ITNET01 Case Study
Xcite Interactive Game Studio Network Documentation

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## Introduction

The document analyzes a case study centered around Xcite Interactive, a game studio that focuses on creating smartphone and PC video games. The main objective of the study is to propose an optimized network design that aligns with the specific requirements of the company.

## Background

Beginning as a humble venture established between a group of friends, the company has since then steadily risen in popularity following the moderate successes of their games. As they progressed, so did the need to expand their workforce and as such have needed to hire additional developers, graphic artists, creative writers, marketing team members, IT Professionals, and other such employees essential for the success of a moderately sized game development studio. However, their existing workplace lacked the necessary space and equipment to navigate the growing staff. To amend this, the company planned to relocate to a newer, larger workspace. Before they could begin operations at their new workplace however, they needed to establish a network that could connect all the company's end devices, infrastructure devices, and other necessary equipment.

## Document Overview

The document thus presents a network design that is expected to be both manageable and reasonably secure with regard to the company's operations. Accordingly, the following components included are:

a. A Physical Topology which illustrates the physical layout, the measurements for the cables, and the location of the necessary networking equipment in the floor plan, as well as its overall cost.
b. An IP addressing scheme which serves to indicate each device's hostname, IP address, subnet mask, and default gateway. Furthermore, the IP address and subnet mask information of each of the router interfaces are included.

c. A device interconnection documentation which provides a list of each network device's interfaces and the corresponding devices connected.
d. A logical topology that illustrates the interconnection of every device, including the ports and subnets these are part of.
e. Security Implementations that show the measures taken to ensure network security.

The documentation will also include a Packet Tracer file of the proposed network to showcase its functionality as well as its adherence to company standards and requirements. The aforementioned file will have all the devices pre-configured with the IP addressing scheme and the security measures included within this document. Each device is also connected according to the interconnection setup described. The simulated network aims to demonstrate that all devices can successfully communicate with each other via the use of 'pings' and that all network devices follow the appropriate security measures to minimize vulnerabilities to external threats.

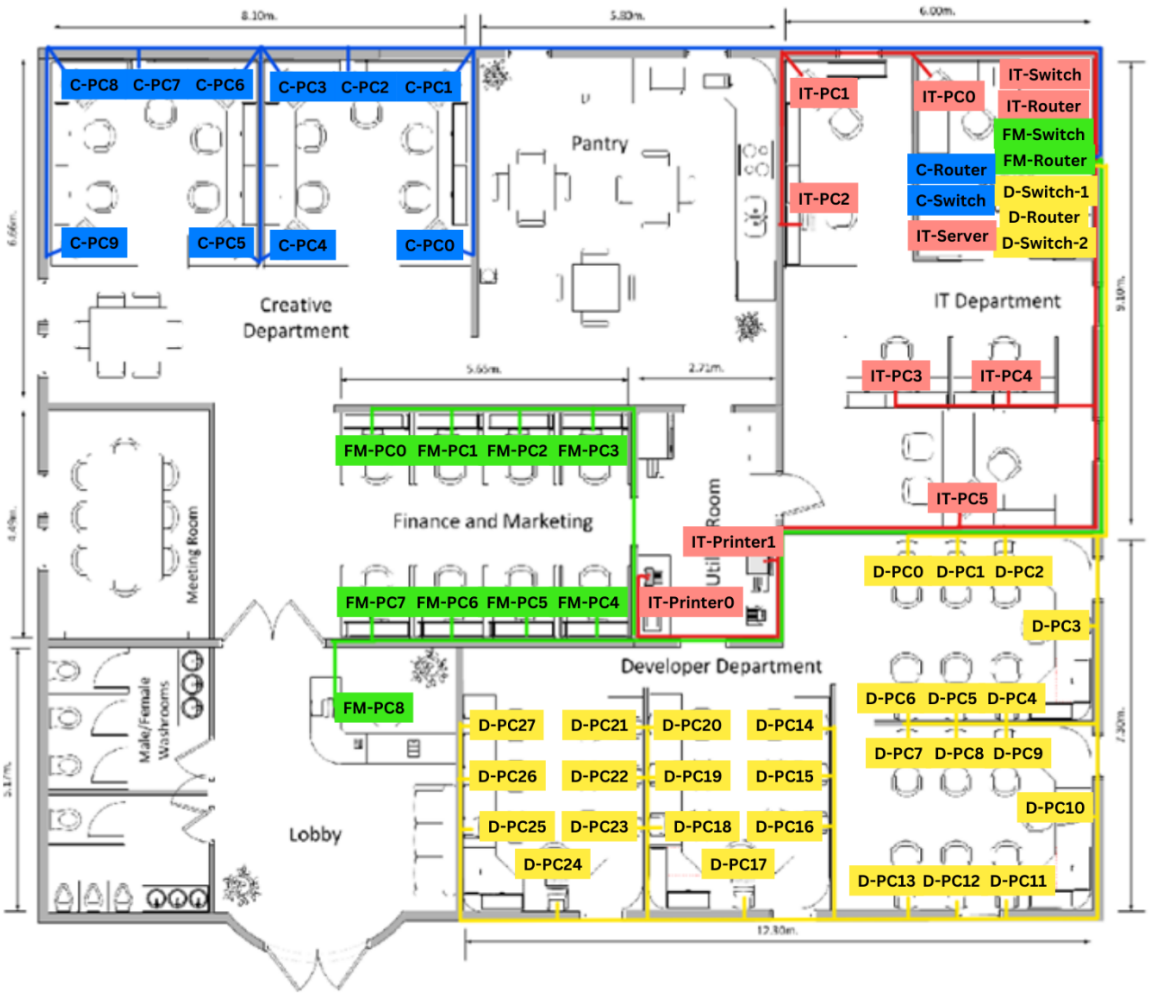
## Section 1 - Physical Topology

### Subsection 1.1 Introduction

Prior to configuring the network, it is essential to determine the specific network devices that need to be acquired, as well as their respective placements and their interconnections. This section provides a comprehensive overview of the physical topology of the recommended network design that also promotes comfort and organization with the company's floor plan.

### Subsection 1.2 Physical Topology

The diagrams below display our network layout on how this will be physically set up. In This diagram, we display the cable scheme and present indications of which physical rooms the devices will be in. Figure 1-1 shows the rooms where each device will be located, while Figure 1-2 displays the cable layout to be followed when connecting the devices.In Figure 1-2, the cables will be run along the walls and ceiling to minimize obstruction and consequently lessen the possibility for workplace accidents. While installing raised flooring was considered, the group decided on snaking the wires through the walls and ceilings as this was more economical and cost effective. After calculating the distances from the server room to each of the departments, we found that at least 483 feet worth of cabling (147 m) is needed for the layout (Refer to Figure 1-2).


C-PC8 C-PC7 C-PC6
C-PC3 C-PC2 C-PC1
C-PC9
C-PC5
C-PC4
C-PC0
Pantry
Creative Department
IT-PC1
IT-PC0
IT-Switch
IT-Router
FM-Switch
FM-Router
C-Router
C-Switch
D-Switch-1
D-Router
D-Switch-2
IT-Server
IT-PC2
IT Department
IT-PC3
IT-PC4
IT-PC5
FM-PC0 FM-PC1 FM-PC2 FM-PC3
Finance and Marketing
IT-Printer1
IT-Printer0
FM-PC7 FM-PC6 FM-PC5 FM-PC4
Meeting Room
Male/Female Washrooms
FM-PC8
Lobby
Developer Department
D-PC0 D-PC1 D-PC2
D-PC3
D-PC6 D-PC5 D-PC4
D-PC7 D-PC8 D-PC9
D-PC10
D-PC27 D-PC21 D-PC20 D-PC14
D-PC26 D-PC22 D-PC19 D-PC15
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D-PC17
D-PC13 D-PC12 D-PC11

