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Cisco Catalyst 9800-L Wireless Controller Deployment Guide

Introduction

This document provides an overview of the Cisco® Catalyst® 9800-L Wireless Controllers and their deployment within the Cisco Digital Network Architecture.

Prerequisites

Requirements

There are no specific requirements for this document.

Components used

This document is not restricted to specific software and hardware versions.

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 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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Product overview

The Cisco Catalyst 9800-L, a next-generation wireless LAN controller for the midmarket segment, is built from the ground up for intent-based networking and runs Cisco IOS® XE Software. It combines over 15 years of RF innovation from our Cisco Aironet® portfolio and offers innovative wireless technologies, such as Cisco CleanAir® and Intelligent Capture, as well as a powerful networking OS that has been modernized with a modular design to give IT greater availability, programmability, and scale.

The Cisco Catalyst 9800-L Wireless Controller is an integral part of the intent-based networking portfolio. It provides support for 5-Gbps throughput and up to 250 access points and 5000 clients to help ensure high performance and scale for midmarket business-critical networks.

Figure 1.   Cisco Catalyst 9800-L Wireless Controller
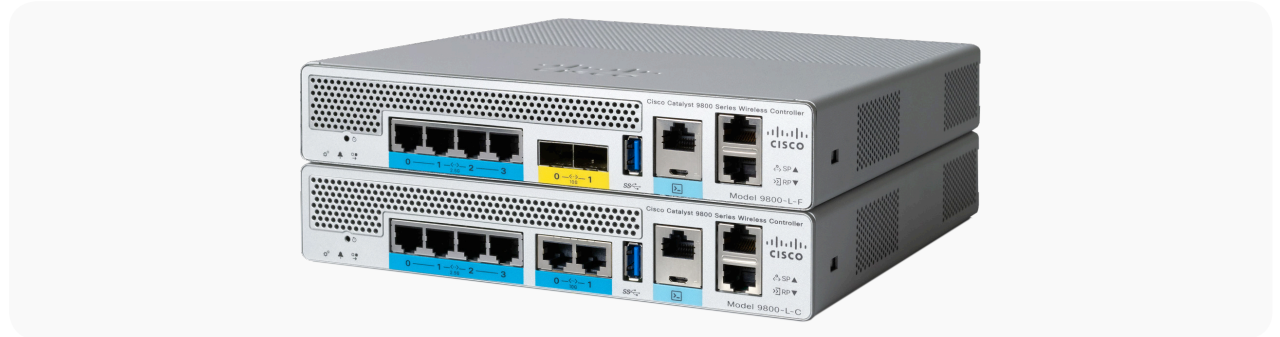
Tables 1 and 2 capture some of the key specifications and attributes of the Cisco Catalyst 9800-L platform.

Table 1.   Key hardware specifications

Chassis height	1 rack unit (RU)
Throughput	5 Gbps
Maximum AP support	250
Maximum client support	5000
Data ports	2x 10G/Multigigabit copper or 2x 10G/Multigigabit fiber, 4x 2.5G/1G copper
Console port	Dual RJ-45 + micro-B USB console port
USB port	Single USB 3.0

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Environmental conditions supported	Operating temperature:
	• 32° to 113°F (0° to 45°C) Note: The maximum temperature is derated by 1.0°C for every 1000 ft (305 m) of altitude above sea level.
	Nonoperating temperature: –13° to 158°F (–25° to 70°C)
	Operating humidity:
	• 10% to 95% noncondensing
	Nonoperating humidity:
	• 0% to 95% (noncondensing)
	Altitude:
	• Operating altitude: 0 to 3000 m (0 to 10,000 ft) • Nonoperating altitude: 0 to 12,192 m (0 to 40,000 ft)
	Electrical input:
	• AC input frequency range: 47 to 63 Hz • AC input range: 90 to 264 VAC
	Maximum power:
	• 9800-L-C maximum measured power: 86.9W (with 4.5W USB load) • 9800-L-F maximum measured power: 84.5W (assumes 2pc 2.5W SFP and with 4.5W USB load)
	Maximum heat dissipation:
	• 9800-L-C: 296.4 Btu/hr (with 4.5W USB load) • 9800-L-F: 288.2 Btu/hr (assumes 2pc 2.5W SFP and with 4.5W USB load)
	Sound power level measure:
	• Normal: 40 dBA at 25C • Maximum: 42.9 dBA at 40C
	Power adapter:
	• Input power: 100 to 240 VAC, 50/60 Hz

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Power	79.3W
Dimensions and weight	1.58 x 8.50 x 9.06 in 4.01 x 21.59 x 23.01 cm C9800-L-C: 3.95 lb. (1.79 kg) C9800-L-F: 4.01 lb. (1.82 kg)

