Concepts, FAQs, and Information for Advanced Users

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Supported Browsers

Operating System	Supported Browsers and Versions
Microsoft Windows	• Internet Explorer 10 and later • Mozilla Firefox 33 and later • Google Chrome 38 and later
Apple Mac OS	• Safari 7 and later • Mozilla Firefox 33 and later • Google Chrome 38 and later

Cisco Mobility Express Controller Failover and Master AP Election Process

Mobility Express Controller Redundancy for Failover

In a Cisco Mobility Express network, not all APs have the capability to work as a master AP. See Supported Cisco Access Points to know which AP models are capable of working as a master AP.

In order to have Cisco Mobility Express controller redundancy to enable a failover, your network must have two or more active APs with master AP capability. In the event of a failover, one of these other APs will automatically be elected as a master. The newly elected Master will have the same IP and configuration as the original Master. From an administrator perspective, there will be no difference between the original Master and the newly elected Master in case of a failover.

Note Clients that connect to the master AP will lose connectivity during a failover.

Mobility Express Controller Forced Failover

In a Cisco Mobility Express network, not all APs have the capability to work as a master AP. See Supported Cisco Access Points to know which AP models are capable of working as a master AP.

You can manually force any AP, that has the capability to work as a master AP, to become the master AP. This forced failover of the master AP to another master-capable AP of your choice can be performed both using the GUI and the CLI.

To perform a forced failover using the GUI:

1. Choose **Wireless Settings > Access Points**.

   The **Access Points Administration** window is displayed.

2. Click the **Edit** icon adjacent to the AP you want to set as master.

   The **Edit** window with the **General** tab is displayed.

3. Under the **General** tab, next to the **Operating Mode field**, click **Make me Controller**.

Note For a master AP, the **Operating Mode** field shows *AP & Controller*. For other associated APs, this field shows *AP Only*. The **Make Me Controller** button is available only for subordinate APs that are capable of participating in the master election process.

To perform a forced failover using CLI, use the following command:

```
config ap next-preferred-master cisco-ap-name forced-failover
```

When you force the failover of the master to an AP of your choice, using the GUI or CLI methods, the current master AP reboots while the new AP takesover as the controller, with the IP address and configuration as the previous master. The previous master, after rebooting, comes back online and joins the new master AP as a subordinate AP.

Note Like any failover, this forced failover causes some downtime in the Cisco Mobility Express network. During this downtime, clients associated to APs that have the standalone feature enabled will not face any disruption in service. Clients of APs that do not have the standalone functionality enabled will be affected.

Master AP Election Process

In a Cisco Mobility Express network, when the master AP shuts down, one of the other master-capable APs in this deployment is automatically designated as the master AP. The automatic selection of the master AP among the Cisco Mobility Express-capable APs is as per an internal automatic master election process. This process is used to both detect the failure of the master AP and to designate the new master AP among the eligible APs. This process is based on Virtual Router Redundancy Protocol (VRRP) that algorithmically determines the next master AP, based on the following parameters listed in the order of descending precedence:

- The AP configured as VRRP master, using the VRRP command **config ap next-preferred-master** on the controller's CLI.
- The AP with the least load in terms of the number of associated clients associated.
- Among APs with a similar client load, the AP with the lowest MAC address.

Predownloading an Image to an Access Point

To minimize network outages, an upgrade software image is downloaded to the access point from the controller without resetting the access point or losing network connectivity. This means that, first the upgrade image to the controller is downloaded and then the image is downloaded to the access point while the network is still up. When the controller reboots, the access points are disassociated and reboot. The controller comes up first, followed by the access points, all with their upgraded images. Once the controller responds to the discovery request sent by an access point with its discovery response packet, the access point sends a join request.

Alternative Method for CAPWAP to Mobility Express Conversion

Note

- The recommended method is Converting from CAPWAP Lightweight AP to Cisco Mobility Express Software. The following is an alternative only in case the recommended method does not work.
- The following procedure shows a conversion from the 8.1.122.0 Lightweight AP release on an 1850 series AP, and hence uses the corresponding software file. Ensure that you use the appropriate software file depending on the release you are converting from and the AP model.

Tip If you face issues with converting the AP software to a Cisco Mobility Express software, upgrade the AP CAPWAP software to the latest AP software version ap3g3-k9w8-tar.153-3.JD.tar. Now, you can convert the CAPWAP software to the Cisco Mobility Express software *AIR-AP2800-K9-ME-8-3-102-0.tar*.

This issue occurs in Mobility Express-capable APs shipped with default images or a version of the images prior to Cisco Wireless Release 8.3. This is due to insufficient space in the AP's memory or because the AP has been started in U-boot mode where the image is not found in flash.

Step 1 Download the *AIR-AP1850-K9-ME-8-1-122-0.zip* software file from Cisco.com to the TFTP server.

On the Download Software page, for a given release, this .ZIP file is labeled, *"Access point image bundle, to be used for software update and/or supported access points images"*.

Step 2 Unzip the contents of the ZIP file to a directory on the TFTP server.

Step 3 Connect to the console port of the AP.

Step 4 Log in to the AP using the username **Cisco** and password **Cisco**. Both are case-sensitive.

This is the default factory-shipped username and password on all Cisco Aironet APs.

Step 5 Use the command **ap-type mobility-express tftp://***<tftp server ip-address>/<filename of ap1g4 TAR file with path from root on the TFTP server>* command.

The AP reboots, comes back online, and tries to join a controller for about 5 minutes. After this, the AP continues to boot into Mobility Express mode and starts broadcasting the *CiscoAirProvison* SSID.

