# Alcatel-Lucent 8.10.0.0 Mobility Conductor Licensing Guide

**Alcatel·Lucent** *A*

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# Contents

The following table lists the revisions of this document.

**Table 1:** *Revision History*

| Revision | Change Description |
|---|---|
| Revision 02 | Updated the **License Types and Usage** and **Adding License in Mobility Conductor Deployment** sections. |
| Revision 01 | Initial release. |

As part of advancing Alcatel-Lucent Enterprise's commitment to racial justice, we are taking a much-needed step in overhauling ALE engineering terminology to reflect our belief system of diversity and inclusion. Some legacy products and publications may continue to include terminology that seemingly evokes bias against specific groups of people. Such content is not representative of our ALE culture and moving forward, ALE will replace racially insensitive terms and instead use the following new language:

| Usage | Old Language | New Language |
|---|---|---|
| Campus Access Points + Controllers | Master-Slave | Conductor-Member |
| Instant Access Points | Master-Slave | Conductor-Member |
| Switch Stack | Master-Slave | Conductor-Member |
| Wireless LAN Controller | Mobility Master | Mobility Conductor |
| Firewall Configuration | Blacklist, Whitelist | Denylist, Allowlist |
| Types of Hackers | Black Hat, White Hat | Unethical, Ethical |

This document describes the add-on licenses supported by AOS-W.

## Contacting Support

**Table 2:** *Contact Information*

| Contact Center Online | |
|---|---|
| Main Site | https://www.al-enterprise.com |
| Support Site | https://myportal.al-enterprise.com |
| Email | ebg_global_supportcenter@al-enterprise.com |
| **Service & Support Contact Center Telephone** | |
| North America | 1-800-995-2696 |
| Latin America | 1-877-919-9526 |
| EMEA | +800 00200100 (Toll Free) or +1(650)385-2193 |
| Asia Pacific | +65 6240 8484 |
| Worldwide | 1-818-878-4507 |

AOS-W supports a variety of optional add-on licenses that enhance the base OS and provide advanced features such as wireless intrusion protection, advanced cryptography, policy-based traffic management and controls, web content classification, and stateful user firewalls.

This section describes AOS-W license types and licensing features and lists the procedures to configure a licensing solution.

## Learn more about Licenses and Licensing Features

Select any of the links below to view detailed information about AOS-W license types, licensing features and examples of deployment topologies that support these features.

- License Types and Usage on page 11
- Centralized Licensing on page 7
- Licensing Pools on page 17
- WebCC Operation modes on page 14
- Best Practices and Limitations on page 16

## Configure a Licensing Management Solution

The following sections describe the procedures to configure centralized licensing clusters and licensing pools, and to add, remove, and monitor individual licenses.

- Creating and Managing Licensing Pools on page 20
- License Installation on page 24
- Adding License to Stand-alone Switch on page 27
- Associating Mobility Conductor or Stand-alone Switch to External License Server on page 29
- Removing License on page 31

## Centralized Licensing

AOS-W supports a centralized licensing architecture, which allows a group of managed devices to share a pool of licenses. A primary and backup Mobility Conductor can share a single set of licenses, eliminating the need for a redundant license set on the backup server. Managed Devices maintain information sent from Mobility Conductor, even if the managed device and Mobility Conductor can no longer communicate.

AOS-W now supports centralized licensing architecture in IPv6 network also, where a local Switch containing IPv4 or IPv6 address acts as the license client and communicates with the license server containing IPv6 address to obtain the available licenses. The centralized licensing information is sent between license server and license client through heartbeat messages based on UDP. With the introduction of IPv6 address support, the heartbeat messages between the license server and license client must use IPv6 address as source and destination IP address.

NOTE

The license server now supports both IPv4 and IPv6 address clients. However, you cannot configure both IPv4 and

IPv6 addresses and must configure either IPv4 address or IPv6 address as license server IP address.

The License Server must run an equal or higher version of AOS-W software than that of the license clients.

This section describes the following licensing features:

- [Supported Topologies on page 8](#)
- [Licensing Pools on page 17](#)
- [Mobility Conductor Redundancy on page 9](#)
- [Communication between the License Server and License Clients on page 10](#)
- [Failover Behaviors on page 10](#)

## Supported Topologies

AOS-W 8.x supports centralized licensing for the following topologies, where:

- a Mobility Conductor acts as a licensing server to all its associated managed devices, stand-alone Switches, or another Mobility Conductor acting as a licensing client.
- a stand-alone Switch acts as a licensing server to other stand-alone Switches.

## License Pools

Mobility Conductor uses licensing pools to distribute licenses to a large number of managed devices across geographic locations. By default, all managed devices associated to Mobility Conductor share a single global pool of all the sharable licenses added to that Mobility Conductor. However, AOS-W also allows you to create additional licensing pools at a configuration node, allowing a group of managed devices at or below that configuration level to share licenses among themselves, but not with other groups.

**NOTE**

The following example shows how licenses can be allocated within one or more license pools. The following examples use only AP licenses for simplicity, but the same methodology applies to all sharable licenses. For more information and additional examples for licensing pool types, see [Licensing Pools on page 17](#).

If you create a license pool for the configuration node **/USA**, as shown in [Figure 1](#), the four managed devices below this node use licenses from the **/USA** pool, while the other managed devices continue to use the global pool. If the **/USA** license pool is allocated 40 of the 100 AP licenses installed on Mobility Conductor, the four managed devices using the **/USA** pool can share 40 AP licenses from Mobility Conductor. The global license pool now contains only 60 of the AP licenses from Mobility Conductor.

**Figure 1** *Managed Nodes Use Global or Custom License Pools*
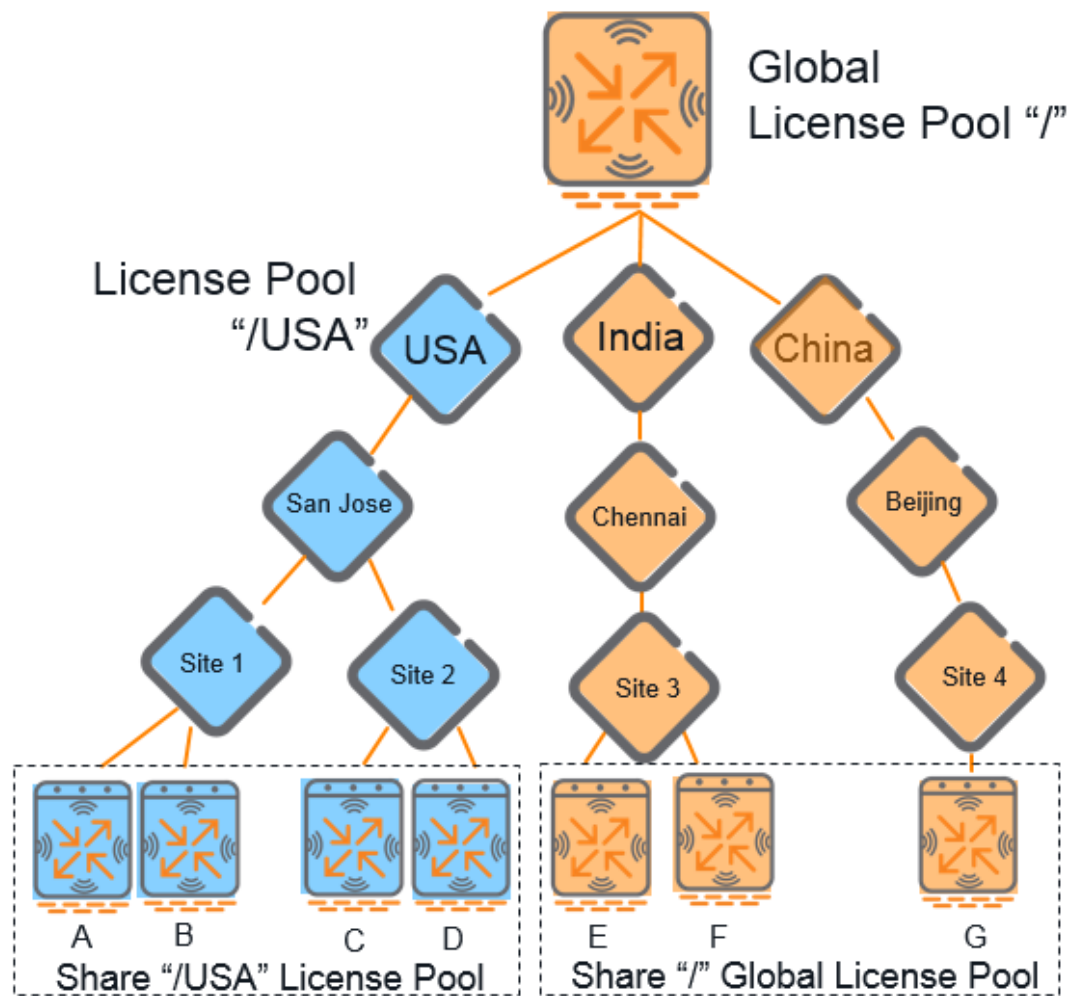


## Mobility Conductor Redundancy

A primary and backup Mobility Conductor connected on the same broadcast domain using the Virtual Router Redundancy Protocol (VRRP) can share a single set of licenses. Managed devices on the network connect to Mobility Conductor using the VRRP virtual IP address configured for that set of redundant servers. The primary Mobility Conductor uses the configured virtual IP address by default. However, if the primary Mobility Conductor becomes unavailable, the secondary Mobility Conductor will take ownership of the virtual IP address, allowing managed devices to retain seamless connectivity to a Mobility Conductor device.