Table 2.   Key attributes

Deployment modes	Centralized (local), Distributed Branch (Cisco FlexConnect®), SD-Access Wireless (fabric)
Maximum scale	250 APs 5000 clients
Connectivity	2x 10G/Multigigabit copper or 2x 10G/Multigigabit fiber, 4x 2.5G/1G copper
Maximum number of rogue APs management	1000
Maximum number of rogue client management	2500
Maximum number of local users	4000
Maximum number of RFIDs	5000
Maximum VLANs supported	4096
Maximum WLANs supported	4096
Fast secure roaming clients/maximum Pairwise Master Key (PMK) cache entries	10,000

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Max number of multicast groups	4096
Max number of interface groups	100
Max number of interfaces per interface group	64
Max number of mobility groups	72
Max number of guest anchor tunnels	72
Max number of Access Control Lists (ACLs)	128
Maximum number of sleeping clients	5000
Maximum number of web-authentication clients	5000
Maximum number of APs per Radio Resource Management (RRM) group	1000
Maximum AP join profiles	250
Maximum flex profiles	250
Maximum policy profiles	4096
Maximum RF profiles	500
Maximum site tags	250
Maximum RF tags	250
Maximum policy tags	4096

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Maximum number of Application Visibility and Control (AVC) flows	80,000
Maximum number of RADIUS servers	17
Maximum number of Scalable Group Tags (SGTs)	256
Maximum number of unique security group ACLs (SGACLs)	64
Maximum number of access control entries (ACEs) per SGACL	128

Platform support

The Cisco Catalyst 9800-L Wireless Controller is available in two SKUs as an appliance:

Copper model: C98000-L-C-K9

Fiber model: C9800-L-F-K9

Both SKUs support the following 802.11ax and 802.11ac Wave 1 and Wave 2 access point models:

- Cisco Catalyst 9115AX, 9117AX, and 9120AX Series
- Cisco Aironet 1800 Series, 2800, 3800,4800, 1540 Series, and 1560 Series
- Cisco Aironet 1700, 2700, 3700, and 1570 Series

Image specifications

The Cisco Catalyst 9800-L Wireless Controller supports all of the features of Cisco Catalyst Wireless software release 16.12.
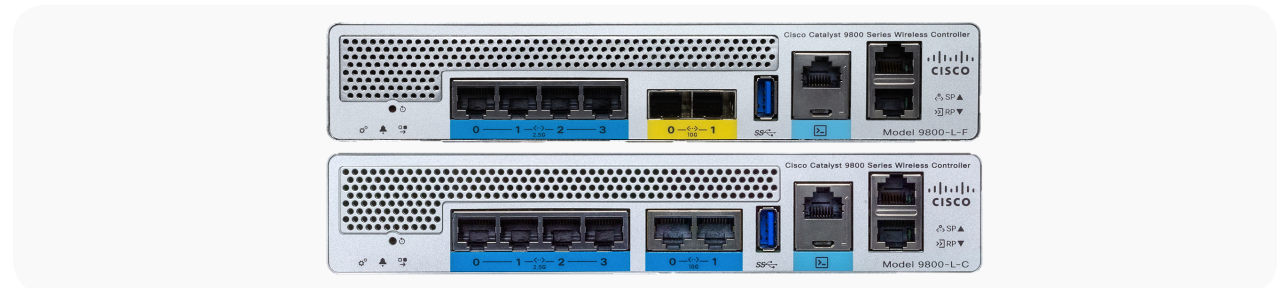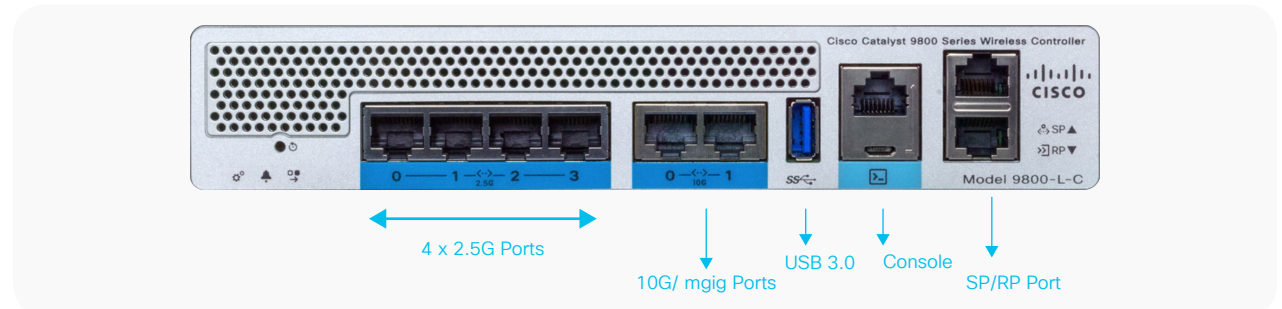
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Platform components

Front panel view

The Cisco Catalyst 9800-L Wireless Controller supports LED indicators, USB ports, console ports, 4x 2.5G/1G RJ-45 ports, and a 10G/Multigigabit port on the front panel.

