Cisco Redundant Power System 2300

The Cisco® Redundant Power System 2300 (RPS 2300) increases availability for converged data, voice, and video networks. The system delivers power supply redundancy and resiliency for a variety of power requirements, including Power over Ethernet (PoE). It helps ensure uninterrupted operation and protection against device power supply failures by providing seamless failover for Cisco switches such as the Cisco Catalyst® 2960-X, 2960-Plus, 2960-S, 2960, and 3750-E Series Switches and routers such as the Integrated Services Routers.

The Cisco RPS 2300 supplies redundant power for up to two of six connected 48-port PoE devices in a convenient, 1-rack-unit form factor (Figure 1). When attached to Cisco Catalyst 2960-X, 2960-S, 3750-E, and 3560-E Series Switches, the Cisco RPS 2300 offers additional intelligent management capabilities.

Figure 1.   Cisco RPS 2300

Flexibility and High Availability

The Cisco RPS 2300 can provide complete internal power supply redundancy for up to two attached networking devices. It has two power supply bays and can accept 1150W AC or 750W AC power supply modules. These power supply modules are also used with Cisco Catalyst 2960-X, 2960-Plus, 2960-S, 2960, 3750-E, and 3560-E Series Switches. With two 1150W AC power supply modules, the Cisco RPS 2300 can fully back up two 48-port switches that are delivering 15.4W of PoE on all ports. The Cisco RPS 2300 also has a replaceable fan module.

Ease of Use

When connected to Cisco Catalyst 2960-X, 2960-S, 3750-E, and 3560-E Series Switches, the Cisco RPS 2300 offers enhanced capabilities to manage power supply redundancy, including:

- The ability to remotely place the RPS or any of the six individual RPS ports in active or standby mode
- Setting priorities for each RPS port
- RPS status reporting, such as the number of power supplies inserted or the availability to back up connected switches
- Switch status reporting, such as a list of the power requirements of each of the attached switches
- Failure and exception history reporting

These capabilities are accessible through the switch's command line interface (CLI), or through graphical user interface (GUI) tools such as the Cisco Network Assistant and CiscoWorks CiscoView.

The default failover behavior for the RPS is "first-come, first-served." Default priorities can be overridden with a programmable priority, and higher-priority ports can be programmed to supersede lower-priority ports. This feature gives the network administrator the flexibility to define the RPS failover policy.

When a failure is detected, the Cisco RPS 2300 sends status information that can be monitored through Cisco Network Assistant. In addition, Cisco Catalyst 3750-E, 3750, 3560-E, 3560, 3550, 2960, and 2950 Series Switches send a trap in the event of an internal power supply failure, allowing the Cisco RPS 2300 to back up the failed switch.

Product Applications

The Cisco RPS 2300 can be deployed in a variety of situations to help ensure network resiliency for mission-critical applications. Figure 2 shows the Cisco RPS 2300 in a converged voice and data network that includes switches connected to IP phones and PCs. In the event of a switch's internal power supply failure, the Cisco RPS 2300 helps ensure voice and data network operation without interruption. In this scenario, multiple PoE switches are attached to the Cisco RPS 2300.

