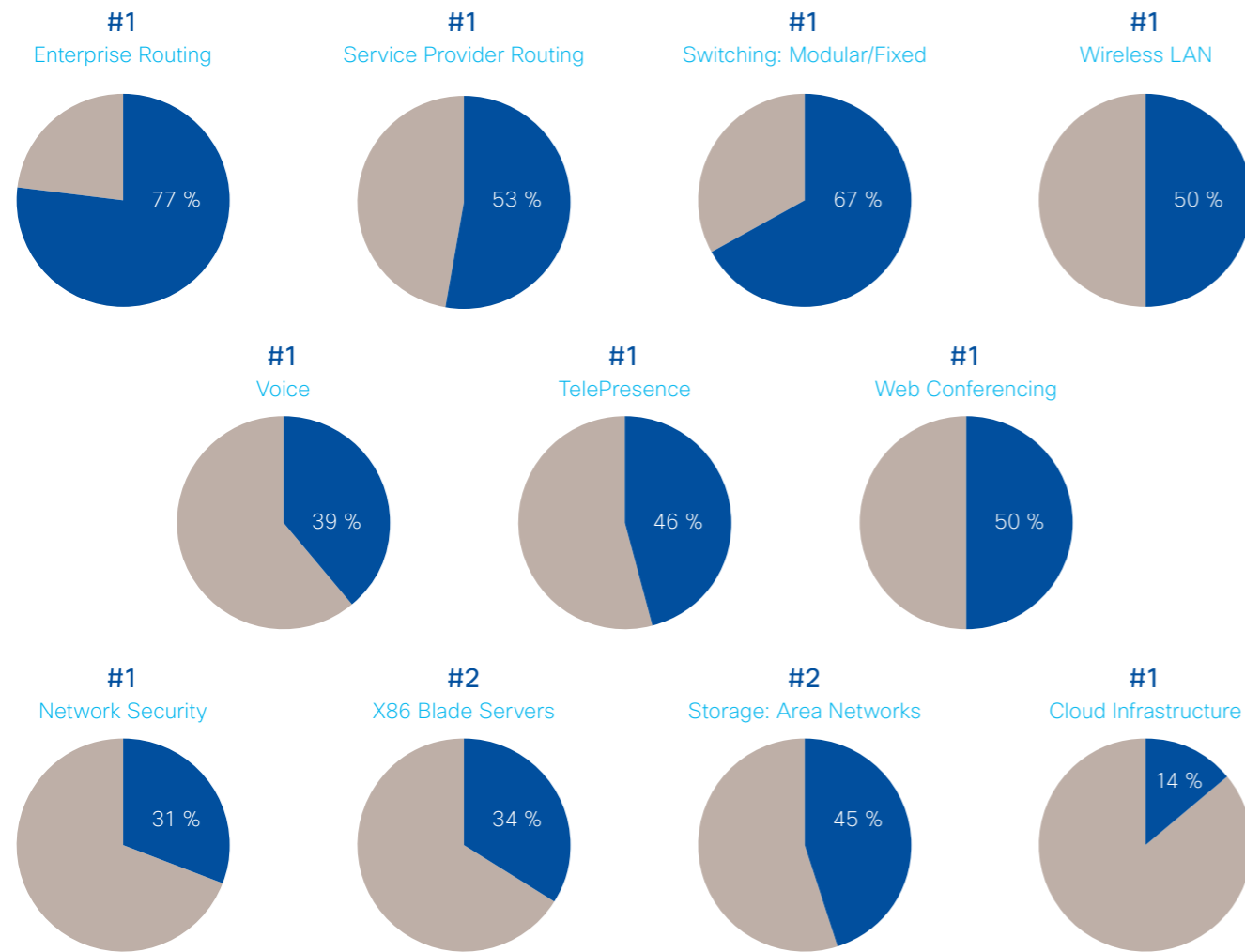


## Our Leading Market Share



Source: Dell'Oro, Synergy, Infonetics, ACG; Q1'CY15 Market share data (Network Security share DOES include Sourcefire; Web Conferencing is SaaS; Cloud Infrastructure is Q4'CY14 Synergy data).

Accelerating Innovation with Fast IT

# Cisco

## Cisco Catalog - Asia Pacific

Vol.4 2016 February - April

### Feature

Cisco On-premises & Cloud-managed Solutions

## The Best of Both Worlds



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Cisco Systems, Inc.  
San Jose, CA

**Asia Pacific Headquarters**  
Cisco Systems (USA) Pte. Ltd.  
Singapore

**Europe Headquarters**  
Cisco Systems International BV Amsterdam,  
The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at [www.cisco.com/go/offices](http://www.cisco.com/go/offices).

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Switches

Wireless

Routers

Meraki

Small Business

Services



## Catch the Wave with Cisco Mobility Express

Win a BB-8 remote control mini droid

Designed for small and medium-sized networks, Cisco has recently announced two cost-effective enterprise class access points - Cisco Aironet AP1830 and 1850 that support the latest Wi-Fi standard 802.11ac WAVE 2.

Did you know that to set up and manage AP1830 and 1850 only takes 10 minutes? Not only that, but by using Mobile Apps you can monitor, provision and do troubleshooting on the go!

The name of the management console is Cisco Mobility Express. What's more, you can manage up to 25 access points for ZERO Dollar charge in AP licenses!

We are pleased to announce the Easy Cisco Wireless Video Contest where we want you to demonstrate just how simple the set up is by following the steps below.

The first 300 submissions in APJ will receive an Amazon gift voucher and the top 100 participants' videos that receive the most 'likes' will win a BB-8 remote control mini droid.

The competition opens on 10th Feb 2016 and will run through to 29th Apr 2016. The winners list will be announced by email to your company administrator approximately ten days after winners are determined. They will also be available on Partner Central.

To view a Step by Step setup guide visit <https://goo.gl/ON7zA>

So what are you waiting for? Video your demo and submit ASAP to be in the running!

Good luck!

### HOW YOU CAN WIN!

#### Step One – Create your video

Take a video of your setup demonstration of Cisco's Aironet AP 1830 or 1850 to show us how easy it really is! If you don't have a demo kit, submit your request at <http://goo.gl/forms/SBBEKfSiGG>

#### Step Two – Upload your Video to YouTube

Upload your video to [www.youtube.com](http://www.youtube.com) and get as many likes as you can during the competition period.

#### Step Three – Submit your Video to enter the Competition

To complete your entry, submit it via <http://goo.gl/forms/8LBGqO7Ndm>

#### Terms & Conditions:

By participating in the competition you confirm that you have read and agree to the Cisco competitions Terms & Conditions, please visit Partner Central at <https://goo.gl/ON7zA>

#### Please ensure that you follow the Video Submission Criteria:

1. Video should demonstrate how easy it is to set up Cisco Aironet AP1830 or 1850
2. Describe, demonstrate or otherwise communicate the complete process required to set up a Cisco Aironet AP 1830 or 1850
3. Use your creativity in backgrounds, editing, and directing!
4. Video should be up to 10 minutes in duration
5. Videos can be submitted in English or your local country language
6. Multiple individuals are allowed to participate from one reseller or Distributor company



## Cisco Catalog – Asia Pacific

Vol.4 2016 February – April

### Index

What's New	P04
Cisco On-premises & Cloud-managed Solutions The Best of Both Worlds	P06
Cisco ONE Software The More Flexible, Cost-Effective Solution Makes Buying Your Infrastructure Software Faster and Easier	P08
Cisco Network as a Sensor and Enforcer Activate Your Cisco Network as a Powerful Security Sensor and Enforcer	P10

#### Switches

Cisco Catalyst 2960-CX Series	P18
Cisco Catalyst 3560-CX Series	P18
Cisco Catalyst 2960-Plus Series	P19
Cisco Catalyst 2960-X Series	P20
Cisco Catalyst 3650 Series	P21
Cisco Catalyst 3850 Series	P22
Cisco Catalyst 4500E Series	P24
Cisco Catalyst 4500-X Series	P25
Cisco Catalyst 6500 Series	P26
Cisco Catalyst 6800 Series	P27
Modules & Accessories	P29

#### Wireless

Cisco Aironet Access Points	P34
■ Indoor Access Points	P34
■ Outdoor Access Points	P36
■ Cisco Aironet Antennas and Accessories	P37
Cisco Wireless Controllers	P39
Mobility Services & Wireless Management	P41

#### Routers

Cisco ISR 800 Series	P44
Cisco ISR 1900/2900/3900 Series	P45
Cisco ISR 4000 Series	P46
Modules & Accessories	P47
Cisco Wide Area Application Services (WAAS)	P50

#### Meraki

Cisco Meraki	P52
--------------	-----

#### Small Business

Cisco Small Business Switches	P56
Cisco Small Business Wireless Access Points	P59
Cisco Small Business Routers	P59
Cisco Low-end Product Series Comparison	P60

#### Services

Cisco Smart Net Total Care Service	P62
------------------------------------	-----

### 1 Training Provider 5 Architecture Specializations

Enterprise Networking • Security • Collaboration  
• Data Center • Service Provider



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Global Knowledge.



Switches

Wireless

Routers

Meraki

Small Business

Services

# What's New - Tools

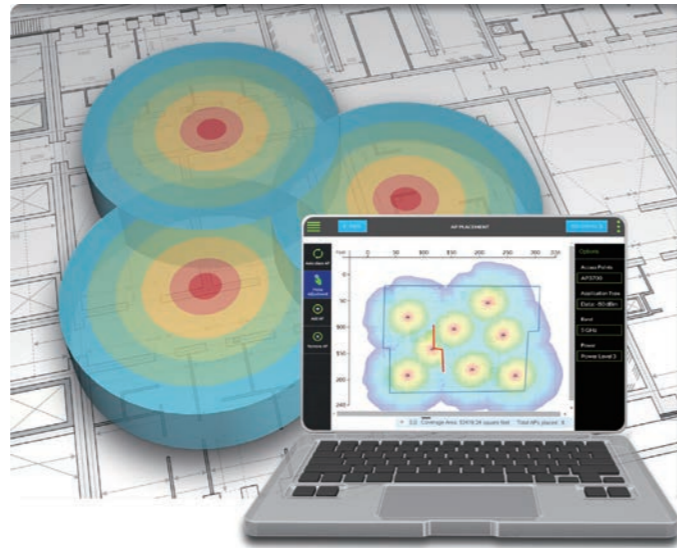
## Free Cloud-Based Tools

### Cisco Cloud-Based Predictive RF Tool

The **Cisco Cloud-Based Predictive RF Planner Tool** will make an initial site estimate of the number and placement of Cisco wireless access points needed for your customer sites. You will be able to easily create a bill of materials without the expense and time required of a physical onsite survey.

**Features:**

- Easy RF proposal generation
- Supports all Cisco Access points - Aironet, Meraki
- Supported on all Browsers
- Simple drag & draw from RF legends provided
- Optimized for better access points coverage
- Several coverage models (Data, Voice, Location)
- User-friendly display (sliding ruler to see the exact edge of a given coverage value, extensible and contextual menus to offer options without clogging screen)



**Wireless Design Made Easy**  
Scalable. Intelligent. Cloud Ready.

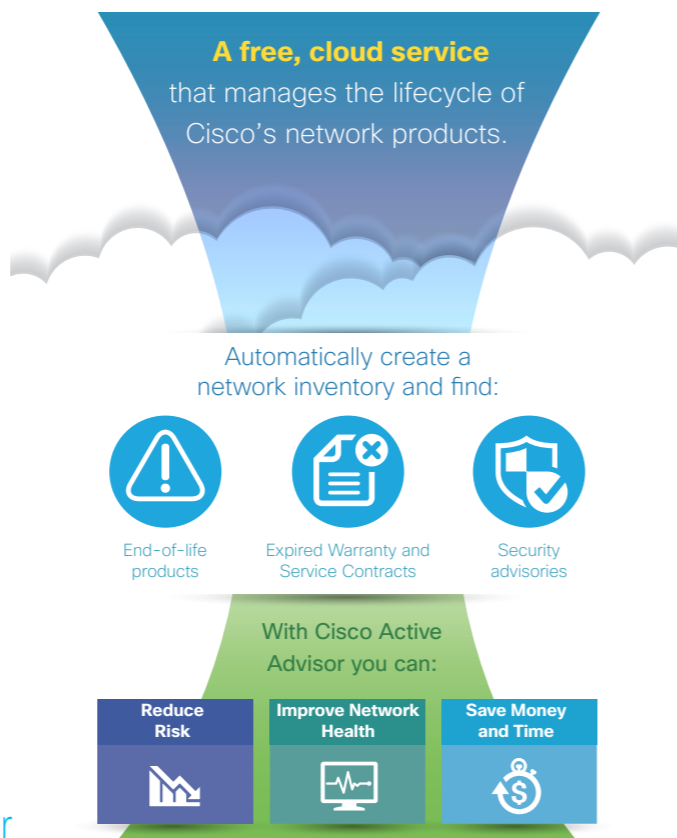
<http://www.cisco.com/web/partners/tools/rf-planner-tool.html>

### Cisco Active Advisor

The **Cisco Active Advisor** is a cloud-based service that provides essential lifecycle information about your network inventory. Available standalone or in conjunction with other Cisco network management applications, Cisco Active Advisor can help you reduce the overall risk of your network by keeping up-to-date with the status of your products.

Cisco Active Advisor shows the following information, and is constantly expanding its functions:

- Warranty and service contract status
- Product advisories:
  - Cisco Product Security Incident Response Team (PSIRT) and field notices
- End-of-life notifications:
  - Hardware and software



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

# What's New - Products

Enterprise networks today are required to be secure, reliable, and connectable seamlessly anywhere, anytime, for any user, and on any device. This catalog introduces the lineup of new products designed to deliver enterprise networks that help steer small- and medium-sized companies toward business success.

*Please contact your authorized Cisco partner, authorized Cisco distributor or Cisco reseller for details on the release date.*

## Meraki

### High Performance 11ac Wave 2 Wireless

The **Cisco Meraki MR42** ushers in the next generation of WLAN to the Meraki access point family with support for IEEE's new 802.11ac Wave 2. This enhancement to the 'ac' standard brings support for Multi-User - Multiple Input Multiple Out, or MU-MIMO to its friends.

MU-MIMO allows wireless networks to more efficiently service a large number of phones, tablets, and other mobile devices by allowing the access point to communicate with multiple devices concurrently, rather than consecutively. This increases total network performance and improves the end user experience, especially when large numbers of devices are connected.



**Cisco Meraki MR42** P54

### The More Affordable Way to Provide Fiber Aggregation

The **Cisco Meraki MS410-16/MS410-32**, available with 16 or 32 x SFP interfaces, offer a more affordable way to provide fiber aggregation to the campus. The Cisco MS410 features SFP+ uplink connectors, plus redundant, hot-swappable power supplies and fans.

New to the Meraki aggregation switch family (now known as the The Cisco MS400 Series), Cisco MS410 features a pair of integrated 40 GE stacking connectors, enabling Cisco MS410s to be stacked up to 8 units. This opens up new possibilities for creating highly redundant switch architectures, or top-of-rack fiber aggregation.



**Cisco Meraki MS410-16/MS410-32** P55

### Simplify Mission Critical Networks

The **Cisco Meraki MX65/MX65W** are Meraki's first security appliances incorporating dedicated Power over Ethernet (PoE+) ports. Now it's possible to power two devices, up to 30 W each, without requiring a separate power injector.

The model is available with a wireless option, providing IEEE 802.11ac WiFi with improved coverage thanks to a new wireless chipset and antenna design. There are also 8 dedicated 1 GE LAN ports and 2 WAN interfaces, perfect for customers looking to build dual-active VPNs with our Intelligent WAN technology.



**Cisco Meraki MX65/MX65W** P54

# The Best of Both Worlds

Whether you go with on-premises, cloud-managed, or hybrid, with Cisco you can build a network solution that is ideal for your application strategy, your IT staff's capabilities, and your business requirements.

## How to Choose between On-premises and Cloud-managed Solutions

Now Cisco offers both on-premises and cloud-managed solutions for network infrastructure;

- On-premises: Catalyst, Aironet, ISR/ASA
- Cloud-managed: Meraki

Which solution should we use? Here are questions to help you choose between on-premises and cloud-managed solutions.

### 1 Where will your applications live?

If you're not comfortable with moving applications to the cloud for the next 3 to 5 years or are restricted due to security and privacy guidelines, an on-premises solution may be the way to go.

On the other hand, if you want to simplify and centralize overall network management, if you're ready to move applications to the cloud, or if you have already set up some cloud services, Cisco Meraki cloud-managed solution might be best.

### 2 Do you have local IT support in most locations or are you struggling to scale your staff?

*On-premises* - If your IT staff consists of technical experts who want a highly customizable network, consider an on-premises solution.

*Cloud-managed* - If your IT staff is small or stretched thin and is looking for ways to simplify deployments, consider a cloud-managed approach.

### 3 How do you buy IT solutions?

If you prefer to budget each project independently in a CapEx model, go with an on-premises deployment. If you'd rather pay for licenses and services over time in a renewable model through a subscription or OpEx-based approach, cloud management is best.

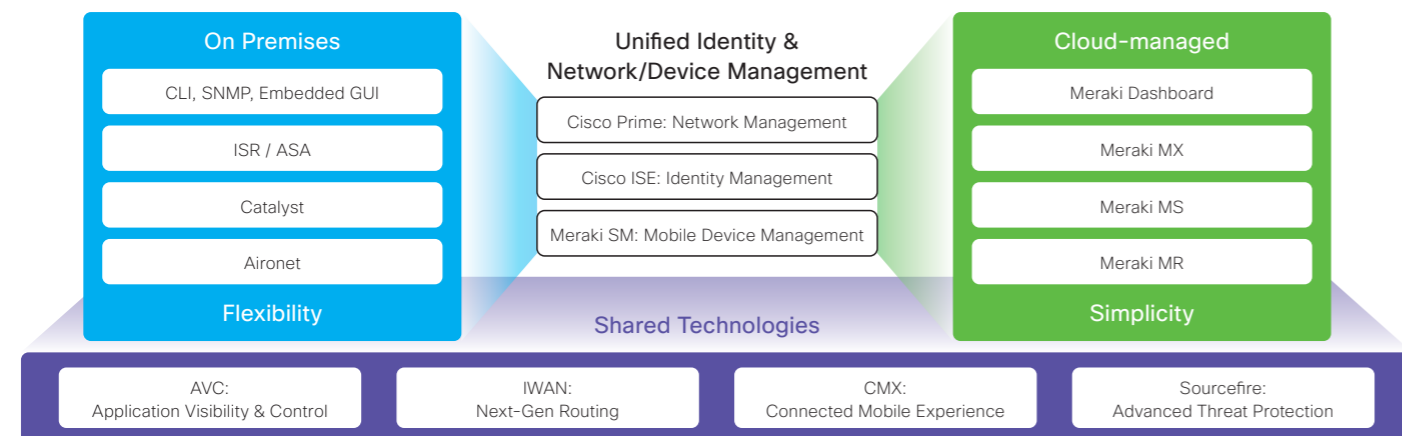
### 4 How are you supporting mobile devices?

On-premises networks can be great when you need advanced features, whereas cloud-managed networks offer quick setup and visibility.

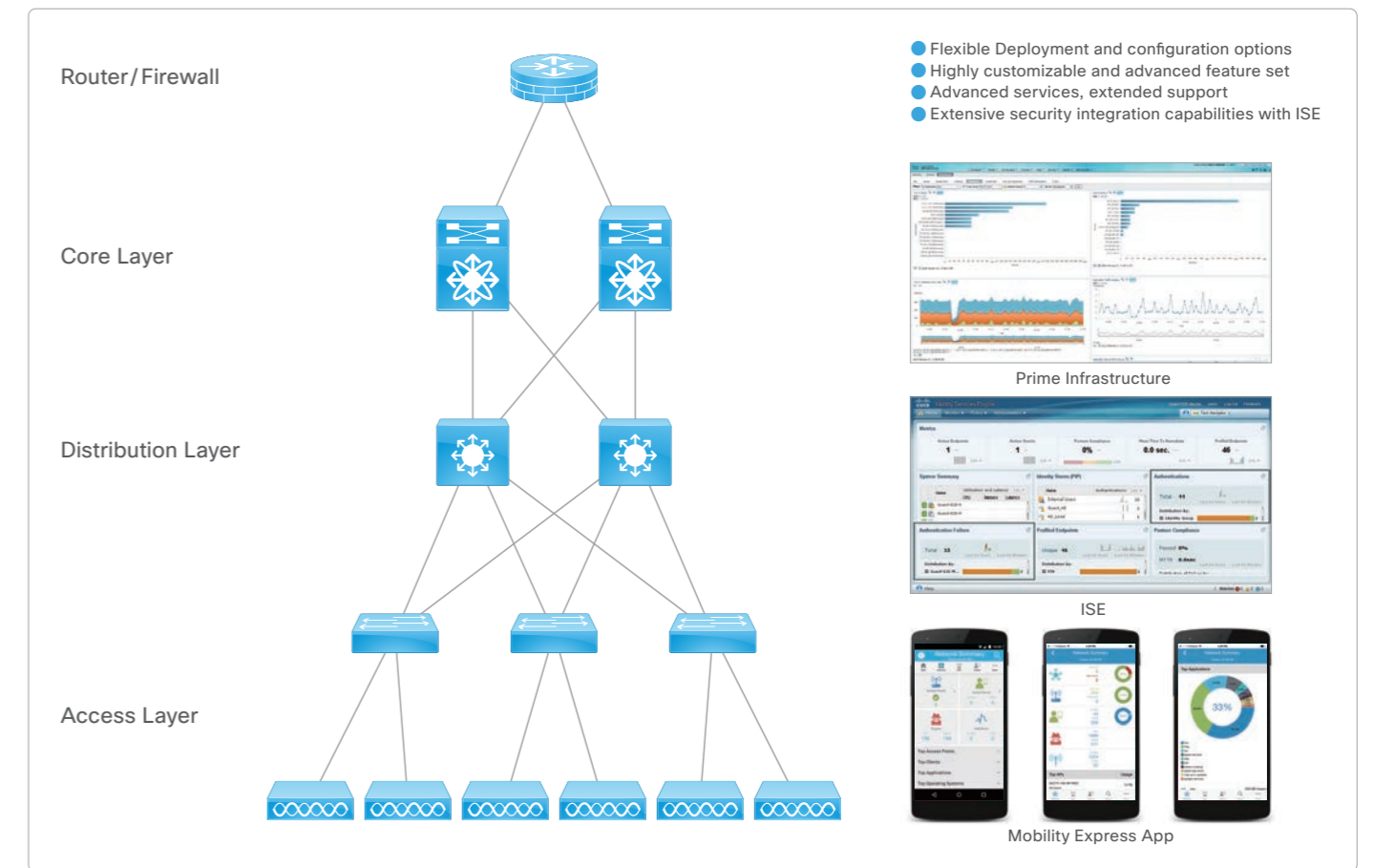
- |                           |                          |
|---------------------------|--------------------------|
| <i>On-premises;</i>       | <i>Cloud-managed;</i>    |
| ● Intelligent caching     | ● Turnkey installation   |
| ● Optimization techniques | ● Networkwide visibility |
| ● Customized deployments  | ● Management simplicity  |

### 5 What matters to you most?

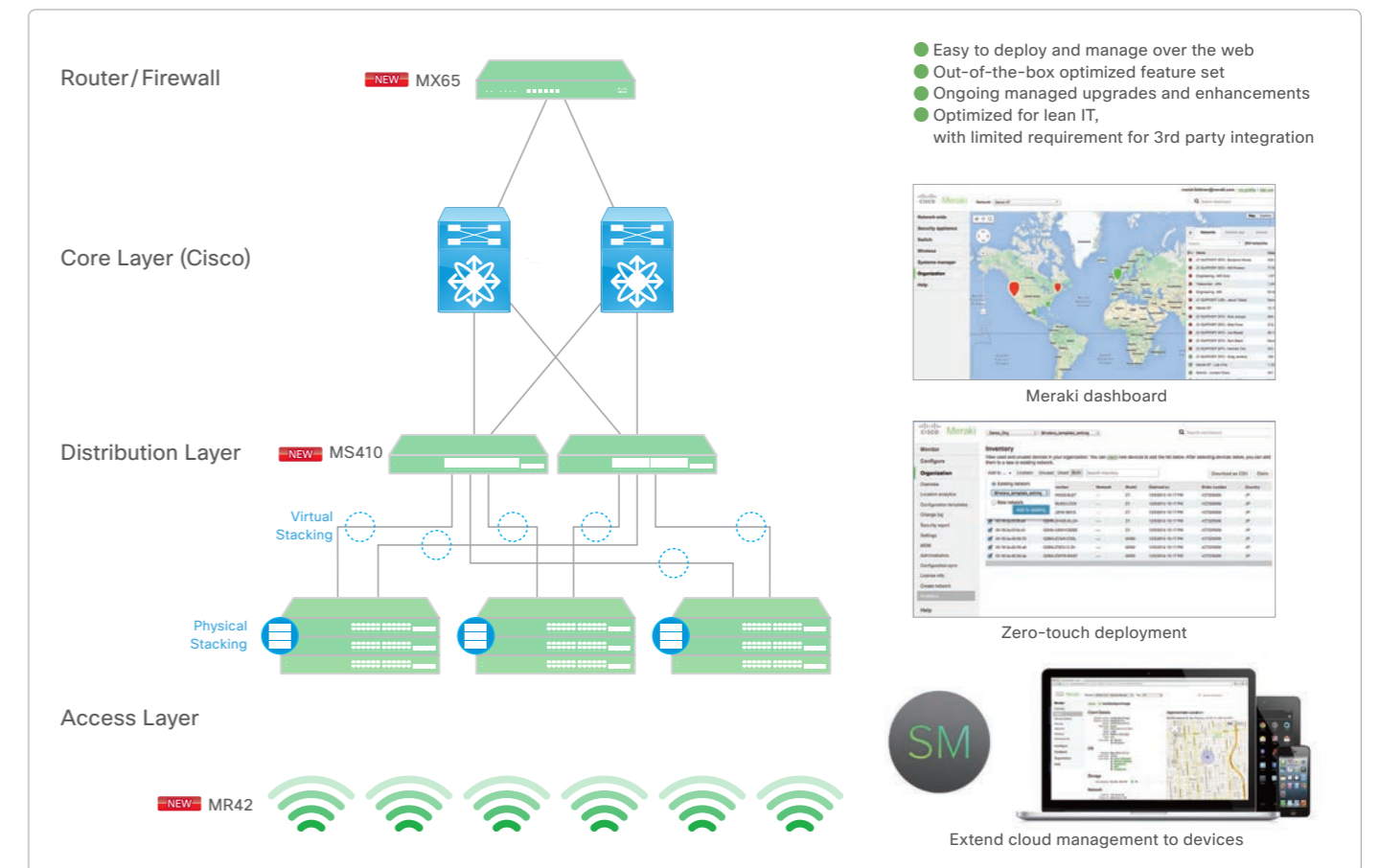
- |                            |                            |
|----------------------------|----------------------------|
| <i>On-premises;</i>        | <i>Cloud-managed;</i>      |
| ● Advanced features        | ● Ease of use              |
| ● Dynamic service rollouts | ● Security and reliability |
| ● Deep visibility          | ● Out-of-the-box           |



## Typical Deployment of On-premises: Network as a Platform



## Typical Deployment of Cloud-managed: Network as a Service



Switches

Wireless

Routers

Meraki

Small Business

Services

# The More Flexible, Cost-Effective Solution Makes Buying Your Infrastructure Software Faster and Easier

What if buying complete IT solutions across your data center, WAN, and access domains were as simple as a single purchase? With Cisco ONE Software, we are making it easier for you to extract the value in your network infrastructure.

## Making Software Buying Simple

Cisco ONE Software is a valuable and flexible way to buy software for your data center, WAN, and access domains. At each stage in the product lifecycle, Cisco ONE Software helps make buying, managing, and upgrading your network and infrastructure software easier.

Cisco ONE Software is organized by domains (Data Center, WAN, and Access) and feature sets (Foundation, Advanced Applications, and Advanced Security). Cisco ONE for Access offers a comprehensive fea-

ture set for wired and wireless access. Cisco ONE for WAN provides complete functionality for the branch and network edge. Cisco ONE for Data Center provides functionality for physical and virtualized data centers, across network and compute resources, and provides secure, scalable support for private and hybrid clouds. Finally, Cisco ONE Advanced Security provides a robust set of threat defense capabilities and central policy management.

## Cisco ONE for Access

Cisco ONE for Access is a simple and economical solution for deploying branch and campus switches and wireless access points. It offers an uncompromised user experience in a highly secure and feature-rich access infrastructure.

Cisco ONE Foundation for Switching provides a solution to:

- Manage a large switching infrastructure more efficiently.
- Help reduce expenses by simplifying network deployment and management.
- Centralize network access policies across wired and wireless networks.
- Manage wired, wireless, and VPN users and devices easily.
- Help improve the energy efficiency of your connected devices.

Cisco ONE Campus Fabric:

- Delivers a better user experience in complex switching environments.
- Helps you scale your network for business expansion and increases resiliency for your mission-critical applications.

Cisco ONE Foundation for Wireless offers connectivity and management solutions to:

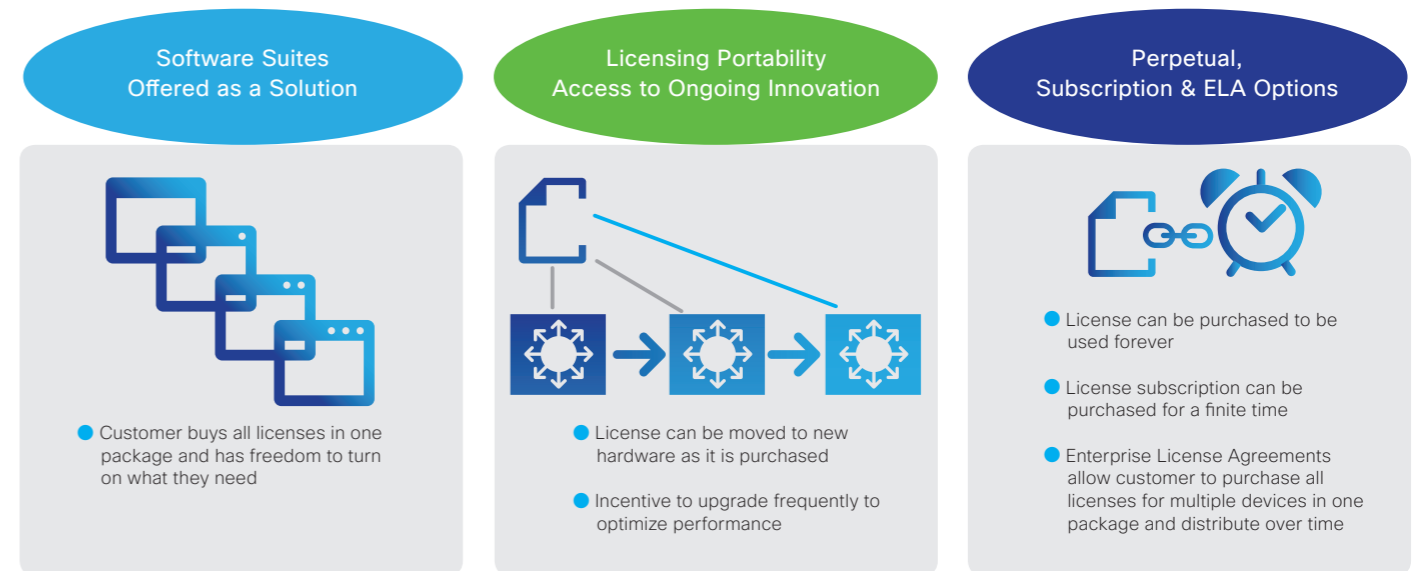
- Build business-class Wi-Fi networks.
- Create trusted wireless LAN (WLAN) access points.
- Manage mobile devices across the network more efficiently.
- Deliver location-based services for your users.
- Provide highly secure access for guest and employee access.

Cisco ONE Advanced Mobility Services:

- Help you create personalized mobile experiences for your users and start unlocking the potential of your business with wireless security and advance mobile location and analytics.

	Cisco ONE for Access		Cisco ONE for WAN	Cisco ONE for Data Center	
Advanced Security	Threat Defence for Access ISE		Threat Defence for WAN ASA, FS	Threat Defence for Data Center ASA 5585, FP, FS	
Advanced Applications	Campus Fabric	Advanced Mobility Services	WAN Collaboration	Data Center Fabric	Enterprise Cloud Suite
Foundation	Foundation for Switching	Foundation for Wireless	Foundation for WAN	Foundation for Data Center Networking	Foundation for Compute
Infrastructure and Base OS	Switching Catalyst 2K, 3K, 4K, 6K	Wireless AP, WLC	WAN ISR, ASR	Networking Nexus 5K, 6K, 7K	Compute X86, UCS

### ■ Cisco ONE Software: Buy All Applications/Licenses as a Suite



## Cisco ONE for WAN

Cisco ONE for WAN provides rich capabilities for branch offices and the network edge. If you want to implement new branch-office initiatives and secure IP WAN connections, this is the right solution.

Cisco ONE Foundation for WAN connects and better secures your branch offices while keeping WAN bandwidth costs under control and gives you solutions to:

- Improve application performance.
- Deploy hybrid WANs with high reliability.
- Automate deployment with centralized policies and distributed enforcement.
- Strengthen network security.
- Manage the energy use of connected devices more easily.

Cisco ONE WAN Collaboration integrates voice and video across your branches to increase productivity and helps remote branch facilities to:

- Extend rich-media capabilities to branches with more secure video.
- Improve branch and cloud telephony reliability.
- Simplify transition to IP collaboration at your own pace and budget.
- Migrate easily from time-division multiplexing (TDM) to Session Initiation Protocol (SIP) trunking.
- Manage collaboration sessions centrally.

## Cisco ONE for Data Center

Cisco ONE for Data Center can help you build a scalable, resilient, and efficient data center. You can move workloads and resources between different cloud models, quickly, more securely, and in compliance with your policies. You can also reduce costs and increase IT agility with highly secure private, public, and hybrid clouds for your physical and virtual environments.

Cisco ONE Foundation for Data Center Networking:

- Improves visibility and consistency across physical and virtual networks.
- Delivers global reach across your businesses and data centers.
- Delivers automation to simplify management of compute and virtual network environments.
- Adds performance and port density with greater fault tolerance.
- Increases operational efficiency with performance and power management.

Cisco ONE Data Center Fabric:

- Helps you create a scalable, intelligent network by converging your LANs and SANs.