Figure 2. Front panel

Physical ports supported

Data ports:

- 2x 10G/Multigigabit ports that can be auto-negotiated to 1G, 2.5G, 5G, and 10G speeds.

- 4x 2.5G/Multigigabit ports that can be auto-negotiated to 1G or 2.5G speeds.

- Ports 0 and 1 are 10G/Multigigabit copper or 10G/1G fiber. Ports 0, 1, 2, and 3 are 2.5G/1G copper.

- Service port: 1x GE port.

- High Availability (HA) port: 1x GE port.

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With this form factor, two controllers can be placed in the same rack to conserve rack space, as shown in Figure 3.

Figure 3.   Placement of two controllers in one rack (front, back, and overhead views)

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Supported SFP and SFP+ modules

Network ports for this controller support the following Cisco SFP and SFP+ modules:

SFP

- GLC-BX-D
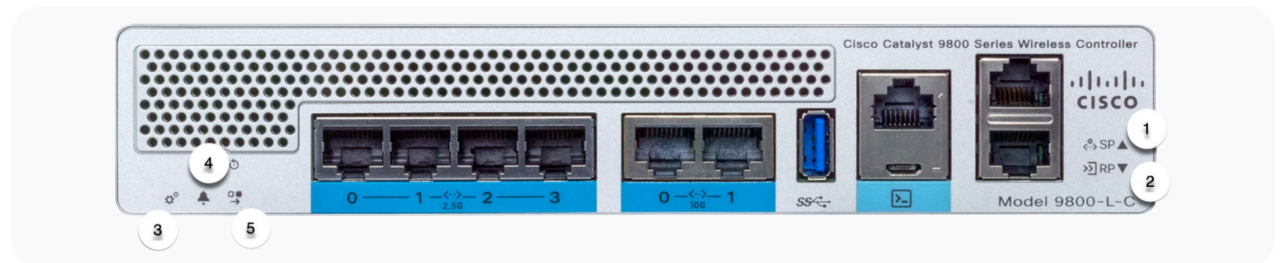- GLC-BX-U
- GLC-SX-MMD
- GLC-ZX-SMD

SFP+

- SFP-10G-SR
- SFP-10G-SR-X
- SFP-H10GB-ACU7M
- SFP-H10GB-ACU10M

Management LEDs and behavior

Figure 4 shows the LEDs on the front panel of the Cisco Catalyst 9800-L Wireless Controller:

1. RP (Redundancy Port) LED
2. SP (Service Port) LED
3. System LED
4. Alarm LED
5. HA (High Availability) LED

Figure 4.   Front panel LEDs

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Table 3.   LED descriptions

LED label	Description
Power	Green when on, unlit when off
USB	Green when connected and powered on, unlit when off
1G port	Solid green when linked, blinking green with activity, and unlit when off
Multigigabit port	Solid green when linked, blinking green with activity, and unlit when off
RP	Solid Green when HA Port paired with peer controller LED Off when HA disabled
SP	Solid Green when Linked, Blinking green with activity, and unlit when off

Table 4.   System LED descriptions

Color	Description
Off	System not receiving power
	System crash
	Firmware upgrade
	Temperature error
Blinking Green	System boot
Red	Controller error. For example, an internal voltage error exists

Table 5.   Alarm LED Descriptions

Color	Description
Blinking Green	Controller image upgrade
Amber	Controller status activity, such as firmware upgrade
Red	Controller error. For example, a temperature error exists

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Table 6.   HA (High Availability) LED

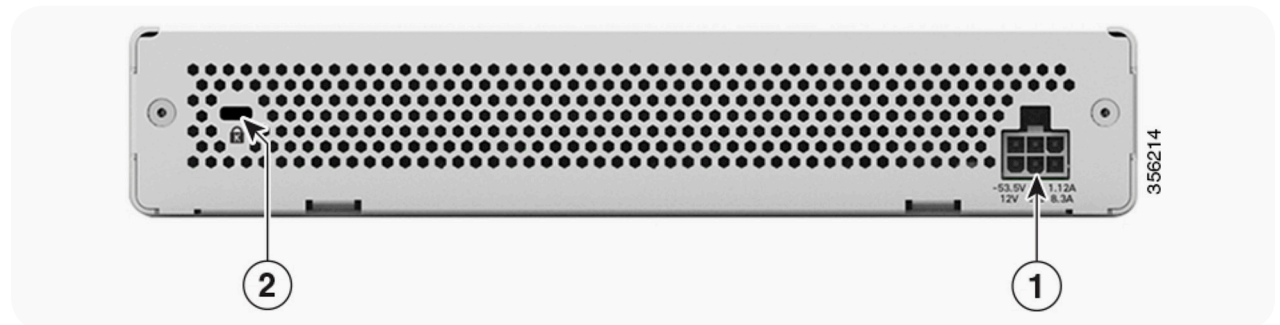| State	Status
HA disabled	Off
HA active	On
HA Hot Standby	Slow Blink

Rear panel view

The rear of the chassis supports:

1. 6-pin power connector for an external 12VDC/110W power adapter (C9800-AC-PWR)
2. Kensington lock feature

Figure 6 shows the rear of the 9800-L controller.

