

# Cisco Flex 7500 Series Cloud Controller

The Cisco Flex<sup>®</sup> 7500 Series Cloud Controller is a highly scalable branch controller for multisite [wireless](#) deployments. Deployed in the private cloud, the Cisco Flex 7500 Series Controller extends wireless services to distributed branch offices with centralized control that lowers the total cost of operations.

<p><b>Lower CapEx</b></p> <ul style="list-style-type: none"> <li>Consolidate multiple controllers into one controller with support up to 6000 access points, and save on rack space with a 1RU platform.</li> <li>Save on power and switch ports with fewer controllers to support large deployments.</li> <li>Save on licensing costs by purchasing a higher <a href="#">access point</a> capacity license at a lower premium and take advantage of the license across multiple sites.</li> </ul>
<p><b>Lower OpEx</b></p> <ul style="list-style-type: none"> <li>Deploy fewer controllers in a data center by consolidating many controllers into one and manage up to 6000 branches.</li> <li>Gain significant savings in operations by configuring, managing, and troubleshooting up to 6000 access points and 64,000 clients with a single point of touch.</li> </ul>
<p><b>Licensing Flexibility and Investment Protection</b></p> <ul style="list-style-type: none"> <li>Additional access point capacity licenses can be added over time.</li> <li>Right to Use Licensing (with EULA acceptance) for faster and easier license enablement.</li> </ul>
<p><b>FlexConnect Solution</b></p> <ul style="list-style-type: none"> <li>Intelligent RF control plane, centralized software update, control and management, and troubleshooting.</li> <li>With a distributed data plane, deploy in-branch (locally switched) voice-, video-, and data-intensive applications over wireless.</li> <li>Deploy Cisco FlexConnect<sup>™</sup> in sites with up to 100 access points.</li> <li>Seamless wireless services even when WAN link fails or a controller flaps.</li> <li>Local RADIUS server for new clients to get on the network and access the services.</li> </ul>
<p><b>Comprehensive Wired and Wireless Security</b></p> <ul style="list-style-type: none"> <li>Full CAPWAP access point to controller encryption.</li> <li>Supports rogue access point detection and denial-of-service attacks.</li> <li>Management frame protection detects malicious users and alerts network administrators.</li> </ul>
<p><b>Secured Guest Access</b></p> <ul style="list-style-type: none"> <li>Deploy simple and secure guest access services across 6000 sites.</li> </ul>

The Cisco Flex 7500 Series Cloud Controllers (Figure 1) can manage wireless [access points](#) in up to 6000 branch locations. This controller allows IT managers to configure, manage, and troubleshoot up to 6000 access points and 64,000 clients from the data center. The Cisco Flex 7500 Series Cloud Controller supports secure guest access, rogue detection for Payment Card Industry (PCI) compliance, and in-branch (locally switched) Wi-Fi voice and video.

**Figure 1.** Cisco Flex 7500 Series Cloud Controller



## Features

The Cisco Flex 7500 Series Cloud Controller provides centralized control, management, and troubleshooting. It supports the Cisco FlexConnect<sup>™</sup> solution for a lean branch network that uses access points connected to controllers in the data center over a wide area network. Data traffic from the access points is switched locally at the branch, so that in the rare event of a WAN failure at the branch, wireless clients remain connected on the network with access to local resources within the branch.

Cisco Flex 7500 Series Cloud Controllers automate wireless configuration and management functions and allow network managers to have the visibility and control needed to cost-effectively manage, secure, and optimize the performance of their branch networks. When traffic is directed to the controller in FlexConnect central switched mode, the Cisco Flex 7500 Series supports Cisco<sup>®</sup> Application Visibility and Control (AVC). Cisco AVC includes the NBAR-2 engine, Cisco's deep packet inspection (DPI) capability that classifies applications, applies quality of service (QoS) to either drop or mark the traffic, and prioritizes business-critical applications in the network.

