Networking & IT Infrastructure
Assignment
IP Subnetting Proposal

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1.0 Background

Our team created this proposal report as part of our module assignment: Networking IT & Infrastructure. This assignment aims to develop a secure networking system that would reduce the risk of cyber-attacks and data theft.

2.0 Introduction

This proposal is for a data communication network to serve a small start-up Interior Design Firm - **YDC Interior**. With collaborations with lead generation companies, the firm intends to upscale on a progressive rate of 15% per annum quarter. Thus, extensive planning should go into a network installation or implementation. As with any project, a need is identified thus, this proposal outlines the steps (or phases) of a structured network design and demonstrates a practical implementation of the steps through Cisco Packet Tracer™ software.

3.0 Network Needs Analysis

The basis for the Network Needs Analysis is based on the extended knowledge that the network system is for an Interior Design company in its early stages of operations. Thereby, the analysis is focused on the core of the firm that essentially needs connectivity to carry daily operational tasks.

S/No	Requirement(s)	Client's Response
1	A. Number of Users B. Type of Equipment	1. Accounting Team - 2 Personnel 2. Design Team - 2 Personnel 3. Sales Team - 2 Personnel
2	Service Provider Equipment	Fast and Stable
3	Number of Printer(s)	None. Concrete Plans to acquire one for the Sales Team.
4	Reliability and Uptime Expectations	Reliable and consistent network
5	Security & Privacy Concerns	Secured with restricted access; ability to filter.
6	Physical Layout	Unavailable.
7	Application Requirements	365 MSOffice, AutoCAD, 3DMax, Adobe Photoshop, Adobe Illustrator, Sketchup Pro, 1SalesForce Sales Cloud, Wrike, Xero.
8	Budget Estimate	Value-for-money; Estimated Budget of SGD30,000-40,000/-
9	Project Growth	Number of users and departments will increase overtime.

Figure 1 Table of Requirements

The requirements are narrowed down based on the Figure 1.0 (as shown above) and it is as follows-:

3.1 Functionality

At present, there is no existence of a network system in place, thus, there would be no consideration to input existing devices and integrate with a former network system. The design of the network is to be functionally and physically isolated from access by people not employed by **YDC Interior** so as to minimize the risk of unauthorized use. The integration and updates are to be effortless and versatile, one that enables users to retrieve, process and store ASCII and non-ASCII text, different media mediums from any connected computer and across all existing departments.

3.2 Network Scalability

The design should be scalable so more departments and devices can be added as the business expands without having to redo the installed network while combining the power and capabilities of diverse equipment across the office space to provide a collaborative medium that aids in sharing information and ideas easily, so as to work in a more efficient and productive manner.

3.3 Intended Users

The intended primary users of the network are the sales, accounting and design team of **YDC Interior**, with two users per department as of current. With higher sales volume and project completion turnover rates, LANS and WAN are expected to operate at 99.9% uptime and undiscovered error rate of .01%, in alignment with user expectations and industry standards.

4.0 The Network Diagram Design

The focus on this project is placed on its data flow, data types, and processes that access or change the data while being scalable. As a floor plan is currently not obtainable, a site survey and diagram of the floor plan will be required to indicate size and locations of working spaces.

