

**KULLIYAH OF INFORMATION AND COMMUNICATION TECHNOLOGY**

**CSC 2201 COMPUTER NETWORKING**

**SEMESTER 1, 2018/2019**

**SECTION 4**

**TITLE: TERM PAPER GROUP PROJECT**

**PREPARED BY:**

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**DUE**

23 NOVEMBER 2018

**PROJECT TITLE:** Cisco Redundant Power System 2300 and Its Use in Universities

**GROUP NAME:** Packet Tracer Mediocre

**GROUP MEMBERS:**

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**PROJECT BRIEF:**

1. Explain what is your project novelty about:

Our project novelty is about one of Cisco Redundant Power Systems which is Cisco Redundant Power System 2300 (PWR-RPS2300). This system, also known as the RPS 2300, is a redundant power system which supplies seamless failover for internal power supply failures. Up to six network devices can be supplied seamless failover by RPS 2300. Moreover, in this project, we are going to find the use of RPS 2300 in universities.

1. Explain about the novelty – location, size, selling what service/product?

The RPS 2300 is produced in the United States since Cisco headquarters is located there too. Its width is 17.5 inches, its depth is 17.2 inches and its height is 1.8 inches. It is selling redundant power system which protects data when there are power supply problems.

1. What kind of data network the novelty use (if any)? If not network, do you have an idea what do you want to propose?

Local Area Network (LAN).

1. How do you get information about the novelty?

The internet and user guides about the Cisco RPS 2300.

**CHAPTER 1 - PROJECT INTRODUCTION**

**PART 1: Project Overview and Objectives**

**Project Objective**

The main objective of this project is to establish the suitable redundant power system which can power the switches whenever the power supply is interrupted.

**Project Description**

In this project, we are going to analyse the problems of computer network in universities caused by shortage and interruption of power supply to power the switches and other network products. When there is power supplies problems toward computer networks, there will be memory and data lost. Data lost is a crucial problem since the data contains many information about the students, academic, staffs and more related information with universities. Then, we are going to propose a suitable redundant power system that can cater these kind of network problems.

**Importance of Project**

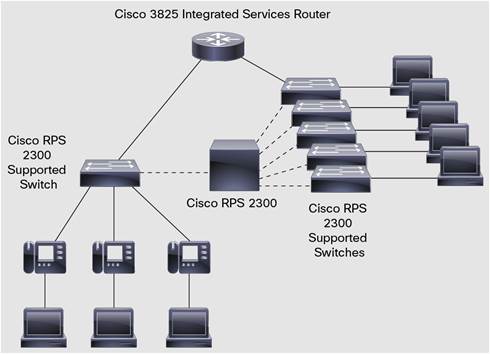
The importance of this project is the preservation of information related to researches, academic foundation and more significant information in universities. For a nation to be built as a competent nation, education and knowledge are crucial. Therefore, the preservation of data in the computer network in universities is one of the main aspects that must be focused on. This is the reason this project is relevant towards the society, nation and the world.

**PART 2: Project Background and Description**

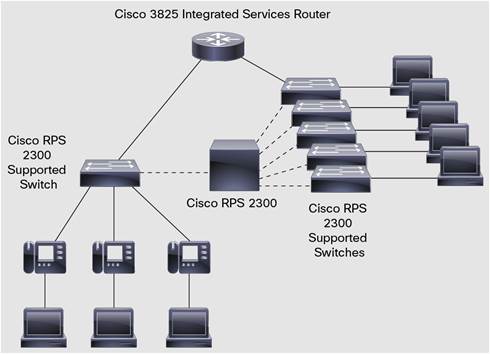
**Type of System Environment**

The system environment will be based on universities. The type of network that will be used is Local Area Network (LAN) because the data is only important in the university.

**Background with Mapping**

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**Process Flow Chart**



**Description of Process Flow Chart**

From the process flow chart, it can be seen that Cisco Redundant Power System (RPS) 2300 powers the switches only. From below, the Personal Computer (PC) is connected to the Phones and the Phones is connected to the Cisco RPS 2300 supported switches which is connected Cisco 3825 Integrated Services Router. From the right side, the PC is connected to the switches without going through any network devices. The switches then are connected to the router.

**Existing System Diagram**



**PART 3: Project Analysis**

**Current System/ Process/Network Problems and Issues**

* Cisco Redundant Power System 2300 protects only network devices against internal power supply failures and failure of an AC circuit (a circuit breaker tripping, for example) and need uninterrupted power supply to be used together.
* Only up to six devices may be connected to the Cisco RPS 2300.
* The total power available to the switches depends on the number and capacity of power supply modules in the Cisco RPS 2300.

**Assessment of Situation and Overview of Solution**

* Cisco Redundant Power System 2300 should protect these devices against interruption of utility power and not rely on uninterrupted power supply (UPS).
* Cisco RPS 2300 should increase the number of devices that can be connected so less cost is needed to install the system.
* Cisco RPS 2300 should not be depended on the number and capacity of power supply modules. It should instead use less power supply and backup power supply for other network devices.

**CHAPTER 2 - DESIGN**

The Cisco RPS 2300 can be deployed in a variety of situations to help ensure network resiliency for mission-critical applications. Figure 1 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.

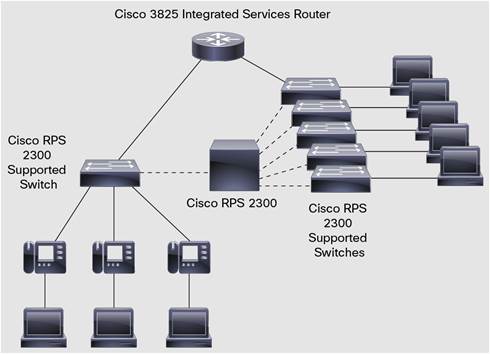


Figure 1 10/100 IP Phone and Desktop Computer Connections

**CHAPTER 3 – NOVELTY: NETWORK CONFIGURATION, OR IMPLEMENTATION OR SIMULATION**

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 | Ö | Ö |
| 24-Port PoE Switch | Ö | Ö |
| 48-Port Switch | Ö | Ö |
| 24-Port Switch | Ö | Ö |
| Cisco RPS 2300 | Ö | Ö |

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]](https://www.cisco.com/c/en/us/products/collateral/switches/redundant-power-system-2300/product_data_sheet0900aecd805bbef6.html" \l "_ftn1" \o ")**(W)** | **-52V DC**[[2]](https://www.cisco.com/c/en/us/products/collateral/switches/redundant-power-system-2300/product_data_sheet0900aecd805bbef6.html" \l "_ftn2" \o ")**(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 | | |
| 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]](https://www.cisco.com/c/en/us/products/collateral/switches/redundant-power-system-2300/product_data_sheet0900aecd805bbef6.html" \l "_ftn3" \o ")

|  |  |  |
| --- | --- | --- |
| **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]](https://www.cisco.com/c/en/us/products/collateral/switches/redundant-power-system-2300/product_data_sheet0900aecd805bbef6.html" \l "_ftn4" \o ")

| **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) | |
| 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) |  |

**CHAPTER 4 – NETWORK MANAGEMENT AND SECURITY**

From chapter 3, we can conclude that Cisco Redundant Power System 2300 can backed up many switches with power supply. These switches are important for the main router in the university. Without the router, personal computers and landline telephones cannot be connected through Local Area Network (LAN). From the network, it is easier to transfer important files or documents regarding work and academic between computer systems.