**Figure 2.**   10/100 IP Phone and Desktop Computer Connections
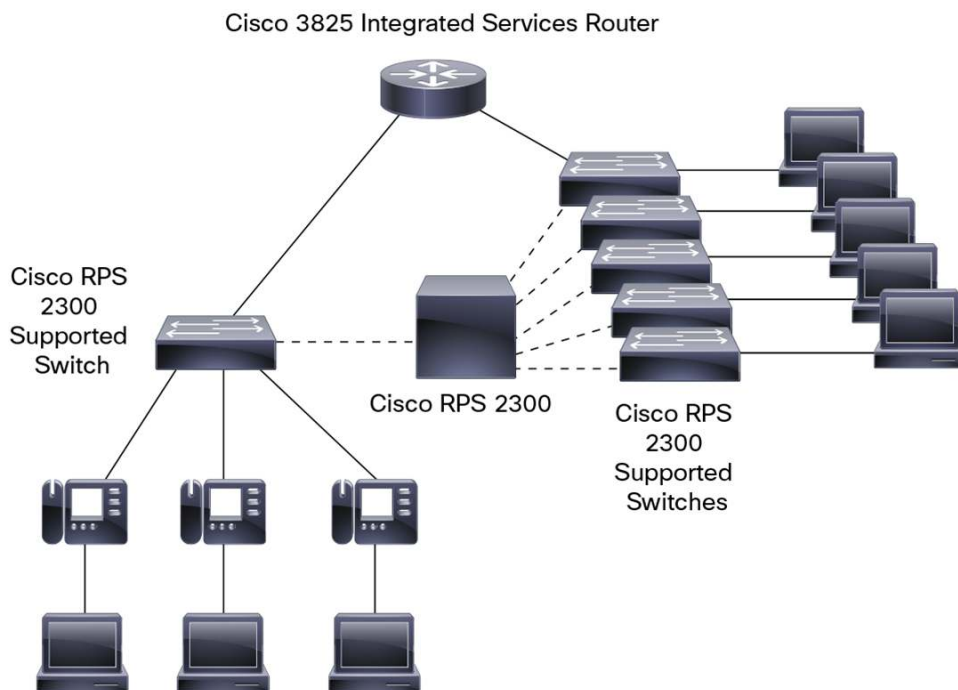
When designing or upgrading a wiring closet, careful consideration should be given to power requirements, particularly for PoE deployments. A power architecture can be selected based on the level of availability desired. The primary power faults to protect against include:

- Internal power supply failures in network devices
- Failure of an AC circuit (a circuit breaker tripping, for example)
- Interruption of utility power

The Cisco RPS 2300 can address the first two issues. The last issue requires an uninterruptible power supply (UPS). With a single AC circuit, regardless of whether it is from a UPS (Figure 3), the RPS provides protection against a power supply failure for up to two attached devices. With a second circuit (Figure 4), again regardless of whether it is from a UPS, the RPS provides protection not only from an internal power supply failure but also a failure of the primary AC source. For maximum availability, the RPS should always be used in conjunction with a UPS (Figure 5).
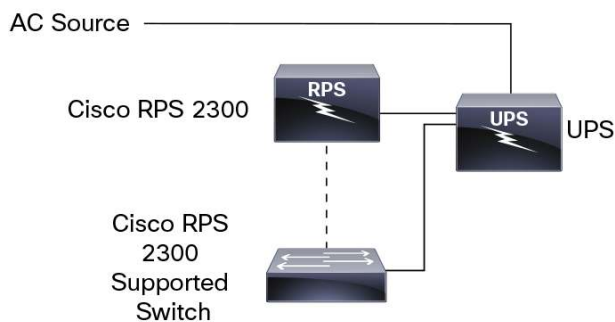
Figure 3.   Cisco RPS 2300 Using the Same AC Circuit as the Connected Network Devices
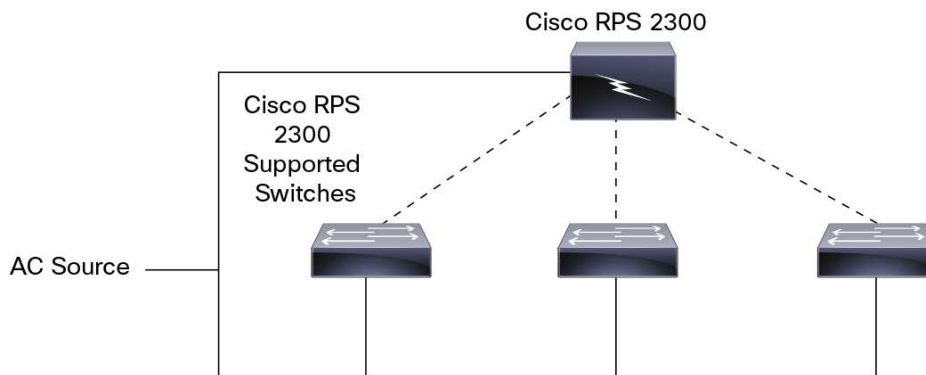
Figure 4.   Cisco RPS 2300 Using a Different Circuit from the Connected Network Devices
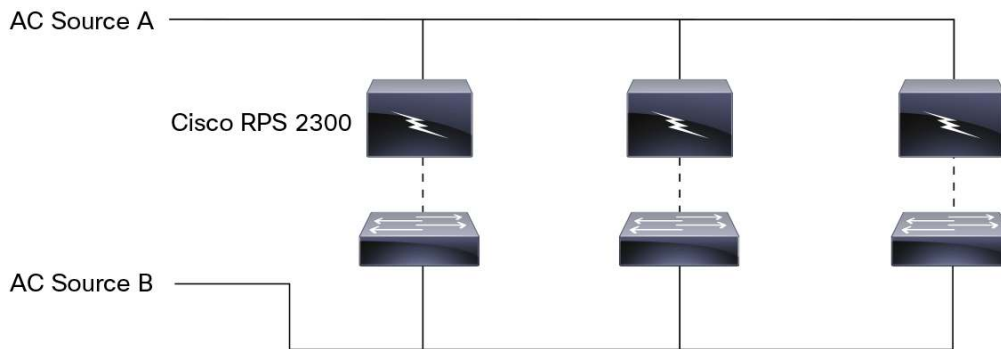
Figure 5.   Using the Cisco RPS 2300 and Connected Network Devices with a UPS for Maximum Availability