4.1 The Design and Selection

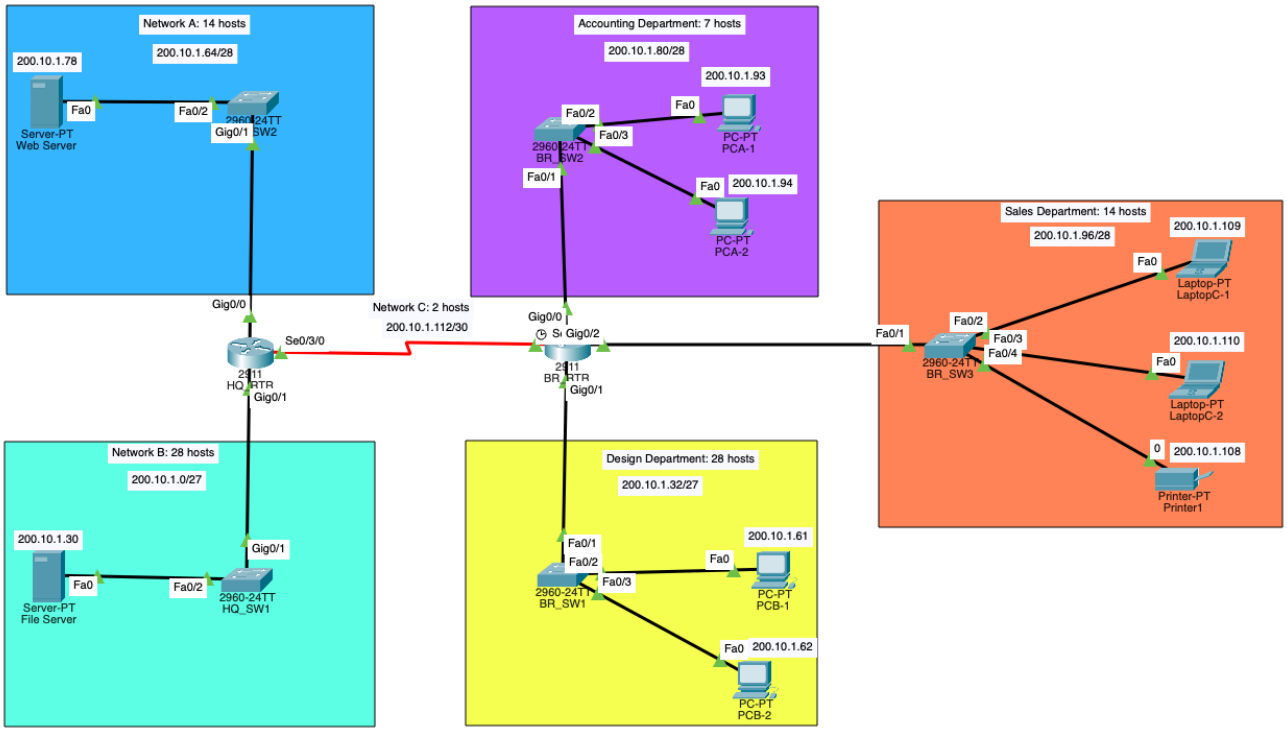


Figure 2 Design of The Network Diagram simulated on Packet Tracer

The main goal of the project at its initial stages is to design it in a manageable way while taking under serious consideration that it may be easily modified and maintained with ease, thus, creating value of convenience and efficacy. By using the Packet Tracer simulation, it allows one to view the LAN from a documentation perspective and be able to evaluate trade-offs in performance and cost. During the designing phase of the network, weaknesses of the design may be identified and addressed.

In Figure 2, the design of the structural network diagram consists of the two 2911 Router(s), five 2960 Switches, two Server components - a Web Server and File Server; two laptops; four PCs, and one printer allocated to the Sales Team. This is achieved by using the modular concept and dividing it into three prominent networks as per team. Upon approval of this project, a successful prototype is a good indicator of how the network will eventually operate.

4.2 The Proposed Scalable IP Addressing Scheme For YDC Interior

Figure 3.0 depicts the proposed scalable IP Addressing Scheme for YDC Interior with the network determinants calculated as follows-:

