Deploying Cisco Mobility Express

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Pre-requisites for Deploying Mobility Express Solution

1 You must not have other Cisco Wireless LAN Controllers; neither appliance nor virtual in the same network during set up or during daily operation of a Cisco Mobility Express network. The Mobility Express controller cannot interoperate or co-exist with other Wireless LAN Controllers in the same network.

2 Decide on the first Access Point to be configured as a Master Access Point. This Access Point should be capable of supporting the Wireless LAN Controller function.

3 A DHCP server must be available on the network so that Access Points and clients can obtain an IP Address. Starting AireOS® Release 8.3.102.0 or later, one can configure a DHCP server on the Master Access Point as well but this is typically used for Site Survey.

Connecting Mobility Express capable Access Point to the network

Depending on the deployment, Mobility Express capable Access Points can be connected to an access port or a trunk port on the switch.

If Access Points and WLANs are all on the same network, Mobility Express capable Access Points can connect to an access port on the switch as shown below.
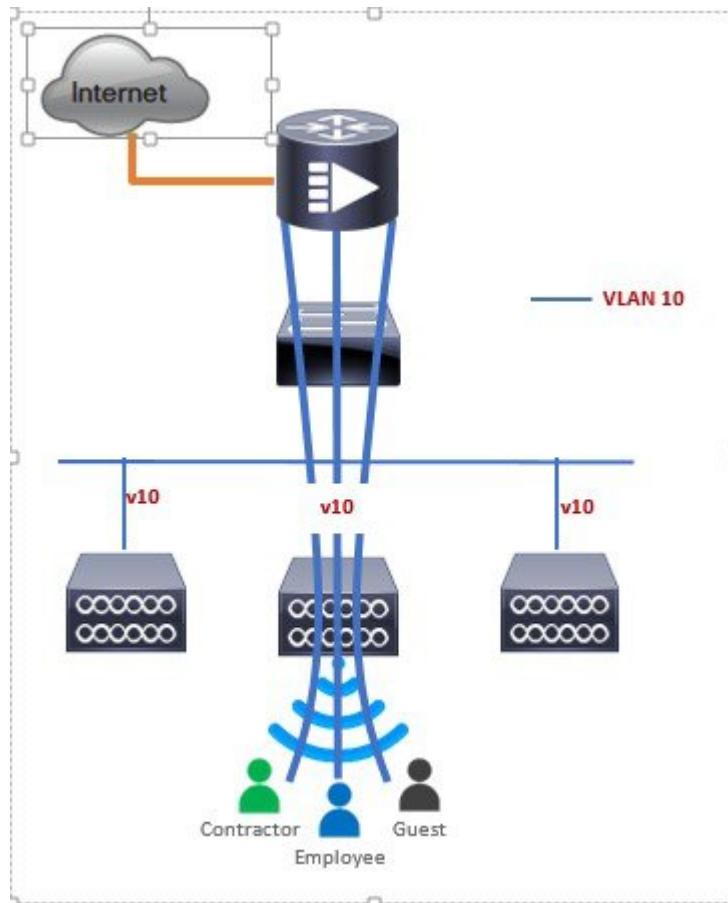
On Mobility Express, management traffic is untagged. If Access Points and WLANs are all on different VLANs, Mobility Express capable Access Points will connect to a trunk port on the switch and traffic for individual WLANs will be switched locally on individual VLANs. Shown below is a deployment with Access Points and WLANs on different VLANs.
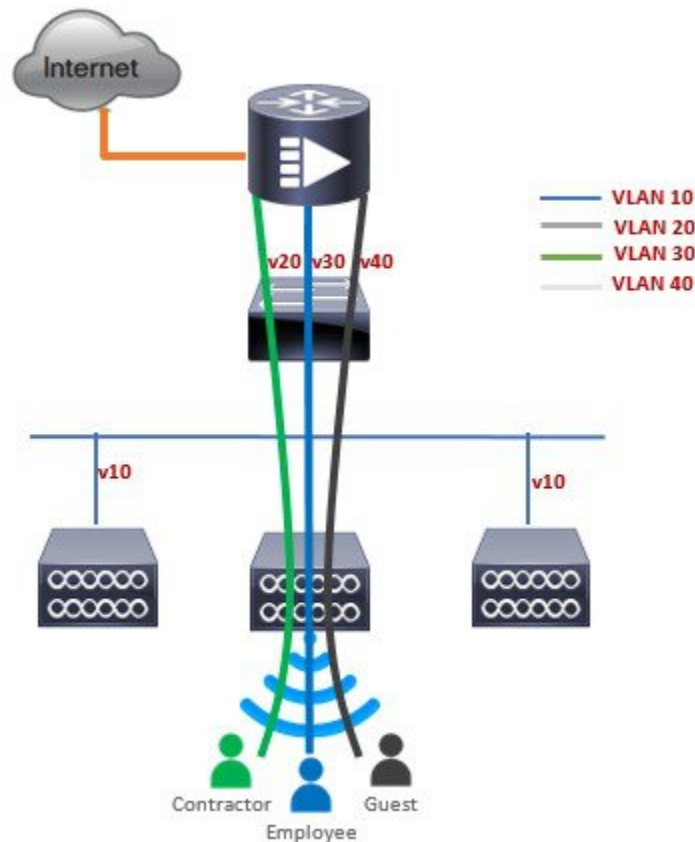
```
interface GigabitEthernet1/0/37
description » Connected to Master AP «
switchport trunk native vlan 40
switchport trunk allowed vlan 10,20,30,40
switchport mode trunk
```

