Configuring High Availability

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Information about High Availability

High availability feature is enabled by default when the controllers are connected using the stack cable and the Cisco StackWise-480 technology is enabled. You will not be able to disable it; however, you can initiate a manual graceful-switchover using the command line interface to avail the high availability feature enabled in the controller.

Information about Access Point Stateful Switch Over

An Access Point Stateful Switch Over (AP SSO) implies that all the access point sessions are switched over state-fully and the user session information is maintained during a switchover, and access points continue to

operate in network with no loss of sessions, providing improved network availability. The active switch in the stack is equipped to perform all network functions, including IP functions and routing information exchange. Controller supports 1000 access points and 12000 clients.

However, all the clients are de-authenticated and need to be re-associated with the new active controller except for the locally switched clients in FlexConnect mode when a switchover occurs.

Once redundancy pair is formed while in stack, high availability is enabled; which includes that access points continue to remain connected during an active-to-standby switchover.

Note You can not disable AP SSO while in a controller stack once the controllers form a redundant pair.

Initiate Graceful Switchover

To perform a manual switchover and to avail high availability feature enabled in the controller, execute the **redundancy force-switchover** command. This command initiates a graceful switchover from the then active to the standby controller.

```
controller#redundancy force-switchover
System configuration has been modified. Save ? [yes/no] : yes
Building configuration …
Preparing for switchover …
Compressed configuration from 14977 bytes to 6592 bytes[OK]This will reload the active unit
 and force switchover to standby[confirm] : y
```

Before You Begin

Configuring EtherChannel

The LAG or an EtherChannel, bundles all the existing ports in both the standby and active units into a single logical port? link? to provide an aggregate bandwidth of 60 Gbps. The creation of Etherchannel enables protection against failures. The Etherchannels or LAG created are used for link redundancy to ensure high availability of access points.

SUMMARY STEPS

1. Connect two controllers that are in powered down state using the stack cable.
2. Power up and perform a boot on both controllers simultaneously or power and boot one controller.
3. Configure Etherchannel or LAG on the units.
4. Execute the **show etherchannel summary** command to view status of the configured Etherchannel.
5. Execute the **show ap uptime** command to verify the connected access points.

DETAILED STEPS

Step 1 Connect two controllers that are in powered down state using the stack cable.

Step 2 Power up and perform a boot on both controllers simultaneously or power and boot one controller.
The controllers boot up successfully, and forms a high availability pair.

Step 3 Configure Etherchannel or LAG on the units.

Step 4 Execute the **show etherchannel summary** command to view status of the configured Etherchannel.
On successful configuration, all the specified ports will be bundled in a single channel and listed in the command output of **show etherchannel summary**.

Step 5 Execute the **show ap uptime** command to verify the connected access points.

Example:

LACP Configuration

Before You Begin

SUMMARY STEPS

1. conf t
2. interface Port-channel *number*
3. lacp max-bundle *number*
4. lacp port-priority *number*
5. switchport backup interface Po2
6. end
7. show etherchannel summary
8. show interfaces switchport backup

DETAILED STEPS

	Command or Action	Purpose
Step 1	conf t **Example:** `controller#conf t`	Configures the terminal.
Step 2	interface Port-channel *number* **Example:** `controller(config)#interface Port-channel Po2`	Enters the port-channel interface configuration mode.
Step 3	lacp max-bundle *number* **Example:** `controller(config-if)# lacp max-bundle 6`	Defines the maximum number of active bundled LACP ports allowed in a port channel. The value ranges from 1 to 8.

	Command or Action	Purpose
Step 4	lacp port-priority *number* **Example:** `controller(config-if)#lacp port-priority 4`	Specifies port priority to be configured on the port using LACP . The value ranges from 0 to 65535.
Step 5	switchport backup interface Po2 **Example:** `controller(config-if)# switchport backup interface Po2`	Specifies an interface as the backup interface.
Step 6	end	Exits the interface and configuration mode.
Step 7	show etherchannel summary **Example:** `controller# show etherchannel summary`	Displays summary of Etherchannel(s) properties.
Step 8	show interfaces switchport backup **Example:** `controller#show interfaces switchport backup`	Displays summary of backup Etherchannel properties.

