

Cisco Catalyst 9800 Series Wireless Controllers Data Sheet



Router-Switch.com
Leading Network Hardware Supplier

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OVERVIEW

With business-critical applications running on billions of wireless devices, customers need a wireless network that is always on, secure, and flexible.

Catalyst 9800 Series Wireless Controllers combine the best of RF excellence with IOS XE benefits. These are the industry's most reliable and highly secure controllers, ready to deploy anywhere--including the cloud of your choice. They provide operational ease and save time and money.

Features and benefits

• Always on

High availability and seamless software updates, enabled by hot patching, keep your clients and services always on during planned and unplanned events.

Secure wireless access

• Secure

Help secure air, devices, and users. With Encrypted Traffic Analytics and SD-Access, wireless infrastructure becomes your strongest first line of defense. Catalyst 9800 controllers come with built-in security: secure boot, runtime defenses, image signing, integrity verification, and hardware authenticity.

• Deploy anywhere

Deploy anywhere to help enable wireless connectivity everywhere. Whether on premises, in public and private cloud, or embedded on a switch, Catalyst 9800 controllers have multiple scale options to best meet your organization's needs.

PLATFORMS

Catalyst 9800 Series Wireless Controllers provide four platforms:

Catalyst 9800-40

- For small to medium-sized campus deployments
- Up to 2,000 APs, 32,000 clients, and 40-Gbps throughput
- Hot patching, time saving and hitless upgrades
- Advanced, on-demand telemetry

Catalyst 9800-80

- For large campus and service provider deployments
- Up to 6000 APs, 64,000 clients, and 80-Gbps throughput
- Hot patching, time saving and hitless upgrades
- Advanced, on-demand telemetry

Catalyst 9800-CL

- Deploy in private or public (AWS) cloud
- Up to 6,000 APs and 64,000 clients
- Hot patching, time saving and hitless upgrades
- Advanced, on-demand telemetry

Embedded wireless

- Catalyst 9800 embedded on a Catalyst 9000 switch
- Ideal for SD-Access-enabled distributed branches and small campuses

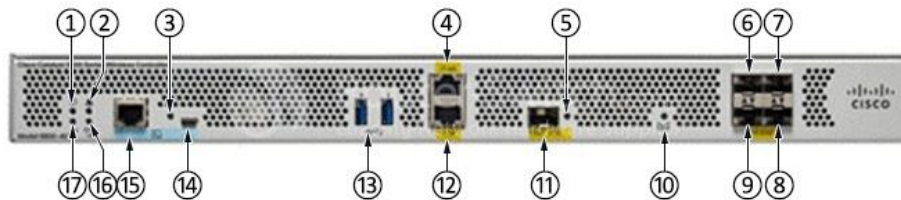
- Up to 200 APs and 4,000 clients
- Hot patching, time saving and hitless upgrades

CATALYST 9800-40 OVERVIEW & SPECIFICATION

C9800-40-K9 is the Cisco Catalyst 9800-40 Wireless Controller.

Appearance

Figure 1 shows the front panel of Cisco Catalyst 9800-40.



Note:

①	PWR: Power LED	⑩	SSD: SSD activity LED
②	ALM: Alarm LED	⑪	RP: 1 GE SFP port (the only SFPs supported on the RP port are GLC-SX-MMD and GLC-LH-SMD)
③	EN: USB console-enabled LED	⑫	RP: RJ-45 10/100/1000 redundancy Ethernet port
④	SP: RJ-45 10/100/1000 management Ethernet port	⑬	USB ports 0 and 1
⑤	LINK: RJ-45 connector LED	⑭	CON: Mini USB console port
⑥	TE1: 1 GE SFP/10 GE SFP+ port 1	⑮	CON: RJ-45 compatible console port
⑦	TE3: 1 GE SFP/10 GE SFP+ port 3	⑯	HA: High-availability LED
⑧	TE2: 1 GE SFP/10 GE SFP+ port 2	⑰	SYS: System LED
⑨	TE0: 1 GE SFP/10 GE SFP+ port 0		

Figure 2 shows the back panel of Cisco Catalyst 9800-40.



Note:

①	Fans	③	Power supply (PEM 0)
②	Optional redundant power supply (PEM 1)	④	Power/standby switch

Supported Products

Table 2 shows the recommended supported products.

Model	Description
LIC-C9800-DTLS-K9	Cisco Catalyst 9800 Series Wireless Controller DTLS License
C9800-AC-750W R=	Cisco Catalyst 9800-40 750W AC Power Supply Reverse Air
GLC-BX-D	1000BASE-BX SFP, 1490NM
GLC-BX-U	1000BASE-BX SFP, 1310NM
GLC-LH-SMD	Cisco GLC-LH-SMD 1000BASE-LX/LH SFP transceiver module, MMF/SMF, 1310nm, DOM
GLC-SX-MMD	Cisco GLC-SX-MMD 1000BASE-SX SFP transceiver module, MMF, 850nm, DOM
GLC-ZX-SMD	Cisco GLC-ZX-SMD 1000BASE-ZX SFP transceiver module, SMF, 1550nm, DOM
GLC-TE	1000BASE-T SFP transceiver module for Category 5 copper wire
SFP-10G-SR	10GBASE-SR SFP Module
SFP-10G-SR-X=	SFP-10G-SR-X= 10GBASE-SR SFP Module, LC connector, 850nm, 300m range, multimode fiber (MMF), extended operating temperature range
SFP-10G-LR	10GBASE-LR SFP+ Module for SMF 10 Gbps
SFP-10G-LRM	10GBASE-LRM SFP Module
SFP-10G-ER	Cisco 10GBASE-ER SFP+ Module for SMF
CISCO SFP-10G-ZR	Cisco 10GBASE-ZR SFP10G Module for SMF
SFP-H10GB-ACU7M	Cisco Direct-Attach Active Optical Cables with SFP+ Connectors, SFP-H10GB-ACU7M
SFP-H10GB-ACU10M	Cisco SFP-H10GB-ACU10M Direct-Attach Active Optical Cables with SFP+ Connectors

Specification

Table 3 shows the specification.