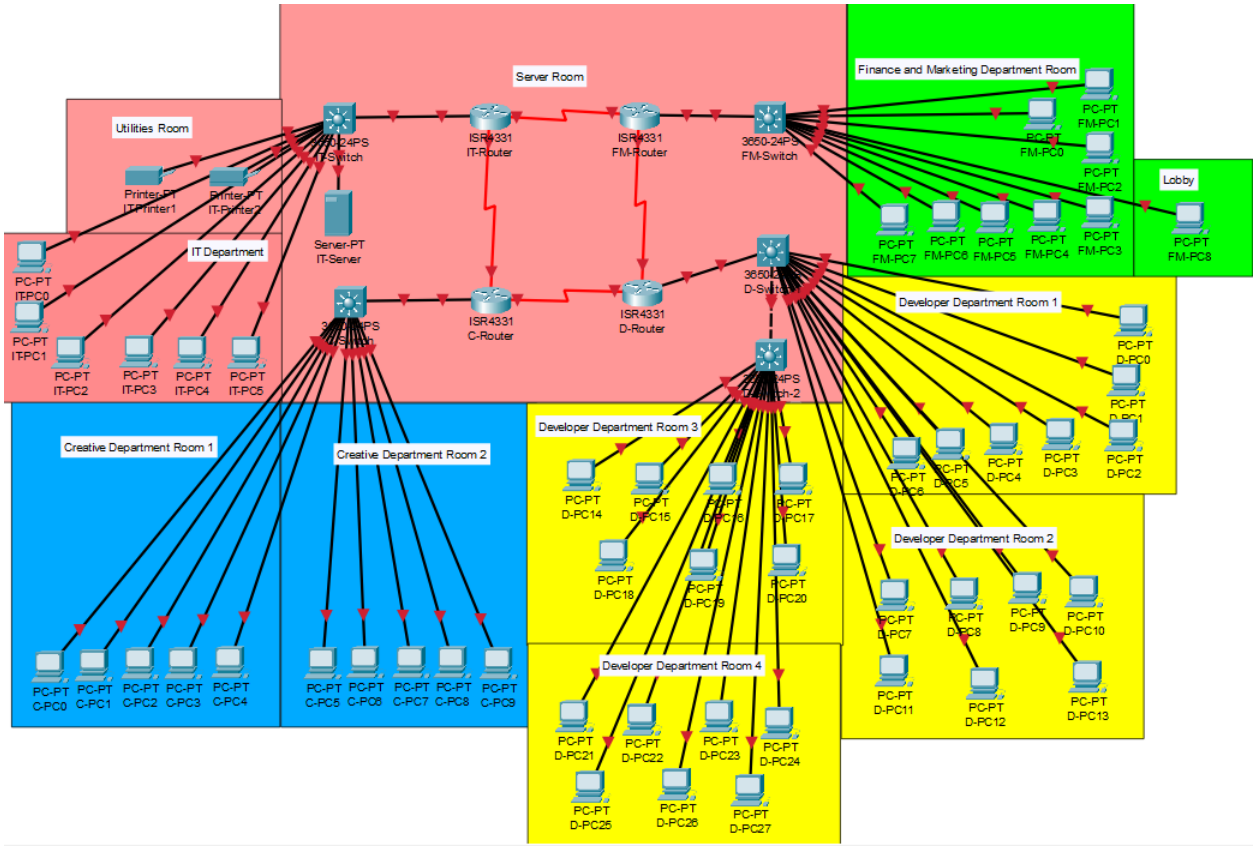


**FIGURE 1-1.** Network Design Physical Topology

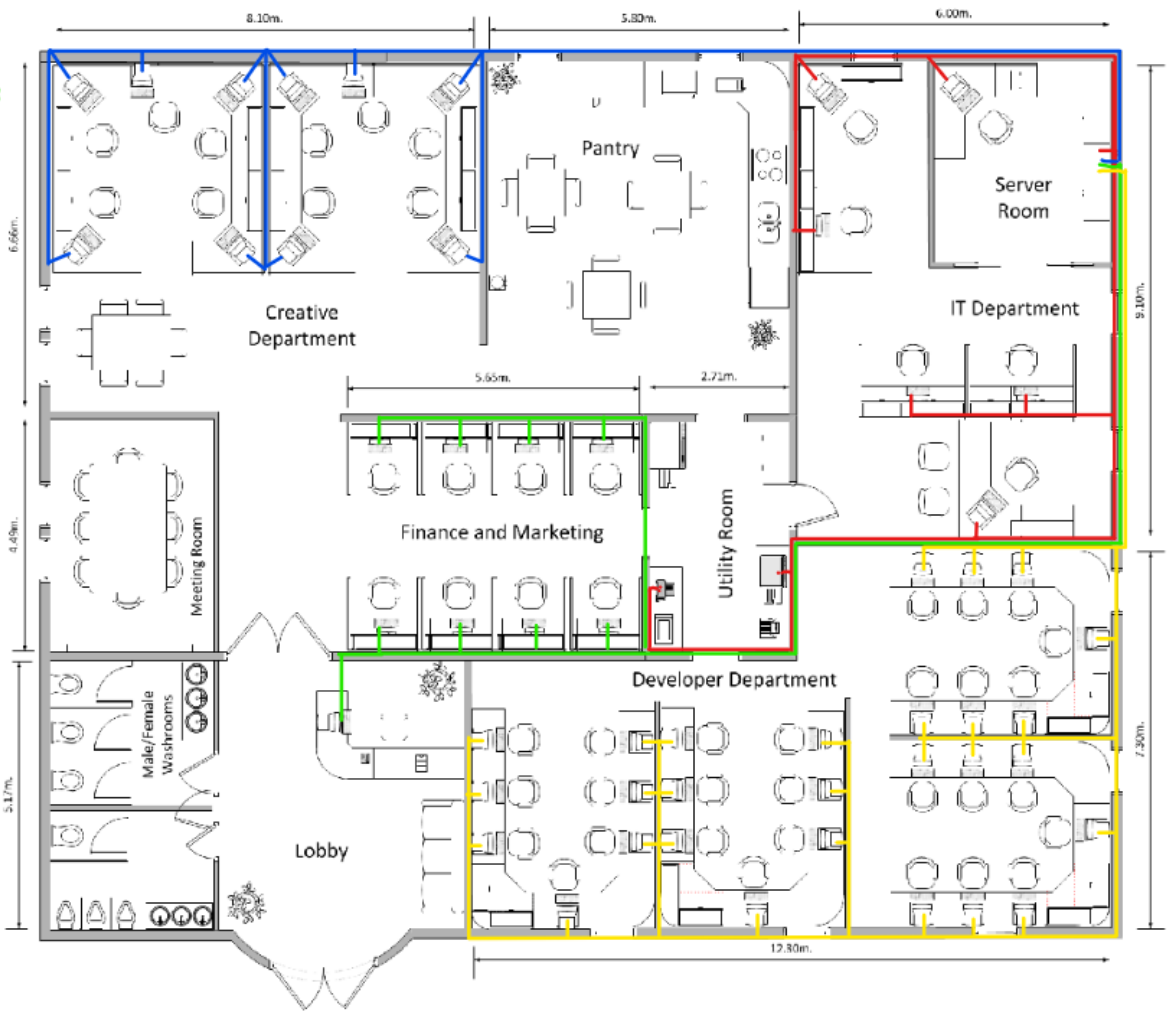


**FIGURE 1-2.** Floor Plan Cabling Layout

### Subsection 1.3 Costs of Materials

The group suggested the following equipment to ensure effective, efficient, and properly established networking within the office:

- **ISR4331 Router -** Designed for small to medium-sized networks, it delivers speeds of 100-300Mbps and offers flexibility with single and double service module support. With integrated security features and options for virtualization and application optimization, it ensures network protection and efficiency. The 4331 router's manageability and centralized control make it ideal for the office's dedicated IT team. Overall, it provides

a reliable, scalable, and reasonably secure network infrastructure solution for the studio's needs, able to meet high standards after further growth.

- **Cisco Catalyst 3650-24PS -** this series provides a high-performance solution suitable for small to midsize networks. With 24 ports supporting both Fast Ethernet and Gigabit Ethernet speeds, it enables efficient data transfer. The switch features Power over Ethernet (PoE) support, Layer 3 switching capabilities, and stackability for scalability and enhanced network management. Its advanced features and reliability make it an ideal choice for the Game Studio network, providing the necessary performance and capabilities to meet their requirements.
- **Tripp Lite Snagless Gigabit Cat6 Ethernet Cables** - a reliable and high-performance solution that offers several advantages such as a snagless design with a protective boot and support for gigabit ethernet speeds delivering reliable and high-performance data transmission. Known for its superior build quality, this cable is designed to withstand wear and tear, ensuring long-term durability while meeting industry standards providing excellent signal quality and minimal interference.
- **Comlink RJ45 connectors** - These are cost-effective and high-quality connectors and include many pieces per pack. These are durable, and of quality make, establishing a robust and efficient network connection system ensuring secure and stable connections while minimizing risk of signal loss or disconnections.
- **Telegärtner Port Network Panel -** These have high-quality standards, and offer scalable options that ensure flexibility as the studio grows. These are used to hold cables and offer these protection while retaining efficient cable management features and user-friendly installation, simplifying network organization.
- **Electriduct Ceiling Entry** - These also hold the cables and ensure a clean and organized appearance via the concealing of cables while preventing tripping hazards, being more cost effective as compared to raised flooring while maintaining the aesthetic integrity of the studio space.
- **NIM-2T -** is a network interface module that offers two high-speed serial interfaces, which will be used for our router-to-router connections. Each serial interface typically supports synchronous or asynchronous data transmission and can be configured to work with various protocols, such as High-Level Data Link Control (HDLC), Point-to-Point Protocol (PPP), and Serial Line Internet Protocol (SLIP).
- **Cisco Systems Hssi Cable Male to Male Connectors 10Ft -** This cable was used as it is designed to work with the NIM-2T module, has legacy support and allows for consistent data transfer rates between each of the routers.

| Component | Cost (as of July 2023) | Quantity | Total Cost |
|---|---|---|---|
| Cisco ISR4331 | ₱82,534.14 | 4 | ₱330,136.56 |
| Cisco Catalyst 3650 24PS | ₱170,129.34 | 5 | ₱850,646.7 |
| Comlink RJ45 Connector 100 per box | ₱100.00 | 1 | ₱100.00 |
| Tripp Lite Cat6 Gigabit Snagless Molded Patch Cable | ₱44.5(per foot) | 600(in feet) (4 bundles of 150 feet, 100 feet bundles not available) | ₱26,700 |
| Telegärtner H02025A0167 24 ports Network patch panel CAT 6A 1 U | ₱3,200.00 | 5 | ₱16,000.00 |
| Electriduct Ceiling Entry for (LG1) Large Raceway Wall Wire Concealer and Cord Manager - White | ₱180.00 | 5 | ₱900.00 |
| NIM-2T | ₱19,813.06 | 4 | ₱79,252.24 |
| Cisco Systems Hssi Cable Male to Male Connectors 10Ft | ₱4,791.45 | 4 | ₱19,164 |
| Total Estimated Cost: | ₱1,322,899.5 | | |

## Section 2 - IP Addressing Scheme

### Subsection 2.1 Introduction

To ensure effective communication across the network, it is crucial to establish a well-configured IP addressing scheme for all devices. This section presents a concise overview of the IP addressing scheme to be implemented in the network design plan for Xcite Interactive. The table provided will list the hostnames and corresponding IP addresses, subnet masks, default gateways (where applicable), and VLANs for all PCs, switches, routers, servers, and printers that will be connected to the company's network. This comprehensive tabulation ensures a structured and organized approach to IP addressing for seamless network communication.

### Subsection 2.2 Subnets

From the IPv4 address space 192.168.0.0/20 given in the specs, we will be making use of the Variable Length Subnet Mask (VLSM) strategy since FLSM is not ideal for hosts that are far apart in number (eg. 11 hosts vs 31 hosts is very far apart), and this would save space when it comes to subnetting. 8 total subnets will be allocated, with 4 being for the 4 departments (1 for each department) and the remaining 4 subnet will be for the router interface to router interface connections (4 routers so 4 subnets).

The **first subnet** will be allocated to the Developer's department. This is because following the VLSM strategy, we start with the one with the most hosts, working our way down to the one with the least number of hosts. Since the Developer department has 31 total hosts (28 PCs, 1 router interface, 2 switches), we will be needing 6 host bits, and thus, we will be using the subnet mask of /26. Following the formula *total number of usable hosts = [2^(number of host bits)] - 2,* there are 62 usable hosts available since 2 are allocated to the network address and broadcast address. This is equivalent to 255.255.255.192, (decimal form of the binary value of 1111 1111. 1111 1111. 1111 1111. 1100 0000, the 6 zeroes at the end being the host bits). The network ID will have an address of 192.168.0.0, while the broadcast ID will have an address of 192.168.0.63. The usable hosts' addresses will range from 192.168.0.1 to 192.168.0.62.

The **second subnet** will be allocated to the IT Department. Since this department has 11 hosts (6 PCs, 2 printers, 1 server, 1 router interface, and 1 switch), it will be using the subnet mask of /28 since this can accommodate 14 usable hosts ip addresses (16 total hosts addresses, 2 allocated to network address and broadcast address). The network ID will have an address of 192.168.0.64, and the broadcast ID

will have an address of 192.168.0.79. The usable host addresses will range from 192.168.0.33 to 192.168.0.78.

The **third subnet** will be allocated to the Finance and Marketing Department. Since this department has 10 hosts (1 PC in the lobby, 8 PCs in the Finance and Marketing room, 1 router interface, and 1 switch), similar to the IT department, we will again use the /28 subnet mask since it can accommodate 14 usable hosts. The network ID will have an address of 192.168.0.80, and the broadcast ID will have an address of 192.168.0.95. The usable host addresses will be ranging from 192.168.0.81 to 192.168.0.94.

The **fourth subnet** will be allocated to the Creatives Department. Since this department has 11 hosts (10 PCs (5 PCs in each room, with 2 rooms), 1 router interface, and 1 switch), we will again be using the subnet mask of /28 since it can accommodate 14 usable hosts. The network ID will have an address of 192.168.0.96, and the broadcast ID will have an address of 192.168.0.111. The usable host addresses will be ranging from 192.168.0.97 to 192.168.0.110.

The **fifth subnet** will be allocated for the point-to-point connection between the D-Router interface S0/1/0 to C-Router interface S0/1/1 . The subnet mask that we will be using for this is /30. The network ID will have an address of 192.168.0.112, and the broadcast ID will have an address of 192.168.0.115. The usable host addresses will range from 192.168.0.113 to 192.168.0.114.

The **sixth subnet** will be allocated for the point-to-point connection between the C-Router interface S0/1/0 to IT-Router interface S0/1/1 . The subnet mask that we will be using for this is /30. The network ID will have an address of 192.168.0.116, and the broadcast ID will have an address of 192.168.0.19. The usable host addresses will range from 192.168.0.117 to 192.168.0.118.

The **seventh subnet** will be allocated for the point-to-point connection between the IT-Router interface S0/1/0 to FM-Router interface S0/1/1 . The subnet mask that we will be using for this is /30. The network ID will have an address of 192.168.0.120, and the broadcast ID will have an address of 192.168.0.123. The usable host addresses will range from 192.168.0.121 to 192.168.0.122.

The **eighth subnet** will be allocated for the point-to-point connection between the FM-Router interface S0/1/0 to D-Router interface S0/1/1 . The subnet mask that we will be using for this is /30. The network ID will have an address of 192.168.0.124, and the

broadcast ID will have an address of 192.168.0.127. The usable host addresses will range from 192.168.0.125 to 192.168.0.126.

### Subsection 2.3 IP Addressing Scheme

The following table lists devices and router interfaces, as well as the IP addresses, subnet masks, and default gateways that were configured. The following data were obtained after subnetting the original IP address of 192.168.0.0/20.