Network Determinants / Octet(s)	1st Octet	2nd Octet	3rd Octet	7	6	5	4	3	2	1	0
Plus				2^7=128	2^6=64	2^5=32	2^4=16	2^3=8	2^2=4	N/A	N/A
No. of Host Per Subnet				2^7-2=126	2^6-2=62	2^5-2=30	2^4-2=14	2^3-2=6	2^2-2=2	N/A	N/A
Prefix /CIDR (Classless Inter-Domain Routing (CIDR) is a range of IP addresses a network uses)				/25	/26	/27	/28	/29	/30	N/A	N/A
No. of Subnet				2^1=2	2^2=4	2^3=8	2^4=16	2^5=32	2^6=64	N/A	N/A
Subnet Mask				255.255.255.128	255.255.255.192	255.255.255.224	255.255.255.240	255.255.255.248	255.255.255.252	N/A	N/A
Binary				11111111.1111111 1.11111111.100000 00	11111111.111111 11.11111111.1100 0000	11111111.11111111 .11111111.1110000 0	11111111.11111111 .11111111.1111000 0	11111111.11111111 .11111111.11111100 0	11111111.11111111 .11111111.1111110 0	N/A	N/A

Figure 3 Network Determinants Calculation Table

4.3 Subnet IP Address Range

Devices	Base	# of Hosts	Network	/	Mask	Plus	Max. # Hosts	1st IP	Last IP	Broadcast Address
HQ_SW1, File Server	**NetB**	**28**	**200.10.1.0**	**/**	**27**	**32**	**30**	**200.10.1.1**	**200.10.1.30**	**200.10.1.31**
BR_SW1, PCB	**NetE - Design Team**	**28**	**200.10.1.32**	**/**	**27**	**32**	**30**	**200.10.1.33**	**200.10.1.62**	**200.10.1.63**
HQ-SW2, Web Server	**NetA**	**14**	**200.10.1.64**	**/**	**28**	**16**	**14**	**200.10.1.65**	**200.10.1.78**	**200.10.1.79**
BR_SW2, PCA	**NetD - Accounting Team**	**7**	**200.10.1.80**	**/**	**28**	**16**	**14**	**200.10.1.81**	**200.10.1.94**	**200.10.1.95**
BR_SW3, LAPTOPC-1, LAPTOPC-2, Printer1	**Sales Department**	**7**	**200.10.1.96**	**/**	**28**	**16**	**14**	**200.10.1.97**	**200.10.1.110**	**200.10.1.111**
HQ_RTR, BR_RTR	**NetC**	**2**	**200.10.1.112**	**/**	**30**	**4**	**2**	**200.10.1.113**	**200.10.1.114**	**200.10.1.115**

Figure 4 Table For Network Device Components

The Base Network Address is **200.10.1.0/24**. As shown in Figure 4.0, the range of Subnet IP Addresses are from the 1st IP to the Last Addresses, as shown in Figure 4.

4.4 Network Capacity, Bandwidth and Estimated Users

The transmission speed should be transparent to users, in order for remotely executed applications, file transfers and the like to ideally appear to operate as quickly as processes executed within an end-station. To ascertain the intended users' needs and expectations, using the capabilities of Fast Ethernet and Gigabit Ethernet connectivity.

The bandwidth of the physical interface will be able to support delivery of speeds from 10/100 megabits per second (Mbps) within each internal LAN and 1000 Mbps bandwidth between external LANs respectively. If required, more support will be allocated than needed performance in most cases. This may include activities such as frequent video conferencing and large file sharing to be hindered between departments and their clients.

As depicted in Figure 4, the maximum users hosted on Network E (Design Department) is 30; the maximum users on Network D (Accounting Department) is 30, and Network F (Sales Department) may host a maximum of 14 users.

4.5 Server Components

4.5.1 File Server

The File Server's accessibility caters to the three departments of YDC Interior - Accounting, Design, Sales, to facilitate effective and efficient file sharing, data management, project management across teams or departments.

4.5.2 Web Server

To limit public traffic into the firm's internal file storage systems, the accessibility of Web Server is denied from the File Server.