Cisco AVC uses NetFlow Version 9 to export the flows to [Cisco Prime™ Infrastructure](#) or a third-party NetFlow Collector. The Cisco Flex 7500 Series in central switched mode also supports Bonjour Services Directory to enable Bonjour Services to be advertised and utilized in a separate Layer 3 network. Wireless Policy engine is a wireless profiler and policy feature on the Cisco Flex 7500 Series wireless controller that enables profiling of wireless devices and enforcement of policies such as VLAN assignment, QoS, ACL, and time-of-day-based access. As a component of the Cisco Unified [Wireless Network](#), this controller provides real-time communications between [Cisco Aironet® access points](#), Cisco Prime Infrastructure, and the [Cisco Mobility Services Engine \(MSE\)](#), and is interoperable with other Cisco controllers. With integrated Cisco CleanAir® technology, the Cisco Flex 7500 Series provides the industry's only self-healing and self-optimizing wireless network for branches.

### Software Licensing Flexibility

The Cisco Flex 7500 Series Cloud Controllers provide right-to-use (with EULA agreement) license enablement for faster time to deployment, with flexibility to add additional access points (up to 6000 access points) as business needs grow.

Table 1 lists the features of Cisco Flex 7500 Series Cloud Controllers.

**Table 1.** Cisco Flex 7500 Series Cloud Controller Features

Feature	Benefits
<b>Scalability</b>	<ul style="list-style-type: none"> <li>• Supports 300, 500, 1000, 2000, 3000 and 6000 access points</li> <li>• Supports 64,000 clients</li> <li>• Supports up to 6000 branch locations (up to 2000 Cisco FlexConnect groups)</li> </ul>
<b>RF Management</b>	<ul style="list-style-type: none"> <li>• Provides both real-time and historical information about RF interference impacting network performance across controllers, through systemwide Cisco <a href="#">CleanAir technology</a> integration</li> </ul>
<b>Cisco FlexConnect</b>	<ul style="list-style-type: none"> <li>• Wireless branch deployment for up to 100 access points per Flex-group and multiple Flex-groups per remote location</li> <li>• Centralized control, management, and client troubleshooting</li> <li>• Seamless Layer 2 roaming within a Cisco FlexConnect group of 100 access points</li> <li>• Seamless client access in the event of a WAN link failure (local data switching)</li> <li>• Local RADIUS server support to enable new clients to access wireless services without depending on the central RADIUS servers</li> <li>• Support for high-latency WAN links</li> <li>• Secure guest access</li> <li>• 10 Gigabit Ethernet connectivity support: 2 x 10 Gigabit Ethernet ports for redundancy</li> <li>• Efficient access point upgrade that optimizes the WAN link utilization for downloading access point images</li> <li>• Cisco OfficeExtend technology supports corporate wireless service for mobile and remote workers with secure wired tunnels to the Cisco Aironet 1130 or 1140 Series Access Points</li> <li>• Enhanced security with a wireless intrusion prevention system (wIPS)</li> <li>• Rogue detection for PCI compliance</li> <li>• Wi-Fi Certified™ Passpoint (Hotspot 2.0) for 3G offloads</li> <li>• Local Split tunneling for improved WAN bandwidth utilization</li> <li>• VLAN based routing for deployment flexibility of single sign on</li> <li>• WGB/uWGB support for local switching simplifies deployment of wired-only devices in remote locations</li> </ul>
<b>Comprehensive End-to-End Security</b>	<ul style="list-style-type: none"> <li>• Offers control and provisioning of wireless access points (CAPWAP)-compliant Datagram Transport Layer Security (DTLS) encryption on the control plane between access points and controllers across remote WAN links</li> </ul>
<b>End-to-End Voice</b>	<ul style="list-style-type: none"> <li>• Supports <a href="#">Cisco Unified Communications</a> for improved collaboration through messaging, presence, and conferencing</li> <li>• Supports all <a href="#">Cisco Unified IP Phones</a> for cost-effective, real-time voice services</li> </ul>

Feature	Benefits
<b>Fault Tolerance</b>	<ul style="list-style-type: none"> <li>• Access points continue to provide seamless services when a controller fails; provides failover to another backup controller for centralized control and management</li> <li>• Service Set Identifier (SSID) high availability with sub-second access point and client failover from the primary to standby controller</li> <li>• Redundant power supply helps to ensure maximum availability</li> </ul>
<b>Environmentally Responsible</b>	<ul style="list-style-type: none"> <li>• Organizations may choose to turn off access point radios to reduce power consumption during off-peak hours</li> </ul>

Table 2 lists the product specifications for Cisco Flex 7500 Series Cloud Controllers.