**Developers Department**

| Device | IP Address | Subnet Mask | Default Gateway |
|---|---|---|---|
| D-Router G0/0/0 | 192.168.0.1 | 255.255.255.192 | N/A |
| D-PC0 | 192.168.0.2 | 255.255.255.192 | 192.168.0.1 |
| D-PC1 | 192.168.0.3 | 255.255.255.192 | 192.168.0.1 |
| D-PC2 | 192.168.0.4 | 255.255.255.192 | 192.168.0.1 |
| D-PC3 | 192.168.0.5 | 255.255.255.192 | 192.168.0.1 |
| D-PC4 | 192.168.0.6 | 255.255.255.192 | 192.168.0.1 |
| D-PC5 | 192.168.0.7 | 255.255.255.192 | 192.168.0.1 |
| D-PC6 | 192.168.0.8 | 255.255.255.192 | 192.168.0.1 |
| D-PC7 | 192.168.0.9 | 255.255.255.192 | 192.168.0.1 |
| D-PC8 | 192.168.0.10 | 255.255.255.192 | 192.168.0.1 |
| D-PC9 | 192.168.0.11 | 255.255.255.192 | 192.168.0.1 |
| D-PC10 | 192.168.0.12 | 255.255.255.192 | 192.168.0.1 |
| D-PC11 | 192.168.0.13 | 255.255.255.192 | 192.168.0.1 |
| D-PC12 | 192.168.0.14 | 255.255.255.192 | 192.168.0.1 |
| D-PC13 | 192.168.0.15 | 255.255.255.192 | 192.168.0.1 |
| D-PC14 | 192.168.0.16 | 255.255.255.192 | 192.168.0.1 |

| | | | |
|---|---|---|---|
| D-PC15 | 192.168.0.17 | 255.255.255.192 | 192.168.0.1 |
| D-PC16 | 192.168.0.18 | 255.255.255.192 | 192.168.0.1 |
| D-PC17 | 192.168.0.19 | 255.255.255.192 | 192.168.0.1 |
| D-PC18 | 192.168.0.20 | 255.255.255.192 | 192.168.0.1 |
| D-PC19 | 192.168.0.21 | 255.255.255.192 | 192.168.0.1 |
| D-PC20 | 192.168.0.22 | 255.255.255.192 | 192.168.0.1 |
| D-PC21 | 192.168.0.23 | 255.255.255.192 | 192.168.0.1 |
| D-PC22 | 192.168.0.24 | 255.255.255.192 | 192.168.0.1 |
| D-PC23 | 192.168.0.25 | 255.255.255.192 | 192.168.0.1 |
| D-PC24 | 192.168.0.26 | 255.255.255.192 | 192.168.0.1 |
| D-PC25 | 192.168.0.27 | 255.255.255.192 | 192.168.0.1 |
| D-PC26 | 192.168.0.28 | 255.255.255.192 | 192.168.0.1 |
| D-PC27 | 192.168.0.29 | 255.255.255.192 | 192.168.0.1 |
| D-Switch-1 (VLAN1) | 192.168.0.30 | 255.255.255.192 | 192.168.0.1 |
| D-Switch-2 (VLAN1) | 192.168.0.31 | 255.255.255.192 | 192.168.0.1 |

**IT department**

| Device | IP Address | Subnet Mask | Default Gateway |
|---|---|---|---|
| IT-Router G0/0/0 | 192.168.0.65 | 255.255.255.240 | N/A |
| IT-PC0 | 192.168.0.66 | 255.255.255.240 | 192.168.0.65 |
| IT-PC1 | 192.168.0.67 | 255.255.255.240 | 192.168.0.65 |
| IT-PC2 | 192.168.0.68 | 255.255.255.240 | 192.168.0.65 |

| | | | |
|---|---|---|---|
| IT-PC3 | 192.168.0.69 | 255.255.255.240 | 192.168.0.65 |
| IT-PC4 | 192.168.0.70 | 255.255.255.240 | 192.168.0.65 |
| IT-PC5 | 192.168.0.71 | 255.255.255.240 | 192.168.0.65 |
| IT-Printer1 | 192.168.0.72 | 255.255.255.240 | 192.168.0.65 |
| IT-Printer2 | 192.168.0.73 | 255.255.255.240 | 192.168.0.65 |
| IT-Server | 192.168.0.74 | 255.255.255.240 | 192.168.0.65 |
| IT-Switch-1 (VLAN1) | 192.168.0.75 | 255.255.255.240 | 192.168.0.65 |

**Finance and Marketing Department**

| Device | IP Address | Subnet Mask | Default Gateway |
|---|---|---|---|
| FM-Router G0/0/0 | 192.168.0.81 | 255.255.255.240 | N/A |
| FM-PC0 | 192.168.0.82 | 255.255.255.240 | 192.168.0.81 |
| FM-PC1 | 192.168.0.83 | 255.255.255.240 | 192.168.0.81 |
| FM-PC2 | 192.168.0.84 | 255.255.255.240 | 192.168.0.81 |
| FM-PC3 | 192.168.0.85 | 255.255.255.240 | 192.168.0.81 |
| FM-PC4 | 192.168.0.86 | 255.255.255.240 | 192.168.0.81 |
| FM-PC5 | 192.168.0.87 | 255.255.255.240 | 192.168.0.81 |
| FM-PC6 | 192.168.0.88 | 255.255.255.240 | 192.168.0.81 |
| FM-PC7 | 192.168.0.89 | 255.255.255.240 | 192.168.0.81 |
| FM-PC8 | 192.168.0.90 | 255.255.255.240 | 192.168.0.81 |
| FM-Switch-1 (VLAN1) | 192.168.0.91 | 255.255.255.240 | 192.168.0.81 |

**Creatives Department**

| Device | IP Address | Subnet Mask | Default Gateway |
|---|---|---|---|
| C-Router G0/0/0 | 192.168.0.97 | 255.255.255.240 | N/A |
| C-PC0 | 192.168.0.98 | 255.255.255.240 | 192.168.0.97 |
| C-PC1 | 192.168.0.99 | 255.255.255.240 | 192.168.0.97 |
| C-PC2 | 192.168.0.100 | 255.255.255.240 | 192.168.0.97 |
| C-PC3 | 192.168.0.101 | 255.255.255.240 | 192.168.0.97 |
| C-PC4 | 192.168.0.102 | 255.255.255.240 | 192.168.0.97 |
| C-PC5 | 192.168.0.103 | 255.255.255.240 | 192.168.0.97 |
| C-PC6 | 192.168.0.104 | 255.255.255.240 | 192.168.0.97 |
| C-PC7 | 192.168.0.105 | 255.255.255.240 | 192.168.0.97 |
| C-PC8 | 192.168.0.106 | 255.255.255.240 | 192.168.0.97 |
| C-PC9 | 192.168.0.107 | 255.255.255.240 | 192.168.0.97 |
| C-Switch-1 (VLAN1) | 192.168.0.108 | 255.255.255.240 | 192.168.0.97 |

**Router to Router Interface**

| Device | Interface | IP Address | Subnet Mask | Default Gateway |
|---|---|---|---|---|
| D-Router | S0/1/0 | 192.168.0.113 | 255.255.255.252 | N/A |
| | S0/1/1 | 192.168.0.126 | 255.255.255.252 | N/A |
| FM-Router | S0/1/0 | 192.168.0.125 | 255.255.255.252 | N/A |
| | S0/1/1 | 192.168.0.122 | 255.255.255.252 | N/A |
| IT-Router | S0/1/0 | 192.168.0.121 | 255.255.255.252 | N/A |
| | S0/1/1 | 192.168.0.118 | 255.255.255.252 | N/A |

| | | | | |
|---|---|---|---|---|
| C-Router | S0/1/0 | 192.168.0.117 | 255.255.255.252 | N/A |
| | S0/1/1 | 192.168.0.114 | 255.255.255.252 | N/A |

## Section 3 - Device Interconnection Documentation

### Subsection 3.1 Device Interconnection Diagrams

The following diagrams are used to visualize how each device is connected to each other through the interfaces they use.