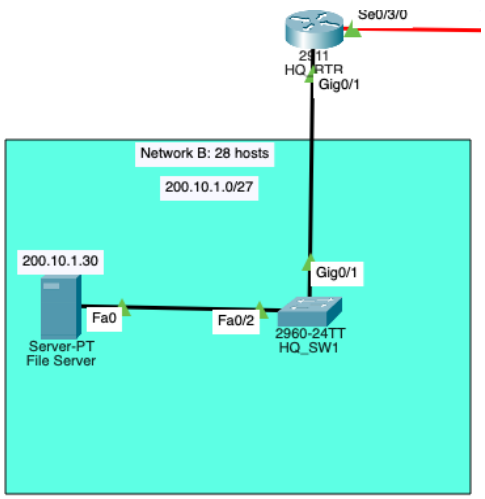
5.0 IP Address Assignments

This section illustrates the steps taken to achieve the final addressing table (as shown in Section 5.2.1), which consists of the devices and its respective IP Addresses, Sub-masks, Default Gateway and designated interfaces. The documentation of the Packet Tracer implementation process is attached as Appendix B ,for clearer reference.

5.1 Assignments to Appropriate Devices, Router, Switches and End Devices

5.1.1 Step 1.1 IP Address Assignments to Network B - 1st Subnet

The steps of IP Address assigned to Network B as the first Subnet is as follows-:



1. Use the first host address for the **HQ_RTR interface** connected to **HQ_SW1 switch, to assign the first Subnet to Network B**
2. Use the second host address for the **HQ_SW1 switch** and assign a default gateway address for the **switch**.
3. Use the last host address for **File Server (FTP Server)** and assign a default gateway address for the **Web Server**.

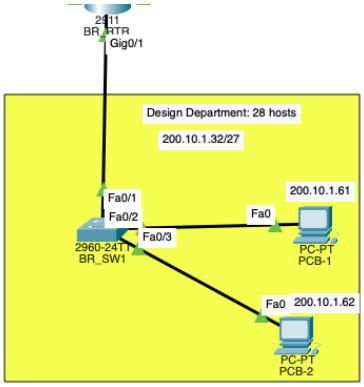
Device	Interface	IP Address	Subnet Mask	Default Gateway
HQ_RTR (Router)	G0/0			
	G0/1	200.10.1.1	255.255.255.224	N/A
	S0/3/0			
BR_RTR (Router)	G0/0			N/A
	G0/1			N/A
	G0/2			
	S0/3/0			
HQ_SW1 (Switch)	VLAN1	200.10.1.2	255.255.255.224	200.10.1.1
HQ_SW2 (Switch)	VLAN1			
BR_SW1 (Switch)	VLAN1			
BR_SW2 (Switch)	VLAN1			
BR_SW3 (Switch)	VLAN1			
PCA-1	NIC			
PCA-2	NIC			
PCB-1	NIC			
PCB-2	NIC			
LaptopC-1	NIC			
LaptopC-2	NIC			
Printer1	NIC			
Web Server	NIC			
File Server	NIC	200.10.1.30	255.255.255.224	200.10.1.1

Figure 5 Addressing Table: First Subnet To Network B

Addressing Table for First Subnet Assigned To Network B

The addressing table depicts the IP addresses, subnet masks and default gateways achieved from assigning the first subnet to Network B.

5.1.2 Step 1.2 IP Address Assignments to Network E (Design Department) - 2nd Subnet



The steps of IP Address assigned to Network E (Design Team) is as follows-:

1. Use the first host address for the **BR_RTR interface** connected to **BR_SW1 switch.**
2. Use the second host address for the **BR_SW1 switch** and assign a default gateway address for the **BR_SW1 switch** at this stage.
3. Use the last host address for **PC-B1** and assign a default gateway address for the **PC-B2**.

