Configure Multicast on Cisco Mobility Express AP's

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Introduction

This document describes the steps to configure Multicast on the Cisco Mobility Express (Access Point) AP’s.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Cisco Mobility Express that runs code 8.5 and higher.
- Good knowledge of how multicast works on the wired side.

Components Used

The information in this document is based on Cisco 2802 AP that runs Mobility Express software Release 8.5.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Configure

Enable Multicast on Mobility Express
The first step to configure multicast on the Wireless LAN Controller (WLC) is to enable multicast globally. On failure to enable it, multicast packets cannot be forwarded. It can be enabled with the command `config network multicast global enable`.

This can be verified with the `show network summary` command.

For ex:
(Mobility_Express) >show network summary
<Output clipped>
Ethernet Multicast Forwarding................. Enable ---If this setting shows disabled that means global multicast is disabled.

**Multicast Delivery Mechanism**

In a typical WLC (like 5508) there are two types of multicast delivery mechanisms.

1. Multicast with Multicast
2. Multicast with Unicast

With the Mobility Express WLC, the only delivery mechanism supported is the multicast with multicast.

In this method, you specify a multicast IP address that the AP’s need to send an Internet Group Management Protocol (IGMP) Membership report to. WLC then encapsulates all client multicast traffic into a Control and Provisioning of Wireless Access Points (CAPWAP) header, where the source IP address is the WLC and destination IP address is the multicast IP address.

For example, if the multicast IP address configured in the WLC is 238.1.1.10, the wired infrastructure must be configured to support and send multicast traffic on IP address 238.1.1.10 from the WLC to the AP.

You can configure the multicast with multicast IP address. Run the command `config network multicast mode multicast ip_addr`.

For ex:
(Mobility_Express) >config network multicast mode multicast 238.1.1.10

These IP address ranges must be avoided:

- 224.0.0.0 through 224.0.0.255—Reserved link local addresses
- 224.0.1.0 through 238.255.255.255—Globally scoped addresses
- 239.0.0.0 through 239.255.x.y /16—Limited scope address

**IGMP Snooping**

IGMP snooping is used by the WLC to create a mapping of wireless clients to the multicast IP addresses requested by them. When IGMP snooping is enabled, IGMP report packets from wireless clients are consumed or absorbed by the controller, which in turn generates a query for the clients. When the router sends the IGMP query, the controller sends the IGMP reports with its interface IP address as the listener IP address for the multicast group. If there is an interface group mapped to the Service Set Identifier (SSID), then the WLC sends this out on each interface in the interface group as long as there is a client mapped to that interface and requests multicast traffic. As a result, the router IGMP table is updated with the controller IP address as the multicast
The command to enable IGMP snooping is `config network multicast igmp snooping enable`.

(Mobility_Express) >config network multicast igmp snooping enable

When IGMP snooping is disabled, the IGMP packets from clients are simply forwarded to the router. As a result, the router IGMP table is updated with the IP address of the clients as the last reporter.

The IGMP timeout value can be set. Run the command `config network multicast igmp timeout interval_secs`.

You can enter a timeout value between 30 and 7200 seconds. The controller retries three times every retry interval to see if any clients exists for a particular multicast group. If the controller does not receive a response through an IGMP report from the client, the controller times out the client entry from the Multicast Group IDs (MGID) table. When no clients are left for a particular multicast group, the controller waits for the IGMP timeout value to expire and then deletes the MGID entry from the controller. The controller always generates a general IGMP query (that is, to destination address 224.0.0.1) and sends it on all WLANs with an MGID value of 1.

You can specify how often the WLC does a query to the clients. Run the command `config network multicast igmp query interval time_secs 20`.

For ex:
(Mobility_Express) >config network multicast igmp query interval 25

**MLD Snooping**

Multicast Listener Discovery (MLD) is a protocol used by IPv6 multicast routers to discover the presence of multicast listeners (nodes configured to receive IPv6 multicast packets) on its directly attached links and to discover which multicast packets are of interest to neighbourhood nodes. The ME supports MLD snooping for IPv6 multicast which allows it to intelligently keep track of and deliver multicast flows to clients that request them. In order to enable MLD snooping, you need to run the command `config network multicast mld snooping {enable | disable}`.

The default value is disabled.

**Note:** In order to enable MLD snooping, you must enable global multicast mode of the controller.

The MLD timeout value can be set. Run this command `config network multicast mld timeout interval_secs`. MLD timeout has a range from 30 to 7200.

For ex:
(Mobility_Express) >config network multicast mld timeout 45

You can run the MLD Query Interval (in seconds) with the command `config network multicast mld query interval interval_secs`. The valid range is between 15 and 2400 seconds.
Verify

Use this section in order to confirm that your configuration works properly.

Step 1. You can verify the multicast configuration that has been applied on the ME. Run the command:

(Mobility_Express) >show network summary
<output clipped>

Ethernet Multicast Forwarding................. Enable          -----This command shows that global multicast has been enabled
IPv4 AP Multicast/Broadcast Mode............. Multicast Address : 238.1.1.10       -----This line shows the multicast-multicast IP address configured
IGMP snooping................................ Enabled         -----This section shows the IGMP snooping settings
IGMP timeout................................ 60 seconds
IGMP Query Interval.......................... 20 seconds
MLD snooping................................ Disabled          -----This section shows the MLD snooping settings.
MLD timeout................................. 60 seconds
MLD query interval.......................... 20 seconds

Step 2. The controller creates a L3 MGID entry for each combination of multicast IP address-VLAN combination that a wireless client requests multicast traffic. So for example, if a client requests traffic for multicast IP address 239.10.10.10 on vlan 10, the WLC creates an MGID entry for this. If there is another client on a different VLAN which requests for the same multicast IP address, the WLC creates a separate MGID entry for this as the VLAN is different from the first client that requested.

The MGID table on the WLC is very useful to see if the WLC processes the multicast requests correctly. Without an MGID entry creation, the clients do not receive multicast traffic. You can check if the MGID table, run the command show network multicast mgid summary.

For ex:

(Mobility_Express) >show network multicast mgid summary
Layer3 MGID Mapping:
---------------------
Number of Layer3 MGIDs......................... 6

Group address VLAN MGID IGMP/MLD
--------------------------- ---- ---- --------
239.4.4.4   93 12352 IGMP
239.4.4.5   93 12353 IGMP
239.4.4.6   93 12354 IGMP
239.255.255.250 93 12351 IGMP
ff02::1:3   93 12350 MLD
ff03::3     93 12362 MLD

Step 3. You can also view the client details mapped to each MGID entry, run the command show network multicast mgid detail mgid_id. If a client MAC address is not listed in this output, it cannot receive the multicast traffic.

(Mobility_Express) >show network multicast mgid detail 12352
Mgid.............................................. 12352
Multicast Group Address..................... 239.4.4.4
Vlan........................................ 93
No of clients............................... 1
Client List.................................

<table>
<thead>
<tr>
<th>Client MAC</th>
<th>AP Name</th>
<th>Expire Time (mm:ss)</th>
<th>Multicast-Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>a8:8e:24:45:bc:3d</td>
<td>AP-3702</td>
<td>0:36 Normal</td>
<td>Multicast</td>
</tr>
</tbody>
</table>

**Troubleshoot**

There is currently no specific troubleshooting information available for this configuration.