C9800-40-K9 Specification	
Maximum number of access points	Up to 2000
Maximum number of clients	32,000
Maximum throughput	Up to 40 Gbps
Maximum WLANs	4096
Maximum VLANs	4096
Max Site Tags	2000
Max APs per Site	100
Max Policy Tags	2000
Max RF Tags	2000
Max RF Profiles	4000
Max Policy Profiles	1000
Max Flex Profiles	2000
Interfaces	4x 10 GE/1 GE SFP+/SFP
Power supply	AC power with optional redundant AC power
Maximum power consumption	381W
Deployment modes	Centralized, Cisco FlexConnect®, and Fabric Wireless (SD-Access)

Form factor	1RU
License	Smart License enabled
Operating system	Cisco IOS XE
Management	Cisco DNA Center™ 1.2.8, Cisco Prime® Infrastructure 3.5, integrated WebUI, and third party (open standards APIs)
Interoperability	AireOS-based controllers with 8.8 MR2, 8.5 MR4, and 8.5 MR3 special
Policy engine	Cisco Identity Services Engine (ISE) 2.2, 2.3, and 2.4
Cisco Connected Mobile Experiences (CMX)	CMX 10.5.1
Access points	Aironet 802.11ac Wave 1 and Wave 2 access points
Dimension (W × D × H)	17.3 inches × 19.5 inches × 1.72 inches (43.94 cm × 49.53 cm × 4.37 cm)
Weight	22.8 lb (10.34 kg)
Wireless standards	IEEE 802.11a, 802.11b, 802.11g, 802.11d, WMM/802.11e, 802.11h, 802.11n, 802.11k, 802.11r, 802.11u, 802.11w, 802.11ac Wave1 and Wave2
Wired, switching, and routing standards	IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX, 1000BASE-T, 1000BASE-SX, 1000BASE-LH, IEEE 802.1Q VLAN taggin, 802.1AX Link Aggregation
Data standards	<ul style="list-style-type: none"> ● RFC 768 User Datagram Protocol (UDP) ● RFC 791 IP ● RFC 2460 IPv6 ● RFC 792 Internet Control Message Protocol (ICMP) ● RFC 793 TCP ● RFC 826 Address Resolution Protocol (ARP) ● RFC 1122 Requirements for Internet Hosts ● RFC 1519 Classless Interdomain Routing (CIDR) ● RFC 1542 Bootstrap Protocol (BOOTP) ● RFC 2131 Dynamic Host Configuration Protocol (DHCP) ● RFC 5415 Control and Provisioning of Wireless Access Points (CAPWAP) Protocol ● RFC 5416 CAPWAP Binding for 802.11
Security standards	<ul style="list-style-type: none"> ● Wi-Fi Protected Access (WPA) ● IEEE 802.11i (WPA2, RSN) ● RFC 1321 MD5 Message-Digest Algorithm ● RFC 1851 Encapsulating Security Payload (ESP) Triple DES (3DES) Transform ● RFC 2104 HMAC: Keyed-Hashing for Message Authentication ● RFC 2246 TLS Protocol Version 1.0 ● RFC 2401 Security Architecture for the Internet Protocol ● RFC 2403 HMAC-MD5-96 within ESP and AH ● RFC 2404 HMAC-SHA-1-96 within ESP and AH ● RFC 2405 ESP DES-CBC Cipher Algorithm with Explicit IV ● RFC 2407 Interpretation for Internet Security Association Key Management Protocol (ISAKMP) ● RFC 2408 ISAKMP ● RFC 2409 Internet Key Exchange (IKE)

	<ul style="list-style-type: none"> ● RFC 2451 ESP CBC-Mode Cipher Algorithms ● RFC 3280 Internet X.509 Public Key Infrastructure (PKI) Certificate and Certificate Revocation List (CRL) Profile ● RFC 4347 Datagram Transport Layer Security (DTLS) ● RFC 5246 TLS Protocol Version 1.2
Encryption standards	<ul style="list-style-type: none"> ● Static Wired Equivalent Privacy (WEP) RC4 40, 104 and 128 bits ● Advanced Encryption Standard (AES): Cipher Block Chaining (CBC), Counter with CBC-MAC (CCM), Counter with CBC Message Authentication Code Protocol (CCMP) ● Data Encryption Standard (DES): DES-CBC, 3DES ● Secure Sockets Layer (SSL) and Transport Layer Security (TLS): RC4 128-bit and RSA 1024- and 2048-bit ● DTLS: AES-CBC ● IPsec: DES-CBC, 3DES, AES-CBC ● 802.1AE MACsec encryption
Authentication, Authorization, and Accounting (AAA) standards	<ul style="list-style-type: none"> ● IEEE 802.1X ● RFC 2548 Microsoft Vendor-Specific RADIUS Attributes ● RFC 2716 Point-to-Point Protocol (PPP) Extensible Authentication Protocol (EAP)-TLS ● RFC 2865 RADIUS Authentication ● RFC 2866 RADIUS Accounting ● RFC 2867 RADIUS Tunnel Accounting ● RFC 2869 RADIUS Extensions ● RFC 3576 Dynamic Authorization Extensions to RADIUS ● RFC 5176 Dynamic Authorization Extensions to RADIUS ● RFC 3579 RADIUS Support for EAP ● RFC 3580 IEEE 802.1X RADIUS Guidelines ● RFC 3748 Extensible Authentication Protocol (EAP) ● Web-based authentication ● TACACS support for management users
Management standards	<ul style="list-style-type: none"> ● Simple Network Management Protocol (SNMP) v1, v2c, v3 ● RFC 854 Telnet ● RFC 1155 Management Information for TCP/IP-based Internets ● RFC 1156 MIB ● RFC 1157 SNMP ● RFC 1213 SNMP MIB II ● RFC 1350 Trivial File Transfer Protocol (TFTP) ● RFC 1643 Ethernet MIB ● RFC 2030 Simple Network Time Protocol (SNTP) ● RFC 2616 HTTP ● RFC 2665 Ethernet-Like Interface Types MIB ● RFC 2674 Definitions of Managed Objects for Bridges with Traffic Classes, Multicast Filtering, and Virtual Extensions

	<ul style="list-style-type: none"> ● RFC 2819 Remote Monitoring (RMON) MIB ● RFC 2863 Interfaces Group MIB ● RFC 3164 Syslog ● RFC 3414 User-Based Security Model (USM) for SNMPv3 ● RFC 3418 MIB for SNMP ● RFC 3636 Definitions of Managed Objects for IEEE 802.3 MAUs ● RFC 4741 Base NETCONF protocol ● RFC 4742 NETCONF over SSH ● RFC 6241 NETCONF ● RFC 6242 NETCONF over SSH ● RFC 5277 NETCONF event notifications ● RFC 5717 Partial Lock Remote Procedure Call ● RFC 6243 With-Defaults capability for NETCONF ● RFC 6020 YANG ● Cisco private MIBs
Management interfaces	<ul style="list-style-type: none"> ● Web-based: HTTP/HTTPS ● Command-line interface: Telnet, Secure Shell (SSH) Protocol, serial port ● SNMP ● NETCONF
Hard Disk Drives (HDD)	<ul style="list-style-type: none"> ● SATA Solid-State Drive (SSD) ● 240 GB of memory
Environmental conditions supported	<p>Operating temperature:</p> <ul style="list-style-type: none"> ● Normal: 5° to 40° C (41° to 104°F) ● Short term: 5° to 50° C (41° to 122°F) <p>Nonoperating temperature:</p> <ul style="list-style-type: none"> ● -40° to 65° C (-104° to 149°F) <p>Operating humidity:</p> <ul style="list-style-type: none"> ● Nominal: 5% to 85% no-condensing ● Short term: 5% to 90% noncondensing <p>Nonoperating temperature humidity:</p> <ul style="list-style-type: none"> ● 5% to 93% at 82°F (28°C) <p>Operating altitude:</p> <ul style="list-style-type: none"> ● Appliance operating: 0 to 3000 m (0 to 10,000 ft) ● Appliance nonoperating: 0 to 12,192 m (0 to 40,000 ft) <p>Electrical input:</p> <ul style="list-style-type: none"> ● AC input frequency range: 47 to 63 Hz ● AC input range: 90 to 264 VAC with AC PEM ● 1100W AC with optional redundant power supply (hot-swappable) <p>Maximum power: 381W</p> <p>Heat dissipation: 1,300 BTU/hr</p> <p>Sound power level measure:</p> <ul style="list-style-type: none"> ● A-weighted sound power level is 74.1 LpAm(dBA) @ 27C nominal operation
Regulatory compliance	Safety:

