Cisco Catalyst 3850 Series Switches

Overview

Q. What are the Cisco Catalyst 3850 Series Switches?

A. The Cisco® Catalyst® 3850 Series Switches are the next generation of enterprise-class stackable access-layer switches and provide convergence between wired and wireless over a single platform. The switches also provide high availability with new and improved 480-Gbps stacking and Cisco StackPower™. Wired and wireless security and application visibility are natively built into the switch. The Cisco Catalyst 3850 Series Switches also support full IEEE 802.3at Power over Ethernet Plus (PoE+), Universal Power Over Ethernet (UPOE), modular and field-replaceable network modules, redundant fans, and power supplies. The Cisco Catalyst 3850 enhances productivity by enabling applications such as IP telephony, wireless, and video for a true borderless network experience. In addition, the Cisco Catalyst 3850 SFP based models support 12 or 24 SFP receptacles, and SFP+ based models support 12, 24, or 48 receptacles. These SFP/SFP+ receptacles are compatible with a variety of Gigabit Ethernet pluggable transceiver modules for both copper and fiber downlink support. These models add even more flexibility to the interface choices that users can make in a single Cisco Catalyst 3850 switch or in a stack of Cisco Catalyst 3850 switches.

Q. Can the Cisco Catalyst 3850 act as a wired switch?

A. The Cisco Catalyst 3850 switch can act as a wired switch as well as a converged wired wireless switch.

Q. How do the Cisco Catalyst 3850 switches compare to the Cisco Catalyst 3750-X models?

A. The Cisco Catalyst 3850 switch is revolutionary in terms of both functionality and features. Table 1 shows a comparison with the Cisco Catalyst 3750-X.

Table 1. Comparison of the Cisco Catalyst 3750-X and 3850 Switches

Features	Cisco Catalyst 3750-X	Cisco Catalyst 3850
Stacking bandwidth	64 Gbps	480 Gbps**
Cisco IOS® Software wireless controller	No	Yes
Queues per port	4	8
Quality-of-service (QoS) model	MLS	MQC
Uplinks**	4 x 1GE 2 x 10GE NM 4 x 1 GE or 2 x 10GE SM	4 x 1GE 2 x 1/10GE 4 x 1/10GE* 8 x 10GE*** 2 x 40GE***
Downlinks	24 or 48 RJ45 interfaces 12 or 24 SFP receptacles	24 or 48 RJ45 interfaces 12 or 24 SFP receptacles 12, 24, or 24 SFP+ receptacles
StackPower	Yes	Yes**
Flexible NetFlow support	Yes (C3KX-SM-10G required)	Yes
Multicore CPU for hosted services	No	Yes
Flash size	64 Mb	2 Gb
Operating system	Cisco IOS Software	Cisco IOS XE Software

*Available only for the 48-port RJ45 models and for the 12-port (or higher) 10 Gigabit capable models

**StackWise-480 and StackPower not supported on the 48-port 10G SFP+ switch

*** Supported on the 24-port and 48-port Multigigabit Switch and also on the 24-port 10G SFP+ switch

****Optional uplink modules are not supported on the 48-port 10G SFP+ switch

Features

Q. What feature sets do the Cisco Catalyst 3850 switches support?

A. Table 2 shows the feature sets. Please check the release notes for details.

(SFP models WS-C3850-12S, WS-3850-24S and SFP+ models WS-C3850-12XS, WS-C3850-16XS, WS-C3850-24XS, WS-C3850-32XS, and WS-C3850-48XS support IP Base and IP Services only.)

Table 2. Cisco IOS Software Feature Set Differences

Functions	LAN Base	IP Base	IP Services
Layer 2+	Enterprise access Layer 2 Wide range of Layer 2 access features for enterprise deployments supports Cisco StackPower technology	Complete Access Layer 2 Supports all Cisco Catalyst 2000 and Cisco Catalyst 3000 Layer 2 features, including hot standby protocols	
Layer 3	Static IP routing support Support for SVI	Enterprise access Layer 3 RIP, EIGRP stub, OSPF for routed access, PBR, IPv4 & IPv6 EIGRP stub routing, WCCP, IPV6 uRPF, IPV6 PBR, VRRPv3, Policy Classification Engine, HSRP v6	Complete access Layer 3 OSPF, EIGRP, BGP, IS-IS VRF-lite
Multicast	IGMP	IPV4 & IPV6 PIM routing	
Mobility	Supports Cisco Unified Wireless Networking mobility architecture	Supports Cisco Converged Access mobility architecture with CAPWAP termination at the access	
Manageability	Basic manageability Support for a wide range of MIBs, IPSLA Responder, and RSPAN, PnP, Autoconf, Interface Templates, Secure CDP	Enterprise access Layer 3, Flexible NetFlow for wired and wireless traffic EEM, GOLD-Lite, and Smart Install Director	
Security	Enterprise access security DHCP Snooping, IPSG, DAI, PACLs, Cisco Identity 4.0, NAC and 802.1x features	Complete access security Router and VLAN ACLs, private VLANs, complete identity and security; Cisco TrustSec® SXP and IEEE 802.1AE capable in hardware, Device Sensor	
QoS	Enterprise access QoS Ingress policing, Trust Boundary, AutoQoS, and DSCP mapping	Complete access QoS Support for all Cisco Catalyst 2000 and Cisco Catalyst 3000 QoS features, including per-VLAN policies	
Interoperability	Prime 2.1	Identity Services Engine (ISE 1.2/1.3), Mobility Services Engine (MSE 8.0), Improved WebUI	

Q. Does Cisco Catalyst 3850 support IEEE802.1 Audio Video Bridging standard?

A. AVB is supported on select Catalyst 3850 platforms, please refer to the Audio Video Bridging FAQ for more information.