Features and Benefits

High Availability/Increased Network Uptime

- Modular power supplies and a fan module offer enhanced availability.
- Less than 60-μs failover capability prevents switch reboot after an internal switch power failure.
- When backed up by a Cisco RPS 2300, a Cisco Catalyst 2960-X, 2960-S, 3750-E, or 3560-E Series Switch is capable of reverting back to its own power supply without rebooting. All other devices may reboot when reverting back to their own power supplies.
- The system supports traditional data-only Ethernet switches as well as PoE switches.
- The system is capable of providing AC source backup when separate circuits are used for the RPS and attached devices.

Ease of Use and Ease of Deployment

- Modular power supplies offer configuration flexibility.
- The system, or individual RPS ports, can be remotely placed in active or standby mode.
- 1-rack-unit form factor provides for efficient wiring closet space utilization
- The system offers configurable RPS port priorities and failover policy.
- Enhanced management capabilities are available through Cisco Catalyst 2960-X, 2960-S, 3750-E, and 3560-E Series Switches. Users can identify and monitor the following activity on the Cisco RPS 2300, using CLI, the CiscoWorks LMS or Cisco Network Assistant network management applications:
  - Switch connectivity and power requirements
  - Power delivery status for individual RPS ports
  - Net power usage
  - Backup, failure, and exception history
- The system enables hot insertion of external devices and modular power supplies
- LEDs on front panel and power supplies indicate system and power status.

Cost-Effective Solution

- Innovative power architecture delivers a cost-effective RPS that can connect up to six devices and can actively back-up up to two devices simultaneously, thereby reducing the redundant power cost per device.
- The system supports a wide variety of Cisco Catalyst fixed configuration switches and Cisco Integrated Services Routers.

Technical Specifications

Supported Products

- Cisco Catalyst 2960-X Series Switches
- Cisco Catalyst 2960-Plus Series Switches
- Cisco Catalyst 2960-S Series Switches
- Cisco Catalyst 3750-E Series Switches
- Cisco Catalyst 3560-E Series Switches
- Cisco Catalyst 3750v2 Series Switches
- Cisco Catalyst 3750 Series Switches

- Cisco Catalyst 3560v2 Series Switches

- Cisco Catalyst 3560 Series Switches

- Cisco Catalyst 3550 Series Switches

- Cisco Catalyst 2960 Series Switches

- Cisco Catalyst 2950 Series Switches

- Cisco Catalyst Express 500 Series Switches (Select PoE models only)

- Cisco 3825 Integrated Services Routers

- Cisco 2851 Integrated Services Routers

- Cisco 2821 Integrated Services Routers

- Cisco 2811 Integrated Services Routers

Modular Power Supplies

Cisco RPS 2300 users can choose between two power supplies that are also compatible with Cisco Catalyst 3750-E and 3560-E Series Switches:

- The C3K-PWR-1150WAC power supply

- The C3K-PWR-750WAC power supply

The Cisco RPS 2300 can operate with one or two power supplies. If two power supplies are installed, they must be of the same type. Table 1 shows the number of switches that can be simultaneously backed up by the Cisco RPS 2300 for its different configurations.