> Only one backup Mobility Conductor can be defined for each primary Mobility Conductor.

To configure the automatic database synchronization period between the primary and backup Mobility Conductor, access the mobility conductor node hierarchy via the command-line interface and run the command **database synchronized period <time-interval>**.

For example,

```
(host) [mynode] (config) #change-config-node mm
(host) [mm] (config) #database synchronize period 25
```

The example below shows a primary and backup license server connected using VRRP. Licenses must be installed on the primary Mobility Conductor, but are shared between that redundant pair. If the primary Mobility Conductor had 32 AP licenses, 32 PEFNG licenses, and 32 xSec licenses installed, both Mobility Conductors

would share a combined global pool of 32 AP, 32 PEFNG, and 32 xSec licenses. By default, any managed devices connected to this pair of redundant servers use licenses from this shared license pool.

### Communication between the License Server and License Clients

The sharable licenses for all managed devices associated with a Mobility Conductor are managed through the Mobility Conductor license table. The information in this table is then shared with all managed devices as a pool of available licenses. When a managed device uses a license in the available pool, it communicates this change to the Mobility Conductor, which updates the license pool information, and sends the updated information to the managed devices.

If a Switch had previously installed sharable licenses before it was added to a Mobility Conductor as a managed device, those licenses are no longer usable on a managed device. These license keys must be added to the Mobility Conductor and then Mobility Conductor WebUI and then assign them to the Managed node.

Those license keys must be regenerated and associated with to a managed device or licensing pool using the Mobility Conductor WebUI.

When a new AP associates with managed devices, the managed devices sends updated licensing information to Mobility Conductor. Mobility Conductor then recalculates the available total for that pool, and sends the revised license count back to the managed devices. If a managed device uses an AP license from the license pool, it also consumes a PEFNG and an RFProtect license from the pool, even if that AP has not enabled any features that would require that license. A managed device cannot use more licenses than what is supported by its Switch platform, regardless of how many licenses are available in the license pool.

## Multi-Version Licensing

Starting from AOS-W 8.2.0.0, Mobility Conductor supports multi-version licensing, which allows a managed device to run a different version of AOS-W 8.x software than the primary (and backup) Mobility Conductor. If a license is introduced in a newer version of AOS-W, Mobility Conductor can still distribute licenses to licensing clients running an older version of AOS-W, even if the managed device does not recognize the newer license type.

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**NOTE:** In Mobility Conductor Redundancy, the standby Mobility Conductor becomes the standby license server. You must enable database synchronization on both active and standby Mobility Conductors for the license database to synchronize.

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## Failover Behaviors

Managed devices can continue to operate as usual in the event that a managed device fails to contact the Mobility Conductor. The following sections describe failover behaviors.

# Mobility Conductor Fails Over to a Backup Mobility Conductor

If the primary Mobility Conductor fails, the backup Mobility Conductor will retain the shared license limits until the backup Mobility Conductor reboots. If both the primary and the backup Mobility Conductor fail, or if the backup Mobility Conductor reboots before the primary Mobility Conductor comes back up, managed devices will retain the license limits sent to them by Mobility Conductor for 30 days.

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**NOTE:** Although a managed device retains its licensing information for 30 days after it loses contact with the Mobility Conductor, if the managed device reboots at any time during this 30-day window, the window will restart, and the managed device will retain its information for another 30 days.

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# Mobility Conductor Must be Replaced

If you need to replace a stand-alone Mobility Conductor, the keys installed on the previous Mobility Conductor must be regenerated and added to the new Mobility Conductor. You do not need to reinstall keys on Mobility

Conductor if it is using a redundancy solution with a backup Mobility Conductor, as the replacement Mobility Conductor will synchronize its licensing database with the backup Mobility Conductor once the replacement Mobility Conductor comes back online.

## Mobility Conductor is Unreachable

If a managed device does not receive three consecutive heartbeats from the Mobility Conductor, it assumes that Mobility Conductor is down, but continues to use the licenses it received from its Mobility Conductor license pool. When a managed device is unable to reach a license server for 30 consecutive days, it removes any shared licenses pushed to it from Mobility Conductor. If the 30-day window has passed and the managed device does not have enough installed licenses for all of its associated APs, the managed device will nonetheless continue to support each AP. However, when an AP reboots and its managed device does not have enough licenses that AP will not come up.

| NOTE | For more information on replacing a managed device, see the *AOS-W 8.10.0.0 User Guide*. |

## Managed Device is Unreachable

Mobility Conductor sends keepalive heartbeats between the license server and the licensing client Switches every 30 seconds. If Mobility Conductor fails to receive three consecutive heartbeats from a client, it assumes that the licensing client is down, and that any APs associated with that client are also down or have failed over to another Switch. Therefore, Mobility Conductor adds any licenses used by that client back into the available pool of licenses.

| NOTE | The WebUI of the licensing client and Mobility Conductor display a warning message when a licensing client and Mobility Conductor are unable to communicate. |

## AP Fails Over to another Licensing Client

If an AP fails over from one client Switch to another, the AP will be allowed to come up even if there aren't sufficient licenses present on the backup Switch. APs continue to stay active until they reboot; however, if there are not sufficient available licenses to bring up an AP after it reboots, that AP will not become active.

# License Types and Usage

Licenses are platform independent and can be installed on any Switch. Installation of the feature license unlocks that feature's functionality for the maximum capacity of the Switch. Table 3 lists the license types and describes how licenses are consumed on the Switches.

**Table 3:** *Usage per License Type*

| License | Usage Basis | What Consumes One License |
|---------|-------------|---------------------------|
| AP | AP | An AP license is required for each operational LAN-connected, mesh, or remote AP that is advertising at least one BSSID (virtual-AP). |
| ACR | Client Session | This license enables AOS-W Advanced Cryptography (ACR) features. A license is required for each active client termination using Suite-B algorithms or protocols. |

| License | Usage Basis | What Consumes One License |
|---|---|---|
| **PEF** | AP | One operational AP using one or more Policy Enforcement Firewall (PEF) features, such as intelligent application identification, policy-based traffic management and controls, or stateful user firewalls.<br>The PEF license was called PEF-NG in some previous versions of AOS-W. |
| **PEFV** | Switch | The PEFV license allows a network administrator to apply firewall policies to clients using a VPN to connect to the Switch. Starting in AOS-W 8.2.0.0, a sharable VIA license is introduced that supports Alcatel-Lucent VIA clients on a per-session basis. The legacy PEFV license is purchased as a single license that enables the functionality up to the full user capacity of the Switch. |
| **RFprotect** | AP | An RFProtect (RFP) license is required for each operational AP using one or more RF Protect features, such as spectrum analysis and Wireless Intrusion Protection (WIP). |
| **MM** | Associated device (Switch/AP) | Starting with AOS-W 8.0.1.0, the MM license is required to support Switches or APs on Mobility Conductor. If the Mobility Conductor does not have sufficient MM licenses and an AP fails to obtain a license, that AP can get an IP address and connect to its Switch, but will not broadcast an SSID.<br><br>**NOTE:** You must activate your Mobility Conductor (MM) license **before** you activate your MM-VA-XX licenses via the LMS website. If you activate a MC-VA-XXS license before the MM license, the Mobility Conductor passphrase becomes associated to the device using the MC-VA-XX license, and doesn't allow you to use the passphrase to activate the MM license for Mobility Conductor. |
| **HMM** | Mobility Conductor Hardware Appliance | Only MM-VA license is pre-installed on a Mobility Conductor Hardware Appliance running AOS-W 8.1.0.0 or later. |
| **MC-VA-US<br>MC-VA-JP<br>MC-VA-IL<br>MC-VA-EG<br>MC-VA-RW** | AP | The MC-VA-XX license is a sharable license required to terminate APs on a virtual Switch, and which replaces the VMC license available in previous version of AOS-W 8.x. Starting with AOS-W 8.1.0.0, different MC-VA-XX license types enable APs to support regional channels for the following countries:<br>■ MC-VA-US: United states<br>■ MC-VA-JP: Japan<br>■ MC-VA-IL: Israel<br>■ MC-VA-EG: Egypt<br>■ MC-VA-RW: Rest of the world (all other countries) |
| **VIA** | Client Session | Each Virtual Intranet Access (VIA) or 3rd party VPN client consumes a single VIA license. VIA licenses are not consumed for site-to-site VPNs. If a managed device or standalone Switch has a PEFV license, that device will not consume VIA licenses from a licensing pool, as a single PEFV license supports all VIA and 3rd party VPN clients, up to the full user capacity for that device.<br>The VIA license has the following advantages over the PEFV license:<br>■ It is a per user license and hence users can buy the exact count based on their scale needs.<br>■ It supports centralized licensing and hence the licenses can be distributed to the managed devices from a centralized licensing server based on the individual device needs.<br>■ It is a single SKU license and is platform independent. |