Q. What are the supported uplink modules in the Cisco Catalyst 3850?

A. The Cisco Catalyst 3850 supports the following uplink modules:

- 4 x 1GE network module
- 2 x 1/10GE network module
- 4 x 1/10GE network module (can be used for the 48-port RJ-45 models and for the 12-port (or higher) 10-gigabit-capable models)
- 8 x 10GE network module (can be used on the 24-port and 48-port multigigabit switch and also on the 24-port 10G SFP+ switch)
- 2 x 40GE network module (can be used on the 24-port and 48-port multigigabit switch and also on the 24-port 10G SFP+ switch)

Q. Does the Cisco Catalyst 3850 10G SFP+ 48-port switch support uplink modules?

A. No. It has 4 fixed 40G QSFP ports for uplinks. This is not field-replaceable.

Q. Are the uplinks between the Cisco Catalyst 3850 and the 3750-X interchangeable?

A. No, the uplink modules from the 3750-X are not compatible with the Cisco Catalyst 3850.

Q. What about service modules for the Cisco Catalyst 3850?

A. There are no service modules for the Cisco Catalyst 3850. Features supported through the service module in the 3750-X (including Flexible NetFlow and MACsec*) are natively supported by the Cisco Catalyst 3850.

* MACsec software support might be added later as part of a software update.

Q. How do you manage the Cisco Catalyst 3850?

A. The Cisco Catalyst 3850 can be managed using the Cisco IOS Software CLI or using Cisco Prime™ Infrastructure 2.0.

Q. Is there an onboard web GUI on the Cisco Catalyst 3850?

A. Yes. Onboard web GUI requires Cisco IOS XE Release 3.2.2SE or later.

Q. Does the Cisco Catalyst 3850 support 802.1ae on downlink ports?

A. The Cisco Catalyst 3850 is hardware capable for 802.1ae on all ports on the switch. Software support will be available later.

Q. What management ports are available on the Cisco Catalyst 3850?

A. The Cisco Catalyst 3850 comes with a 10/100 Ethernet dedicated management port on the backside of the switch right above the console port. This port is in separate VRF called “Mgmt-vrf.” This is to segment the management traffic from the global routing table of the switch.

Q. What is the maximum number of VRFs (Virtual routing and forwarding) that can be configured on a Cisco Catalyst 3850?

A. Maximum number of VRFs that can be configured on a Cisco Catalyst 3850 is 27.

Q. Can both console ports be used simultaneously?

A. No. When the USB console is used, the RJ-45 console receives the output of the USB console as well. This design allows the administrator to see when the USB console port is in use. This capability is useful for remote administrators.

Q. Does the switch support auto-baud on the console port?

A. No.

Q. What type of airflow do the Cisco Catalyst 3850 switches support?

A. The airflow on the Cisco Catalyst 3850 is “front and sides” to back airflow except for the 48-port 10G SFP+ switch. The 48-port 10G SFP+ switch has support for front-to-back and back-to-front airflow.

Q. What pluggable transceiver modules are supported by the Cisco Catalyst 3850 switches?

A. Refer to the Cisco Transceiver Module Compatibility Matrixes for a complete list: http://www.cisco.com/c/en/us/support/interfaces-modules/transceiver-modules/products-device-support-tables-list.html.

Q. What are the power consumptions for copper and fiber SKUs?

A. For 24 port copper SKU the power consumption is 200W and for 48 port its 280W. In the case of both 12 Port and 24 Port fiber SKUs its 200W.

License and Warranty

Q. What licensing model does the Cisco Catalyst 3850 use?

A. The Cisco Catalyst 3850 uses a right-to-use (RTU) licensing model.

Q. What is an RTU licensing model?

A. RTU is a trust-based licensing model designed to give customers the flexibility to upgrade, downgrade, or move the license for RMA purpose by using simple EXEC CLI commands.

Q. Do the Cisco Catalyst 3850 switches require a product activation key (PAK) for licensing?

A. No. No PAK is required for software licensing in Cisco Catalyst 3850 switches. Cisco Catalyst 3850 switches use a trust-based RTU licensing model. While placing the order, the customer specifies the license requirement and receives an electronic license or paper license for entitlement purpose only.

Q. What are the different types of licenses in the Cisco Catalyst 3850?

A. There are two main types of Cisco Catalyst 3850 license: permanent RTU license and evaluation RTU license. These are available for both image-based licensing (IP Base or IP Services) and AP count licensing.

A permanent RTU license is a paid license, with no expiration date. The universal Cisco IOS XE Software-based images have all three license levels: LAN Base, IP Base, and IP Services. RTU CLI commands enable the switch license to be moved between different license levels.

An evaluation RTU license allows the customers to evaluate image-based and/or AP count license for 90 days at no cost.

Q. How is the image-based license enabled?

A. An image-based license can be enabled by executing the following EXEC CLI, which activates the license level and also accepts the end-user license agreement (EULA).