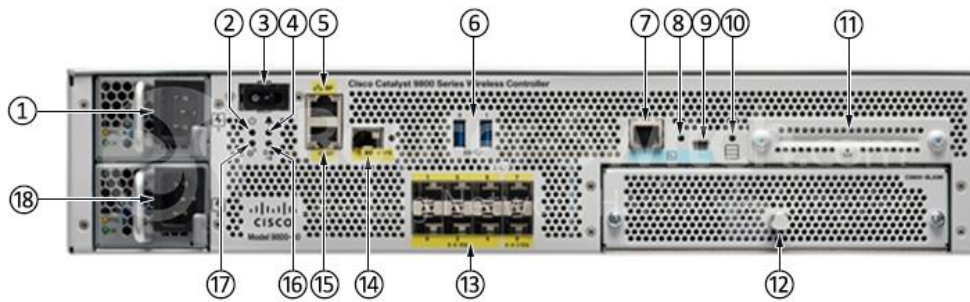
- UL/CSA 60950-1
 - IEC/EN 60950-1
 - AS/NZS 60950.1
 - CAN/CSA-C22.2 No. 60950-1
- EMC – Emissions – Class A
- FCC 47CFR15
 - AS/NZS CISPR 22
 - CISPR 22
 - EN55022/EN55032 (EMI-1)
 - ICES-003
 - VCCI
 - KN 32 (EMI-2)
 - CNS-13438
- EMC – Emissions:
- EN61000-3-2 Power Line Harmonics (EMI-3)
 - EN61000-3-3 Voltage Changes, Fluctuations, and Flicker (EMI-3)
- EMC – Immunity:
- IEC/EN61000-4-2 Electrostatic Discharge Immunity
 - IEC/EN61000-4-3 Radiated Immunity
 - IEC/EN61000-4-4 EFT-B Immunity (AC Power Leads)
 - IEC/EN61000-4-4 EFT-B Immunity (DC Power Leads)
 - IEC/EN61000-4-4 EFT-B Immunity (Signal Leads)
 - IEC/EN61000-4-5 Surge AC Port
 - IEC/EN61000-4-5 Surge DC Port
 - IEC/EN61000-4-5 Surge Signal Port
 - IEC/EN61000-4-6 Immunity to Conducted Disturbances
 - IEC/EN61000-4-8 Power Frequency Magnetic Field Immunity
 - IEC/EN61000-4-11 Voltage Dips, Short Interruptions, and Voltage Variations
 - K35 (EMI-2)
- EMC (ETSI/EN)
- EN 300 386 Telecommunications Network Equipment (EMC) (EMC-3)
 - EN55022 Information Technology Equipment (Emissions)
 - EN55024/CISPR 24 Information Technology Equipment (Immunity)
 - EN50082-1/EN61000-6-1 Generic Immunity Standard (EMC-4)

CATALYST 9800-80 OVERVIEW & SPECIFICATION

C9800-80-K9 is the Cisco Catalyst 9800-80 Wireless Controller.

Appearance

Figure 3 shows the front panel of Catalyst 9800-80.



Note:

①	Power supply (PEM 1)	⑩	SSD: SSD activity LED
②	PWR: Power LED	⑪	SSD access
③	Power (PWR) switch	⑫	Modular uplink
④	ALM: Alarm LED	⑬	Fixed: 6x 10 GE and 2x 1 GE or 8x 10 GE
⑤	SP: RJ-45 10/100/1000 management Ethernet port	⑭	RP: 1 GE SFP port (the only SFPs supported on the RP port are GLC-SX-MMD and GLC-LH-SMD)
⑥	USB ports 0 and 1	⑮	RP: RJ-45 10/100/1000 redundancy Ethernet port
⑦	CON: RJ-45 compatible console port	⑯	HA: High-availability LED
⑧	LINK: RJ-45 connector LED	⑰	SYS: System LED
⑨	CON: Mini USB console port	⑱	Power supply (PEM 0)

Figure 4 shows the back panel of Catalyst 9800-80.



Supported Products

Table 3 shows the recommended supported products.

Model	Description
LIC-C9800-DTLS-K9	Cisco Catalyst 9800 Series Wireless Controller DTLS License
GLC-BX-D	1000BASE-BX SFP, 1490NM
GLC-BX-U	1000BASE-BX SFP, 1310NM
GLC-LH-SMD	Cisco GLC-LH-SMD 1000BASE-LX/LH SFP transceiver module, MMF/SMF, 1310nm, DOM

GLC-SX-MMD	Cisco GLC-SX-MMD 1000BASE-SX SFP transceiver module, MMF, 850nm, DOM
GLC-ZX-SMD	Cisco GLC-ZX-SMD 1000BASE-ZX SFP transceiver module, SMF, 1550nm, DOM
GLC-TE	1000BASE-T SFP transceiver module for Category 5 copper wire
SFP-10G-SR	10GBASE-SR SFP Module
SFP-10G-SR-X=	SFP-10G-SR-X= 10GBASE-SR SFP Module, LC connector, 850nm, 300m range, multimode fiber (MMF), extended operating temperature range
SFP-10G-LR	10GBASE-LR SFP+ Module for SMF 10 Gbps
SFP-10G-LRM	10GBASE-LRM SFP Module
SFP-10G-ER	Cisco 10GBASE-ER SFP+ Module for SMF
CISCO SFP-10G-ZR	Cisco 10GBASE-ZR SFP10G Module for SMF
SFP-H10GB-ACU7M	Cisco Direct-Attach Active Optical Cables with SFP+ Connectors, SFP-H10GB-ACU7M
SFP-H10GB-ACU10M	Cisco SFP-H10GB-ACU10M Direct-Attach Active Optical Cables with SFP+ Connectors
QSFP-40G-SR4	40GBASE-SR4 QSFP Transceiver Module with MPO Connector
QSFP-40GE-LR4	40GBASE-LR4 QSFP+ transceiver module for SMF, 4 CWDM lanes in 1310 nm window Muxed inside module, duplex LC connector, 10km reach
C9800-AC-1100W	Cisco Catalyst Wireless Controller 1100 AC Power Supply
C9800-DC-950W	Cisco Catalyst Wireless Controller 950W DC Power Supply
C9800-18X1GE	Cisco Catalyst 9800-80 GE Module
C9800-10X10E	Cisco Catalyst 9800-80 10 GE Module
C9800-1X40GE	Cisco Catalyst 9800-80 1 Port 40 GE Module
C9800-2X40GE	Cisco Catalyst 9800-80 2 Ports 40 GE Module
C9800-1X100GE	Cisco Catalyst 9800-80 1 Port 100 GE Module

Specification

Table 4 shows the specification.