Cisco ONE Foundation for Compute:

- Increases security in your virtual environments.
- Deploys foundational automation across compute and virtual infrastructure layers across private and hybrid environments.
- Uses programmable application containers for your converged data center.
- Monitors performance and energy of your compute and virtual network environments.
- Manages multiple UCS domains from a single management console.

Cisco ONE Enterprise Cloud Suite:

- Delivers the tools for creating, monitoring, self-service ordering, and lifecycle management of your private cloud. It provides unified provisioning and management of both Cisco and multi-vendor hardware.

# Activate Your Cisco Network as a Powerful Security Sensor and Enforcer

Cybercrime is now a major global business, rendering traditional approaches to security inadequate. Organizations need to add another layer of protection by using the network itself to detect anomalous behavior and enforce security policies. The Cisco 'Network as a Sensor' and 'Network as an Enforcer' solutions deliver deep visibility and pervasive control to mitigate threats before, during, and after an attack.

## The Enterprise Cybercrime Landscape

Global enterprise networks face an epidemic of cybercrime. Fully 100 percent of the business networks analyzed by Cisco threat research teams contained traffic going to websites that host malware, according to the Cisco 2014 Annual Security Report.

Cybercrime is a major global business composed of extremely profitable crime syndicates. Cybercriminals build malware directly targeting an organization's specific vulnerabilities, often discovered through extensive surveillance of the organization's networks and business practices. These threats can remain in the network for months gathering data about the company's network, devices, and users before launching attacks elsewhere in the organization's environment.

Further complicating matters, the number of potential points of infiltration into the organizations is expanding because of the growth in mobility, cloud, and the Internet of Things (IoT). The continuous growth of connected endpoints exponentially expands the attack surface for malware. An average organization uses as many as 40 separate security tools to defend against threats. However, it's nearly impossible to correlate data from so many disparate systems and uncover the source and trajectory of security threats.

Instead, your customers can leverage the network itself as a sensor and enforce to complement traditional security systems and better detect and mitigate threats in the earliest stages of attack.

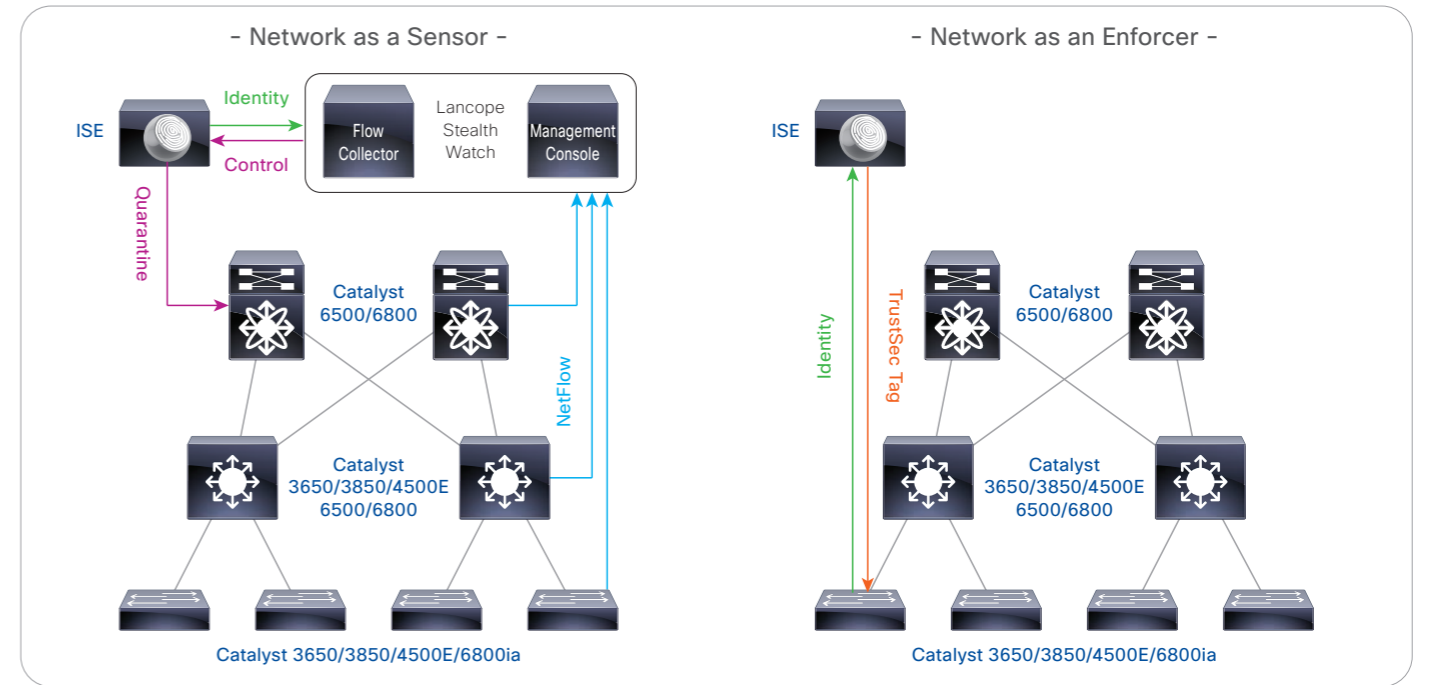
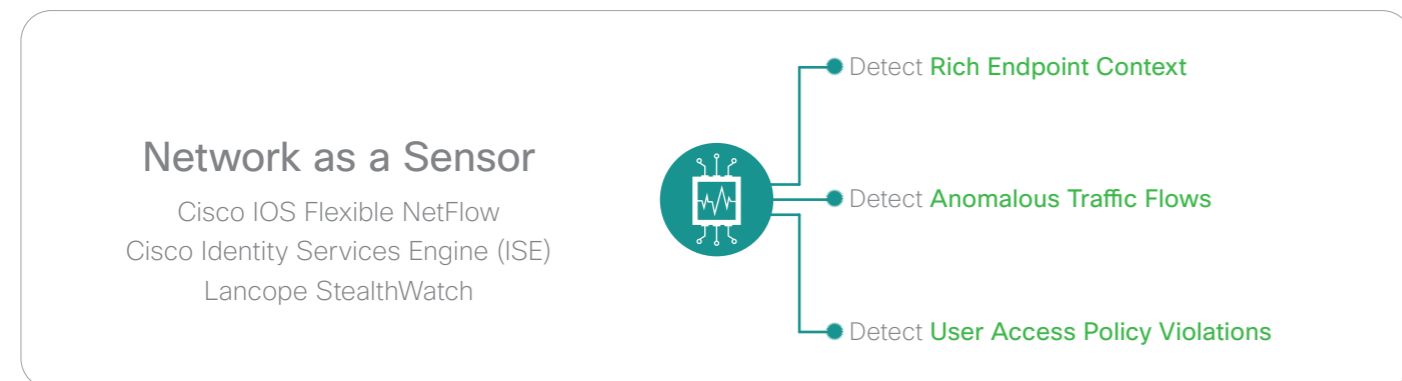
## Cisco Network as a Sensor

With so many access attempts occurring beyond the traditional enterprise network perimeter, you now need security everywhere. Fortunately, your Cisco network already contains what you need to do the job. We call it the Cisco Network as a Sensor solution. By simply activating the embedded security capabilities in your Cisco network, you can transform your network into a full-blown security monitoring system that gives you broad and deep visibility into your network and everything that connects to it.

If you can't see network threats, how can you defend against them? The Cisco Network as a Sensor solution addresses this issue head-on.

You get the global network visibility you need in the form of detailed security analytics generated by Cisco IOS Flexible NetFlow, contextual data from the Cisco Identity Services Engine (ISE), and real-time monitoring and alerts from partner technology, Lancope StealthWatch.

The solution determines the baseline profile for your network. From there it can then rapidly detect malicious activities - abnormal data movements, suspicious traffic, advanced threats - anywhere in your environment. You see how your traffic is flowing, which devices are accessing your network and what malicious activities might be taking place on your network.



### Cisco Catalyst Switches Compatibility

	NetFlow	TrustSec
2960-CX (LAN Base)	Lite	-
3560-CX	Lite	SGT, SGACL
2960-X (LAN Base/IP Lite)	Lite	SXP
3650	Full Flexible	SGT, SGACL
3850	Full Flexible	SGT, SGACL
4500E (SUP8-E)	Full Flexible	SGT, SGACL
6500 (SUP2T)	Full Flexible	SGT, SGACL
6800 (SUP2T)	Full Flexible	SGT, SGACL

### Cisco NetFlow

- Full Flexible - Provides full scale NetFlow for all traffic without CPU impact
- Lite - Provides sampled NetFlow, reducing total visibility

### Cisco TrustSec

- SGT - Supports inline packet tagging
- SGACL - Supports SGT-based access control
- SXP - Supports exchange of tag assignment with upstream SGT-capable device

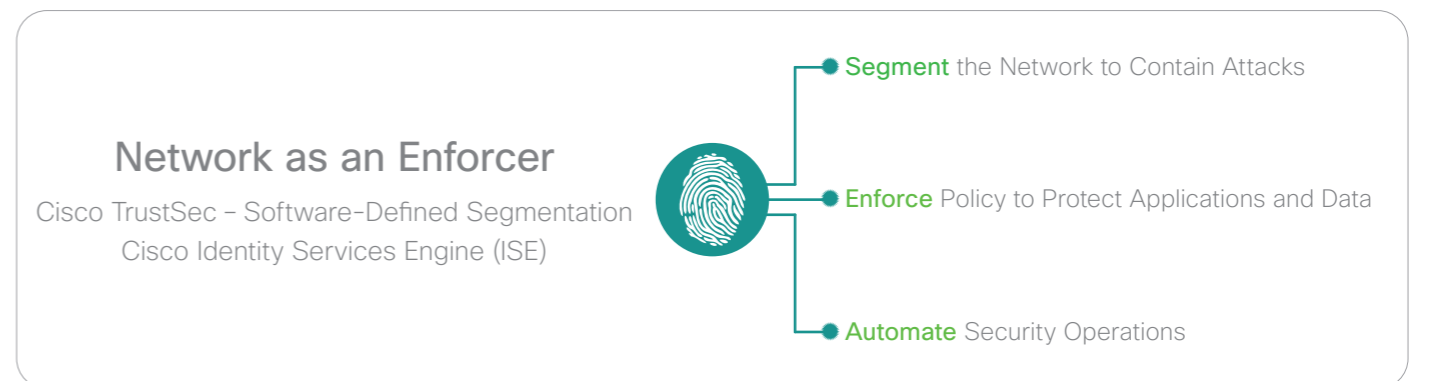
## Cisco Network as an Enforcer

Each network connection, whether created by cloud services, mobility, the Internet of Things (IoT), or something else, represents a potential attack entry point. Your challenge is to balance the network access that users and devices need with risk mitigation.

The good news is that your Cisco network already contains the tools to do that. You just need to activate them to allow your network to serve as an enforcer of network security policy. For example, you can contain threats by using Cisco TrustSec and Cisco ISE to partition your network into smaller segments. Through a software-defined approach to network segmentation, you can then protect the segments using specific group

policies that determine user access based on user roles and their business needs and greatly reduce your "attack surface." That means that even if hackers do make their way into your network, they can no longer move freely about and cause widespread damage.

With your Cisco network acting as a network security enforcer, you centrally apply your security policies networkwide. The right users and devices now enjoy the right access, and you contain the impact of an attack. Cisco ISE serves as the centralized policy engine that provides real-time access control decisions for Cisco switches, routers, and security devices.



# Switches

## L2 / L3 Switches



### Line-up of Cisco Catalyst Switches

Category	Series	Layer
Core	Cisco Catalyst 4500-X Series, Cisco Catalyst 6500 Series, Cisco Catalyst 6800 Series	L3
Core / Access	Cisco Catalyst 3650 Series, Cisco Catalyst 3850 Series, Cisco Catalyst 4500E Series	L2/L3
Access	Cisco Catalyst 2960-X Series, Cisco Catalyst 2960-Plus Series	L2
Compact	Cisco Catalyst 2960-CX Series, Cisco Catalyst 3560-CX Series	L2

Cisco Catalyst 2960-CX Series	L2 compact switches suitable for deployment in the access layer. These switches deliver basic network services even outside the wiring closet.	See page 18.
Cisco Catalyst 3560-CX Series	L3 compact switches suitable for deployment in the access layer. These switches deliver advanced network services even outside the wiring closet.	See page 18.
Cisco Catalyst 2960-Plus Series	L2 fixed-configuration switches suitable for deployment in the access layer. FE is supported on all downlink ports.	See page 19.
Cisco Catalyst 2960-X Series	L2/L3 fixed-configuration switches suitable for deployment in the access layer. GE and stacking are supported on all downlink ports.	See page 20.
Cisco Catalyst 3650 Series	L2/L3 fixed-configuration switches suitable for deployment in the access layer or core layer. Provide a wireless controller function to server as an integrated platform for wired/wireless LAN networks.	See page 21.
Cisco Catalyst 3850 Series	Next-generation L2/L3 fixed-configuration switches suitable for deployment in the access layer or core layer. Provide a wireless controller function to server as an integrated platform for wired/wireless LAN networks.	See page 22.
Cisco Catalyst 4500E Series	L2/L3 modular switches suitable for deployment in the access layer or core layer. The superior cost performance of these switches ensure the protection of investment over long periods.	See page 24.
Cisco Catalyst 4500-X Series	L3 fixed-configuration switches suitable for deployment in the core layer. Deliver excellent expandability and performance in environments with space constraints.	See page 25.
Cisco Catalyst 6500 Series	L3 modular switches suitable for deployment in the core layer. Provide a wide range of network services thanks to their top-of-the-industry performance.	See page 26.
Cisco Catalyst 6800 Series	L3 fixed-configuration/modular switches suitable for deployment in the core layer. Provide network services optimized for 10/40/100 Gigabit Ethernet.	See page 27.

### Selection of Cisco Catalyst Switches

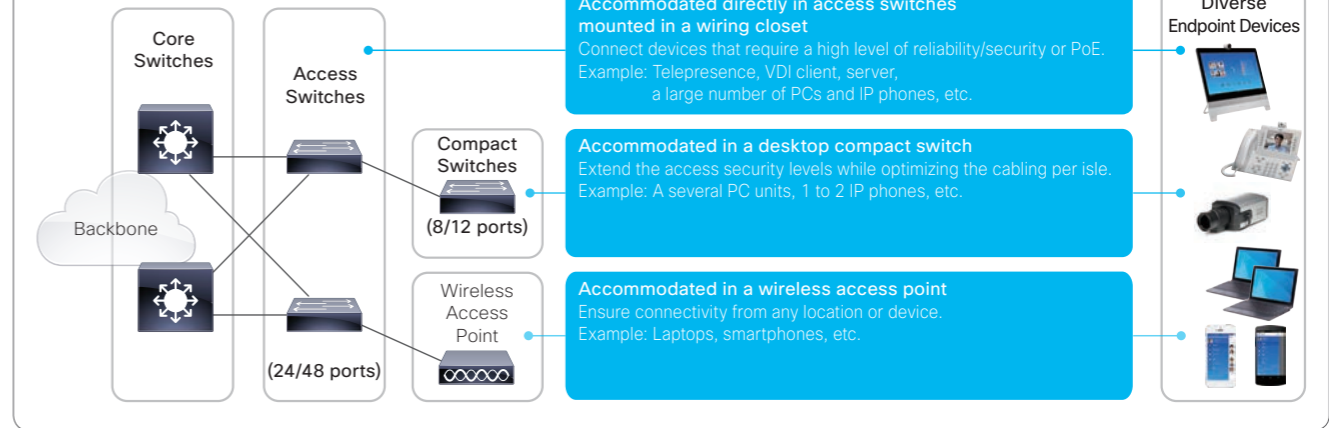
#### Access Switches and Core Switches

Medium-sized corporate networks today are generally configured in two layers with access switches and core switches. Access switches are used to connect the end devices such as client PCs, IP phones and wireless access points; and core switches are used to consolidate lines by connecting multiple access switches. Switches with higher performance than access switches should be selected for core switches as their role is to consolidate a large number of lines.

#### L2 Switches and L3 Switches

Switches can be categorized into L2 switches (Layer 2 switches) and L3 switches (Layer 3 switches) based on their functionality. In general, L2 switches are used for access switches and L3 switches are used for core switches, respectively. However, L3 switches should also be selected for access switches when offering services with higher added value to the end users such as MACsec, which is a part of the Cisco TrustSec solution. The Cisco Catalyst 3650/3850/4500E Series support the upgrade from L2 to L3 switches via a Cisco IOS upgrade license.

#### Configuration/Connection Examples



#### Fixed-Configuration Switches and Modular Switches

Typically, fixed-configuration switches (or box-type switches) are referred to as having low cost and low performance; and modular switches (or chassis-type switches) are referred to as having high cost and high performance. However, when the port unit prices of multiple fixed-configuration switches and a single modular switch are put to comparison, the latter cost may become lower as the number of ports increases. High-performance switches should generally be selected for the core switches. However, in a small-sized network, a sufficient performance and redundant configuration can be achieved by connecting the fixed-configuration Cisco Catalyst 3650/3850 Series switches in a stack.

#### Compact Switches

In some physical environments such as an office, it may be impossible or labor- and cost-intensive to run separate wiring from access switches installed in a wiring closet to the end devices such as a client PC, IP phone and wireless access points. The Cisco Catalyst 2960-CX/3560-CX Series compact switches have been developed to resolve these issues. All models feature space-saving dimensions of under 5 cm x 27 cm x 24 cm with weight under 2 kg as well as a stylish, fanless low-noise design, making them suitable for installation in locations that are within sight of end users, such as on a desktop, counter or wall. In addition to addressing issues related to the cable wiring, installation space, some models also support the innovative PoE pass-through functionality to resolve any power supply issues.

### Ports

Cisco Catalyst Switches support the following interface ports for uplink and downlink connections:

- Fast Ethernet port (FE)
- Gigabit Ethernet port (GE)
- Multigigabit Ethernet port (mGig)
- SFP module slot (SFP)
- Dual-Purpose port (GE/SFP)
- 10GBASE-T port (10GB-T)
- X2 module slot (X2)
- SFP+ module slots (SFP/SFP+)
- CFP module slot (CFP)

The bracketed notations are abbreviations used in the specification comparison tables in this catalog. A dual-purpose port is an interface combining a Gigabit Ethernet port with an SFP module slot and is notated as GE/SFP (Either one can be activated independently). Similarly, SFP+ module slots are notated as SFP/SFP+ due to their compatibility with SFP. SFP/SFP+ modules can be mounted to X2 or CFP module slots using an appropriate converter. In most cases, the supported port interfaces and number of ports of each product can be determined from their SKU (Refer to page 14 for details).

#### Ports Supported by Fixed-Configuration Cisco Catalyst Switches (e.g.)

- Uplink**
  - Gigabit Ethernet port (GE)
  - SFP module slot (SFP)
  - Dual-Purpose port (GE/SFP)
  - 10GBASE-T port (10 GB-T)
  - SFP+ module slot (SFP/SFP+)



- Downlink**
  - Fast Ethernet port (FE)
  - Gigabit Ethernet port (GE)
  - Multigigabit Ethernet port (mGig)
  - SFP module slot (SFP)
  - SFP+ module slot (SFP/SFP+)

## How to Distinguish Specifications from SKU of Cisco Catalyst Switches

The SKU of each Cisco Catalyst Switch contains a broad description of the product's specification.

Cisco Catalyst 2960-CX/2960-Plus/2960-X Series

**WS-C 2960 X-24 TS-L**

**Series Number**

**Model Type**

- CX : Compact model
- + : FE model
- G : GE model
- X : GE model with stacking support<sup>\*1\*</sup>
- XR : GE model with power supply redundancy/stacking support

**Number of Ports**

8, 24, or 48

**Downlink Ports**

- T : Data-only port
- L : Port with PoE power supply support (Full 15.4 W power on 8 ports)
- P : Port with PoE power supply support (Full 15.4 W power on 24 ports)<sup>\*3</sup>
- LP : Port with PoE power supply support (Full 15.4 W power on 24 ports)
- FP : Port with PoE power supply support (Full 15.4 W power on 48 ports)

**Uplink Ports**

- Q : GE port
- T : GE port
- C : GE/SFP port
- S : SFP module slot
- D : SFP/SFP+ module slot

**Cisco IOS**

- L or LL : LAN Lite
- S : LAN Base
- I : IP Lite

Cisco Catalyst 3560-CX/3650/3850 Series

**WS-C 3850 -24 XU-S**

**Series Number**

**Number of Ports**

8, 12, 24, or 48

**Downlink Ports**

- T : Data-only port
- P : Port with PoE power supply support (Full 15.4 W power on 24 ports)<sup>\*4</sup>
- PF/F/PW : Port with PoE power supply support (Full 15.4 W power on 48 ports)
- U : Port with UPOE power supply support
- S : SFP module slot
- X : mGig port or SFP/SFP+ module slot

**Cisco IOS**

- L : LAN Base
- S : IP Base
- E : IP Services

Cisco Catalyst 4500E Series (Chassis)

**WS-C 4507 R+E**

**Number of Slots**

3, 6, 7, or 10

**Supervisor Engine Redundancy**

- None : Not supported
- R : Supported

Cisco Catalyst 4500E Series (Line Card)

**WS-X 4748 -RJ45 - E**

**Bandwidth per Slot**

- 46 : 24 Gbps
- 47 : 48 Gbps

**Port Interface**

- RJ45 : GE port
- RJ45V+ : GE port with PoE+ power supply support
- U, UPOE : GE port with UPOE power supply support
- X : mGig port
- SFP : SFP module slot
- X2 : X2 module slot
- SFP+ : SFP/SFP+ module slot

Cisco Catalyst 4500-X Series (no Network Module)

**WS-C 4500 X-F-16 SFP+**

**Cooling Fan**

- None : Front air intake/Rear exhaust
- F : Rear air intake/Front exhaust

**Number of Ports**

16 or 32

Cisco Catalyst 4500-X Series (with Network Module)

**WS-C 4500 X-24 X-ES**

**Number of Ports**

16 or 32

**Cisco IOS**

- IPB : IP Base
- ES : Enterprise Services

Cisco Catalyst 6500 Series (Chassis)

**WS-C 6509 -V-E**

**Number of Slots**

3, 4, 6, 9, or 13

**Chassis Type**

- None : Horizontal slot
- V : Vertical slot

Cisco Catalyst 6500/6800 Series (Line Card)

**WS-X 6904 -40G - 2T**

**Number of Ports**

4, 8, 16, 24, 32, or 48

**Port Interface**

- TX : GE port
- SFP : SFP module slot
- 10T : 10GBASE-T port
- 10G : X2 module slot or SFP/SFP+ module slot
- 40G : CFP module slot

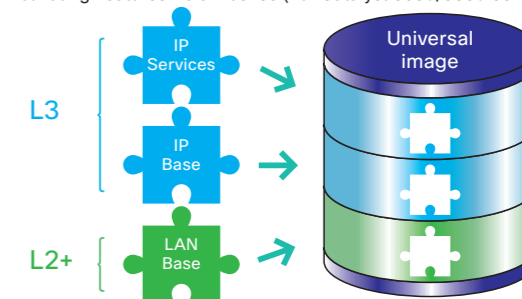
\*1 LAN Lite model does not support stacking. \*2 WS-C2960X-24PSQ-L is not supported. \*3 Compact switches support full 15.4 W power on 8 ports. \*4 Compact switches support full 15.4 W power on 8 or 12 ports.

## Cisco IOS on Cisco Catalyst Switches

Cisco Catalyst Switches incorporate the Cisco IOS (Internetwork Operating System), which is a high-performance network infrastructure software. LAN Lite and LAN Base feature sets provide the L2 level features, and IP Lite, IP Base, IP Services, Advanced IP Services, Enterprise Services, and Advanced Enterprise Services feature sets provide the L3 level features, respectively.

Cisco IOS provided with the Cisco Catalyst 3560-CX/3650/3850/4500-X/4500E Series is delivered in a single universal image. The universal image contains the entire Cisco IOS feature set that can be activated via a software license. A software image needed to be installed in order to use the new functions on previous Cisco Catalyst Switches. However, on the Cisco Catalyst 3560-CX/3650/3850/4500-X/4500E Series Switches, advanced functions can be activated immediately using the Cisco IOS Upgrade License.

■ Activating Features via a License (For Catalyst 3650/3850 Series)



Cisco IOS Feature Sets	LAN Lite	LAN Base	IP Lite	IP Base	IP Services	Enterprise Services	Advanced IP Services	Advanced Enterprise Services	
Supported Series	2960-CX	-	●	-	-	-	-	-	
	3560-CX	-	-	-	●	●	-	-	
	2960-Plus	●	●	-	-	-	-	-	
	2960-X	●	●	●	-	-	-	-	
	3650	-	●	-	●	●	-	-	
	3850	-	●	-	●	●	-	-	
	4500-X	-	-	-	●	-	●	-	
	4500E	-	●	-	●	-	●	-	
6500	-	-	-	●	●	-	●		
6800	-	-	-	●	●	-	●		
L2	- IEEE 802.1 Q trunking - STP (Spanning tree protocol) - CDP - DTP - UDLD - VTP - EtherChannel - LACP - LLDP - Storm control on port-by-port basis		All LAN Lite functions PLUS: - Flex Link - Link State Tracking - LLDP-MED		All LAN Base features				
	- Static Routing - RIP - PIM Stub - EIGRP Stub - Policy-based routing (PBR)		- Static Routing - RIP - PIM Stub - EIGRP Stub - OSPF for Routed Access - WCCP <sup>*1</sup> - Policy-based routing (PBR)		All IP Base functions PLUS: - OSPF - EIGRP - BGP - IS-IS <sup>*2</sup> - VRF-Lite - WCCP - Policy-based routing (PBR)		All IP Services functions PLUS: - IS-IS - MPLS - EoMPLS - L3 VPN		All Advanced IP Services functions PLUS: - L2 VPN (Native VPLS, A-VPLS)
L3	- SNMP - RMON - SPAN - TDR - Smart Ports - Smart Install (client)		All LAN Lite functions PLUS: - RSPAN - Cisco IOS IP SLA (responder)		All LAN Base features		All LAN Base functions PLUS: - Smart Install (director) - Cisco IOS EEM - Cisco IOS IP SLA (initiator)		
Manageability	- SSH - SSL - SCP - HTTPS - TACACS+ - RADIUS - Port security - MAC authentication bypass for voice - Private VLAN edge		All LAN Lite functions PLUS: - ALC in Layer 2-4 - DHCP snooping - Dynamic ARP inspection - IP source guard - Web authentication - TrustSec SXP		All LAN Base functions PLUS: - Router ACL - VLAN ACL - Private VLAN		All LAN Base functions PLUS: - Router ACL - VLAN ACL - TrustSec SGT/SGACL - MACsec		All LAN Base functions PLUS: - Smart Install (director) - Cisco IOS EEM - Cisco IOS IP SLA (initiator)
Security	- SRR		All LAN Lite functions PLUS: - AutoQoS - DSCP		All LAN Base functions PLUS: - Separate policy for each VLAN				
QoS									

\*1 Cisco Catalyst 3560-CX/3650 Series are not supported. \*2 Cisco Catalyst 6500/6800 Series require the Cisco IOS Advanced IP Services/Advanced Enterprise Services image.



# New Switch Selection Decision Tree

1. What's the purpose of the switch?

2. Where will you deploy the switch?

3. Do you need converged wired and wireless support?

4. What are your connectivity needs?

5. What type of switch do you prefer?

6. What features do you need?

Advantages over Basic Switch

5. What features do you need?

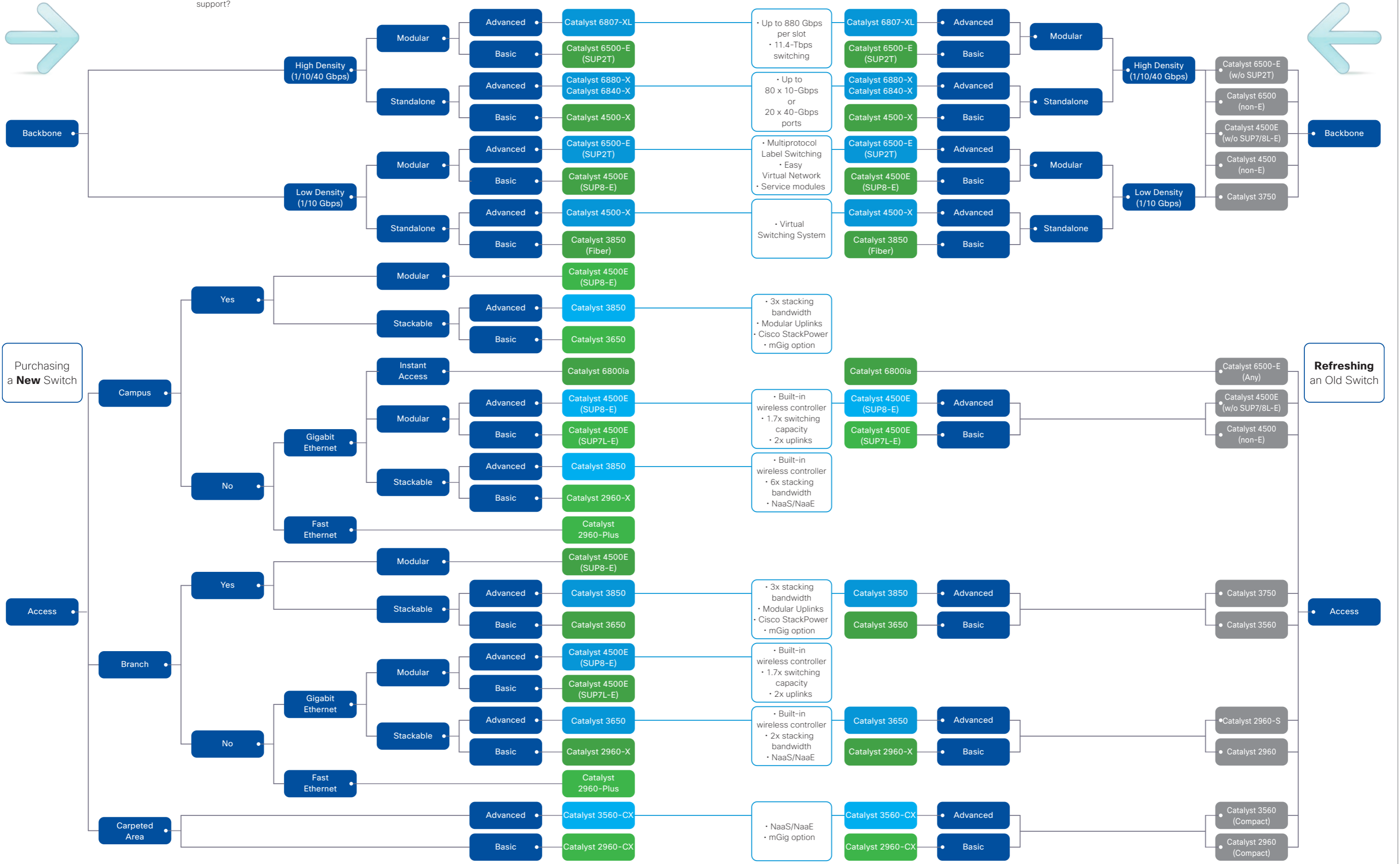
4. What type of switch do you prefer?

# Switch Refresh Decision Tree

3. What are your connectivity needs?

2. Which Cisco switch are you upgrading?

1. What's the purpose of the switch?



Switches

Switches

Wireless

Routers

Meraki

Small Business

Services

## Cisco Catalyst 2960-CX Series

The compact switches are Layer 2 switches that are purpose built to enhance scalability and reduce costs through cable consolidation. Extend enterprise-class services to wherever you want, far from the wiring closet. They provide advanced networking features for security and management, equivalent to **Cisco Catalyst 2960-X Series**.

### Highlights

- Stylish, compact, fan-less design and silent in operation.
- Deep-sleep mode: average 60 %, max 80 % on power saving.
- Operating temperature advantage: -5 °C to 45° C.
- Various mounting options: under a desk, on a shelf, on a wall, on a DIN rail or even in a rack using mounting brackets.
- IT simplicity: zero-touch deployments & maintenance, Plug-n-Play (PnP).
- Traffic visibility: support **Cisco NetFlow-Lite** up to Layer 4, supported both on all downlink and uplink ports.



### Cisco Catalyst 2960-CX Series

SKU	Downlinks		Uplinks		Cisco IOS	Web Auth	MAC sec	Max VLANs	Instant Access	PoE Output Ports			AC Power	Magnet	Rack Mount
	GE	mGig	GE	SFP						SFP/SFP+	PoE 7.7 W	PoE 15.4 W			
WS-C2960CX-8TC-L	8	-	2	2	-	LAN Base	●	-	255	-	-	-	Internal	- <sup>1</sup>	- <sup>2</sup>
WS-C2960CX-8PC-L	8	-	2	2	-	LAN Base	●	-	255	-	8	8	4	Internal	- <sup>2</sup>

<sup>1</sup> Magnet and Mounting Tray (CMPCT-MGNT-TRAY) is required. Optional new Power Adapter Bracket (PWR-ADPT-BRKT) is available.  
<sup>2</sup> Rack Mounting Brackets (RCKMNT-19-CMPCT/RCKMNT-23-CMPCT) is required. Optional new Power Adapter Bracket (PWR-ADPT-BRKT) is available.

## Cisco Catalyst 3560-CX Series

The compact switches are Layer 3 switches that are purpose built to enhance scalability and reduce costs through cable consolidation. Extend enterprise-class services to wherever you want, far from the wiring closet. They provide advanced networking features for security and management, equivalent to **Cisco Catalyst 3650/3850 Series**.

### Highlights

- Stylish, compact, fan-less design and silent in operation.
- Deep-sleep mode: average 60 %, max 80 % on power saving, 3.8 Watt only for a 8 port switch in deep-sleep mode.
- Operating temperature advantage: -5 °C to 45° C.
- Various mounting options: under a desk, on a shelf, on a wall, on a DIN rail or even in a rack using mounting brackets.
- IT simplicity: zero-touch deployments & maintenance, Plug-n-Play (PnP).
- Traffic visibility: support **Cisco NetFlow-Lite** up to Layer 4, supported both on all downlink and uplink ports.
- PoE pass-through: industry's first UPOE powered switch that can pass through up to 146 W to power up the devices connected to the switch (**WS-C3560CX-8PT-S**)
- new DC-DC powering option for usage in trains, buses, etc.