Table 1.　　Number of Switches Actively Backed Up by Cisco RPS 2300

	Cisco RPS 2300 Configuration			
	1 x 750W	**2 x 750W**	**1 x 1150W**	**2 x 1150W**
Cisco Catalyst 3750E or 3560E switches with 1150W power supply	Not supported	1	1	2
All other supported network devices	1	2	1	2

Table 2 lists the power supply specifications for the 1150W and 750W power supplies.

Table 2.　　Power Supply Specifications

Description	Specification	
	C3K-PWR-1150WAC	**C3K-PWR-750WAC**
Maximum output power	1150W	750W
Input-voltage range and frequency	115-240 VAC, 50-60 Hz	100-240 VAC, 50-60 Hz
Input current	12-6A	10-5A
Output ratings	12V@25A and -52V@16.4A	12V@25A and -52V@8.7A
Output holdup time	20 ms minimum	20 ms minimum
Power-supply input receptacles	IEC 320-C13 (IEC60320-C13)	IEC 320-C13 (IEC60320-C13)
Power cord rating	15A	15A
LED indicators	"AC OK" - Input power to the power supply is working properly "PS OK" - Output power from the power supply is working properly	

Table 3 is a power supply compatibility matrix.

Table 3.   Power Supply Compatibility Matrix

Cisco Supported Catalyst Switch and RPS Type	Power Supply	
	C3K-PWR-1150WAC	C3K-PWR-750WAC
48-Port PoE Switch	√	√
24-Port PoE Switch	√	√
48-Port Switch	√	√
24-Port Switch	√	√
Cisco RPS 2300	√	√

Table 4 provides DC output ratings for the Cisco RPS 2300.

Table 4.   Power Delivery (DC Output Rating)

Cisco RPS 2300 Power Supply Configuration	DC Output Power	
	12V DC[1] (W)	-52V DC[2] (W)
1 x C3K-PWR-750WAC	252W (21A)	416W (8A)
2 x C3K-PWR-750WAC	540W (45A)	832W (16A)
1 x C3K-PWR-1150WAC	252W (21A)	800W (15.4A)
2 x C3K-PWR-1150WAC	540W (45A)	1600W (30.8A)

Table 5 provides heat dissipation information for the Cisco RPS 2300.

Table 5.   Heat Dissipation

Cisco RPS 2300 Power Supply Configuration	Heat Dissipation	
	No Load (BTU/hr)	Full Load (BTU/hr)
1 x C3K-PWR-750WAC	95	724
2 x C3K-PWR-750WAC	208	1299
1 x C3K-PWR-1150WAC	143	1056
2 x C3K-PWR-1150WAC	276	1963

Table 6 lists the physical and environmental specifications for the 1150W and 750W power supplies.

Table 6.   Power Supply Physical and Environmental Specifications

Product Specifications	Power Supply	
	C3K-PWR-1150WAC	C3K-PWR-750WAC
Physical specifications	H x W x D: 1.65 x 6.0 x 14.90 in. (4.2 x 15.24 x 37.85 cm) Weight: 5.6 lb (2.6 kg)	H x W x D: 1.65 x 6.0 x 11.4 in. (4.2 x 15.24 x 28.96 cm) Weight: 3.9 lb (1.8 kg)
Total input BTU (1000 BTU/Hr = 290W)	3924 BTU/Hr, 1150W	4225 BTU/Hr, 765W
Operating temperature	23 to 113°F (-5 to 45°C)	
Storage temperature	-4 to 149°F (-20 to 65°C)	
Relative humidity operating, noncondensing	10 to 85% noncondensing	

[1] Maximum power per RPS port at 12V is 300W.
[2] Maximum power per RPS port at -52V is 800W.

