAS**, **wIPS** or **MSAP** option.
- Step 6** Choose the MSE to which the Cisco WLCs must be synchronized.
- Step 7** Click either one of the following in the Choose MSEs dialog box:
- **Synchronize**—Synchronizes the MSE assignment.
  - **Cancel**—Discards the changes to MSE assignment and returns to the **Controllers** page.

You can also click **Reset** to undo the MSE assignments.

**Step 8** Click **Synchronize** to complete the synchronization process.

**Step 9** Verify that the MSE is communicating with each of the Cisco WLCs for only the chosen service. This can be done by clicking the NMSP status link in the status page.

**Note** After synchronizing a Cisco WLC, verify that the timezone is set on the associated Cisco WLC.

**Note** Controller names must be unique for synchronizing with a MSE. If you have two Cisco WLCs with the same name, only one is synchronized. You can use the same procedure to assign Catalyst switches or event groups to a MSE.

**Note** A switch can be synchronized with only one MSE. However, a MSE can have many switches attached to it.

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## Unassigning a Network Design, Wired Switch, or Event Group from MSE

To unassign a network design, controller, wired switch, or event group from a Mobility Services Engine, follow these steps:

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**Step 1** Choose **Services > Synchronize Services**.

**Step 2** From the left sidebar menu, choose the appropriate menu options.

**Step 3** Select one or more elements by selecting the **Name** check box, and click **Change MSE Assignment**. The Choose MSEs dialog box appears.

**Step 4** On the respective tabs, choose one or more elements, and click **Change MSE Assignment**.

**Step 5** Unselect the MSE if you do not want the elements to be associated with that MSE by selecting either the **CAS** or **MSAP** check box.

**Step 6** Click **Synchronize**. The Sync Status column appears blank.

**Step 7** Click **Cancel** to discard the changes to MSE assignment and to return to the Controllers page.

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## Configuring Automatic Database Synchronization and Out-of-Sync Alerts

Manual synchronization of the Prime Infrastructure and Mobility Services Engine databases is immediate. However, future deployment changes (such as changes to maps and access point positions) can yield incorrect location calculations and asset tracking until resynchronization.

To prevent out-of-sync conditions, use the Prime Infrastructure to carry out synchronization. This policy ensures that synchronization between the Prime Infrastructure and MSE databases is triggered periodically and any related alarms are cleared.

Any change made to one or more of any synchronized component is automatically synchronized with the MSE. For example, if a floor with access points is synchronized with a particular MSE and then one access point is moved to a new location on the same floor or another floor that is also synchronized with the MSE, then the changed location of the access point is automatically communicated.

To further ensure that the Prime Infrastructure and MSE are in sync, smart synchronization happens in the background.

- [Configuring Automatic Database Synchronization](#), on page 6
- [Smart Controller Assignment and Selection Scenarios](#), on page 6
- [Out-of-Sync Alarms](#), on page 7

## Configuring Automatic Database Synchronization

To configure smart synchronization, follow these steps:

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- Step 1** Choose **Administration > Background Tasks**.
- Step 2** Select the **Mobility Service Synchronization** check box and click the **Mobility Service Synchronization** link. The Mobility Services Synchronization page appears.
- Step 3** To set the Mobility Services Engine to send out-of-sync alerts, select the Out of Sync Alerts **Enabled** check box.
- Step 4** To enable smart synchronization, select the Smart Synchronization **Enabled** check box.
- Note** Smart synchronization does not apply to elements (network designs, controllers, or event groups) that have not yet been assigned to a MSE. However, out-of-sync alarms are still generated for these unassigned elements. For smart synchronization to apply to these elements, you must manually assign them to a MSE.
- Note** When a MSE is added to a Prime Infrastructure, the data in the Prime Infrastructure is always treated as the primary copy that is synchronized with the MSE. All synchronized network designs, controllers, event groups, and wired switches that are present in the MSE and not in the Prime Infrastructure are removed automatically from MSE.
- Step 5** Enter the time interval, in minutes, that the smart synchronization is to be performed. By default, the smart-sync is enabled.
- Step 6** Click **SubmitSave**.  
For Smart controller assignment and selection scenarios, see the [Smart Controller Assignment and Selection Scenarios](#), on page 6.
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## Smart Controller Assignment and Selection Scenarios

### Scenario 1

If a floor having at least one access point from a controller is chosen to be synchronized with the Mobility Services Engine in the Network Designs menu of the Synchronize Services page, then the controller to which that access point is connected is automatically selected to be assigned to the Mobility Services Engine for CAS service.