Determining image on the Access Point

The Cisco Aironet® 1560, 1815, 1830, 1850, 2800 and 3800 series access points can either have CAPWAP image or the Cisco Mobility Express image which is capable of running the virtual Wireless LAN controller function on the Access Point.

To determine the image and capability of an Access Point, follow the procedure below:

Procedure

Step 1 Login to the Access Point CLI using a console and type **AP#show version** and check the full output of show version. The default login credentials are Username:cisco and Password:cisco.

Step 2 If *show version* output **does not** display **AP Image Type** and **AP Configuration** parameters as highlighted below, it means that AP is running the CAPWAP image and a conversion to Cisco Mobility Express is required if you want to run the controller function on the Access Point. To convert from a CAPWAP Access Point to Mobility Express, go to Conversion section.

```
cisco AIR-AP1852E-UXK9 ARMv7 Processor rev 0 (v71) with 997184/525160K bytes of memory.
Processor board ID RFDP2BCR021
AP Running Image : 8.2.100.0
Primary Boot Image : 8.2.100.0
Backup Boot Image : 8.1.106.33
AP Image type : MOBILITY EXPRESS IMAGE
AP Configuration : MOBILITY EXPRESS CAPABLE
0 Gigabit Ethernet interfaces
0 802.11 Radios
Radio FW version . 1401b63d12113073a3C08aa67f0c039c0
NSS FW version : NSS.AK.1.0.c4-0Z026-E_cust C-1.24160
```

If the **show version** displays **AP Image Type: MOBILITY EXPRESS IMAGE** and **AP Configuration: NOT MOBILITY EXPRESS CAPABLE** , it means that even though the Access Point has the Cisco Mobility Express image, it is configured to run as a CAPWAP Access Point. In this case Access Point will not run the controller function and will not participate in the Master Election process upon failure of the active Master AP.

```
cisco AI R-AP1852E-UXK9 ARMv7 Processor rev 0 (v7I) with 997184/726252K bytes of memory.
Processor board ID RFDP2BCR021
AP Running Image : 8.2.101.0
Primary Boot Image : 8.2.100.0
Backup Boot Image : 8.1.106.33
AP Image type : MOBILITY EXPRESS IMAGE
AP Configuration : NOT MOBILITY EXPRESS CAPABLE
```

For this AP to run the controller function, **AP Configuration** has to be changed to **MOBILITY EXPRESS CAPABLE** . To change the AP Configuration, execute the following command from the AP CLI. **AP#ap-type mobility-express tftp://**

Access Point will reboot and after it comes up, it will be capable of running the controller function. You can check the output of *show version* again to confirm that *AP Configuration* has changed to *MOBILITY EXPRESS CAPABLE* .