### Cisco Catalyst 3560-CX Series

SKU	Downlinks		Uplinks		Cisco IOS	Web Auth	MAC sec	Max VLANs	Instant Access	PoE Output Ports			AC Power	Magnet	Rack Mount
	GE	mGig	GE	SFP						SFP/SFP+	PoE 7.7 W	PoE 15.4 W			
WS-C3560CX-8TC-S	8	-	2	2	-	IP Base	●	1023	-	-	-	-	Internal	- <sup>2</sup>	- <sup>3</sup>
WS-C3560CX-8PT-S	8	-	2	-	-	IP Base	●	1023	-	8	8	8	8	External <sup>1</sup>	- <sup>3</sup>
WS-C3560CX-8PC-S	8	-	2	2	-	IP Base	●	1023	-	8	8	8	8	Internal	- <sup>2</sup>
WS-C3560CX-8XPD-S	6	2	-	-	2	IP Base	●	1023	●	8	8	8	8	Internal	- <sup>2</sup>
WS-C3560CX-12TC-S	12	-	2	2	-	IP Base	●	1023	-	-	-	-	Internal	- <sup>2</sup>	
WS-C3560CX-12PC-S	12	-	2	2	-	IP Base	●	1023	-	12	12	8	8	Internal	- <sup>2</sup>
WS-C3560CX-12PD-S	12	-	2	-	2	IP Base	●	1023	●	12	12	8	8	Internal	- <sup>2</sup>

### Cisco IOS Upgrade License for Cisco Catalyst 3560-CX Series

SKU	Description
L-C3560CX-RTU=	Cisco IOS IP Services license for Cisco Catalyst 3560-CX Series

<sup>1</sup> Power Adapter and Power Cord is Required when not using PoE receiving. <sup>2</sup> Magnet and Mounting Tray (CMPCT-MGNT-TRAY) is required. Optional new Power Adapter Bracket (PWR-ADPT-BRKT) is available.  
<sup>3</sup> Rack Mounting Brackets (RCKMNT-19-CMPCT/RCKMNT-23-CMPCT) is required. Optional new Power Adapter Bracket (PWR-ADPT-BRKT) is available.

## Comparison of Cisco Catalyst Compact Switches

### Comparison of Cisco Catalyst 2960-CG & 2960-CX Compact Switches

Parameter	Feature	2960-CG	2960-CX
Ports	Uplinks	2 x GE/SFP	2 x GE and 2 x SFP
	Downlinks	8 x GE	8 x GE
PoE	PoE	-	124 W PoE+
	Perpetual PoE	-	● <sup>1</sup>
Hardware	DRAM, Flash	128 MB, 64 MB	512 MB, 128 MB
	Security	802.1x	802.1x, SXP <sup>2</sup>
Other	AVC	-	NetFlow Lite

### Comparison of Cisco Catalyst 3560-CG & 3560-CX Compact Switches

Parameter	Feature	3560-CG	3560-CX
Ports	Uplinks	2 x GE or 2 x SFP	2 x GE and SFP/SFP+ <sup>3</sup>
	Downlinks	8 x GE	8 x GE or 12 x GE
	mGig	-	● <sup>4</sup>
PoE	PoE	124 W PoE+	240 W PoE+
	PoE pass-through	1 x UPOE, 23.8 W	2 x UPOE, 144.8 W <sup>1</sup>
	DC Power	-	● <sup>1</sup>
	Power Stacking	-	Horizontal <sup>1</sup>
Ease of Management	Perpetual PoE	-	●
	Instant Access	-	● <sup>3</sup>
Software	Cisco IOS	IP Base Only	IP Base, IP Services
Hardware	DRAM, Flash	128 MB, 64 MB	512 MB, 128 MB
	Security	802.1x, MACsec	802.1x, MACsec, SXP <sup>1</sup> , SGACL <sup>1</sup>
Other	AVC	NO	NetFlow Lite
	IPv6	Basic	Enhanced

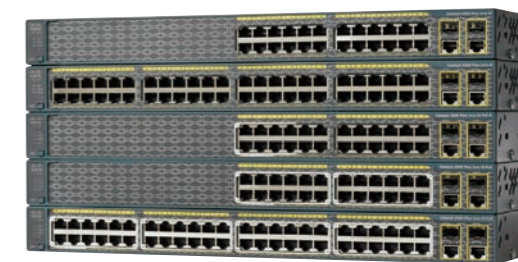
<sup>1</sup> On roadmap. <sup>2</sup> SGACL is not supported. <sup>3</sup> WS-C3560CX-8XPD-S & WS-C3560CX-12PD-S only. <sup>4</sup> WS-C3560CX-8XPD-S only.

## Cisco Catalyst 2960-Plus Series

L2 fixed-configuration switches equipped Fast Ethernet downlink ports. Based on the Fast Ethernet models of the **Cisco Catalyst 2960 Series**, these switches have twice the memory capacity and support the new Cisco IOS 15.0(2)SE and higher.

### Highlights

- Equipped with Cisco IOS **LAN Base** Image (Excludes **LAN Lite** models)
- Equipped with PoE power supplying downlink ports (PSE models)



### Cisco Catalyst 2960-Plus Series

SKU	Downlinks		Uplinks		Cisco IOS	Web Auth	Max VLANs	PoE Output Ports		AC Power	Rack Mount
	FE	GE	SFP	GE/SFP				PoE 7.7 W	PoE 15.4 W		
WS-C2960+24TC-S	24	-	-	2	LAN Lite	-	64	-	-	Internal	1 RU
WS-C2960+24LC-S	24	-	-	2	LAN Lite	-	64	8	8	Internal	1 RU
WS-C2960+24PC-S	24	-	-	2	LAN Lite	-	64	24	24	Internal	1 RU
WS-C2960+48TC-S	48	-	-	2	LAN Lite	-	64	-	-	Internal	1 RU
WS-C2960+48PST-S	48	2	2	-	LAN Lite	-	64	48	24	Internal	1 RU
WS-C2960+24TC-L	24	-	-	2	LAN Base	●	255	-	-	Internal	1 RU
WS-C2960+24LC-L	24	-	-	2	LAN Base	●	255	8	8	Internal	1 RU
WS-C2960+24PC-L	24	-	-	2	LAN Base	●	255	24	24	Internal	1 RU
WS-C2960+48TC-L	48	-	-	2	LAN Base	●	255	-	-	Internal	1 RU
WS-C2960+48PST-L	48	2	2	-	LAN Base	●	255	48	24	Internal	1 RU

## Cisco Catalyst 2960 Series Transition Guide

### Fast Ethernet Models

Stacking Supported	Stacking Not Supported
2960-SF <sup>1</sup>	2960-Plus
WS-C2960S-F24TS-S <sup>2</sup>	WS-C2960+24TC-S
-	WS-C2960+24LC-S
-	WS-C2960+24PC-S
WS-C2960S-F48TS-S <sup>2</sup>	WS-C2960+48TC-S
-	WS-C2960+48PST-S
WS-C2960S-F24TS-L	WS-C2960+24TC-L
WS-C2960S-F24PS-L	WS-C2960+24LC-L
-	WS-C2960+24PC-L
WS-C2960S-F48TS-L	WS-C2960+48TC-L
WS-C2960S-F48LPS-L	WS-C2960+48PST-L
WS-C2960S-F48FPS-L	-

### Gigabit Ethernet Models

Stacking Supported	Stacking Not Supported
2960-S <sup>1</sup>	2960-X
WS-C2960S-24TS-S <sup>2</sup>	WS-C2960X-24TS-LL <sup>2</sup>
WS-C2960S-48TS-S <sup>2</sup>	WS-C2960X-48TS-LL <sup>2</sup>
WS-C2960S-24TS-L	WS-C2960X-24TS-L
WS-C2960S-24TD-L	WS-C2960X-24TD-L
-	WS-C2960X-24PSQ-L <sup>2</sup>
WS-C2960S-24PS-L	WS-C2960X-24PS-L
WS-C2960S-24PD-L	WS-C2960X-24PD-L
WS-C2960S-48TS-L	WS-C2960X-48TS-L
WS-C2960S-48TD-L	WS-C2960X-48TD-L
WS-C2960S-48LPS-L	WS-C2960X-48LPS-L
WS-C2960S-48FPS-L	WS-C2960X-48FPS-L
WS-C2960S-48LPD-L	WS-C2960X-48LPD-L
WS-C2960S-48FPD-L	WS-C2960X-48FPD-L
-	WS-C2960XR-24TS-I
-	WS-C2960XR-24TD-I
-	WS-C2960XR-24PS-I
-	WS-C2960XR-24PD-I
-	WS-C2960XR-48TS-I
-	WS-C2960XR-48TD-I
-	WS-C2960XR-48LPS-I
-	WS-C2960XR-48FPS-I
-	WS-C2960XR-48LPD-I
-	WS-C2960XR-48FPD-I

### Comparison of Main Features

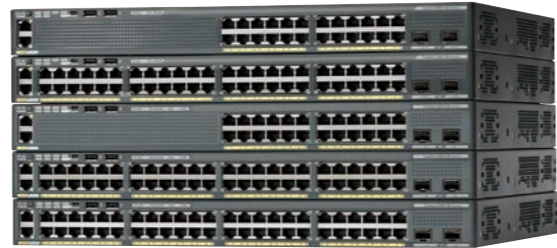
	2960-Plus	2960-SF 2960-S	2960-X
Cisco IOS 15.0(2)SE and higher	●	●	●
Cisco IOS IP Lite	-	-	● <sup>3</sup>
IPv6	●	●	●
Full PoE	●	●	●
PoE +	-	●	●
Duplexed power supply	-	-	●
FlexStack	-	●	●
FlexStack Plus	-	-	●

<sup>1</sup> Search for EOL10043 at cisco.com. <sup>2</sup> Stacking is not supported. <sup>3</sup> LAN Lite/LAN Base models are not supported.

## Cisco Catalyst 2960-X Series

Stackable L2/L3 fixed-configuration switches equipped Gigabit Ethernet downlink ports. A flexible and redundant power supply configuration is achieved via a stack function and mounting of multiple power supply modules or a redundant power supply system.

- Highlights**
  - Equipped with Cisco IOS Universal Image (Supports **LAN Lite/LAN Base/IP Lite**)<sup>\*1</sup>
  - Supports Layer 3 functions including HSRP and VRRP (**IP Lite** model)
  - Equipped with PoE+ power supplying downlink ports (PSE model)
  - Equipped with full PoE powering power supply (**WS-C2960X-48FPS-L/WS-C2960X-48FPD-L/WS-C2960XR-48FPS-I/WS-C2960XR-48FPD-I**)
  - Supports multiple Power Supply Modules (**IP Lite** model)
  - Supports **Cisco FlexStack Plus (LAN Base/IP Lite)** models



### Cisco Catalyst 2960-X Series

SKU	Downlinks		Uplinks		Cisco IOS	Web Auth	Max VLANs	PoE Output Ports			Fanless	Power Supply	Power Redundancy	RPS	Flex Stack Plus	Rack Mount
	GE	SFP/SFP+	GE	SFP/SFP+				PoE 7.7 W	PoE 15.4 W	PoE+ 30 W						
WS-C2960X-24TS-LL	24	-	2	-	LAN Lite	-	64	-	-	-	-	Fixed AC	-	-	-	1 RU
WS-C2960X-48TS-LL	48	-	2	-	LAN Lite	-	64	-	-	-	-	Fixed AC	-	-	-	1 RU
WS-C2960X-24TS-L	24	-	4	-	LAN Base	●	1024	-	-	-	-	Fixed AC	-	●	● <sup>*2</sup>	1 RU
WS-C2960X-24TD-L	24	-	-	2	LAN Base	●	1024	-	-	-	-	Fixed AC	-	●	● <sup>*2</sup>	1 RU
WS-C2960X-24PSQ-L	24	2	2	-	LAN Base	●	1024	8	6	3	●	Fixed AC	-	-	-	1 RU
WS-C2960X-24PS-L	24	-	4	-	LAN Base	●	1024	24	24	12	-	Fixed AC	-	●	● <sup>*2</sup>	1 RU
WS-C2960X-24PD-L	24	-	-	2	LAN Base	●	1024	24	24	12	-	Fixed AC	-	●	● <sup>*2</sup>	1 RU
WS-C2960X-48TS-L	48	-	4	-	LAN Base	●	1024	-	-	-	-	Fixed AC	-	●	● <sup>*2</sup>	1 RU
WS-C2960X-48TD-L	48	-	-	2	LAN Base	●	1024	-	-	-	-	Fixed AC	-	●	● <sup>*2</sup>	1 RU
WS-C2960X-48LPS-L	48	-	4	-	LAN Base	●	1024	48	24	12	-	Fixed AC	-	●	● <sup>*2</sup>	1 RU
WS-C2960X-48FPS-L	48	-	4	-	LAN Base	●	1024	48	48	24	-	Fixed AC	-	●	● <sup>*2</sup>	1 RU
WS-C2960X-48LPD-L	48	-	-	2	LAN Base	●	1024	48	24	12	-	Fixed AC	-	●	● <sup>*2</sup>	1 RU
WS-C2960X-48FPD-L	48	-	-	2	LAN Base	●	1024	48	48	24	-	Fixed AC	-	●	● <sup>*2</sup>	1 RU
WS-C2960XR-24TS-I	24	-	4	-	IP Lite	●	1024	-	-	-	-	250 W AC	●	-	● <sup>*2</sup>	1 RU
WS-C2960XR-24TD-I	24	-	-	2	IP Lite	●	1024	-	-	-	-	250 W AC	●	-	● <sup>*2</sup>	1 RU
WS-C2960XR-24PS-I	24	-	4	-	IP Lite	●	1024	24	24	12	-	640 W AC	●	-	● <sup>*2</sup>	1 RU
WS-C2960XR-24PD-I	24	-	-	2	IP Lite	●	1024	24	24	12	-	640 W AC	●	-	● <sup>*2</sup>	1 RU
WS-C2960XR-48TS-I	48	-	4	-	IP Lite	●	1024	-	-	-	-	250 W AC	●	-	● <sup>*2</sup>	1 RU
WS-C2960XR-48TD-I	48	-	-	2	IP Lite	●	1024	-	-	-	-	250 W AC	●	-	● <sup>*2</sup>	1 RU
WS-C2960XR-48LPS-I	48	-	4	-	IP Lite	●	1024	48	24	12	-	640 W AC	●	-	● <sup>*2</sup>	1 RU
WS-C2960XR-48FPS-I	48	-	4	-	IP Lite	●	1024	48	48	24	-	640 W AC	●	-	● <sup>*2</sup>	1 RU
WS-C2960XR-48LPD-I	48	-	-	2	IP Lite	●	1024	48	24	12	-	1025 W AC	●	-	● <sup>*2</sup>	1 RU
WS-C2960XR-48FPD-I	48	-	-	2	IP Lite	●	1024	48	48	24	-	1025 W AC	●	-	● <sup>*2</sup>	1 RU

### Power Supply Module for the Cisco Catalyst 2960-XR Series

SKU	Description	Compatible SKU
PWR-C2-250WAC	250 W AC power supply module	WS-C2960XR-24TS-I/WS-C2960XR-24TD-I/WS-C2960XR-48TS-I/WS-C2960XR-48TD-I
PWR-C2-640WAC	640 W AC power supply module	WS-C2960XR-24PS-I/WS-C2960XR-24PD-I/WS-C2960XR-48LPS-I/WS-C2960XR-48LPD-I
PWR-C2-1025WAC	1025 W AC power supply module	WS-C2960XR-48FPS-I/WS-C2960XR-48FPD-I

<sup>\*1</sup> Upgrade is not supported. <sup>\*2</sup> Cisco FlexStack Plus module (C2960X-STACK) is required.

## Cisco FlexStack Plus module

When equipped with the optional **Cisco FlexStack Plus Module (C2960X-STACK)**, the **LAN Base/IP Lite** models of the **Cisco Catalyst 2960-X Series** support connection of up to eight switches in a stack at 80 Gbps.

### Combined Stacks (Cisco FlexStack & Cisco FlexStack-Plus) Compatibility List

	2960-SF/S LAN Base	2960-X LAN Base	2960-XR IP Lite
2960-SF/S LAN Base	●	●	-
2960-X LAN Base	●	●	-
2960-XR IP Lite	-	-	●

**Cisco FlexStack Plus** is backward-compatible with Cisco FlexStack. Up to four switches can be connected in a stack at 40 Gbps when (and only when) the LAN Base model of the Cisco Catalyst 2960-X Series is combined with the LAN Base model of the Cisco Catalyst 2960-SF/S Series.

### Cisco FlexStack Plus Module

SKU	C2960X-STACK
Compatible IOS	LAN Base/IP Lite
Maximum number of devices	8
Stack bandwidth	80 Gbps
Architecture	Hardware drop table
Dynamic ring load-balancing	-
Stack convergence	100 milliseconds

## Cisco Catalyst 3650 Series

Stackable L2/L3 fixed-configuration switches that offer the wireless controller function. These switches incorporate a 160 Gbps stack function and support multiple Power Supply Modules to achieve a flexible redundant configuration. They also provide common intelligent services for both wired/wireless LAN networks, such as QoS and security.



- Highlights**
  - Equipped with Cisco IOS XE Universal Image (Supports **LAN Base/IP Base/IP Services**)
  - Equipped with the **Unified Access Data Plane (UADP)** ASIC built to support **Cisco ONE (Open Network Environment)**
  - Built-in controller function capable of managing up to 50 wireless access points (Supports **IP Base/IP Services**)
  - Equipped with PoE+ power supplying downlink ports (PSE model)
  - Equipped with MACsec-enabled downlink/uplink ports (**IP Base/IP Services** models)
  - Supports **Cisco StackWise-160**

### Cisco Catalyst 3650 Series

SKU	Wireless Throughput	Downlinks		Uplinks		Cisco IOS	MAC sec	Max VLANs	PoE Output Ports				Power Supply	Rack Mount
		GE	SFP	SFP/SFP+	SFP/SFP+				PoE 7.7 W	PoE 15.4 W	PoE+ 30 W	UPOE 60 W		
WS-C3650-24TS-L	20 Gbps	24	4	-	-	LAN Base	- <sup>*1</sup>	255	-	-	-	-	250 W AC	1 RU
WS-C3650-24TS-S	20 Gbps	24	4	-	-	IP Base	●	4094	-	-	-	-	250 W AC	1 RU
WS-C3650-24TS-E	20 Gbps	24	4	-	-	IP Services	●	4094	-	-	-	-	250 W AC	1 RU
WS-C3650-24TD-L	20 Gbps	24	-	4/2	-	LAN Base	- <sup>*1</sup>	255	-	-	-	-	250 W AC	1 RU
WS-C3650-24TD-S	20 Gbps	24	-	4/2	-	IP Base	●	4094	-	-	-	-	250 W AC	1 RU
WS-C3650-24TD-E	20 Gbps	24	-	4/2	-	IP Services	●	4094	-	-	-	-	250 W AC	1 RU
WS-C3650-24PS-L	20 Gbps	24	4	-	-	LAN Base	- <sup>*1</sup>	255	24	24	13	-	640 W AC	1 RU
WS-C3650-24PS-S	20 Gbps	24	4	-	-	IP Base	●	4094	24	24	13	-	640 W AC	1 RU
WS-C3650-24PS-E	20 Gbps	24	4	-	-	IP Services	●	4094	24	24	13	-	640 W AC	1 RU
WS-C3650-24PD-L	20 Gbps	24	-	4/2	-	LAN Base	- <sup>*1</sup>	255	24	24	13	-	640 W AC	1 RU
WS-C3650-24PD-S	20 Gbps	24	-	4/2	-	IP Base	●	4094	24	24	13	-	640 W AC	1 RU
WS-C3650-24PD-E	20 Gbps	24	-	4/2	-	IP Services	●	4094	24	24	13	-	640 W AC	1 RU
WS-C3650-48TS-L	40 Gbps	48	4	-	-	LAN Base	- <sup>*1</sup>	255	-	-	-	-	250 W AC	1 RU
WS-C3650-48TS-S	40 Gbps	48	4	-	-	IP Base	●	4094	-	-	-	-	250 W AC	1 RU
WS-C3650-48TS-E	40 Gbps	48	4	-	-	IP Services	●	4094	-	-	-	-	250 W AC	1 RU
WS-C3650-48TD-L	40 Gbps	48	-	4/2	-	LAN Base	- <sup>*1</sup>	255	-	-	-	-	250 W AC	1 RU
WS-C3650-48TD-S	40 Gbps	48	-	4/2	-	IP Base	●	4094	-	-	-	-	250 W AC	1 RU
WS-C3650-48TD-E	40 Gbps	48	-	4/2	-	IP Services	●	4094	-	-	-	-	250 W AC	1 RU
WS-C3650-48TQ-L	40 Gbps	48	-	4	-	LAN Base	- <sup>*1</sup>	255	-	-	-	-	250 W AC	1 RU
WS-C3650-48TQ-S	40 Gbps	48	-	4	-	IP Base	●	4094	-	-	-	-	250 W AC	1 RU
WS-C3650-48TQ-E	40 Gbps	48	-	4	-	IP Services	●	4094	-	-	-	-	250 W AC	1 RU
WS-C3650-48PS-L	40 Gbps	48	4	-	-	LAN Base	- <sup>*1</sup>	255	48	25	13	-	640 W AC	1 RU
WS-C3650-48PS-S	40 Gbps	48	4	-	-	IP Base	●	4094	48	25	13	-	640 W AC	1 RU
WS-C3650-48PS-E	40 Gbps	48	4	-	-	IP Services	●	4094	48	25	13	-	640 W AC	1 RU
WS-C3650-48PD-L	40 Gbps	48	-	4/2	-	LAN Base	- <sup>*1</sup>	255	48	25	13	-	640 W AC	1 RU
WS-C3650-48PD-S	40 Gbps	48	-	4/2	-	IP Base	●	4094	48	25	13	-	640 W AC	1 RU
WS-C3650-48PD-E	40 Gbps	48	-	4/2	-	IP Services	●	4094	48	25	13	-	640 W AC	1 RU
WS-C3650-48PQ-L	40 Gbps	48	-	4	-	LAN Base	- <sup>*1</sup>	255	48	25	13	-	640 W AC	1 RU
WS-C3650-48PQ-S	40 Gbps	48	-	4	-	IP Base	●	4094	48	25	13	-	640 W AC	1 RU
WS-C3650-48PQ-E	40 Gbps	48	-	4	-	IP Services	●	4094	48	25	13	-	640 W AC	1 RU
WS-C3650-48FS-L	40 Gbps	48	4	-	-	LAN Base	- <sup>*1</sup>	255	48	48	25	-	1025 W AC	1 RU
WS-C3650-48FS-S	40 Gbps	48	4	-	-	IP Base	●	4094	48	48	25	-	1025 W AC	1 RU
WS-C3650-48FS-E	40 Gbps	48	4	-	-	IP Services	●	4094	48	48	25	-	1025 W AC	1 RU
WS-C3650-48FD-L	40 Gbps	48	-	4/2	-	LAN Base	- <sup>*1</sup>	255	48	48	25	-	1025 W AC	1 RU
WS-C3650-48FD-S	40 Gbps	48	-	4/2	-	IP Base	●	4094	48	48	25	-	1025 W AC	1 RU
WS-C3650-48FD-E	40 Gbps	48	-	4/2	-	IP Services	●	4094	48	48	25	-	1025 W AC	1 RU
WS-C3650-48FQ-L	40 Gbps	48	-	4	-	LAN Base	- <sup>*1</sup>	255	48	48	25	-	1025 W AC	1 RU
WS-C3650-48FQ-S	40 Gbps	48	-	4	-	IP Base	●	4094	48	48	25	-	1025 W AC	1 RU
WS-C3650-48FQ-E	40 Gbps	48	-	4	-	IP Services	●	4094	48	48	25	-	1025 W AC	1 RU

### Power Supply Module for the Cisco Catalyst 3650 Series

SKU	Description
PWR-C2-250WAC	250 W AC Power Supply Module
PWR-C2-640WAC	640 W AC Power Supply Module
PWR-C2-1025WAC	1025 W AC Power Supply Module
PWR-C2-640WDC	640 W DC Power Supply Module

### Cisco IOS Upgrade License for the Cisco Catalyst 3650 Series

SKU	Description
L-C3650-24-L-S	Cisco IOS IP Base License for 24-port IP Base model
L-C3650-24-S-E	Cisco IOS IP Services License for 24-port IP Base model
L-C3650-24-L-E	Cisco IOS IP Services License for 24-port IP Base model
L-C3650-48-L-S	Cisco IOS IP Base License for 48-port IP Base model
L-C3650-48-S-E	Cisco IOS IP Services License for 48-port IP Base model
L-C3650-48-L-E	Cisco IOS IP Services License for 48-port IP Base model

### Cisco StackWise-160 Module for the Cisco Catalyst 3650 Series

SKU	Description
C3650-STACK-KIT	Cisco StackWise-160 Module

### Additional Access Point License for the Cisco 3650 Series

SKU	Additional	Primary Upgrade SKU
L-LIC-CTIOS-1A	1	L-LIC-CT3650-UPG

### Cisco Catalyst 3650 Series Bundle

SKU	Model	Bundle	
		Number of Access Point Licenses	Cisco IOS
WS-C3650-24PWS-S	WS-C3650-24PS-S	5	IP Base
WS-C3650-24PWD-S	WS-C3650-24PD-S	5	IP Base
WS-C3650-48FWS-S	WS-C3650-48FS-S	5	IP Base
WS-C3650-48FWD-S	WS-C3650-48FD-S	5	IP Base
WS-C3650-48FWQ-S	WS-C3650-48FQ-S	5	IP Base

<sup>\*1</sup> Cisco IOS IP Base/IP Services License is required.

# Cisco Catalyst 3850 Series

Next-generation stackable L2/L3 fixed-configuration switches featuring a wireless controller function. These switches feature the industry's fastest 480 Gbps stack function, support for multiple Power Supply Modules and innovative power-sharing function to achieve a flexible and advanced redundant configuration. They also provide common intelligent services for both wired/wireless LAN networks, such as QoS and security.



- **Highlights**
  - Equipped with Cisco IOS XE Universal Image (Supports **LAN Base/IP Base/IP Services**)
  - Equipped with the **Unified Access Data Plane (UADP)** ASIC built to support **Cisco ONE (Open Network Environment)**
  - Built-in controller function capable of managing up to 100 wireless access points (Supports **IP Base/IP Services**)
  - Equipped with **Cisco Catalyst Multigigabit Technology (mGig)**-enabled downlink ports (some models)
  - Equipped with **PoE+/UPOE** power supplying downlink ports (**UPOE** ports are only incorporated on some PSE models)
  - Equipped with **MACsec**-enabled downlink ports (**IP Base/IP Services** models)
  - **MACsec**-enabled uplink ports (Optional, **IP Base/IP Services** models)
  - Supports **Cisco StackPower**
  - Supports **Cisco StackWise-480**

## ■ Cisco Catalyst 3850 Series

SKU	Wireless Throughput	Downlinks				Uplinks <sup>1</sup>			Cisco IOS	MAC sec	Max VLANs	PoE Output Ports <sup>3</sup>				Power Supply	Rack Mount
		GE	mGig	SFP	SFP/SFP+	SFP	SFP/SFP+	QSFP				PoE 7.7 W	PoE 15.4 W	PoE+ 30 W	UPOE 60 W		
WS-C3850-24T-L	20 Gbps	24	-	-	-	4	2	-	LAN Base	- <sup>2</sup>	255	-	-	-	-	350 W AC	1 RU
WS-C3850-24T-S	20 Gbps	24	-	-	-	4	2	-	IP Base	●	4094	-	-	-	-	350 W AC	1 RU
WS-C3850-24T-E	20 Gbps	24	-	-	-	4	2	-	IP Services	●	4094	-	-	-	-	350 W AC	1 RU
WS-C3850-24P-L	20 Gbps	24	-	-	-	4	2	-	LAN Base	- <sup>2</sup>	255	24	24	14	-	715 W AC	1 RU
WS-C3850-24P-S	20 Gbps	24	-	-	-	4	2	-	IP Base	●	4094	24	24	14	-	715 W AC	1 RU
WS-C3850-24P-E	20 Gbps	24	-	-	-	4	2	-	IP Services	●	4094	24	24	14	-	715 W AC	1 RU
WS-C3850-24U-L	20 Gbps	24	-	-	-	4	2	-	LAN Base	- <sup>2</sup>	255	24	24	14	13	715 W AC	1 RU
WS-C3850-24U-S	20 Gbps	24	-	-	-	4	2	-	IP Base	●	4094	24	24	14	13	715 W AC	1 RU
WS-C3850-24U-E	20 Gbps	24	-	-	-	4	2	-	IP Services	●	4094	24	24	14	13	715 W AC	1 RU
WS-C3850-24XU-L	40 Gbps	-	24	-	-	8	8	2	LAN Base	- <sup>2</sup>	255	24	24	24	24	1100 W AC	1 RU
WS-C3850-24XU-S	40 Gbps	-	24	-	-	8	8	2	IP Base	●	4094	24	24	24	24	1100 W AC	1 RU
WS-C3850-24XU-E	40 Gbps	-	24	-	-	8	8	2	IP Services	●	4094	24	24	24	24	1100 W AC	1 RU
WS-C3850-48T-L	40 Gbps	48	-	-	-	4	4	-	LAN Base	- <sup>2</sup>	255	-	-	-	-	350 W AC	1 RU
WS-C3850-48T-S	40 Gbps	48	-	-	-	4	4	-	IP Base	●	4094	-	-	-	-	350 W AC	1 RU
WS-C3850-48T-E	40 Gbps	48	-	-	-	4	4	-	IP Services	●	4094	-	-	-	-	350 W AC	1 RU
WS-C3850-48P-L	40 Gbps	48	-	-	-	4	4	-	LAN Base	- <sup>2</sup>	255	48	28	14	-	715 W AC	1 RU
WS-C3850-48P-S	40 Gbps	48	-	-	-	4	4	-	IP Base	●	4094	48	28	14	-	715 W AC	1 RU
WS-C3850-48P-E	40 Gbps	48	-	-	-	4	4	-	IP Services	●	4094	48	28	14	-	715 W AC	1 RU
WS-C3850-48F-L	40 Gbps	48	-	-	-	4	4	-	LAN Base	- <sup>2</sup>	255	48	48	26	-	1100 W AC	1 RU
WS-C3850-48F-S	40 Gbps	48	-	-	-	4	4	-	IP Base	●	4094	48	48	26	-	1100 W AC	1 RU
WS-C3850-48F-E	40 Gbps	48	-	-	-	4	4	-	IP Services	●	4094	48	48	26	-	1100 W AC	1 RU
WS-C3850-48U-L	40 Gbps	48	-	-	-	4	4	-	LAN Base	- <sup>2</sup>	255	48	48	26	13	1100 W AC	1 RU
WS-C3850-48U-S	40 Gbps	48	-	-	-	4	4	-	IP Base	●	4094	48	48	26	13	1100 W AC	1 RU
WS-C3850-48U-E	40 Gbps	48	-	-	-	4	4	-	IP Services	●	4094	48	48	26	13	1100 W AC	1 RU
WS-C3850-12X48U-L	40 Gbps	36	12	-	-	8	8	2	LAN Base	- <sup>2</sup>	255	48	48	48	36	1100 W AC	1 RU
WS-C3850-12X48U-S	40 Gbps	36	12	-	-	8	8	2	IP Base	●	4094	48	48	48	36	1100 W AC	1 RU
WS-C3850-12X48U-E	40 Gbps	36	12	-	-	8	8	2	IP Services	●	4094	48	48	48	36	1100 W AC	1 RU
WS-C3850-12S-S	20 Gbps	-	-	12	-	4	2	-	IP Base	●	4094	-	-	-	-	350 W AC	1 RU
WS-C3850-12S-E	20 Gbps	-	-	12	-	4	2	-	IP Services	●	4094	-	-	-	-	350 W AC	1 RU
WS-C3850-12XS-S	40 Gbps	-	-	12	4	2	-	-	IP Base	●	4094	-	-	-	-	350 W AC	1 RU
WS-C3850-12XS-E	40 Gbps	-	-	12	4	2	-	-	IP Services	●	4094	-	-	-	-	350 W AC	1 RU
WS-C3850-24S-S	20 Gbps	-	-	24	-	4	2	-	IP Base	●	4094	-	-	-	-	350 W AC	1 RU
WS-C3850-24S-E	20 Gbps	-	-	24	-	4	2	-	IP Services	●	4094	-	-	-	-	350 W AC	1 RU
WS-C3850-24XS-S	40 Gbps	-	-	24	8	8	2	-	IP Base	●	4094	-	-	-	-	715 W AC	1 RU
WS-C3850-24XS-E	40 Gbps	-	-	24	8	8	2	-	IP Services	●	4094	-	-	-	-	715 W AC	1 RU
WS-C3850-48XS-S	40 Gbps	-	-	48	-	-	4	-	IP Base	●	4094	-	-	-	-	750 W AC	1 RU
WS-C3850-48XS-E	40 Gbps	-	-	48	-	-	4	-	IP Services	●	4094	-	-	-	-	750 W AC	1 RU
WS-C3850-48XS-F-S	40 Gbps	-	-	48	-	-	4	-	IP Base	●	4094	-	-	-	-	750 W AC	1 RU
WS-C3850-48XS-F-E	40 Gbps	-	-	48	-	-	4	-	IP Services	●	4094	-	-	-	-	750 W AC	1 RU

## ■ Network Module for the Cisco Catalyst 3850 Series

SKU	Description	Supported Configuration (SFP/SFP+/QSFP)
C3850-NM-4-1G	Network Module equipped with SFP module slots for 12/24/48-port models	4/0/0
C3850-NM-2-10G	Network Module equipped with SFP+ module slots for 12/24/48-port models	3/1/0, 2/2/0, 0/2/0
C3850-NM-4-10G	Network Module equipped with SFP+ module slots for 48-port models	4/0/0, 3/1/0, 2/2/0, 1/3/0, 0/4/0
C3850-NM-8-10G	Network Module equipped with SFP+ module slots for mGig models & 24-port fiber model	0/8/0
C3850-NM-2-40G	Network Module equipped with QSFP module slots for mGig models & 24-port fiber model	0/0/2

## ■ Power Supply Module for the Cisco Catalyst 3850 Series

SKU	Description	SKU	Description
PWR-C1-350WAC	350 W AC Power Supply Module	PWR-C3-750WAC-R	750 W AC Front-to-Back Airflow Power Supply Module for WS-C3850-48XS
PWR-C1-715WAC	715 W AC Power Supply Module	PWR-C3-750WAC-F	750 W AC Back-to-Front Airflow Power Supply Module for WS-C3850-48XS
PWR-C1-1100WAC	1100 W AC Power Supply Module	PWR-C3-750WDC-R	750 W DC Front-to-Back Airflow Power Supply Module for WS-C3850-48XS
PWR-C1-440WDC	440 W DC Power Supply Module	PWR-C3-750WDC-F	750 W DC Back-to-Front Airflow Power Supply Module for WS-C3850-48XS

\*1 Network Module for the Cisco Catalyst 3850 Series is required (Except for 48-port fiber model). \*2 Cisco IOS IP Base/IP Services License is required. \*3 For the default power supply configuration.