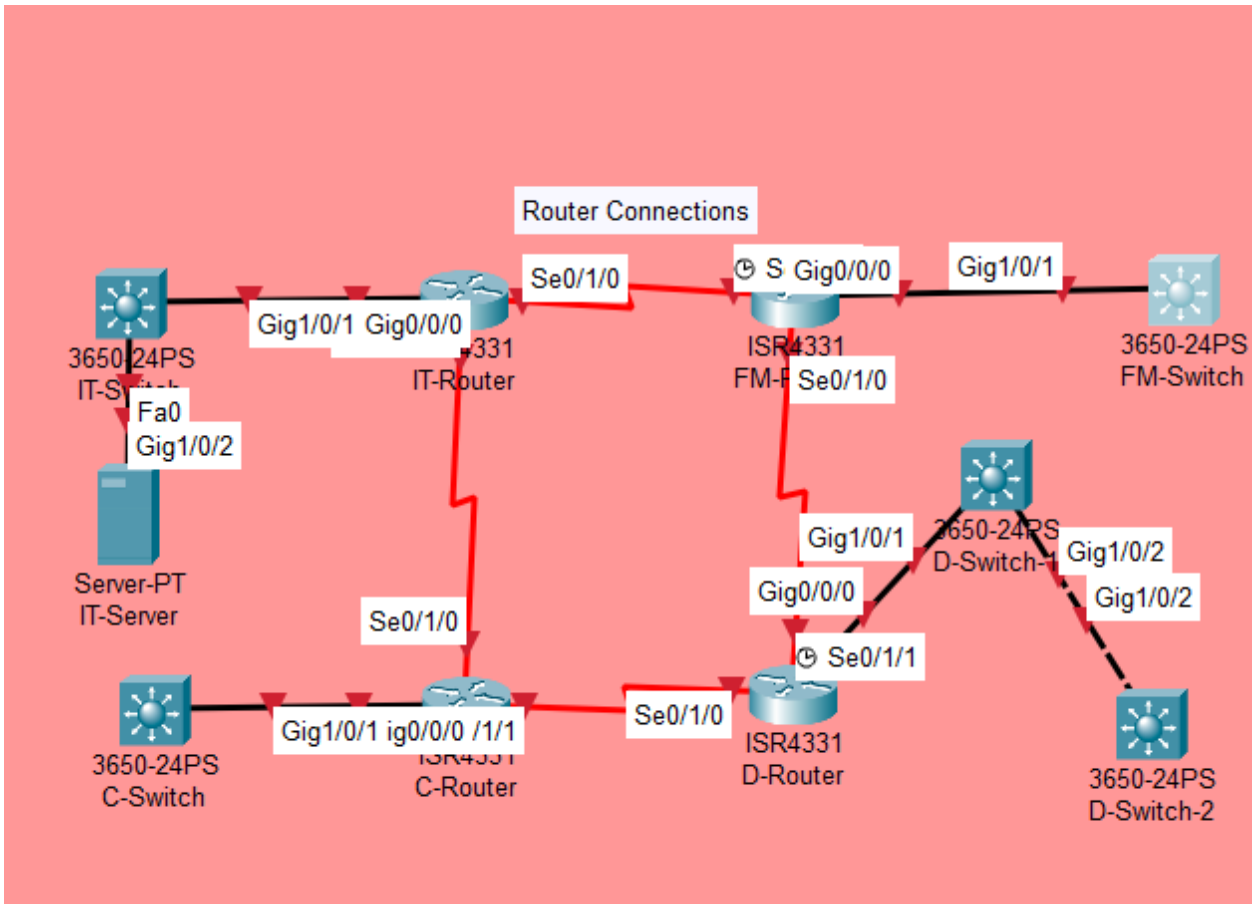


**FIGURE 3-1.** Router connections

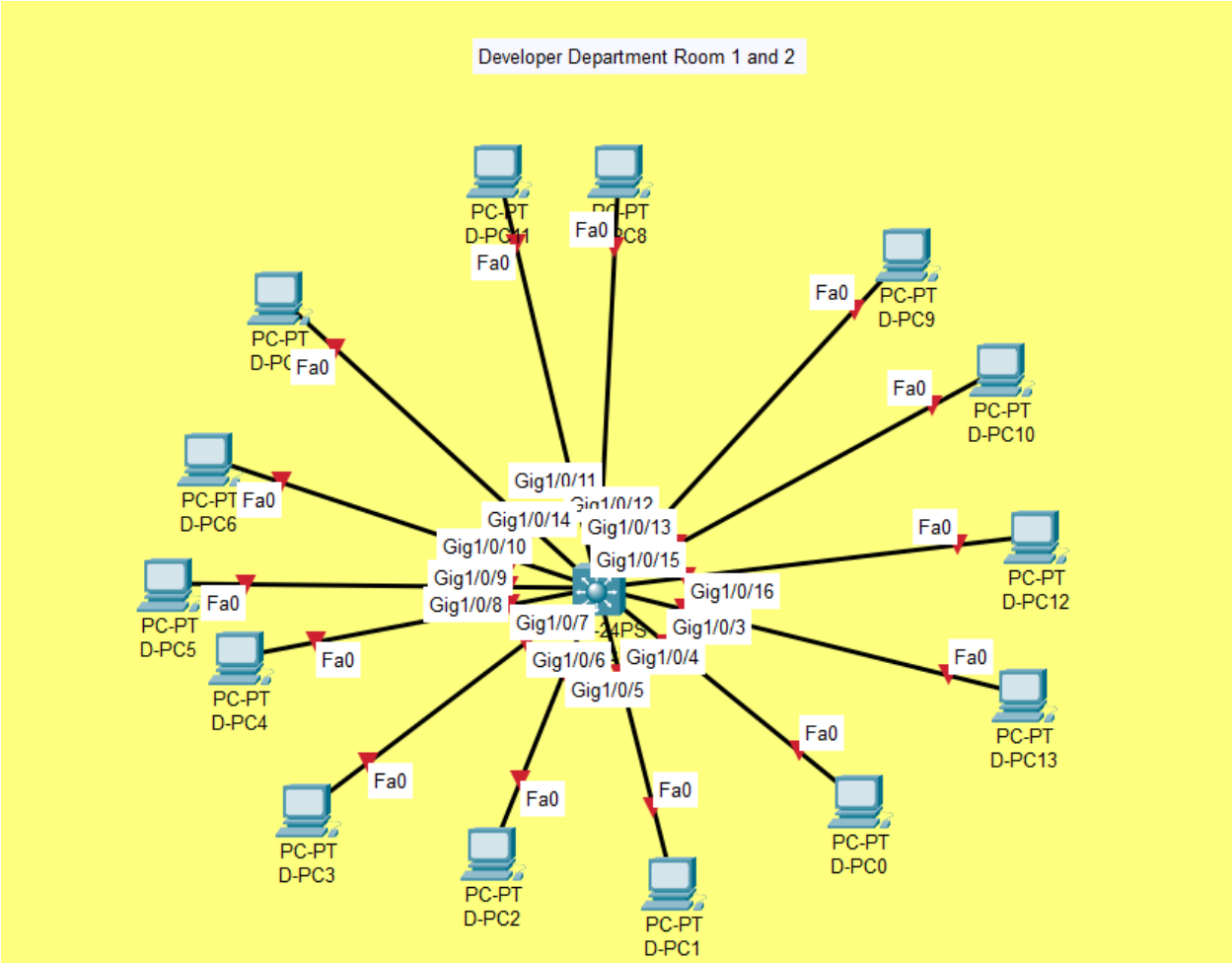


**FIGURE 3-2.** Developer Switch 1 connections (Note: the switch is connected to the D-Router which could not be pictured due to interface port unreadability)

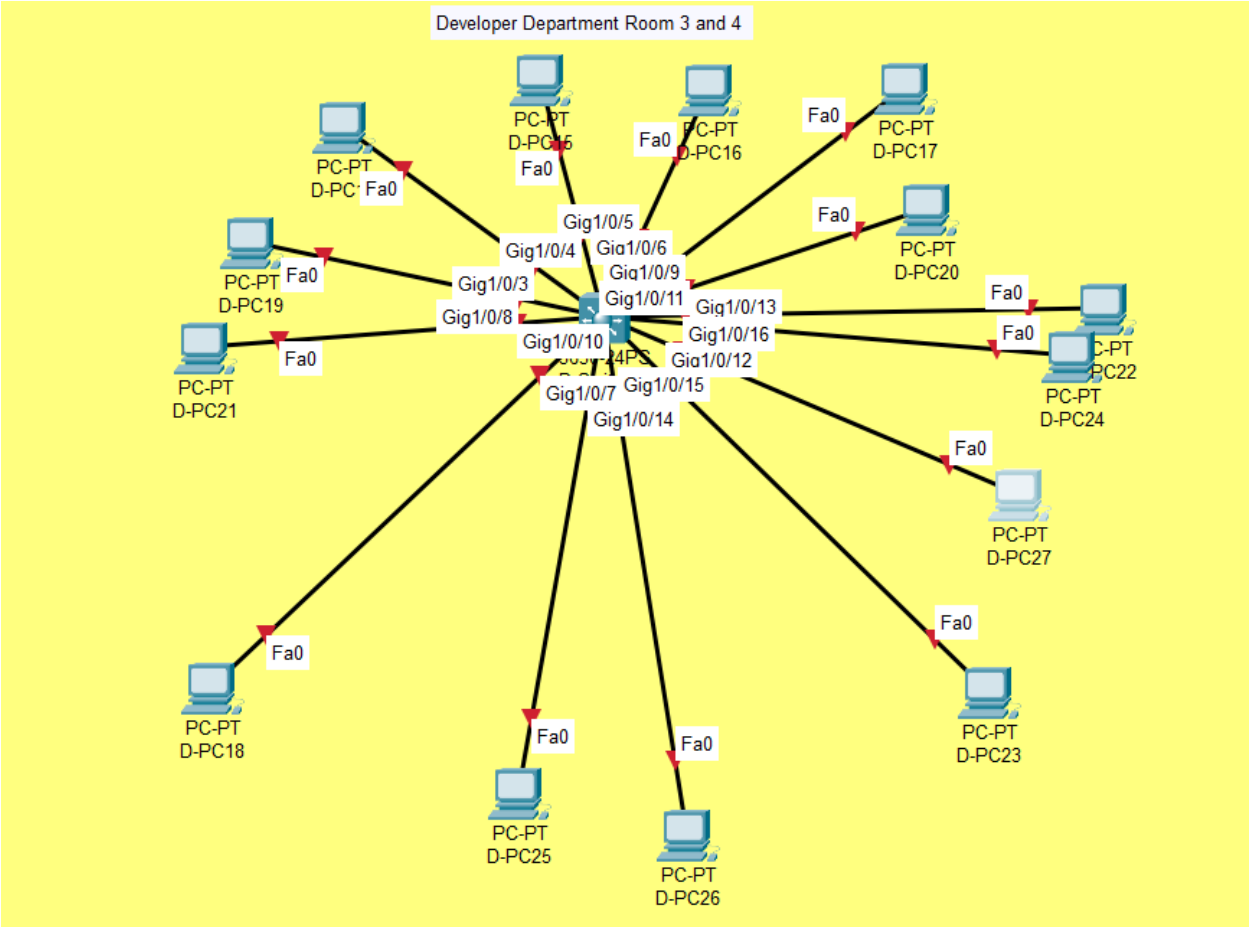


**FIGURE 3-3.** Developer Switch 2 connections(Note: the switch is connected to the D-Switch-1 which could not be pictured due to interface port unreadability)