If the **show version** displays **AP Image Type: MOBILITY EXPRESS IMAGE** and **AP Configuration: MOBILITY EXPRESS CAPABLE** , it means that the Access Point has the Mobility Express image and is capable of running the controller function. For this scenario, the output of the **show version** is shown below:

```
cisco AIR-AP3802I-B-K9 ARMv7 Processor rev 1 (v7l) with 1028384/255032K bytes of memory.
Processor board ID FCW2034NXAV
AP Running Image     : 8.4.2.66
Primary Boot Image   : 8.4.2.66
Backup Boot Image    : 8.4.2.34
AP Image type : MOBILITY EXPRESS IMAGE
AP Configuration : MOBILITY EXPRESS CAPABLE
1 Multigigabit Ethernet interfaces
1 Gigabit Ethernet interfaces
2 802.11 Radios
Radio Driver version : 9.0.5.5-W8964
Radio FW version : 9.1.8.1
NSS FW version : 2.4.18
```

Conversion

One can convert an Access Point running CAPWAP to Cisco Mobility Express and vice versa.

Converting Access Point from CAPWAP to Cisco Mobility Express

Cisco Mobility Express support on 11ac Wave 2 Access Points is introduced in different AireOS releases and it is important to note that before an Access Point can be converted to Mobility Express, it must have the minimum AireOS CAPWAP image which supported Cisco Mobility Express capability for that Access Point. Given below is the minimum AireOS release for an Access Point which will support conversion from CAPWAP to Cisco Mobility Express.

Table 1: Minimum AireOS release supporting Cisco Mobility Express

Access Point	Minimum AireOS Release with CAPWAP image
Cisco Aironet® 1560 Series	Release 8.3 MR1
Cisco Aironet® 1815I Series	Release 8.4 or later
Cisco Aironet® 1815W Series	Release 8.4 or later
Cisco Aironet® 1830 Series	Release 8.1 MR2 or later
Cisco Aironet® 1850 Series	Release 8.1 MR2 or later
Cisco Aironet® 2800 Series	Release 8.3 or later
Cisco Aironet® 3800 Series	Release 8.3 or later

Note If the CAPWAP image on the Access Point is older than the minimum AireOS release capable of supporting Cisco Mobility Express, Access Point MUST first join a WLC running the minimum AireOS release or higher to upgrade its CAPWAP image. After the CAPWAP image of the AP has been upgraded, conversion of AP from CAPWAP to Mobility Express can be performed.

To perform a conversion on an Access Point running CAPWAP to Mobility Express, follow the procedure below:

Procedure

Step 1 Download the conversion image for the Access Point from cisco.com to the TFTP server. It is a tar file. Do not untar the file. The following table lists the Cisco Mobility Express software for Cisco Wireless Release **8.4.100.0.**

Table 2: Conversion tar file for Access Points

Access Points supported as Master AP	Software to be used only for Conversion from Unified Wireless Network Lightweight AP Software to Cisco Mobility Express
Cisco Aironet® 1560 Series	AIR-AP1560-K9-ME–8-4-100-0.tar
Cisco Aironet® 1815W Series	AIR-AP1815-K9-ME–8-4-100-0.tar
Cisco Aironet® 1830 Series	AIR-AP1830-K9-ME–8-4-100-0.tar
Cisco Aironet® 1850 Series	AIR-AP1850-K9-ME–8-4-100-0.tar
Cisco Aironet® 2800 Series	AIR-AP2800-K9-ME–8-4-100-0.tar
Cisco Aironet® 3800 Series	AIR-AP3800-K9-ME–8-4-100-0.tar

Step 2 Login to the Access Point.