## ■ Additional Access Point License for the Cisco 3850 Series

SKU	Additional	Primary Upgrade SKU
L-LIC-CTIOS-1A	1	L-LIC-CT3850-UPG

## ■ Cisco IOS XE Upgrade License for the Cisco Catalyst 3850 Series

SKU	Description
L-C3850-12-S-E	Cisco IOS IP Services License for 12-port IP Base model
L-C3850-24-L-S	Cisco IOS IP Base License for 24-port LAN Base model
L-C3850-24-S-E	Cisco IOS IP Services License for 24-port IP Base model
L-C3850-24-L-E	Cisco IOS IP Services License for 24-port LAN Base model
L-C3850-48-L-S	Cisco IOS IP Base License for 48-port LAN Base model
L-C3850-48-S-E	Cisco IOS IP Services License for 48-port IP Base model
L-C3850-48-L-E	Cisco IOS IP Services License for 48-port LAN Base model

## ■ Cisco Catalyst 3850 Series Bundle

SKU	Bundle			
	Model	Network Module	Number of Access Point Licenses	Cisco IOS
WS-C3850-24PW-S	WS-C3850-24P-S	-	5	IP Base
WS-C3850-24UW-S	WS-C3850-24U-S	-	5	IP Base
WS-C3850-24XUW-S	WS-C3850-24XU-S	-	5	IP Base
WS-C3850-48W-S	WS-C3850-48P-S	-	5	IP Base
WS-C3850-48PW-S	WS-C3850-48F-S	-	5	IP Base
WS-C3850-48UW-S	WS-C3850-48U-S	-	5	IP Base
WS-C3850-12X48UW-S	WS-C3850-12X48U-S	-	5	IP Base
WS-C3850-16XS-S	WS-C3850-12XS-S	C3850-NM-4-10G	5	IP Base
WS-C3850-16XS-E	WS-C3850-12XS-E	C3850-NM-4-10G	5	IP Services
WS-C3850-32XS-S	WS-C3850-24XS-S	C3850-NM-8-10G	5	IP Base
WS-C3850-32XS-E	WS-C3850-24XS-E	C3850-NM-8-10G	5	IP Services

# Cisco Catalyst Multigigabit Technology (mGig)

## ■ Challenges for Wired LAN Posed by 11ac "Gigabit Wireless LAN"

IEEE 802.11ac is a super high-speed wireless standard that delivers a theoretical maximum throughput of up to 6.9 Gbps. Wireless LAN is literally entering the "Gigabit era", but the migration to 11ac is presenting wired LAN with "old and new" challenges. In other words, these are the same old challenges that were experienced during the migration from 11a/g to 11n.

During the migration from 11a/g to 11n, it was obvious that Fast Ethernet switches (max 100 Mbps) had insufficient capacity to server as access switches for accommodating the access points. Similarly today, it is obvious that 1-Gigabit Ethernet switches (1 GE, max 1000 Mbps) have insufficient capacity when migrating from 11n to 11ac. Specifically:

- A bottleneck will occur if the uplink port of the access switches accommodating multiple 11ac compatible access points is 1 GE.
- A bottleneck will occur if the downlink port of the access switches accommodating 11ac Wave compatible access points is 1 GE.

Therefore, as was during the migration from 11a/g to 11n, replacement of access switches is therefore indispensable in order to unleash the full potential of 11ac.

The only current IEEE standard that is faster than 1 GE is 10 Gigabit Ethernet (10 GE) with copper or optical fiber cables. However, there are some difficulties associated with the deployment of 10 GE-compatible switches.

- Cable re-installation is required in many cases: Category 5e accounts for 46 % and Category 6 accounts for 28 % of the copper cables currently installed in corporations around the world, respectively. 10 GE via copper is not supported for Category 5e cables and is limited to a length of 55 meters for Category 6 cables. Installations of optical fiber cables and copper wire cables both require huge costs.
- Current 10 GE does not support PoE: Power supply units and power cables would be required for the access points.

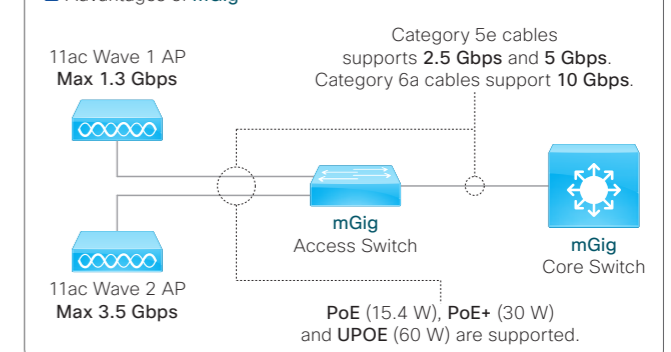
## ■ Cisco Catalyst Multigigabit Technology (mGig)

Cisco's innovative **Cisco Catalyst Multigigabit Technology (mGig)** has been developed to address all of these challenges posed by the deployment of 11ac. Largely, mGig offers the following three advantages:

- Multi-speed: Category 5e cables support 100 Mbps, 1 Gbps, 2.5 Gbps and 5 Gbps; and category 6a cables support 10 Gbps, respectively.
- Cable type: A wide variety of cable types are supported including Category 5e, Category 6, and Category 6a.
- PoE: PoE (15.4 W), PoE+ (30 W), and UPOE (60 W) are supported unlike the current 10 GE.

mGig is based on the technology of the NBASE-T Alliance established by Cisco in October 2014. A large number of vendors are participating in the NBASE-T Alliance; and IEEE standardization is currently being promoted for 2.5GBASE-T for 5GBASE-T.

## ■ Advantages of mGig



## ■ Cisco Catalyst Multigigabit Technology (mGig): Speeds and Cables

Cable Type	1 Gbps	2.5 Gbps	5 Gbps	10 Gbps
Cat 5e	●	●	●	-
Cat 6	●	●	●	●(55m)
Cat 6a	●	●	●	●

# Cisco Catalyst 4500E Series

L2/L3 modular switches equipped with a 3/6/7/10-slot chassis. These switches can be configured with components that offer intergenerational upward and backward compatibility, including Chassis, Supervisor Engine and Line Card. Their outstanding cost performance will ensure the protection of investment over long periods.



- Highlights**
  - Broad range of interface options for 10/100/1000 and mGig on copper and 1 G/10 G on Fiber
  - Equipped with Cisco IOS XE Universal Image (Supports LAN Base/IP Base/Enterprise Services)
  - Equipped with the Unified Access Data Plane (UADP) ASIC built to support Cisco ONE (Open Network Environment) (WS-X45-SUP8-E)
  - Support for SDN/OpenFlow 1.3
  - Built-in controller function capable of managing up to 100 wireless access points (Supports IP Base/Enterprise Services on WS-X45-SUP8-E)
  - Supports Cisco VSS (Switching capacity of up to 1.6 Tbps)
  - Supports Cisco TrustSec (MACsec/SGT/SGACL)
  - Switching capacity of up to 928 Gbps (WS-X45-SUP8-E)
  - Bandwidth of up to 48 Gbps per slot
  - IPv4 throughput of up to 250 Mpps (WS-X45-SUP7-E/WS-X45-SUP8-E)
  - IPv6 throughput of up to 125 Mpps (WS-X45-SUP7-E/WS-X45-SUP8-E)
  - Equipped with Cisco Catalyst Multigigabit Technology (mGig)-enabled downlink ports (WS-X4748-12X48U+E)

### Chassis for the Cisco Catalyst 4500E Series

SKU	Slots		Supervisor Engine Redundancy	Maximum Ports (equipped with Line Card)			Maximum Power Supply (per slot)	Slots for Power Supply Module	Rack Mount
	Supervisor Engine	Line Card		GE	SFP	SFP+			
WS-C4503-E	1	2	-	96	96	24	1500 W	2	7 RU
WS-C4506-E	1	5	-	240	240	60	1500 W	2	10 RU
WS-C4507R-E	2	5	●	240	240	60	1500 W	2	11 RU
WS-C4510R-E	2	8	●	384	384	96	1500 W <sup>*1</sup>	2	14 RU

### Supervisor Engine for the Cisco Catalyst 4500E Series

SKU	Switching Capacity	Throughput		SFP/SFP+	Cisco IOS	Registered L3 Routes		Compatible Chassis			
		IPv4	IPv6			IPv4	IPv6	WS-C4503-E	WS-C4506-E	WS-C4507R-E	WS-C4510R-E
WS-X45-SUP7L-E	520 Gbps	225 Mpps	110 Mpps	4	IP Base	64K	32K	●	●	●	-
WS-X45-SUP7-E	848 Gbps	250 Mpps	125 Mpps	4	IP Base	256K	128K	●	●	●	●
WS-X45-SUP8-E	928 Gbps	250 Mpps	125 Mpps	8	IP Base	256K	128K	●	●	●	●

### Line Card for the Cisco Catalyst 4500E Series

SKU	Per-slot Bandwidth	Ports				PoE Output Ports		MAC sec	Power-saving (EEE)
		GE	SFP	SFP/SFP+	mGig	PoE+	UPOE		
WS-X4648-RJ45-E	24 Gbps	48	-	-	-	-	-	-	
WS-X4648-RJ45V+E	24 Gbps	48	-	-	-	48	-	-	
WS-X4612-SFP-E	24 Gbps	-	12	-	-	-	-	-	
WS-X4624-SFP-E	24 Gbps	-	24	-	-	-	-	-	
WS-X4748-RJ45-E	48 Gbps	48	-	-	-	-	●	●	
WS-X4748-RJ45V+E	48 Gbps	48	-	-	-	48	-	-	
WS-X4748-UPOE+E	48 Gbps	48	-	-	-	48	48 <sup>*2</sup>	●	
WS-X4748-12X48U+E	48 Gbps	36	-	-	12	48	48 <sup>*2</sup>	●	
WS-X4712-SFP-E	48 Gbps	-	12	-	-	-	-	●	
WS-X4724-SFP-E	48 Gbps	-	24	-	-	-	-	●	
WS-X4748-SFP-E	48 Gbps	-	48	-	-	-	-	●	
WS-X4712-SFP+E	48 Gbps	-	-	12	-	-	-	●	

### Power Supply Module for the Cisco Catalyst 4500E Series

SKU	Type	Connectors	Maximum Output Power (Redundancy Mode)		Maximum PoE Devices (Redundancy Mode)		
			Data	PoE	PoE 15.4 W	PoE+ 30 W	UPOE 60 W
PWR-C45-1000AC	AC	1	1000 W + 40 W	-	-	-	
PWR-C45-1300ACV	AC	1	1000 W + 40 W	800 W	48	24	
PWR-C45-1400AC	AC	1	1360 W + 40 W	-	-	-	
PWR-C45-2800ACV	AC	1	1360 W + 40 W	1400 W	84	43	
PWR-C45-4200ACV	AC	2	1360 W + 40 W	1850 W (110 V) / 3700 W (220 V)	223	114	
PWR-C45-6000ACV	AC	2	2200 W + 40 W	1850 W (110 V) / 4800 W (220 V)	289	148	
PWR-C45-9000ACV	AC	3	1960 W + 40 W	2500 W (110 V) / 7500 W (220 V)	384	232	

### Cisco IOS XE Upgrade License for the Cisco Catalyst 4500E Series

SKU	Description
L-C4500E-LB-IP	Bundled IP Base License
L-C4500E-IP-ES	Cisco IOS Enterprise Services License for Supervisor Engine
L-C4500E-LB-ES	Bundled Cisco IOS Enterprise Services License

### Cisco Catalyst 4500E Series Bundle

SKU	Bundle				Upgrade Options		
	Chassis	Supervisor Engine	Line Card	Cisco IOS	WS-X4748-UPOE+E	WS-X45-SUP8-E WS-X4748-RJ45V+E	WS-X45-SUP8-E WS-X4748-UPOE+E
WS-C4503E-S7L+48V+	WS-C4503-E	WS-X45-SUP7L-E	WS-X4648-RJ45V+E	LAN Base	C4500E-S3-UPOE	-	C4500E-3NR-8E-UPOE
WS-C4506E-S7L+96	WS-C4506-E	WS-X45-SUP7L-E	WS-X4648-RJ45-E x 2	LAN Base	-	-	-
WS-C4506E-S7L+96V+	WS-C4506-E	WS-X45-SUP7L-E	WS-X4648-RJ45V+E x 2	LAN Base	C4500E-S6-UPOE	-	C4500E-6NR-8E-UPOE
WS-C4507RE-S7L+96	WS-C4507R+E	WS-X45-SUP7L-E	WS-X4648-RJ45-E x 2	LAN Base	-	-	-
WS-C4507RE+96V+	WS-C4507R+E	WS-X45-SUP7L-E	WS-X4648-RJ45V+E x 2	LAN Base	C4500E-S7-UPOE	C4500E-S7L-S8	C4500E-7R-S8E-UPOE
WS-C4510RE-S7+96V+	WS-C4510R+E	WS-X45-SUP7-E	WS-X4748-RJ45V+E x 2	LAN Base	C4500E-S7-UPOE	-	-
WS-C4510RE-S8+96V+	WS-C4510R+E	WS-X45-SUP8-E	WS-X4748-RJ45V+E x 2	LAN Base	C4510RE-S8-UPOE	-	-

\*1 Slots 3, 4, 7-10 are 750 W. \*2 Depends on modes of operation (Redundant 1 + 1 Mode, Redundant N + 1 Mode, Combined Mode).

# Cisco Catalyst 4500-X Series

L3 fixed-configuration switches equipped with SFP+ module slots. These switches deliver the same level of performance as the latest supervisor engine of the Cisco Catalyst 4500E Series, while having a 1 RU space-saving and power-thrifty design. These switches can be expanded to accommodate SFP+ module slots using optional Network Modules.



- Highlights**
  - Equipped with Cisco IOS XE Universal Image (Supports IP Base/Enterprise Services)
  - Support for SDN/OpenFlow 1.3
  - Supports Cisco VSS (Switching capacity of up to 1.6 Tbps)
  - Cisco TrustSec-enabled hardware (MACsec/SGT/SGACL)
  - Switching capacity of up to 800 Gbps
  - IPv4 throughput of up to 250 Mpps
  - IPv6 throughput of up to 125 Mpps
  - Network module equipped with 8 SFP+ ports (Optional)

### Cisco Catalyst 4500-X Series

SKU	SFP/SFP+		Cisco IOS	Registered L3 Routes		Multicast Routes		Cooling Fan	Power Supply Module Number of slots	Rack Mount
	Default	Maximum		IPv4	IPv6	IPv4	IPv6			
WS-C4500X-16SFP+	16	24 <sup>*1</sup>	IP Base	64K	32K	24K	12K	Front air intake/Rear exhaust	2	1 RU
WS-C4500X-F-16SFP+	16	24 <sup>*1</sup>	IP Base	64K	32K	24K	12K	Rear air intake/Front exhaust	2	1 RU
WS-C4500X-32SFP+	32	40 <sup>*1</sup>	IP Base	256K	128K	32K	32K	Front air intake/Rear exhaust	2	1 RU
WS-C4500X-F-32SFP+	32	40 <sup>*1</sup>	IP Base	256K	128K	32K	32K	Rear air intake/Front exhaust	2	1 RU
WS-C4500X-24X-IPB	24	24	IP Base	64K	32K	24K	12K	Front air intake/Rear exhaust	2	1 RU
WS-C4500X-24X-ES	24	24	Enterprise Services	64K	32K	24K	12K	Front air intake/Rear exhaust	2	1 RU
WS-C4500X-40X-ES	40	40	Enterprise Services	256K	128K	32K	32K	Front air intake/Rear exhaust	2	1 RU

### Network Module for the Cisco Catalyst 4500-X Series

SKU	Description	Number of SFP/SFP+ Ports
C4KX-NM-8SFP+	Network Module equipped with SFP+ module slots	8

### Power Supply Module for the Cisco Catalyst 4500-X Series

SKU	Description	Compatible SKU
C4KX-PWR-750AC-R	750 W AC Front-to-Back Cooling Power Supply Module	WS-C4500X-16SFP+/WS-C4500X-32SFP+/WS-C4500X-24X-IPB/WS-C4500X-24X-ES/WS-C4500X-40X-ES
C4KX-PWR-750AC-F	750 W AC Back-to-Front Cooling Power Supply Module	WS-C4500X-F-16SFP+/WS-C4500X-F-32SFP+
C4KX-PWR-750DC-R	750 W DC Front-to-Back Cooling Power Supply Module	WS-C4500X-16SFP+/WS-C4500X-32SFP+/WS-C4500X-24X-IPB/WS-C4500X-24X-ES/WS-C4500X-40X-ES
C4KX-PWR-750DC-F	750 W DC Back-to-Front Cooling Power Supply Module	WS-C4500X-F-16SFP+/WS-C4500X-F-32SFP+

### Cisco IOS XE Upgrade License for the Cisco Catalyst 4500-X Series

SKU	Description	Compatible SKU
L-C4500X-16P-IP-ES	Cisco IOS Enterprise Services License for 16/24-port IP Base model	WS-C4500X-16SFP+/WS-C4500X-F-16SFP+/WS-C4500X-24X-IPB
L-C4500X-IP-ES	Cisco IOS Enterprise Services License for 24-port IP Base model	WS-C4500X-32SFP+/WS-C4500X-F-32SFP+

\*1 Network Module for the Cisco Catalyst 4500-X Series is required.

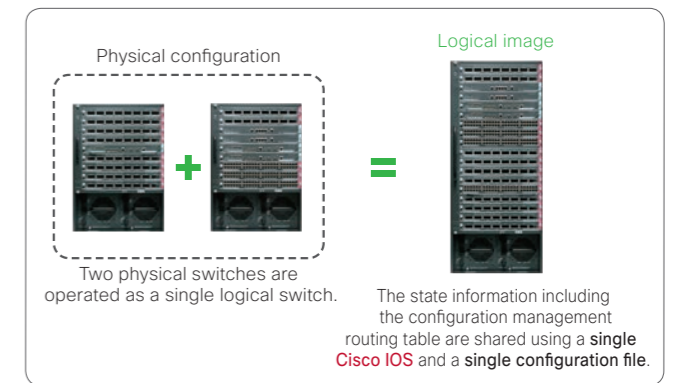
# Cisco Virtual Switching System (VSS)

Cisco Virtual Switching System (VSS) is a cluster technology for operating two Cisco Catalyst Switches as one virtual logical switch. Both the Data Plane and Switch Fabric functionalities of the switches comprising a cluster will operate at 100% performance. It is therefore possible to configure a single logical switch capable of delivering 200% better performance than native Cisco Catalyst Switches. This technology also offers the following benefits in addition to performance improvement:

- Simple topology (No-loop network with no need for STP) Since two physical switches are operated as one logical switch, there is no need for a redundancy protocol such as STP between the physical switches.
- Single routing instance The second physical switch will continue to operate in the event when one of the physical switches fails. There will be no service interruption due to switching of networks and/or reconstruction of routing tables.
- Network manageability The workload of the network administrator will be reduced as he/she only

needs to configure and manage one logical switch instead of two physical switches.

Cisco Virtual Switching System (VSS) is supported on the Cisco Catalyst 4500-X/4500E/6500/6800 Series.



## Cisco Catalyst 6500 Series

L3 modular switches equipped with a 3/4/6/7/13-slot chassis. These switches deliver the industry's top-level performance that is suitable for deployment in the core layer, providing integration with a variety of network services including wireless and security and an unmatched level of investment protection.



## ■ Highlights

- Equipped with Cisco IOS (Supports **IP Base/IP Services/Advanced IP Services/Advanced Enterprise Services**)
- Supports **Cisco VSS** (Switching capacity of up to 4 Tbps)
- Supports **Cisco TrustSec** (MACsec/SGT/SGACL)
- Switching capacity of up to 2.08 Tbps
- Bandwidth of up to 80 Gbps per slot
- IPv4 throughput of up to 720 Mpps (WS-C6513-E)
- IPv6 throughput of up to 390 Mpps (WS-C6513-E)
- Supports various Services Modules (Wireless Services Module 2, ASA Services Module, etc.)

## ■ Chassis for the Cisco Catalyst 6500 Series

SKU	IPv4 Throughput	Slots			Supervisor Engine Redundancy	Maximum Ports (equipped with Line Card)						Slots for Power Supply Module	Rack Mount
		SE/LC	Line Card			GE	SFP	SFP/SFP+	10GB-T	X2/SFP+	CFP/QSFP		
WS-C6503-E	150 Mpps	1	1	1	●	96	96	64	32	32	8/16	2	4 RU
WS-C6504-E	210 Mpps	1	1	2	●	144	144	96	64	64	12/24	2	5 RU
WS-C6506-E	330 Mpps	1	1	4	●	240	240	160	80	80	20/40	2	12 RU
WS-C6509-E	510 Mpps	1	1	7	●	384	384	256	128	128	32/64	2	15 RU
WS-C6509-V-E	510 Mpps	1	1	7	●	384	384	256	128	128	32/64	2	21 RU
WS-C6513-E	720 Mpps	2	-	11	●	528	528	352	176	176	44/88	2	20 RU

## ■ Supervisor Engine for the Cisco Catalyst 6500 Series

SKU	Switching Capacity	Equipped PFC	Equipped MSFC	Ports		Cisco IOS	Registered L3 Routes		Registered NetFlow
				SFP	X2		IPv4	IPv6	
VS-S2T-10G	2.08 Tbps	PFC4	MSFC5	3	2	IP Base	256K	128K	512K
VS-S2T-10G-XL	2.08 Tbps	PFC4XL	MSFC5	3	2	IP Base	1024K	512K	1024K

## ■ Line Card for the Cisco Catalyst 6500 Series &amp; Cisco Catalyst 6807-XL

SKU	DFC4-equipped model	DFC4XL-equipped model	Per-slot Bandwidth	Ports						MAC sec	VSL
				GE	SFP	SFP/SFP+	10GB-T	X2/SFP+	CFP/QSFP		
WS-X6824-SFP-2T	WS-X6824-SFP-2T	WS-X6824-SFP-2TXL	20 Gbps	-	24	-	-	-	-	-	-
WS-X6848-TX-2T	WS-X6848-TX-2T	WS-X6848-TX-2TXL	40 Gbps	48	-	-	-	-	-	-	-
C6800-48P-TX	C6800-48P-TX	C6800-48P-TX-XL	40 Gbps	48	-	-	-	-	-	-	-
WS-X6848-SFP-2T	WS-X6848-SFP-2T	WS-X6848-SFP-2TXL	40 Gbps	-	48	-	-	-	-	-	-
C6800-48P-SFP	C6800-48P-SFP	C6800-48P-SFP-XL	40 Gbps	-	48	-	-	-	-	-	-
WS-X6816-10T-2T	WS-X6816-10T-2T	WS-X6816-10T-2TXL	40 Gbps	-	-	-	16	-	-	-	●
WS-X6816-10G-2T	WS-X6816-10G-2T	WS-X6816-10G-2TXL	40 Gbps	-	-	-	-	16 <sup>2</sup>	-	-	●
C6800-8P10G	C6800-8P10G	C6800-8P10G-XL	80 Gbps	-	-	8	-	-	2 <sup>4</sup>	●	●
C6800-16P10G	C6800-16P10G	C6800-16P10G-XL	80 Gbps	-	-	16	-	-	4 <sup>4</sup>	●	●
C6800-32P10G	C6800-32P10G	C6800-32P10G-XL	80 Gbps <sup>1</sup>	-	-	32	-	-	8 <sup>4</sup>	●	●
WS-X6908-10G-2T	WS-X6908-10G-2T	WS-X6908-10G-2TXL	80 Gbps	-	-	-	-	8 <sup>2</sup>	-	●	●
WS-X6904-40G-2T	WS-X6904-40G-2T	WS-X6904-40G-2TXL	80 Gbps	-	-	-	-	16 <sup>3</sup>	4	●	●

## ■ Power Supply Module for the Cisco Catalyst 6500 Series

SKU	Type	Connectors	Maximum Output Power	Compatible Chassis					
				WS-C6503-E	WS-C6504-E	WS-C6506-E	WS-C6509-E	WS-C6509-V-E	WS-C6513-E
PWR-1400-AC <sup>3</sup>	AC	1	1400 W	●	-	-	-	-	-
PWR-2700-AC/4	AC	1	2700 W	-	●	-	-	-	-
WS-CAC-3000W	AC	1	3000 W	-	-	●	●	●	●
WS-CAC-6000W	AC	2	6000 W	-	-	●	●	●	●
WS-CAC-8700W-E	AC	3	8700 W	-	-	●	●	●	●
PWR-2700-DC/4	DC	2	2700 W	-	●	-	-	-	-
WS-CDC-2500W	DC	2	2500 W	-	-	●	●	●	●
PWR-4000-DC	DC	3	4000 W	-	-	●	●	●	●
PWR-6000-DC	DC	4	6000 W	-	-	●	●	●	●

## ■ Fan Tray for the Cisco Catalyst 6500 Series

SKU	Description	SKU	Description
WS-C6503-E-FAN	Fan Tray for WS-C6503-E	WS-C6509-E-FAN	Fan Tray for WS-C6509-E
FAN-MOD-4HS=	Fan Tray for WS-C6504-E	WS-C6509-V-E-FAN	Fan Tray for WS-C6509-V-E
WS-C6506-E-FAN	Fan Tray for WS-C6506-E	WS-C6513-E-FAN=	Fan Tray for WS-C6513-E

## ■ Cisco Catalyst 6500 Series Bundle

SKU	Bundle				
	Chassis	Supervisor Engine	Line Card	Fan tray	Cisco IOS
VS-C6503E-SUP2T	WS-C6503-E	VS-S2T-10G	-	WS-C6503-E-FAN	IP Services
VS-C6504E-SUP2T	WS-C6504-E	VS-S2T-10G	-	FAN-MOD-4HS	IP Services
VS-C6506E-SUP2T	WS-C6506-E	VS-S2T-10G	-	WS-C6506-E-FAN	IP Services
VS-C6506E-S2T-6816	WS-C6506-E	VS-S2T-10G	WS-X6816-10G-2T x 2	WS-C6506-E-FAN	IP Services
VS-C6506E-S2T-6904	WS-C6506-E	VS-S2T-10G	WS-X6904-40G-2T x 2	WS-C6506-E-FAN	IP Services
VS-C6509E-SUP2T	WS-C6509-E	VS-S2T-10G	-	WS-C6509-E-FAN	IP Services
VS-C6509E-S2T-6816	WS-C6509-E	VS-S2T-10G	WS-X6816-10G-2T x 2	WS-C6509-E-FAN	IP Services
VS-C6509E-S2T-6904	WS-C6509-E	VS-S2T-10G	WS-X6904-40G-2T x 2	WS-C6509-E-FAN	IP Services
VS-C6509VE-SUP2T	WS-C6509-V-E	VS-S2T-10G	-	WS-C6509-V-E-FAN	IP Services
VS-C6513E-SUP2T	WS-C6513-E	VS-S2T-10G	-	WS-C6513-E-FAN	IP Services

## Cisco Catalyst 6800 Series

L3 switches optimized for 10/40/100 Gigabit Ethernet. The product lineup includes the fixed-configuration **Cisco Catalyst 6840-X/6880-X Series**, the modular **Cisco Catalyst 6807-XL**, and the **Cisco Catalyst 6800ia Series** dedicated for **Cisco Catalyst Instant Access**.

## ■ Highlights

- Equipped with Cisco IOS (Supports **IP Base/IP Services/Advanced IP Services/Advanced Enterprise Services**)<sup>1</sup>
- Supports **Cisco VSS** (**C6807-XL** has a switching capacity of up to 22.8 Tbps)
- Supports **Cisco TrustSec** (MACsec/SGT/SGACL)
- Switching capacity of up to 11.4 Tbps (**C6807-XL**)
- Bandwidth of up to 880 Gbps per slot (**C6807-XL**)
- IPv4 throughput of up to 300 Mpps (**C6880-X**)
- IPv6 throughput of up to 150 Mpps (**C6880-X**)
- Equipped with 2 Native uplink ports of 40 G QSFP (**C6824-X-LE-40G/C6840-X-LE-40G**)

## ■ Chassis for the Cisco Catalyst 6840-X Series

SKU	Switching Capacity	Ports		Maximum Ports		Cisco IOS	Registered L3 Routes		Registered NetFlow	Slots for Power Supply Module	Rack Mount
		SFP/SFP+	QSFP	SFP/SFP+	QSFP		IPv4	IPv6			
C6816-X-LE	80 Gbps	16	-	16	4 <sup>3</sup>	IP Services	256K	128K	512K	2	2 RU
C6832-X-LE	160 Gbps	32	-	32	8 <sup>3</sup>	IP Services	256K	128K	1024K	2	2 RU
C6824-X-LE-40G	160 Gbps	24	2	24 + 8 <sup>2</sup>	2 + 6 <sup>3</sup>	IP Services	256K	128K	1024K	2	2 RU
C6840-X-LE-40G	240 Gbps	40	2	40 + 8 <sup>2</sup>	2 + 10 <sup>3</sup>	IP Services	256K	128K	1536K	2	2 RU

## ■ Power Supply Module for the Cisco Catalyst 6840-X Series

SKU	Description
C6840-X-750W-AC	750 W AC Power Supply Module
C6840-X-1100W-AC	1100 W AC Power Supply Module
C6840-X-750W-DC	750 W DC Power Supply Module
C6840-X-1100W-DC	1100 W DC Power Supply Module

## ■ Chassis for the Cisco Catalyst 6880-X Series

SKU	Slots for Port Card	Switching Capacity	Maximum Ports (equipped with Line Card)		Cisco IOS	Registered L3 Routes		Registered NetFlow	Slots for Power Supply Module	Rack Mount
			SFP+	QSFP <sup>2</sup>		IPv4	IPv6			
C6880-X-LE	4	2 Tbps	80	20	IP Services	256K	128K	512K	2	4.85 RU
C6880-X	4	2 Tbps	80	20	IP Services	2048K	1024K	512K	2	4.85 RU

## ■ Multi-rate Port Card for the Cisco Catalyst 6880-X Series

SKU	Per-slot Bandwidth	SFP/SFP+	Registered L3 Routes		Multicast Routes		MAC sec	Compatible Chassis	
			IPv4	IPv6	IPv4	IPv6		C6880-X-LE	C6880-X
C6880-X-LE-16P10G	80 Gbps	16	256K	128K	128K	128K	●	●	-
C6880-X-16P10G	80 Gbps	16	2048K	1024K	128K	128K	●	-	●

## ■ Power Supply Module for the Cisco Catalyst 6880-X Series

SKU	Description
C6880-X-3KW-AC	3000 W AC Power Supply Module
C6880-X-3KW-DC	3000 W DC Power Supply Module

## ■ Fan Tray for the Cisco Catalyst 6880-X Series

SKU	Description
C6880-X-FAN	Fan Tray for the Cisco Catalyst 6880-X Series

## ■ Chassis for Cisco Catalyst for 6807-XL

SKU	Slots		Maximum Ports (equipped with Line Card)						Slots for Power Supply Module	Rack Mount
	Supervisor Engine	Line Card	GE	SFP	SFP/SFP+	10GB-T	X2/SFP+	CFP/QSFP		
C6807-XL	2	5	240	240	160	80	-	20/40	4	10 RU

## ■ Supervisor Engine for Cisco Catalyst 6807-XL

SKU	Switching Capacity	Equipped PFC	Equipped MSFC	Ports		Cisco IOS	Registered L3 Routes		Registered NetFlow
				SFP	X2		IPv4	IPv6	
VS-S2T-10G	2.08 Tbps	PFC4	MSFC5	3	2	IP Base	256K	128K	256K
VS-S2T-10G-XL	2.08 Tbps	PFC4XL	MSFC5	3	2	IP Base	1024K	512K	1024K

## ■ Power Supply Module for Cisco Catalyst for 6807-XL

SKU	Description
C6800-XL-3KW-AC	3000 W AC Power Supply Module

## ■ Fan Tray for Cisco Catalyst for 6807-XL

SKU	Description
C6807-XL-FAN	Fan Tray for Cisco Catalyst 6807-XL

## ■ Cisco Catalyst 6807-XL Bundle

SKU	Bundle				
	Chassis	Supervisor Engine	Power Supply Module	Fan Tray	Cisco IOS
C6807-XL-S2T-BUN	C6807-XL	VS-S2T-10G	C6800-XL-3KW-AC x 2	C6807-XL-FAN	IP Services

## ■ Cisco Catalyst 6800ia Series

SKU	Downlinks			Cisco IOS	MAC sec	PoE Output Ports				Power Supply	Power Redundancy	RPS	Flex Stack Plus	Rack Mount
	GE	SFP / SFP+	Cisco IOS			PoE 7.7 W	PoE 15.4 W	PoE + 30 W	UPOE 60 W					
C6800IA-48TD	48	2	- <sup>4</sup>	●	-	-	-	-	-	Fixed AC	-	●	●	1 RU
C6800IA-48FPD	48	2	- <sup>4</sup>	●	48	48	24	-	-	Fixed AC	-	●	●	1 RU
C6800IA-48FPDR	48	2	- <sup>4</sup>	●	48	48	24	-	-	1025 W AC	● <sup>5</sup>	●	●	1 RU

<sup>1</sup> Cisco Catalyst 6807-XL supports 160 Gbps. <sup>2</sup> SFP+ Converter (CVR-X2-SFP10G) is required to mount SFP+ module.

<sup>3</sup> X2 module is not supported. FourX SFP+ Converter (CVR-CFP-4SFP10G) is required to mount SFP+ module.

<sup>4</sup> QSFP Active Optical breakout Cable (QSFP-4X10G-AOCxM) or QSFP Converter (CVR-4SFP10G-QSFP on roadmap) is required to mount QSFP module. <sup>5</sup> Power Entry Module (PEM-20A-AC+) is required.

<sup>1</sup> Cisco Catalyst 6840-X/6880-X Series supports the Cisco IOS IP Services/Advanced Enterprise Services.

<sup>2</sup> SFP+ direct-attach breakout cable (QSFP-4SFP10G-CUXM, QSFP-4x10G-ACxM) or SFP+ Active Optical breakout Cable (QSFP-4X10G-AOCxM) is required to mount SFP/SFP+ module.

