

# Cisco Catalyst **2950** Series Switches— with Standard Image Software

## Product Overview

The Cisco Catalyst 2950SX-24, 2950-24, and 2950-12, members of the Cisco Catalyst 2950 Series Switches, are standalone, fixed-configuration, managed 10/100 switches providing basic workgroup connectivity for small to midsized networks. These wire-speed desktop switches come with Standard Image (SI) Software features and offer Cisco IOS® functionality for basic data, video and voice services at the edge of the network. Embedded in all Catalyst 2950 Series is the Cisco Cluster Management Suite (CMS) Software, which allows users to simultaneously configure and troubleshoot multiple Catalyst desktop switches using a standard Web browser.

This product line offers two distinct sets of software features and a range of configurations to allow small, midsized, and enterprise branch offices to select the right combination for the network edge. The SI software offers Cisco IOS functionality for basic data, video, and voice services. For networks with requirements for additional security, advanced quality of service (QoS), and high availability, the Enhanced Image (EI) software delivers intelligent services such as rate limiting and security filtering for deployment at the network edge.

The Catalyst 2950SX-24, 2950-12, and 2950-24 switches are only available with the SI software for the Catalyst 2950 Series.

- Catalyst 2950SX-24 Switch—24 10/100 ports with 2 fixed 1000BASE-SX uplinks
- Catalyst 2950-24 Switch—24 10/100 ports
- Catalyst 2950-12 Switch—12 10/100 ports

These switches provide customers with a choice of connectivity options. While the Catalyst 2950-12 and 2950-24 provide 12 and 24 10/100 ports for edge connectivity respectively, the Catalyst 2950SX-24 provides 24 10/100 ports and 2 integrated 1000BASE-SX ports for gigabit uplink connectivity over fiber. With these integrated ports, customers get an extremely cost-effective solution for delivering gigabit speeds using fiber. Dual ports also provide redundancy and increased availability, as well as provide a cost-effective means for cascading switches and managing them as a cluster. This switch is ideal for education and government segments, where fiber uplinks are a requirement.

The Catalyst® 2950 Series Intelligent Ethernet Switches with EI Software are also part of the Catalyst 2590 Series switches. These fixed-configuration, stackable models bring intelligent services, such as advanced QoS, enhanced security, and high availability to the network edge—while maintaining the simplicity of traditional LAN switching. When a Catalyst 2950 Intelligent Ethernet Switch is combined with a Catalyst 3550 Series Switch, the

solution enables IP routing from the edge to the core of the network. Refer to the Catalyst 2950 Series EI Data Sheet for more information.

### **Network Availability with Wire-Speed Performance in Connecting End-Stations to the LAN**

With a switching fabric of 8.8 Gigabits per second (Gbps) and a maximum forwarding bandwidth of 4.4 Gbps, these Catalyst 2950 switches deliver wire-speed performance on all ports in connecting end-stations and users to the company LAN. Catalyst 2950 switches with basic services support performance-boosting features such as Fast EtherChannel<sup>®</sup>—offering up high-performance bandwidth between Catalyst switches, routers, and servers.

### **Network Security**

The Cisco Catalyst 2950 Series switches offer enhanced data security through a wide range of security features. These features allow customers to provide network security based on users and/or MAC addresses. The security enhancements are available free-of-charge by downloading the latest software release for the Catalyst 2950 switches.

Private VLAN Edge isolates ports on a switch, ensuring that traffic travels directly from the entry point to the aggregation device through a virtual path and cannot be directed to another port. In addition, for authentication of users with a Terminal Access Controller Access Control System (TACACS+) or a RADIUS server, 802.1x provides port-level security. SNMPv3 (non-crypto) monitors and controls network devices as well as manages configurations, performance, collection of statistics, and security.

With the Catalyst 2950SX-24, 2950-24, and 2950-12 switches, network managers can implement high levels of port and console security. Media Access Control (MAC) address-based port-level security prevents unauthorized stations from accessing the switch. Multilevel access security on the switch console and the Web-based management interface prevents unauthorized users from accessing or altering switch configuration, and can be implemented using an internal user database on each switch, or a centrally administrated TACACS+ or RADIUS server. 802.1x in conjunction with a RADIUS server allows for dynamic port-based user authentication. In addition, 802.1x can co-exist with port security on a per port basis. Deploying security can be done through Cisco CMS Software Security Wizards, which ease the deployment of security features that restrict user access to a server or portion of the network, or to restrict the applications used in certain areas of the network.