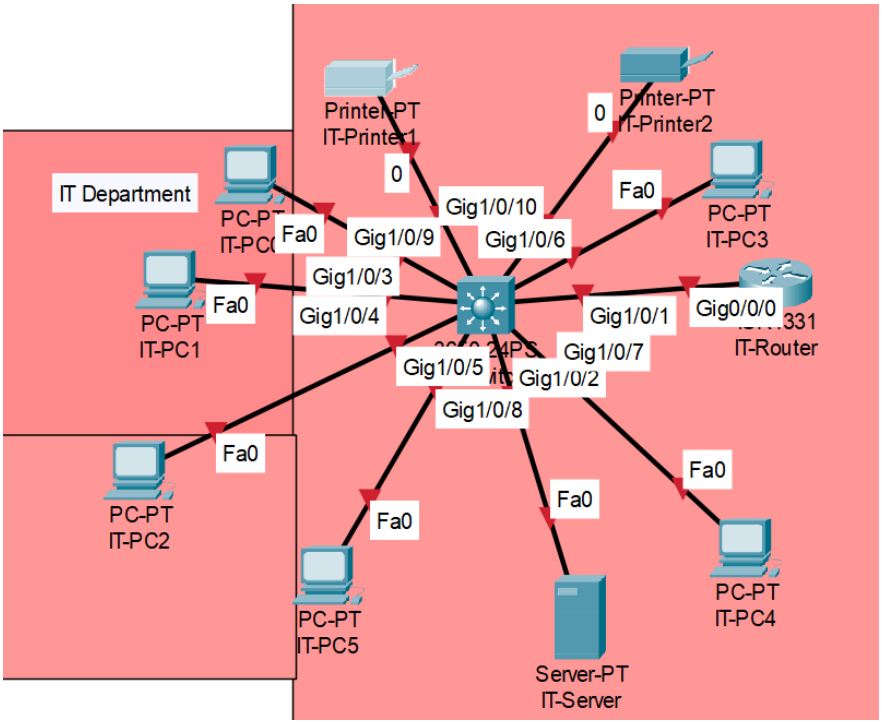


**FIGURE 3-3.** IT Switch connections

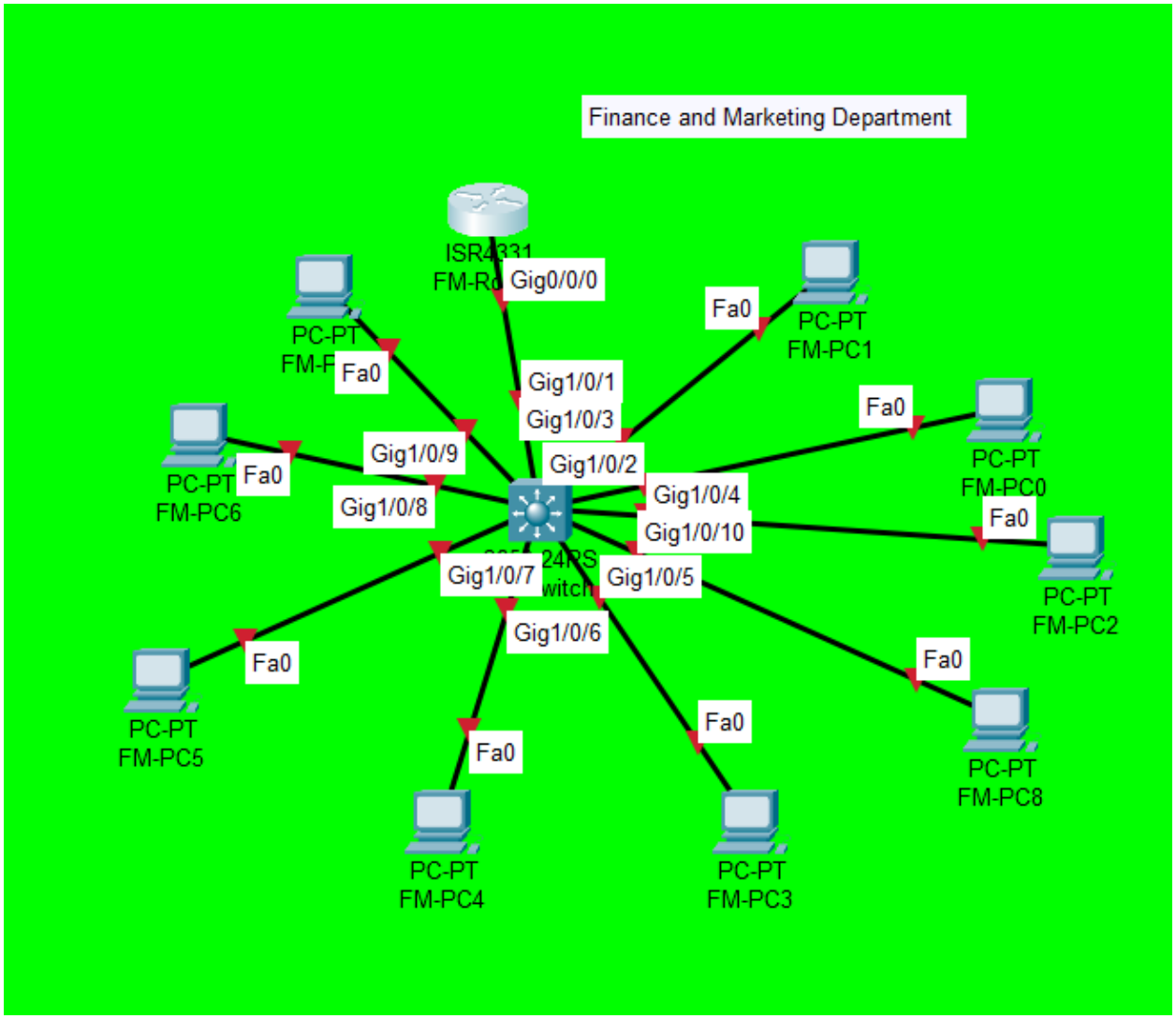


**FIGURE 3-4.** Finance and Marketing Switch connections

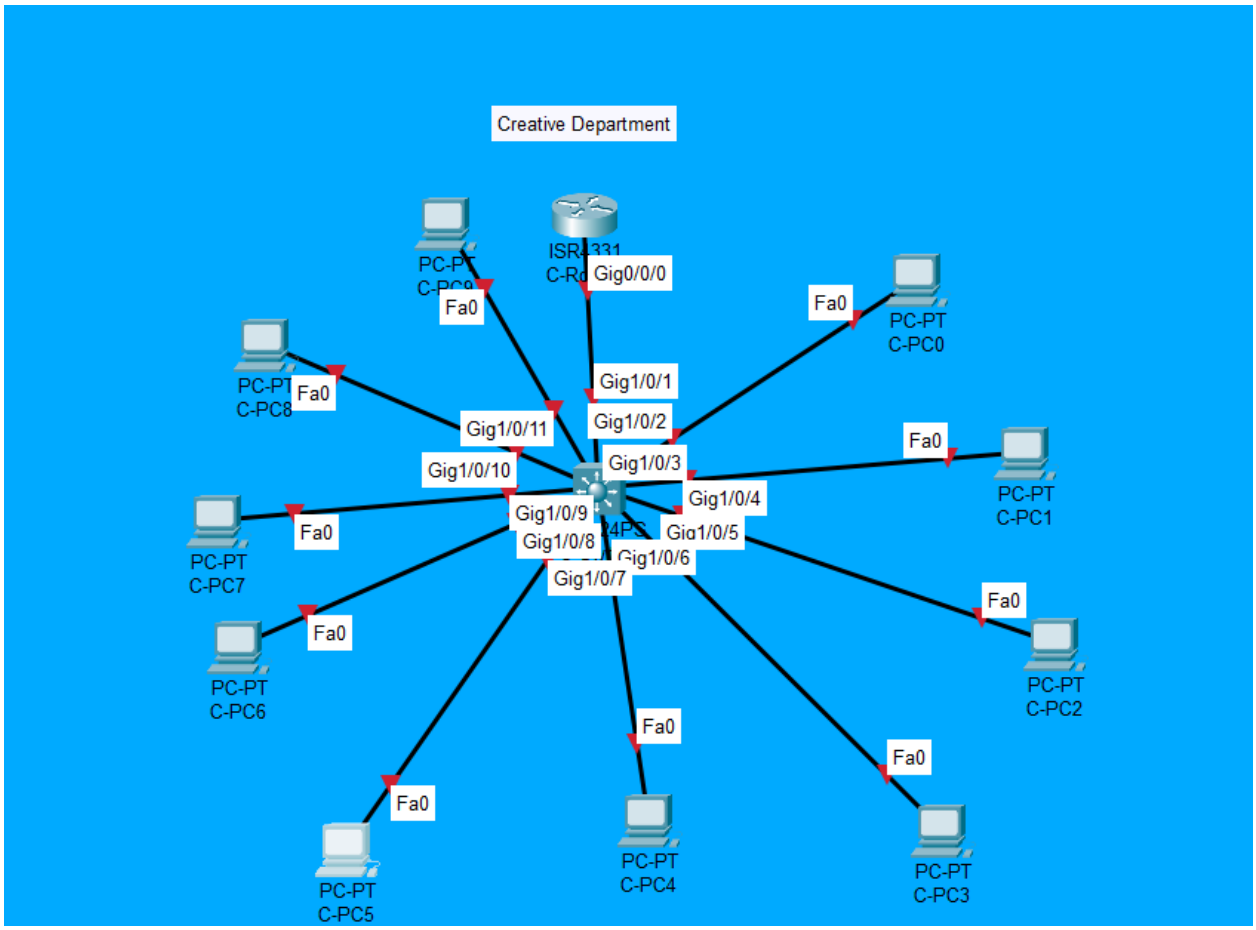


**FIGURE 3-5.** Creative Switch  connections

### Subsection 3.2 Device Interconnection Table

The following table lists each device in the network, which device its connected to, and which interfaces are involved on both ends.

| Connected from | Interface | Connected to | Interface |
|---|---|---|---|
| IT-Router | S0/1/0 | FM-Router | S0/1/1 |
| FM-Router | S0/1/0 | D-Router | S0/1/1 |
| D-Router | S0/1/0 | C-Router | S0/1/1 |
| C-Router | S0/1/0 | IT-Router | S0/1/1 |

| | | | |
|---|---|---|---|
| IT-Router | G0/0/0 | IT-Switch | G1/0/1 |
| IT-Switch | G1/0/2 | IT-Server | FastEthernet0 |
| IT-Switch | G1/0/3 | IT-PC0 | FastEthernet0 |
| IT-Switch | G1/0/4 | IT-PC1 | FastEthernet0 |
| IT-Switch | G1/0/5 | IT-PC2 | FastEthernet0 |
| IT-Switch | G1/0/6 | IT-PC3 | FastEthernet0 |
| IT-Switch | G1/0/7 | IT-PC4 | FastEthernet0 |
| IT-Switch | G1/0/8 | IT-PC5 | FastEthernet0 |
| IT-Switch | G1/0/9 | IT-Printer1 | FastEthernet0 |
| IT-Switch | G1/0/10 | IT-Printer2 | FastEthernet0 |
| D-Router | G0/0/0 | D-Switch-1 | G1/0/1 |
| D-Switch-1 | G1/0/2 | D-Switch-2 | G1/0/1 |
| D-Switch-1 | G1/0/3 | D-PC0 | FastEthernet0 |
| D-Switch-1 | G1/0/4 | D-PC1 | FastEthernet0 |
| D-Switch-1 | G1/0/5 | D-PC2 | FastEthernet0 |
| D-Switch-1 | G1/0/6 | D-PC3 | FastEthernet0 |

| | | | |
|---|---|---|---|
| D-Switch-1 | G1/0/7 | D-PC4 | FastEthernet0 |
| D-Switch-1 | G1/0/8 | D-PC5 | FastEthernet0 |
| D-Switch-1 | G1/0/9 | D-PC6 | FastEthernet0 |
| D-Switch-1 | G1/0/10 | D-PC7 | FastEthernet0 |
| D-Switch-1 | G1/0/11 | D-PC8 | FastEthernet0 |
| D-Switch-1 | G1/0/12 | D-PC9 | FastEthernet0 |
| D-Switch-1 | G1/0/13 | D-PC10 | FastEthernet0 |
| D-Switch-1 | G1/0/14 | D-PC11 | FastEthernet0 |
| D-Switch-1 | G1/0/15 | D-PC12 | FastEthernet0 |
| D-Switch-1 | G1/0/16 | D-PC13 | FastEthernet0 |
| D-Switch-2 | G1/0/3 | D-PC14 | FastEthernet0 |
| D-Switch-2 | G1/0/4 | D-PC15 | FastEthernet0 |
| D-Switch-2 | G1/0/5 | D-PC16 | FastEthernet0 |
| D-Switch-2 | G1/0/6 | D-PC17 | FastEthernet0 |
| D-Switch-2 | G1/0/7 | D-PC18 | FastEthernet0 |
| D-Switch-2 | G1/0/8 | D-PC19 | FastEthernet0 |

| | | | |
|---|---|---|---|
| D-Switch-2 | G1/0/9 | D-PC20 | FastEthernet0 |
| D-Switch-2 | G1/0/10 | D-PC21 | FastEthernet0 |
| D-Switch-2 | G1/0/11 | D-PC22 | FastEthernet0 |
| D-Switch-2 | G1/0/12 | D-PC23 | FastEthernet0 |
| D-Switch-2 | G1/0/13 | D-PC24 | FastEthernet0 |
| D-Switch-2 | G1/0/14 | D-PC25 | FastEthernet0 |
| D-Switch-2 | G1/0/15 | D-PC26 | FastEthernet0 |
| D-Switch-2 | G1/0/16 | D-PC27 | FastEthernet0 |
| FM-Router | G0/0/0 | FM-Switch | G1/0/1 |
| FM-Switch | G1/0/2 | FM-PC0 | FastEthernet0 |
| FM-Switch | G1/0/3 | FM-PC1 | FastEthernet0 |
| FM-Switch | G1/0/4 | FM-PC2 | FastEthernet0 |
| FM-Switch | G1/0/5 | FM-PC3 | FastEthernet0 |
| FM-Switch | G1/0/6 | FM-PC4 | FastEthernet0 |
| FM-Switch | G1/0/7 | FM-PC5 | FastEthernet0 |
| FM-Switch | G1/0/8 | FM-PC6 | FastEthernet0 |

| | | | |
|---|---|---|---|
| FM-Switch | G1/0/9 | FM-PC7 | FastEthernet0 |
| FM-Switch | G1/0/10 | FM-PC8 (Lobby) | FastEthernet0 |
| C-Router | G0/0/0 | C-Switch | G1/0/1 |
| C-Switch | G1/0/2 | C-PC0 | FastEthernet0 |
| C-Switch | G1/0/3 | C-PC1 | FastEthernet0 |
| C-Switch | G1/0/4 | C-PC2 | FastEthernet0 |
| C-Switch | G1/0/5 | C-PC3 | FastEthernet0 |
| C-Switch | G1/0/6 | C-PC4 | FastEthernet0 |
| C-Switch | G1/0/7 | C-PC5 | FastEthernet0 |
| C-Switch | G1/0/8 | C-PC6 | FastEthernet0 |
| C-Switch | G1/0/9 | C-PC7 | FastEthernet0 |
| C-Switch | G1/0/10 | C-PC8 | FastEthernet0 |
| C-Switch | G1/0/11 | C-PC9 | FastEthernet0 |

## Section 4 - Logical Topology

### Subsection 4.1 Introduction

To enhance understanding of the network's device interconnections, this section provides a comprehensive overview of the company's logical topology. This includes a detailed analysis of the devices and interfaces utilized, with a particular emphasis on showcasing the interconnections between end devices and infrastructure devices through an informative diagram. The main objective of this section is to provide a visual representation that offers assistance in understanding the network's overall structure.