<sup>3</sup> QSFP Converter (CVR-4SFP10G-QSFP on roadmap) is required to mount QSFP module. <sup>4</sup> Integrated with the Instant Access parent switch.

<sup>5</sup> Power Supply Module for C6800IA-48FPDR (PWR-C2-1025WAC) is required.

# Cisco Catalyst 4500/6500/6800 Series Transition Guide

## Chassis for the Cisco Catalyst 4500 Series

Legacy Models	Current Models
WS-C4503 <sup>1</sup>	WS-C4503-E
WS-C4506 <sup>1</sup>	WS-C4506-E
WS-C4507R-E <sup>2</sup>	WS-C4507R+E
WS-C4510R-E <sup>2</sup>	WS-C4510R+E

## Supervisor Engine for the Cisco Catalyst 4500 Series

Legacy Models	Current Models
WS-X4516-10GE <sup>4</sup>	WS-X45-SUP7L-E WS-X45-SUP7-E WS-X45-SUP8-E
WS-X45-SUP6L-E <sup>5</sup>	WS-X45-SUP7L-E
WS-X45-SUP6-E <sup>6</sup>	WS-X45-SUP7-E WS-X45-SUP8-E

## Line Card for the Cisco Catalyst 4500 Series

Legacy Models	Current Models
WS-X4148-RJ <sup>7</sup>	WS-X4648-RJ45-E WS-X4748-RJ45-E
WS-X4248-RJ45V <sup>8</sup>	WS-X4648-RJ45V+E WS-X4748-RJ45V+E WS-X4748-UPOE+E WS-X4748-12X48U+E
WS-X4306-GB <sup>9</sup>	WS-X4612-SFP-E WS-X4624-SFP-E WS-X4712-SFP-E WS-X4724-SFP-E WS-X4748-SFP-E
WS-X4418-GB <sup>10</sup>	WS-X4612-SFP-E WS-X4624-SFP-E WS-X4712-SFP-E WS-X4724-SFP-E WS-X4748-SFP-E
WS-X4506-GB-T <sup>10</sup>	WS-X4648-RJ45V+E WS-X4748-RJ45V+E WS-X4748-UPOE+E WS-X4612-SFP-E WS-X4624-SFP-E WS-X4712-SFP-E WS-X4724-SFP-E WS-X4748-SFP-E
WS-X4548-GB-RJ45 <sup>4</sup>	WS-X4648-RJ45-E WS-X4748-RJ45-E
WS-X4524-GB-RJ45V <sup>11</sup>	WS-X4648-RJ45V+E WS-X4748-RJ45V+E WS-X4748-UPOE+E WS-X4748-12X48U+E
WS-X4548-GB-RJ45V <sup>4</sup>	WS-X4648-RJ45V+E WS-X4748-RJ45V+E WS-X4748-UPOE+E WS-X4748-12X48U+E
WS-X4548-RJ45V <sup>12</sup>	WS-X4648-RJ45V+E WS-X4748-RJ45V+E WS-X4748-UPOE+E WS-X4748-12X48U+E
WS-X4648-RJ45V-E <sup>4</sup>	WS-X4648-RJ45V+E WS-X4748-RJ45V+E WS-X4748-UPOE+E WS-X4748-12X48U+E

## Chassis for the Cisco Catalyst 6500/6800 Series

Legacy Models	Suggested Models
WS-C6503 <sup>13</sup>	C6807-XL
WS-C6506 <sup>13</sup>	C6807-XL
WS-C6509 <sup>13</sup>	C6807-XL
WS-C6509-NEB <sup>14</sup>	WS-C6509-V-E
WS-C6509-NEB-A <sup>15</sup>	WS-C6509-V-E
WS-C6513 <sup>16</sup>	WS-C6513-E

## Supervisor Engine for the Cisco Catalyst 6500/6800 Series

Legacy Models	Current Models (PFC4)	Current Models (PFC4XL)
WS-SUP32-GE-3B <sup>17</sup>	VS-S2T-10G	VS-S2T-10G-XL
WS-SUP32-10GE-3B <sup>17</sup>	VS-S2T-10G	VS-S2T-10G-XL
WS-SUP720-3B <sup>18</sup>	VS-S2T-10G	VS-S2T-10G-XL
WS-SUP720-3BXL <sup>18</sup>	-	VS-S2T-10G-XL
VS-S720-10G-3C <sup>19</sup>	VS-S2T-10G	VS-S2T-10G-XL
VS-S720-10G-3CXL <sup>19</sup>	-	VS-S2T-10G-XL

## Line Card for the Cisco Catalyst 6500/6800 Series

Legacy Models	Current Models (PFC4)	Current Models (PFC4XL)
WS-X6148-FE-SFP <sup>20</sup>	WS-X6848-SFP-2T C6800-48P-SFP	WS-X6848-SFP-2TXL C6800-48P-SFP
WS-X6148A-GE-TX <sup>21</sup>	WS-X6848-TX-2T	WS-X6848-TX-2TXL
WS-X6548-GE-TX <sup>20</sup>	WS-X6848-TX-2T	WS-X6848-TX-2TXL
WS-X6516A-GBIC <sup>20</sup>	WS-X6824-SFP-2T	WS-X6824-SFP-2TXL
WS-X6724-SFP <sup>19</sup>	WS-X6824-SFP-2T	WS-X6824-SFP-2TXL
WS-X6748-GE-TX <sup>22</sup>	C6800-48P-TX	C6800-48P-TX-XL
WS-X6748-SFP <sup>22</sup>	WS-X6848-SFP-2T C6800-48P-SFP	WS-X6848-SFP-2TXL C6800-48P-SFP
WS-X6716-10T-3C <sup>19</sup>	-	-
WS-X6716-10T-3CXL <sup>19</sup>	-	-
WS-X6716-10G-3C <sup>19</sup>	WS-X6816-10G-2T C6800-16P10G	-
WS-X6716-10G-3CXL <sup>19</sup>	-	WS-X6816-10G-2TXL C6800-16P10G-XL
WS-X6708-10G-3C <sup>22</sup>	C6800-8P10G	-
WS-X6708-10G-3CXL <sup>22</sup>	-	C6800-16P10G-XL
WS-X6908-10G-2T <sup>22</sup>	C6800-8P10G	-
WS-X6908-10G-2TXL <sup>22</sup>	-	C6800-16P10G-XL
WS-X6904-40G-2T <sup>22</sup>	C6800-16P10G C6800-32P10G	-
WS-X6904-40G-2TXL <sup>22</sup>	-	C6800-16P10G-XL C6800-32P10G-XL
WS-X6816-10T-2T <sup>22</sup>	-	-
WS-X6816-10T-2TXL <sup>22</sup>	-	-

# Modules & Accessories

## Cisco Redundant Power System (RPS) 2300

SKU	Description	Compatible Series									
		2960-CX	3560-CX	2960-Plus	2960-X	3650	3850	4500E	4500-X	6500	6800
PWR-RPS2300	Cisco RPS 2300 Chassis	-	-	-	● <sup>*1</sup> ● <sup>*2</sup>	-	-	-	-	-	● <sup>*3</sup>
C3K-PWR-750WAC	750 W AC Power Supply Module for Cisco RPS 2300	-	-	-	● <sup>*1</sup> ● <sup>*2</sup>	-	-	-	-	-	● <sup>*3</sup>
CAB-RPS2300=	Spare 14-pin RPS Cable for Cisco RPS 2300	-	-	●	-	-	-	-	-	-	-
CAB-RPS2300-E=	Spare 22-pin RPS Cable for Cisco RPS 2300	-	-	-	● <sup>*1</sup> ● <sup>*2</sup>	-	-	-	-	-	● <sup>*3</sup>

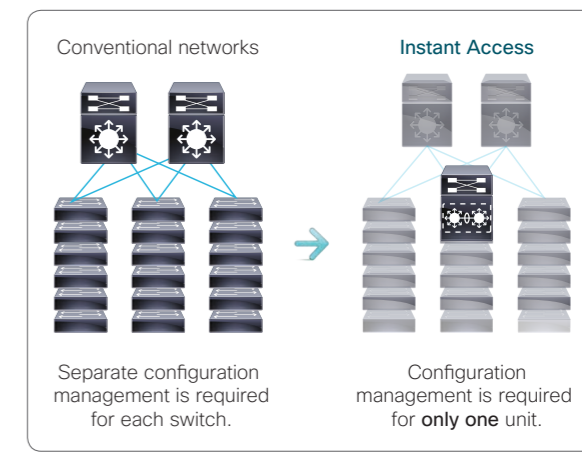
## Cisco Transceiver Module

SKU	Description	Compatible Series									
		2960-CX	3560-CX	2960-Plus	2960-X	3650	3850	4500E	4500-X	6500	6800
GLC-GE-100FX	100BASE-FX SFP Module	●	●	●	●	●	●	●	-	●	●
GLC-T	1000BASE-T SFP Module	-	-	●	●	●	●	●	●	●	●
GLC-SX-MMD	1000BASE-SX SFP Module (DOM)	●	●	●	●	●	●	●	●	●	●
GLC-LH-SMD	1000BASE-LX SFP Module (DOM)	●	●	●	●	●	●	●	●	●	●
GLC-BX-D	1000BASE-BX SFP Module (1490 nm)	●	●	●	●	●	●	●	●	●	●
GLC-BX-U	1000BASE-BX SFP Module (1310 nm)	●	●	●	●	●	●	●	●	●	●
GLC-EX-SMD	1000BASE-EX SFP Module	●	●	-	●	●	●	●	●	●	●
GLC-ZX-SMD	1000BASE-ZX SFP Module	●	●	●	●	●	●	●	●	●	●
SFP-10G-SR	10GBASE-SR SFP+ Module	-	●	-	●	●	●	●	●	●	●
SFP-10G-LR	10GBASE-LR SFP+ Module	-	●	-	●	●	●	●	●	●	●
SFP-10G-LRM	10GBASE-LRM SFP Module	-	●	-	●	●	●	●	●	●	●
SFP-10G-ER	10GBASE-ER SFP+ Module	-	●	-	●	●	●	●	●	●	●
X2-10GB-CX4	10GBASE-CX4 X2 Module	-	-	-	-	-	●	-	●	● <sup>*4</sup>	
X2-10GB-LRM	10GBASE-LRM X2 Module	-	-	-	-	-	●	-	●	● <sup>*4</sup>	
X2-10GB-SR	10GBASE-SR X2 Module	-	-	-	-	-	●	-	●	● <sup>*4</sup>	
X2-10GB-LR	10GBASE-LR X2 Module	-	-	-	-	-	●	-	●	● <sup>*4</sup>	
X2-10GB-ER	10GBASE-ER X2 Module	-	-	-	-	-	●	-	●	● <sup>*4</sup>	
X2-10GB-ZR	10GBASE-ZR X2 Module	-	-	-	-	-	●	-	●	● <sup>*4</sup>	
CVR-X2-SFP	TwinGig Converter for X2 Module	-	-	-	-	-	●	-	-	-	
CVR-X2-SFP10G	SFP+ Converter for X2 Module	-	-	-	-	-	●	-	●	● <sup>*4</sup>	
CFP-40G-SR4	40GBASE-SR4 CFP Module	-	-	-	-	-	-	-	●	● <sup>*4</sup>	
CFP-40G-LR4	40GBASE-LR4 CFP Module	-	-	-	-	-	-	-	●	● <sup>*4</sup>	
CVR-CFP-4SFP10G	FourX SFP+ Converter for CFP Module	-	-	-	-	-	-	-	●	● <sup>*4</sup>	
CVR-QSFP-SFP10G	SFP/SFP+ Converter for QSFP Module	-	-	-	-	-	-	-	●	● <sup>*4</sup>	
CVR-4SFP10G-QSFP	QSFP Converter for SFP+ Module	-	-	-	-	-	●	●	●	● <sup>*5</sup>	

\*1 LAN Lite model does not support stacking. \*2 IP Lite model is not supported. \*3 Cisco Catalyst 6880-Series and Cisco Catalyst 6807-XL are not supported. \*4 Cisco Catalyst 6880-X and Cisco Catalyst 6800a Series are not supported. \*5 Cisco Catalyst 6800a Series are not supported.

# Cisco Catalyst Instant Access

Cisco Catalyst Instant Access is a solution that is designed to dramatically simplify network operations. The operational management points for access and core layers are combined into one for operational simplicity. This solution consists of Cisco Catalyst 6500/6800 Series core switches (Instant Access parent) and Cisco Catalyst 6800ia Series (Cisco Catalyst 3560-CX Series (WS-C3560CX-8XPD-S/WS-C3560CX-12PD-S) access switches (Instant Access client). The Cisco Catalyst 6800ia Series switches connect uplink to the Cisco Catalyst 6500/6800 Series and operate as remote line card, allowing them to be treated as a single virtual switch. This enables the functions of the Cisco Catalyst 6500/6800 Series to be expanded to the access layer of the network with ease, without increasing the operation man-hours. A Supervisor Engine (VS-S2T-10G/VS-S2T-10GXL) and a Line Card (WS-X6904-40G-2T/C6800-8P10G/C6800-16P10G/C6800-32P10G) are required when using the Cisco Catalyst 6500 Series or Cisco Catalyst 6807-XL as an Instant Access parent. And a Multi-rate Port Card (C6880-X-16P10G) is required when using the Cisco Catalyst 6880-X Series as an Instant Access parent. Deployment of the Cisco Virtual Switching System (VSS) is also necessary.



\*1 Search for EOL6869 at cisco.com. \*2 Search for EOL8168 at cisco.com. \*4 Search for EOL8162 at cisco.com. \*5 Search for EOL9604 at cisco.com. \*6 Search for EOL8975 at cisco.com. \*7 Search for EOL9420 at cisco.com. \*8 Search for EOL9424 at cisco.com. \*9 Search for EOL8969 at cisco.com. \*10 Search for EOL7380 at cisco.com. \*11 Search for EOL6879 at cisco.com. \*12 Search for EOL9426 at cisco.com. \*13 Search for EOL3037 at cisco.com. \*14 Search for EOL6564 at cisco.com. \*15 Search for EOL6720 at cisco.com. \*16 Search for EOL8193 at cisco.com. \*17 Search for EOL7769 at cisco.com. \*18 Search for EOL8147 at cisco.com. \*19 Search for EOL9892 at cisco.com. \*20 Search for EOL7770 at cisco.com. \*21 Search for EOL9058 at cisco.com. \*22 Search for EOL10550 at cisco.com.

# Wireless

## Wireless Access Points / Controllers



### New Features of Cisco Aironet 1850/1830 Series

**Cisco Aironet 1850/1830 Series** are Cisco's first access points that support IEEE 802.11ac Wave 2 technology. With 11ac Wave 2, Cisco Aironet 1850 Series provide a data rate of up to 1.7 Gbps on the 5 GHz radio, more than triple the rates offered by today's high-end 11n access points. And Cisco Aironet 1830 Series provide a data rate of up to 866 Mbps on the 5 GHz radio. These also enable a total aggregate dual-radio PHY data rate of 2.0 Gbps and 1.0 Gbps respectively, providing the necessary foundation for enterprise and service provider networks to stay ahead of the performance and bandwidth expectations and needs of their wireless users.

#### ■ MU-MIMO

With 11n and 11ac Wave 1, a device can transmit multiple spatial streams at once, but only directed to a single address. For individually addressed frames, only a single device (or user) gets data at a time. This is referred to as SU-MIMO (Single-User Multiple Input and Multiple Output).

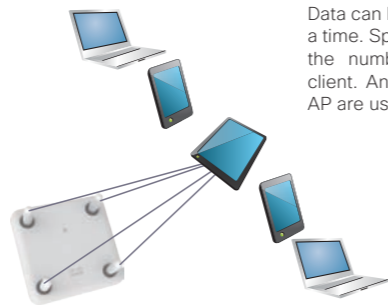
With the advent of 11ac Wave 2, a new technology is defined, called MU-MIMO (Multi-User MIMO). Using this technology, an access point can use its antennas and radio systems to transmit to different clients, all at the same time over the same frequency spectrum. These parallel transmissions improve RF efficiency when client devices also support 11ac Wave 2.

Cisco Aironet 1850 Series support 4 x 4 SU-MIMO with four spatial streams, and 4 x 4 MU-MIMO with three spatial streams. Cisco Aironet 1830 Series support 3 x 3 SU-MIMO and MU-MIMO with two spatial streams.

#### ■ Link Aggregation

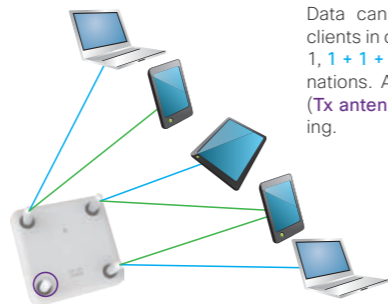
Many switches support links up to 1 Gbps throughput. However, with newer 11ac Wave 2 access points, it is possible (or at least the potential exists) that the access point traffic could exceed 1 Gbps. It is not likely to occur until MU-MIMO and 4 spatial stream 11 ac Wave 2 clients become more commonplace. To address this potential issue, Cisco have implemented Link Aggregation into the Cisco Aironet 1850 Series. Link Aggregation is the only method to gain higher throughput on access point that does not support multi-gigabit technologies such as NBASE-T.

#### ■ SU-MIMO



Data can be directed to one client at a time. Spatial streams are limited to the number of receivers on the client. Any additional radios on the AP are used for beamforming.

#### ■ MU-MIMO



Data can be directed to different clients in concurrent streams in a 1 + 1, 1 + 1 + 1, or 1 + 2 stream combinations. Additional radio on the AP (Tx antenna) is used for beamforming.

### Cisco Mobility Express Solution

The **Cisco Mobility Express Solution** is specifically designed to help small and medium-sized networks easily and cost-effectively deliver enterprise-class wireless access to employees and customers.

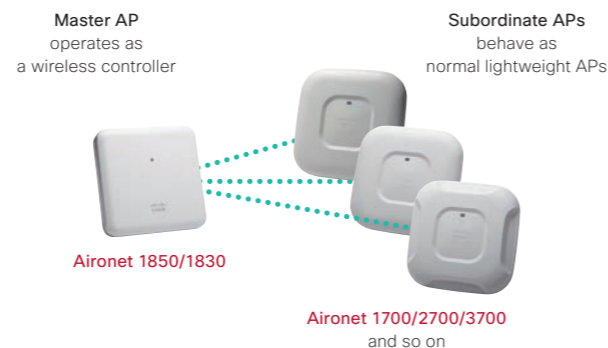
Cisco Mobility Express Solution is an on-premise, managed Wi-Fi solution that:

- Provides an easy, over-the-air interface for deployment in under **10 minutes**
- Is ideal for small and medium-sized deployments of up to **25 access points** and **500 clients**
- Is supported on Cisco Aironet 1850/1830 Series
- Can control other access points, such as Cisco Aironet 1700/2700/3700 Series



3-step over-the-air wireless network configuration

In the Cisco Mobility Express Solution, one access point (AP), running the Cisco Mobility Express wireless controller, is designated as the **master AP**. Other access points, referred to as **subordinate APs**, associate to this master AP. The master AP operates as a **wireless controller**, to manage and control the subordinate APs, and also operates as an access point to serve clients. The subordinate APs behave as normal lightweight access points to serve clients.



### Why Cisco?

#### Robust Stability

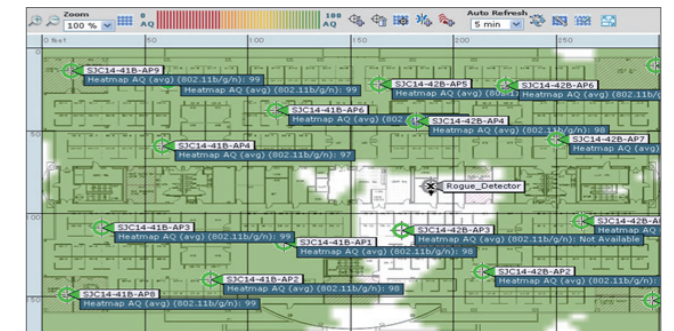
Cisco was one of the first corporations to foresee that wireless LAN would eventually either replace wired LAN or occupy the same position as wired LAN. In order for this transition to occur, high-speed communication was one of the primary requirements for wireless LAN. Cisco Wireless products are the best achieving products on the market, with IEEE 802.11ac PHY rates of 1.7 Gbps. However, high-speed communication alone is not enough to promote the use of wireless LAN in business. In addition to providing a high level of reliability without security risks such as information leakage and data theft, it is critical that wireless LAN has the required stability to ensure that user convenience is not compromised by factors such as impaired or broken communications. Cisco has developed a wide array of technologies and solutions to address such needs. Cisco's wireless products provide unparalleled stability based on over 15+ years of development achievements.

- Stability is pursued from the hardware design phase, including the use of custom chips.
- Radio interference is avoided intelligently based on reliable information related to the "type", "location", "impact range" and "degree of impact" of the source of interference.
- Automatic calibration is performed in areas where service is unavailable. In the unlikely event of failure of a wireless access point, a neighboring wireless access point takes its place automatically.
- Performance and stability of conventional IEEE 802.11a/g/n clients are enhanced as well, not just the IEEE 802.11ac clients.
- Dual-band compatible clients are automatically guided to a clean, interference-free 5 GHz band.
- Cisco verifies the compatibility with a wide array of vendors through the Wi-Fi Alliance certification as well as proprietary certification programs.

#### Unparalleled Level of Visualization

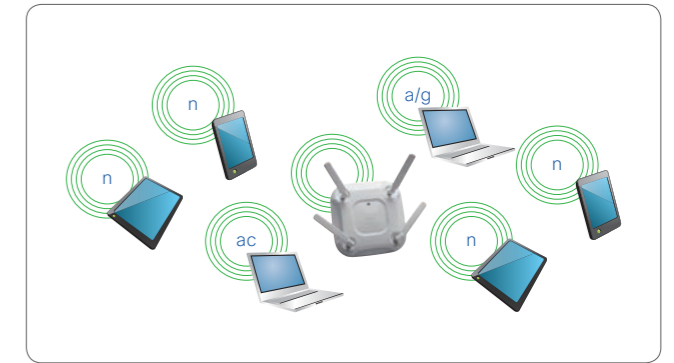
Radio waves are invisible, and this fact can often cause a nightmare for wireless LAN network administrators. Potential problems related to the radio environment may include "The communication speed is slowing down without any known cause", "Some kind of interference is occurring but its level of impact is unknown", etc. Visualization of wireless LAN is therefore one of the important trends today. Cisco's wireless access points incorporate a dedicated custom chip which functions as a measuring instrument and/or analyzer for the radio wave environment. Unlike the software-based data used in competitors' products, Cisco visualizes the radio wave intensity and type, location, impact range and degree of impact of the interference source in great precision and detail, based on highly accurate hardware-based data. The quality of the radio wave can also be visualized using this data. Visualization also includes identification of protocols and applications in the wireless LAN, making it "completely transparent" and significantly enhancing the network manageability.

#### ■ Quantifying and Graphically Visualizing the Radio Wave Quality (AQ) in a Floor Map



### Cisco ClientLink

In a mixed environment with low-speed clients (e.g. IEEE 802.11a/g clients) and high-speed clients (e.g. IEEE 802.11n/ac clients), the communication performance of the entire wireless LAN network will be dragged down by the slower clients. The **Cisco ClientLink** technology implemented on Cisco Aironet Access Points uses the signal processing expansion function, which is embedded in the chipset, to analyze the uplink communication signals from the client and strengthen/optimize the downlink communication signals to enhance the communication performance of low-speed clients. **Cisco ClientLink 3.0** implemented on the **Cisco Aironet 1570/2700/3700 Series** use the third or fourth antenna of the access points to also enhance the communication performance of IEEE 802.11n-compatible clients supporting up to three data streams, including the iPhone, iPad and latest laptops. In Cisco ClientLink 3.0, the communication performance of IEEE 802.11ac-compatible clients can be enhanced without implementing special hardware or software on the client side.



### Cisco CleanAir

**Cisco CleanAir** is an innovative technology for the **Controller-based Wireless Solution** that enables construction of self-recovering, self-optimizing wireless LAN environments.

In conventional technologies, the network administrators were required to move around carrying a sensor-equipped laptop in order to identify the source of radio interference. In Cisco CleanAir, Cisco Aironet Access Points with built-in ASIC (a dedicated custom chip) serve the roles of a measuring instrument and an analyzer for the wireless environment; and the data obtained from the Cisco Aironet Access Points are presented in a visualized manner. This enables network administrators to identify the cause of a problem and fix it promptly and efficiently. This technology also offers the wireless resource

management function which alleviates problems by automatically optimizing the frequency band after detecting a radio interference.

Cisco CleanAir can be implemented for the following products:

- **Cisco Aironet 1570/1700/2700/3700 Series:** Collects data by detecting and categorizing the radio interference in wireless LAN network.<sup>1</sup>
- **Cisco Wireless Controller:** Analyzes the collected data to identify the cause and dynamically optimizes the entire wireless LAN network.
- **Cisco Mobility Service Engine (MSE):** Tracks wireless LAN devices and collects the location information and the radio interference range.
- **Cisco Prime Infrastructure:** Visualizes the entire wireless LAN environment.

<sup>1</sup> Cisco Aironet 1700 Series support Cisco CleanAir Express in Cisco AireOS 8.0 or later. Cisco Aironet 1570/2700/3700 Series support the 80 MHz channel bandwidth of IEEE 802.11ac.



## Cisco Connected Mobile Experiences (CMX) Solutions

Cisco Connected Mobile Experiences (CMX) is a revolutionary solution that collects and analyzes the location of wireless LAN (Wi-Fi) devices such as smartphones and tablets for business utilization. This solution supports the monetization of wireless LAN in a wide range of sectors including retail, services, transportation, healthcare, education, and government offices. This solution already has an excellent deployment track record overseas. And in Asia Pacific, positive results have been obtained in demonstration experiments

conducted at events such as Interop Tokyo 2013/2014; and its commercial deployment is already in the pipeline. Cisco CMX provides the services described below.

For details on Cisco CMX, visit the following Web site:  
<http://www.cisco.com/go/cmxf>

### Location Analysis

This function anonymously detects and traces Wi-Fi device signals to obtain, aggregate and visualize the number of Wi-Fi users and their movement for analysis.

In the Copenhagen Airport case study, for example, this function enabled analysis of the general movement route and staying area/time of travelers (i.e. Wi-Fi users) during their departure and arrival, enabling better understanding of their different behavior patterns. This has enabled optimization of personnel allocation based on crowding and adjustment of the facility layout for improved customer convenience, helping to deliver services that guarantee high levels of customer satisfaction in a cost-effective manner. This function has also facilitated effective attraction of customers through optimization of the advertisement layout, contributing to bursting the earnings of duty free shops and tenant stores.

### Customer Engagement

The ability to capture new and keep existing customers by delivering more value is essential to continued growth in all industries. Cisco CMX allows customers mobile users to connect through your onsite wireless LAN. It opens a direct channel of communication that lets you better understand and deliver what your guests want. When you more effectively engage your mobile users, you can:

- Increase loyalty of existing customers and attract new customers by providing them with a personalized experience
- Heighten the guest experience by providing wireless access and key information during their journey
- Increase brand exposure through social media check-in and feed streaming
- Increase visitor satisfaction by helping them make decisions more aligned with their needs

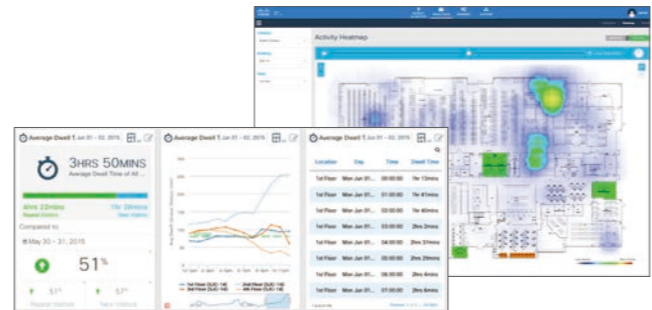
### Cisco CMX for Facebook Wi-Fi

Cisco has also begun a new Cisco CMX service called **Cisco CMX for Facebook Wi-Fi** in collaboration with Facebook. In hotels and shops that are deploying this service, Wi-Fi users can use free wireless LAN by checking in with the facility using the facility's wireless network. This solution not only improves

### Cisco CMX Cloud NEW

**Cisco CMX Cloud** revolutionizes the delivery of wireless guest access and in-venue analytics, integrating seamlessly with Cisco wireless infrastructure. This cloud-delivered Software-as-a-Service (SaaS) offering is quick to deploy and intuitive to use. The affordable subscription-billing model helps reduce initial investments in equipment (capital expenditures [CapEx]) and IT resources. Ultimately, this solution accelerates how wireless infrastructure can deliver business outcomes by:

### Offering a Variety of Analysis Methods including Traffic Line Information and Residence Time



### Venue Efficiency

By helping you better understand how your visitors actually behave while at your site, Cisco CMX helps you make the best use of your floor plan. With this improved insight, you can:

- Determine the most trafficked locations to position advertisements, products or services
- Adjust venue layout to optimize traffic flow in periods of high use
- Staff service locations to accommodate visitor flows and time of day
- Evaluate impact of floor plan adjustments

For your customers and your business, the Cisco CMX solution can deliver the right information at the right time.

user convenience but also offers a variety of business benefits including better customer recognition thanks to the increased number of check-ins and marketing based on the customer information collected anonymously by Facebook.

- Detecting all Wi-Fi devices (the "devices") in the venue and providing analytics on their presence, including dwell times, new vs. repeat visitors, and peak times
- Providing an easy-to-use guest-access solution for visitors through a custom portal using various authentication methods including social, self-registration, and Short Message Service (SMS)
- Engaging visitors directly on the guest portal page or mobile app with location-based content

### Cisco Connected Mobile Experiences Cloud

SKU	Description	SKU	Description
AIR-CMX-SVC-CX <sup>1</sup>	CMX Cloud Connect.	AIR-CMX-SVC-CPAX <sup>1</sup>	CMX Cloud Connect with Presence Analytics.



<sup>1</sup> AIR-CMX-CLOUD is required.

## Wireless Product Line

### Cisco Aironet Access Points

#### Indoor Access Points

All indoor models of the **Cisco Aironet Access Points** are compatible with the IEEE 802.11 standards including IEEE 802.11a/b/g/n and the latest standard IEEE 802.11ac which provides throughput up to 1.7 Gbps (some models are IEEE 802.11ac-compatible). A wide lineup of models are available including: (1) Lightweight compact models featuring a streamlined body with built-in antenna and integrated LAN/power cable using PoE (Power over Ethernet) for stylish installation without spoiling the aesthetics of the office; (2) Heavy-duty models with a wide selection of external antennas and featuring a rigid metal chassis to support a wide range of operating temperatures for use in factories, warehouses and stores where environmental requirements are strict; and (3) High-performance models for telecommuters and satellite offices offering the same level of security and network services as the headquarters office.



➔ See page 34 to 35 for details.

#### Outdoor Access Points

The outdoor models of the **Cisco Aironet Access Points** deliver high-speed and stable wireless LAN environments in various locations such as in a massive city-size area, inside a company building, a factory ground, or a mining field. Featuring a chassis with IEC IP67 waterproof and NEMA Type 4X certified outdoor dust/rust resistance, a wide lineup of outdoor models is available to meet the diversifying customer needs in the harshest of environments. Available models include the lightweight compact model with a polished exterior design that blends into the surrounding environment, the PoE power supplying model capable of powering surveillance cameras, and the model with built-in cable modem for utilizing the existing cable network.



➔ See page 36 for details.

### Cisco Wireless Controller

**Cisco Wireless Controller** is a platform that enables centralized management of multiple Cisco Aironet Access Points including remote bases. This platform automates the configuration management required for deploying/adding Cisco Aironet Access Points to reduce the workload of the network administrator, as well as provide the control functions needed to establish a stable wireless LAN environment. The control functions include load balancing of Cisco Aironet Access Points and prompt and dynamic response to changes in the wireless environment.

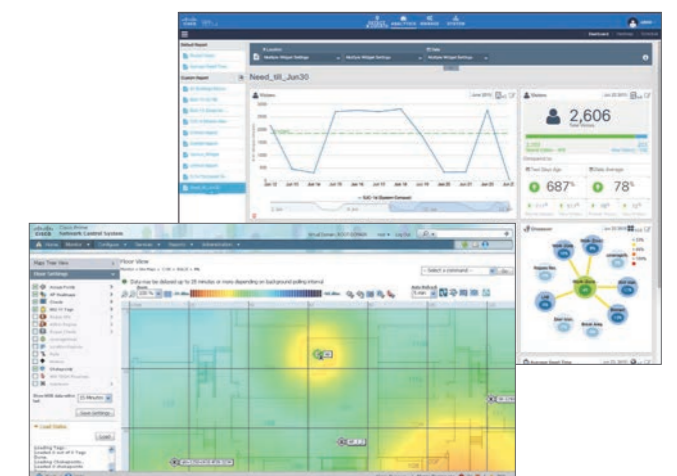


➔ See page 39 to 40 for details.

### Mobility Services & Network Management Tools

**Cisco Mobility Engine (MSE)**, which delivers a wide range of mobility services such as collecting the location of mobile devices, and **Cisco Prime Infrastructure**, that is designed to dramatically simplify network operations by providing management of wired and wireless network seamlessly, these are two critical components of **Cisco CleanAir**.

➔ See page 41 for details.





# Outdoor Access Points

## ■ Cisco Aironet Outdoor Access Points

The **Cisco Aironet Outdoor Access Points** deliver high-speed and stable wireless LAN environments in various locations such as in a massive city-size area, inside a company building, a factory ground, or a mining field. Featuring a chassis with IEC IP67 waterproof and NEMA Type 4X certified outdoor dust/rust resistance, a wide lineup of outdoor models is available to meet the diversifying customer needs in the harshest of environments.

- Built-in antenna models: **Cisco Aironet 1532I** and **Cisco Aironet 1572IC** have a polished exterior design that blends into the surrounding environment.
- External antenna models: A wide selection of antennas are available for **Cisco Aironet 1532E** and **Cisco Aironet 1572EAC/EC** to suit different installation environments (Refer to page 37-38 for details on the **Cisco Aironet antennas**).
- Built-in cable modem models: **Cisco Aironet 1572IC/EC** incorporate a cable modem that is compatible with DOCSIS 3.0 (24x8), an international standard for communication services via coaxial cables used for cable television, etc.