### **Network Control**

The Catalyst 2950SX-24, 2950-24, and 2950-12 switches deliver LAN-edge QoS, supporting two modes of reclassification. One mode—based on the IEEE 802.1p standard—honor the class-of-service (CoS) value at the ingress point and assigns the packet to the appropriate queue. In the second mode, packets can be reclassified based on a default CoS value assigned to the ingress port by the network administrator. In the case of frames that arrive without a CoS value (such as untagged frames), these Catalyst 2950 switches support classification based on a default CoS value per port assigned by the network administrator. Once the frames have been classified or reclassified using one of the above modes, they are assigned to the appropriate queue at the egress. These Catalyst 2950 switches support four egress queues, which allow the network administrator to be more discriminating and granular in assigning priorities for the various applications on the LAN. Strict Priority Scheduling configuration ensures time-sensitive applications, such as voice, always follow an expedited path through the switch fabric. Weighted Round Robin (WRR) scheduling, another significant enhancement, ensures that lower-priority traffic receives attention without comprising the priority settings administered by a network manager. These features allow network administrators to prioritize mission-critical, time-sensitive traffic, such as voice (IP telephony traffic), ERP (Oracle, SAP, and so on), and CAD/CAM over less time-sensitive applications such as FTP or e-mail (SMTP).

### **Network Availability**

To provide efficient use of resources for bandwidth-hungry applications like multicasts, the Cisco Catalyst 2950 Series switches support Internet Group Management Protocol (IGMP) snooping in hardware. Through the support and configuration of IGMP snooping via the Cisco CMS Software, these Catalyst 2950 Series switches deliver outstanding performance and ease of use in administering and managing multicast applications on the LAN.

The IGMP snooping feature allows the switch to “listen in” on the IGMP conversation between hosts and routers. When a switch hears an IGMP join request from a host for a given multicast group, the switch adds the host’s port number to the Group Destination Address (GDA) list for that group. And, when the switch hears an IGMP leave request, it removes the host’s port from the Content Addressable Memory (CAM) table entry.

Multicast VLAN Registration (MVR) is designed for applications using wide-scale deployment of multicast traffic across an Ethernet ring-based service provider network (for example, the broadcast of multiple television channels over a service-provider network). MVR allows a subscriber on a port to subscribe and unsubscribe to a multicast stream on the network-wide multicast VLAN.

Per VLAN Spanning-Tree Plus (PVST+) allows users to implement redundant uplinks while also distributing traffic loads across multiple links. This is not possible with standard Spanning-Tree Protocol implementations. Cisco UplinkFast technology ensures immediate transfer to the secondary uplink, much better than the traditional 30 to 60 second convergence time. This is yet another enhancement of the Spanning-Tree Protocol implementation. An additional feature that enhances performance is Voice VLAN. This feature allows network administrators to assign voice traffic to a VLAN dedicated to IP telephony—simplifying phone installations and providing easier network traffic administration and troubleshooting.

## Network Management

The Cisco CMS is Web-based software that is embedded in Catalyst 3550, 2950, 3500 XL, 2900 XL, and 2900 LRE XL switches. Through Cisco Switch Clustering technology, users access Cisco CMS Software with any standard Web browser to manage up to 16 of these switches at once, regardless of their geographic proximity—with the option of using a single IP address for the entire cluster if desired. With the addition of the Catalyst 3550 switches, Cisco CMS Software can now extend beyond routed boundaries for even more flexibility in managing a Cisco cluster.

Cisco CMS Software supports standards-based connectivity options such as Ethernet, Fast Ethernet, Fast EtherChannel, Gigabit Ethernet, and Gigabit EtherChannel connectivity. Because Cisco Switch Clustering technology is not limited to a single stack of switches, Cisco CMS Software expands the traditional cluster domain beyond a single wiring closet and saves time and effort for network administrators.

Catalyst 2950 switches can be configured either as command or member switches in a Cisco switch cluster. Cisco CMS also allows the network administrator to designate a standby or redundant command switch, which takes the commander duties should the primary command switch fail. Other key features include the ability to configure multiple ports and switches simultaneously, as well as perform software updates across the entire cluster at once, and clone configurations to other clustered switches for rapid network deployment. Bandwidth graphs and link reports provide useful diagnostic information and the topology map gives network administrators a quick view of the network status.

In addition to CMS, Cisco Catalyst 2950 switches provide extensive management tools using Simple Network Management Protocol (SNMP) network management platforms such as CiscoWorks for Switched Internetworks.