### Subsection 4.2 Logical Topology Diagram

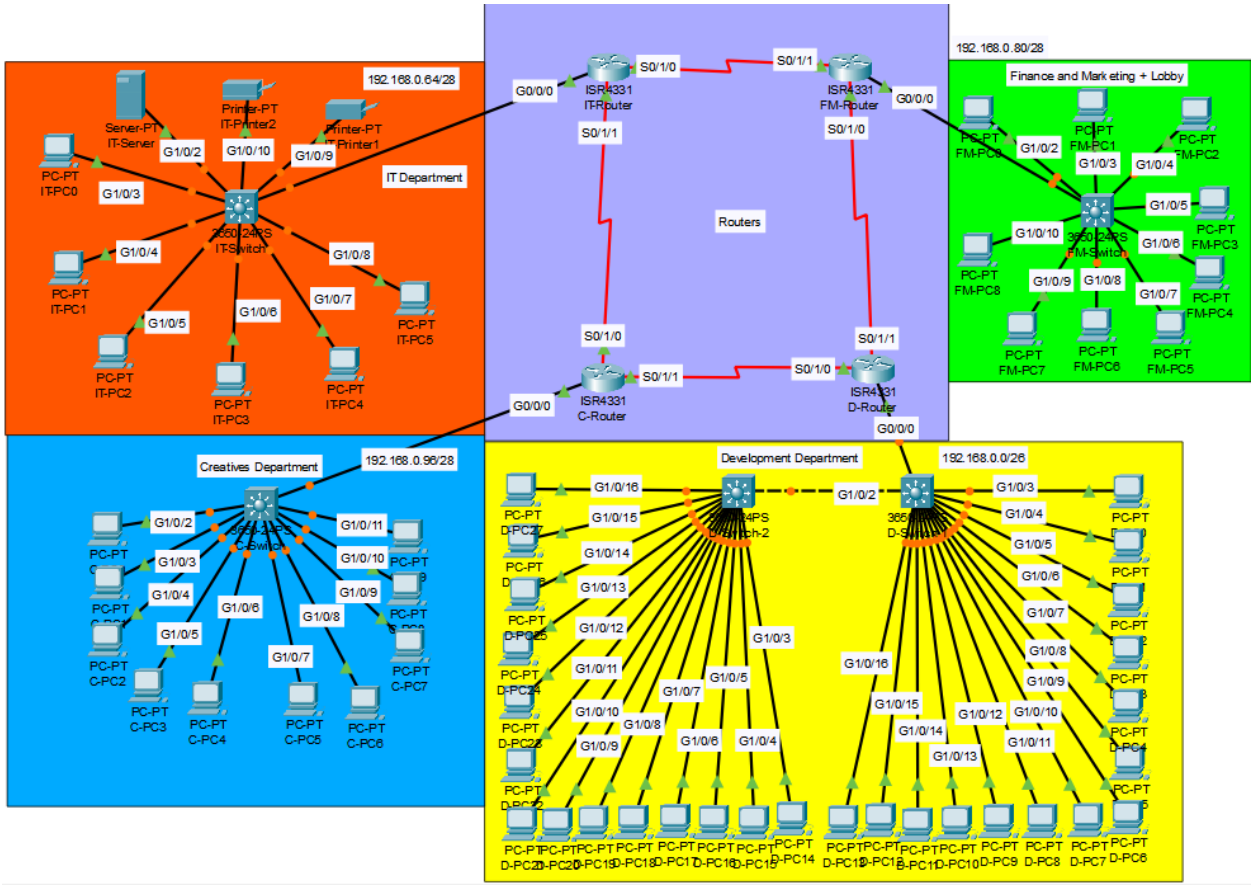


**FIGURE 4-1.** Logical Topology Diagram

As shown in the illustration above, we have designed the topology in order to have 4 different LANs in the business, wherein there is one LAN dedicated for each department. This was made possible through the different GigabitEthernet interfaces available on the router that allowed each department to have their own LAN. These

LANs are connected to each of their own Router, with all 4 routers being connected to each other through the serial interfaces. This allows host devices from any LAN to access a device in another LAN while maintaining redundancy.

The routers are connected to each other through the serial ports S0/1/0 and S0/1/1 which were made available through the NIM-2T. The IT-Router's S0/1/0 port is connected to the FM-Router's S0/1/1 port. The FM-Router's S0/1/0 port is connected to the D-Router's S0/1/1 port. The D-Router's S0/1/0 port is connected to the C-Router's S0/1/1 port. The C-Router's S0/1/0 port is connected to the IT-Router's S0/1/1 port.

The G0/0/0 interface on the D-Router is used to have a LAN connection to the switch (D-Switch-1) using the interface G1/0/1 wherein this would be the local network for the Developer's Department. The default gateway that will be configured to this router interface would be 192.168.0.1. The interfaces G1/0/2 to G1/0/16 on the switch (D-Switch-1) are used to have a direct connection to the switch (D-Switch-2) and to the 14 PCs (D-PC0 to D-PC13) through their FastEthernet0 interfaces. While, interfaces G1/0/1 (barring G1/0/2) to G1/0/16 on switch (D-Switch-2) are used to have a direct connection to the switch (D-Switch-1) and to the 14 PCs (D-PC14 to D-PC27) using their FastEthernet0 interfaces.

The G0/0/0 interface on the IT-Router establishes a LAN connection to the switch (IT-Switch) using its interface G1/0/1 where it would be the local network used by the IT Department. The default gateway that will be assigned to this router interface is 192.168.0.65. The interfaces G1/0/2 to G1/0/10 on the switch (IT-Switch-1) are used to have a direct connection to the FastEthernet0 interfaces on the server, 2 printers and 6 PCs (IT-PC0 to IT-PC6).

The G0/0/0 interface on the FM-Router makes a LAN connection to the switch (FM-Switch) through its G1/0/1 interface. This local network is used by the Finance and Marketing Department. The default gateway assigned to this router interface is 192.168.0.81. The interfaces G1/0/2 to G1/0/10 on the switch (FM-Switch-1) are used to have a direct connection to the FastEthernet0 interfaces on the 9 PCs (FM-PC0 to FMPC8).

The G0/0/0 interface on the C-Router makes a LAN connection to the switch (C-Switch) using the G1/0/1 interface. This LAN is allocated to the Creatives Department hence, the default gateway needed in this interface is 192.168.0.97. The interfaces G1/0/2 to G1/0/11 on the switch (C-Switch-1) are used to make a connection to the FastEthernet0 interfaces on the 10 PCs (C-PC0 to C-PC9) in this department.

## Section 5 - Security Implementation

### Subsection 5.1 Introduction

Network Security is an integral factor to consider when designing a network. An improperly secured network is more vulnerable to threats from the outside, causing damage to the system. An example would be unauthorized individuals managing to gain access to the network where they could then steal important network data,consequently causing substantial financial and reputational losses to the company. This ever-present threat of network vulnerabilities underscores the paramount importance of prioritizing network security Thus, this section encompasses a comprehensive exposition of the security measures integrated into each device within the proposed network.

### Subsection 5.2 Passwords

Passwords serve as the primary defense against unauthorized entry into a network and its sensitive data. Robust passwords play a vital role in safeguarding the company against potential theft and tampering of critical assets. Keeping this perspective in mind, the subsequent guidelines were adhered to while configuring passwords for all switches and routers:

- Passwords must have a minimum length of 8 characters.
- Passwords must comprise a combination of alphanumeric characters and symbols.
- Passwords must encompass both uppercase and lowercase characters.
- Passwords must be unique across all devices.

A random password generator following these guidelines was used to secure the user EXEC mode, privileged EXEC mode, and VTY lines. In addition, all plaintext passwords were encrypted using service-password-encryption to prevent unauthorized individuals from simply viewing them in the configuration file.

### Subsection 5.3 Logins and Timeouts

To deter brute-force password guessing attacks, the routers were configured to block all logins for 5 minutes if there have been 7 wrong attempts within 2 minutes (login block-for 300 attempts 7 within 120). A banner displaying a message of “unauthorized access is prohibited” was also added to all switches and routers. Additionally, we have also configured the routers to automatically logout (exec-timeout 6 0) if the user was inactive for 6 minutes, in order to mitigate risk of internal threat actors taking advantage of said inactivity.

### Subsection 5.4 SSH

Enabling SSH for secure remote access to switches and routers was also implemented. To accomplish this, the following steps were taken on all network devices:

- Set a unique and appropriate hostname
- Set the IP domain name to “XciteInteractive.com”
- Generate a 1024-bit RSA key to encrypt traffic going to and from the device
- Create a local user entry
- The username used in all devices is “admin”, and its password is “pLs_giVE4_0” (username admin password pLs_giVE4_0)
- Enter the “login local” command to authenticate the vty lines
- Enable inbound SSH sessions using the “transport input ssh” command (line vty 0 4 for routers, line vty 0 15 for switches)

### Subsection 5.5 Other Security Measures

In addition to the aforementioned security measures, we also shut down any unused router and switch ports. This was done to prevent security hazards that may result from non-authorized users connecting devices that could potentially jeopardize the network, resulting in a range of problems like security breaches, network disruptions, data corruption, and other related concerns.

# Appendices

## Appendix A.

### User EXEC mode password table

This table contains the User EXEC mode or line password configured to each network device. These passwords are needed when first logging into the switch or router.

| | |
|---|---|
| **C-Switch** | KAWZPS%w |
| **IT-Switch** | ^J6/;z#g |
| **FM-Switch** | U}RhX5Xi |
| **D-Switch-1** | x*v;9&%f |
| **D-Switch-2** | NhPF"Z61 |
| **IT-Router** | A0AX!H!6 |
| **C-Router** | K(atbU2a |
| **FM-Router** | }hXK0:A1 |
| **D-Router** | %V{\|1y8P |

## Appendix B.

### Privileged EXEC mode password table

This table contains the Privileged EXEC mode password configured to each network device. These passwords are needed when going to the Privileged EXEC mode from the User EXEC mode.

| | |
|---|---|
| **C-Switch** | w%SPOZWA^K |
| **IT-Switch** | #gz;6J^ |
| **FM-Switch** | iX5XhR}U |
| **D-Switch-1** | f%&9;v*x |
| **D-Switch-2** | 16Z"FPNh |
| **IT-Router** | 6!H!XA0A |
| **C-Router** | a2Ubt(aK |
| **FM-Router** | 1A:0KXh} |
| **D-Router** | P8y1\|V%! |

## Appendix C.

## VTY password table

This table contains the VTY password configured to all VTY lines of each network device.

| | |
|---|---|
| **C-Switch** | wPKZ%ASOW^ |
| **IT-Switch** | J^gz6#; |
| **FM-Switch** | U}RhXiX5 |
| **D-Switch-1** | f*%x9v;f |
| **D-Switch-2** | N6ZFPH1" |
| **IT-Router** | AAX!6H0! |
| **C-Router** | 2a(KbUta |
| **FM-Router** | }Xh1K0A: |
| **D-Router** | %1y!\|8V{P |