## ■ Highlights

- IEC IP67 waterproof (All models)
- NEMA Type 4X certified outdoor dust/rust resistance (**Cisco Aironet 1570 Series**)
- Designed for hazardous environments, certified Class 1 Div2/Zone2 enclosure (All models)
- Supports built-in SFP module slot (**Cisco Aironet 1570 Series**)
- Supports GPS (**Cisco Aironet 1570 Series**)<sup>\*1</sup>
- IEEE 802.11n compatible (All models)
- IEEE 802.11ac compatible (**Cisco Aironet 1570 Series**)
- Supports 2.4 GHz/5 GHz dual-band (All models)
- Supports 5.6 GHz (W56) frequency band (All models)
- Supports **Cisco CleanAir** (**Cisco Aironet 1570 Series**, Refer to page 31 for details on the technology)
- Supports **ClientLink** (**Cisco Aironet 1570 Series**, Refer to page 31 for details on the technology)
- Supports **Cisco BandSelect** (All models, for wired connection)
- Supports **Cisco High Density Experience (HDX)** (**Cisco Aironet 1570 Series**)



Model Name	Dimensions (Height x Width x Depth)	Maximum Weight
Cisco Aironet 1532I	10.16 x 17.78 x 22.86 cm	2.27 kg
Cisco Aironet 1532E	10.16 x 17.78 x 25.40 cm	2.49 kg
Cisco Aironet 1572IC	29.97 x 20.07 x 20.07 cm	5.22 kg
Cisco Aironet 1572EAC	29.97 x 20.07 x 16.00 cm	6.12 kg
Cisco Aironet 1572EC	29.97 x 20.07 x 16.00 cm	6.12 kg

## ■ Cisco Aironet 1530 Series

SKU	Clean Air	ClientLink		Band Select	Ports			Power Supply Options					Antennas				
		2.0	3.0		GE	SFP	Cable	AC	DC	PoE (PSE)	PoE (PD)	UPOE (PD)	PoC (PD)	Built-in Dual-band	External Dual-band	External Single-band	
AIR-CAP1532I-x-K9	-	-	-	●	2	-	-	-	●	-	-	●	-	-	3 <sup>*2</sup>	-	-
AIR-CAP1532E-x-K9	-	-	-	●	2	-	-	-	●	-	●	-	-	-	-	2	2 + 2

## ■ Cisco Aironet 1570 Series

SKU	Clean Air	ClientLink		Band Select	Ports			Power Supply Options					Antennas				
		2.0	3.0		GE	SFP	Cable	AC	DC	PoE (PSE)	PoE (PD)	UPOE (PD)	PoC (PD)	Built-in Dual-band	External Dual-band	External Single-band	
AIR-AP1572ICn-x-K9 <sup>*3</sup>	●	-	●	●	2	1	1	-	●	-	-	-	●	-	4	-	-
AIR-AP1572EAC-x-K9	●	-	●	●	2	1	-	-	●	-	●	-	-	-	-	4	2 + 2
AIR-AP1572ECn-x-K9 <sup>*3</sup>	●	-	●	●	2	1	1	-	●	-	-	-	●	-	4	2 + 2	

\*1 GPS Antenna (AIR-ANT-GPS-1) is required. \*2 2.4 GHz: 3 Tx / 3 Rx Antennas with 3 streams. 5 GHz: 2 Tx / 3 Rx Antennas with 2 streams. \*3 If "n" is "1"; Diplex Filter split of: 5-42/88-1000 MHz. If "n" is "2"; Diplex Filter split of: 5-85/108-1002 MHz. If "n" is "3"; Diplex Filter split of: 5-65/108-1002 MHz. \*4 PoE+ power supply is supported.

# Cisco Aironet Antennas and Accessories

## ■ Cisco Aironet 2.4 GHz Omni-directional Antenna

SKU	Installation/Dimensions	Gain (dBi)
AIR-ANT2420V-N	12.70 x 2.54 cm	2.0
AIR-ANT2450V-N	27.94 x 2.54 cm	5.0
AIR-ANT2455V-N	31.75 x 2.54 cm	5.5
AIR-ANT2480V-N	49.53 x 2.22 cm	8.0

## ■ Cisco Aironet 2.4 GHz Directional Antenna

SKU	Installation/Dimensions/Weight	Gain (dBi)
AIR-ANT2413P2M-N	Patch 19.81 x 19.81 x 3.05 cm 0.61 kg	13.0

## ■ Cisco Aironet Dual-band Omni-directional Antenna

SKU	Installation/Dimensions/Weight	Gain (dBi)
AIR-ANT2524V4C-R	Ceiling mount 18.42 x 18.42 x 2.54 cm 0.59 kg	2.0 (2.4 GHz) 4.0 (5 GHz)
AIR-ANT2544V4M-R	Wall mount 55.37 x 16.00 cm 0.67 kg	4.0 (2.4 GHz) 4.0 (5 GHz)
AIR-ANT2547V-N	28.19 x 3.18 cm 170 g	4.0 (2.4 GHz) 7.0 (5 GHz)
AIR-ANT2547VG-N	28.19 x 3.18 cm 170 g	4.0 (2.4 GHz) 7.0 (5 GHz)
AIR-ANT2568VG-N	37.59 x 3.81 cm 204 g	6.0 (2.4 GHz) 8.0 (5 GHz)

## ■ Cisco Aironet 5 GHz Omni-directional Antenna

SKU	Installation/Dimensions	Gain (dBi)
AIR-ANT5140V-N	12.70 x 2.54 cm	4.0
AIR-ANT5175V-N	29.59 x 2.54 cm	7.5
AIR-ANT5180V-N	27.94 x 2.54 cm	8.0

## ■ Cisco Aironet 5 GHz Directional Antenna

SKU	Installation/Dimensions/Weight	Gain (dBi)
AIR-ANT5114P2M-N	Patch 19.81 x 19.81 x 3.05 cm 0.61 kg	14.0

## ■ Cisco Aironet Dual-band Dipole Antenna

SKU	Color/Dimensions/Weight	Gain (dBi)
AIR-ANT2524DB-R	Black 16.84 x 2.11 cm 36.85 g	2.0 (2.4 GHz) 4.0 (5 GHz)
AIR-ANT2524DG-R	Grey 16.84 x 2.11 cm 36.85 g	2.0 (2.4 GHz) 4.0 (5 GHz)
AIR-ANT2524DW-R	White 16.84 x 2.11 cm 36.85 g	2.0 (2.4 GHz) 4.0 (5 GHz)
AIR-ANT2535SDW-R	White 8.38 x 3.18 cm 48.19 g	3.0 (2.4 GHz) 5.0 (5 GHz)

## ■ Cisco Aironet Dual-band Directional Antenna

SKU	Installation/Dimensions/Weight	Gain (dBi)
AIR-ANT2566P4W-R	Patch 16.00 x 27.94 x 3.05 cm 0.64 kg	6.0 (2.4 GHz) 6.0 (5 GHz)
AIR-ANT2566D4M-R	Patch 25.40 x 25.40 x 4.09 cm 1.36 kg	6.0 (2.4 GHz) 6.0 (5 GHz)
AIR-ANT2588P3M-N	Patch 30.48 x 17.78 x 2.79 cm 0.45 kg	8.0 (2.4 GHz) 8.0 (5 GHz)
AIR-ANT2513P4M-N	Patch 30.48 x 17.78 x 2.79 cm 0.45 kg	13.0 (2.4 GHz) 13.0 (5 GHz)

For details on **Cisco Aironet Antennas**, visit the following Web site:  
<http://www.cisco.com/go/antenna>

#### ■ Cisco Aironet 2.4 GHz Omni-directional Antenna Model Compatibility Comparison

SKU	Gain (dBi)							
	2.4 GHz	5 GHz	1852E	2702E	3702E	3702P	1532E	1572E
AIR-ANT2420V-N	2.0	-	-	-	-	-	-	●
AIR-ANT2450V-N	5.0	-	-	-	-	-	●	●
AIR-ANT2455V-N	5.5	-	-	-	-	-	-	-
AIR-ANT2480V-N	8.0	-	-	-	-	-	●	●

#### ■ Cisco Aironet 5 GHz Omni-directional Antenna Model Compatibility Comparison

SKU	Gain (dBi)							
	2.4 GHz	5 GHz	1852E	2702E	3702E	3702P	1532E	1572E
AIR-ANT5140V-N	-	4.0	-	-	-	-	-	●
AIR-ANT5175V-N	-	7.5	-	-	-	-	-	-
AIR-ANT5180V-N	-	8.0	-	-	-	-	●	●

#### ■ Cisco Aironet 2.4 GHz Directional Antenna Model Compatibility Comparison

SKU	Gain (dBi)							
	2.4 GHz	5 GHz	1852E	2702E	3702E	3702P	1532E	1572E
AIR-ANT2413P2M-N	13.0	-	-	-	-	-	●	●

#### ■ Cisco Aironet 5 GHz Directional Antenna Model Compatibility Comparison

SKU	Gain (dBi)							
	2.4 GHz	5 GHz	1852E	2702E	3702E	3702P	1532E	1572E
AIR-ANT5114P2M-N	-	14.0	-	-	-	-	●	●

#### ■ Cisco Aironet Dual-band Di-pole Antenna Model Compatibility Comparison

SKU	Gain (dBi)							
	2.4 GHz	5 GHz	1852E	2702E	3702E	3702P	1532E	1572E
AIR-ANT2524DB-R	2.0	4.0	●	●	●	●	-	-
AIR-ANT2524DG-R	2.0	4.0	●	●	●	●	-	-
AIR-ANT2524DW-R	2.0	4.0	●	●	●	●	-	-
AIR-ANT2535SDW-R	3.0	5.0	●	●	●	●	-	-

#### ■ Cisco Aironet Dual-band Omni-directional Antenna Model Compatibility Comparison

SKU	Gain (dBi)							
	2.4 GHz	5 GHz	1852E	2702E	3702E	3702P	1532E	1572E
AIR-ANT2524V4C-R	2.0	4.0	●	●	●	●	-	-
AIR-ANT2544V4M-R	4.0	4.0	●	●	●	●	-	-
AIR-ANT2547V-N	4.0	7.0	-	-	-	-	-	●
AIR-ANT2547VG-N	4.0	7.0	-	-	-	-	●	●
AIR-ANT2568VG-N	6.0	8.0	-	-	-	-	-	●

#### ■ Cisco Aironet Dual-band Directional Antenna Model Compatibility Comparison

SKU	Gain (dBi)							
	2.4 GHz	5 GHz	1852E	2702E	3702E	3702P	1532E	1572E
AIR-ANT2566P4W-R	6.0	6.0	●	●	●	●	-	-
AIR-ANT2566D4M-R	6.0	6.0	●	●	●	●	-	-
AIR-ANT2588P3M-N	8.0	8.0	-	-	-	-	●	●
AIR-ANT2513P4M-N	13.0	13.0	-	-	-	-	-	●

#### ■ Cisco Aironet Power Supply Options

SKU	Description	Compatible Models								
		700	700W	1830	1850	1700	2700	3700	1530	1570
AIR-PWRINJ4=	Power Injector	●	●	●	●	●	●	●	-	-
AIR-PWRINJ5=	Power Injector	●	●	● <sup>*1</sup>	● <sup>*2</sup>	●	● <sup>*3</sup>	-	-	-
AIR-PWRINJ-30=	Power Injector	-	-	-	-	-	-	-	●	-
AIR-PWRINJ1500-2=	Power Injector	-	-	-	-	-	-	-	●	● <sup>*4</sup>
AIR-PWR-B=	Power Supply Module	●	-	-	-	●	●	●	-	-
AIR-PWR-C=	Power Supply Module	-	●	●	●	-	-	-	-	-
AIR-PWRADPT2-1530=	Power Supply Module	-	-	-	-	-	-	-	●	-

\*1 Full features are supported when powered via PoE+, AIR-PWRINJ4= or AIR-PWR-C= (The AIR-PWRINJ5 supports PoE receiving only). (If PoE is the source of power, the USB port is disabled).  
 \*2 Full features are supported when powered via PoE+, AIR-PWRINJ4= or AIR-PWR-C= (The AIR-PWRINJ5 supports PoE receiving only). (If PoE is the source of power, the Cisco Aironet 1852E 2.4-GHz radio will shift to 2 x 3 from 3 x 4, and the AUX and USB port are disabled).  
 \*3 Full features are supported when powered via PoE+, AIR-PWRINJ4= or AIR-PWR-B= (The AIR-PWRINJ5 supports PoE receiving only). (If PoE is the source of power, the Cisco Aironet 2702 2.4/5-GHz radios will shift to 3 x 3 from 3 x 4).  
 \*4 Cisco Aironet 1572IC4 is not supported.

# Cisco Wireless Controller

**Appliance/ Virtual Machine:**  
 Cisco 2500 Series Wireless Controller, Cisco Virtual Wireless Controller, Cisco 5700 Series Wireless Controller, Cisco 5500 Series Wireless Controller, Cisco 8500 Series Wireless Controller

**Module:**  
 Cisco Wireless Services Module 2 (WISM2)

**Number of Access Points → More**

#### ■ Cisco Wireless Controller

Cisco Wireless Controller is a platform that enables controller-based management of multiple Cisco Aironet Access Points including remote bases. An extensive lineup of products includes expansion modules for integrating services to the Cisco Catalyst 6500 Series, software products for VMware ESX/ESXi and Linux Kernel-based Virtual Machine (KVM), and dedicated hardware appliances. A flexible licensing system is adopted for the number of managed Cisco Aironet Access Points, making it one of the most cost-effective solutions in the industry. The required number of managed access points can be selected based on the network requirements at the time of deployment, and the number of managed access points can be expanded flexibly based on the post-deployment network requirements.

#### ■ Cisco 2500 Series Wireless Controller

Dimensions (Height x Width x Depth): 4.39 x 20.32 x 17.15 cm Maximum Weight: 1.59 kg

SKU	OS	Managed Access Points		Clients	RF tags	Throughput	Office Extend	Wireless Mesh	Ports			Rack mount
		Default	Maximum						GE	SFP	SFP +	
AIR-CT2504-5-K9	AireOS	5	75	1,000	500	1 Gbps	●	●	4	-	-	- <sup>*1</sup>
AIR-CT2504-15-K9	AireOS	15	75	1,000	500	1 Gbps	●	●	4	-	-	- <sup>*1</sup>
AIR-CT2504-25-K9	AireOS	25	75	1,000	500	1 Gbps	●	●	4	-	-	- <sup>*1</sup>
AIR-CT2504-50-K9	AireOS	50	75	1,000	500	1 Gbps	●	●	4	-	-	- <sup>*1</sup>

#### ■ Cisco Virtual Wireless Controller

SKU	OS	Managed Access Points		Clients	RF tags	Throughput	Office Extend	Wireless Mesh	Ports			Rack mount
		Default	Maximum						GE	SFP	SFP +	
L-AIR-CTVM-5-K9	AireOS	5	200	3,000	3,000	500 Mbps	●	-	-	-	-	-

#### ■ Cisco 5700 Series Wireless Controller

SKU	OS	Managed Access Points		Clients	RF tags	Throughput	Office Extend	Wireless Mesh	Ports			Rack mount
		Default	Maximum						GE	SFP	SFP +	
AIR-CT5760-25-K9	IOS-XE	25	1,000	12,000	1,000	60 Gbps	-	-	-	-	6	1 RU
AIR-CT5760-50-K9	IOS-XE	50	1,000	12,000	1,000	60 Gbps	-	-	-	-	6	1 RU
AIR-CT5760-100-K9	IOS-XE	100	1,000	12,000	1,000	60 Gbps	-	-	-	-	6	1 RU
AIR-CT5760-250-K9	IOS-XE	250	1,000	12,000	1,000	60 Gbps	-	-	-	-	6	1 RU
AIR-CT5760-500-K9	IOS-XE	500	1,000	12,000	1,000	60 Gbps	-	-	-	-	6	1 RU
AIR-CT5760-1K-K9	IOS-XE	1,000	1,000	12,000	1,000	60 Gbps	-	-	-	-	6	1 RU

#### ■ Cisco Wireless Services Module 2 (WISM2)

SKU	OS	Managed Access Points		Clients	RF tags	Throughput	Office Extend	Wireless Mesh	Ports			Rack mount
		Default	Maximum						GE	SFP	SFP +	
WS-SVC-WISM2-1-K9	AireOS	100	1,000	15,000	5,000	20 Gbps	●	●	-	-	-	-
WS-SVC-WISM2-3-K9	AireOS	300	1,000	15,000	5,000	20 Gbps	●	●	-	-	-	-
WS-SVC-WISM2-5-K9	AireOS	500	1,000	15,000	5,000	20 Gbps	●	●	-	-	-	-
WS-SVC-WISM2-K-K9	AireOS	1,000	1,000	15,000	5,000	20 Gbps	●	●	-	-	-	-

#### ■ Cisco 5500 Series Wireless Controller (5508/5520)

SKU	OS	Managed Access Points		Clients	RF tags	Throughput	Office Extend	Wireless Mesh	Ports			Rack mount
		Default	Maximum						GE	SFP	SFP +	
AIR-CT5508-12-K9	AireOS	12	500	7,000	5,000	8 GB/s	●	●	-	8	-	1 RU
AIR-CT5508-25-K9	AireOS	25	500	7,000	5,000	8 GB/s	●	●	-	8	-	1 RU
AIR-CT5508-50-K9	AireOS	50	500	7,000	5,000	8 GB/s	●	●	-	8	-	1 RU
AIR-CT5520-K9	AireOS	0	1,500	20,000	25,000	20 Gbps	●	●	-	-	2	1 RU
AIR-CT5520-50-K9	AireOS	50	1,500	20,000	25,000	20 Gbps	●	●	-	-	2	1 RU

#### ■ Cisco 8500 Series Wireless Controller (8510/8540)

SKU	OS	Managed Access Points		Clients	RF tags	Throughput	Office Extend	Wireless Mesh	Ports			Rack mount
		Default	Maximum						GE	SFP	SFP +	
AIR-CT8510-300-K9	AireOS	300	6,000	64,000	50,000	10 Gbps	●	●	-	-	2	1 RU
AIR-CT8510-500-K9	AireOS	500	6,000	64,000	50,000	10 Gbps	●	●	-	-	2	1 RU
AIR-CT8510-1K-K9	AireOS	1,000	6,000	64,000	50,000	10 Gbps	●	●	-	-	2	1 RU
AIR-CT8510-3K-K9	AireOS	3,000	6,000	64,000	50,000	10 Gbps	●	●	-	-	2	1 RU
AIR-CT8510-6K-K9	AireOS	6,000	6,000	64,000	50,000	10 Gbps	●	●	-	-	2	1 RU
AIR-CT8540-K9	AireOS	0	6,000	64,000	50,000	40 Gbps	●	●	-	-	4	2 RU
AIR-CT8540-1K-K9	AireOS	1,000	6,000	64,000	50,000	40 Gbps	●	●	-	-	4	2 RU

\*1 Rack Mounting Brackets (AIR-CT2504-RMNT) is required.

Additional Access Point License for Cisco 2500 Series Wireless Controller<sup>\*1</sup>

SKU	Additional	Compatible Models
L-LIC-CT2504-1A	1	2504
L-LIC-CT2504-5A	5	2504
L-LIC-CT2504-25A	25	2504

Additional Access Point License for Cisco Virtual Wireless Controller<sup>\*2</sup>

SKU	Additional	Compatible Models
L-LIC-CTVM-1A	1	-
L-LIC-CTVM-5A	5	-
L-LIC-CTVM-25A	25	-

Additional Access Point License for Cisco 5700 Series Wireless Controller<sup>\*3</sup>

SKU	Additional	Compatible Models
L-LIC-CTIOS-1A	1	5760

Additional Access Point License for Cisco Wireless Services Module 2 (WISM2)<sup>\*4</sup>

SKU	Additional	Compatible Models
L-LIC-WISM2-100A	100	6500/6800
L-LIC-WISM2-200A	200	6500/6800

Additional Access Point License for Cisco 5500 Series Wireless Controller<sup>\*5</sup>

SKU	Additional	Compatible Models
L-LIC-CT5508-1A	1	5508
L-LIC-CT5508-25A	25	5508
L-LIC-CT5508-50A	50	5508
L-LIC-CT5508-100A	100	5508
L-LIC-CT5508-250A	250	5508
L-LIC-CT5520-1A	1	5520

Additional Access Point License for Cisco 8500 Series Wireless Controller<sup>\*6</sup>

SKU	Additional	Compatible Models
L-LIC-CT8500-1A	1	8510
L-LIC-CT8500-100A	100	8510
L-LIC-CT8500-500A	500	8510
L-LIC-CT8500-1000A	1,000	8510
L-LIC-CT8540-1A	1	8540

\*1 L-LIC-CT2504-UPG is required. \*2 L-LIC-CTVM-UPG is required. \*3 L-LIC-CT5760-UPG is required. \*4 L-LIC-WISM2-UPG is required. \*5 L-LIC-CT5508-UPG or L-LIC-CT5540-UPG is required. \*6 L-LIC-CT8500-UPG or L-LIC-CT8540-UPG is required.

## Cisco Wireless Controller Software

Unlike traditional products, the **Cisco 5700 Series Wireless Controllers** (and the **Cisco Catalyst 3650/3850 Series** and the **Supervisor Engine 8-E for Cisco Catalyst 4500E Series**) incorporate the Cisco IOS XE based wireless

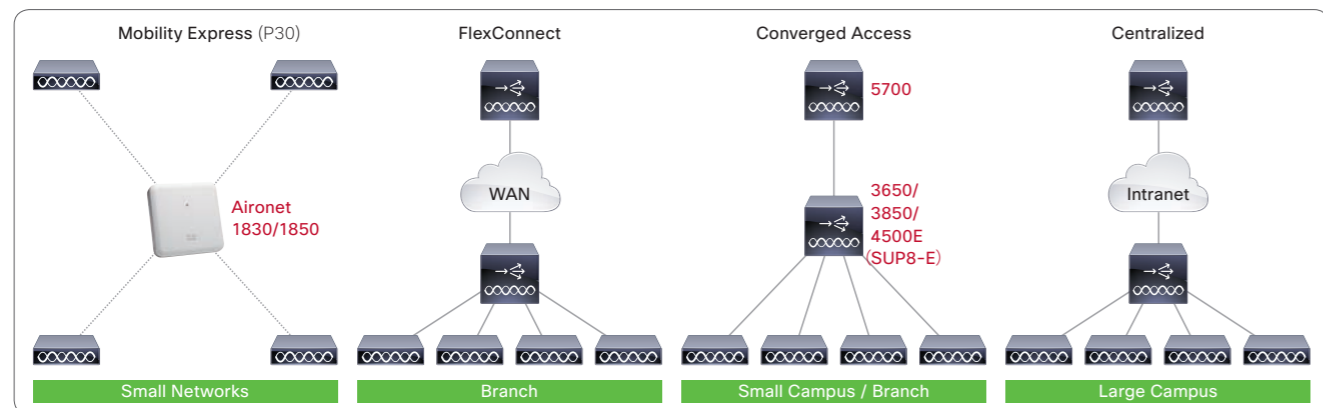
controller software. Rich features of the Cisco IOS including **Flexible NetFlow**, advanced QoS and **dACL (downloadable Access Control List)** can be provided for wireless LAN networks as well.

Cisco Wireless Controller Software Specification Comparison

	AirOS	IOS-XE
Resilience	Client SSO, AP SSO, N+1, High-availability option SKU	AP SSO, Multiple LAG, High-availability option SKU
QoS	Alloy QoS	High level of QoS (MQC)
Security	Dynamic ACLs, SGA (SXP)	dACL
Roaming	L2 and L3 FSR, IEEE 802.11r, Neighbor List	L2 and L3 FSR
Service	Bonjour, AVC, Static Netflow	Flexible Netflow, AVC
Command Line Interface	Secure FTP	Cisco IOS CLI, Secure Shell, EEM/TCL/TK

## Deployment Modes

Cisco's wireless solutions can be broadly classified into **Standalone** systems that operate **Cisco Aironet Access Points** individually and **Controller-based** systems that centrally manage multiple Cisco Aironet Access Points using a **Cisco Wireless Controller**. Multiple expansion modes are also supported in **Controller-based** systems.



The Mesh Mode, FlexConnect + Mesh Mode, OfficeExtend Mode, Monitor Mode, Rogue Detector Mode, and Sniffer Mode are also supported.

Cisco Wireless Controller Deployment Mode Compatibility Comparison

Platform	Deployment Modes					
	Mobility Express	FlexConnect	Converged Access	Centralized	Mesh	OfficeExtend
Cisco Aironet 1830/1850 Series Access Points	●	-	-	●	-	-
Cisco 2500 Series Wireless Controller	-	●	-	●	●	●
Cisco Virtual Wireless Controller	-	●	-	-	-	-
Cisco 5500 Series Wireless Controller	-	●	● <sup>*1</sup>	●	●	●
Cisco 5700 Series Wireless Controller	-	●	●	●	●	●
Cisco Wireless Services Module 2 (WISM2)	-	●	● <sup>*1</sup>	●	-	-
Cisco 8500 Series Wireless Controller	-	●	-	●	●	●

\*1 Cisco Wireless Controller Software release 7.3.112.0 is required. \*2 Cisco AireOS 8.1 and higher are not supported.

## Mobility Services & Network Management Tools

### Cisco Mobility Service Engine (MSE)

**Cisco Mobility Service Engine (MSE)** is a platform that provides a wide range of mobility services including **Cisco CleanAir**, **Cisco Base Location Services**, **Cisco Connected Mobile Experiences (CMX)**, and **Cisco Wireless Intrusion Prevention System (wIPS)**. This platform is implemented as a software product on VMware ESX/ESXi or as a hardware appliance.



Cisco Connected Mobile Experiences (CMX) release 10

Cisco CMX 10 is a platform that enhances the Cisco wireless LAN by:

- Calculating the location of all wireless devices in a venue, including mobile devices, tags, rogue access points, and wireless interferers.
- Generating advanced location analytics (**CMX Analytics**).
- Providing a visitor wireless onboarding platform (**CMX Connect**).
- Calculating the location of Bluetooth Low Energy (BLE) beacons.

Cisco Connected Mobile Experiences (CMX) release 10 License

- Cisco CMX Base License**  
Provides the ability to determine the location of Wi-Fi clients, Bluetooth low energy (BLE) beacons, devices, and RFID tags, **CMX Connect**, third-party integration using standard REST APIs.
- Cisco CMX Advanced License**  
Provides all the CMX Base services and **CMX Analytics**.
- Cisco wIPS Monitor Mode License**  
Provides wIPS for Cisco Aironet Access Points in monitor mode (will be available in a future release).
- Cisco wIPS Enhanced Local Mode License**  
Provides wIPS for Cisco Aironet Access Points in local mode (will be available in a future release).

Cisco Mobility Services Engine (MSE)

SKU	Description	Managed Access Points	
		Location service CMX	wIPS Monitor Mode wIPS Enhanced Local Mode
L-MSE-7.0-K9	Software product	5,000	10,000
AIR-MSE-3365-K9	Hardware appliance	5,000	10,000

Cisco CMX Base License

SKU	CMX 10.x <sup>*2</sup>	Supported Access Points
MSE 8.0 <sup>*1</sup>	L-LS-1AP-N	1
L-LS-100AP	-	100
L-LS-1000AP	-	1,000

Cisco wIPS Monitor Mode License

SKU	CMX 10.x <sup>*2</sup>	Supported Access Points
MSE 8.0 <sup>*1</sup>	TBD	1
L-WIPS-MM-100AP	TBD	100
L-WIPS-MM-1000AP	TBD	1,000

Cisco CMX Advanced License

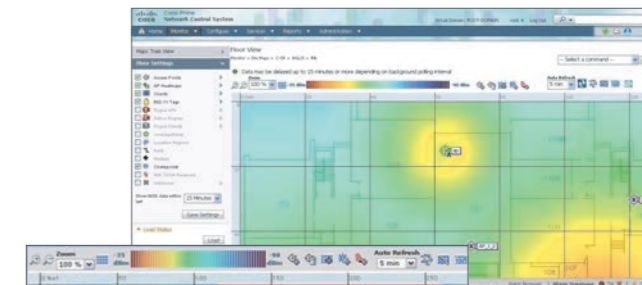
SKU	CMX 10.x <sup>*2</sup>	Supported Access Points
MSE 8.0 <sup>*1</sup>	L-AD-LS-1AP-N	1
L-AD-LS-100AP	-	100
L-AD-LS-1000AP	-	1,000
L-UPG-LS-1AP	L-UPG-LS-1AP-N	1

Cisco wIPS Enhanced Local Mode License

SKU	CMX 10.x <sup>*2</sup>	Supported Access Points
MSE 8.0 <sup>*1</sup>	TBD	1
L-WIPS-ELM-100AP	TBD	100
L-WIPS-ELM-1000AP	TBD	1,000

## Cisco Prime Infrastructure

**Cisco Prime Infrastructure** is an integrated management platform that enables comprehensive management of the entire network including wired/wireless LAN at the headquarters and branches. This platform not only enables devices comprising wired/wireless LAN networks to be managed as physical assets but also enables the networks to be managed from the user service level perspective, based on the rich information collected from the devices.



Cisco Prime Infrastructure 3.x Hardware Appliance

SKU	Description
PI-UCS-APL-K9	Generation 2 Hardware Appliance
PI-UCS-APL-U-K9	Upgrade from Generation 1

Cisco Prime Infrastructure 3.x Software & Base License<sup>\*3</sup>

SKU	Description
R-PI30-SW-K9	Prime Infrastructure 3.0 Software
L-MGMT3X-PI-BASE	Base License

Cisco Prime Infrastructure 3.x High Availability License<sup>\*3</sup>

SKU	Description
L-MGMT3X-HA	High Availability License

Cisco Prime Infrastructure 3.x Lifecycle & Assurance License<sup>\*3</sup>

SKU	Managed Devices	QTY
L-MGMT3X-2K-K9	Cisco Catalyst 2000 Series	1
L-MGMT3X-3K-K9	Cisco Catalyst 3000 Series	1
L-MGMT3X-4K-K9	Cisco Catalyst 4000 Series	1
L-MGMT3X-6K-K9	Cisco Catalyst 6000 Series	1
L-MGMT3X-CSR1-K9	Cisco CSR 1000 Series	1
L-MGMT3X-800SR-K9	Cisco ISR 800 Series	1
L-MGMT3X-ISR1-K9	Cisco ISR 1000 Series	1
L-MGMT3X-ISR2-K9	Cisco ISR 2000 Series	1
L-MGMT3X-ISR3-K9	Cisco ISR 3000 Series	1
L-MGMT3X-ISR4-K9	Cisco ISR 4000 Series	1

SKU	Managed Devices	QTY
L-MGMT3X-ASR1K9	Cisco ASR 1000 Series	1
L-MGMT3X-AP-K9	Cisco Aironet Access Point	1
L-MGMT3X-N2K-K9	Cisco Nexus 2000 Series Fabric Extender (FEX)	1
L-MGMT3X-N3K-K9	Cisco Nexus 3000 Series	1
L-MGMT3X-N5K-K9	Cisco Nexus 5000 Series	1
L-MGMT3X-N6K-K9	Cisco Nexus 6000 Series	1
L-MGMT3X-N7K-K9	Cisco Nexus 7000 Series	1
L-MGMT3X-N93XX-K9	Cisco Nexus 9300 Series	1
L-MGMT3X-N9K-K9	Cisco Nexus 9000 Series	1

\*1 L-MSE-PAK is required. \*2 L-MSE-PAK-N is required. \*3 R-MGMT3X-N-K9 is required.

# Routers

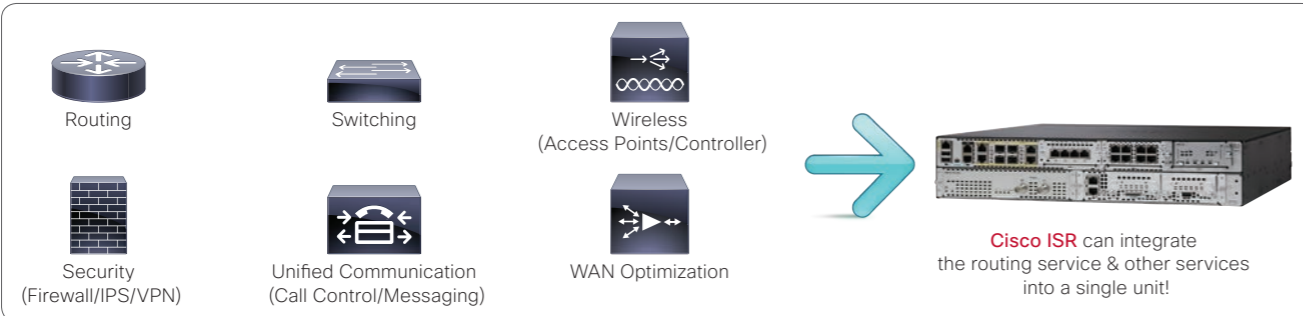
## Integrated Services Routers



### Line-up of Cisco ISR

Previously, even the small-scale bases were required to install a wide range of devices including switches, wireless access points and WAN optimization appliances. **Cisco Integrated Services Routers (ISR)** are "super routers" that are capable of integrating the network services provided by these multiple devices into a single platform. These routers are not only capable of integrating

multiple services but also have the flexibility to add new services as required via license activation and/or addition of expansion modules. Adoption of these routers results in simpler network configuration, helping to reduce the device costs as well as operation and maintenance costs.

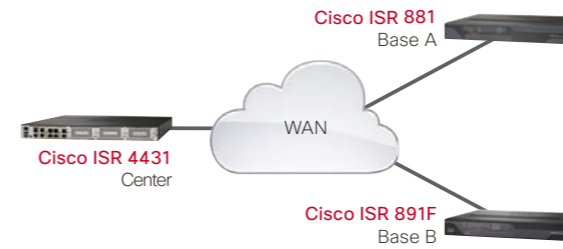


### Selection of Cisco ISR

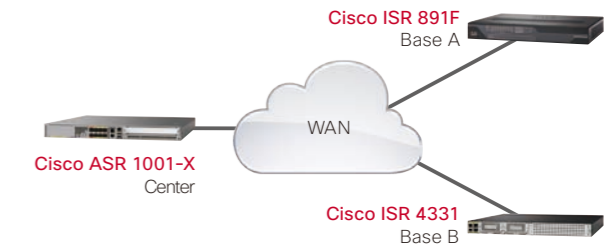
Routers with higher performance and expandability should be selected for traffic-intensive data centers than the bases. **Cisco ISR** not only allows selection of bundle models according to the services required at the data centers or bases,

but also respond flexibly to changes in the business needs by means of license activation of **Cisco IOS** technologies and addition of expansion modules.