Converting an AP from Mobility Express to CAPWAP Type

To convert a Mobility Express AP into a CAPWAP AP, you must change its ap-type from mobility-express to capwap, though the CLI, as given in this procedure:

1. Connect to the Console Port, Telnet or SSH to the AP.
2. Login to the Mobility Express controller console.
3. In the Mobility Express controller console, use the command **apciscoshell** to connect to the AP console.
4. Login to the AP console using the username *Cisco* and password *Cisco*. Both are case-sensitive.
5. Enter **enable**.
6. Enter the command **ap-type capwap**, and confirm .

   Once the AP type is CAPWAP, the AP will not start its Mobility Express controller functionality and does not participate in the Mobility Express master AP election process. This AP can then be deployed in a physical wireless controller-based network (i.e. in a non-Mobility Express network). There the AP will join that controller, and as the image on the controller will be different, the AP will request a CAPWAP image from the controller, reboot, and rejoin the controller as a CAPWAP AP.

To convert multiple access points running Mobility Express image to CAPWAP simultaneously from the Mobility Express controller CLI, execute the following command:

```
(Cisco Controller) > config ap unifiedmode <switch_name> <switch_ip_address>
```

The arguments <switch_name> and <switch_ip_address> are the name and IP address, respectively, of the WLC to which the APs need to be migrated to.

The above command converts all APs to *AP Configuration: NOT MOBILITY EXPRESS CAPABLE*. The APs are then reloaded, and they come back up in local mode.

RF Parameter Optimization Settings

When making the RF Parameter Optimization settings, use the information in the following table to select the right settings for your deployment. The following table shows the default values when low, typical, or high client density type is selected.

Note If you do not enable RF Parameter Optimization during the initial configuration wizard, then client density is set to **Typical** (the default value), and RF traffic type is set to **Data** (the default value).

	Dependency	**Typical** **(For enterprise deployments. Default profile.)**	**High Density** **(Where throughput is most important)**	**Low Density** **(For coverage in open spaces)**
TX Power	Global per band	Default	Higher	Highest
TPC Threshold, TPC Min, and TPC max (These parameters are equivalent to TX Power)	Specific RF profile per band	TPC Min: Default at -10 dB TPC Max: Default at 30 dB	TPC Threshold: • -65 dB for 5 GHz • -70 dB for 2.4 GHz TPC Min: +7 dB TPC Max: Default at 30 dB	TPC Threshold: • -60 dB for 5 GHz • -65 dB for 2.4 GHz TPC Min: -10 dB TPC Max: Default at 30 dB
RX Sensitivity	Global per band (Advanced RX-SOP) RF profiles	Default (Automatic)	Medium (RX-SOP)	Low
CCA Threshold	Global per band 802.11 a only (hidden) RF Profiles	Default (0)	Default (0)	Default (0)

	Dependency	Typical (For enterprise deployments. Default profile.)	High Density (Where throughput is most important)	Low Density (For coverage in open spaces)
Coverage RSSI Threshold	Global per band Data and voice RSSI RF Profiles	Default (Data: -80 Voice: -80)	Default (Data: -80 Voice: -80)	Higher (Data: -90 Voice:-90)
Coverage Client Count	Global per band (Coverage Exception) RF Profiles (Coverage Hole Detection)	Default (3)	Default (3)	Lower (2) Lower (1 to 3)
Data Rates	Global per band (network) RF Profiles	12 Mbp mandatory 9 Mbp supported 1,2, 5.5, 6, 11 Mbp disabled	12 Mbp mandatory 9 Mbp supported 1,2, 5.5, 6, 11 Mbp disabled	CCK rates enabled 1,2, 5.5, 6, 9, 11, 12 Mbp enabled

Related Documents

- Cisco Mobility Express Release Notes
- Cisco Mobility Express Command References
- Cisco Aironet Access Points Ordering Guide
- Cisco Aironet Universal AP Priming and Cisco AirProvision User Guide
- Cisco Aironet AP Hardware Guides
  - Cisco Aironet 1560 Access Point Hardware Guide
  - Cisco Aironet 1815i Access Point Hardware Guide
  - Cisco Aironet 1815w Access Point Hardware Guide
  - Cisco Aironet 1830 Series Access Points Hardware Guide
  - Cisco Aironet 1850 Series Access Points Hardware Guide
  - Cisco Aironet 2800 Series Access Points Hardware Guide
  - Cisco Aironet 3800 Series Access Points Hardware Guide

FAQs

Which access points can host the Cisco Mobility Express wireless LAN controller function and which access points can be managed by it?

See Supported Cisco Access Points#unique_104.

What controller-based modes does the Cisco Mobility Express wireless LAN controller function support?

Access points managed by the Cisco Mobility Express solution will operate with Centralized Control Plane and Distributed Data Plane, similar to the AireOS FlexConnect mode.

What are the licensing requirements for Cisco Mobility Express?

The Cisco Mobility Express solution does not require any licenses for access points.

Can I expand the scale of access points and convert to a wireless controller deployment?

Yes, you can simply point the APs to the WLAN controller IP address as the primary controller. This is independent of modes. The WLAN controller will push the right AP image and respective configuration. For detailed information, see Converting an AP from Mobility Express to CAPWAP Type, on page 4.

If my deployment needs to downsize to 25 access points or less, can they convert from existing controller-based deployment to Cisco Mobility Express?

Yes. You can convert your wireless controller-based deployment to Cisco Mobility Express, as long as your deployment has APs capable of hosting the Cisco Mobility Express controller functionality (listed as master APs in Supported Cisco Access Points#unique_104).

Where can I get more information on the Cisco Mobility Express solution?

Go to http://www.cisco.com/go/mobilityexpress.