C9800-80-K9 Specification	
Maximum number of access points	Up to 6000
Maximum number of clients	64,000
Maximum throughput	Up to 80 Gbps
Maximum WLANs	4096
Maximum VLANs	4096
Max site tags	6000
Max APs per site	100
Max policy tags	6000
Max RF tags	6000
Max RF profiles	12000
Max policy profiles	1000
Max flex profiles	6000
Fixed uplinks	8x 10 GE or 6x 10 GE + 2x 1 GE SFP+/SFP
Modular uplinks (optional)	The supported uplink modules are: <ul style="list-style-type: none"> ● C9800-18X1GE(=) ● C9800-10X10GE(=)

	<ul style="list-style-type: none"> ● C9800-1X40GE(=) ● C9800-2X40GE(=) ● C9800-1X100GE(=) <p>The uplink modules are hot-swappable. Supports 10 GE, 40 GE, and 100 GE QSFP transceivers</p>
Redundant power supply	AC or DC power supply
Maximum power consumption with modules	600W
Deployment modes	Centralized, Cisco FlexConnect®, and Fabric Wireless (SD-Access)
Form factor	2RU
License	Smart License enabled
Operating system	Cisco IOS XE
Management	Cisco DNA Center™ 1.2.8, Cisco Prime® Infrastructure 3.5, integrated WebUI, and third party (open standards APIs)
Interoperability	AireOS-based controllers with 8.8 MR2, 8.5 MR4 and 8.5 MR3 special
Policy engine	Cisco Identity Services Engine (ISE) 2.2, 2.3, and 2.4
Cisco Connected Mobile Experiences (CMX)	CMX 10.5.1
Access points	Aironet 802.11ac Wave 1 and Wave 2 access points
Dimension (W × D × H)	17.3 × inches × 20.5 inches × 3.47 inches (43.94 cm × 52.07 cm × 8.81 cm)
Weight	31.5 lb (14.29 kg)
Wireless	IEEE 802.11a, 802.11b, 802.11g, 802.11d, WMM/802.11e, 802.11h, 802.11n, 802.11k, 802.11r, 802.11u, 802.11w, 802.11ac Wave 1 and Wave 2
Wired, switching, and routing	IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX, 1000BASE-T, 1000BASE-SX, 1000-BASE-LH, IEEE 802.1Q VLAN tagging, IEEE 802.1AX Link Aggregation
Data standards	<ul style="list-style-type: none"> ● RFC 768 User Datagram Protocol (UDP) ● RFC 791 IP ● RFC 2460 IPv6 ● RFC 792 Internet Control Message Protocol (ICMP) ● RFC 793 TCP ● RFC 826 Address Resolution Protocol (ARP) ● RFC 1122 Requirements for Internet Hosts ● RFC 1519 Classless Interdomain Routing (CIDR) ● RFC 1542 Bootstrap Protocol (BOOTP) ● RFC 2131 Dynamic Host Configuration Protocol (DHCP) ● RFC 5415 Control and Provisioning of Wireless Access Points (CAPWAP) Protocol ● RFC 5416 CAPWAP Binding for 802.11
Security standards	<ul style="list-style-type: none"> ● Wi-Fi Protected Access (WPA) ● IEEE 802.11i (WPA2, RSN) ● RFC 1321 MD5 Message-Digest Algorithm ● RFC 1851 Encapsulating Security Payload (ESP) Triple DES (3DES) Transform ● RFC 2104 HMAC: Keyed-Hashing for Message Authentication

	<ul style="list-style-type: none"> ● RFC 2246 TLS Protocol Version 1.0 ● RFC 2401 Security Architecture for the Internet Protocol ● RFC 2403 HMAC-MD5-96 within ESP and AH ● RFC 2404 HMAC-SHA-1-96 within ESP and AH ● RFC 2405 ESP DES-CBC Cipher Algorithm with Explicit IV ● RFC 2407 Interpretation for Internet Security Association Key Management Protocol (ISAKMP) ● RFC 2408 ISAKMP ● RFC 2409 Internet Key Exchange (IKE) ● RFC 2451 ESP CBC-Mode Cipher Algorithms ● RFC 3280 Internet X.509 Public Key Infrastructure (PKI) Certificate and Certificate Revocation List (CRL) Profile ● RFC 4347 Datagram Transport Layer Security (DTLS) ● RFC 5246 TLS Protocol Version 1.2
Encryption standards	<ul style="list-style-type: none"> ● Static Wired Equivalent Privacy (WEP) RC4 40, 104 and 128 bits ● Advanced Encryption Standard (AES): Cipher Block Chaining (CBC), Counter with CBC-MAC (CCM), Counter with CBC Message Authentication Code Protocol (CCMP) ● Data Encryption Standard (DES): DES-CBC, 3DES ● Secure Sockets Layer (SSL) and Transport Layer Security (TLS): RC4 128-bit and RSA 1024- and 2048-bit ● DTLS: AES-CBC ● IPsec: DES-CBC, 3DES, AES-CBC ● 802.1AE MACsec encryption
Authentication, Authorization, and Accounting (AAA)	<ul style="list-style-type: none"> ● IEEE 802.1X ● RFC 2548 Microsoft Vendor-Specific RADIUS Attributes ● RFC 2716 Point-to-Point Protocol (PPP) Extensible Authentication Protocol (EAP)-TLS ● RFC 2865 RADIUS Authentication ● RFC 2866 RADIUS Accounting ● RFC 2867 RADIUS Tunnel Accounting ● RFC 2869 RADIUS Extensions ● RFC 3576 Dynamic Authorization Extensions to RADIUS ● RFC 5176 Dynamic Authorization Extensions to RADIUS ● RFC 3579 RADIUS Support for EAP ● RFC 3580 IEEE 802.1X RADIUS Guidelines ● RFC 3748 Extensible Authentication Protocol (EAP) ● Web-based authentication ● TACACS support for management users
Management standards	<ul style="list-style-type: none"> ● Simple Network Management Protocol (SNMP) v1, v2c, v3 ● RFC 854 Telnet ● RFC 1155 Management Information for TCP/IP-based Internets ● RFC 1156 MIB ● RFC 1157 SNMP ● RFC 1213 SNMP MIB II