| License | Usage Basis | What Consumes One License |
|---|---|---|
| | | ■ It supports both hardware Switches and Mobility Controller Virtual Appliances. |
| WebCC | AP | The Web Content Classification (WebCC) license is a subscription-based, per-AP license that supports Web content classification features on an AP for the duration of the subscription period (up to 10 years per license. |

This section describes the following license types:

-
-
-

## Sharable vs Switch-Specific Licenses

Many licenses are consumed on a per-AP, or per-user basis, and are not unique to any specific hardware device. These sharable license types can be assigned to a licensing pool and used by any device within a group of managed devices. Non-sharable licenses is generated using a Switch serial number, and can only be used by the individual Switch for which it was generated. Both sharable and non-sharable licenses are installed using Mobility Conductor, allowing network administrators with root-level access to remotely add licenses to any licensing pool or managed devices on the network. For more information on adding a license to a remote managed device, see License Installation on page 24.

**Table 4:** *Sharable Licenses vs Switch-Specific Licenses*

| Sharable via a Licensing Pool | Switch-Specific License |
|---|---|
| AP | PEFV |
| ACR | |
| PEF | |
| RF Protect | |
| MC-VA-US MC-VA-JP MC-VA-IL MC-VA-EG MC-VA-RW | |
| MM | |
| VIA | |
| WebCC | |

## Evaluation vs Permanent Licenses

Each license can be either an evaluation or permanent license. A permanent license permanently enables the desired software module on a specific Alcatel-Lucent Switch. You obtain permanent licenses through the sales order process only. Permanent software license keys are sent to you via email.

An evaluation license allows you to evaluate the unrestricted functionality of a software module on a specific Switch for 90 days (in three 30-day increments). Evaluation licenses are added to Mobility Conductor and made sharable within a licensing pool. An expired evaluation license will remain in the license database until the Switch is reset using the command **write erase all**, where all license keys are removed. An expired evaluation license has no impact on the normal operation of the Switch, but it is kept in the license database to prevent abuse.

To determine your remaining time on an evaluation license, select the Alert flag ( ) in the WebUI title bar. The WebUI displays information about evaluation license status. When an evaluation period expires:

- The Switch automatically backs up the startup configuration and reboots itself at midnight (according to the system clock).

- All permanent licenses are unaffected. The expired evaluation license feature is no longer available and is displayed as **Expired** in the WebUI.

## Perpetual vs Subscription Licenses

A perpetual license is a purchased license that has no end date; once installed, it does not expire. Most purchased licenses are perpetual licenses. The Web Content and Classification (WebCC) license is a subscription license that enables WebCC features only for the duration of the subscription (1,3,5,7 or 10 years). The subscription time period starts from the time license key is generated from the licensing Web site. After the license expiration date is passed, the license continues to operate as an active license for an extended grace period of 120 days. After this final grace period elapses, the license permanently expires.

Thirty days before the license period expires, an alert appears in the WebUI banner and a message appears in the **Mobility Conductor > Configuration > License** page of the WebUI, warning the user that the license is ready to expire. The **Mobility Conductor Licenses** page also indicates if the subscription license has expired but is in the expiration grace period, and displays the number of remaining days in the grace period.

> Subscription licenses cannot be renewed. Once a license subscription expires, a new license subscription key must be generated and installed on Mobility Conductor.

Starting with AOS-W 8.0.1.0, if one or more subscription WebCC licenses expire so that a Switch has fewer active WebCC subscription licenses than AP licenses, that Switch will no longer be able to download WebCC updates from the cloud or perform classification using cloud lookup. The APs associated to that device, can, however, continue to use the cached WebCC date currently on the Switch. For more information on the behavior of the WebCC feature due to expired licenses, see .

# WebCC Operation modes

The Web Content Classification (WebCC) license allows all web traffic to be classified and allows the managed device to apply firewall policies based on Web content category and reputation. The category and reputation data for each URL is obtained from an external WebRoot Server. The WebCC feature can operate in two distinct modes which control whether the Managed Device or Mobility Conductor performs the WebCC content lookup tasks.

## Centralized Mode

In the default **centralized** Mode, only Mobility Conductor downloads the URL entry database from the WebRoot Server. If a URL for Web traffic sent through the managed device does not appear in its datapath cache, the managed device sends a query request to Mobility Conductor. Mobility Conductor queries the WebRoot Server, adds the response to its database, then sends information about the URL back to the managed device.

WebCC license usage is calculated for each license pool, and the total count in each pool is sent to each managed device within that pool. If the WebCC licenses expire, or fewer WebCC licenses are available than AP

licenses, then individual managed devices within that pool will no longer be able to send query requests to Mobility Conductor, and WebCC classification will be blocked.

> In the event that WebCC classification is blocked due to expired or insufficient licenses, individual managed devices will continue to classify requested URLs currently available in the managed device datapath cache until the cache entries time out (usually over a period of 24 to 96 hours, depending upon the reputation level of the URL).

## Distributed Mode

In **distributed** mode, each individual managed device downloads the complete URL entry database (approximately 22 MB) directly from the WebRoot Server. If a URL for Web traffic sent through the managed device does not appear in this database, the managed device sends a query to the WebRoot Server, then adds the response its datapath cache.

WebCC license usage is calculated for each license pool, and the total count in each pool is sent to each managed device within that pool. If the WebCC licenses expire, or fewer WebCC licenses are available than AP licenses, then individual managed devices within that pool will no longer be able to send new query requests to the WebRoot server. However, the WebCC feature continue to classify requested URLs that are already in the URL entry database on the managed device.

## Setting and Monitoring the WebCC Operation Modes

To change a managed device from the default centralized WebCC mode to distributed mode, or to revert the WebCC feature back to the default centralized mode, access that the configuration node for that managed device and issue the following command:

```
(host)[mynode](config) #webcc distributed|centralized
```

To see if the WebCC feature is able to send queries from Mobility Conductor to the WebRoot server in the cloud, issue the command **show web-cc status**.

```
(host)[mynode](config) #show web-cc status
Web Content Classification Status
--------------------------------
Service Status
------- ------
Web Content Classification enabled :    Yes
DNS/Name Server configured :            Yes
URL Cloud lookup server reachable :     Yes
Mode:                                   MM
Cloud lookup/update available :         Yes
```

A status of **Yes** in the **Cloud lookup/update field** indicates that license pool for that configuration node has a sufficient number of unexpired Web Content Classification licenses. A status of **No** indicates that licenses have expired, or that there are not enough licenses for the managed devices in that pool. The **Mode** field indicates operational mode for the WebCC feature. If the managed device is in the default centralized WebCC mode, Mobility Conductor contacts the WebRoot server for URL queries. If the managed device is in distributed mode, the managed device contacts the WebRoot server directly.

# Using WebCC in Wired-Only Topology

The WebCC feature is most commonly used in network topologies that supports wireless clients. A wireless topology requires a WebCC license to be installed on Mobility Conductor, enabled via the root licensing pool, and also requires that the number of WebCC licenses on Mobility Conductor is equal to or greater than the number of AP licenses on Mobility Conductor. However, if you use WebCC in a topology with only wired clients connected to a VPN concentrator (VPNC) or a managed device, then you can use the WebCC feature without installing a WebCC license just by enabling this feature via the root licensing pool. Note, however, that the WebCC feature is *not* supported if there are any AP licenses on Mobility Conductor in this type of wired-only topology, as the number of WebCC licenses (in this case, 0) must still be equal to or greater than the number of AP licenses.