## Appendix D.

### Startup Configs for each Switch and Router

### Startup Config for IT-Switch

```
Current configuration : 1822 bytes
!
version 16.3.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname IT-Switch
!
!
enable secret 5 $1$mERr$GEw02ZFipYD9SXHjFxM7I0
!
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
username admin password 7 0831605D361E0C21375F3354
!
!
!
!
!
!
!
!
!
!
!
no ip domain-lookup
ip domain-name XciteInteractive.com
!
!
spanning-tree mode pvst
!
!
!
```

```
!
!
!
interface GigabitEthernet1/0/1
!
interface GigabitEthernet1/0/2
!
interface GigabitEthernet1/0/3
!
interface GigabitEthernet1/0/4
!
interface GigabitEthernet1/0/5
!
interface GigabitEthernet1/0/6
!
interface GigabitEthernet1/0/7
!
interface GigabitEthernet1/0/8
!
interface GigabitEthernet1/0/9
!
interface GigabitEthernet1/0/10
!
interface GigabitEthernet1/0/11
!
interface GigabitEthernet1/0/12
!
interface GigabitEthernet1/0/13
!
interface GigabitEthernet1/0/14
!
interface GigabitEthernet1/0/15
!
interface GigabitEthernet1/0/16
!
interface GigabitEthernet1/0/17
!
interface GigabitEthernet1/0/18
!
interface GigabitEthernet1/0/19
!
interface GigabitEthernet1/0/20
!
interface GigabitEthernet1/0/21
```

```
!
interface GigabitEthernet1/0/22
!
interface GigabitEthernet1/0/23
!
interface GigabitEthernet1/0/24
!
interface GigabitEthernet1/1/1
!
interface GigabitEthernet1/1/2
!
interface GigabitEthernet1/1/3
!
interface GigabitEthernet1/1/4
!
interface Vlan1
 ip address 192.168.0.75 255.255.255.240
!
ip default-gateway 192.168.0.65
ip classless
!
ip flow-export version 9
!
!
!
banner motd ^CUnauthorized Access is Prohibited^C
!
!
!
!
line con 0
 exec-timeout 6 0
 password 7 081F661846421F5415
 login
!
line aux 0
!
line vty 0 4
 exec-timeout 6 0
 password 7 080B7249134F464C
 login local
 transport input ssh
line vty 5 15
 exec-timeout 6 0
```

```
 password 7 080B7249134F464C
 login local
 transport input ssh
!
!
!
!
End
```

**Startup Config for C-Switch**

```
Using 2067 bytes
!
version 16.3.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname C-Switch
!
!
enable secret 5 $1$mERr$nspg3CEnWTctt23qG2Jut/
!
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
username admin password 7 0831605D361E0C21375F3354
!
!
!
!
!
!
!
!
!
!
```

```
!
no ip domain-lookup
ip domain-name XciteInteractive.com
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet1/0/1
 description "Connection to C-Router"
!
interface GigabitEthernet1/0/2
!
interface GigabitEthernet1/0/3
!
interface GigabitEthernet1/0/4
!
interface GigabitEthernet1/0/5
!
interface GigabitEthernet1/0/6
!
interface GigabitEthernet1/0/7
!
interface GigabitEthernet1/0/8
!
interface GigabitEthernet1/0/9
!
interface GigabitEthernet1/0/10
!
interface GigabitEthernet1/0/11
!
interface GigabitEthernet1/0/12
 shutdown
!
interface GigabitEthernet1/0/13
 shutdown
!
interface GigabitEthernet1/0/14
 shutdown
!
```

```
interface GigabitEthernet1/0/15
 shutdown
!
interface GigabitEthernet1/0/16
 shutdown
!
interface GigabitEthernet1/0/17
 shutdown
!
interface GigabitEthernet1/0/18
 shutdown
!
interface GigabitEthernet1/0/19
 shutdown
!
interface GigabitEthernet1/0/20
 shutdown
!
interface GigabitEthernet1/0/21
 shutdown
!
interface GigabitEthernet1/0/22
 shutdown
!
interface GigabitEthernet1/0/23
 shutdown
!
interface GigabitEthernet1/0/24
 shutdown
!
interface GigabitEthernet1/1/1
 shutdown
!
interface GigabitEthernet1/1/2
 shutdown
!
interface GigabitEthernet1/1/3
 shutdown
!
interface GigabitEthernet1/1/4
 shutdown
!
interface Vlan1
 ip address 192.168.0.108 255.255.255.240
```

```
!
interface Vlan2
 mac-address 0004.9a1d.7101
 no ip address
!
ip default-gateway 192.168.0.97
ip classless
!
ip flow-export version 9
!
!
!
banner motd ^Cunauthorized access is prohibited^C
!
!
!
!
line con 0
 exec-timeout 6 0
 password 7 080A6D793329365205
 login
!
line aux 0
!
line vty 0 4
 exec-timeout 6 0
 password 7 08367C65335C24243D3C32
 login local
 transport input ssh
line vty 5 15
 exec-timeout 6 0
 password 7 08367C65335C24243D3C32
 login local
 transport input ssh
!
!
!
!
end
```

**Startup-config for D-Switch-1**

```
Using 2502 bytes
!
version 16.3.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname D-Switch-1
!
!
enable secret 5 $1$mERr$EOOEVo8ezNuq2oSubjkc./
!
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
username admin password 7 0831605D361E0C21375F3354
!
!
!
!
!
!
!
!
!
!
!
no ip domain-lookup
ip domain-name XciteInteractive.com
!
!
spanning-tree mode pvst
!
```

```
!
!
!
!
!
interface GigabitEthernet1/0/1
description "Connected to D-Router"
!
interface GigabitEthernet1/0/2
description "Connected to D-Switch-2"
!
interface GigabitEthernet1/0/3
description "Connected to D-PC0"
!
interface GigabitEthernet1/0/4
description "Connected to D-PC1"
!
interface GigabitEthernet1/0/5
description "Connected to D-PC2"
!
interface GigabitEthernet1/0/6
description "Connected to D-PC3"
!
interface GigabitEthernet1/0/7
description "Connected to D-PC4"
!
interface GigabitEthernet1/0/8
description "Connected to D-PC5"
!
interface GigabitEthernet1/0/9
description "Connected to D-PC6"
!
interface GigabitEthernet1/0/10
description "Connected to D-PC7"
!
interface GigabitEthernet1/0/11
description "Connected to D-PC8"
!
interface GigabitEthernet1/0/12
description "Connected to D-PC9"
!
interface GigabitEthernet1/0/13
description "Connected to D-PC10"
!
```

```
interface GigabitEthernet1/0/14
description "Connected to D-PC11"
!
interface GigabitEthernet1/0/15
description "Connected to D-PC12"
!
interface GigabitEthernet1/0/16
description "Connected to D-PC13"
!
interface GigabitEthernet1/0/17
shutdown
!
interface GigabitEthernet1/0/18
shutdown
!
interface GigabitEthernet1/0/19
shutdown
!
interface GigabitEthernet1/0/20
shutdown
!
interface GigabitEthernet1/0/21
shutdown
!
interface GigabitEthernet1/0/22
shutdown
!
interface GigabitEthernet1/0/23
shutdown
!
interface GigabitEthernet1/0/24
shutdown
!
interface GigabitEthernet1/1/1
shutdown
!
interface GigabitEthernet1/1/2
shutdown
!
interface GigabitEthernet1/1/3
shutdown
!
interface GigabitEthernet1/1/4
shutdown
```

```
!
interface Vlan1
ip address 192.168.0.30 255.255.255.192
!
ip default-gateway 192.168.0.1
ip classless
!
ip flow-export version 9
!
!
!
banner motd ^CUnauthorized access is prohibited^C
!
!
!
!
line con 0
exec-timeout 6 0
password 7 0827060B1140134C14
login
!
line aux 0
!
line vty 0 4
exec-timeout 6 0
password 7 0827060B1140134C14
login local
transport input ssh
line vty 5 15
exec-timeout 6 0
password 7 0827060B1140134C14
login local
transport input ssh
!
!
!
!
end
```

**Startup-config for D-Switch-2**

```
Using 1959 bytes
!
version 16.3.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname D-Switch-2
!
!
enable secret 5 $1$mERr$fhoLLPbHDKd11iTKREN231
!
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
username admin
!
!
!
!
!
!
!
!
!
!
!
!
no ip domain-lookup
ip domain-name XciteInteractive.com
!
!
spanning-tree mode pvst
!
!
```

```
!
!
!
!
interface GigabitEthernet1/0/1
description "Connected to D-Switch-1"
!
interface GigabitEthernet1/0/2
shutdown
!
interface GigabitEthernet1/0/3
!
interface GigabitEthernet1/0/4
!
interface GigabitEthernet1/0/5
!
interface GigabitEthernet1/0/6
!
interface GigabitEthernet1/0/7
!
interface GigabitEthernet1/0/8
!
interface GigabitEthernet1/0/9
!
interface GigabitEthernet1/0/10
!
interface GigabitEthernet1/0/11
!
interface GigabitEthernet1/0/12
!
interface GigabitEthernet1/0/13
!
interface GigabitEthernet1/0/14
!
interface GigabitEthernet1/0/15
!
interface GigabitEthernet1/0/16
!
interface GigabitEthernet1/0/17
shutdown
!
interface GigabitEthernet1/0/18
shutdown
!
```

```
interface GigabitEthernet1/0/19
shutdown
!
interface GigabitEthernet1/0/20
shutdown
!
interface GigabitEthernet1/0/21
shutdown
!
interface GigabitEthernet1/0/22
shutdown
!
interface GigabitEthernet1/0/23
shutdown
!
interface GigabitEthernet1/0/24
shutdown
!
interface GigabitEthernet1/1/1
shutdown
!
interface GigabitEthernet1/1/2
shutdown
!
interface GigabitEthernet1/1/3
shutdown
!
interface GigabitEthernet1/1/4
shutdown
!
interface Vlan1
ip address 192.168.0.31 255.255.255.192
!
ip default-gateway 192.168.0.1
ip classless
!
ip flow-export version 9
!
!
!
banner motd ^CUnauthorized Access is prohibited^C
!
!
!
```

```
!
line con 0
exec-timeout 6 0
password 7 08701A744B3F35391A
login
!
line aux 0
!
line vty 0 4
exec-timeout 6 0
password 7 080F1A742F292D4650
login local
transport input ssh
line vty 5 15
exec-timeout 6 0
password 7 080F1A742F292D4650
login local
transport input ssh
!
!
!
!
end
D-Switch-2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
D-Switch-2(config)#line vty 0 4
D-Switch-2(config-line)#username admin password pLs_giVE4_0
D-Switch-2(config)#line vty 0 15
D-Switch-2(config-line)#username admin password pLs_giVE4_0
D-Switch-2(config)#exit
D-Switch-2#
%SYS-5-CONFIG_I: Configured from console by console
write
Building configuration...
Compressed configuration from 7383 bytes to 3601 bytes[OK]
[OK]
D-Switch-2#sho
D-Switch-2#show st
D-Switch-2#show sta
D-Switch-2#show start
Using 1995 bytes
!
version 16.3.2
no service timestamps log datetime msec
```

```
no service timestamps debug datetime msec
service password-encryption
!
hostname D-Switch-2
!
!
enable secret 5 $1$mERr$fhoLLPbHDKd11iTKREN231
!
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
username admin password 7 0831605D361E0C21375F3354
!
!
!
!
!
!
!
!
!
!
!
no ip domain-lookup
ip domain-name XciteInteractive.com
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet1/0/1
description "Connected to D-Switch-1"
!
interface GigabitEthernet1/0/2
```

```
shutdown
!
interface GigabitEthernet1/0/3
!
interface GigabitEthernet1/0/4
!
interface GigabitEthernet1/0/5
!
interface GigabitEthernet1/0/6
!
interface GigabitEthernet1/0/7
!
interface GigabitEthernet1/0/8
!
interface GigabitEthernet1/0/9
!
interface GigabitEthernet1/0/10
!
interface GigabitEthernet1/0/11
!
interface GigabitEthernet1/0/12
!
interface GigabitEthernet1/0/13
!
interface GigabitEthernet1/0/14
!
interface GigabitEthernet1/0/15
!
interface GigabitEthernet1/0/16
!
interface GigabitEthernet1/0/17
shutdown
!
interface GigabitEthernet1/0/18
shutdown
!
interface GigabitEthernet1/0/19
shutdown
!
interface GigabitEthernet1/0/20
shutdown
!
interface GigabitEthernet1/0/21
shutdown
```

```
!
interface GigabitEthernet1/0/22
shutdown
!
interface GigabitEthernet1/0/23
shutdown
!
interface GigabitEthernet1/0/24
shutdown
!
interface GigabitEthernet1/1/1
shutdown
!
interface GigabitEthernet1/1/2
shutdown
!
interface GigabitEthernet1/1/3
shutdown
!
interface GigabitEthernet1/1/4
shutdown
!
interface Vlan1
ip address 192.168.0.31 255.255.255.192
!
ip default-gateway 192.168.0.1
ip classless
!
ip flow-export version 9
!
!
!
banner motd ^CUnauthorized Access is prohibited^C
!
!
!
!
line con 0
exec-timeout 6 0
password 7 08701A744B3F35391A
login
!
line aux 0
!
```

```
line vty 0 4
exec-timeout 6 0
password 7 080F1A742F292D4650
login local
transport input ssh
line vty 5 15
exec-timeout 6 0
password 7 080F1A742F292D4650
login local
transport input ssh
!
!
!
!
end
```