**Table 2.** Product Specifications for Cisco Flex 7500 Series Cloud Controllers

Item	Specifications
<b>Wireless</b>	IEEE 802.11a, 802.11b, 802.11g, 802.11d, WMM/802.11e, 802.11h, 802.11k, <a href="#">802.11n</a> , 802.11r, 802.11u, 802.11w, 802.11ac
<b>Wired/Switching/Routing</b>	IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX specification, 1000BASE-T, 1000BASE-SX, 1000BASE-LH, IEEE 802.1Q VLAN tagging, IEEE 802.1AX Link Aggregation
<b>Data Request For Comments (RFC)</b>	<ul style="list-style-type: none"> <li>• RFC 768 UDP</li> <li>• RFC 791 IP</li> <li>• RFC 2460 IPv6 (pass through Bridging mode only)</li> <li>• RFC 792 ICMP</li> <li>• RFC 793 TCP</li> <li>• RFC 826 ARP</li> <li>• RFC 1122 Requirements for Internet Hosts</li> <li>• RFC 1519 CIDR</li> <li>• RFC 1542 BOOTP</li> <li>• RFC 2131 DHCP</li> <li>• RFC 5415 CAPWAP Protocol Specification</li> </ul>
<b>Security Standards</b>	<ul style="list-style-type: none"> <li>• WPA</li> <li>• IEEE 802.11i (WPA2, RSN)</li> <li>• RFC 1321 MD5 Message-Digest Algorithm</li> <li>• RFC 1851 The ESP Triple DES Transform</li> <li>• RFC 2104 HMAC: Keyed Hashing for Message Authentication</li> <li>• RFC 2246 TLS Protocol Version 1.0</li> <li>• RFC 2401 Security Architecture for the Internet Protocol</li> <li>• RFC 2403 HMAC-MD5-96 within ESP and AH</li> <li>• RFC 2404 HMAC-SHA-1-96 within ESP and AH</li> <li>• RFC 2405 ESP DES-CBC Cipher Algorithm with Explicit IV</li> <li>• RFC 2407 Interpretation for ISAKMP</li> <li>• RFC 2408 ISAKMP</li> <li>• RFC 2409 IKE</li> <li>• RFC 2451 ESP CBC-Mode Cipher Algorithms</li> <li>• RFC 3280 Internet X.509 PKI Certificate and CRL Profile</li> <li>• RFC 4347 Datagram Transport Layer Security</li> <li>• RFC 4346 TLS Protocol Version 1.1</li> </ul>
<b>Encryption</b>	<ul style="list-style-type: none"> <li>• Wired Equivalent Privacy (WEP) and Temporal Key Integrity Protocol-Message Integrity Check (TKIP-MIC): RC4 40, 104 and 128 bits (both static and shared keys)</li> <li>• Advanced Encryption Standard (AES): Cipher Block Chaining (CBC), Counter with CBC-MAC (CCM), Counter with Cipher Block Chaining Message Authentication Code Protocol (CCMP)</li> <li>• Data Encryption Standard (DES): DES-CBC, 3DES</li> <li>• Secure Sockets Layer (SSL) and Transport Layer Security (TLS): RC4 128-bit and RSA 1024- and 2048-bit</li> <li>• Datagram Transport Layer Security (DTLS): AES-CBC</li> <li>• IPsec: DES-CBC, 3DES, AES-CBC</li> </ul>

