



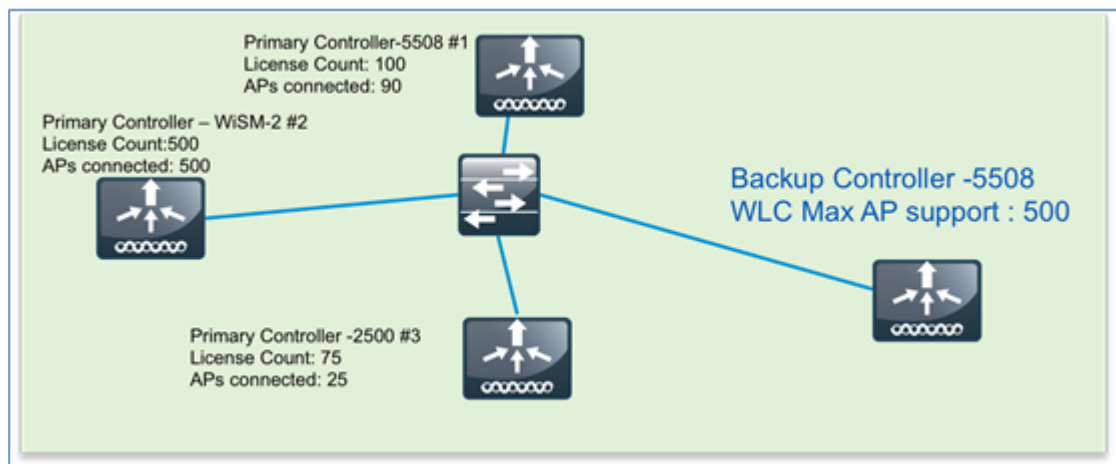
N+1 High Availability Overview

N+1 HA Overview

- The N+1 HA architecture provides redundancy for controllers across geographically separate data centers with low cost of deployment.
- A single backup controller can be used in order to provide backup for multiple primary WLCs, with consideration for appropriate compatibility in terms of AP mode. (See [Figure 2-1](#))
- These WLCs are independent of each other and do not share configuration or IP addresses on any of their interfaces. Each WLC needs to be managed separately by Cisco Prime, can run a different hardware and a different software version, and can be deployed in different datacenters across the WAN link.
- Access Point Stateful Switch Over (AP SSO) functionality is not supported for N+1 HA. The AP Control and Provisioning of Wireless Access Points (CAPWAP) state machine is restarted when the primary controller fails.
- When a primary WLC resumes operation, the APs fall back from the backup WLC to the primary WLC automatically if the AP fallback option is enabled.
- APs with high priority on the primary controller always connect first to the backup controller, even if they have to push out low priority APs.
- When using a permanent AP count license for the backup controller, the 90-day timer does not start when the APs join the backup controller.
- With Release 7.4, an HA-SKU secondary controller can be configured as a backup controller for N+1 HA. For example, the following can be used as an HA-SKU controller:
 - 5508 Series Standalone controller with 50 AP license
 - WiSM-2 Wireless LAN controller
 - 7500 Series Standalone controller
 - 8500 Series Standalone controller
 - 2504 Wireless LAN controller, Release 7.5, with a minimum of 5 Permanent AP licenses
- As soon as an AP joins the HA-SKU secondary controller, the 90-day timer starts, and the user sees a warning message after 90 days. In other words, an HA-SKU controller can be used as a secondary controller for 90 days without a warning message.

- The HA-SKU Unique Device Identifier (UDI) provides the capability of the maximum number of APs supported on that hardware. For instance, a 5508 HA-SKU controller provides support for 500 APs.
- The N+1 Secondary HA-SKU cannot be configured in combination with AP SSO. They are mutually exclusive.

Figure 2-1 N+1 HA



Supported Hardware

N+1 HA with HA-SKU is supported on the 2504, 5500, 7500, and 8500 Series of standalone controllers as well as the WiSM-2 WLCs.

Configuration of N+1 HA with HA-SKU with the CLI

From the primary controller, configure the backup controller on the primary to point to the secondary controller. Use the `config advanced backup-controller primary backup_controller_name backup_controller_IP_address` command. (See [Figure 2-2](#).)

Figure 2-2 Primary WLC (CLI)

```
(5500) >config advanced backup-controller primary Secondary 9.5.56.2
(5500) >show advanced backup-controller
AP primary Backup Controller ..... Secondary 9.5.56.2
AP secondary Backup Controller ..... 0.0.0.0
```

Configuration of HA-SKU UDI as HA-SKU Secondary Controller

On the HA-SKU UDI controller, execute the `config redundancy unit secondary` command to obtain support for Max AP count licenses on a given hardware. Evaluation license does not need to be enabled for this purpose.

The section below depicts the process of converting a permanent AP count WLC to a HA-SKU secondary controller.

Configuration of Permanent AP Count WLC as HA-SKU Secondary Controller

On the permanent AP count WLC, use the `config redundancy unit secondary` command to convert the controller into an HA-SKU secondary controller. In order to convert a permanent AP count controller to an HA-SKU secondary controller, it should have a minimum number of base AP count licenses; if that minimum is not met, an error message appears. (See [Figure 2-3](#)).

Figure 2-3 Secondary WLC (CLI)

```
(5500) >config redundancy unit secondary
In order to configure this controller secondary, Controller should at least have
a threshold base ap count. Please read the Documentation for further details
```

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On the CLI, use the `show redundancy summary` command to view the status of the primary and secondary controllers. (See [Figure 2-4](#) and [Figure 2-5](#).)



Note

With release 7.5 and 7.6, the HA SKU WLC has to be rebooted after issuing the command "config redundancy unit secondary" to make APs join it.