The Cisco Catalyst 2950 Switches delivers a comprehensive set of management tools to provide the required visibility and control in the network. Managed with CiscoWorks2000, Catalyst family switches can be configured and managed to deliver end-to-end device, VLAN, traffic, and policy management. Coupled with CiscoWorks2000, Cisco Resource Manager Essentials, a Web-based management tool, offers automated inventory collection, software deployment, easy tracking of network changes, views into device availability, and quick isolation of error conditions.

**Figure 1**  
Catalyst 2950-12 Switch



**Figure 2**  
Catalyst 2950-24 Switch



**Figure 3**  
Catalyst 2950SX-24 Switch





## Product Features and Benefits

| Feature  | Benefit  |
|--|--|
| <b>Availability</b>                                      |  |
| Superior Redundancy for Fault Backup                     | <ul style="list-style-type: none"><li>• IEEE 802.1D Spanning-Tree Protocol support for redundant backbone connections and loop-free networks simplifies network configuration and improves fault tolerance.</li><li>• Support for Cisco Spanning-Tree Protocol enhancements such as UplinkFast, BackboneFast, and PortFast technologies ensure quick fail-over recovery enhancing overall network stability and availability.</li><li>• Support for Cisco's optional, 300-watt redundant AC power system provides a backup power source for up to four units for improved fault tolerance and network uptime.</li><li>• Provides unidirectional link detection (UDLD) and Aggressive UDLD for detecting and disabling unidirectional links on fiber-optic interfaces caused by incorrect fiber-optic wiring or port faults.</li></ul>  |
| Integrated Cisco IOS Features for Bandwidth Optimization | <ul style="list-style-type: none"><li>• Bandwidth aggregation through EtherChannel<sup>®</sup> technology enhances fault tolerance and offers higher-speed aggregated bandwidth between switches, to routers and individual servers. Port Aggregation Protocol (PAgP) is available to simplify configuration.</li><li>• Per-port broadcast, multicast, and unicast storm control prevents faulty end stations from degrading overall systems performance.</li><li>• Per virtual LAN (VLAN) Spanning-Tree Plus (PVST+) allows for Layer 2 load sharing on redundant links to efficiently utilize the extra capacity inherent in a redundant design.</li><li>• VLAN Trunking Protocol (VTP) pruning limits bandwidth consumption on VTP trunks by flooding broadcast traffic only on trunk links required to reach the destination devices. Dynamic Trunking Protocol (DTP) enables dynamic trunk configuration across all ports in the switch.</li><li>• IGMP snooping provides for fast client joins and leaves of multicast streams and limits bandwidth-intensive video traffic to only the requestors. MVR, IGMP filtering and fast-join and immediate leave are available as enhancements.</li></ul> |
| <b>Security</b>  |  |



| Feature                        | Benefit  |
|--------------------------------|--|
| Network-Wide Security Features | <ul style="list-style-type: none"><li>• A private VLAN edge provides security and isolation between ports on a switch, ensuring that voice traffic travels directly from its entry point to the aggregation device through a virtual path and cannot be directed to a different port.</li><li>• Support for the 802.1x standard allows users to be authenticated regardless of which LAN port they are accessing, and provides unique benefits to customers who have a large base of mobile (wireless) users accessing the network.<ul style="list-style-type: none"><li>– 802.1x with voice VLAN to permit an IP phone access to the voice VLAN irrespective of the authorized or unauthorized state of the port.</li><li>– 802.1x with port security for authenticating the port and managing network access for all MAC addresses, including that of the client.</li></ul></li><li>• Port Security secures the access to a port based on the MAC address of a user's device. The aging feature removes the MAC address from the switch after a specific timeframe to allow another device to connect to the same port.</li><li>• MAC Address Notification allows administrators to be notified of new users added or removed from the network.</li><li>• Multilevel security on console access prevents unauthorized users from altering the switch configuration.</li><li>• Trusted Boundary provides the ability to trust the QoS priority settings if an IP phone is present and disable the trust setting in the event that the IP phone is removed, thereby preventing a rogue user from overriding prioritization policies in the network.</li><li>• TACACS+ and RADIUS authentication to enable centralized control of the switch and restrict unauthorized users from altering the configuration.</li><li>• SNMPv3 (non-crypto) monitors and controls network devices, manages configurations, statistics collection, performance, and security</li><li>• Cisco CMS Software Security Wizards ease the deployment of security features for restricting user access to a server, a portion of the network, or access to the network.</li></ul> |
| <b>QoS</b>                     |  |
| Layer 2 QoS                    | <ul style="list-style-type: none"><li>• Support for reclassifying frames based either on 802.1p CoS value or default CoS value per port assigned by network manager.</li><li>• Four queues per egress port supported in hardware.</li><li>• The WRR scheduling algorithm ensures that low-priority queues are not starved.</li><li>• Strict priority queue configuration via Strict Priority Scheduling ensures that time-sensitive applications such as voice always follow an expedited path through the switch fabric.</li></ul>  |