CLI for permanent: **`license right-to-use activate lanbase | ipbase | ipservices <slot #> acceptEULA`**

CLI for evaluation: **`license right-to-use activate ipbase | ipservices evaluation <slot #> acceptEULA`**

Q. How is the access point count license enabled?

A. The access point count license can be enabled by executing the following EXEC CLI, which activates the access point count number and also accepts the EULA. A permanent access point count license can be enabled in unit increments up to a maximum of 50. An evaluation license is available only for the maximum access point count (50).

CLI for permanent: **`license right-to-use activate apcount <1-50> <slot #> acceptEULA`**

CLI for evaluation: **`license right-to-use activate apcount evaluation <slot#> acceptEULA`**

Q. What happens after 90 days of activating an evaluation RTU license?

A. An evaluation RTU license EULA expects that customers will purchase a permanent license within 90 days. After 90 days the evaluation license will not be valid. Warning syslog messages about the evaluation license expiry are generated 10 and 5 days before the 90-day window. Warning syslog messages are generated every day after the 90-day period. The expired evaluation license continues to function with the daily syslog messages until the switch is reloaded. The expired evaluation license cannot be reactivated after the reload.

Q. What are the license requirements for a Cisco Catalyst 3850 switch stack?

A. In a Cisco Catalyst 3850 stack, all switches should be at the same image-based license (IP Services/IPBase/LAN Base) level. The active switch license level is considered as the reference, and the member switch licenses are compared against it. If there is a mismatch, the active switch with the syslog message "**`license mismatch error`**" indicates that the stacking was unsuccessful. Because the 12-port and 24-port SFP models only ship with an IP Base or IP Services base license, in order for them to stack with LAN Base switches, either the latter are upgraded to a common higher license level or the former are downgraded to LAN Base through the CLI.

Q. How is a "**`license mismatch error`**" fixed in a Cisco Catalyst 3850 stack?

A. The license level of the mismatch stack member switch can be changed with the license right-to-use activate <license> all acceptEULA CLI command (entire stack should have the same wired license level) and reloaded from the active switch console. This will enable the member switch to join the stack successfully. The customer has to purchase a license before moving to a specific license level.

Q. How is the access point count license managed across a Cisco Catalyst 3850 stack?

A. The total access point count license of a Cisco Catalyst 3850 stack is equal to the sum of all the individual member access point count licenses, up to a maximum of 50 access points. When new members are added to the stack, the total access point count license of the stack is automatically recalculated. When members are removed from the stack, the access point count license does not decrement until a reload of the stack.

Stack member addition example: A Cisco Catalyst 3850 stack with 3 switches, each with an access point count license of 10 access points, will have support for a total of 30 access points. When a new Cisco Catalyst 3850 (Switch 4) is added to the stack with an access point count license of 25 access points, the total access points supported by the stack equals 50, since the total (30+25) 55 exceeds the stack limit.

Stack member remove example: In the preceding example, if Switch 4 is removed from the stack, the access point count license stays at 50 access points until the stack is reloaded. After being reloaded, the stack returns to its original value of 30 access points.

Q. How is an RTU license migrated in case of a Cisco Catalyst 3850 hardware swap/RMA?

A. Both image-based and access point count licenses can be deactivated from the old/swapped-out hardware and activated on the new switch. Deactivation is done by the "**`license right-to-use deactivate`**" EXEC command and activation by "**`license right-to-use activate`**" EXEC command.

Q. How is the license usage monitored?

A. The license usage is maintained in the Cisco Catalyst 3850 stack for individual switches. The usage information is maintained from the initial boot across reboots, including the status of EULA, in-use condition, and type of license. The usage information is updated daily and can be displayed with the "**`show license right-to-use usage`**" EXEC command.

Q. How is the license information stored and protected?

A. The license information is stored in two hidden flash partitions: Active and Backup. They are not customer accessible, and write erase will not erase the license files. If the license file in the primary partition is corrupted or tampered with, the license file from secondary/backup partition is used. If both the partitions are corrupted, Cisco will recreate the license files.

Q. What is the hardware warranty and return policy on the Cisco Catalyst 3850 switches?

A. Cisco Catalyst 3850 switches come with an enhanced limited lifetime hardware warranty (ELLW). It provides 90-day TAC support and next business day delivery for hardware replacement.

Q. What is the software update policy for Cisco Catalyst 3850 switches?

A. The software update policy can be found at http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps4324/product_bulletin_c25-696974_ps12686_Products_Bulletin.html.

Stacking and High Availability

Q. How is stacking done in the Cisco Catalyst 3850?

A. The Cisco Catalyst 3850 introduces a revolutionary stacking technology called Cisco StackWise-480. It offers a stacking bandwidth of 480 Gbps nonblocking, and it supports Cisco IOS Software Stateful Switchover (SSO) technology. Both the stacking cables and connectors have been revamped in the Cisco Catalyst 3850 for easy installation and removal.

Q. What is SSO technology?

A. The Cisco SSO technology synchronizes the Layer 2/3 and wireless tunnel protocol state machines from Active to Standby stack switch. During Active switch switchover the Standby switch performs graceful-recovery with neighbors without disrupting network topology.