Troubleshooting High Availability

Access Standby Console

You can only access the console of the active controller in a stack. To access the standby controller console, use the following commands; however, use this functionality only under supervision of Cisco Support.

Before You Begin

SUMMARY STEPS

1. conf t
2. service internal
3. redundancy
4. main-cpu
5. standby console enable
6. exit

DETAILED STEPS

	Command or Action	Purpose
Step 1	conf t **Example:** `Controller# configure terminal`	Configures the terminal.
Step 2	service internal **Example:** `Controller(config)# service internal`	Enables Cisco IOS debug commands.
Step 3	redundancy **Example:** `Controller(config)# redundancy`	
Step 4	main-cpu **Example:** `Controller(config)# main-cpu`	
Step 5	standby console enable **Example:** `Controller(config)# standby console enable`	Enables the standby console.
Step 6	exit **Example:** `Controller(config)# exit`	Exits the configuration mode.

Before a Switchover

A switchover happens when the active controller fails; however, while performing a manual switchover, you can execute the commands listed in this section to ensure if you can initiate a successful swicthover.

SUMMARY STEPS

1. show redundancy states
2. show switch detail
3. show platform SES states
4. show ap summary
5. show CAPWAP detail
6. show dtls database-brief
7. show power inline

DETAILED STEPS

	Command or Action	Purpose
Step 1	show redundancy states **Example:** `controller#show redundancy states`	Display the high availability role of the active and standby switches.
Step 2	show switch detail **Example:** `controller#show switch detail`	Display physical property of the stack. Verify if the physical states of the stacks are "Ready" or "Port".
Step 3	show platform SES states **Example:** `controller#show platform SES states`	Display the sequences of the stack manager.
Step 4	show ap summary **Example:** `controller#show ap summary`	Display all the access points in the active and standby switch.
Step 5	show CAPWAP detail **Example:** `controller#show CAPWAP detail`	Display the details of the CAPWAP tunnel in the active and standby switch.
Step 6	show dtls database-brief **Example:** `controller#show dtls database-brief`	Display DTLS details in the active and standby switch.
Step 7	show power inline **Example:** `controller#show power inline`	Display the power on Ethernet power state.

After a Switchover

This section defines the steps that you must perform to ensure that successful switchover from the active to standby switch is performed. On successful switchover of the standby switch as active, all access points connected to the active need to re-join the standby (then active) switch.

SUMMARY STEPS

1. **show ap uptime**
2. **show wireless summary**
3. **show wcdb database all**
4. **show power inline**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**show ap uptime** **Example:** `controller#show ap uptime`	Verify if the uptime of the access point after the switchover is large enough.
Step 2	**show wireless summary** **Example:** `controller#show wireless summary`	Display the clients connected in the active switch.
Step 3	**show wcdb database all** **Example:** `controller#show wcdb database all`	Display if the client has reached the uptime.
Step 4	**show power inline** **Example:** `controller#show power inline`	Display the power over Ethernet power state.

Monitoring the Controller Stack

Table 1: Commands for Displaying Stack Information

Command	Description
show switch	Displays summary information about the stack, including the status of provisioned switches and switches in version-mismatch mode.
show switch *stack-member-number*	Displays information about a specific member.
show switch detail	Displays detailed information about the stack.
show switch neighbors	Displays the stack neighbors.

Command	Description
show switch stack-ports [**summary**]	Displays port information for the stack. Use the **summary** keyword to display the stack cable length, the stack link status, and the loopback status.
show redundancy	Displays the redundant system and the current processor information. The redundant system information includes the system uptime, standby failures, switchover reason, hardware, configured and operating redundancy mode. The current processor information displayed includes the active location, the software state, the uptime in the current state and so on.
show redundancy state	Displays all the redundancy states of the active and standby controllers.