| Feature                | Benefit  |
|------------------------|--|
| <b>Management</b>      |  |
| Superior Manageability | <ul style="list-style-type: none"><li>• SNMP and Telnet interface support delivers comprehensive in-band management, and a command-line interface (CLI)-based management console provides detailed out-of-band management.</li><li>• An embedded Remote Monitoring (RMON) software agent supports four RMON groups (history, statistics, alarms, and events) for enhanced traffic management, monitoring, and analysis.</li><li>• A SPAN port can mirror traffic from one or many ports to another port for monitoring all nine RMON groups with an RMON probe or network analyzer.</li><li>• Trivial File Transfer Protocol (TFTP) reduces the cost of administering software upgrades by downloading from a centralized location.</li><li>• Network Timing Protocol (NTP) provides an accurate and consistent timestamp to all switches within the intranet.</li><li>• Layer 2 traceroute eases troubleshooting by identifying the physical path that a packet takes from the source device to a destination device.</li><li>• Multifunction LEDs per port for port status, half-duplex/full-duplex, 10BASE-T/100BASE-TX/1000BASE-T indication, as well as switch-level status LEDs for system, redundant power supply, and bandwidth utilization provide a comprehensive and convenient visual management system.</li><li>• Crash Information support enables switch to generate a crash file for improved troubleshooting.</li><li>• Show-interface-capabilities provides information on configuration capabilities of any interface.</li><li>• RTTMON-MIB allows users to monitor network performance between a Catalyst switch and a remote device.</li></ul>  |
| Cisco CMS              | <ul style="list-style-type: none"><li>• Cisco CMS Software allows the user to manage up to 16 inter-connected Cisco Catalyst 3550, 2950, 3500 XL, 2900 XL, and 2900 LRE XL switches without the limitation of being physically located in the same wiring closet, and with the option of using a single IP address for the entire cluster if desired. Full backward compatibility ensures any combination of the above switches can be managed with a Cisco Catalyst 2950 switch.</li><li>• Cisco Architecture for Voice, Video and Integrated Data (AVVID) Wizards use just a few user inputs to automatically configure the switch to optimally handle different types of traffic: voice, video, multicast, and/or high-priority data.</li><li>• One-click software upgrades can be performed across the entire cluster simultaneously, and configuration cloning enables rapid deployment of networks.</li><li>• Cisco CMS Guide Mode assists users in the configuration of powerful advanced features by providing step-by-step instructions.</li><li>• Cisco CMS provides enhanced online help for context-sensitive assistance.</li><li>• Easy-to-use graphical interface provides both a topology map and front panel view of the cluster.</li><li>• Multi-device and multiport configuration capabilities allow network administrators to save time by configuring features across multiple switches and ports simultaneously.</li><li>• Ability to launch the Web-based management for a Cisco Aironet Wireless Access Point by simply clicking on its icon in the topology map.</li><li>• User-personalized interface allows users to modify polling intervals, table views, and other settings within CMS and retain these settings the next time they use CMS.</li><li>• Alarm notification provides automated e-mail notification of network errors and alarm thresholds.</li></ul> |