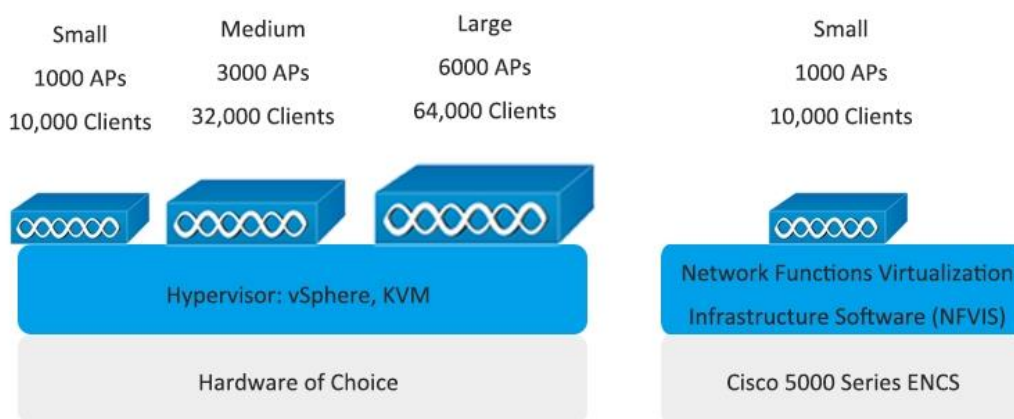
	<ul style="list-style-type: none"> ● RFC 1350 Trivial File Transfer Protocol (TFTP) ● RFC 1643 Ethernet MIB ● RFC 2030 Simple Network Time Protocol (SNTP) ● RFC 2616 HTTP ● RFC 2665 Ethernet-Like Interface Types MIB ● RFC 2674 Definitions of Managed Objects for Bridges with Traffic Classes, Multicast Filtering, and Virtual Extensions ● RFC 2819 Remote Monitoring (RMON) MIB ● RFC 2863 Interfaces Group MIB ● RFC 3164 Syslog ● RFC 3414 User-Based Security Model (USM) for SNMPv3 ● RFC 3418 MIB for SNMP ● RFC 3636 Definitions of Managed Objects for IEEE 802.3 MAUs ● RFC 4741 Base NETCONF protocol ● RFC 4742 NETCONF over SSH ● RFC 6241 NETCONF ● RFC 6242 NETCONF over SSH ● RFC 5277 NETCONF event notifications ● RFC 5717 Partial Lock Remote Procedure Call ● RFC 6243 With-Defaults capability for NETCONF ● RFC 6020 YANG ● Cisco private MIBs
Management interfaces	<ul style="list-style-type: none"> ● Web-based: HTTP/HTTPS ● Command-line interface: Telnet, Secure Shell (SSH) Protocol, serial port ● SNMP ● NETCONF
Hard Disk Drives (HDD)	<ul style="list-style-type: none"> ● SATA solid-state drive (SSD) ● 240 GB of memory
Environmental conditions supported	<p>Operating temperature:</p> <ul style="list-style-type: none"> ● Normal: 5° to 40° C (41° to 104°F) ● Short term: 5° to 50° C (41° to 122°F) <p>Nonoperating temperature:</p> <ul style="list-style-type: none"> ● -40° to 65° C (-104° to 149°F) <p>Operating humidity:</p> <ul style="list-style-type: none"> ● Normal: 5% to 85% noncondensing ● Short term: 5% to 90% noncondensing <p>Nonoperating temperature humidity:</p> <ul style="list-style-type: none"> ● 5% to 93% at 82°F (28°C) <p>Operating altitude:</p> <ul style="list-style-type: none"> ● Appliance operating: 0 to 3000 m (0 to 10,000 ft) ● Appliance nonoperating: 0 to 12,192 m (0 to 40,000 ft) <p>Electrical input:</p> <ul style="list-style-type: none"> ● AC input frequency range: 47 to 63 Hz

	<ul style="list-style-type: none"> ● AC input range: 90 to 264 VAC with AC PEM ● DC input range: -40 to -72 VDC with DC PEM <p>Maximum power with modules: 600W Heat dissipation: 2047 BTU/hr Sound power level measure:</p> <ul style="list-style-type: none"> ● A-weighted sound power level is 70.5 LpAm(dBA) @ 27C nominal operation
Regulatory compliance	<p>Safety:</p> <ul style="list-style-type: none"> ● UL/CSA 60950-1 ● IEC/EN 60950-1 ● AS/NZS 60950.1 ● CAN/CSA-C22.2 No. 60950-1 <p>EMC – Emissions: Class A</p> <ul style="list-style-type: none"> ● FCC 47CFR15 ● AS/NZS CISPR 22 ● CISPR 22 ● EN55022/EN55032 (EMI-1) ● ICES-003 ● VCCI ● KN 32 (EMI-2) ● CNS-13438 <p>EMC – Emissions:</p> <ul style="list-style-type: none"> ● EN61000-3-2 Power Line Harmonics (EMI-3) ● EN61000-3-3 Voltage Changes, Fluctuations, and Flicker (EMI-3) <p>EMC – Immunity:</p> <ul style="list-style-type: none"> ● IEC/EN61000-4-2 Electrostatic Discharge Immunity ● IEC/EN61000-4-3 Radiated Immunity ● IEC/EN61000-4-4 EFT-B Immunity (AC Power Leads) ● IEC/EN61000-4-4 EFT-B Immunity (DC Power Leads) ● IEC/EN61000-4-4 EFT-B Immunity (Signal Leads) ● IEC/EN61000-4-5 Surge AC Port ● IEC/EN61000-4-5 Surge DC Port ● IEC/EN61000-4-5 Surge Signal Port ● IEC/EN61000-4-6 Immunity to Conducted Disturbances ● IEC/EN61000-4-8 Power Frequency Magnetic Field Immunity ● IEC/EN61000-4-11 Voltage Dips, Short Interruptions, and Voltage Variations ● K35 (EMI-2) <p>EMC (ETSI/EN)</p> <ul style="list-style-type: none"> ● EN 300 386 Telecommunications Network Equipment (EMC) (EMC-3) ● EN55022 Information Technology Equipment (Emissions) ● EN55024/CISPR 24 Information Technology Equipment (Immunity) ● EN50082-1/EN61000-6-1 Generic Immunity Standard (EMC-4)

C9800-CL-K9 is the Cisco Catalyst 9800-CL Wireless Controller for Cloud.