Step 3 Execute **AP#show version** on the Access Point CLI. From the show version output, you can determine the **AP Image type** and **AP Configuration** and can then proceed with the conversion

Case 1: If the **AP Image type** is **MOBILITY EXPRESS IMAGE** and **AP configuration** is **NOT MOBILITY EXPRESS CAPABLE**, enter the command below to change the **AP Configuration** to **MOBILITY EXPRESS CAPABLE** .

AP#ap-type mobility-express

Note   Since the Access Point has **AP Image type: MOBILITY EXPRESS IMAGE**, a new image will not be downloaded. After the command is executed, the Access Point will reboot and after it comes up, the **AP Configuration** will be changed to **MOBILITY EXPRESS CAPABLE**.

Case 2 : If the **AP Image type** and **AP Configuration** are not available, it means that the AP is running CAPWAP image. To do the conversion, execute the command below:
AP#ap-type mobility-express tftp://<TFTP Server IP>/<path to tar file>

Example:

```
AP#ap-type mobility-express tftp://10.18.22.34/AIR-AP1850-K9-8.1.120.0.tar

Starting the ME image download...
It may take few minutes to finish the download.

Image downloaded, writing to flash...
do PREDOWNLOAD, part1 is active part
sh: CHECK_ME: unknown operand
Image start 0x40355008 size 0x01dae41a file size 0x01dae7ca
Key start 0x42103422 size 0x00000230
Sinature start 0x42103652 size 0x00000180
Verify returns 0
btldr rel is 16 vs 16, does not need update
part to upgrade is part2
activate part2, set BOOT to part2
AP primary version: 8.1.105.37
Archive done.
Oe as AP needs to boot up with ME image
```

```
The system is going down Now!
sent SIGTERM to all processes
sent SIGKILL to all processes

Requesting system reboot79]
[07/24/2015 18:19:43.0887] Restarting system.
[07/24/2015 18:19:43.1257] Going down for restart now
```

Note   After the image download is complete, it will be written to the flash followed by a reboot. After the AP comes up, *AP Image type* will be *MOBILITY EXPRESS IMAGE* and *AP Configuration* will *MOBILITY EXPRESS CAPABLE* .

Step 4   If this is the first Access Point in the network, it will start the controller function and will broadcast the *CiscoAirProvison* SSID.

Converting Access Point from Cisco Mobility Express to CAPWAP

There are typically two reasons why one would want to convert an Access Point running Mobility Express image to CAPWAP. There are as follows:

1. You want to keep the Access Point in a Mobility Express deployment but do not want the Access point to participate in the Master election process upon a failover of the Master AP.
2. You want to migrate one or more Access Points with Mobility Express to an appliance or vWLC based deployment.

1. If your reason to convert to CAPWAP is 1 above, follow the procedure below:

   a. Login to the Access Point CLI either through console or ssh and go to exec mode. If you are trying to convert the Master AP to CAPWAP, connecting a console will lead you to the controller CLI. To get to the AP CLI, type **apciscochell** at the controller prompt and login to the Access Point shell.

   b. Execute **ap#ap-type capwap** CLI. This will change the **AP Configuration** to **NOT MOBILITY EXPRESS** and the Access Point will no longer participate in the Master election process.

2. If your reason to convert to CAPWAP is 2 above, follow the procedure below:

   a. Login to the Access Point CLI either via console or ssh and go to exec mode.

   b. Execute the following CLI.

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

`<switch_name>` and `<switch_ip_address>` is the name and IP address respectively of the WLC to which the APs need to be migrate.

Note   The above command converts all connected Access Points with **AP Configuration: MOBILITY EXPRESS CAPABLE** to **AP Configuration: NOT MOBILITY EXPRESS CAPABLE** . When this command is issued, the APs are reloaded, and they come back up and look for the controller (switch_ip_address) to join.