Item	Specifications
<b>Authentication, Authorization, and Accounting (AAA)</b>	<ul style="list-style-type: none"> <li>• IEEE 802.1X</li> <li>• RFC 2548 Microsoft Vendor-Specific RADIUS Attributes</li> <li>• RFC 2716 PPP EAP-TLS</li> <li>• RFC 2865 RADIUS Authentication</li> <li>• RFC 2866 RADIUS Accounting</li> <li>• RFC 2867 RADIUS Tunnel Accounting</li> <li>• RFC 3576 Dynamic Authorization Extensions to RADIUS</li> <li>• RFC 3579 RADIUS Support for EAP</li> <li>• RFC 3580 IEEE 802.1X RADIUS Guidelines</li> <li>• RFC 3748 Extensible Authentication Protocol</li> <li>• Web-based authentication</li> <li>• Terminal Access Controller Access-Control System (TACACS) support for management users</li> </ul>
<b>Management</b>	<ul style="list-style-type: none"> <li>• SNMP v1, v2c, v3</li> <li>• RFC 854 Telnet</li> <li>• RFC 1155 Management Information for TCP/IP-Based Internets</li> <li>• RFC 1156 MIB</li> <li>• RFC 1157 SNMP</li> <li>• RFC 1213 SNMP MIB II</li> <li>• RFC 1350 TFTP</li> <li>• RFC 1643 Ethernet MIB</li> <li>• RFC 2030 SNTP</li> <li>• RFC 2616 HTTP</li> <li>• RFC 2665 Ethernet-Like Interface types MIB</li> <li>• RFC 2674 Definitions of Managed Objects for Bridges with Traffic Classes, Multicast Filtering, and Virtual Extensions</li> <li>• RFC 2819 RMON MIB</li> <li>• RFC 2863 Interfaces Group MIB</li> <li>• RFC 3164 Syslog</li> <li>• RFC 3414 User-Based Security Model (USM) for SNMPv3</li> <li>• RFC 3418 MIB for SNMP</li> <li>• RFC 3636 Definitions of Managed Objects for IEEE 802.3 MAUs</li> <li>• Cisco private MIBs</li> </ul>
<b>Management Interfaces</b>	<ul style="list-style-type: none"> <li>• Web-based: HTTP/HTTPS</li> <li>• Command-line interface: Telnet, Secure Shell (SSH) Protocol, serial port</li> <li>• Cisco Wireless Control System (WCS)</li> </ul>
<b>Interfaces and Indicators</b>	<ul style="list-style-type: none"> <li>• 2 x 10 Gigabit Ethernet interfaces</li> <li>• Small Form-Factor Pluggable (SFP) options (only Cisco SFPs supported): SFP-10G-SR, SFP-10G-LR</li> <li>• LED indicators: Network Link, Diagnostics</li> <li>• 1 x Service Port: 10/100/1000 Mbps Ethernet (RJ-45)</li> </ul>
<b>Physical Dimensions</b>	<ul style="list-style-type: none"> <li>• Dimensions (WxDxH): 17.30 x 28.00 x 1.69 in. (440.0 x 711.4 x 43.0 mm)</li> <li>• Weight: 35.1 lb (15.9 kg) with 2 power supplies</li> </ul>
<b>Environmental Conditions</b>	<p>Air temperature:</p> <ul style="list-style-type: none"> <li>• Appliance On: 10°C to 35°C (50°F to 95°F); altitude: 0 to 914.4 m (3000 ft), decrease system temperature by 1.0°C for every 1000-foot increase in altitude</li> <li>• Appliance Off: 5°C to 45°C (41°F to 113°F); maximum altitude: 3048 m (10,000 ft)</li> <li>• Storage: -40°C to 60°C (-40°F to 140°F); maximum altitude: 3048 m (10,000 ft)</li> </ul> <p>Humidity:</p> <ul style="list-style-type: none"> <li>• Appliance On: 20% to 80%; maximum dew point: 21°C; maximum rate of change: 5 °C/hr</li> <li>• Appliance Off: 8% to 80%; maximum dew point: 27°C</li> </ul> <p>Electrical input:</p> <ul style="list-style-type: none"> <li>• Sine-wave input (47 - 63 Hz) required</li> <li>• Input voltage low range: <ul style="list-style-type: none"> <li>◦ Minimum: 100 VAC</li> <li>◦ Maximum: 127 VAC</li> </ul> </li> <li>• Input voltage high range:</li> </ul>