Technology

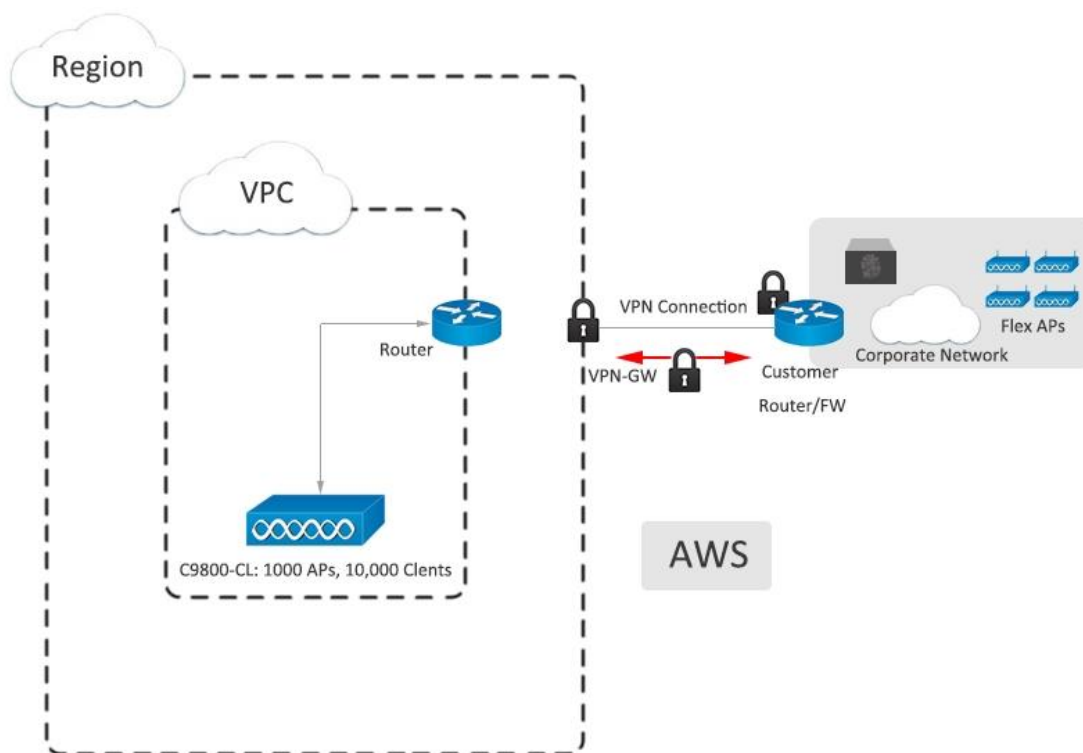
Figure 5 shows the Cisco 9800-CL for private cloud.



Key highlights

- Multiple scale templates (small, medium, and large)
- VMware ESXi, KVM, and Cisco NFVIS (on ENCS) supported
- Supports centralized, Cisco FlexConnect®, and fabric (SD-Access) deployment
- Multiple scale options with a single deployment package to best meet your organization’s needs.
 - Small: Designed for distributed branches and small campuses supporting up to 1000 Access Points (APs) and 10,000 clients
 - Medium: Designed for medium-sized campuses supporting up to 3000 APs and 32,000 clients
 - Large: Designed for large enterprises and service providers supporting up to 6000 APs and 64,000 clients
- Supports up to 2.5 Gbps of throughput in a centralized wireless deployment.
- One deployment package for all the scale templates. Pick the deployment size when you instantiate the Virtual Machine (VM).
- An intuitive bootstrap wizard is available during the VM instantiation to boot the wireless controller with recommended parameters.
- Optimize your branch by deploying the 9800-CL as a virtual machine on the Cisco 5000 Series Enterprise Network Compute System (ENCS) running Cisco NFVIS

Figure 6 shows the Cisco 9800-CL for private cloud.



Key highlights

- IaaS solutions available in the AWS Marketplace
- Supported only with managed VPN
- Cisco FlexConnect central authentication and local switching
- Available on AWS GovCloud
- Cisco Catalyst 9800-CL is available in the AWS Marketplace.
- Supports up to 1000 access points and 10,000 clients.
- The 9800-CL should be instantiated within a Virtual Private Cloud (VPC).
- A VPN tunnel has to be established from the customer site to AWS to enable communication between the Cisco access point and 9800-CL wireless controller.
- Deploy a wireless controller instance in AWS using cloud-formation templates provided by Cisco (recommended) or by manually using the EC2 console.

Specification

Table 5 shows the specification.

C9800-CL-K9 Specification	
Maximum number of access points	Up to 6000
Maximum number of clients	64,000
Maximum throughput	Up to 2.5 Gbps
Maximum WLANs	4096
Maximum VLANs	4096
Deployment modes	Centralized, Cisco FlexConnect, and Fabric Wireless (SD-Access)
License	Smart License enabled

Operating system	Cisco IOS XE Software			
Management	Cisco DNA Center™ 1.2.8, Cisco Prime® Infrastructure 3.5, integrated WebUI, and third party (open standards APIs)			
Interoperability	AireOS-based controllers with 8.8 MR2, 8.5 MR4, and 8.5 MR3 special			
Policy engine	Cisco Identity Services Engine (ISE) 2.2, 2.3, and 2.4			
Cisco Connected Mobile Experiences (CMX)	CMX 10.5.1			
Access points	Aironet 802.11ac Wave 1 and Wave 2 access points			
Key Specification				
Metric	Private cloud			Public cloud
	Small	Medium	Large	
Deployment modes supported	Centralized, Cisco FlexConnect, Fabric (SD-Access)	Centralized, Cisco FlexConnect, Fabric (SD-Access)	Cisco FlexConnect, Fabric (SD-Access)	Cisco FlexConnect (local switching only)
vCPUs Required	4	6	10	4
RAM required (GB)	8	16	32	8
Hypervisors and cloud providers supported	ESXi 6.0/6.5, KVM, NFVIS	ESXi 6.0/6.5, KVM, NFVIS	ESXi 6.0/6.5, KVM, NFVIS	AWS
Maximum number of access points	1000	3000	6000	1000
Maximum number of clients	10,000	32,000	64,000	10,000
Maximum throughput	2.5 Gbps	2.5 Gbps	Locally switched	(All traffic will be locally switched)
Maximum WLANs	4096	4096	4096	4096
Maximum VLANs	4096	4096	4096	4096
Maximum site tags	1000	3000	6000	1000
Maximum APs per site	100	100	100	100
Maximum policy tags	1000	3000	6000	1000
Maximum RF tags	1000	3000	6000	1000
Maximum RF profiles	2000	6000	12,000	2000
Maximum policy profiles	1000	1000	1000	1000
Maximum Flex profiles	1000	3000	6000	1000
vNIC adapters	ESXi: VXNET3, E1000E, E1000 KVM: VIRTIO	ESXi: VXNET3, E1000E, E1000 KVM: VIRTIO	ESXi: VXNET3, E1000E, E1000 KVM: VIRTIO	–
Virtual switch	ESXi: vSwitch KVM: OVS Linux Bridge(brctl)	ESXi: vSwitch KVM: OVS Linux Bridge(brctl)	ESXi: vSwitch KVM: OVS Linux Bridge(brctl)	–
High availability	SSO, N+1	SSO, N+1	SSO, N+1	N+1
Cisco DNA™ support	Automation, Assurance	Automation, Assurance	Automation, Assurance	–
Guest anchor	Yes	Yes	Yes	–
Client IPv6 support	Yes	Yes	Yes	Yes

Infrastructure IPv6 support	Yes	Yes	Yes	Yes
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CATALYST 9800-L OVERVIEW & SPECIFICATION

The Cisco® Catalyst® 9800-L is a fixed wireless controller with seamless software updates for small and midsize enterprises. Built from the ground up for intent-based networking, the Cisco Catalyst 9800-L brings together Cisco IOS® XE Software and Cisco RF excellence to create a best-in-class wireless experience for your evolving and growing organization.