Addressing Table For Second Subnet Assigned To Network E

Device	Interface	IP Address	Subnet Mask	Default Gateway
HQ_RTR (Router)	G0/0			N/A
	G0/1	200.10.1.1	255.255.255.224	
	S0/3/0			
BR_RTR (Router)	G0/0			N/A
	G0/1	200.10.1.33	255.255.255.224	
	G0/2			
	S0/3/0			
HQ_SW1 (Switch)	VLAN1	200.10.1.2	255.255.255.224	200.10.1.1
HQ_SW2 (Switch)	VLAN1			
BR_SW1 (Switch)	VLAN1	200.10.1.34	255.255.255.224	200.10.1.33
BR_SW2 (Switch)	VLAN1			
BR_SW3 (Switch)	VLAN1			
PCA-1	NIC			
PCA-2	NIC			
PCB-1	NIC	200.10.1.61	255.255.255.224	200.10.1.33
PCB-2	NIC	200.10.1.62	255.255.255.224	200.10.1.33
LaptopC-1	NIC			
LaptopC-2	NIC			
Printer1	NIC			
Web Server	NIC			
File Server	NIC	200.10.1.30	255.255.255.224	200.10.1.1

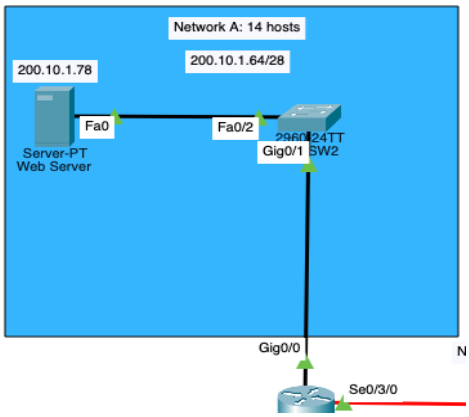
Figure 6 Addressing Table For Second Subnet Assigned To Network E

The addressing table in Figure 6 depicts the IP addresses, subnet masks and default gateways achieved from assigning the second subnet to Network E.

5.1.3 Step 1.3 IP Address Assignments to Network A - 3rd Subnet

The steps of IP Address assigned to Network A as the third Subnet is as follows-:

1. Use the first host address for the **HQ_RTR interface** connected to **HQ_SW2 switch.**



2. Use the second host address for the **HQ_SW2 switch** and assign a default gateway address for the **HQ_SW2 switch**.

3. Use the last host address and assign a default gateway address for **Web Server**.

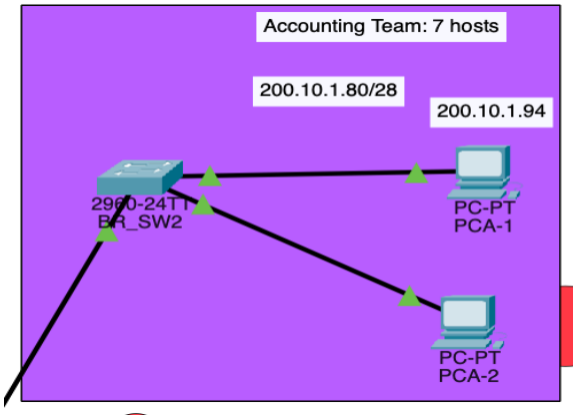
Addressing Table for Network A

Device	Interface	IP Address	Subnet Mask	Default Gateway
HQ_RTR (Router)	G0/0	200.10.1.65	255.255.255.240	
	G0/1	200.10.1.1	255.255.255.224	N/A
	S0/3/0			
BR_RTR (Router)	G0/0			
	G0/1	200.10.1.33	255.255.255.224	N/A
	G0/2			
	S0/3/0			
HQ_SW1 (Switch)	VLAN1	200.10.1.2	255.255.255.224	200.10.1.1
HQ_SW2 (Switch)	VLAN1	200.10.1.66	255.255.255.240	200.10.1.65
BR_SW1 (Switch)	VLAN1	200.10.1.34	255.255.255.224	200.10.1.33
BR_SW2 (Switch)	VLAN1			
BR_SW3 (Switch)	VLAN1			
PCA-1	NIC			
PCA-2	NIC			
PCB-1	NIC	200.10.1.61	255.255.255.224	200.10.1.33
PCB-2	NIC	200.10.1.62	255.255.255.224	200.10.1.33
LaptopC-1	NIC			
LaptopC-2	NIC			
Printer1	NIC			
Web Server	NIC	200.10.1.78	255.255.255.240	200.10.1.65
File Server	NIC	200.10.1.30	255.255.255.224	200.10.1.1

The addressing table depicts the IP addresses, subnet masks and default gateways achieved from assigning the third subnet to Network A.