Figure 2-4 Status of Primary WLC (CLI)

```
(5500) >show redundancy summary
Redundancy Mode = SSO DISABLED
Local State = ACTIVE
Peer State = N/A
Unit = Primary
Unit ID = 30:F7:0D:31:82:E0
Redundancy State = N/A
Mobility MAC = 6C:20:56:64:B9:A0
Redundancy Management IP Address..... 9.5.56.11
Peer Redundancy Management IP Address... 9.5.56.10
Redundancy Port IP Address..... 169.254.56.11
Peer Redundancy Port IP Address..... 169.254.56.10
```

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Figure 2-5 Status of HA-SKU Secondary WLC (CLI)

```

(5500) >show redundancy summary
Redundancy Mode = SSO DISABLED
Local State = ACTIVE
Peer State = N/A
Unit = Secondary - HA SKU
Unit ID = 6C:20:56:64:B9:A0
Redundancy State = N/A
Mobility MAC = 6C:20:56:64:B9:A0

Redundancy Management IP Address..... 9.5.56.10
Peer Redundancy Management IP Address..... 9.5.56.11
Redundancy Port IP Address..... 169.254.56.10
Peer Redundancy Port IP Address..... 169.254.56.11

```

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Configuration of N+1 HA with HA-SKU with the GUI

From the primary controller, navigate to **Access Points > Global Configuration**, then configure the backup controller on the primary to point to the secondary controller. (See [Figure 2-6](#).)

Figure 2-6 Primary WLC (GUI)

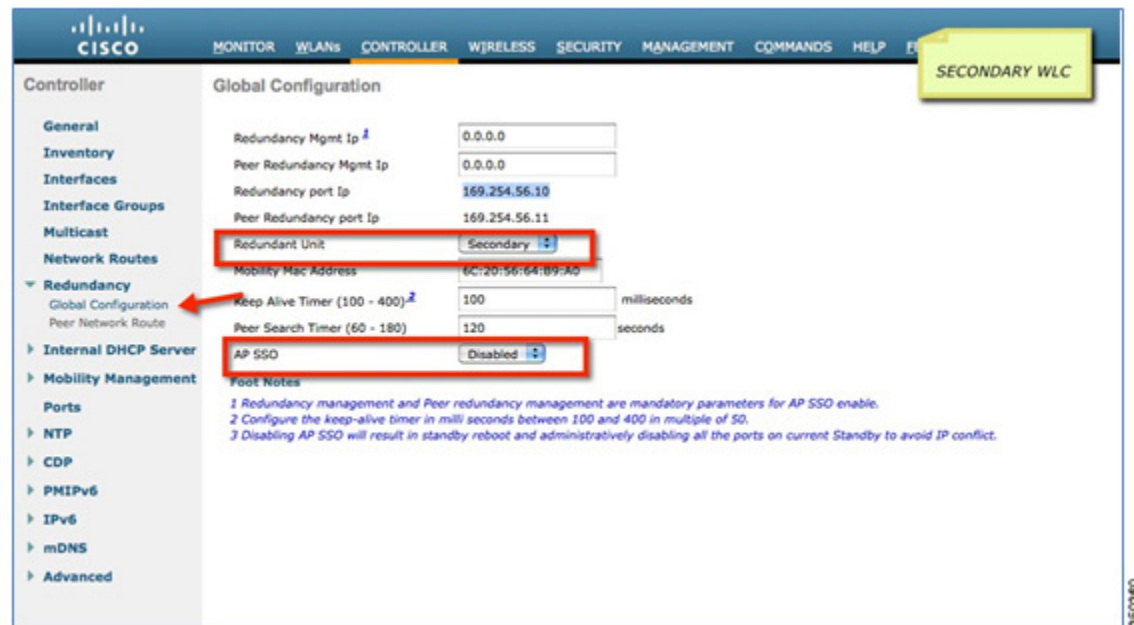
The screenshot shows the Cisco GUI for the Primary WLC Global Configuration. The 'High Availability' section is highlighted with a red box, showing the following configuration:

- AP Heartbeat Timeout(1-30): 30
- Local Mode AP Fast Heartbeat Timer State: Disable
- FlexConnect Mode AP Fast Heartbeat Timer State: Disable
- AP Primary Discovery Timeout(30 to 36000): 120
- Back-up Primary Controller IP Address: 9.5.56.2
- Back-up Primary Controller name: secondary
- Back-up Secondary Controller IP Address: (empty)
- Back-up Secondary Controller name: (empty)

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On the secondary controller, navigate to **Redundancy > Global Configuration**, then configure the secondary controller to convert it to an HA-SKU secondary controller. (See [Figure 2-7](#))

Figure 2-7 HA-SKU Secondary WLC (GUI)



Note AP SSO must be disabled to configure the controller to be an N+1 HA-SKU secondary controller.

Primary, Secondary, and Tertiary Redundancy with HA-SKU

An HA-SKU secondary controller can also be used as a primary, secondary, or tertiary controller. This can be configured under the AP specific configuration. (See [Figure 2-8](#).)

Figure 2-8 Primary, Secondary, and Tertiary Configuration (GUI)

The screenshot shows the Cisco GUI for configuring a wireless controller. The 'High Availability' tab is selected, and the 'Secondary Controller' field is highlighted with a red arrow. The configuration table is as follows:

	Name	Management IP Address
Primary Controller	Primary	9.5.56.3
Secondary Controller	Secondary	9.5.56.2
Tertiary Controller		

Below the table, the 'AP Failover Priority' is set to 'Low'.

The configuration on HA-SKU secondary controller is the same as shown previously.