

## Q&A

# Deploying High Availability in the Wiring Closet

**Q.** Why deploy high availability in the wiring closet?

**A.** Organizations are using new business-enhancing real-time collaborative applications and communications tools such as IP telephony, IP video, and multimedia conferencing. More than ever, employees are more dependent on the network to deliver these productivity-enhancing applications. Historically, organizations have deployed high-availability features and designs in the distribution and core of the network. However, as employee productivity becomes increasingly dependent on the network, these high-availability features need to be extended to the wiring closet. A failure in the wiring closet can leave users unable to access the network, costing organizations thousands of dollars per hour in lost productivity.

**Q.** How do I increase high availability in the wiring closet?

**A.** There are two primary ways to increase high availability in the wiring closet: deploying device-level resiliency and deploying network-level resiliency. Cisco Systems® offers several switch families, including fixed switches, stackables, and modular switches, each with a varying amount of device-level and network-level resiliency features to meet specific business needs.

**Q.** What are the differences between device-level features and network-level features?

**A.** Device-level features help ensure that the switches used to provide network connectivity have built-in redundant features in both hardware and software, thus reducing the chances of device failure. Network-level features revolve around the software features that allow organizations to build high-availability network designs to help ensure the network itself is resilient and has the intelligence to detect and bypass link and device failures.

**Q.** How do you provide high availability with fixed switches?

**A.** To help ensure high availability with fixed switches, enterprises can deploy stackable Cisco® Catalyst® 3750 Series Switches with Cisco StackWise™ technology, which uses stack interconnect cables to create a virtual switch fabric for fixed switches. This technology brings to fixed switches a level of resiliency not found in fixed switches.

**Q.** What is Cisco StackWise technology?

**A.** Cisco StackWise technology provides an innovative method for collectively using and extending the resources of a stack. Up to nine switches can be joined together to create a single switching unit controlled by a master switch in the stack. In the case of master switch failure, another master switch takes over with minimal disruption within 2 to 3 seconds. Switches within the stack can be added and removed without affecting user network access. Its innovative design sets the bar of availability in stackable switches. It supports link-level and stack-level redundancy. The Cisco Catalyst 3750 Series supports cross-stack EtherChannel® technology as well as Cross-Stack UplinkFast (with subsecond failover) and cross-stack equal cost routes across different switches in the stack.

**Q.** Do modular switches have higher availability than fixed switches?

**A.** Yes, the modular Cisco Catalyst 4500 and 6500 Series Switches take high availability to the next level with numerous innovative features to help ensure very high levels of resiliency in the wiring closet. Modular switches inherently have many physical redundant features that are optimized for deployment in “single-connection” environments such as the wiring closet. The primary hardware-level high-availability features include redundant power supplies and fans and dual supervisors. Essentially, every important component that can fail has a backup.

**Q.** Does the switch experience a temporary outage when the primary supervisor fails over to the backup?

**A.** No. In modular chassis with dual supervisors, a feature called Nonstop Forwarding with Stateful Switchover (NSF/SSO) synchronizes information between the primary and backup supervisors, allowing for rapid supervisor switchover if the primary fails. With NSF/SSO, switchover happens in less than 150 milliseconds (ms), which is essentially transparent to end users even if they are on an IP voice call. NSF/SSO is an essential

feature for single points of termination in the wiring closet, especially in converged networks, where users are heavily dependent on the network for data, voice, and other real-time applications.

**Q.** How does control plane policing (CoPP) help with high availability?

**A.** CoPP allows users to configure a quality-of-service (QoS) filter that manages the traffic flow to the CPU to help ensure that malicious traffic does not cripple a switch by overwhelming the CPU. Denial-of-service (DoS) attacks can generate a mass volume of traffic directed to a switch's CPU. This traffic can overrun the CPU, causing poor performance or an outage. CoPP is critical to mitigate such threats.

**Q.** Are there features to proactively help ensure the health of a switch?

**A.** Yes. Generic On-Line Diagnostics (GOLD) provides proactive hardware and software diagnosis of faults before they become a problem. It provides enhanced diagnostics during bootstrap and nonintrusive on-demand tests on live systems.

**Q.** Is GOLD support on all Cisco Catalyst platforms?

**A.** GOLD is supported on the Cisco Catalyst 3560, 3750, 4500, and 6500 Series Switches in varying degrees. The highest level of support is on the Cisco Catalyst 6500 Series. GOLD features are continuously being added to the platforms.

**Q.** How does Cisco IOS® Software modularity increase network availability?

**A.** The Cisco Catalyst 6500 Series with Cisco IOS Software modularity minimizes downtime through evolutionary software infrastructure advancements. By enabling modular Cisco IOS Software subsystems to run in independent processes, a disruption of a single protocol or process caused by internal or external influences will no longer affect the entire system. This innovation also minimizes unplanned downtime through self-healing processes, simplifies software changes through subsystem In Service Software Upgrades (ISSU), and enables automated process-level policy control by integrating Embedded Event Manager (EEM).

**Q.** What is EEM?

**A.** EEM is part of Cisco IOS Software modularity in the Cisco Catalyst 6500 Series. It provides the switch the capability to automatically take a prescribed action based on an event. This automation tool further enhances the switch's capability to avoid an outage by taking immediate proactive action.

**Q.** Is Cisco IOS Software modularity available on all Cisco Catalyst platforms?

**A.** No. Cisco IOS Software modularity is only available on the Cisco Catalyst 6500 Series.

**Q.** What are some of the high-level features for delivering network protocol-level high availability?

**A.** Many features are integrated into Cisco Catalyst switches; several are described in the following paragraphs. Other important features not listed here include numerous Spanning Tree Protocol and routing protocol enhancements. To use the intelligence of routing protocols, customers are beginning to deploy routed access designs in their campus networks (see next question for more information about routed access).

HSRP and Virtual Router Redundancy Protocol (VRRP) target single points of termination in a Layer 2 access design. HSRP and VRRP provide a backup "standby" default gateway for users connected in the wiring closet.

Gateway Load Balancing Protocol (GLBP) is a Cisco extension to HSRP. GLBP allows users to use the HSRP standby router while functioning as a standby. This allows better utilization of network investments by load balancing traffic across the active and standby gateway routers.

**Q.** What is a routed access solution?

**A.** A routed access solution uses routing protocols in the wiring closet to provide increased network availability. By utilizing the intelligence and resiliency capabilities of routed protocols such as Enhanced Interior Gateway Routing Protocol (EIGRP) and Open Shortest Path First (OSPF), routing in the access layer or wiring closet delivers the mechanisms that enable a network to recover from failure in a deterministic way without having to fine tune multiple protocols or devices. Cisco EIGRP also delivers convergence times of less than 200 ms with fewer configuration

commands. The inherent deterministic recovery from failure helps ensure that your network remains available for your critical communication applications.

**Q.** What are the primary benefits of a routed access design?

**A.** Some of the primary benefits are:

- Reduces network recovery times by converging around failures more quickly
- Eliminates the need for Spanning Tree Protocol in the network, reducing the need for multiple protocols
- Provides simpler configuration and troubleshooting for faster problem resolution resulting in higher availability
- Allows better utilization of bandwidth



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