High Availability Enhancements in Wireless LAN Controller (WLC) Software Release 5.0

Document ID: 107250

Introduction

This document explains the high availability enhancements that are introduced with the Wireless LAN Controller release 5.0.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Knowledge of how to configure the Wireless LAN Controller (WLC) and Lightweight Access Points (LAP)
- Knowledge of Lightweight Access Point Protocol (LWAPP)

Components Used

High Availability (HA) is supported on these WLC Platforms that run software version 5.0:

- Cisco 4400 Series Wireless LAN Controllers
- Cisco 2100 Series Wireless LAN Controllers
- Cisco Catalyst 6500 Series Wireless Services Module (WiSM)
- Cisco Catalyst 3750G Integrated Wireless LAN Controller
- Cisco Wireless LAN Controller Module

HA is not supported on AP1000 series. All other Access Points support HA.

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.

Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

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In wireless network deployments that run controller versions earlier than 5.0, when a controller goes down, it takes a long time for all the APs and the associated clients to move to a backup controller and for wireless service to resume.

The features discussed in the document are implemented on the controller CLI in WLC software release 5.0 in order to decrease the time that it takes for access points and their associated clients to move to a backup controller and for wireless service to resume after a controller goes down:

- In order to reduce the controller failure detection time, you can configure the heartbeat interval between the controller and access point with a smaller timeout value.
- In addition to the option to configure primary, secondary, and tertiary controllers for a specific access point, you can now also configure primary and secondary backup controllers for a specific controller. If the local controller of the access point fails, it chooses an available controller from the backup controller list in this order:
    - primary
    - secondary
    - tertiary
    - primary backup
    - secondary backup
- The access point maintains a list of backup controllers and periodically sends primary discovery requests to each entry on the list. You can now configure a primary discovery request timer in order to specify the amount of time that a controller has to respond to the discovery request of the access point before the access point assumes that the controller cannot be joined and waits for a discovery response from the next controller in the list.

Reduce the Controller Failure Detection Time

In order to reduce the controller failure detection time, new heartbeats are added between the WLC and AP with smaller timeout values.

This feature is available in the CLI only if all advance timer configurations are done from the CLI:

In order to enable or disable the fast heartbeat timer and reduce the amount of time it takes to detect a controller failure for local, hybrid−REAP, or all access points, issue the **config advanced timers ap−fast−heartbeat** command.

```
config advanced timers ap−fast−heartbeat {local | hreap | all}
    {enable | disable} interval
```

Syntax Description

config	Configure parameters.
advanced	Advanced parameters.
timers	Network timers.
ap-fast-heartbeat	Configure the fast heartbeat interval
(**local** | **hreap** | **all**)	• Enable **local** to configure the fast heartbeat interval for access points in local mode only. • Enable **hreap** to configure the fast heartbeat interval for access points in hybrid-REAP mode only. • Enable **all** to configure the fast heartbeat interval for all access points.
(**enable** | **disable**)	• Select **enable** to enable a fast heartbeat interval. • Select **disable** to disable a fast heartbeat interval
interval	Specify a small heartbeat interval (between 1 and 10 seconds inclusive) reduces the amount of time it takes to detect a controller failure.

By default, this feature is disabled.

Examples

```
> config advanced timers ap-fast-heartbeat local enable 5
> config advanced timers ap-fast-heartbeat hreap enable 8
> config advanced timers ap-fast-heartbeat all enable 6
> config advanced timers ap-fast-heartbeat all disable
```

Primary and/or Secondary Backup Controller(s)

In addition to the option to configure Primary / Secondary / Tertiary WLCs on the AP side, a new configuration on the WLC is introduced to set up primary and/or secondary backup controller(s).

If there are no primary/secondary/tertiary WLCs configured on the AP side and a primary backup controller and/or secondary backup controller are configured on the controller side (downloaded to AP), the primary backup controller and/or secondary backup controller are added to the primary discovery request message recipient list of the AP.

In order to configure a primary backup controller for a specific controller, issue the **config advanced backup-controller primary** command.

```
config advanced backup-controller primary
 backup_controller_name backup_controller_ip_address
```

Syntax Description

config	Configure parameters.
advanced	Advanced parameters.
backup-controller primary	Configure the primary backup controller.
backup_controller_name	Name of the backup controller.
backup_controller_ip_address	IP address of the backup controller.

Example

```
> config advanced backup-controller primary Controller_1 10.10.10.10
```

In order to configure a primary backup controller for a specific controller, issue the **config advanced backup-controller secondary** command.

```
config advanced backup-controller secondary
  backup_controller_name backup_controller_ip_address
```

Syntax Description

config	Configure parameters.
advanced	Advanced parameters.
backup-controller secondary	Configure the secondary backup controller.
backup_controller_name	Name of the backup controller.
backup_controller_ip_address	IP address of the backup controller.