**Startup Config for FM-Switch**

```
Using 2343 bytes
!
version 16.3.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname FM-Switch
!
!
enable secret 5 $1$mERr$ih3Z4Gw8Q4AabedTYtDI30
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
username admin password 7 0831605D361E0C21375F3354
!
!
!
!
```

```
!
!
!
!
!
!
no ip domain-lookup
ip domain-name XciteInteractive.com
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet1/0/1
 description Connected to FM-Router
!
interface GigabitEthernet1/0/2
 description Connected to FM-PC0
!
interface GigabitEthernet1/0/3
 description Connected to FM-PC1
!
interface GigabitEthernet1/0/4
 description Connected to FM-PC2
!
interface GigabitEthernet1/0/5
 description Connected to FM-PC3
!
interface GigabitEthernet1/0/6
 description Connected to FM-PC4
!
interface GigabitEthernet1/0/7
 description Connected to FM-PC5
!
interface GigabitEthernet1/0/8
 description Connected to FM-PC6
!
interface GigabitEthernet1/0/9
 description Connected to FM-PC7
!
```

```
interface GigabitEthernet1/0/10
 description Connected to FM-PC8(Lobby)
!
interface GigabitEthernet1/0/11
 shutdown
!
interface GigabitEthernet1/0/12
 shutdown
!
interface GigabitEthernet1/0/13
 shutdown
!
interface GigabitEthernet1/0/14
 shutdown
!
interface GigabitEthernet1/0/15
 shutdown
!
interface GigabitEthernet1/0/16
 shutdown
!
interface GigabitEthernet1/0/17
 shutdown
!
interface GigabitEthernet1/0/18
 shutdown
!
interface GigabitEthernet1/0/19
 shutdown
!
interface GigabitEthernet1/0/20
 shutdown
!
interface GigabitEthernet1/0/21
 shutdown
!
interface GigabitEthernet1/0/22
 shutdown
!
interface GigabitEthernet1/0/23
 shutdown
!
interface GigabitEthernet1/0/24
 shutdown
```

```
!
interface GigabitEthernet1/1/1
 shutdown
!
interface GigabitEthernet1/1/2
 shutdown
!
interface GigabitEthernet1/1/3
 shutdown
!
interface GigabitEthernet1/1/4
 shutdown
!
interface Vlan1
 ip address 192.168.0.91 255.255.255.240
!
ip default-gateway 192.168.0.81
ip classless
!
ip flow-export version 9
!
!
!
banner motd ^CUnauthorized Access is Prohibited^C
!
!
!
!
line con 0
 exec-timeout 6 0
 password 7 0814517C0121502F1B
 login
!
line aux 0
!
line vty 0 4
 exec-timeout 6 0
 password 7 0814517C01210C2F47
 login local
 transport input ssh
line vty 5 15
 exec-timeout 6 0
 password 7 0814517C01210C2F47
 login local
```

```
 transport input ssh
!
!
!
!
end
```

**Startup Config for C-Router**

```
Using 1669 bytes
!
version 15.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
security passwords min-length 8
!
hostname C-Router
!
login block-for 300 attempts 7 within 120
!
!
enable secret 5 $1$mERr$4IAnycW/LiLadkOs5yJiw/
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
username admin password 7 0831605D361E0C21375F3354
!
!
!
!
!
!
```

```
!
!
no ip domain-lookup
ip domain-name XciteInteractive.com
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet0/0/0
description "Connection to C-Switch"
ip address 192.168.0.97 255.255.255.240
duplex auto
speed auto
!
interface GigabitEthernet0/0/1
no ip address
duplex auto
speed auto
shutdown
!
interface GigabitEthernet0/0/2
no ip address
duplex auto
speed auto
shutdown
!
interface Serial0/1/0
description "Connection to IT-Router"
ip address 192.168.0.117 255.255.255.252
!
interface Serial0/1/1
description "Connection to D-Router"
ip address 192.168.0.114 255.255.255.252
clock rate 2000000
!
interface Vlan1
no ip address
shutdown
!
```

```
ip classless
ip route 192.168.0.0 255.255.255.192 192.168.0.113
ip route 192.168.0.64 255.255.255.240 192.168.0.118
ip route 192.168.0.80 255.255.255.240 192.168.0.113
ip route 192.168.0.80 255.255.255.240 192.168.0.118
!
ip flow-export version 9
!
!
ip access-list extended sl_def_acl
deny tcp any any eq telnet
deny tcp any any eq www
deny tcp any any eq 22
permit tcp any any eq 22
!
banner motd ^Cunauthorized access is prohibited^C
!
!
!
!
line con 0
password 7 080A044F1D1B304513
login
!
line aux 0
!
line vty 0 4
exec-timeout 6 0
password 7 08734D06221B300313
login local
transport input ssh
!
!
!
end
```

**Startup Config for IT-Router**

```
Current configuration : 1794 bytes
!
version 15.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
security passwords min-length 8
```

```
!
hostname IT-Router
!
login block-for 300 attempts 7 within 120
!
!
enable secret 5 $1$mERr$Z9xrsP/ZoQpYsb2znnwjO0
!
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
username admin password 7 0831605D361E0C21375F3354
!
!
!
!
!
!
!
!
!
no ip domain-lookup
ip domain-name XciteInteractive.com
!
!
spanning-tree mode pvst
!
!
!
!
!
!
!
interface GigabitEthernet0/0/0
 description LAN connection to IT-Switch
 ip address 192.168.0.65 255.255.255.240
 duplex auto
 speed auto
!
```

```
interface GigabitEthernet0/0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface GigabitEthernet0/0/2
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/1/0
 description WAN connection to FM-Router
 ip address 192.168.0.121 255.255.255.252
!
interface Serial0/1/1
 description WAN connection to C-Router
 ip address 192.168.0.118 255.255.255.252
 clock rate 2000000
!
interface Vlan1
 no ip address
 shutdown
!
ip classless
ip route 192.168.0.96 255.255.255.240 192.168.0.117
ip route 192.168.0.80 255.255.255.240 192.168.0.122
ip route 192.168.0.0 255.255.255.192 192.168.0.122
ip route 192.168.0.0 255.255.255.192 192.168.0.117
!
ip flow-export version 9
!
!
ip access-list extended sl_def_acl
 deny tcp any any eq telnet
 deny tcp any any eq www
 deny tcp any any eq 22
 permit tcp any any eq 22
!
banner motd ^CUnauthorized Access is Prohibited^C
!
!
!
```

```
!
line con 0
 exec-timeout 6 0
 password 7 08001C6F31582D5644
 login
!
line aux 0
!
line vty 0 4
 exec-timeout 6 0
 password 7 08006D76484F2D4753
 login local
 transport input ssh
line vty 5 15
 exec-timeout 6 0
 password 7 08006D76484F2D4753
 login local
 transport input ssh
!
!
!
end
```

**Startup Config for D-Router**

```
Using 1790 bytes
!
version 15.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
security passwords min-length 8
!
hostname D-Router
!
login block-for 300 attempts 7 within 120
!
!
enable secret 5 $1$mERr$gaR3j2vGtGgSvj9qvrM6l0
!
!
!
!
!
```

```
!
no ip cef
no ipv6 cef
!
!
!
username admin password 7 0831605D361E0C21375F3354
!
!
!
!
!
!
!
!
no ip domain-lookup
ip domain-name XciteInteractive.com
!
!
spanning-tree mode pvst
!
!
!
!
!
!
!
interface GigabitEthernet0/0/0
description "Connected to D-Switch-1"
ip address 192.168.0.1 255.255.255.192
duplex auto
speed auto
!
interface GigabitEthernet0/0/1
no ip address
duplex auto
speed auto
shutdown
!
interface GigabitEthernet0/0/2
no ip address
duplex auto
speed auto
shutdown
!
```

```
interface Serial0/1/0
description "Connected to C-Router"
ip address 192.168.0.113 255.255.255.252
!
interface Serial0/1/1
description "Connected to FM-Router"
ip address 192.168.0.126 255.255.255.252
clock rate 2000000
!
interface Vlan1
no ip address
shutdown
!
ip classless
ip route 192.168.0.80 255.255.255.240 192.168.0.125
ip route 192.168.0.96 255.255.255.240 192.168.0.114
ip route 192.168.0.64 255.255.255.240 192.168.0.125
ip route 192.168.0.64 255.255.255.240 192.168.0.114
!
ip flow-export version 9
!
!
ip access-list extended sl_def_acl
deny tcp any any eq telnet
deny tcp any any eq www
deny tcp any any eq 22
permit tcp any any eq 22
!
banner motd ^CUnauthorized access is prohibited^C
!
!
!
!
line con 0
exec-timeout 6 0
password 7 086614575805335253
login
!
line aux 0
!
line vty 0 4
exec-timeout 6 0
password 7 08641D5748055D21094C
login local
```

```
transport input ssh
line vty 5 15
exec-timeout 6 0
password 7 08641D5748055D21094C
login local
transport input ssh
!
!
!
end
```

**Start-up Config for FM-Router**

```
Using 1782 bytes
!
version 15.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
security passwords min-length 8
!
hostname FM-Router
!
login block-for 300 attempts 7 within 120
!
!
enable secret 5 $1$mERr$fgpkFluWTrpwgeUctQJnY1
!
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
username admin password 7 0831605D361E0C21375F3354
!
!
!
!
!
```

```
!
!
!
no ip domain-lookup
ip domain-name XciteInteractive.com
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet0/0/0
description Connected to FM-Switch
ip address 192.168.0.81 255.255.255.240
duplex auto
speed auto
!
interface GigabitEthernet0/0/1
no ip address
duplex auto
speed auto
shutdown
!
interface GigabitEthernet0/0/2
no ip address
duplex auto
speed auto
shutdown
!
interface Serial0/1/0
description Connnected to D-Router
ip address 192.168.0.125 255.255.255.252
!
interface Serial0/1/1
description Connnected to IT-Router
ip address 192.168.0.122 255.255.255.252
clock rate 2000000
!
interface Vlan1
no ip address
shutdown
```

```
!
ip classless
ip route 192.168.0.0 255.255.255.192 192.168.0.126
ip route 192.168.0.64 255.255.255.240 192.168.0.121
ip route 192.168.0.96 255.255.255.240 192.168.0.126
ip route 192.168.0.96 255.255.255.240 192.168.0.121
!
ip flow-export version 9
!
!
ip access-list extended sl_def_acl
deny tcp any any eq telnet
deny tcp any any eq www
deny tcp any any eq 22
permit tcp any any eq 22
!
banner motd ^CUnauthorized Access is Prohibited^C
!
!
!
!
line con 0
exec-timeout 6 0
password 7 083C447622495F3643
login
!
line aux 0
!
line vty 0 4
exec-timeout 6 0
password 7 083C74465832553648
login local
transport input ssh
line vty 5 15
exec-timeout 6 0
password 7 083C74465832553648
login local
transport input ssh
!
!
!
end
```

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