| Feature                            | Benefit   |
|------------------------------------|---|
| Support for CiscoWorks             | <ul style="list-style-type: none"> <li>• Manageable through CiscoWorks network management software on a per-port and per-switch basis providing a common management interface for Cisco routers, switches, and hubs.</li> <li>• SNMP v1, v2, and v3 (non-crypto) and Telnet interface support delivers comprehensive in-band management, and a CLI-based management console provides detailed out-of-band management.</li> <li>• Cisco Discovery Protocol (CDP) Versions 1 and 2 enable a CiscoWorks network management station to automatically discover the switch in a network topology.</li> <li>• Supported by the CiscoWorks 2000 LAN Management Solution.</li> </ul>   |
| Ease of Use and Ease of Deployment | <ul style="list-style-type: none"> <li>• Auto-configuration eases deployment of switches in the network by automatically configuring multiple switches across a network via a bootp server.</li> <li>• Auto-sensing on each port detects the speed of the attached device and automatically configures the port for 10- or 100-operation, easing the deployment of the switch in mixed 10- and 100BASE-T environments.</li> <li>• Auto-negotiating on all ports automatically selects half- or full-duplex transmission mode to optimize bandwidth.</li> <li>• Link Aggregation Control Protocol (LACP) allows the creation of Ethernet channeling with devices that conform to IEEE 802.3ad. This is similar to Cisco's EtherChannel and PAGP.</li> <li>• Cisco CDP Versions 1 and 2 enable a CiscoWorks network management station to automatically discover the switch in a network topology.</li> <li>• Cisco VTP supports dynamic VLANs and dynamic trunk configuration across all switches.</li> <li>• Support for dynamic VLAN assignment through implementation of VLAN Membership Policy Server (VMPS) client functionality provides flexibility in assigning ports to VLANs.</li> <li>• Voice VLAN simplifies telephony installations by keeping voice traffic on a separate VLAN for easier network administration and troubleshooting.</li> <li>• The default configuration stored in Flash ensures that the switch can be quickly connected to the network and can pass traffic with minimal user intervention.</li> </ul> |

## Product Specifications

| Feature     | Description  |
|-------------|--|
| Performance | <ul style="list-style-type: none"> <li>• 8.8-Gbps switching fabric</li> <li>• Catalyst 2950-12: 2.4-Gbps maximum forwarding bandwidth</li> <li>• Catalyst 2950-24: 4.8-Gbps maximum forwarding bandwidth</li> <li>• Catalyst 2950SX-24: 8.8-Gbps maximum forwarding bandwidth<br/>(Forwarding Rates based on 64-byte packets)</li> <li>• Catalyst 2950-12: 1.8-Mpps wire-speed forwarding rate</li> <li>• Catalyst 2950-24: 3.6-Mpps wire-speed forwarding rate</li> <li>• Catalyst 2950SX-24: 6.6-Mpps wire-speed forwarding rate</li> <li>• 8-MB packet buffer memory architecture shared by all ports</li> <li>• 16-MB DRAM and 8-MB Flash memory</li> <li>• Configurable up to 8000 MAC addresses</li> </ul> |



| Feature    | Description  |
|------------|--|
| Management | <ul style="list-style-type: none"><li>• BRIDGE-MIB</li><li>• CISCO-2900-MIB</li><li>• CISCO-BULK-FILE-MIB</li><li>• CISCO-CDP-MIB</li><li>• CISCO-CLASS-BASED-QOS-MIB</li><li>• CISCO-CLUSTER-MIB</li><li>• CISCO-CONFIG-COPY-MIB</li><li>• CISCO-CONFIG-MAN-MIB</li><li>• CISCO-ENVMON-MIB</li><li>• CISCO-FLASH-MIB</li><li>• CISCO-FTP-CLIENT-MIB</li><li>• CISCO-IMAGE-MIB</li><li>• CISCO-IPMROUTE-MIB</li><li>• CISCO-MAC-NOTIFICATION-MIB</li><li>• CISCO-MEMORY-POOL-MIB</li><li>• CISCO-PAGP-MIB</li><li>• CISCO-PING-MIB</li><li>• CISCO-PROCESS-MIB</li><li>• CISCO-PRODUCTS-MIB</li><li>• CISCO-RTTMON-MIB</li><li>• CISCO-SMI</li><li>• CISCO-STACKMAKER-MIB</li><li>• CISCO-STP-EXTENSIONS-MIB</li><li>• CISCO-SYSLOG-MIB</li><li>• CISCO-TC</li><li>• CISCO-TCP-MIB</li><li>• CISCO-VLAN-MEMBERSHIP-MIB</li><li>• CISCO-VTP-MIB</li><li>• ENTITY-MIB</li><li>• IANAifType-MIB</li><li>• IF-MIB (RFC 1573)</li><li>• OLD-CISCO-CHASSIS-MIB</li><li>• OLD-CISCO-CPU-MIB</li><li>• OLD-CISCO-INTERFACES-MIB</li><li>• OLD-CISCO-IP-MIB</li><li>• OLD-CISCO-MEMORY-MIB</li><li>• OLD-CISCO-SYSTEM-MIB</li><li>• OLD-CISCO-TCP-MIB</li><li>• OLD-CISCO-TS-MIB</li><li>• RFC1213-MIB (MIB-II)</li><li>• RFC1398-MIB (ETHERNET-MIB)</li><li>• RMON-MIB (RFC 1757)</li><li>• RS-232-MIB</li><li>• SNMPv2-MIB</li><li>• SNMPv2-SMI</li><li>• SNMPv2-TC</li><li>• TCP-MIB</li><li>• UDP-MIB</li></ul> |