Q. What is Nonstop Forwarding (NSF) technology?

A. The complementary NSF technology enables business continuity by delivering nonstop forwarding communication, while the Standby switch is transitioning in the Active role.

Q. How does new Cisco IOS XE Software change the Cisco Catalyst 3850 stack architecture?

A. The next-generation Cisco Catalyst 3850 becomes modularized and fully distributed with a highly resilient stackable system with the next-generation Cisco IOS XE Software architecture.

Q. How many Cisco Catalyst 3850 switches can stack into a single logical entity?

A. Up to 9 Cisco Catalyst 3850 switches can be stacked together to build single logical StackWise-480 switch since Cisco IOS XE Release 3.3.0SE. Prior to Cisco IOS XE Release 3.3.0SE, up to 4 Cisco Catalyst 3850 switches could be stacked together.

If you have 3850-XU (multigigabit) switches or Cisco Catalyst 3850-XS (10G SFP+) switches in the stack, then up to 8 switches can be stacked together to build a single logical StackWise-480 switch.

Q. Can a Cisco Catalyst 3850 stack with any of the Cisco Catalyst 3750 switches in StackWise-480?

A. No. The hardware architecture between Cisco Catalyst 3750 switches and the Cisco Catalyst 3850 is different, and thus this design is not supported.

Q. Does the Cisco Catalyst 3850 10G SFP+ 48-port switch support StackWise-480 and StackPower?

A. No. It is designed for high-density deployments and does not support StackWise-480 or StackPower.

Q. Are StackWise-480 cables backward compatible?

A. No. The cable and connector type used in StackWise-480 are different from the StackWise and StackWise Plus cables. Hence the newly redesigned hardware architecture of the next-generation StackWise-480 is incompatible with traditional StackWise Plus technology.

Q. What StackWise-480 cable lengths are supported?

A. The Cisco Catalyst 3850 StackWise-480 cable length sizes are in the range of 50 cm, 1m, and 3m sizes.

Q. Is StackWise-480 installation plug and play?

A. Yes. To provide nonstop business communication, the Cisco Catalyst 3850 switch insertion and removal process in a StackWise-480 ring is hot swappable.

Q. What is the key difference between StackWise Plus and StackWise-480 technology?

A. The key differences are as follows:

- **Bandwidth:** StackWise-480 supports a stacking bandwidth of 480 Gbps as compared to 64 Gbps on StackWise Plus.
- **Cable and connectors:** These have been revamped with StackWise-480 for ease of insertion and removal.
- **Stacking technology:** StackWise-480 is built on Cisco IOS Software SSO, which provides better state synchronization between the various members.
- **Stacking terminology:** StackWise-480 identifies active and standby members in the stack per the Cisco IOS Software SSO technology. All control plane activities are centralized and synchronized between the active and standby. StackWise-Plus identifies a single master in the stack and distributes some control plane activities.

Q. Which stack switch in StackWise-480 manages the control and management planes?

A. The Active stack switch centrally manages all the control and management communication. The network control data traffic is transparently switched from Standby and other member switches to Active for centralized processing.

Q. How does distributed forwarding work in the Cisco Catalyst 3850 stack architecture?

A. The Active stack switch builds the network adjacencies and forwarding tables. For hardware-accelerated distributed forwarding, the Active switch programs the forwarding information to Standby and member switches.

Q. Does StackWise-480 support same spatial-reuse technology as StackWise Plus?

A. Yes. The spatial-reuse technology enables multipath parallel switching across each stack ring to double the throughput.

Q. What are the key StackWise-480 benefits over standalone Cisco Catalyst 3850?

A. The Cisco Catalyst 3850 Series deployed in StackWise-480 mode provides the following set of benefits:

- **Simplified:** Single unified system to manage and operate up to 208 ports (will increase to 432 ports in a future release). StackWise-480 also simplifies network design and topologies in converged access.
- **Scalable:** No performance compromise. Each Cisco Catalyst 3850 switch deployed in StackWise-480 mode boosts wiring-closet performance with nonblocking 480-Gbps backplane and 40 Gbps on uplink ports.
- **Resilient:** The Cisco Catalyst 3850 deployed in StackWise-480 mode enables Cisco IOS Software SSO high-availability framework to deliver nonstop communication during fault conditions.

Q. Can switch priorities be configured in a Cisco Catalyst 3850 stack?

A. Yes. For deterministic control-plane operation within a StackWise-480 ring network, it is recommended to adjust switch priorities from default value.

Q. How can switch priorities and switch numbers be configured in a Cisco Catalyst 3850 stack?

A. In the new Cisco Catalyst 3850 software design, the switch priority and switch number CLI are available using EXEC mode. These switch parameters are dynamically saved based on user input. This is different from the 3750 Series, where it was configured using CONFIG mode.

Q. What is the recommendation to protect stack-mac during switchover?

A. The base stack-mac address is set by the Active switch. To retain network communication over the original address, the stack-mac persistent timer must be set to indefinite using "**stack-mac persistent timer 0**" in global exec mode.

Q. What is the Active and Standby switch election process during bootup?

A. The Active and Standby switch role selection during bootup is based on switch MAC address or user-defined switch priorities.

Q. What happens during an Active switchover?

A. The original Standby switch gracefully transitions into new Active role upon rapidly detecting Active switch failure. This role switchover remains deterministic and independent of switch priority set across other switches in a stack ring.