Figure 5.   Rear panel view

Fans

An internal blower provides forced-air cooling. Fan control is based on a simple linear, closed-loop, continuously variable voltage circuit that monitors the CPU temperature and external heatsink temperature. Built-in temperature hysteresis eliminates needless fan cycling.

Airflow is from front I/O side to the rear of the chassis. Do not block or obstruct airflow.

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High availability with SSO

The 9800-L supports full access point and client Stateful Switchover (SSO). Client SSO is supported for clients that have already completed the authentication and Dynamic Host Configuration Protocol (DHCP) phase and have started passing traffic. With client SSO, a client's information is synced to the standby wireless controller when the client associates to the wireless controller or the client's parameters change. Fully authenticated clients—the ones in the run state—are synced to the standby, thus avoiding client re-association on switchover and making the failover seamless for the APs as well as for the clients. This process results in zero client service downtime and zero SSID outage. The overall goal for the addition of AP and client SSO support to the Cisco Catalyst 9800-L Wireless Controller is to reduce major downtime in wireless networks due to failure conditions that may occur due to box failover, network failover, or a power outage at the primary site.

Figure 6.   High availability with SSO
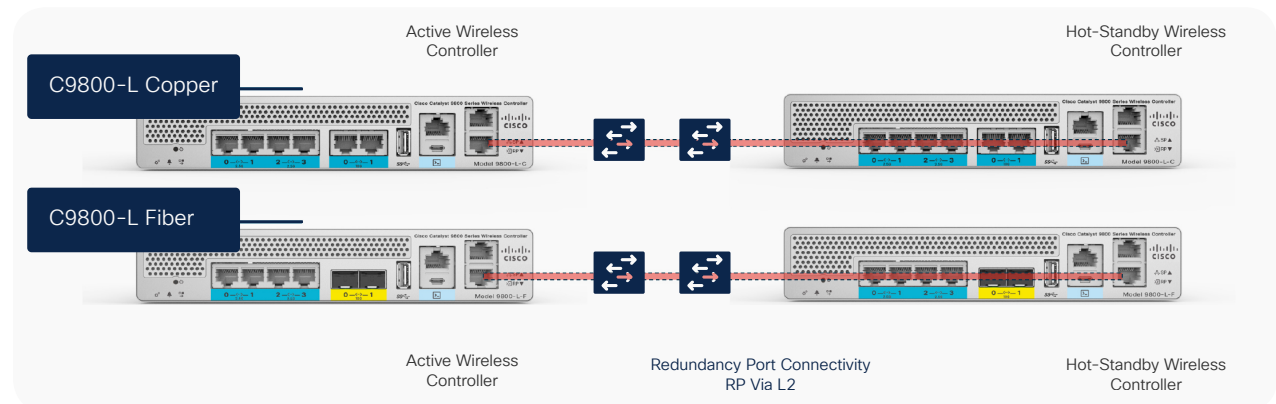
SSO prerequisites

- An HA pair can be formed only between two wireless controllers of the same form factor

- Both controllers must be running the same software version in order to form an HA pair

- Maximum rendezvous point (RP) link latency is 80 milliseconds Round-Trip Time (RTT), minimum bandwidth is 60 Mbps, and minimum maximum transmission unit (MTU) is 1500

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Licensing

The Cisco Catalyst 9800-L supports Smart Licensing (SL) as the default mode. The functionality is in line with the Cisco Catalyst 9800 Series Wireless Controller platforms.

License registration is supported via Cisco Smart Software, and the various supported by the Smart licensing component for connecting to the Smart Licensing Server are supported.

Specific License Registration (SLR) is also supported. Four types of licensing are available: Network Essentials with an add-on of Cisco DNA Essentials, and Network Advantage with an add-on of Cisco DNA Advantage.

Summary

The Cisco Catalyst 9800-L next-generation controller for the midmarket segment delivers a modernized modular OS that supports IT simplicity and robust security. With flexible connectivity to uplinks with copper and fiber, it offers investment protection into the future. It is open and programmable with standards-based APIs that make bridging IT processes seamless. With support for high availability and seamless software updates, it is ideal for mission-critical networks with up to 250 APs. It supports all deployment modes and seamless roaming with existing AireOS platforms as well, for a seamless migration.