#### Scenario 2

When at least one access point from a controller is placed on a floor that is synchronized with the Mobility Services Engine, the controller to which the access point is connected is automatically assigned to the same MSE for the CAS service.

#### Scenario 3

An access point is added to a floor and assigned to a MSE. If that access point is moved from controller A to controller B, then controller B is automatically synchronized to the MSE.

#### Scenario 4

If all access points placed on a floor that is synchronized to the MSE are deleted, then that controller is automatically removed from the MSE assignment or unsynchronized.

## Out-of-Sync Alarms

Out-of-sync alarms are of the minor severity (yellow), and are raised in response to the following conditions:

- Elements are modified in the Prime Infrastructure (the auto-sync policy pushes these elements).
- Elements other than Cisco WLCs exist in the Mobility Services Engine database but not in the Prime Infrastructure.
- Elements are not assigned to any MSE (the auto-sync policy does not apply).

Out-of-sync alarms are cleared when the following occurs:

- The MSE is deleted



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**Note** When you delete a MSE, the out-of-sync alarms for that system are also deleted. In addition, if you delete the last available MSE, the alarm for the following event: “elements not assigned to any server” is deleted.

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- Elements are synchronized manually or automatically
- User manually clears the alarms (although the alarms may reappear in the future when the scheduled task is next executed)

## Viewing the Status of Mobility Services Engine Synchronization

You can use the Synchronize Services feature in the Prime Infrastructure to view the status of network design, controller, switch, and event group synchronization with a Mobility Services Engine.

- [Viewing the Status of Mobility Services Engine Synchronization, on page 8](#)
- [Viewing Synchronization History, on page 8](#)

## Viewing the Status of Mobility Services Engine Synchronization

To view the synchronization status, follow these steps:

**Step 1** Choose **Services > Synchronize Services**.

**Step 2** From the left sidebar menu, choose **Network Designs, Controllers, Wired Switches, Third Party Elements, or Service Advertisements**.

For each of the elements, the Sync. Status column shows the synchronization status. A green two-arrow icon indicates that its corresponding element is synchronized with the specified server such as a Mobility Services Engine. A gray two-arrow icon with a red circle indicates that its corresponding item is not synchronized with a provided server.

The Message column shows the reason for failure if the elements are out of sync.

You can also view the synchronization status at **Monitor > Maps > System Campus > Building > Floor**.

where *Building* is the building within the campus and *Floor* is a specific floor in that campus building.

The MSE Assignment option on the left sidebar menu shows which Mobility Services Engine the floor is currently assigned to. You can also change the Mobility Services Engine assignment in this page.

## Viewing Synchronization History

You can view the synchronization history for the last 30 days for a Mobility Services Engine. This is especially useful when automatic synchronization is enabled as alarms are automatically cleared. Synchronization history provides a summary of those cleared alarms.

To view synchronization history, choose **Services > Synchronization History**. The Synchronization History page appears. The following table lists the Synchronization History Page parameters.

**Table 1: Synchronization History Page**

Text Boxes	Description
Timestamp	The date and time at which the synchronization has happened.
Server	The Mobility Services Engine server.
Element Name	The name of the element that was synchronized.
Type	The type of the element that was synchronized.
Sync Operation	The sync operation that was performed. It can either be an Update, Add, or Delete.
Generated By	The method of synchronization. It can either be Manual or Automatic.



Text Boxes	Description
Status	The status of the synchronization. It can be either Success or Failed.
Message	Any additional message about the synchronization.