#### Sample inter-base network configuration: small-scale network



#### Sample inter-base network configuration: Medium-scale network



### Benefits of Migrating to Cisco ISR 4000 Series

The Cisco ISR 4000 Series build on 20 years of branch-office routers, adding services and horsepower for the needs of modern branch offices and allowing businesses to:

- Quickly open new remote offices or easily add additional services
- Operate an entire branch office with a single box
- Give IT departments more time for innovation by automating repetitive tasks and orchestrating security and application services

The **Cisco ISR 4000 Series** address the problems that modern branch offices face, without giving up any of the existing services of previous-generation Cisco ISRs. It also brings virtualization to networking so that IT can adopt services faster and repurpose resources as needs change. And it delivers additional computing power for local application survivability, data backup, and local analytics processing.

The new architecture of the Cisco ISR 4000 Series delivers up to 2 Gbps in a converged platform, typically 4 to 10 times faster than the previous-generation ISRs. The WAN and application optimization services of the Cisco ISR 4000 Series include **Cisco Application Visibility and Control (AVC)**, allowing IT to assess capacity planning; and **Cisco Performance Routing Version 3 (PfR v3)**, which automatically sends traffic across the best connection for current network conditions. Not only does this architecture allow a branch office to run the network with a single box, it also allows use of that box to converge network, computing, and storage resources in the same platform. The virtualization technology available both embedded within the Cisco ISR 4000 Series and through additional data center-class server modules (**Cisco UCS E Series Servers**) offers new levels of converged capability.



#### Series Comparison

Branch Network Needs	Features	Cisco ISR 1800/2800/3800 Series	Cisco ISR 1900/2900/3900 Series	Cisco ISR 4000 Series	Benefits
Scale with high performance	Maximum throughput	Up to 50 Mbps	Up to 350 Mbps	Up to 2 Gbps	4 to 10 times performance increase for the same price as the ISR G2
	Separate data, control, and services planes	-	-	●	Minimal performance impact as network services are added and throughput increases
	Integrated service container	-	-	●	No need for additional branch appliances; add network services using pluggable virtual machines
	Integrated compute with Cisco UCS E-Series Servers	-	●	●	Local compute resources for applications, data backup, and analytics
Uncompromised user experience	Cisco IOS XE Operating System	-	-	●	Higher availability for network services with multicore processing
	Cisco Application Visibility and Control (AVC)	-	●	●	Visibility into 1000+ applications for capacity planning and prioritization
	Intelligent path selection (PfR v3)	-	●	●	Improve application experience and lower costs with path selection using real-time analytics
Security	WAN optimization (WAAS and Akamai)	-	●	●	Improve application performance and offload WAN with Layer 4-7 optimization and intelligent caching
	Sourcefire Intrusion Detection System (IDS)	-	●	●	Industry-leading advanced threat defense
	Cloud Web Security with Advanced Malware Protection (AMP)	-	●	●	Scale secure direct Internet access with consistent policy enforcement
Reduced costs and increased business agility	Multicore hardware VPN acceleration	-	-	●	High-performance encryption for secure WAN
	Pay-as-you-grow performance and services	-	-	●	Ability to buy what you need today and upgrade anytime without complete equipment upgrades
	Cisco ONE Software Suites	-	●	●	Predictable OpEx spend, license portability, and investment protection
	Intelligent WAN app with Cisco APIC Enterprise Module	-	●	●	Automated provisioning for faster deployment

High Performance & Functionality

Fixed-configuration

Modular (EHWIC/SM) \*1

Modular (NIM/SM-X) \*1

\*1 Primary expansion slots incorporated on the platform. Refer to pages 48-49 for details on the compatible expansion modules.

- Cisco ISR 800 Series
Fixed-configuration second-generation integrated services routers suitable for deployment in small-sized bases, home offices and Machine-to-Machine (M2M) environments.
➔
See page 44 for details.
- Cisco ISR 1900/2900/3900 Series
Modular second-generation integrated services routers suitable for deployment in small- to large-sized bases.
➔
See page 45 for details.
- Cisco ISR 4000 Series
Modular second-generation integrated services routers suitable for deployment in bases that require a provision of application-aware services.
➔
See page 46 for details.







Extension Module for Cisco ISR 1900/2900/3900/4000 Series (1 of 2)

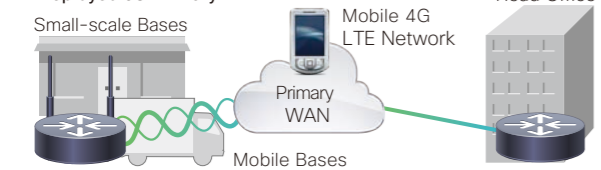
SKU	Description	Slot	Compatible Models															
			1921	1941	1941W	2901	2911	2921	2951	3925	3945	3925E	3945E	4321	4331	4351	4431	4451
EHWIC-4ESG	Gigabit EtherSwitch Module (L2, 4-port GE)	EHWIC	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-
EHWIC-4ESG-P	Gigabit EtherSwitch Module (L2, 4-port GE/PoE)	EHWIC	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-
EHWIC-D-8ESG	Gigabit EtherSwitch Module (L2, 8-port GE)	EHWIC	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-
EHWIC-D-8ESG-P	Gigabit EtherSwitch Module (L2, 8-port GE/PoE)	EHWIC	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-
SM-ES2-16-P	Enhanced EtherSwitch Module (L2, 16-port FE/GE/PoE)	SM	-	-	-	●	●	●	●	●	●	●	●	-	-	-	-	-
SM-ES2-24	Enhanced EtherSwitch Module (L2, 24-port FE/GE)	SM	-	-	-	●	●	●	●	●	●	●	●	-	-	-	-	-
SM-ES2-24-P	Enhanced EtherSwitch Module (L2, 24-port FE/GE/PoE)	SM	-	-	-	●	●	●	●	●	●	●	●	-	-	-	-	-
SM-ES3-16-P	Enhanced EtherSwitch Module (L2/L3, 16-port FE/GE/PoE)	SM	-	-	-	●	●	●	●	●	●	●	●	-	-	-	-	-
SM-ES3-24-P	Enhanced EtherSwitch Module (L2/L3, 24-port FE/GE/PoE)	SM	-	-	-	●	●	●	●	●	●	●	●	-	-	-	-	-
SM-ES3G-16-P	Enhanced EtherSwitch Module (L2/L3, 16-port GE/PoE)	SM	-	-	-	●	●	●	●	●	●	●	●	-	-	-	-	-
SM-ES3G-24-P	Enhanced EtherSwitch Module (L2/L3, 24-port GE/PoE)	SM	-	-	-	●	●	●	●	●	●	●	●	-	-	-	-	-
NIM-ES2-4	EtherSwitch Module (L2, 4-port GE)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-ES2-8	EtherSwitch Module (L2, 8-port GE)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-ES2-8-P	EtherSwitch Module (L2, 8-port GE/PoE+)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
SM-X-ES3-16-P	SM-X EtherSwitch Module (L2/L3, 16-port GE/PoE+) <sup>*1</sup>	SM	-	-	-	●	●	●	●	●	●	●	●	-	●	●	●	●
SM-X-ES3-24-P	SM-X EtherSwitch Module (L2/L3, 24-port GE/PoE+) <sup>*1</sup>	SM	-	-	-	●	●	●	●	●	●	●	●	-	●	●	●	●
SM-X-ES3D-48-P	SM-X EtherSwitch Module (L2/L3, 48-port GE/PoE+) <sup>*1</sup>	SM	-	-	-	●	●	●	●	●	●	●	●	-	●	●	●	●
EHWIC-1GE-SFP-CU	GE/SFP WAN Module (1 port)	EHWIC	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-
WIC-1B-S/T-V3	ISDN BRI Module (1-port)	EHWIC	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-
HWIC-4B-S/T	ISDN BRI Module (4-port)	EHWIC	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-
NIM-VAB-A	Multi Mode VDSL2/ADSL2/2+ (Annex A)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-VA-B	Multi Mode VDSL2/ADSL2/2+ (Annex B)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-VAB-M	Multi Mode VDSL2/ADSL2/2+ (Annex M)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-1T	Serial WAN Module (1-port)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-2T	Serial WAN Module (2-port)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-4T	Serial WAN Module (4-port)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
SM-X-1T3/E3	T3/E3 Module (1 port) <sup>*1</sup>	SM	-	-	-	●	●	●	●	●	●	●	●	-	●	●	●	●
NIM-1GE-CU-SFP	GE/SFP Module (1-port)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-2GE-CU-SFP	GE/SFP Module (2-port)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
SM-X-6X1G	GE/SFP Service Module (6-port) <sup>*1</sup>	SM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
SM-X-4X1G-1X10G	GE/SFP (4-port) or SFP+ (1-port) Service Module <sup>*1</sup>	SM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
EHWIC-4G-LTE-ST	4G LTE Wireless WAN Module for Sprint	EHWIC	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-
EHWIC-4G-LTE-VZ	4G LTE Wireless WAN Module for Verizon	EHWIC	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-
EHWIC-4G-LTE-AT	4G LTE Wireless WAN Module for AT&T	EHWIC	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-
EHWIC-4G-LTE-GB	4G LTE Wireless WAN Module for Europe	EHWIC	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-

\*1 SM-X slot is used for the Cisco ISR 4000 Series.

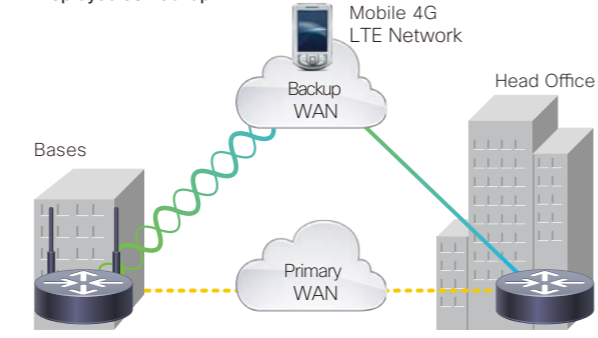
### 4G LTE Wireless WAN Solutions

Mobile 4G LTE networks can be deployed rapidly as primary or backup WAN by incorporating the **4G LTE Wireless WAN Module** on **Cisco ISR 1900/2900/3900/4000 Series**. Bandwidth can be utilized even more efficiently by using the module in combination with **Cisco Wide Area Application Services (WAAS)**.

Deployed as Primary WAN



Deployed as Backup WAN



Extension Module for Cisco ISR 1900/2900/3900/4000 Series (2 of 2)

SKU	Description	Slot	Compatible Models															
			1921	1941	1941W	2901	2911	2921	2951	3925	3945	3925E	3945E	4321	4331	4351	4431	4451
NIM-4G-LTE-GA	4G LTE Wireless WAN Module for Global	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-4G-LTE-VZ	4G LTE Wireless WAN Module for Verizon	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-4G-LTE-ST	4G LTE Wireless WAN Module for Sprint	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-4G-LTE-NA	4G LTE Wireless WAN Module for North America	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
VIC3-2FXS/DID	Voice Module (2-port FXS/DID)	EHWIC	-	-	-	●	●	●	●	●	●	●	●	-	-	-	-	-
VIC2-2BRI-NT/TE	Voice Module (2-port BRI)	EHWIC	-	-	-	●	●	●	●	●	●	●	●	-	-	-	-	-
NIM-2FXS	Voice Module (2-port FXS)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-4FXS	Voice Module (4-port FXS)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-2FXO	Voice Module (2-port FXO)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-4FXO	Voice Module (4-port FXO)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-2FXS/4FXO	Voice Module (2-port FXS and 4-port FXO)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-4E/M	Voice Module (4-port E/M)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-2BRI-NT/TE	Voice Module (2-port BRI)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-4BRI-NT/TE	Voice Module (4-port BRI)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
VVIC3-1MFT-T1/E1	Voice/WAN Module (1-port T1/E1) <sup>*2</sup>	EHWIC	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-
VVIC3-4MFT-T1/E1	Voice/WAN Module (4-port T1/E1)	EHWIC	-	-	-	●	●	●	●	●	●	●	●	-	-	-	-	-
NIM-1MFT-T1/E1	Voice/WAN Module (1-port T1/E1)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-2MFT-T1/E1	Voice/WAN Module (2-port T1/E1)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-4MFT-T1/E1	Voice/WAN Module (4-port T1/E1)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-8MFT-T1/E1	Voice/WAN Module (8-port T1/E1)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-1CE1T1-PRI	Voice/WAN Module (1-port T1/E1/G.703)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-2CE1T1-PRI	Voice/WAN Module (2-port T1/E1/G.703)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
NIM-8CE1T1-PRI	Voice/WAN Module (8-port T1/E1/G.703)	NIM	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
PVDM3-16	High-density Packet Voice/Video DSP Module (16-channel)	PVDM3	-	-	-	●	●	●	●	●	●	●	●	-	-	-	-	-
PVDM3-32	High-density Packet Voice/Video DSP Module (32-channel)	PVDM3	-	-	-	●	●	●	●	●	●	●	●	-	-	-	-	-
PVDM3-64	High-density Packet Voice/Video DSP Module (64-channel)	PVDM3	-	-	-	●	●	●	●	●	●	●	●	-	-	-	-	-
PVDM3-128	High-density Packet Voice/Video DSP Module (128-channel)	PVDM3	-	-	-	●	●	●	●	●	●	●	●	-	-	-	-	-
PVDM3-192	High-density Packet Voice/Video DSP Module (192-channel)	PVDM3	-	-	-	●	●	●	●	●	●	●	●	-	-	-	-	-
PVDM3-256	High-density Packet Voice/Video DSP Module (256-channel)	PVDM3	-	-	-	●	●	●	●	●	●	●	●	-	-	-	-	-
PVDM4-32	High-density Packet Voice/Video DSP Module (32-channel)	PVDM4 <sup>*3</sup>	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
PVDM4-64	High-density Packet Voice/Video DSP Module (64-channel)	PVDM4 <sup>*3</sup>	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
PVDM4-128	High-density Packet Voice/Video DSP Module (128-channel)	PVDM4 <sup>*3</sup>	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
PVDM4-256	High-density Packet Voice/Video DSP Module (256-channel)	PVDM4 <sup>*3</sup>	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
PVDM4-64U128	Factory Upgrade from PVDM4-64 to PVDM4-128	PVDM4 <sup>*3</sup>	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●
PVDM4-64U256	Factory Upgrade from PVDM4-64 to PVDM4-256	PVDM4 <sup>*3</sup>	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●

\*1 SM-X slot is used for the Cisco ISR 4000 Series. \*2 Cisco ISR 1900 Series only supports data communications. \*3 Also supported by a PVDM4 slot on Voice NIMs.

# Cisco Wide Area Application Services (WAAS)

## What is Cisco WAAS?

**Cisco Wide Area Application Services (WAAS)** is an effective solution for achieving optimization of inter-office WAN and application acceleration. This solution addresses the WAN-specific issues such as delays to enhance the TCP-based application performance.

### Same Level of Application Performance as LAN Connection

Cisco WAAS enables applications to be used via WAN with the same level of performance as via LAN.

- Optimized throughput: Enhances the WAN environment even further by improving the behavior of the transport protocol.
- More efficient bandwidth: Minimizes the sending/receiving of redundant data patterns using DRE (Data Redundancy Elimination) and compression technology.
- Application speedup: Achieves efficient utilization of bandwidth by eliminating delays using technologies such as read-ahead, protocol proxy and caching.

### Full Support for Citrix XenDesktop and XenApp

VDI (Virtual Desktop Infrastructure) solutions that are becoming increasingly popular to address the challenges in the fields of business flexibility and sustainability as well as compliance/security requirements. However, since the communications from a client to a virtual desktop (i.e. server) are achieved via a network, network delay and bandwidth limit need to be considered carefully (especially via WAN).

Cisco WAAS has obtained Citrix's compatibility certification for their VDI solutions Citrix XenDesktop and XenApp and delivers the following benefits.

- Enhances the virtual desktop performance on WAN by up to 70 %
- Increases the number of simultaneous Citrix client connections by up to twice without the costly upgrade of the WAN bandwidth.
- Up to 60 % reduction of the WAN bandwidth requirements
- Up to 98 % optimization of the printing via WAN
- Supports Citrix MSI (Multi Stream ICA)

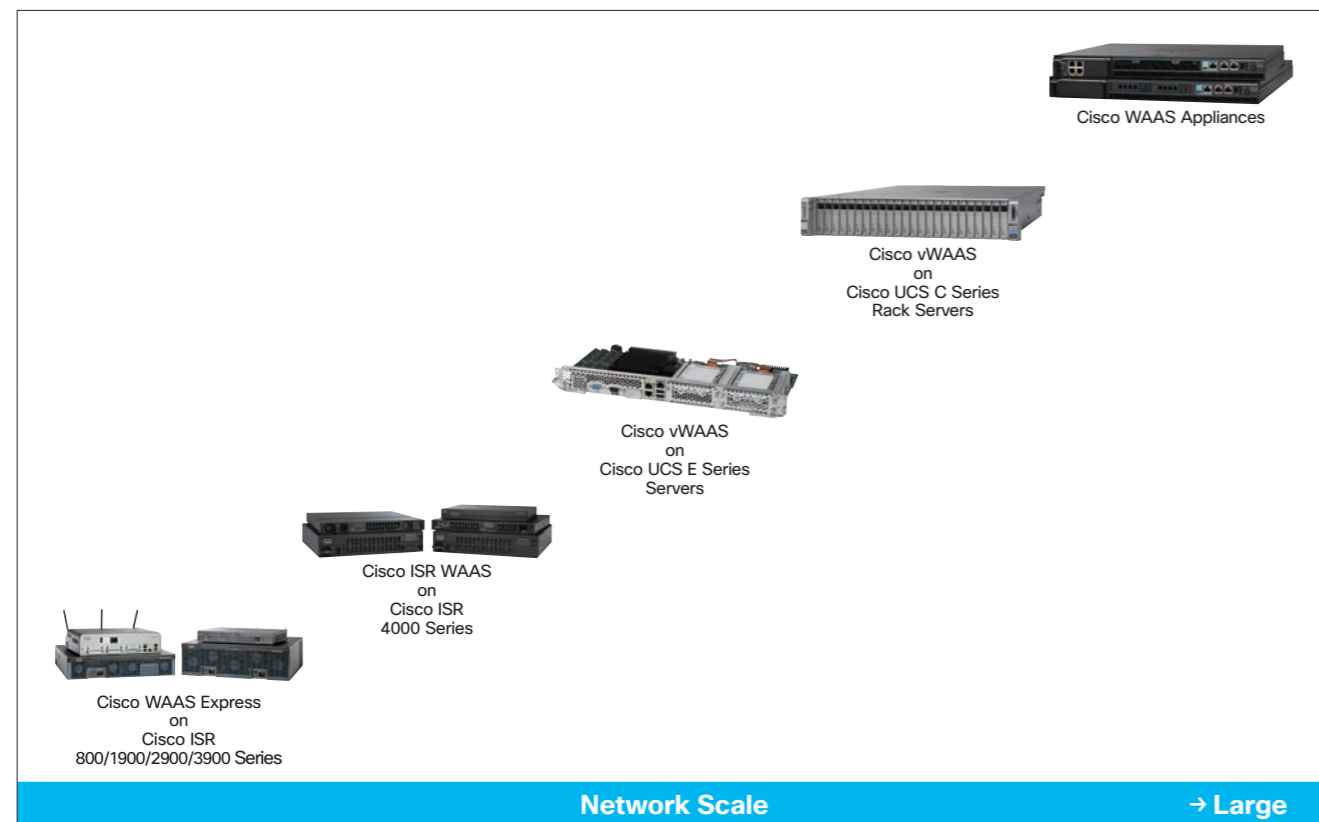
For details on **Cisco WAAS**, visit the following Web site:

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

## Cisco WAAS Product Portfolio

Cisco WAAS is available in various types to suit different purposes and scales. These products can be used to achieve WAN optimization and application

acceleration in a variety of operating environments, resulting in enhanced corporate productivity.



- Cisco WAAS Express**: Software products suitable for bases, integrated into Cisco IOS on the Cisco ISR 800/1900/2900/3900 Series, and activated by Cisco IOS Feature License or Cisco IOS APP license.
- Cisco ISR WAAS**: Software products suitable for bases or data centers/headquarters, integrated into Cisco IOS XE on the Cisco ISR 4000 Series, and activated by Cisco IOS APP License.
- Cisco vWAAS**: Software products suitable for bases or data centers/headquarters, implemented on VMware ESX/ESXi which is supported by Cisco UCS E Series Servers and Cisco UCS C Series Rack Servers.
- Cisco WAAS Appliances**: Hardware appliances suitable for bases or data centers/headquarters.

## Cisco Intelligent WAN (IWAN) with Akamai Connect

**Cisco Intelligent WAN (IWAN) with Akamai Connect** is a suite of integrated WAN optimization, application acceleration, and intelligent caching features in Cisco ISRs running Application Experience services.

The solution extends the well-known **Akamai Intelligent Platform** with HTTP caching across the last mile into the branch office, turbo charging the application optimization features of the **Cisco IWAN**. Akamai Connect caching integrates with Cisco IWAN features such as **Application Visibility and Control (AVC)**, **Cisco Performance Routing (PfR)**, and **Cisco Wide Area Application Services (WAAS)**. It is available across the **Cisco ISR** portfolio and **Cisco WAAS Appliances**, allowing you to deploy full-service branch-office operations.

Users can access bandwidth-intensive applications instantly, over any network, regardless of where the application is hosted - data center, private cloud, public cloud, or the Internet.

### Mobile Assisted Selling Application Benchmark Results in Seconds (s)

	Without Akamai Connect	With Akamai Connect 1st Hit	With Akamai Connect 2nd Hit
ERP App	57 s	18 s	2 s
Repair App	70 s	28 s	< 1 s
Catalog App	28 s	13 s	< 1 s

### Training/Digital Signage Application Benchmark Results in Pixels (p) and Seconds (s)

	Without Akamai Connect	With Akamai Connect
Default Quality	144 p	720 p (HD Automatic)
Time to Load (720 p HD)	14 s	Instant

### Cisco IWAN with Akamai Connect License

SKU	Description
SL-200-AKC	License for up to 200 WAAS connections
SL-750-AKC	License for up to 750 WAAS connections
SL-1300-AKC	License for up to 1300 WAAS connections
SL-2500-AKC	License for up to 2500 WAAS connections
SL-6K-AKC	License for up to 6000 WAAS connections

### Cisco WAAS Specification Comparison

Series Name	SKU/Platform	WAN Bandwidth (Max)	TCP Optimized Connections (Max)	WAN Optimization	App Speedup	AppNav	Central Manager Mode Managed Devices
Cisco WAAS Express	L-FL-C880-WAASX <sup>*1</sup>	1.5 Mbps	75	●	-	-	-
	L-FL-C890-WAASX <sup>*1</sup>	2 Mbps	75	●	-	-	-
	L-FL-C1941-WAASX <sup>*1</sup>	4 Mbps	150	●	-	-	-
	L-FL-C2901-WAASX <sup>*1</sup>	6 Mbps	150	●	-	-	-
	L-FL-C2911-WAASX <sup>*1</sup>	6 Mbps	200	●	-	-	-
	L-FL-C2921-WAASX <sup>*1</sup>	6 Mbps	200	●	-	-	-
	L-FL-C2951-WAASX <sup>*1</sup>	6 Mbps	200	●	-	-	-
Cisco ISR WAAS	Cisco 4321	15 Mbps	200	●	●	●	-
	Cisco 4331	25 Mbps	750	●	●	●	-
	Cisco 4351	25 Mbps	750	●	●	●	-
	Cisco 4431	50 Mbps	1,300	●	●	●	-
	Cisco 4451	150 Mbps	2,500	●	●	●	-
Cisco vWAAS	LIC-200-VWAAS	20 Mbps	200	●	●	-	-
	LIC-750-VWAAS	50 Mbps	750	●	●	-	-
	LIC-1300-VWAAS	80 Mbps	1,300	●	●	-	-
	LIC-2500-VWAAS	150 Mbps	2,500	●	●	-	-
	LIC-6K-VWAAS	200 Mbps	6,000	●	●	-	-
	LIC-12K-VWAAS	310 Mbps	12,000	●	●	-	-
Cisco WAAS Appliances	WAVE-294-K9	4 GB Memory	10 Mbps	200	●	●	250 (200) <sup>*7</sup>
		8 GB Memory <sup>*2</sup>	20 Mbps	400	●	●	250 (200) <sup>*7</sup>
	WAVE-594-K9	8 GB Memory	50 Mbps	750	●	●	1,000 (800) <sup>*7</sup>
		12 GB Memory <sup>*3</sup>	100 Mbps	1,300	●	●	1,000 (800) <sup>*7</sup>
	WAVE-694-K9	16 GB Memory	200 Mbps	2,500	●	●	2,000 (2,000) <sup>*7</sup>
		24 GB Memory <sup>*4</sup>	200 Mbps	6,000	●	●	2,000 (2,000) <sup>*7</sup>

### Modules for Cisco Wide Area Application Services (WAAS) Appliance

SKU	Description	GE Ports	SFP Ports
WAVE-INLN-GE-4T	GE Module for the Cisco WAAS Appliances <sup>*9</sup>	4	-
WAVE-INLN-GE-8T	GE Module for the Cisco WAAS Appliances	8	-
WAVE-INLN-GE-4SX	SFP Module for the Cisco WAAS Appliances	-	4
WAVE-APNV-GE-12T	AppNav GE Module for the Cisco WAVE 694 WAAS Appliances	12	-
WAVE-APNV-GE-12SFP	AppNav SFP Module for the Cisco WAVE 694 WAAS Appliances	-	12

### Cisco WAAS Central Manager

**Cisco WAAS Central Manager** is a mandatory management tool for all Cisco WAAS implementations. Generally, Cisco WAAS Central Manager is either implemented to a single Cisco WAAS Appliance in the data center or headquarters accommodating the data and application servers, or as Cisco Virtual WAAS (vWAAS) on the VMware ESX/ESXi server. Cisco WAAS Central Manager can be used to centrally manage a wide range of Cisco WAAS devices distributed across multiple bases, including the Cisco

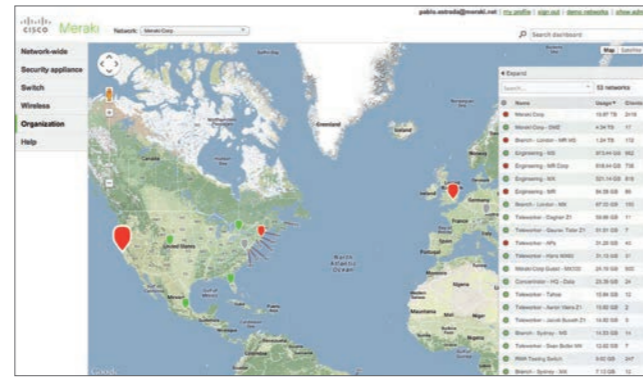
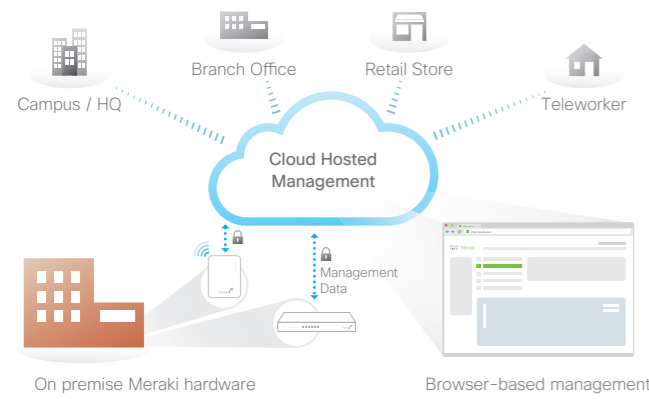
800/1900/2900/3900 Series with activated Cisco WAAS Express, Cisco ISR 4000 Series with activated Cisco ISR WAAS, and Cisco WAAS Appliances, and so on. An intuitive GUI provides access to functions such as deployment and real-time monitoring of Cisco WAAS devices, fault management and logging, as well as the custom reporting function for creating scheduled reports for up to 2,500 Cisco WAAS devices in the Cisco WAAS topology.

<sup>\*1</sup> Maximum DRAM supported by the platform is required. <sup>\*2</sup> MEM-294-8GB is required. <sup>\*3</sup> MEM-594-12GB is required. <sup>\*4</sup> MEM-694-24GB is required. <sup>\*5</sup> Cisco AppNav 10 GE Bundle (WAVE-APNV-10GE) is required. <sup>\*6</sup> Cisco AppNav GE or SFP Module is required. <sup>\*7</sup> Performance indicators based on Cisco WAAS software release 5.1. <sup>\*8</sup> The maximum number of managed devices is reduced by 20 % in an environment containing routers equipped with Cisco WAAS Express. <sup>\*9</sup> Incorporated on WAVE-294-K9 by default.

### 100% Cloud Managed Networking

The Cisco Meraki portfolio of networking devices are centrally managed from the cloud. This feature-rich, easy-to-use cloud architecture enables customers to solve new business problems and reduce operating costs.

- Manage entire network from a single dashboard
- Control users, applications, and devices
- No controller hardware or management software to install and maintain
- Secure (PCI and HIPAA-compliant) cloud infrastructure
- Scales from small sites to million-user deployments



### Cisco Meraki Cloud Managed Products



#### Cloud Managed Wireless

- Indoor and outdoor access point models
- IEEE 802.11ac and 802.11n with ultra-high performance, up to 1.9 Gbps
- Integrated wireless security and guest access
- Third radio dedicated to security and RF optimization (indoor models)
- Ideal for high-density campuses, branches, teleworkers, and rugged/outdoor environments
- Built-in traffic shaping, location analytics, group policies—all configurable with just a few mouse clicks

#### Cloud Managed Switches

- GE access switches and 10 GE aggregation switches
- Centrally managed with monitoring and alerts
- Ultra reliable and includes lifetime warranty
- Optimized for voice and video traffic with PoE available on all ports

#### Cloud Managed Security Appliances

- Complete networking, security, and application control
- Centrally managed from the cloud
- Includes firewall, auto VPN, WAN optimization, and branch routing
- Six models scale from small branches to campuses

#### Mobility Management

- Network-wide visibility and control
- No on-site controller hardware
- Automatic monitoring and alerts
- Seamless over-the-web upgrades

For details on Cisco Meraki, visit the following Web site:

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

### Mobility Management Promotion

Meraki Systems Manager provides cloud-based over-the-air centralized management, diagnostics, monitoring, and security of the mobile devices managed by your organization. Manage distributed deployments of all of your devices with Systems Manager – without an on-site appliance. Managed devices connect securely to

Meraki's cloud, enabling you to locate devices, deploy software and apps, deliver content, enforce security policies, and monitor all your devices through an intuitive and powerful web-based dashboard.