LACP Configuration: Example

This example shows how to configure LACP and to verify creation of the LACP bundle and the status:

```
Controller(config)# !
interface TenGigabitEthernet1/0/1
 switchport mode trunk
 channel-group 1 mode active
 lacp port-priority 10
 ip dhcp snooping trust
!
interface TenGigabitEthernet1/0/2
 switchport mode trunk
 channel-group 1 mode active
 lacp port-priority 10
 ip dhcp snooping trust
!
interface TenGigabitEthernet1/0/3
 switchport mode trunk
 channel-group 1 mode active
 lacp port-priority 10
 ip dhcp snooping trust
!
interface TenGigabitEthernet1/0/4
 switchport mode trunk
 channel-group 1 mode active
 ip dhcp snooping trust
!
interface TenGigabitEthernet1/0/5
 switchport mode trunk
 channel-group 1 mode active
 ip dhcp snooping trust
!
interface TenGigabitEthernet1/0/6
 switchport mode trunk
 channel-group 1 mode active
 ip dhcp snooping trust
!
interface TenGigabitEthernet2/0/1
 switchport mode trunk
 channel-group 1 mode active
 lacp port-priority 10
```

```
 ip dhcp snooping trust
!
interface TenGigabitEthernet2/0/2
 switchport mode trunk
 channel-group 1 mode active
 lacp port-priority 10
 ip dhcp snooping trust
!
interface TenGigabitEthernet2/0/3
 switchport mode trunk
 channel-group 1 mode active
 lacp port-priority 10
 ip dhcp snooping trust
!
interface TenGigabitEthernet2/0/4
 switchport mode trunk
 channel-group 1 mode active
 ip dhcp snooping trust
!
interface TenGigabitEthernet2/0/5
 switchport mode trunk
 channel-group 1 mode active
 ip dhcp snooping trust
!
interface TenGigabitEthernet2/0/6
 switchport mode trunk
 channel-group 1 mode active
 ip dhcp snooping trust
!
interface Vlan1
 no ip address
 ip igmp version 1
 shutdown
!
```

```
  Controller#  show etherchannel summary

  Flags:  D - down        P - bundled in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator

        M - not in use, minimum links not met
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 1
Number of aggregators:           1

Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------------------
1      Po1(SU)         LACP      Te1/0/1(P)  Te1/0/2(P)  Te1/0/3(P)
                                 Te1/0/4(H)  Te1/0/5(H)  Te1/0/6(H)
                                 Te2/0/1(P)  Te2/0/2(P)  Te2/0/3(P)
                                 Te2/0/4(H)  Te2/0/5(H)  Te2/0/6(H)
```

This example shows the switch backup interface pairs:

```
Controller# show interfaces switchport backup

Switch Backup Interface Pairs:

Active Interface        Backup Interface        State
------------------------------------------------------------------------
Port-channel1             Port-channel2             Active Standby/Backup Up
```

This example shows the summary of the Etherchannel configured in the controller:

```
Controller# show ethernet summary


Flags:  D - down        P - bundled in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator

        M - not in use, minimum links not met
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 2
Number of aggregators:           2

Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------------------
1      Po1(SU)         LACP      Te1/0/1(P)  Te1/0/2(P)  Te1/0/3(P)
                                 Te1/0/4(P)  Te1/0/5(P)  Te1/0/6(P)
2      Po2(SU)         LACP      Te2/0/1(P)  Te2/0/2(P)  Te2/0/3(P)
                                 Te2/0/4(P)  Te2/0/5(P)  Te2/0/6(P)
```