| Feature   | Description   |
|---|---|
| Standards                                       | <ul style="list-style-type: none"> <li>• IEEE 802.1x support</li> <li>• IEEE 802.3x full duplex on 10BASE-T and 100BASE-TX ports</li> <li>• IEEE 802.1D Spanning-Tree Protocol</li> <li>• IEEE 802.1p CoS prioritization</li> <li>• IEEE 802.1Q VLAN</li> <li>• IEEE 802.3 10BASE-T specification</li> <li>• IEEE 802.3u 100BASE-TX specification</li> <li>• IEEE 802.3ad</li> <li>• IEEE 802.3z 1000BASE-X specification</li> </ul>  |
| Y2K   | <ul style="list-style-type: none"> <li>• Y2K compliant</li> </ul>   |
| Connectors and Cabling                          | <ul style="list-style-type: none"> <li>• 10BASE-T ports: RJ-45 connectors, two-pair Category 3, 4, or 5 unshielded twisted-pair (UTP) cabling</li> <li>• 100BASE-TX ports: RJ-45 connectors; two-pair Category 5 UTP cabling</li> <li>• 1000BASE-SX ports: MT-RJ connectors, up to 550 meters Cable distance for 50/125, or up to 275 meters Cable distance for 62.5/125 micron multimode fiber-optic cabling</li> <li>• Management console port: 8-pin RJ-45 connector, RJ-45-to-DB9 adapter cable for PC connections; for terminal connections, use RJ-45-to-DB25 female data-terminal-equipment (DTE) adapter (can be ordered separately from Cisco, part number ACS-DSBUASYN=)</li> </ul>   |
| MTRJ Patch Cables for Catalyst 2950SX-24 Switch | <p>Type of Cable, Cisco Part Number</p> <ul style="list-style-type: none"> <li>• 1-meter, MT-RJ-to-SC multimode cable, CAB-MTRJ-SC-MM-1M</li> <li>• 3-meter, MT-RJ-to-SC multimode cable, CAB-MTRJ-SC-MM-3M</li> <li>• 5-meter, MT-RJ-to-SC multimode cable, CAB-MTRJ-SC-MM-5M</li> <li>• 1-meter, MT-RJ-to-ST multimode cable, CAB-MTRJ-ST-MM-1M</li> <li>• 3-meter, MT-RJ-to-ST multimode cable, CAB-MTRJ-ST-MM-3M</li> <li>• 5-meter, MT-RJ-to-ST multimode cable, CAB-MTRJ-ST-MM-5M</li> </ul>  |
| Power Connectors                                | <p>Customers can provide power to a switch by using either the internal power supply or the Cisco Redundant Power System (RPS) 300. The connectors are located at the back of the switch.</p> <p>Internal Power Supply Connector</p> <ul style="list-style-type: none"> <li>• The internal power supply is an auto-ranging unit.</li> <li>• The internal power supply supports input voltages between 100 and 240 VAC.</li> <li>• Use the supplied AC power cord to connect the AC power connector to an AC power outlet.</li> </ul> <p>Cisco RPS Connector</p> <ul style="list-style-type: none"> <li>• The connector offers connection for an optional Cisco RPS 300 that uses AC input and supplies DC output to the switch.</li> <li>• The connector offers a 300-watt redundant power system that can support six external network devices and provides power to one failed device at a time.</li> <li>• The connector automatically senses when the internal power supply of a connected device fails and provides power to the failed device, preventing loss of network traffic.</li> <li>• Attach only the Cisco RPS 300 (model PWR300-AC-RPS-N1) to the redundant-power-supply receptacle.</li> </ul> |
| Indicators                                      | <ul style="list-style-type: none"> <li>• Per-port status LEDs: link integrity, disabled, activity, speed, and full-duplex indications</li> <li>• System status LEDs: system, RPS, and bandwidth utilization indications</li> </ul>  |