# Best Practices and Limitations

The following best practices and limitations apply to AOS-W licenses:

- New licenses can only be associated to a managed device via the Mobility Conductor WebUI or command-line interfaces. Licenses cannot be added directly to a managed device.

- If a Switch had previously installed sharable licenses before it was added to Mobility Conductor as a managed device, those licenses are no longer usable on a managed device. Those license keys must be regenerated, added to Mobility Conductor, and assigned to the managed device or licensing pool using the Mobility Conductor WebUI.

- When allocating licenses, allow for the maximum quantity of licenses required at any given time. A common estimate when calculating user licenses is 20 users per AP. Do not forget to consider occasional large assemblies or gatherings.

- Before you upgrade or make database changes to Mobility Conductor, back up its configuration (**backup flash**) and its license database (**license export** *filename.db*).

- Rebooting, resetting, or issuing the **write erase** command on Mobility Conductor does not affect its license key management database. However, issuing the **write erase all** command resets the device to a factory default state and deletes all databases, including the license key management database. If you reset Mobility Conductor to its factory default state, you must reinstall all previously-installed license keys.

- Abnormal tampering of the Mobility Conductor or managed device system clock can disable evaluation licenses on that device. This can disable the features supported by this license, and affect network services.

- The Advanced Cryptography (ACR) license includes the following caveats:

- On a platform that supports 2048 IPsec tunnels, the maximum number of Suite B IPsec tunnels supported is 2048, even if a larger capacity license is installed.

- ACR licenses are cumulative. For example, if you want to support 2048 Suite B connections, you can install two ACR licenses that support 1024 connections each.

- If your Mobility Conductor or managed device uses an ACR license that allows fewer IPsec tunnels that is supported by that device platform, that device can still support IPsec tunnels using non-Suite B modes (for example, AES-CBC), up to the platform maximum.

- The ACR license allows Mobility Conductor or a managed device to use both IPsec Suite B and 802.11i Suite B connections simultaneously. The combined number of these sessions may not exceed the ACR license maximum.

- A single client using both 802.11i Suite B and IPsec Suite B connections will simultaneously consume two ACR licenses.

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**NOTE**

AOS-W provides the ability to move a license from one stand-alone Switch to another, for maximum flexibility in managing an organization's network and to minimize an RMA impact. Alcatel-Lucent monitors and detects license fraud. Abnormally high volumes of license transfers for the same license certificate to multiple devices can indicate a breach of the Alcatel-Lucent end user software license agreement and will be investigated.

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By default, all managed devices associated to the same Mobility Conductor share a global pool of licenses that includes all the sharable licenses added to the Mobility Conductor. However, AOS-W also allows you to create individual licensing pools at a configuration node, allowing managed devices below that node to share licenses amongst themselves but not with other managed devices.

This section describes the following license pools:

- Licensing Pool Topologies on page 17
- Creating and Managing Licensing Pools on page 20

## Licensing Pool Topologies

The following examples show how licenses can be allocated within one or more license pools. These examples use only AP licenses for simplicity, but the same methodology applies to all sharable licenses.

NOTE | For more information on licensing pool configuration, see Creating and Managing Licensing Pools on page 20

### Topology 1: Global Pool Only

In the topology shown in Figure 2 , all seven managed devices are part of the default "**/**" global license pool defined at the Mobility Conductor configuration root. The licenses installed on Mobility Conductor are all sharable between the managed devices using this global license pool. For example, if there are 100 AP licenses installed on the Mobility Conductor, all managed devices share the global pool of 100 AP licenses.

**Figure 2** *All Switches Use the Global License Pool*
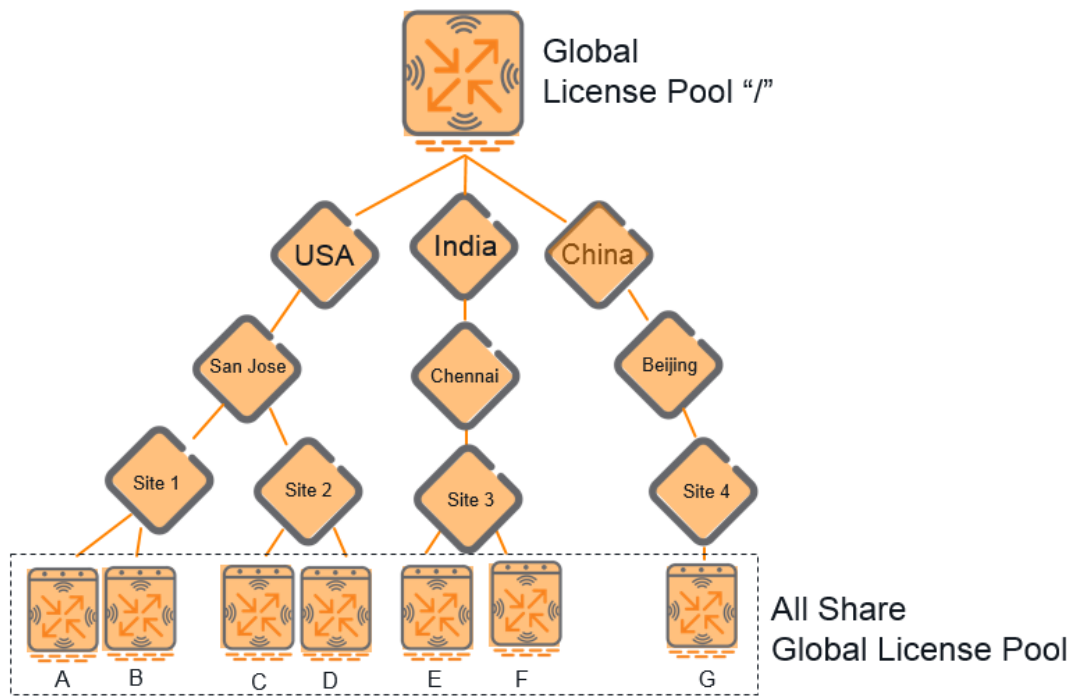


**Table 5:** *License Pool Allocation for Topology 1*

| Pool Name | Licenses from Mobility Conductor |
|---|---|
| **/ (Global pool)** | 100b |

## Topology 2: Global and Custom Pools

If you create a license pool for the configuration node **/USA**, as shown in Figure 3, the four managed devices below this node use licenses from the **/USA** pool, while the other managed devices continue to use the global pool. In the previous example, all managed devices shared a single pool of 100 licenses. If the **/USA** license pool is allocated 40 of the 100 AP licenses installed on Mobility Conductor, the four managed devices using the **/USA** pool can share 40 AP licenses from Mobility Conductor. The global license pool now contains only 60 of the AP licenses from the Mobility Conductor.