The Cisco Catalyst 9800-L is feature rich and enterprise ready to power your business-critical operations and transform end-user experiences:

- Choose between copper and fiber uplinks. This choice gives you flexibility in your network.
- High availability and seamless software updates, enabled by hot and cold patching, keep your clients and services always on in planned and unplanned events.
- Secure the air, devices, and users with the Cisco Catalyst 9800-L. The wireless infrastructure becomes the strongest first line of defense, with Encrypted Traffic Analytics and Software-Defined Access (SD-Access). The controller comes with built-in security: Secure Boot, runtime defenses, image signing, integrity verification, and hardware authenticity.
- Built on a modular operating system, the controller features open and programmable APIs that enable automation of day-0 to day-N network operations. Model-driven streaming telemetry provides deep insights into your network and client health.

Figure 7 shows the Cisco 9800-L appearance.



Table 6 shows the key features of C9800-L.

Feature	Description
Maximum number of access points	250
Maximum number of clients	5000
Maximum throughput	5 Gbps
Maximum WLANs	4096
Maximum VLANs	4096
Fixed uplinks	2x 10G/Multigigabit copper or 2x 10G/Multigigabit fiber
Power supply	110W, 12VDC, AC/DC adapter
Maximum power consumption	9800-L-C: 86.9W (with 4.5W USB load) 9800-L-F: 84.5W (assumes 2pc 2.5W SFP and with 4.5W USB load)
Deployment modes	Centralized, Cisco FlexConnect®, and fabric
Form factor	1RU; half-width chassis allows side-by-side installation in standard 19-in. rack
License	Smart License enabled

Software	Cisco IOS XE
Management	Cisco DNA Center, Cisco Prime® Infrastructure, and third party (open standards APIs)
Interoperability	AireOS-based controllers
Access points	Cisco Aironet® 802.11ac Wave 1 and Wave 2 access points, Cisco Catalyst 9100 802.11ax access points

Specification

Table 7 shows the specification of C9800-L.

Item	Specification
Wireless	IEEE 802.11a, 802.11b, 802.11g, 802.11d, WMM/802.11e, 802.11h, 802.11n, 802.11k, 802.11r, 802.11u, 802.11w, 802.11ac Wave1 and Wave2, 802.11ax
Wired, switching, and routing	IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX specification, 1000BASE-T, 1000BASE-SX, 1000-BASE-LH, IEEE 802.1Q VLAN tagging, IEEE 802.1AX Link Aggregation
Data Requests For Comments (RFCs)	<ul style="list-style-type: none"> ● RFC 768 UDP ● RFC 791 IP ● RFC 2460 IPv6 ● RFC 792 ICMP ● RFC 793 TCP ● RFC 826 ARP ● RFC 1122 Requirements for Internet Hosts ● RFC 1519 CIDR ● RFC 1542 BOOTP ● RFC 2131 DHCP ● RFC 5415 CAPWAP Protocol Specification ● RFC 5416 CAPWAP Binding for 802.11
Security standards	<ul style="list-style-type: none"> ● Wi-Fi Protected Access (WPA) ● IEEE 802.11i (WPA2, RSN) ● RFC 1321 MD5 Message-Digest Algorithm ● RFC 1851 ESP Triple DES Transform ● RFC 2104 HMAC: Keyed-Hashing for Message Authentication ● RFC 2246 TLS Protocol Version 1.0 ● RFC 2401 Security Architecture for the Internet Protocol ● RFC 2403 HMAC-MD5-96 within ESP and AH ● RFC 2404 HMAC-SHA-1-96 within ESP and AH ● RFC 2405 ESP DES-CBC Cipher Algorithm with Explicit IV ● RFC 2407 Interpretation for ISAKMP ● RFC 2408 ISAKMP ● RFC 2409 IKE ● RFC 2451 ESP CBC-Mode Cipher Algorithms ● RFC 3280 Internet X.509 PKI Certificate and CRL Profile ● RFC 4347 Datagram Transport Layer Security ● RFC 5246 TLS Protocol Version 1.2
Encryption	<ul style="list-style-type: none"> ● Wired Equivalent Privacy (WEP) RC4 40, 104 and 128 bits (both static and shared keys) ● Advanced Encryption Standard (AES): Cipher Block Chaining (CBC), Counter with CBC-MAC

	<p>(CCM), Counter with Cipher Block Chaining Message Authentication Code Protocol (CCMP)</p> <ul style="list-style-type: none"> ● Data Encryption Standard (DES): DES-CBC, 3DES ● Secure Sockets Layer (SSL) and Transport Layer Security (TLS): RC4 128-bit and RSA 1024-bit and 2048-bit ● DTLS: AES-CBC ● IPsec: DES-CBC, 3DES, AES-CBC ● 802.1AE MACsec encryption
Authentication, Authorization, and Accounting (AAA)	<ul style="list-style-type: none"> ● IEEE 802.1X ● RFC 2548 Microsoft Vendor-Specific RADIUS Attributes ● RFC 2716 PPP EAP-TLS ● RFC 2865 RADIUS Authentication ● RFC 2866 RADIUS Accounting ● RFC 2867 RADIUS Tunnel Accounting ● RFC 2869 RADIUS Extensions ● RFC 3576 Dynamic Authorization Extensions to RADIUS ● RFC 5176 Dynamic Authorization Extensions to RADIUS ● RFC 3579 RADIUS Support for EAP ● RFC 3580 IEEE 802.1X RADIUS Guidelines ● RFC 3748 Extensible Authentication Protocol (EAP) ● Web-based authentication ● TACACS support for management users
Management	<ul style="list-style-type: none"> ● Simple Network Management Protocol (SNMP) v1, v2c, v3 ● RFC 854 Telnet ● RFC 1155 Management Information for TCP/IP-Based Internets ● RFC 1156 MIB ● RFC 1157 SNMP ● RFC 1213 SNMP MIB II ● RFC 1350 TFTP ● RFC 1643 Ethernet MIB ● RFC 2030 Sntp ● RFC 2616 HTTP ● RFC 2665 Ethernet-Like Interface Types MIB ● RFC 2674 Definitions of Managed Objects for Bridges with Traffic Classes, Multicast Filtering, and Virtual Extensions ● RFC 2819 RMON MIB ● RFC 2863 Interfaces Group MIB ● RFC 3164 Syslog ● RFC 3414 User-Based Security Model (USM) for SNMPv3 ● RFC 3418 MIB for SNMP ● RFC 3636 Definitions of Managed Objects for IEEE 802.3 MAUs ● RFC 4741 Base NETCONF protocol ● RFC 4742 NETCONF over SSH ● RFC 6241 Network Configuration Protocol (NETCONF)