| Feature                                      | Description  |
|--|--|
| Dimensions and Weight<br>(H x W x D)         | <ul style="list-style-type: none"> <li>• 1.72 x 17.5 x 9.52 in. (4.36 x 44.45 x 24.18 cm)</li> <li>• One rack-unit high (1.72 in./4.36 cm)</li> <li>• 6.5 lb (3.0 kg)</li> </ul>   |
| Environmental Ranges                         | <ul style="list-style-type: none"> <li>• Operating temperature: 32° to 113°F (0°C to 45°C) \</li> <li>• Storage temperature: -13° to 158° F (-25° to 70°C)</li> <li>• Operating relative humidity: 10 to 85% (non-condensing)</li> <li>• Operating altitude: Up to 10,000 ft (3,000 m)</li> <li>• Storage Altitude: Up to 15,000 ft (4,500 m)</li> </ul> |
| Power Requirements                           | <ul style="list-style-type: none"> <li>• Power consumption: 30W (maximum), 102 BTUs per hour</li> <li>• AC input voltage/frequency: 100 to 127 or 200 to 240 VAC (auto-ranging), 50 to 60 Hz</li> <li>• DC Input Voltages for Cisco RPS 300 RPS: +12V @ 4.5A</li> </ul>  |
| Acoustic Noise                               | <ul style="list-style-type: none"> <li>• ISO 7770, bystander position—operating to an ambient temperature of 30 degrees Celsius:               <ul style="list-style-type: none"> <li>– WS-C2950-24, WS-C2950-12, WS-C2950C-24, WS-C2950T-24: 46dBa</li> <li>– WS-C2950G-12, WS-C2950G-24: 46 dBa</li> <li>– WS-C2950G-48: 48 dBa</li> </ul> </li> </ul> |
| Mean Time Between Failure (MTBF) — Predicted | <ul style="list-style-type: none"> <li>• 268,292 hours (Catalyst 2950-24)</li> <li>• 318,440 hours (Catalyst 2950-12)</li> <li>• 403,214 hours (Catalyst 2950SX-24)</li> </ul>   |
| <b>Regulatory Agency Approvals</b>           |  |
| Safety Certifications                        | <ul style="list-style-type: none"> <li>• UL 60950/CSA 22.2 No. 950</li> <li>• IEC 60950/EN 60950</li> <li>• AS/NZS 3260, TS001</li> <li>• CE Marking</li> </ul>  |
| Electromagnetic Emissions Certifications     | <ul style="list-style-type: none"> <li>• FCC Part 15 Class A</li> <li>• EN 55022: 1998 (CISPR 22) Class A</li> <li>• EN 55022: 1998 (CISPR 22)</li> <li>• VCCI Class A</li> <li>• AS/NZS 3548 Class A</li> <li>• CE Marking</li> <li>• CNS 13438 Class A</li> <li>• CLEI Code</li> <li>• MIC</li> </ul>  |
| Warranty                                     | <ul style="list-style-type: none"> <li>• Lifetime limited warranty</li> </ul>  |



## Service and Support

The services and support programs described in the table below are available as part of the Cisco Desktop Switching Service and Support solution, and are available directly from Cisco and through resellers.

| Service and Support  | Features  | Benefits  |
|--|---|---|
| <b>Advanced Services</b>   |   |   |
| <i>Total Implementation Solutions (TIS)</i> —available direct from Cisco<br><i>Packaged Total Implementation Solutions (Packaged TIS)</i> —available through resellers | <ul style="list-style-type: none"> <li>• Project management</li> <li>• Site survey, configuration deployment</li> <li>• Installation, text, and cutover</li> <li>• Training</li> <li>• Major Moves, Adds, Changes (MAC)</li> <li>• Design review and product staging</li> </ul> | <ul style="list-style-type: none"> <li>• Supplements existing staff</li> <li>• Ensures functionality meets needs</li> <li>• Mitigates risk</li> </ul>   |
| <b>Technical Support Services</b>  |   |   |
| <i>SMARTnet and SMARTnet Onsite (OS)</i> —available direct from Cisco<br><i>Packaged SMARTnet</i> —available through resellers   | <ul style="list-style-type: none"> <li>• 24x7 access to software updates</li> <li>• Web access to technical repositories</li> <li>• Telephone support through the Technical Assistance Center</li> <li>• Advance replacement of hardware parts</li> </ul>                       | <ul style="list-style-type: none"> <li>• Enables proactive or expedited issue resolution</li> <li>• Lowers cost of ownership by utilizing Cisco expertise and knowledge</li> <li>• Minimize network downtime</li> </ul> |