Q. How is SSO mode on Cisco Catalyst 3850 in StackWise-480 enabled?

A. The StackWise-480 mode by default is in SSO and does not require any user intervention.

Q. How will the Cisco Catalyst 3850 support NSF/SSO differently than Cisco modular switches?

A. Both the Cisco Catalyst 3850 and modular switches in fully operational state enable 1+1 control plane redundancy. The Cisco Catalyst 3850 uniquely enables 1:N system-level resiliency across stack design.

Q. What network protocols are NSF/SSO capable?

A. The Cisco Catalyst 3850 Series Switches support various types of the following Layer 2 and Layer 3 network protocols:

- Layer 2 protocols: CDP, STP, VTP, LACP, PAgP+, DTP, UDLD
- Layer 3 protocols: EIGRP, OSPF, IS-IS, BGP
- VRF-aware Layer 3 protocols: EIGRP, OSPF, IS-IS, BGP
- Mobility: Wireless control module (WCM), access point management, CAPWAP data tunnel, CAPWAP mobility tunnel, CAPWAP multicast tunnels

Q. What types of EtherChannel capability are supported on Cisco Catalyst 3850 Series Switches?

A. The Cisco Catalyst 3850 Series is supported on two different modes:

- Single-chassis EtherChannel: In this EtherChannel configuration mode, all the member links of given EtherChannel on single stack-switch system.
- Cross-stack EtherChannel: In this EtherChannel configuration mode, the member links are diversified between stack switches regardless of their roles.

Q. What cross-stack EtherChannel link bundling protocols are supported?

A. The Cisco Catalyst 3850 supports Cisco Port Aggregation Protocol (PAgP) and industry-standard IEEE 802.3ad Link Aggregation Control Protocol (LACP). Other 3750 Series Switches support only LACP for cross-stack EtherChannel.

Q. Can Cisco Catalyst 3850 deployed in StackWise-480 be used for VSS dual active detection?

A. Yes. Cisco Catalyst 3850 cross-EtherChannel can be PAgP+ trusted for VSS dual active detection.

Q. How many links can be bundled into a single EtherChannel?

A. Each Layer 2 or Layer 3 EtherChannel can support up to 8 member links.

Q. How many EtherChannels are supported on Cisco Catalyst 3850 Series Switches?

A. The Cisco Catalyst 3850 Series Switch can support up to 128 EtherChannels.

Q. How is the integrated WCM solution unified in the StackWise-480 architecture?

A. In StackWise-480 design the integrated WCM centrally functions on the Active Cisco Catalyst 3850 switch.

Q. What wireless network redundancy can StackWise-480 provide?

A. The StackWise-480 enables wireless mobility tunnel SSO capability in the system. The Active switch establishes various types of CAPWAP tunnels with different devices and synchronizes the tunnel state machines to Standby switch.

Q. What type of mobility function is handled by the Cisco Catalyst 3850 stack?

A. The Active switch provides the same centralized wireless controller function as standalone mode. It terminates CAPWAP data tunnel from all locally attached Cisco WAP across stack member switches and forms CAPWAP tunnels with peer mobility systems and client communications.

Q. What is the WCM and CAPWAP tunnel state on Standby switch?

A. The integrated WCM and all CAPWAP tunnels remain in Hot Standby mode on a Standby Cisco Catalyst 3850 stack switch.

Q. Does Active stack switch centrally process the wireless data-plane traffic?

A. The high-speed data-plane switching between wired (802.3) and wireless (802.11) network is fully distributed in StackWise-480 design.

Q. How is roaming traffic handled in StackWise-480-based network design?

A. In StackWise-480 design, the Active stack switch provides centralized “plumbing” service between roaming CAPWAP mobility tunnel to foreign switch and local CAPWAP data tunnel to Cisco access point. The Active stack switch provides centralized data switching service between two different tunnel types.

Q. What is the user effect when a Cisco Catalyst 3850 switch stack is deployed in mobility agent mode and the Active stack switch fails?

A. The WLAN client information will require rebuilding on the new Active switch. The local WLAN clients will be required to authenticate and use DHCP again to update the database. The roamed WLAN clients will go through the same process and become local to the new Active switch.

Q. What is the user effect when a Cisco Catalyst 3850 switch stack is deployed in mobility agent mode and Active stack switch and the connected Cisco WAP fails?

A. The WLAN client immediately initiates fast roam to another Cisco access point that is possibly connected to another stack switch in the same StackWise-480 ring.

Q. What is the local user effect when a Cisco Catalyst 3850 switch stack is deployed in mobility controller mode and the Active stack switch fails?

A. The WLAN client information will require rebuilding on the new Active switch. The local WLAN clients will be required to authenticate and use DHCP again to update the database. The roamed WLAN clients will go through the same process and become local to new Active switch.

Q. What is the effect to users and connectivity to mobility agents when a Cisco Catalyst 3850 switch stack is deployed in mobility controller mode and Active member fails?

A. The CAPWAP mobility tunnel with mobility agents remains in operational state. No effect **occurs** to local and roamed users between mobility agents in the same switch peer group. The user roamed between switch peer groups will become local and require reauthentication and rerun DHCP for connectivity.

Q. What is the effect to users and connectivity to mobility agents when a Cisco Catalyst 3850 switch stack is deployed in mobility controller mode and complete stack failure occurs?