**Figure 3** *Switches Use Global or Custom License Pools*
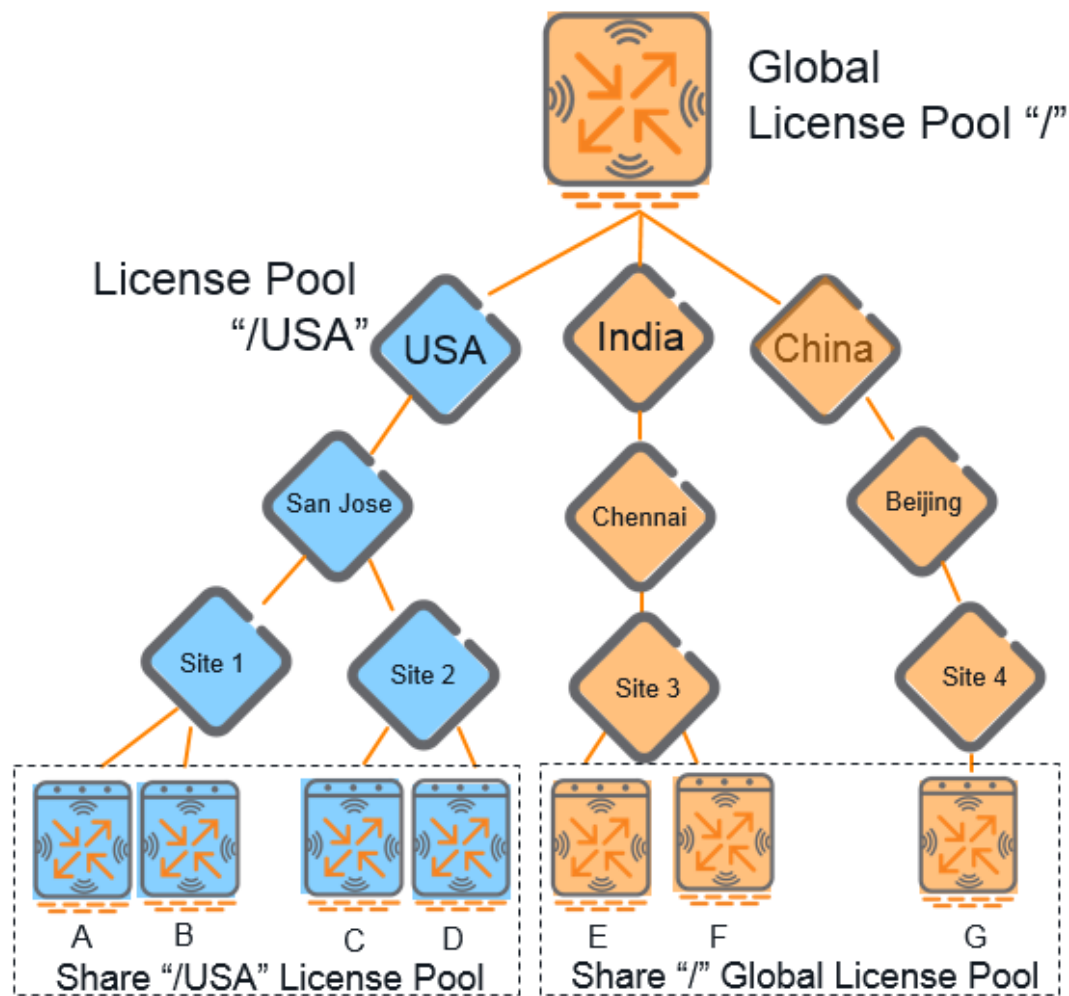


**Table 6:** *License Pool Allocation for Topology 2*

| Pool Name | AP Licenses from Mobility Conductor |
|---|---|
| **/ (Global pool)** | 60 |
| **/USA** | 40 |

## Topology 3: All Custom Pools

If you create a separate license pool for each second-level configuration node, as shown in Figure 4, none of the managed devices is associated with the global license pool. All licenses installed on Mobility Conductor must be allocated to one of the three pools (/USA, /India or /China), or those licenses will not be used.

**Figure 4** *All Switches Use a Custom License Pool*
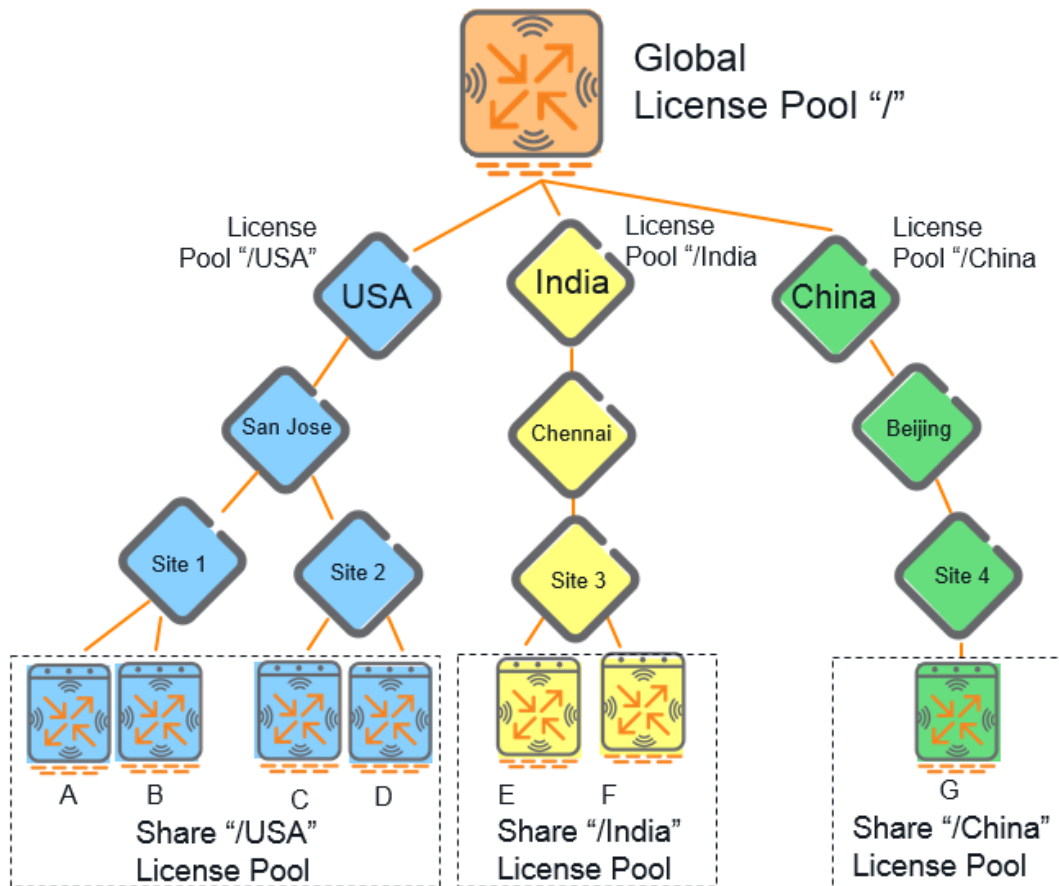


If 40 of the 100 AP licenses installed on the Mobility Conductor are allocated to the **/USA** pool, 35 AP licenses are allocated to the **/India** pool, and 25 AP licenses are allocated to the **/China** pool, the licenses available to the managed devices within each pool will vary, as shown in .

**Table 7:** *License Pool Allocation for Topology 3*

| Pool Name | AP Licenses from Mobility Conductor |
|---|---|
| **/ (Global pool)** | 0 |
| **/USA** | 40 |
| **/India** | 35 |
| **/China** | 25 |

# Creating and Managing Licensing Pools

This section describes how to create and manage licensing pools.

> **NOTE**
>
> Starting with AOS-W 8.0.1.0, centralized licensing is supported on standalone controllers, and is enabled by default. Standalone Switches running AOS-W 8.0.0.0 require that licenses are directly to that individual Switch using the **license add** command.

# Before you Begin

If your network includes a Switch running an earlier version of AOS-W that supported the installation of licenses directly on that device, make a note of the licenses installed on that legacy device before you upgrade to AOS-W 8.0.0.0 or later. If you add that Switch as a managed device under a Mobility Conductor, those locally installed licenses will become inactive and you will need to regenerate those keys and reinstall them via the Mobility Conductor.

This section contains the following information:

- Adding Sharable License to Global License Pool on page 21
- Creating and Managing Local License pool on page 21
- Adding Non-sharable License to Managed Device on page 23

## Adding Sharable License to Global License Pool

The following steps describe the procedure to add a sharable license to the global licensing pool on a Mobility Conductor.

> **NOTE**
>
> When adding a license, you must enable the global licensing pool in the WebUI, or issue the **licensing-pool-profile-root** command to enable licensing features using the command-line interface before that license can be used. Only AP licenses and VIA license are enabled by default when those licenses are added to Mobility Conductor, all other licenses must be manually enabled. For more information on the specific commands to enable individual license types, see Adding Sharable License to Global License Pool on page 21.

You can add a sharable license to the global license pool using the WebUI or CLI.

### In the WebUI

To add a license via the Mobility Conductor WebUI:

1. In the **Mobility Conductor** node hierarchy, navigate to **Configuration > License > Manual**.
2. Click **+** below the **Global License Pool** table. The **Install Licenses** window appears.
3. In the **Install Licenses** window, enter the license key for one or more licenses. Each license key must be on a separate line.
4. Click **OK**.
5. Click **Apply.**
6. Click **Pending Changes**.
7. In the **Pending Changes** window, select the check box and click **Deploy changes**.

### In the CLI

From any configuration node, issue the command **license add <key>**.

Example:

```
(host)[mynode](config) #license add lnZSpC2vkLMlJw8KVYdgj2
```

## Creating and Managing Local License pool

When you add a local license pool to a configuration node, those licenses in that local pool are reserved for that configuration node, and usable only for managed devices at or below the level of configuration.

> **NOTE**
>
> For an overview of global and local license pool usage, see Licensing Pools on page 17.

You can create and manage local license pools using the WebU or CLI.

### In the WebUI

1. In the **Mobility Conductor** node hierarchy, navigate to **Configuration > License**.

2. Select the **License Usage** sub-tab. The **License Usage** table appears, showing the numbers of licenses currently used for each Mobility Conductor configuration node.

3. Select the configuration node for which you want to create a local license pool.

4. Select the **Enable Local License Pool** option below the license usage table. Another table appears below the **License Usage** table, showing the numbers of sharable licenses currently allocated to that license pool. If this is the first time you have enabled a local license pool on this configuration node, this table shows zero allocated licenses for all license types.