Flex Link Configuration: Example

This example shows how to configure flex link and to verify creation and the status of the created link:

```
Controller(config)# !
interface Port-channel1
 description Ports 1-6 connected to NW-55-SW
 switchport mode trunk
 switchport backup interface Po2
 switchport backup interface Po2 preemption mode forced
 switchport backup interface Po2 preemption delay 1
 ip dhcp snooping trust
!
interface Port-channel2
 description Ports 7-12connected to NW-55-SW
 switchport mode trunk
 ip dhcp snooping trust
!
interface GigabitEthernet0/0
 vrf forwarding Mgmt-vrf
 no ip address
 negotiation auto
!
interface TenGigabitEthernet1/0/1
 switchport mode trunk
 channel-group 1 mode on
 ip dhcp snooping trust
!
interface TenGigabitEthernet1/0/2
 switchport mode trunk
 channel-group 1 mode on
 ip dhcp snooping trust
!
interface TenGigabitEthernet1/0/3
 switchport mode trunk
```

```
 channel-group 1 mode on
 ip dhcp snooping trust
!
interface TenGigabitEthernet1/0/4
 switchport mode trunk
 channel-group 1 mode on
 ip dhcp snooping trust
!
interface TenGigabitEthernet1/0/5
 switchport mode trunk
 channel-group 1 mode on
 ip dhcp snooping trust
!
interface TenGigabitEthernet1/0/6
 switchport mode trunk
 channel-group 1 mode on
 ip dhcp snooping trust
!
interface TenGigabitEthernet2/0/1
 switchport mode trunk
 channel-group 2 mode on
 ip dhcp snooping trust
!
interface TenGigabitEthernet2/0/2
 switchport mode trunk
 channel-group 2 mode on
 ip dhcp snooping trust
!
interface TenGigabitEthernet2/0/3
 switchport mode trunk
 channel-group 2 mode on
 ip dhcp snooping trust
!
interface TenGigabitEthernet2/0/4
 switchport mode trunk
 channel-group 2 mode on
 ip dhcp snooping trust
!
interface TenGigabitEthernet2/0/5
 switchport mode trunk
 channel-group 2 mode on
 ip dhcp snooping trust
!
interface TenGigabitEthernet2/0/6
 switchport mode trunk
 channel-group 2 mode on
 ip dhcp snooping trust
!
interface Vlan1
 no ip address
```

```
Controller#  show etherchannel summary

Flags:  D - down        P - bundled in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator

        M - not in use, minimum links not met
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 2
Number of aggregators:           2

Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------------------
1      Po1(SU)          -        Te1/0/1(P)  Te1/0/2(P)  Te1/0/3(P)
                                 Te1/0/4(P)  Te1/0/5(P)  Te1/0/6(P)
```

```
2       Po2(SU)          -        Te2/0/1(P)  Te2/0/2(P)  Te2/0/3(D)
                                  Te2/0/4(P)  Te2/0/5(P)  Te2/0/6(P)
```

Viewing Redundancy Switchover History (GUI)

Step 1 Click **Monitor > Controller > Redundancy** > **States.**
The Redundancy States page is displayed. The values for the following parameters are displayed in the page:

Parameter	Description
Index	Displays the index number of the of the redundant unit.
Previous Active	Displays the Controllers that was active before.
Current Active	Displays the Controllers that is currently active.
Switch Over Time	Displays the system time when the switchover occurs.
Switch Over Reason	Displays the cause of the switchover.

Step 2 Click **Apply**.

Viewing Switchover States (GUI)

Step 1 Click **Monitor > Controller > Redundancy** > **States.**
The Redundancy States page is displayed. The values for the following parameters are displayed in the page:

Parameter	Description
My State	Shows the state of the active CPU Controller module. Values are as follows: • Active • Standby HOT • Disable
Peer State	Displays the state of the peer (or standby) CPU Controller module. Values are as follows: • Standby HOT • Disable

Parameter	Description
Mode	Displays the current state of the redundancy peer. Values are as follows: • Simplex— Single CPU switch module • Duplex— Two CPU switch modules
Unit ID	Displays the unit ID of the CPU switch module.
Redundancy Mode (Operational)	Displays the current operational redundancy mode supported on the unit.
Redundancy Mode (Configured)	Displays the current configured redundancy mode supported on the unit.
Redundancy State	Displays the current functioning redundancy state of the unit. Values are as follows: • SSP • Not Redundant
Manual SWACT	Displays whether manual switchovers have been enabled without the force option.
Communications	Displays whether communications are up or down between the two CPU Controller modules.
Client Count	Displays the number of redundancy subsystems that are registered as RF clients.
Client Notification TMR	Displays, in milliseconds, the time that an internal RF timer has for notifying RF client subsystems.
Keep Alive TMR	Displays, in milliseconds, the time interval the RF manager has for sending keep-alive messages to its peer on the standby CPU switch module.
Keep Alive Count	Displays the number of keep-alive messages sent without receiving a response from the standby CPU Controller module.
Keep Alive Threshold	Displays the threshold for declaring that interprocessor communications are down when keep-alive messages have been enabled (which is the default).
RF Debug Mask	Displays an internal mask used by the RF to keep track of which debug modes are on.

Step 2 Click **Apply**.