A. In such a catastrophic failure event the intra-SPG communication between mobility agents remains intact. The centralized mobility controller services such as guest access, RRM, and so on will remain down until the mobility controller is restored. The inter-SPG roamed client will need to reauthenticate and rerun DHCP because pairwise master key (PMK) cache information cannot be distributed.

StackPower

Q. What is the Cisco StackPower technology?

A. StackPower technology, developed by Cisco, allows efficient use of available power in a Cisco Catalyst 3850 stack. Cisco StackPower aggregates available power in a stack and shares the power where needed.

Q. How many Cisco Catalyst 3850 switches can make up a Cisco StackPower stack?

A. Up to four switches can become part of the same Cisco StackPower stack in a ring topology (Figure 1).

Figure 1. Cisco StackPower

Q. Why is Cisco StackPower restricted to four switches?
A. It is limited by cable gauge and maximum current draw allowed.

Q. How many Cisco StackPower stacks can be built within one data stack?
A. The recommendation is to have Cisco StackPower stacks of four switch members to maximize the effect of power aggregation and redundancy.

Q. Can Cisco StackPower expand over two data stacks?
A. Technically yes, but this is not recommended.

One Cisco StackPower stack can expand across two data stacks, but doing so is neither recommended nor encouraged because of the complexity created in terms of managing power budgets that are monitored by one or both of the data stacks' Active switches. Power budget and allocation information is passed to the data stack Active switch, and when a Cisco StackPower stack spreads over two data stacks, both stacks' Active switches will receive information about power that is not consumed in their own stacks, creating confusion and unexpected power-shedding scenarios that would be difficult to troubleshoot.

Q. What modes does the Cisco StackPower solution support?
A. There are two; see below.

- **Power-sharing mode:** This mode allows the stack to aggregate and share the entire amount of power available among all the switches in the stack. If needed, all power gets allocated until the entire power budget is depleted.
- **Redundant mode:** This mode allows a customer to plan for potential power supply failures. When this mode is configured, Cisco StackPower sets aside an amount of power equal to the capacity of the largest power supply in the system, in case a power supply fails or the power source of that power supply fails. This mechanism is considered better than the mechanism of a traditional redundant power supply because there is no chance for a latent failure to occur during the power switchover to the redundant power supply, since the redundant power is already online as part of the power available in the system. This is known as 1+N as opposed to 1:N redundancy.

Q. What happens when a power supply fails in a power stack configured in redundant mode?
A. The entire amount of reserved power is made available upon a power supply failure, without regard to which type or size of power supply failed.

Q. What is the “reserved” power?

A. When the Cisco StackPower solution is configured in redundant mode, it aggregates all of the power available in the stack (from all power supplies in the stack) and then subtracts an amount of power that it keeps in reserve. The amount of reserved power is determined by the size of the largest power supply in the stack. The remaining power is used to power up all of the switches and PoE devices similarly.

Q. Is the Cisco RPS 2300 compatible with the Cisco Catalyst 3850 switches?

A. No. Customers cannot use the older Cisco RPS 2300 with the new Cisco Catalyst 3850 switches because the power supplies and the system design are not compatible.

Q. Do I need to populate all of the power supply slots in my switch?

A. No. The Cisco Catalyst 3850 switches provide two slots for the use of redundant power supplies, but only one supply is needed to run a single switch unless full PoE+ is deployed on a 48-port switch. In that case, the power requirement is about 1700W, which is more than the 1100W provided by the largest available power supply. If the switch is deployed within a Cisco StackPower stack, a second power supply might not be needed if the stack has extra power to meet the requirements of this switch, though the power supply slot must be covered to maintain proper airflow.

The Cisco Catalyst 48-port 10G SFP+ switch does not support StackPower. Power cannot be shared by this switch with other Cisco Catalyst 3850 switches

Q. Does it matter which power supply slot is used in a single power supply deployment?

A. No. It does not matter which slot is used if the switch is to remain in a standalone deployment. If the switch is deployed in a Cisco StackPower stack, it is recommended that you fill in slot A first on every switch in the stack before using any slot B in any switch of the stack.

Q. Do I need special cables for the Cisco StackPower solution?

A. Yes. Cisco StackPower has special keyed cables to be used to build the power stack.

Q. What is the length of the Cisco StackPower cables?

A. The StackPower cables come in two lengths: 30 cm and 150 cm (Table 3).

Table 3. StackPower Cable Lengths

Product ID	Description
CAB-SPWR-30CM	30-cm StackPower cable
CAB-SPWR-150CM	150-cm StackPower cable

The reason for the cable length limitation is the amount of current that can be carried. Longer cables would have to be thicker, which would affect their flexibility. There is no plan for longer cables.

Q. Can Cisco StackPower take power supplies offline automatically?

A. Cisco StackPower does not take power supplies offline automatically. With “power supply <switch#> frufep A|B on|off” EXEC command the state of a power supply in a given switch can be enabled or disabled manually. EnergyWise and Cisco IOS Software Embedded Event Manager (EEM) are other services that can be used to implement policies which turn off redundant power supplies during off hours.

Q. Can you mix power supplies in Cisco Catalyst 3850 switches?

A. Yes. You can mix the power supply types either in a standalone switch or in a stack. That is, you can combine a 350W AC power supply (the default for a data-only switch) with a 715W or 1100W AC power supply (the default in a full PoE switch) or with a 440W DC power supply.