5. Click the allocated licenses value for any license type to change the number of licenses in that license pool. The **Allocate Licenses** window opens, displaying the number of available licenses that are free to be allocated to a local pool.

6. Enter the number of permanent and/or evaluation licenses to be added to the selected pool, then click **Done**.

7. Repeat steps 6-7 as required to allocate licenses for other license types.

8. Click **Apply.**

9. Click **Pending Changes**.

10. In the **Pending Changes** window, select the check box and click **Deploy changes**.

Starting with AOS-W 8.1.0.0, local license pools are shown as separate pools at the same level as the global licensing pool, instead of within the global licensing hierarchy, to better indicate that those licenses are removed from the global pool.

> **NOTE**
>
> In AOS-W 8.0.1.0 and later releases, the Global License Pool table displays license usage statistics for each configuration pool, as well as the license usage for the devices associated to those license pools. In AOS-W 8.0.0.0, the Global license pool table does not display license usage data at the device level.

## In the CLI

From the **/mm** node, you can add a local configuration pool for the specified configuration node using the following command:

```
(host)[mm] (config) #license-pool-profile <profile>
  (host)[mm] (License pool profile "<profile>")# acr-licenses {eval key <key> <num>}|<num>
  (host)[mm] (License pool profile "<profile>")# ap-licenses {eval key <key> <num>}|<num>
  (host)[mm] (License pool profile "<profile>")# license-pool-path <license-pool-path>
  (host)[mm] (License pool profile "<profile>")# mc-va-licenses-eg {eval key <key>
  <num>}|<num>}
  (host)[mm] (License pool profile "<profile>")# mc-va-licenses-il {eval key <key>
  <num>}|<num>}
  (host)[mm] (License pool profile "<profile>")# mc-va-licenses-jp {eval key <key>
  <num>}|<num>}
  (host)[mm] (License pool profile "<profile>")# mc-va-licenses-rw {eval key <key>
  <num>}|<num>}
  (host)[mm] (License pool profile "<profile>")# mc-va-licenses-us {eval key <key>
  <num>}|<num>}
  (host)[mm] (License pool profile "<profile>")# mm-license {eval key <key> <num>}|<num>
  (host)[mm] (License pool profile "<profile>")# pefng-licenses {eval key <key>
  <num>}|<num>
  (host)[mm] (License pool profile "<profile>")# rfp-licenses {eval key <key> <num>}|<num>
  (host)[mm] (License pool profile "<profile>")# via-licenses {eval key <key> <num>}|<num>
  (host)[mm] (License pool profile "<profile>")# webcc-licenses {eval key <key> <num>}|
  {subscript key <key> <num>}
```

Example:

```
(host)[mm] (config) #license-pool-profile Southwest
(host)[mm] (License pool profile "Southwest") #license-pool-path /USA/southwest
(host)[mm] (License pool profile "Southwest") #ap-licenses 64
```

```
(host)[mm] (License pool profile "Southwest") #pefng-licenses 64
(host)[mm] (License pool profile "Southwest") #rfp-licenses 64
```

After you create the license pool, you must issue the license-pool-profile-root command to enable shared license features within the global licensing pool.

```
(host) [mm](config) #license-pool-profile-root
(host) [mm](License root(/) pool profile) #acr-license-enable
```

> **NOTE**
>
> The AP, Mobility Conductor, and virtual mobility controller (mc-va-xx) licenses are automatically enabled for their specific device type. VIA licenses are also enabled by default and do not need to be manually enabled within the global licensing pool.

# Adding Non-sharable License to Managed Device

Non-sharable licenses are generated using the serial number of a specific device, and can only be assigned to the device for which they were created. A non-sharable license is associated to an individual managed device using the Mobility Conductor WebUI or command-line interfaces. You can add non-sharable license to managed device using the WebUI or CLI.

## In the WebUI

To add a license via the Mobility Conductor WebUI:

1. In the **Mobility Conductor** node hierarchy, navigate to **Configuration > License**.
2. Select the **Manual**.
3. Select the managed device to which you want to add a license.
4. The **Licenses** table appears, showing the licenses currently associated to that device.
5. Click **+** below the **Licenses** table.
6. Enter the serial number for one or more licenses. Each license key must be on a separate line.
7. Click **OK**.
8. Click **Apply.**
9. Click **Pending Changes**.
10. In the **Pending Changes** window, select the check box and click **Deploy changes**.

## In the CLI

Navigate to the configuration for the managed device for which you want to add a license, then issue the command **license add <key>**.

Example:

```
(host) [group/node/managed-node-14]# license add lnZSpC2vkLMlJw8KVYdgj2
```

This chapter describes how to add a license in a Mobility Conductor deployment and stand-alone Switch. It also describes how to associate a Mobility Conductor or a stand-alone Switch to an external license server and how to remove a license.

# Adding License in Mobility Conductor Deployment

Starting in AOS-W 8.0.0.0, the only way to install a license in a Mobility Conductor deployment is to install that device on Mobility Conductor, and then associate that license to either a specific managed device, or a shared pool of licenses. Licenses cannot be added directly to a managed device via the managed device's UI.

Before you can use the Alcatel-Lucent Software License Management Web site to generate licenses for Mobility Conductor and your managed devices , you must obtain the following:

- A License Certificate ID, which you can request from your sales account manager or authorized reseller. The different MC-VA-XX license types are each region-specific, so ensure that your license order specifies the country where the virtual Switch will be deployed. (For details, see License Types and Usage )
- The auto-generated AOS-W passphrase for Mobility Conductor
- The auto-generated AOS-W passphrase for any managed device installed on a server VM (virtual Switch)
- The serial numbers of your physical Switches
- Access to the Alcatel-Lucent licensing Web site at https://licensing.alcateloaw.com/

---

You must activate your Mobility Conductor license **before** you activate your MM-VA-XX licenses via the LMS website. If you activate a MC-VA-XX license before the MM license, the Mobility Conductor passphrase becomes associated to the device using the MC-VA-XX license, and doesn't allow you to use the passphrase to activate the MM license for Mobility Conductor.

---

All licenses installed in the Mobility Conductor will be invalidated and will not be added to license pool if **license server-ip <ip-addr>** is configured on them. Ensure to transfer the licenses and install them to license server to use them.

---

This section describes the following procedures:

## Identifying Passphrase of Mobility Conductor

Use the Mobility Conductor passphrase in the licensing website to generate a Mobility Conductor (MM) license, or to generate a sharable license that can be added to Mobility Conductor license pools.

- To identify the Mobility Conductor passphrase, access Mobility Conductor via the command-line interface and issue the command **show license passphrase**.

- *(For Mobility Conductor devices running AOS-W 8.0.0.0 only)*: To identify the Mobility Conductor serial number, access Mobility Conductor via the command-line interface and issue the command **show inventory**.

## Identifying Serial Number and Passphrase of Managed Devices

Each managed device has a unique identifier that you can use to create a non-sharable, device-specific license for that managed device. A physical Switch uses a serial number, and a virtual Switch installed on a VM uses an auto-generated VM passphrase.

- To identify the serial number of a physical Switch or a virtual Switch, access that managed device via the command-line interface and issue the command **show inventory**.
- To identify the VM passphrase for a virtual Switch installed on a server VM, access that managed device via the command-line interface and issue the command **show license passphrase.**

## Enabling Sharable Licensing Features on Mobility Conductor

You must enable Mobility Conductor to support sharable AOS-W licenses by enabling each licensing feature type via the Mobility Conductor WebUI or command-line interfaces. Enabling a licensing feature in Mobility Conductor activates all licenses of that type in all licensing pools, allowing managed devices to use that licensing feature.

NOTE | Best practices is to perform this step before you install your sharable licenses. Installed sharable licenses will not become active until these license features are enabled.

You can enable sharable licensing features on Mobility Conductor using the WebUI or CLI.

### In the WebUI

To enable a sharable license via the Mobility Conductor WebUI:

1. In the **Mobility Conductor** node hierarchy, navigate to **Configuration > License > Manual**.

2. Select the **License Usage** tab. The **Global License Pool** and **Usage for Global License Pool** tables appear.

3. In the **Usage for Global License Pool** table, click the check box by each license type to enable features supported by those licenses.

NOTE | The AP, Mobility Conductor, virtual mobility controller licenses are automatically allocated for their specific device type. These licenses do not need to be enabled within the global licensing pool.