Product Specifications	Power Supply	
	C3K-PWR-1150WAC	**C3K-PWR-750WAC**
Relative humidity nonoperating, noncondensing	0 to 95% noncondensing	
Operating altitude	10,000 ft. (3000 m) (up to 45°C)	
Storage altitude	15,000 ft. (4570 m)	
Mean time between failure (MTBF)	Calculated MTBF must be greater than 300,000 using Telcordia SR-332, Method 1, Case 3. Demonstrated MTBF is 500,000 hrs (with 90% confidence level)	Calculated MTBF must be greater than 300,000 using Telcordia SR-332, Method 1, Case 3. Demonstrated MTBF is 500,000 hrs (with 90% confidence level)
Electromagnetic compatibility certifications	- FCC Part 15 Class A - EN 55022: 1998 (CISPR22) Class A - EN 55024: 1998 (CISPR24) - VCCI Class A - AS/NZS CISPR22 Class A - CE - MIC - GOST - China EMC certifications - BSMI (with C3K-PWR-750WAC only)	
Safety certifications	- UL/CSA 60950-1 first edition - CAN/CSA 22.2 No. 60950-1 First Edition - TUV/GS to EN 60950-1 First Edition - EN 60950-1:2001 - IEC 60950-1:2001 - AS/NZS 60950-1 - CE - CLEI - CCC approval pending - NOM approval pending	

Table 7 lists the acoustic specifications of the Cisco RPS 2300, and Table 8 lists physical specifications.

Table 7. Cisco RPS 2300 Acoustic Specifications[3]

Cisco RPS 2300 Power Supply Configuration	Acoustic Level (dB)	
	Idle	**Loaded**
2 x C3K-PWR-1150WAC	48.9	57.7 to 66.2
2 x C3K-PWR-750WAC	51.3	59.5 to 66.7

Table 8. Physical Specifications[4]

Dimensions and Weights	
Without any power supplies	H x W x D: 1.75 x 17.5 x 17.15 in. (4.5 x 44.5 x 43.6 cm) Height: 1 RU Weight: 10.8 lb (4.9 kg)
With two C3K-PWR-1150WAC power supplies	H x W x D: 1.75 x 17.5 x 20.6 in. (4.5 x 44.5 x 52.3 cm) Height: 1 RU Weight: 22 lb (10 kg)

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[3] At ambient temperature of 35 to 55°C
[4] At ambient temperature of 35 to 55°C

Dimensions and Weights	
With one C3K-PWR-1150WAC power supply	H x W x D: 1.75 x 17.5 x 20.6 in. (4.5 x 44.5 x 52.3 cm) Height: 1 RU Weight: 16.4 lb (7.4 kg)
With two C3K-PWR-750WAC power supplies	H x W x D: 1.75 x 17.5 x 17.15 in. (4.5 x 44.5 x 43.6 cm) Height: 1 RU Weight: 18.6 lb (8.5 kg)
With one C3K-PWR-750WAC power supply	H x W x D: 1.75 x 17.5 x 17.15 in. (4.5 x 44.5 x 43.6 cm) Height: 1 RU Weight: 14.7 lb (6.7 kg)

Connectors and Cabling

Cisco RPS 2300 to external device connection:

- 4.9 ft. (1.5 m) RPS cable
- A 22-pin connector on the RPS end, and two varieties of connectors on the switch end:
  - 22-pin connector for Cisco Catalyst 3750-E and 3560-E Series Switches (CAB-RPS2300-E=)
  - 14-pin connector for all other Cisco networking devices (CAB-RPS2300=)
- The Cisco RPS 2300 comes with one cable of either variety; others must be ordered separately

Cisco RPS 2300 power cable connection:

- With the C3K-PWR-1150WAC and the C3K-PWR-750WAC power supply, users get a 15A cable, 6 ft. (1.82 m) in length
- Country-specific cables can be ordered as options

Fans

The Cisco RPS 2300 has a field-replaceable fan module (BLWR-RPS2300=).