	<ul style="list-style-type: none"> ● RFC 6242 NETCONF over SSH ● RFC 5277 NETCONF event notifications ● RFC 5717 Partial Lock Remote Procedure Call ● RFC 6243 With-Defaults capability for NETCONF ● RFC 6020 YANG ● Cisco private MIBs
Management interfaces	<ul style="list-style-type: none"> ● Web-based: HTTP/HTTPS ● Command-line interface: Telnet, Secure Shell (SSH) Protocol, serial port ● Cisco Prime Infrastructure
Environmental conditions supported	<p>Operating temperature:</p> <ul style="list-style-type: none"> ● 32° to 104°F (0° to 40°C) <p>Note: The maximum temperature is derated by 1.0°C for every 1000 ft (305 m) of altitude above sea level.</p> <p>Nonoperating temperature:</p> <ul style="list-style-type: none"> ● -13° to 158°F (-25° to 70°C) <p>Operating humidity:</p> <ul style="list-style-type: none"> ● 10% to 95% noncondensing <p>Nonoperating humidity:</p> <ul style="list-style-type: none"> ● 0% to 95% noncondensing <p>Altitude:</p> <ul style="list-style-type: none"> ● Operating altitude: 0 to 3000 m (0 to 10,000 ft) ● Nonoperating altitude: 0 to 12,192 m (0 to 40,000 ft.) <p>Electrical input:</p> <ul style="list-style-type: none"> ● AC input frequency range: 47 to 63 Hz ● AC input range: 90 to 264 VAC <p>Maximum power:</p> <ul style="list-style-type: none"> ● 9800-L-C max measured power = 86.9W (with 4.5W USB load) ● 9800-L-F max measured power = 84.5W (assumes 2pc 2.5W SFP and with 4.5W USB load) <p>Maximum heat dissipation:</p> <ul style="list-style-type: none"> ● 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) <p>Sound power level measure:</p> <ul style="list-style-type: none"> ● Normal: 40 dBA at 25C ● Maximum: 42.9 dBA at 40C <p>Power adapter:</p> <ul style="list-style-type: none"> ● Input power: 100 to 240 VAC; 50/60 Hz
Regulatory compliance	<p>Safety:</p> <ul style="list-style-type: none"> ● UL/CSA 60950-1 ● IEC/EN 60950-1 ● AS/NZS 60950.1 ● CAN/CSA-C22.2 No. 60950-1 <p>EMC - Emissions:</p> <ul style="list-style-type: none"> ● FCC 47CFR15

	<ul style="list-style-type: none"> ● AS/NZS CISPR 22 ● CISPR 22 ● EN55022/EN55032 (EMI-1) ● ICES-003 ● VCCI ● KN 32 (EMI-2) ● CNS-13438 Class A
	EMC – Emissions: <ul style="list-style-type: none"> ● EN61000-3-2 Power Line Harmonics (EMI-3) ● EN61000-3-3 Voltage Changes, Fluctuations, and Flicker (EMI-3)

COMPARE TO 3504, 5520, 8540 CONTROLLERS

Table 8 shows the comparison.

Models	Catalyst 9800-CL	Catalyst 9800 embedded	3504	5520	Catalyst 9800-40	8540	Catalyst 9800-80
Ideal for	Multiple scale options with a single deployment package	Small campuses or distributed branches	Small or midsize business	Midsize to large enterprise	Midsize to large enterprise	Large enterprise and service provider	Large enterprise and service provider
Form factor	Virtual machine software	Installed on Cisco Catalyst 9300 switches	Desktop	1 RU appliance	1 RU appliance	2 RU appliance	2 RU appliance
FlexConnect	Yes	No, only SDA	Yes	Yes	Yes	Yes	Yes
Central mode (formerly local mode)	Only private cloud	No, only SDA	Yes	Yes	Yes	Yes	Yes
Mesh	Yes	No, only SDA	Yes	Yes	Yes	Yes	Yes
FlexConnect + Mesh	Yes	No, only SDA	Yes	Yes	Yes	Yes	Yes
OfficeExtend	Yes	No, only SDA	Yes	Yes	Yes	Yes	Yes
Minimum access points	1	1	1	1	1	1	1
Maximum access points	6000 (local switching), 3000 (central switching)	200	150	1500	2000	6000	6000



Maximum client support	64,000 (local switching); 32,000 (central switching)	4000	3000	20000	24000	64000	64000
Maximum RF tag support	6000	200	1500	25000	2000	50000	6000
Maximum throughput	2 Gbps	-	4 Gbps	20 Gbps	40 Gbps	40 Gbps	80 Gbps
Maximum access-point groups	6000 policy tags, 6000 RF tags	200 policy tags, 200 RF tags	150	1500	2000 policy tags, 2000 RF tags	6000	6000 policy tags, 6000 RF tags
Maximum FlexConnect Groups	6000 site tags	-	100	1500	2000 site tags	2000	6000 site tags
Maximum access points per group	100	100	100	100	100	100	100
Maximum WLANs	4096	64	512	512	4096	512	4096

ORDERING INFORMATION

The following table provides ordering information for Cisco Catalyst 9800 Wireless Controllers.

Table 9 shows the Ordering information.

Type	Product ID	Description
Wireless controller	C9800-40-K9	Cisco Catalyst 9800-40 Wireless Controller
	C9800-80-K9	Cisco Catalyst 9800-80 Wireless Controller
	LIC-C9800-DTLS-K9	Cisco Catalyst 9800 Series Wireless Controller DTLS License
	C9800-CL-K9	Cisco Catalyst 9800-CL Wireless Controller for Cloud
	C9800-L-F-K9	Cisco Catalyst 9800-L (Fiber Uplink) Wireless Controller
	C9800-L-C-K9	Cisco Catalyst 9800-L (Copper Uplink) Wireless Controller
Accessories, spares	C9800-AC-1100W	Cisco Catalyst Wireless Controller 1100 AC Power Supply
	C9800-DC-950W	Cisco Catalyst Wireless Controller 950W DC Power Supply
	C9800-18X1GE	Cisco Catalyst 9800-80 GE Module
	C9800-10X10E	Cisco Catalyst 9800-80 10 GE Module
	C9800-1X40GE	Cisco Catalyst 9800-80 1 Port 40 GE Module
	C9800-2X40GE	Cisco Catalyst 9800-80 2 Ports 40 GE Module
	C9800-1X100GE	Cisco Catalyst 9800-80 1 Port 100 GE Module

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SOURCES

<https://www.cisco.com/c/en/us/products/wireless/catalyst-9800-series-wireless-controllers/index.html>