Item	Specifications
	<ul style="list-style-type: none"> <li>◦ Minimum: 200 VAC</li> <li>◦ Maximum: 240 VAC</li> <li>• Input kilovolt-amperes (kVA), approximately: <ul style="list-style-type: none"> <li>◦ Minimum: 0.090 kVA</li> <li>◦ Maximum: 0.700 kVA</li> </ul> </li> <li>• Heat output (Maximum) 2302 Btu per hour (675 watts)</li> <li>• Acoustical noise emissions: <ul style="list-style-type: none"> <li>◦ Sound power, idling: 6.1 bels maximum</li> <li>◦ Sound power, operating: 6.1 bels maximum</li> </ul> </li> </ul>
<b>Regulatory Compliance</b>	CE Mark Safety: <ul style="list-style-type: none"> <li>• UL 60950-1:2003</li> <li>• EN 60950:2000</li> <li>• EMI and susceptibility (Class A)</li> <li>• U.S.: FCC Part 15.107 and 15.109</li> <li>• Canada: ICES-003</li> <li>• Japan: VCCI</li> <li>• Europe: EN 55022, EN 55024</li> </ul>

Table 3 lists ordering and accessories information for Cisco Flex 7500 Series Cloud Controllers.

To place an order, visit the Cisco ordering website: <http://www.cisco.com/en/US/ordering/index.shtml>.

**Table 3.** Ordering Information for Cisco Flex 7500 Series Cloud Controller and Accessories

Part Number	Product Name	Cisco SMARTnet <sup>®</sup> Service 8x5xNBD
<b>AIR-CT7510-300-K9</b>	7500 Series Cloud Controller for up to 300 Cisco access points	CON-SNT-CT75300
<b>AIR-CT7510-500-K9</b>	7500 Series Cloud Controller for up to 500 Cisco access points	CON-SNT-CT75500
<b>AIR-CT7510-1K-K9</b>	7500 Series Cloud Controller for up to 1000 Cisco access points	CON-SNT-CT751K
<b>AIR-CT7510-2K-K9</b>	7500 Series Cloud Controller for up to 2000 Cisco access points	CON-SNT-CT752K
<b>AIR-CT7510-3K-K9</b>	7500 Series Cloud Controller for up to 3000 Cisco access points	CON-SNT-CT753K
<b>AIR-CT7510-6K-K9</b>	7500 Series Cloud Controller for up to 6000 Cisco access points	CON-SNT-CT756K
<b>AIR-CT7510-HA-K9</b>	7500 Series High Availability Wireless Controller	CON-SNT-ACT7510

## Additive Capacity Upgrade Licenses

Tables 4 and 5 show the additive capacity upgrade licenses that are available for the Cisco Flex 7500 Series Cloud Controller.

**Table 4.** Ordering Information for Cisco Flex 7500 Series Cloud Controllers Additive Capacity Licenses (e-Delivery PAKs)

	Part Number	Product Description	SMARTnet 8x5xNBD
<b>e-License</b>	L-LIC-CT7500-UPG	Primary upgrade SKU: Pick any number or combination of the following options under this SKU to upgrade one or many controllers under one product authorization key	
	L-LIC-CT7500-100A	100 Access Point Adder License for the 7510 Controller (e-Delivery)	CON-SNT-LC75100A
	L-LIC-CT7500-200A	200 Access Point Adder License for the 7510 Controller (e-Delivery)	CON-SNT-LC75250A
	L-LIC-CT7500-500A	500 Access Point Adder License for the 7510 Controller (e-Delivery)	CON-SNT-LC75500A
	L-LIC-CT7500-1KA	1000 Access Point Adder License for the 7510 Controller (e-Delivery)	CON-SNT-LC751KA