Example

```
> config advanced backup-controller secondary Controller_1 10.10.10.10
```

Access Point Primary Discovery Request Timer

The access point maintains a list of backup controllers and periodically sends primary discovery requests to each entry on the list. You can now configure a primary discovery request timer to specify the amount of time that a controller has to respond to the discovery request of the access point before the access point assumes that the controller cannot be joined and waits for a discovery response from the next controller in the list.

The existing primary discovery mechanism is enhanced to have the AP maintain the backup controller list. The result of each primary discovery response is used to maintain the backup controller list.

In the event of WLC fail-over, the AP selects an available controller from its backup controller list in this order:

- primary
- secondary
- tertiary
- primary backup controller
- secondary backup controller

It sends a join request directly to this selected backup controller and does not go back to the discovery process.

Prior to WLC release 5.0, the primary request uses the same timer as the echo request, which is 30 seconds by default. A new configuration is introduced that allows the primary discovery request to have a different timer default, two minutes, and it is configurable.

In order to configure the access point primary discovery request timer, issue the **config advanced timers ap-primary-discovery-timeout** command.

```
config advanced timers ap-primary-discovery-timeout interval
```

Syntax Description

config	Configure parameters.
advanced	Advanced parameters.
timers	Network timers.
ap-primary-discovery-timeout	Configure the amount of time the access point will wait for a discovery response from a controller.
interval	Timeout value between 30 and 3600 seconds.

The default time interval is 120 seconds.

Examples

```
> config advanced timers ap-primary-discovery-timeout 1200
```

Verify

You can issue this show command in order to verify which advanced timers are configured.

show advanced timers

Here is an example:

```
(Cisco Controller) >show advanced timers

Authentication Response Timeout (seconds)........ 10
Rogue Entry Timeout (seconds)..................... 1200
AP Heart Beat Timeout (seconds).................. 30
AP Discovery Timeout (seconds)................... 10
AP Local mode Fast Heartbeat (seconds)........... 2 (enable)
AP Hreap mode Fast Heartbeat (seconds)........... 2 (enable)
AP Primary Discovery Timeout (seconds)........... 30
```

Note: The timers in bold do not appear in the earlier versions. Here is a sample output from WLC version 4.2:

```
(Cisco Controller) >show advanced timers

Authentication Response Timeout (seconds)........ 10
Rogue Entry Timeout (seconds)..................... 1200
AP Heart Beat Timeout (seconds).................. 30
AP Discovery Timeout (seconds)................... 10
```

Issue this show command in order to verify which backup controllers are configured:

show advanced backup-controller

Here is an example:

```
(Cisco Controller) >show advanced backup-controller
AP primary Backup Controller .................... WLC-2 10.10.78.2
AP secondary Backup Controller .................  0.0.0.0
```

From the console of the AP connected to the WLC, you can see the HA configuration if you issue the **show lwapp client ha** and **show lwapp client config** commands.

```
AP1240#show lwapp client ha

fastHeartbeatTmr(sec)   2 (enabled)
primaryDiscoverTmr(sec) 30
primaryBackupWlcIp      0xA0A4E02
primaryBackupWlcName    WLC-2
secondaryBackupWlcIp    0x0
secondaryBackupWlcName
DHCP renew try count    0
Fwd traffic stats get   302048
Fast Heartbeat sent     281606
Backup WLC array:
Index [3] System name   WLC-2
Index [3] IP            0xA0A4E02
Index [3] Aging Count   0

AP1240 #show lwapp client config
configMagicMark         0xF1E2D3C4
chkSumV2                21720
chkSumV1                24798
swVer                   5.0.72.0
adminState              ADMIN_ENABLED (1)
name                    AP1240-Edgewood
location                default location
group name
mwarName                10.10.76.2
mwarName                10.10.78.2
mwarName
numOfSlots              2
spamRebootOnAssert      1
spamStatTimer           180
randSeed                0x28F4
transport               SPAM_TRANSPORT_L3 (2)
transportCfg            SPAM_TRANSPORT_DEFAULT(0)
initialisation          SPAM_PRODUCTION_DISCOVERY(1)
ApMode                  Local

Discovery Timer         10 secs
Heart Beat Timer        30 secs
Led State Enabled       1
AP ILP Pre-Standard Switch Support Enabled
AP Power Injector Override Safety Checks
Configured Switch 1 Addr 10.10.76.2
non-occupancy channels:
Ethernet (Duplex/Speed) auto/auto
```

Related Information

- **Cisco Wireless LAN Controller Configuration Guide, Release 6.0**
- **WLAN Controller Failover for Lightweight Access Points Configuration Example**
- **AP Load Balancing and AP Fallback in Unified Wireless Networks**
- **Wireless LAN Controller and Light Weight Access Points Failover Outside the Mobility Group Configuration Example**
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Updated: Dec 03, 2009 Document ID: 107250