### In the CLI

Access the Mobility Conductor command-line interface in config mode and execute the following command:

```
(host)[mm] (config) # license-pool-profile-root acr-feature-enable|pefng-feature-enable|rfp-
feature-enable|webcc-feature-enable
```

## Creating License Key

The procedures to create a license key vary, depending upon the license type. Sharable licenses and, the license required to install Mobility Conductor on a server VM must be generated using the Mobility Conductor passphrase. Device-specific licenses for physical Alcatel-LucentSwitches are generated using the serial number for that Switch. Device-specific licenses for virtual Switches installed on a server VM are generated using the passphrase for that virtual managed device.

Use the following procedure to create a license key via the HPE Alcatel-Lucent License Management Website.

1. From the HPE Alcatel-Lucent License Management website, select **Register License** from the navigation menu.

2. In the **Order number or Registration ID/Certificate ID** field, enter the certificate ID(s) you received from your Alcatel-Lucent sales representative or reseller, then click **Next**.

3. Enter the required information to identify the device that will use the license. This can be the device MAC address, country where the VM is installed, serial number or IP address, depending upon the device or license type.

> **NOTE**
>
> *(For AOS-W 8.1.0.0 and later only)* If you are creating a sharable or MM license key for an AOS-W 8.0.0.0 Mobility Conductor, you must also enter the Mobility Conductor serial number

> **NOTE**
>
> *(For AOS-W 8.0.0.0 only)* If you are creating a sharable or MM license key for an AOS-W 8.0.0.0 Mobility Conductor, you must also enter the Mobility Conductor serial number

4. Click **Next** to display the licensing agreement.

5. Select **I accept all of the above terms** to accept the license agreement, then click **Finish** to display a table of license products for that order.

6. In the product order table, select the product name for the license you want to activate.

7. In the **Redeem** field, enter the number of available licenses you would like to redeem for that product, from one license to the maximum quantity available.

8. Click **Next** to display the confirmation page. This page displays transaction details and includes options to download the license key or have the key sent to a specified email address.

9. *(Optional)* Click **Register More** to return to the **Register License** navigation menu, or select **Register More for this order** to return to the product order table for the previous order and activate additional licenses for that order.

## Installing Licenses

Use the Mobility Conductor WebUI and command-line interfaces to add sharable license keys to the global licensing pool, or to assign a non-sharable license to a specific managed device.

After you receive the email with your license key, add a sharable license key to the global licensing pool or install a device-specific license.

### Adding Sharable License Key to Global License Pool

You can add a sharable license key to the global license pool using the WebUI or CLI.

#### In the WebUI

To add a sharable license via the Mobility Conductor WebUI:

1. In the **Mobility Conductor** node hierarchy, navigate to **Configuration > License > Manual**.

2. Select the **License Inventory** tab. Select the license type of MM.

3. Click + below the **Key** table. The **Install Licenses** window appears.

4. In the **Install Licenses** window, enter the serial number for one or more licenses. Each license key must be on a separate line.

5. Click **OK**.

6. Click **Apply**.

7. Click **Pending Changes**.

8. In the **Pending Changes** window, select the check box and click **Deploy changes**.

The **Key** table displays detailed information about the licenses added to Mobility Conductor, including the license type and count, expiration date (if applicable) and current status (active or expired).

**In the CLI**

From any configuration node, execute the command **license add <key>**.

Example:

```
(host)[mynode] #license add lnZSpC2vkLMlJw8KVYdgj2
```

## Adding Device-Specific License

You can add a device-specific license by using the WebUI of CLI.
**In the WebUI**

1. In the **Mobility Conductor** node hierarchy, navigate to **Configuration > License > Manual**.

2. Select the **License Inventory** tab.

3. Select the **Controller Licenses** table appears.

4. Expand the **Root** menu in the **Controller Licenses** table to select the device or Mobility Conductor server on which you want to install the device-specific license. The license table for the selected device appears below the **Controller Licenses** table.

5. Click **+** below the device licenses table. The **Install Licenses** window appears.

6. In the **Install Licenses** window, enter the serial number for one or more licenses. Each license key must be on a separate line.

7. Click **OK**.

8. Click **Pending Changes**.

9. In the **Pending Changes** window, select the check box and click **Deploy changes**.

**In the CLI**

To add a device-specific license (such as a PEF-V license) in AOS-W 8.0.1.0 and later, navigate to the Mobility Conductor (mm) configuration node and issue the command **license remote remote-ip-addr <addr> add <key>**, where <remote-ip-addr> is the address of the managed device to which you are adding the license.

For example:

```
(host)[mm] #license remote remote-ip-addr 192.0.2.14 add lnZSpC2vkLMlJw8KVYdgj2
```

> **NOTE**
> In AOS-W 8.0.0.0, the command to add a license is **license remote ip-addr <ip-addr> add <key>**. The **remote-ip-addr** parameter was introduced to this command in AOS-W 8.0.1.0.

# Adding License to Stand-alone Switch

You can use the Alcatel-Lucent Software License Management website to generate all the licenses for a stand-alone Switch, or associate a stand-alone controller to an external licensing server.

Before you can use the Alcatel-Lucent Software License Management website to generate a license for a stand-alone Switch, you must obtain the following:

- A License Certificate ID, which you can request from your sales account manager or authorized reseller.

- The serial number of the Alcatel-Lucent Switch.

- Access to the Alcatel-Lucent licensing Web site https://licensing.alcateloaw.com/

This section describes the following procedures:

- Enable Licensing Features on Stand-Alone Switch on page 28
- Generate License Key on page 28

## Enable Licensing Features on Stand-Alone Switch

Enable support for sharable AOS-W licenses on a stand-alone Switch by enabling each licensing feature type via the Switch command-line interface. You can skip this step if you are generating a non-sharable license for a specific managed device, as the licensing features for a multi-Switch topology must be enabled via Mobility Conductor.

Best practices is to perform this step before you install licenses on the Switch. Installed licenses will not become active until the license feature is enabled.

All licenses installed in stand-alone controllers will be invalidated and will not be added to license pool if **license server-ip <ip-addr>** is configured on them. Ensure to transfer the licenses and install them to license server to use them.

Access the command-line interface of the stand-alone Switch and execute the following command:
```
(host)[node](config) # license-pool-profile-root acr-feature-enable|pefng-feature-
enable|rfp-feature-enable|webcc-feature-enable.
```

## Generate License Key

Use the following procedure to create a license key for a specific Switch using the certificate ID, and device serial number.

1. From the HPE Alcatel-Lucent License Management website, select **Register License** from the navigation menu.

2. In the **Order number or Registration ID/Certificate ID** field, enter the certificate ID(s) you received from your Alcatel-Lucent sales representative or reseller, then click **Next**.

3. Enter the required information to identify the device that will use the license. Depending upon the device or license type, this can be the device MAC address, serial number or IP address,

*(For AOS-W 8.0.0.0 only)* If you are creating a sharable or MM license key for an AOS-W 8.0.0.0 Mobility Conductor, you must also enter the Mobility Conductor serial number

4. Click **Next** to display the licensing agreement.

5. Select **I accept all of the above terms** to accept the license agreement, then click **Finish** to display a table of license products for that order.

6. In the product order table, select the product name for the license you want to activate.

7. In  the **Redeem** field, enter the number of available licenses you would like to redeem for that product, from one license to the maximum quantity available.

8. Click **Next** to display the confirmation page. This page displays transaction details and includes options to download the license key or have the key sent to a specified email address.

9. *(Optional)* Click **Register More** to return to the **Register License** navigation menu, or select **Register More for this order** to return to the previous product order table and activate additional licenses for that order.

## Install Licenses

After you receive the email with your license key, use the following procedure to add a license key to the stand-alone Switch. Licenses for managed devices, even non-sharable, device-specific licenses, must be associated to the managed device via Mobility Conductor. You can install licenses using the WebUI or CLI.

In the WebUI

To add a license via the WebUI of a stand-alone Switch:

1. Access the Switch WebUI.

2. From the Mobility Controller configuration node, navigate to **Configuration > License**.

3. Select the **License Inventory** menu.

4. Select the License type and expand the licenses accordion.

5. Click **+** below the **Key** table. The **Install Licenses** window appears.

6. In the **Install Licenses** window, enter the serial number for one or more licenses. Each license key must be on a separate line.

7. Click **OK**.

### In the CLI

From the command-line interface of a stand-alone Switch, execute the command **license add <key>**.

Example:

```
(host)[mm](config) #license add lnZSpC2vkLMlJw8KVYdgj2
```

## Associating Mobility Conductor or Stand-alone Switch to External License Server

You can associate one or more stand-alone controllers or Mobility Conductors to an external license server, allowing the Switch or Mobility Conductor to obtain licenses from a license pool on that external server. If Mobility Conductor connects to a license server, that Mobility Conductor then acts a proxy license server, distributing licenses to the managed devices that are part of the root licensing pool on the Mobility Conductor server.