An exception is the Cisco Catalyst 3850 48-port 10G SFP+ switch, which has different AC and DC power supplies. These power supplies cannot be mixed or reused with the other Cisco Catalyst 3850 switches.

Q. Why would you mix a DC power supply with an AC power supply?

A. You can power up the AC power supply using the standard AC power source available and then power up the DC power supply using an uninterruptible power supply (UPS) system in the lab or data center.

Q. Can you give priority to an important switch in the stack?

A. The Cisco StackPower solution assigns a default priority to the switches in a stack as well as to the ports (high or low) of every switch. The administrator has the ability to change and program these priorities with "power-priority switch <1-27>" and "power-priority low | high <1-27>" configuration commands.

Q. Is there a way to know the power-shedding priority of my stack?

A. Yes. A CLI is available to display the current set of priorities for the entire stack. See the command reference for "show stackpower."

Q. Can the Cisco StackPower solution boot up a switch that does not have a power supply?

A. Yes. By using the extra power capacity available in the stack, StackPower allows the system to supply power to a switch that does not have a power supply or that has a failed power supply.

Q. What happens when I oversubscribe the power budget in my stack?

A. Cisco Catalyst 3850 switches have an intelligent mechanism to shed power when the system goes into a negative power budget. This scenario can occur after a power failure/offline of a power supply in a stack. The stack will shed power starting with the lowest-priority powered devices in the entire system, then the high-priority powered devices, then the low-priority switches, and finally the high-priority switches until a balance is reached.

After a power budget goes negative, Cisco IOS Software will send warning messages about the situation and the potential outage that a negative budget represents. Power shedding will initiate immediately if strict mode has been configured.

Q. Can a Cisco Catalyst 3850 and 3750-X form a power stack?

A. No, mixed power stacks are not supported with the Cisco Catalyst 3850.

Q. Does the Catalyst 3850 10G SFP+ 48-port switch support StackWise-480 and StackPower?

A. No. The Catalyst 3850 10G SFP+ 48-port switch is designed for high-density deployments and does not support StackWise-480 or StackPower.

Cisco IOS XE Software

Q. What is the base software architecture of the next-generation Cisco Catalyst 3850 switch?

A. The Cisco Catalyst 3850 Series Switches are developed based on advanced and next-generation Cisco IOS XE Software.

Q. What is Cisco IOS XE Software?

A. The new Cisco IOS XE Software is developed based on Linux software architecture. The Cisco IOS Software is installed as a hosted core software service over Linux kernel infrastructure.

Q. What are the key cost benefits of Cisco IOS XE Software?

A. The next-generation Cisco IOS XE Software helps lower the total cost of ownership of many Cisco solutions by offering enhanced services integration for enhanced functionality within the network.

Q. What are the key technical benefits of Cisco IOS XE Software?

A. Cisco IOS XE Software increases scalability and performance by using Linux capabilities by utilizing system resources such as multiple CPU cores, control-plane and data-plane separation, and hardware-layer abstraction.

Q. What is Cisco IOSd Software?

A. Cisco IOSd Software is a core application daemon running over a Linux kernel. Cisco IOSd Software is the same native Cisco IOS Software operating system with rich feature sets that abstracts the hardware-layer software from common bundle.

Q. What type of integrated application is supported on Cisco Catalyst 3850 Series Switches?

A. The Cisco Catalyst 3850 powered with Cisco IOS XE Software is designed to deliver converged wired and wireless network infrastructure. The WCM is a hosted application over Linux kernel that enables coexistence and giving single operational user experience with single Cisco IOS Software to manage wired and wireless infrastructure in a single system.

Q. How is the new Cisco IOS XE Software architecture structured?

A. The framework of next-generation Cisco IOS XE Software is internally distributed into major subcomponents. To design a scalable software architecture, each Cisco IOS XE Software subcomponent handles unique tasks such as core applications (Cisco IOSd Software), integrated applications (WCM, Wireshark, and so on), Common Management Interface (syslog, HTTP, and so on), distributed forwarding manager, and so on.

Q. Does an integrated WCM needs its own Cisco IOSd Software service instance?

A. No. The Cisco IOSd Software is a centralized core application that delivers rich technologies and provides shared services to hosted applications such as WCM and to other infrastructure such as Common Management Interface.

Q. What is the Cisco IOSd Software and integrated application state when a set of Cisco Catalyst 3850 switches is deployed in StackWise-480 mode?

A. The Cisco Catalyst 3850 in StackWise-480 uses a rich Cisco IOS XE Software HA framework to build an NSF/SSO-based highly resilient stack-system. The state of Cisco IOSd Software on each system is unique on switches:

- **Active:** This Cisco IOSd Software is fully operational on Active switch. All management planes, Layer 2/3 control planes, and integrated WCMs function from this system.
- **Hot standby:** The Cisco IOSd Software is in Hot Standby state on the Standby switch. To enable 1+1 stateful redundancy, the Active switch synchronizes the network protocol state machines, wireless CAPWAP tunnel states, and so on in real time.
- **Cold:** All key software components remains in Cold state on member or line-card stack switches. The Cisco IOSd Software, management, and hosted applications remain in Active state and are fully programmed for wire-speed distributed switching performance.