## Ordering Information

| Model Numbers | Configuration  |
|---------------|--|
| WS-C2950-12   | <ul style="list-style-type: none"> <li>• 12 10/100 ports</li> <li>• 1 rack-unit (RU) standalone, fixed-configuration, managed 10/100 switch</li> <li>• SI Software</li> </ul>                      |
| WS-C2950-24   | <ul style="list-style-type: none"> <li>• 24 10/100 ports</li> <li>• 1 RU standalone, fixed-configuration, managed 10/100 switch</li> <li>• SI Software</li> </ul>                                  |
| WS-C2950SX-24 | <ul style="list-style-type: none"> <li>• 24 10/100 ports with 2 fixed 1000BASE-SX uplinks</li> <li>• 1 RU standalone, fixed-configuration, managed 10/100 switch</li> <li>• SI Software</li> </ul> |

### For More Information on Cisco Products, Contact:

- US and Canada: 800 553-NETS (6387)
- Europe: 32 2 778 4242
- Australia: 612 9935 4107
- Other: 408 526-7209
- World Wide Web URL: <http://www.cisco.com>

## CISCO SYSTEMS



### Corporate Headquarters

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA

www.cisco.com  
Tel: 408 526-4000  
800 553-NETS (6387)  
Fax: 408 526-4100

### European Headquarters

Cisco Systems International BV  
Haarlerbergpark  
Haarlerbergweg 13-19  
1101 CH Amsterdam  
The Netherlands

www-europe.cisco.com  
Tel: 31 0 20 357 1000  
Fax: 31 0 20 357 1100

### Americas Headquarters

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA

www.cisco.com  
Tel: 408 526-7660  
Fax: 408 527-0883

### Asia Pacific Headquarters

Cisco Systems, Inc.  
Capital Tower  
168 Robinson Road  
#22-01 to #29-01  
Singapore 068912

www.cisco.com  
Tel: +65 317 7777  
Fax: +65 317 7799

Cisco Systems has more than 200 offices in the following countries and regions. Addresses, phone numbers, and fax numbers are listed on the

**Cisco Web site at [www.cisco.com/go/offices](http://www.cisco.com/go/offices)**

Argentina • Australia • Austria • Belgium • Brazil • Bulgaria • Canada • Chile • China PRC • Colombia • Costa Rica • Croatia  
Czech Republic • Denmark • Dubai, UAE • Finland • France • Germany • Greece • Hong Kong SAR • Hungary • India • Indonesia • Ireland  
Israel • Italy • Japan • Korea • Luxembourg • Malaysia • Mexico • The Netherlands • New Zealand • Norway • Peru • Philippines • Poland  
Portugal • Puerto Rico • Romania • Russia • Saudi Arabia • Scotland • Singapore • Slovakia • Slovenia • South Africa • Spain • Sweden  
Switzerland • Taiwan • Thailand • Turkey • Ukraine • United Kingdom • United States • Venezuela • Vietnam • Zimbabwe

All contents are Copyright © 1992-2002, Cisco Systems, Inc. All rights reserved. CCIP, the Cisco Arrow logo, the Cisco Powered Network mark, the Cisco Systems Verified logo, Cisco Unity, Follow Me Browsing, FormShare, iQ Breakthrough, iQ Expertise, iQ FastTrack, the iQ logo, iQ Net Readiness Scorecard, Networking Academy, ScriptShare, SMARTnet, TransPath, and Voice LAN are trademarks of Cisco Systems, Inc.; Changing the Way We Work, Live, Play, and Learn, Discover All That's Possible, The Fastest Way to Increase Your Internet Quotient, and iQuick Study are service marks of Cisco Systems, Inc.; and Aironet, ASIST, BPX, Catalyst, CCDA, CCDP, CCIE, CCNA, CCNP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, the Cisco IOS logo, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Empowering the Internet Generation, Enterprise/Solver, EtherChannel, EtherSwitch, Fast Step, GigaStack, Internet Quotient, IOS, IP/TV, LightStream, MGX, MICA, the Networkers logo, Network Registrar, Packet, PIX, Post-Routing, Pre-Routing, RateMUX, Registrar, SlideCast, StrataView Plus, Stratum, SwitchProbe, TeleRouter, and VCO are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the U.S. and certain other countries.

All other trademarks mentioned in this document or Web site are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company.  
(0208R) L.W3800 1002