If you use an external license server, all primary and backup Mobility Conductor servers, and standalone Switches must be able to communicate with the external license server. Managed devices associated to Mobility Conductor do not need connectivity with the license server.

You can connect one or more stand-alone controllers or Mobility Conductors to an external license server in the following scenarios:

- Single Mobility Conductor and Local Switch in IPv6 Network
- Single Mobility Conductor and Local Switch in Mixed Network
- Multiple Mobility Conductors in IPv6 network
- Multiple Mobility Conductors in Mixed Network

### Single Mobility Conductor and Local Switch in IPv6 Network

The centralized licensing feature is supported in a single Mobility Conductor that acts as a centralized license server configured with IPv6 Switch IP address. A local Switch works as a license client that is configured with IPv6 controller IP address as shown in the following table:

**Table 8:** *Mobility Conductor and Local Switch in IPv6 matrix*

| License Server Controller IP | Licenses from Mobility Conductor | Compatible | License heartbeat transport from client to conductor |
|---|---|---|---|
| IPv4 + IPv6 address | IPv4 + IPv6 address | Yes | IPv6 address |

## Single Mobility Conductor and Local Switch in Mixed Network

The **CFGM** process of the License Manager upgrades the Mobility Conductor license server from IPv4 to IPv6 address before the Mobility Conductor license client IP address is upgraded to IPv6 address. The license server can have both IPv4 and IPv6 Switch IP addresses while the license client can have IPv4 Switch IP address only as shown in the following table:

**Table 9:** *Mobility Conductor and Local Switch in IPv4 IPv6 matrix*

| License Server Controller IP | Licenses from Mobility Conductor | Compatible | License heartbeat transport from client to conductor |
|---|---|---|---|
| IPv4 address only | IPv4 address only | Yes | IPv4 address |
| IPv4 + IPv6 address | IPv4 address only | Yes | IPv4 address |

NOTE

The License Manager supports IPv6 address only when you configure IPv4 address of the managed device. If no license server IP address is configured, the license client uses either IPv4 or IPv6 address of license server based on conductor IPv4 or conductor IPv6 address.

## Multiple Mobility Conductors in IPv6 network

The centralized licensing feature is now supported for multiple Mobility Conductors where a single Mobility Conductor acts as a license server that is configured with the IPv6 address of the Switch. The remaining Mobility Conductors The remaining act as relay servers that point to IPv6 license server.

**Table 10:** *Multiple Mobility Conductors in IPv6 matrix*

| License Server Controller IP | License Relay Server License Server IP | License Relay Server Controller IP | Compatible | License heartbeat transport from license relay server to license server |
|---|---|---|---|---|
| IPv4 + IPv6 address | IPv6 address only | IPv4 + IPv6 address | Yes | IPv6 address |

The centralized licensing feature also allows L3 redundant Mobility Conductors to be configured as relay servers. L3 redundantMobility Conductors support both IPv4 and IPv6 addresses.

NOTE

L3 redundant Mobility Conductors cannot be configured as licensing servers.

The relay servers and their license client Switches follow single Mobility Conductor and local IPv6 support network.

## Multiple Mobility Conductors in Mixed Network

The centralized licensing feature for multiple Mobility Conductors in a mixed network is supported in the following scenarios:

- When the license server is configured with IPv4 address of Switch, the remaining Mobility Conductors acting as relay servers can only work with IPv4 license server. However, the relay server itself can have IPv4 or IPv6 Switch IP configured.

- When the license server is configured with IPv6 address of Switch, the remaining Mobility Conductors acting as relay servers can work with IPv4 license server; and the relay server itself can have IPv4 or a combination of IPv4 and IPv6 Switch IP configured.

The following table describes the scenarios:

**Table 11:** *Multiple Mobility Conductors in IPv4 IPv6 matrix*

| License Server Controller IP | License Relay Server License Server IP | License Relay Server Controller IP | Compatible | License heartbeat transport from license relay server to license server |
|---|---|---|---|---|
| IPv4 address only | IPv4 address only | IPv4 + IPv6 address | Yes | IPv4 address |
| IPv4 + IPv6 address | IPv4 address only | IPv4 + IPv6 address | Yes | IPv4 address |

You can associate Mobility Conductor or stand-alone Switch to an external license server by using the WebUI or CLI.

The following procedure describes how to associate Mobility Conductor or stand-alone Switch to an external license server using the WebUI:

1. Before you begin, access the command-line interface Mobility Conductor and remove any unnecessary license pool profiles. For details, see Associating Mobility Conductor or Stand-alone Switch to External License Server on page 29.

2. From the Mobility Controller configuration node on a standalone Switch, or from the Mobility Conductor configuration node for a Mobility Conductor, navigate to **Configuration > License** page.

3. In the **License Management** option, select **External license server** radio button.

The **External License Server** fields are displayed.

4. Select either **IPv4** or **IPv6** radio button based on your preference.

5. In the **IP address** field, enter the IPv4 or IPv6 address of the external license server.

6. Click **Submit** to save your changes.

To associate Mobility Conductor with an external license server, run the **no license-pool-profile <profile>** command from the Mobility Conductor (mm) configuration node to remove any local license pools. Then, run the **license server-ip<ip-addr>|<ipv6-addr>** command to define the external server.

For example:
```
(host)[mm] (config) #no license-pool-profile /USA/southwest
(host)[mm] (config) #no license-pool-profile /USA/northeast
(host)[mm] (config) #no license-pool-profile /APAC/India
(host)[mm] (config) #no license-pool-profile /USA/Beijing
(host)[mm] (config) #license server-ip  2002::6
```

To view license usage details for standalone Switches or Mobility Conductor servers connected to an external licensing pool, run the **show license-usage client** command.

To associate a standalone Switch to an external license server, run the **license server-ip<ip-addr>|<ipv6-addr>** command to define the external server.

For example:
```
(host)[mm] (config) #license server-ip  10.1.1.91
```

# Removing License

You can use the WebUI or command-line interfaces to remove a license key from a stand-alone Switch or Mobility Conductor. You can remove a license by using the WebUI or CLI.

## In the WebUI

To remove a sharable license from Mobility Conductor:

1. In the **Mobility Conductor** node hierarchy, navigate to **Configuration > License > Manual**.

2. Click the **license Inventory** tab.

3. Click on the license you want to remove. The **licenses** table opens.

4. Select the license key you want to delete, then click the delete icon to the right of the highlighted key.

To remove a device-specific license from a managed device:

1. Navigate to the **Configuration > License** page .

2. Click the **License Inventory** tab.

3. Expand the root configuration group to display the Mobility Conductor configuration tree, then select the device with the license you want to delete. A list of non-sharable licenses used by that device appears below the Managed device Licenses table.

4. Select a license key from the list, and then click the delete icon to remove that license key.

5. Click **Apply**.

6. Click **Pending Changes**.

7. In the **Pending Changes** window, select the check box and click **Deploy changes**.

## In the CLI

To delete any license (sharable or non-sharable) via the command-line interface, access the Mobility Conductor (mm) configuration in enable mode, and then issue the command **license delete <key>**:

```
(host)[mm] #license delete lnZSpC2vkLMlJw8KVYdgj2
```

# Capacity Licenses

To enable the Capacity Licenses option through the WebUI, perform the following steps:

1. In the **Mobility Conductor** node hierarchy, navigate to **Mobility Conductor** > **Configuration** > **License.**

2. Select **Capacity Licenses** option for **License management**.

3. Select the MAC address of node for which the license needs to be installed.

4. Click **Deploy**.

The Alcatel-Lucent 9240 Switch supports capacity licensing. The license types are as follows:

- **Base model** - Base license
- **Silver** - Mid-range license
- **Gold** - Top range license

The following table lists the major differences in the license types supported on the Alcatel-Lucent 9240 Switch:

**Table 12:** *Table 1: License Types*

| Feature | Base Model | Silver | Gold |
|---|---|---|---|
| Number of Access Points | 512 | 1024 | 2048 |
| Number of Devices | 16,384 | 24,576 | 32,768 |

**Table 12:** *Table 1: License Types*

| Feature | Base Model | Silver | Gold |
| --- | --- | --- | --- |
| GRE Tunnels | 8,704 | 17,408 | 34,816 |
| Concurrent IPsec sessions | 16,384 | 24,576 | 32,768 |
| Route Cache Entries | 23,764 | 65,532 | 119,343 |
| Wired throughput (Gbps) | 20 | 30 | 40 |