Mobility

Q. What is the first version of software code on a Cisco Catalyst 3850 switch?

A. The first software code version on Cisco Catalyst 3850 is Cisco IOS XE Software 3.2.0SE. The Cisco IOSd Software version is 15.0(1)EX. To run the Cisco Catalyst 3850 12-port and 24-port SFP models, Cisco IOS XE Software 3.3.3SE is required. To run the newer Cisco Catalyst 3850 12-port and 24-port SFP+ models Cisco IOS XE Software 3.7.1SE is required. The Cisco Catalyst 3850 48-port SFP+ model will be supported on 3.7.2SE.

Q. Can the Cisco Catalyst 3850 be upgraded with only the controller software?

A. The Cisco Catalyst 3850 has a single Cisco IOS Software image that has wired and wireless capabilities built in. The wireless controller software cannot be upgraded separately.

Q. Is there a separate wireless configuration wizard on the Cisco Catalyst 3850?

A. There is no separate wireless configuration for the Cisco Catalyst 3850. The configuration wizard enables the Cisco Catalyst 3850 for basic wired and wireless functionality.

Q. Which models of access points can a Cisco Catalyst 3850 switch support?

A. The following models of access points are supported: LAP1040, LAP1142, LAP1260, CAP3700, CAP3500, CAP3600, CAP2600, and CAP1600, AP700I, AP700W, AP2700 and AP1530 (no mesh).

Q. In what modes can an access point operate when connected to a Cisco Catalyst 3850?

A. The following access point modes are supported on the Cisco Catalyst 3850:

- Local mode
- SE connect mode
- Monitor mode
- Sniffer mode

Flex mode and indoor mesh access points are not supported.

Q. Does the Cisco Catalyst 3850 support indirectly connected access points?

A. No. The Cisco Catalyst 3850 switch will always terminate the CAPWAP tunnel locally. Pass-through mode or indirectly connected access point is not supported at this time. Note that a Cisco Catalyst 3850 12-port or 24-port SFP model can be a good choice to act as mobility controller for a stack of Cisco Catalyst 3850 switches that terminate CAPWAP tunnels locally.

Q. In what wireless modes can the Cisco Catalyst 3850 operate?

A. The Cisco Catalyst 3850 Series Switch supports two modes of operation. It can be operated as a mobility agent or mobility controller.

Q. What is a mobility controller?

A. A mobility controller is a switch providing mobility management services for group roaming events. The mobility controller provides a central point of contact for management and policy-based control protocols. In mobility controller mode, the mobility agent capabilities are inherited. The mobility controller functionality requires an IP Base or IP Services image licenses with necessary AP count licenses.

Q. What is a mobility agent (MA)?

A. A mobility agent is an access switch such as Cisco Catalyst 3850 with a wireless module running on it. A mobility agent has the following functionality: CAPWAP tunnels of directly connected access points and maintaining client mobility state machine. The mobility agent functionality requires an IP Base or IP Services capable image licenses.

Q. Can Mobility Agent (MA) be paired with Mobility Controller (MC) over the WAN?

A. No. The MA and MC must not be deployed over the WAN; they must be deployed within LAN (L2/L3) boundary.

Q. What is a switch peer group (SPG)?

A. Switch peer group is the list of statically configured neighboring switches. It localizes traffic for roams within its distribution block.

Q. What is a mobility group?

A. A mobility group is the grouping of a mobility controller and related devices to enable fast roaming, radio frequency management, and so on.

Q. What is a mobility domain?

A. A mobility domain is the entire set of wireless devices across which roaming is supported.

Q. What are the scalability numbers for new converged access architecture?

A. Table 4 provides scalability information.

Q. How is Layer 3 Roaming enabled in a distributed architecture?

A. The data is tunneled back to the switch where the IP address lives (the anchor switch).

Table 4. Scalability Numbers with Cisco 3850 as Mobility Controller

Scalability	3850 as MC	5760	5508	WiSM2
Max number of MC in Mobility Domain	8	72	72	72
Max number of MC in Mobility Group	8	24	24	24
Max number of MAs in Sub-domain (per MC)	16	350	350	350
Max number of SPGs in Sub-domain (per MC)	8	24	24	24
Max number of MAs in a SPG	16	64	64	64

Q. Are 5508 and WiSM2 supported as part of the converged access deployment mode?

A. Yes. The 5508 and WiSM2 with 7.6.x and 8.0.x can operate as mobility controllers with the Cisco Catalyst 3850.

Q. What type of HA functionality is supported by the Cisco Catalyst 3850 switch stack?

A. The Cisco Catalyst 3850 switch stack supports transparent access point failover with access point SSO functionality. Client SSO will be added at a later time.

Q. What is the difference between new Cisco Catalyst 3850 and legacy Cisco Catalyst 3750G-WS Series Switch with integrated controller?

A. The 3750G-WS has separate control and data planes for wired and wireless functionality. The Cisco IOS XE architecture enables converged wired and wireless in the next-generation Cisco Catalyst 3850 switch. The new converged access delivers a single OS, system operation, and management for wired and wireless users. Both wired and wireless features can be configured and monitored using a single console.

Q. What are the new safety and compliance standards supported?

A. FIPS 140-2, Common Criteria (CC), UC APL, USGv6.

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