**Table 5.** Ordering Information for Cisco Flex 7500 Series Cloud Controllers Additive Capacity Licenses (Paper PAKs)

	Part Number	Product Description	SMARTnet 8x5xNBD
<b>Paper License</b>	LIC-CT7500-UPG	Primary upgrade SKU: Pick any number or combination of the following options under this SKU, to upgrade one or many controllers under one product authorization key	
	LIC-CT7500-100A	100 Access Point Adder License for the 7510 Controller	CON-SNT-LC75100A
	LIC-CT7500-200A	200 Access Point Adder License for the 7510 Controller	CON-SNT-LC75250A
	LIC-CT7500-500A	500 Access Point Adder License for the 7510 Controller	CON-SNT-LC75500A
	LIC-CT7500-1KA	1000 Access Point Adder License for the 7510 Controller	CON-SNT-LC751KA

Table 6 shows the optional DTLS license for Cisco Flex 7500 Series Wireless Controllers. When the customer orders the Cisco Flex 7500 Series and chooses “none selected” (the default) in the Optional Licenses tab, data DTLS encryption is disabled.

Datagram Transport Layer Security (DTLS) is required for all Cisco OfficeExtend deployments to encrypt data plane traffic. To enable this functionality, you must obtain a \$0 DTLS license. **Customers planning to install this device physically in Russia must obtain a physical PAK in order to enable a DTLS license and should not download the license from Cisco.com.** Please consult your local government regulations to ensure that Data DTLS encryption is permitted.

The DTLS paper PAK license is designated for customers who purchase a controller with DTLS disabled due to import restrictions but get permission to add DTLS support after initial purchase. This optional DTLS license is required for Cisco OfficeExtend deployment.

**Table 6.** Optional Licensing for Cisco Flex 7500 Series Wireless Controllers (PAKs)

Part Number	Description
<b>LIC-CT7510-UPG</b>	Primary upgrade SKU: Pick any number or combination of the following options under this SKU to upgrade one or many controllers under one product authorization key
<b>LIC-CT7510-DTLS-K9</b>	7500 Series Controller DTLS License (Paper Certificate - U.S. Mail)
<b>L-LIC-CT7500-UPG</b>	Primary upgrade SKU: Pick any number or combination of the following options under this SKU to upgrade one or many controllers under one product authorization key
<b>L-LIC-CT75-DTLS-K9</b>	7500 Series Controller DTLS License (electronic Certificate; must not be ordered by Russian customers)

## Service and Support

Realize the full business value of your wireless network and mobility services investments faster with intelligent, customized services from Cisco and our partners. Backed by deep networking expertise and a broad ecosystem of partners, Cisco professional and technical services enable you to successfully plan, build, and run your network as a powerful business platform. Our services can help you successfully deploy the Cisco Flex 7500 Series Cloud Controller and integrate mobility solutions effectively to lower the total cost of ownership and secure your wireless network.

To learn more about Cisco Wireless LAN service offers, visit: <http://www.cisco.com/go/wirelesslanservices>.

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## Summary

The Cisco Flex 7500 Series Cloud Controller is designed to support large-scale branch wireless deployments. It simplifies deployment and operation of wireless networks, helping to ensure smooth performance, enhance security, and maximize network availability. The Cisco Flex 7500 Series Cloud Controller manages all the Cisco access points within branch locations, eliminating complexity and providing network administrators with visibility and control of their wireless LANs.

## For More Information

For more information about Cisco wireless controllers, contact your local account representative or visit:

[http://www.cisco.com/en/US/products/ps6302/Products\\_Sub\\_Category\\_Home.html](http://www.cisco.com/en/US/products/ps6302/Products_Sub_Category_Home.html).

For more information about the Cisco Unified Wireless Network framework, visit:

<http://www.cisco.com/go/unifiedwireless>.

For more information about the Cisco Flex 7500 Series Cloud Controller, visit:

<http://www.cisco.com/en/US/products/ps11635/index.html>.



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