- Fan module dimensions: 1.65 x 6.0 x 11.9 in. (4.2 x 10.16 x 30.23 cm)
- System fan module offers up to 45 cubic feet per minute (CFM) under full load at ambient temperature of 45°C and altitude of 3000 meters
- Each of the two fans on the C3K-PWR-1150WAC offers up to 18 CFM at full load at ambient temperature of 45°C and altitude of 3000 meters

Indicators
- Status LEDs: Standby/active, output power, temperature, fan module
- DC output LEDs: DC output status for each of the six channels
- Status LEDs for each power supply: AC power status, power supply status

Accessory Kit

The accessory kit (ACC-RPS2300=) contains the following:

- Rack-mount brackets
- Screws
- Grounding lug
- Adhesive feet

MTBF for the RPS 2300

- With two C3K-PWR-750WAC power supplies and a blower: MTBF is 170,000 hours

- With two C3K-PWR-1150WAC power supplies and a blower: MTBF is 170,000 hours

- MTBF for the BLWR-RPS2300= is 1,480,000 hours

Warranty

Limited lifetime warranty

Ordering Information

- A typical Cisco RPS 2300 order includes the following:

  - Cisco RPS 2300 (PWR-RPS2300)

  - 1 RPS cable. Users may order either the CAB-RPS2300-E= compatible with Cisco Catalyst 3750-E and 3560-E Series Switches or the CAB-RPS2300= compatible with all other network devices. Extra cables must be ordered separately or as spares.

  - At least 1 power supply, either a C3K-PWR-1150WAC that can back up 48 ports of Class 3 (15.4W) PoE or a C3K-PWR-750WAC that can back up 24 ports of Class 3 15.4W) PoE or 48 ports of Class 2 (7W) PoE. One power cable is included for every power supply ordered. There will be an additional charge for the power supplies, as they are not included in the base price of the RPS 2300.

  - 1 fan module (BLWR-RPS2300=)

  - 1 power supply bay insert (BLNK-RPS2300=) to block a power supply bay for effective cooling in the Cisco RPS 2300. Note: This insert will only be provided when ordering an RPS 2300 with just one power supply. It will need to be ordered as a spare while ordering an RPS 2300 with two power supplies.

  - 1 Cisco RPS 2300 accessory kit (ACC-RPS2300=)

- Orderable spares are listed in Table 9.

Table 9.   Orderable Spares for the Cisco RPS 2300

Model Number	Product Description
PWR-RPS2300	RPS 2300 chassis
C3K-PWR-1150WAC	Catalyst 3750-E/3560-E 1150WAC power supply
C3K-PWR-750WAC	Catalyst 3750-E/3560-E 750WAC power supply
BLWR-RPS2300=	Spare 45CFM Blower for Cisco Redundant Power System 2300
CAB-RPS2300-E=	Spare RPS Cable RPS 2300 Cat 3750E/3560E, 3750v2/3560v2, and 2960/2960-S Switches
CAB-RPS2300=	Spare RPS Cable for Cisco Redundant Power System 2300
BLNK-RPS2300=	Spare Bay Insert for Cisco Redundant Power System 2300
ACC-RPS2300=	Spare Accessory Kit for Cisco Redundant Power System 2300

Service and Support

Table 10 lists Cisco SMARTnet® Service maintenance contracts.

Table 10. Cisco SMARTnet Maintenance Contracts for Cisco RPS 2300

Model Number	Product Description
CON-SNT-RPS2300	SMARTnet 8x5xNext Business Day Advance Replacement Service
CON-SNTE-RPS2300	SMARTnet 8x5x4hr Advance Replacement Service
CON-SNTP-RPS2300	SMARTnet 24x7x4hr Advance Replacement Service
CON-S2P-RPS2300	SMARTnet 24x7x2hr Advance Replacement Service
CON-OS-RPS2300	SMARTnet 8x5xNext Business Day Onsite Replacement Service
CON-OSE-RPS2300	SMARTnet 8x5x4hr Onsite Replacement Service
CON-OSP-RPS2300	SMARTnet 24x7x4hr Onsite Replacement Service
CON-PREM-RPS2300	SMARTnet 24x7x2hr Onsite Replacement Service

For more information about Cisco service offerings, visit
http://www.cisco.com/en/US/products/ps6897/serv_group_home.html.

For More Information

For more information on Cisco products, contact:

- U.S. and Canada: 800 553-NETS (6387)
- Europe: 32 2 778 4242
- Australia: 612 9935 4107
- Other: 408 526-7209
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Printed in USA   C78-377517-04   1/14