Receive up to 100 devices of Meraki EMM for free with any Cisco purchase

No license required until network reaches 100+ devices, then licenses are required per device



### Use Cases

#### Features Most Used by Our Customers

	Retail	Education	Corporate Office
<b>MX Security</b>	Site-to-Site VPN	Content Filtering	IPS with Sourcefire
<b>MS Switching</b>	Cloning Configurations	Virtual Stacking	Layer 3 and Redundancy
<b>MR Wireless</b>	Cloud CMX Analytics	High-Density WiFi	BYOD Policies
<b>SM Mobility</b>	Tablet Management	Application Management	Security Policy Enforcement

#### Retail Customers

From guest WiFi to line busting and inventory management, Meraki's cloud-managed networking lowers operational costs and improves customer experience. Customer Stories:

- Sealanes
- E la Carte
- BQ
- Ironman Asia Pacific
- Neinver
- Psychogios Publications
- SternPartner GmbH & Co. KG
- Clint Newell Auto Group
- Tommy Bahama
- Rocky Mountain Chocolate Factory Canada
- Ben Bridge Jeweler
- Hydroscand AB
- Peet's Coffee & Tea
- Westfield Malls
- Francesco Smalto

#### Education Customers

##### Higher Education

Meraki's cloud networking platform is the solution of choice for higher education campuses, delivering superior performance, reliability, management, and cost savings to leading universities. Customer Stories:

- Study Group
- Hautes études d'ingénieur (HEI)
- Albany State University
- MIT
- Stanford University
- City College of San Francisco

##### K-12 Education

Meraki's cloud networking solution is ideal for large districts and independent schools alike, providing performance and manageability at a fraction of the cost and complexity of traditional solutions. Customer Stories:

- Schalmont Central School District
- Hills Educational Foundation
- Avenues: The World School
- Region 9 Education Service Center

#### Other Customers

##### Healthcare

Meraki's HIPAA-compliant cloud networking solutions are ideal for enabling mobile healthcare applications, as well as Internet access for patients and visitors, on a single, easy to manage platform. Customer Stories:

- Infors HT
- Zürcher Höhenkliniken Wald und Davos
- Kindred Healthcare
- Montefiore Medical Center
- Talbert House
- Mosaic
- EPIC Management

##### Industrial/Manufacturing

Meraki's self-optimizing wireless and ruggedized hardware provide reliable connectivity in even the least forgiving environments. Customer Stories:

- Sealanes
- BQ
- Infors HT
- Cardno
- Hydroscand AB
- ERG S.p.A.
- Saxon Energy Services
- Columbia Steel
- Safety Kleen

##### Architecture/Construction

Meraki networks are designed for rapid, zero-touch deployments without on-site IT. Cloud based multi-site / remote management tools make Meraki ideal for distributed, remote, and dynamic environments. Customer Stories:

- Cardno
- Pennoni Associates Inc.
- Sullivan & McLaughlin
- C&S Companies
- ZGF Architects
- Clune Construction

##### Hospitality and Tourism

Meraki's cloud networking solution provides reliable, cost-effective, and centrally managed networking that is easy for hotel employees and problem free for guests. Customer Stories:

- Hoteles Center
- bluegr Hotels & Resorts
- The Field Museum
- eTravel
- Friedrichstadt-Palast
- Hafen Hamburg & Empire Riverside Hotel

##### Event Venues

Meraki's plug and play deployment, application traffic shaping, and high-capacity networks are ideal for events of all sizes. Customer Stories:

- Ironman Asia Pacific
- Eastview Church
- The National Gallery
- Monterey Jazz Festival
- ClueCon
- Capital FM Arena

For details on Cisco Meraki Customer Stories, visit the following Web site:

<https://meraki.cisco.com/customers>

## Cloud Managed Wireless

### ■ Cisco Meraki MR Cloud Managed Wireless Access Points

Model	Indoor Access Points			
	MR18	MR32	MR34	MR42 <small>NEW</small>
Radios Specification	1 x 11b/g/n radio 1 x 11a/n radio	1 x 11b/g/n radio 1 x 11a/n/ac radio 1 x Bluetooth Low Energy radio	1 x 11b/g/n radio 1 x 11a/n/ac radio	1 x 11b/g/n radio 1 x 11a/n/ac Wave 2 radio 1 x Bluetooth Low Energy radio
11n and 11ac Capabilities	2 x 2 MIMO 2 streams	2 x 2 MIMO 2 streams	3 x 3 MIMO 3 streams	3 x 3 SU/MU-MIMO 3 streams
Max Data Rate	600 Mbps	1.2 Gbps	1.75 Gbps	1.9 Gbps
Interface	1 x GE	1 x GE	1 x GE	1 x GE

Model	Outdoor Access Points	
	MR66	MR72
Radios Specification	1 x 11b/g/n radio 1 x 11a/n radio	1 x 11b/g/n radio 1 x 11a/n/ac radio 1 x Bluetooth Low Energy radio
11n and 11ac Capabilities	2 x 2 MIMO 2 streams	2 x 2 MIMO 2 streams
Max Data Rate	600 Mbps	1.2 Gbps
Interface	1 x GE	1 x GE

**MR42 NEW**



- 3-stream 11ac Wave 2, up to 1.9 Gbps
- Dual-concurrent radios with MU-MIMO support

## Cloud Managed Switches

### ■ Cisco Meraki MS Cloud Managed Switches

Model	Layer 2 Access Switches			Layer 3 Access Switches			
	MS220-8 MS220-8P	MS220-24 MS220-24P	MS220-48 MS220-48LP MS220-48FP	MS320-24 MS320-24P	MS320-48 MS320-48LP MS320-48FP	MS350-24 MS350-24P	MS350-48 MS350-48LP MS350-48FP
Downlinks	8 x GE	24 x GE	48 x GE	24 x GE	48 x GE	24 x GE	48 x GE
Uplinks	2 x SFP	4 x SFP	4 x SFP	4 x SFP/SFP+	4 x SFP/SFP+	4 x SFP/SFP+	4 x SFP/SFP+
Stacking	Virtual	Virtual	Virtual	Virtual	Virtual	Virtual + Physical	Virtual + Physical
PoE/PoE+ Power Budget	124 W (-8P)	370 W (-24P)	370 W (-48LP) 740 W (-48FP)	370 W (-24P)	370 W (-48LP) 740 W (-48FP)	370 W (-24P)	370 W (-48LP) 740 W (-48FP)
Switching Capacity	20 Gbps	48 Gbps	104 Gbps	128 Gbps	176 Gbps	128 Gbps	176 Gbps

Model	Aggregation Switches			
	MS410-16 <small>NEW</small>	MS410-32 <small>NEW</small>	MS420-24	MS420-48
Downlinks	16 x SFP	32 x SFP	24 x SFP/SFP+	48 x SFP/SFP+
Uplinks	2 x SFP/SFP+	4 x SFP/SFP+	-	-
Stacking	Virtual + Physical	Virtual + Physical	Virtual	Virtual
PoE/PoE+ Power Budget	-	-	-	-
Switching Capacity	72 Gbps	144 Gbps	480 Gbps	960 Gbps

**MS410-16/MS410-32 NEW**



- 16 or 32 x SFP interfaces
- Physical stacking up to 8 units

## Cloud Managed Security Appliances

### ■ Cisco Meraki MX Cloud Managed Security Appliance Series

Model	Small Branch				Medium Branch	
	MX64	MX64W	MX65 <small>NEW</small>	MX65W <small>NEW</small>	MX84	MX100
Recommended Max Users	50	50	50	50	200	500
Stateful Firewall Throughput	200 Mbps	200 Mbps	200 Mbps	200 Mbps	500 Mbps	750 Mbps
Advanced Security Throughput	80 Mbps	80 Mbps	80 Mbps	80 Mbps	200 Mbps	600 Mbps
Maximum VPN sessions	25	25	25	25	100	250
Interfaces	5 x GE	5 x GE	12 x GE (2 PoE+)	12 x GE (2 PoE+)	10 x GE 2 x SFP	9 x GE 2 x SFP
Wireless	-	1 x 11b/g/n radio 1 x 11a/n/ac radio 2 x 2 MIMO 2 streams 1.2 Gbps	-	1 x 11b/g/n radio 1 x 11a/n/ac radio 2 x 2 MIMO 2 streams 1.2 Gbps	-	-

Model	Large Branch, Campus / Concentrator	
	MX400	MX600
Recommended Max Users	2,000	10,000
Stateful Firewall Throughput	1 Gbps	1 Gbps
Advanced Security Throughput	1 Gbps	1 Gbps
Maximum VPN sessions	1,000	5,000
Interfaces	4 x GE	4 x GE
Wireless	-	-

**MX65/MX65W NEW**



- 10 x GE LAN including 2 PoE+, and 2 x GE WAN
- 2-stream 11ac, up to 1.2 Gbps (MX65W)

Switches

Wireless

Routers

Meraki

Small Business

Services

Meraki



## Cisco Small Business 500 Series Stackable Managed Switches/Cisco Small Business 550X Series Stackable Managed Switches

New Model Name	Existing Model Name	Orderable SKU	Ports						PoE		PoE Input Ports	AC Power	Fan less	Stack able	Rack Mount	
			FE	GE	SFP	GE/SFP	10 GB-T	SFP+	10GB-T/SFP+	Ports						Power Budget
SF500-24	n/a	SF500-24-K9-xx	24	-	2	2	-	-	-	-	-	Internal	●	●	1 RU	
SF500-24P	n/a	SF500-24P-K9-xx	24	-	2	2	-	-	-	-	24	180 W	af/at	-	●	1 RU
SF500-24MP	n/a	SF500-24MP-K9-xx	24	-	2	2	-	-	-	-	24	375 W	af/at	-	●	1 RU
SF500-48	n/a	SF500-48-K9-xx	48	-	2	2	-	-	-	-	-	-	Internal	●	●	1 RU
SF500-48P	n/a	SF500-48P-K9-xx	48	-	2	2	-	-	-	-	48	375 W	af/at	-	●	1 RU
SF500-48MP	n/a	SF500-48MP-K9-xx	48	-	2	2	-	-	-	-	48	740 W	af/at	-	●	1 RU
SG500-28	n/a	SG500-28-K9-xx	-	24	2	2	-	-	-	-	-	-	Internal	●	●	1 RU
SG500-28P	n/a	SG500-28P-K9-xx	-	24	2	2	-	-	-	-	24	180 W	af/at	-	●	1 RU
SG500-28MP	n/a	SG500-28MP-K9-xx	-	24	2	2	-	-	-	-	24	740 W	af/at	-	●	1 RU
SG500-52	n/a	SG500-52-K9-xx	-	48	2	2	-	-	-	-	-	-	Internal	●	●	1 RU
SG500-52P	n/a	SG500-52P-K9-xx	-	48	2	2	-	-	-	-	48	375 W	af/at	-	●	1 RU
SG500-52MP	n/a	SG500-52MP-K9-xx	-	48	2	2	-	-	-	-	48	740 W	af/at	-	●	1 RU
SG500X-24	n/a	SG500X-24-K9-xx	-	24	-	-	-	4	-	-	-	-	Internal	-	●	1 RU
SG500X-24P	n/a	SG500X-24P-K9-xx	-	24	-	-	-	4	-	-	24	375 W	af/at	-	●	1 RU
SG500X-24MP	n/a	SG500X-24MP-K9-xx	-	24	-	-	-	4	-	-	24	740 W	af/at	-	●	1 RU
SG500X-48	n/a	SG500X-48-K9-xx	-	48	-	-	-	4	-	-	-	-	Internal	-	●	1 RU
SG500X-48P	n/a	SG500X-48P-K9-xx	-	48	-	-	-	4	-	-	48	375 W	af/at	-	●	1 RU
SG500X-48MP	n/a	SG500X-48MP-K9-xx	-	48	-	-	-	4	-	-	48	740 W	af/at	-	●	1 RU
SG500XG-8F8T	n/a	SG500XG-8F8T-K9-xx	-	-	-	-	8	8	-	-	-	-	Internal	-	●	1 RU
SG550XG-8F8T	n/a	SG550XG-8F8T-K9-xx	-	-	-	-	8	8	-	-	-	-	Internal	-	●	1 RU
SG550XG-24T	n/a	SG550XG-24T-xx	-	-	-	-	22	2	-	-	-	-	Internal	-	●	1 RU
SG550XG-24F	n/a	SG550XG-24F-xx	-	-	-	-	22	2	-	-	-	-	Internal	-	●	1 RU
SG550XG-48T	n/a	SG550XG-48T-K9-xx	-	-	-	-	46	-	2	-	-	-	Internal	-	●	1 RU

## Cisco SFP/SFP+ Transceivers

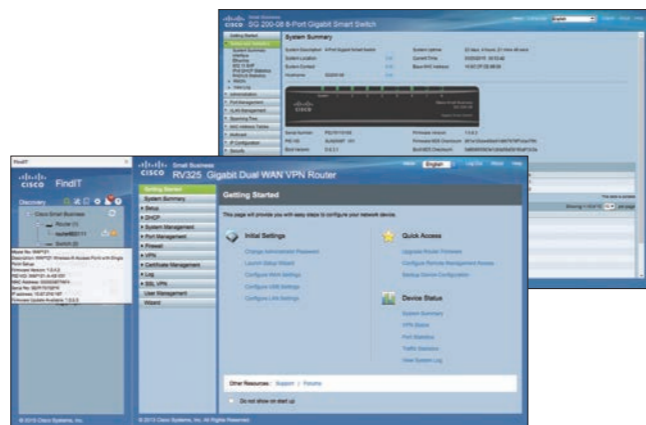
SKU	Description
MFEFX1	100Base-FX SFP transceiver, for multi-mode fiber, 1310 nm wavelength, support up to 2 km
MFELX1	100Base-LX SFP transceiver, for single-mode fiber, 1310 nm wavelength, support up to 15 km
MFBX1	100Base-BX-20U SFP transceiver for single-mode fiber, 1310 nm wavelength, support up to 20 km
MGBT1	100BASE-T SFP transceiver, for Category 5 copper wire, support up to 100 m
MGBSX1	100BASE-SX SFP transceiver, for multi-mode fiber, 850 nm wavelength, support up to 500 m
MGBLX1	100BASE-LX SFP transceiver, for single-mode fiber, 1310 nm wavelength, support up to 10 km
MGBLH1	100BASE-LH SFP transceiver, for single-mode fiber, 1310 nm wavelength, support up to 40 km
MGBBX1	100BASE-BX-20U SFP transceiver, for single-mode fiber, 1310 nm wavelength, support up to 10 km
SFP-H10GB-CU1M, SFP-H10GB-CU3M, SFP-H10GB-CU5M	10GBASE-CU SFP transceiver, for Twinax cable, support up to 1, 3, 5 m
SFP-10G-SR	10GBASE-SR SFP+ transceiver, for multi-mode fiber, 850 nm wavelength, support up to 400 m
SFP-10G-LR	10GBASE-LR SFP+ transceiver, for single-mode fiber, 1310 nm wavelength, support up to 10 km
SFP-10G-LRM	10GBASE-LRM SFP+ transceiver, for multi-mode fiber and single-mode fiber, 1310 nm wavelength, support up to 300 m

## Simple Configuration and Management

Cisco Small Business Products are designed to be configured and managed by small businesses, they include an embedded web-based configuration utility. Their simple graphical user interfaces (GUIs) help your staff easily configure, manage, and troubleshoot your network. (Cisco Small Business 95/110 Series Unmanaged Switches are ready to use right out of the box, there is no software to install and nothing to configure.)

## Cisco FindIT Network Discovery Utility

Easily integrated with your web browser, the Cisco FindIT Network Discovery Utility automatically discovers any Cisco Small Business devices in your network, and allows you to easily view important information about the device or to connect to the device administration interface. You will also be notified of the availability of firmware updates, and about any devices that are no longer under warranty or covered by a support contract.



## What is Meant by a "xx" &amp; "x" Included in the SKU

Correspondence table of symbols and countries of the "xx" & "x" that is included in the SKU is as follows.

	Australia	China	Hong Kong	India	Indonesia	Korea	Malaysia	New Zealand	Philippines	Singapore	Thailand	Vietnam
xx	AU	CN	SG	AS	AS	G5	G5	AU	AS	G5	AS	AS
			UK	G5	G5	KR	SG		EU	SG	EU	EU
							UK		G5	UK	G5	G5
x	A	C	A	A	C	C	C	A	A	A	E	E
	E		C	C	E	K	E	E	C	C		
			E	E	E	WE	E	A	E	E		

## Cisco Small Business Wireless Access Points

## Positioning Map

Cisco Small Business Wireless Access Points combine business-class features with the reliability and performance needed for small business networks. The Single

Point Setup (SPS) feature makes deployment of multiple access point easy and cost effective.



## Cisco Small Business Wireless Access Points

New SKU	Existing SKU	Wireless Data Rate	Active Users per Radio	IEEE 802					2.4 GHz	5 GHz	Con-current Radios	Ports		PoE Ports		AC Power
				11a	11b	11g	11n	11ac				FE	GE	Input	Output	
WAP121-x-K9-xx	n/a	300 Mbps	16	-	●	●	●	●	-	●	-	1	-	1 <sup>1</sup>	-	External
WAP131-x-K9-xx	WAP4410N-xx	300 Mbps	16	●	●	●	●	-	●	-	-	1	1 <sup>1</sup>	-	-	External
WAP321-x-K9	n/a	300 Mbps	32	●	●	●	●	-	●	-	-	1	1 <sup>2</sup>	-	-	External
WAP351-x-K9	n/a	300 Mbps	32	●	●	●	●	-	●	-	-	5	1 <sup>2</sup>	1	-	External
WAP371-x-K9	n/a	1299 Mbps	32	●	●	●	●	●	●	-	-	1	1 <sup>2</sup>	-	-	External
WAP511-x-K9	n/a	450 Mbps	32	●	●	●	●	-	●	-	-	1	1 <sup>2</sup>	-	-	-
WAP561-x-K9	n/a	450 Mbps	32	●	●	●	●	-	●	-	-	1	1 <sup>2</sup>	-	-	-

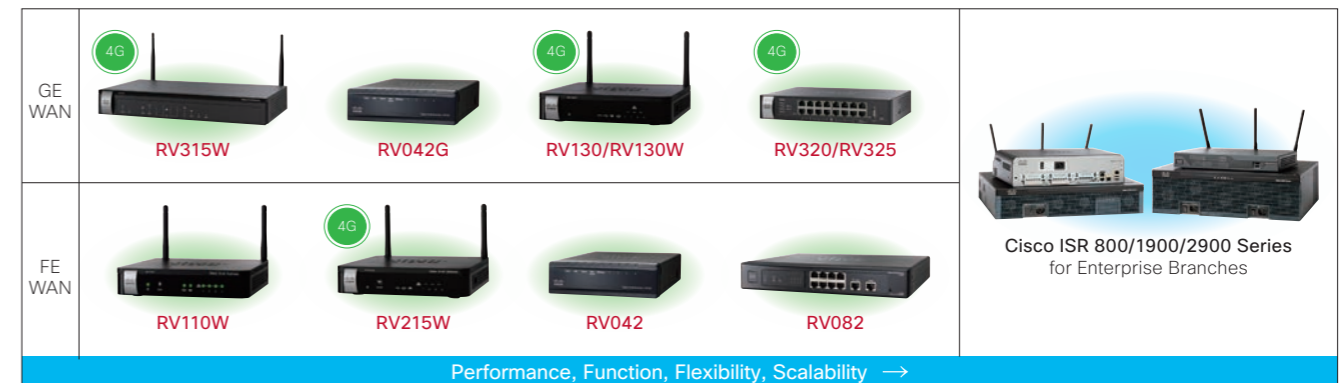
\*1 Power Adapter (included) or Power Injector is required when not using PoE receiving. \*2 Power Adapter or Power Injector is required when not using PoE receiving.

## Cisco Small Business Routers

## Positioning Map

Cisco Small Business Routers are affordable, highly secure network access devices, designed and built for small businesses. Cisco offers a broad range of small business

routers to meet any requirement from basic Internet connectivity to high-capacity, business-critical networking.



## Cisco Small Business RV Series Routers

New SKU	Existing SKU	WAN Ports			LAN Ports		IPsec Throughput	IPsec VPN Tunnels			IEEE 802			2.4 GHz	AC Power
		FE	GE	3G/4G	FE	GE		Site-to-Site	Remote Access	11b	11g	11n			
CVR100W-x-K9-xx	n/a	1	-	-	4	-	5 Mbps	1	3	-	-	-	-	External	
RV042	n/a	2	-	-	4	-	59 Mbps	50	50	-	-	-	-	External	
RV042G-K9-xx	n/a	-	2	-	-	4	75 Mbps	50	50	-	-	-	-	External	
RV082	n/a	2	-	-	8	-	97 Mbps	100	50	-	-	-	-	Internal	
RV110W-x-xx-K9	n/a	1	-	-	4	-	5 Mbps	1	5	●	●	●	●	External	
RV130-K9-xx	RV180-K9-xx	-	1	1 <sup>1</sup>	-	4	50 Mbps	10	10	-	-	-	-	External	
RV130W-x-K9-xx	RV120W-x-xx RV180W-x-K9-xx	-	1	1 <sup>1</sup>	-	4	50 Mbps	10	10	●	●	●	●	External	
RV215W-x-K9-xx	n/a	1	-	1 <sup>1</sup>	4	-	5 Mbps	1	5	●	●	●	●	External	
RV315W-x-K9-xx	n/a	-	2	1 <sup>1</sup>	8	-	100 Mbps	50	50	●	●	●	●	External	
RV320-K9-xx	n/a	-	2	1 <sup>1</sup>	-	4	100 Mbps	25	25	-	-	-	-	External	
RV325-K9-xx	n/a	-	2	1 <sup>1</sup>	-	14	100 Mbps	25	25	-	-	-	-	External	

\*1 3G/4G modem is required.

# Cisco Low-end Product Series Comparison

## Switches

### Catalyst 2960-X Series Switches

- 24- & 48-port GE, 24- & 48-port GE with 10 GE models and PoE options
- Enable scalable, secure and energy-efficient business operations with intelligent services and a range of advanced Cisco IOS software features
- Cisco FlexStack Plus for stacking of up to 8 switches with 80 Gbps of stack throughput (optional)



### 500/550X Series Stackable Managed Switches

- 24- & 48-port FE, 28- & 52-port GE, 24- & 48-port GE with 10 GE, 16- to 48-port 10 GE models and PoE+ options
- Advanced QoS, security, EEE, IPv6 support, and L3 switching
- True stacking of up to 8 switches
- Recommended models: SF500-24, SG500-28, SG500-28P



### 300/350X Series Managed/Stackable Managed Switches

- 8- to 48-port FE, 10- to 52-port GE, 12- to 48-port 10 GE models and PoE+ options
- Enhanced QoS, security, EEE, IPv6 support, and L3 switching
- True stacking of up to 4 switches
- Recommended models: SG300-10, SG300-10MPP, SG300-28



### 200/220 Series Smart/Smart Plus Switches

- 24- & 48-port FE and 8- to 50-port GE models with PoE+ options
- Basic QoS, security, EEE and IPv6 support
- Recommended models: SF200-24, SG200-08, SG200-26



### 95/110 Series Unmanaged Switches

- 5- to 24-port FE and GE models with PoE+ options
- No configuration or management required
- QoS and Energy Efficient Ethernet (EEE) on all models and energy-efficient design on GE models
- Recommended models: SF95-24, SG95D-08, SG95-24



Function, Flexibility, Scalability →

## Wireless Access Points

### Aironet Access Points

- IEEE 802.11 a/b/g/n/ac (Aironet 1700/1830/1850/2700/3700)
- 2.4 and 5 GHz
- The fourth antenna provides exceptional performance compared to other IEEE 802.11ac solutions (Aironet 2700/3700)
- Available in highly secure, enterprise-scale Controller-based mode, or Standalone mode



### 500 Series Wireless Access Points

- IEEE 802.11 a/b/g/n
- 2.4 or 5 GHz (WAP551), 2.4 and 5 GHz (WAP561)
- Up to 450 Mbps with 3 x 3 MIMO
- Manage up to 16 APs in a cluster



### 300 Series Wireless Access Points

- IEEE 802.11 a/b/g/n (WAP321/WAP351), IEEE 802.11 a/b/g/n/ac (WAP371)
- 2.4 or 5 GHz (WAP321), 2.4 and 5 GHz (WAP351/WAP371)
- Up to 300 Mbps with 2 x 3 MIMO (WAP321/WAP351\*), up to 1.3 Gbps with 3 x 3 MIMO (WAP371\*\*)
- Manage up to 8 APs in a cluster



### 100 Series Wireless Access Points

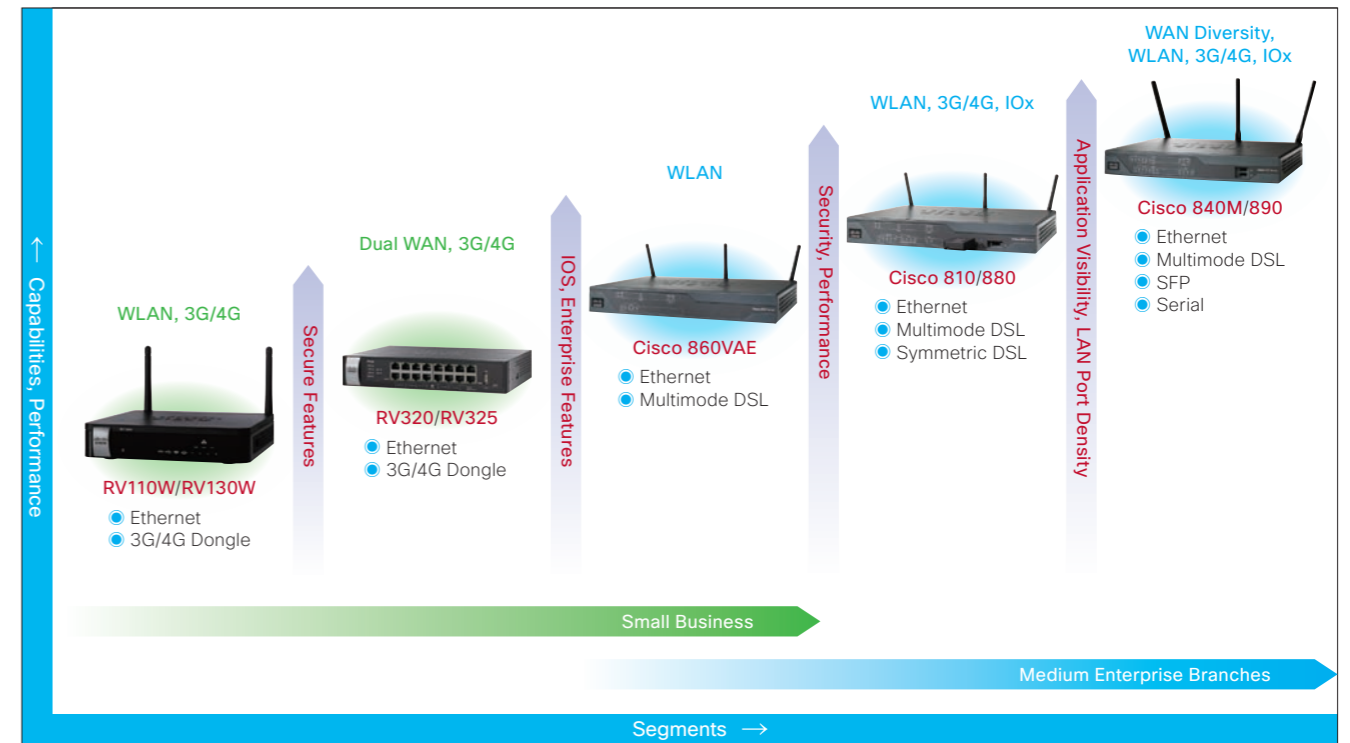
- IEEE 802.11 b/g/n
- 2.4 GHz (WAP121), 2.4 and 5 GHz (WAP131)
- Up to 300 Mbps with 2 x 2 MIMO
- Manage up to 4 APs in a cluster



Function, Flexibility, Scalability →

\*1 2 x 2 MIMO (5 GHz). \*2 2 x 2 MIMO (2.4 GHz).

## Routers



### Low End Routers Specification Comparison

	RV110W/215W	RV130/130W	RV320/325	Cisco 860VAE	Cisco 810	Cisco 880	Cisco 840M	Cisco 890
Multiple Active WAN Interfaces	1 FE + 4G Dongle	1 GE + 4G Dongle	2 GE + 4G Dongle	-	GE + 4G	FE/xDSL + 4G	GE/GE	GE/SFP + GE + xDSL + 4G
FE/GE WAN	1 FE	1 GE	2 GE	1 GE	1 GE	1 FE	2 GE	1 FE (891F), 1 GE (892FSP)
GE SFP	-	-	-	-	-	-	-	1
Switch Ports	4	4	4/14	5 (4 + 1)	4	4	4 or 8	8 or 24
POE	-	-	-	1	-	2	-	4 or 8
VDSL2/ADSL2 G.SHDSL (ATM/EFM)	-	-	-	Yes	-	886VA, 887VA	-	896VA, 897VA
WWAN	4G Dongle (RV215W)	4G Dongle (RV130W)	4G Dongle	-	HSPA, EVDO, HSPA+, 4G LTE	HSPA, EVDO, HSPA+, 4G LTE	EVDO, HSPA	4G LTE
IEEE 802.11n	2.4 GHz	2.4 GHz (RV130W)	-	2.4 GHz	2.4 GHz/5 GHz	2.4 GHz/5 GHz	-	2.4 GHz/5 GHz
WLAN Deployment Modes	Standalone	Standalone	Standalone	Standalone	Standalone, Controller-based	Standalone, Controller-based	-	Standalone, Controller-based
Serial	-	-	-	-	-	-	Optional	-
T1, ISDN, V.92	-	-	-	-	-	ISDN	-	ISDN & V.92
Compute	-	-	-	-	-	IOx	IOx	IOx
Voice Interfaces	-	-	-	-	-	Select Models	-	-
Warranty	LLW	LLW	LLW	1 Year	1 Year	1 Year	1 Year	1 Year
Typical Lifecycle	3 Years	3 Years	3 Years	5 Years	5 Years	5 Years	5 Years	5 Years
OS	Linux	Linux	Linux	IOS	IOS	IOS	IOS	IOS
Routing Features	Static, RIP	Static, RIP	Static, RIP	Static, RIP, BGP	Static, RIP, BGP, OSPF, EIGRP	Static, RIP, BGP, OSPF, EIGRP	Static, RIP, BGP, OSPF, EIGRP	Static, RIP, BGP, OSPF, EIGRP
PPPoX	PPPoE	PPPoE	PPPoE	●	●	●	●	●
Firewall	Layer 4 FW	Layer 4 FW	Layer 4 FW	Layer 4 FW	Layer 4 FW	Layer 4 FW	Layer 4 FW	Layer 4 FW
VPN	Site to Site (IPsec), Remote Access (PPTP)	Site to Site (IPsec), Remote Access (IPsec, PPTP)	Site to Site (IPsec), Remote Access (IPsec, SSL, PPTP)	Site to Site (IPsec), Remote Access (Easy VPN, Flex VPN)	Site to Site (IPsec), Remote Access, Any to Any (IPsec VPN, DMVPN, GETVPN, Flex VPN, SSL)	Site to Site (IPsec), Remote Access, Any to Any (IPsec VPN, DMVPN, GETVPN, Flex VPN, SSL)	Site to Site (IPsec), Remote Access, Any to Any (IPsec VPN, DMVPN, GETVPN, Flex VPN, SSL)	Site to Site (IPsec), Remote Access, Any to Any (IPsec VPN, DMVPN, GETVPN, Flex VPN, SSL)
Content Filtering	-	●*1	●*1	CWS	CWS	CWS	CWS	CWS
NAT/PAT	●	●	●	●	●	●	●	●
QoS	Priority queuing (5-tuple)	Priority queuing (5-tuple)	Rate limiting or Priority queuing (5-tuple)	QoS	HQoS	HQoS	HQoS	HQoS
AVC	-	-	-	-	●	●	●	●
CLI	-	-	●	IOS	IOS	IOS	IOS	IOS
IPSLA	-	-	-	●	●	●	●	●
EEM	-	-	-	●	●	●	●	●

\*1 To be supported in future software release.

## Cisco Smart Net Total Care Service

Your IT infrastructure is the lifeline that connects your business to customers and suppliers. Business success requires maintaining high service levels for your network while reducing costs and expanding your network as your business grows. **Cisco Smart Net Total Care** can help you meet these objectives by providing technical services and smart capabilities that:

- Resolve problems faster**  
 Identify issues quickly and streamline your incident management processes to reduce network downtime and improve IT service levels.
- Reduce risk**  
 Access to Cisco technical experts combined with smart, proactive tools and capabilities minimizes risks to business continuity.
- Increase operational efficiency**  
 Proactive management and automated processes mean fewer support resource requirements and lower costs for managing your network.



### Resolve Problems Faster



24 x 7 x 365 TAC assistance on product use, configuration, and troubleshooting



Get replacement hardware in as little as two hours



Automated diagnostic and support capabilities speed time-to-resolution

### Improve Risk Management



Visibility into covered and uncovered devices - comply with corporate policies



Identify IT that is nearing end-of-life - simplify upgrades, planning and budgeting



Ensure that Cisco products are running current, supported software

### Increase Operational Efficiency



Reduce the time and staff required for contract management and renewal



Improve planning with inventory and support contracts visibility



Pinpoint and manage product and security alerts - only those relevant to your network

## Cisco Smart Assist Service

**Cisco Smart Assist Service** is a related service to extend the value of **Cisco Smart Net Total Care**.

This service can help you accelerate the time to enable and use smart capabilities. It provides assistance for installing the Cisco collector and accessing the Smart Net Total Care portal. It also offers onboarding and enablement services such as smart capability training, support for product inventory collection, installed base (IB) reconciliation (twice per year), and Cisco TAC support for the portal and collections.

Feature / Functionality	Smart Net Total Care (SNTC)	Smart Assist
Smart Capabilities Entitlement	●	Through SNTC
Onboarding Installation Assistance	Customer Self-Service	Cisco Assisted
Onboarding Smart Capabilities Training	Customer Self-Service	Cisco Assisted
IB Reconciliation	Customer Self-Service	Twice per year
Technical Support for Portal & Collections	Community Support	TAC

**Cisco Smart Net Total Care** helps reduce downtime with fast, expert technical support and flexible hardware coverage provided by the **Cisco Technical Assistance Center (TAC)**. Its integrated smart capabilities provide current information about the customer's installed base, contracts, and security alerts to enhance the efficiency of support workflows.

## Technical Service and Incident Management

- Cisco TAC**  
 The Cisco TAC is staffed by Cisco professionals certified in a broad range of Cisco products and technologies and service provider architectures. We provide you with access by phone, fax, or email 24 hours a day, 365 days a year and can assist you with product use, configuration, and troubleshooting issues.
- Advance hardware replacement**  
 With our customized hardware support service plans, you can have confidence knowing that your hardware can support your ongoing business needs. Cisco offers multiple service levels with different shipment options.

### Advance Hardware Replacement Service Levels

Service Level	Description
Smart Net Total Care 24 x 7 x 2	2-hour response, 24 hours a day, 7 days per week, including holidays
Smart Net Total Care 24 x 7 x 4	4-hour response, 24 hours a day, 7 days a week, including holidays
Smart Net Total Care 8 x 5 x 4	4-hour response, local business hours based on depot time, 5 days a week
Smart Net Total Care 8 x 5 x Next Business Day	Next-business-day delivery, local business hours based on depot time, 5 days a week

- Onsite support**  
 Cisco is committed to providing professional, customer-focused support services in person at your location. Smart Net Total Care Onsite service includes installation of advance replacement parts.

### Onsite Support Service Levels

Service Level	Description
Smart Net Total Care Onsite 24 x 7 x 2	2-hour response, 24 hours a day, 7 days per week, including holidays
Smart Net Total Care Onsite 24 x 7 x 4	4-hour response, 24 hours a day, 7 days a week, including holidays
Smart Net Total Care Onsite 8 x 5 x 4	Based on depot time. 4-hour response, 9 a.m. to 5 p.m., if the request is received before 1 p.m., the service (including parts, labor, and materials) will be provided the same day. For requests received after 1 p.m., the service will be provided the following business day.
Smart Net Total Care Onsite 8 x 5 x NextBusiness Day	Based on depot time. Next business day, 9 a.m. to 5 p.m., if the request is received before 3 p.m., the service (including parts, labor, and materials) will be provided the next business day. After 3 p.m., the service (including parts, labor, and materials) will be provided the following business day.

- Software updates**  
 Cisco provides OS software updates for your licensed feature set. Software releases and any supporting documentation are available through Cisco.com Software Central at <http://software.cisco.com/swcentral/home.html>.
- Online self-help support**  
 Cisco provides access to the Cisco Support website, which includes Cisco's extensive knowledge library, software downloads, and support tools designed to help users resolve network issues quickly without opening a case.

## Security and Product Alerts

- Hardware alerts**  
 Hardware alerts inform you about devices that have reached or are approaching end of life in your network.
- Software alerts**  
 Software alerts inform you about end-of-life issues with specific software versions you are using.
- Security alerts**  
 Security alerts are Product Security Incident Response Team (PSIRT) alerts that inform you about security vulnerabilities associated with specific devices in your network.
- Field notices**  
 Field notices inform you about significant issues (other than security vulnerability issues) with a hardware device or software version.

## Service Coverage Management

- Service coverage reports**  
 Device data from installed base collections can be matched against service contracts and purchase orders to identify coverage gaps. View all service contracts and coverage levels, including 24-month advance visibility into upcoming renewal dates. Reviewing coverage information can help ensure that devices in your network have the right kind of coverage for their intended use.
- Service coverage and renewal management workflow**  
 This feature gives you the ability to document and annotate those devices that do not require service coverage and why. You can also assign tasks to people responsible for architectural or budget planning to ask for recommendations about renewing coverage versus replacing specific devices before their service contracts expire.

## Product Lifecycle Management

- Role-based access control (RBAC)**  
 The Smart Net Total Care portal gives you control over the types of data that users can see. User views within the portal are based on the user's role, allowing administrators to assign roles and designate network device data visibility for portal users, including partners. For example, a certain group of network administrators may be given access to data for a specific segment of the network, and other groups of users may be restricted to specific types of information such as device configuration data or security alerts.
- Device data file uploads**  
 In addition to data uploads from the Cisco collector, data can be uploaded using manual file uploads (such as from a spreadsheet) or third-party collection mechanisms. After data is uploaded into the portal, it can be analyzed and enriched with Cisco support information.