Figure 7 Addressing Table For Assigning Third Subnet To Network A

5.1.4 Step 1.4 IP Address Assignments to Network D - 4th Subnet



The steps of IP Address assigned to Network D as the fourth Subnet is as follows-:

1. Use the first host address for the **BR_RTR interface** connected to **BR_SW2 switch**

2. Use the second host address and assign a default gateway address for the **BR_SW2 switch**.

3. Use the second last host address and assign a default gateway address for **PC-A1** and **PC-A2**.

Addressing Table For Assignment of 4th Subnet to Network D

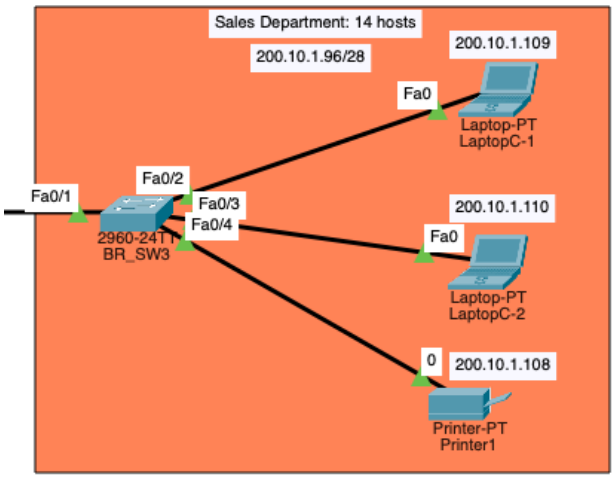
The addressing table depicts the IP addresses, subnet masks and default gateways achieved from assigning the forth subnet to Network D.

Device	Interface	IP Address	Subnet Mask	Default Gateway
HQ_RTR (Router)	G0/0	200.10.1.65	255.255.255.240	N/A
	G0/1	200.10.1.1	255.255.255.224	
	S0/3/0			
BR_RTR (Router)	G0/0	200.10.1.81	255.255.255.240	N/A
	G0/1	200.10.1.33	255.255.255.224	
	G0/2			
	S0/3/0			
HQ_SW1 (Switch)	VLAN1	200.10.1.2	255.255.255.224	200.10.1.1
HQ_SW2 (Switch)	VLAN1	200.10.1.66	255.255.255.240	200.10.1.65
BR_SW1 (Switch)	VLAN1	200.10.1.34	255.255.255.224	200.10.1.33
BR_SW2 (Switch)	VLAN1	200.10.1.82	255.255.255.240	200.10.1.81
BR_SW3 (Switch)	VLAN1			
PCA-1	NIC	200.10.1.93	255.255.255.240	200.10.1.81
PCA-2	NIC	200.10.1.94	255.255.255.240	200.10.1.81
PCB-1	NIC	200.10.1.61	255.255.255.224	200.10.1.33
PCB-2	NIC	200.10.1.62	255.255.255.224	200.10.1.33
LaptopC-1	NIC			
LaptopC-2	NIC			
Printer1	NIC			
Web Server	NIC	200.10.1.78	255.255.255.240	200.10.1.65
File Server	NIC	200.10.1.30	255.255.255.224	200.10.1.1

Figure 8 Addressing Table For Assignment of Forth Subnet To Network D

5.1.5 Step 1.5 Assigning 5th Subnet To Sales Department

The steps to implementing the assignment of the fifth subnet to the Sales Department is as follows-:



1. Use the first host address for the **BR_RTR interface** connected to **BR_SW3 switch**

2. Use the second host address and assign a default gateway address for the **BR_SW3 switch**.

3. Use the third last host address for **Printer1**.

4. Use the second last host address for **Laptop-C1.**

5. Use the second last host address for **Laptop-C2.**

6. Assign a default gateway address for **PC-A1** and **PC-A2**.

Device	Interface	IP Address	Subnet Mask	Default Gateway
HQ_RTR (Router)	G0/0	200.10.1.65	255.255.255.240	N/A
	G0/1	200.10.1.1	255.255.255.224	N/A
	S0/3/0			
BR_RTR (Router)	G0/0	200.10.1.81	255.255.255.240	
	G0/1	200.10.1.33	255.255.255.224	N/A
	G0/2	200.10.1.97	255.255.255.240	
	S0/3/0			
HQ_SW1 (Switch)	VLAN1	200.10.1.2	255.255.255.224	200.10.1.1
HQ_SW2 (Switch)	VLAN1	200.10.1.66	255.255.255.240	200.10.1.65
BR_SW1 (Switch)	VLAN1	200.10.1.34	255.255.255.224	200.10.1.33
BR_SW2 (Switch)	VLAN1	200.10.1.82	255.255.255.240	200.10.1.81
BR_SW3 (Switch)	VLAN1	200.10.1.98	255.255.255.240	200.10.1.97
PCA-1	NIC	200.10.1.93	255.255.255.240	200.10.1.81
PCA-2	NIC	200.10.1.94	255.255.255.240	200.10.1.81
PCB-1	NIC	200.10.1.61	255.255.255.224	200.10.1.33
PCB-2	NIC	200.10.1.62	255.255.255.224	200.10.1.33
LaptopC-1	NIC	200.10.1.109	255.255.255.240	200.10.1.97
LaptopC-2	NIC	200.10.1.110	255.255.255.240	200.10.1.97
Printer1	NIC	200.10.1.108	255.255.255.240	200.10.1.97
Web Server	NIC	200.10.1.78	255.255.255.240	200.10.1.65
File Server	NIC	200.10.1.30	255.255.255.224	200.10.1.1

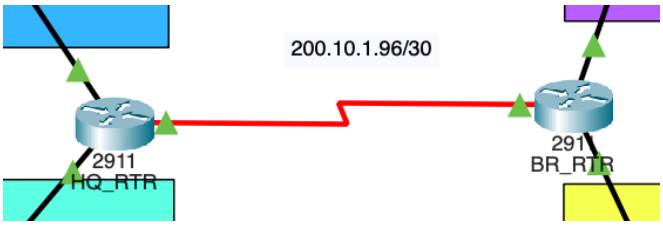
Addressing Table for Subnet Setup of Sales Department

The addressing table depicts the IP addresses, subnet masks and default gateways achieved from assigning the fifth subnet to the designated network of the Sales Department.

Figure 9 Addressing Table For Fifth Subnet to Sales Department

5.1.6 Step 1.6 Assigning 6th Subnet To Network C

The steps to assigning the sixth subnet to Network C is as follows-:



1. Use the first host address for the **HQ_RTR interface** connected to **BR_RTR.**

2. Use the last host address for the **BR_RTR to HQ_RTR.**

Addressing Table for Network C

The addressing table depicts the IP addresses, subnet masks and default gateways achieved from assigning the sixth subnet to Network C.

Device	Interface	IP Address	Subnet Mask	Default Gateway
HQ_RTR (Router)	G0/0	200.10.1.65	255.255.255.240	
	G0/1	200.10.1.1	255.255.255.224	N/A
	S0/3/0	200.10.1.113	255.255.255.252	
BR_RTR (Router)	G0/0	200.10.1.81	255.255.255.240	
	G0/1	200.10.1.33	255.255.255.224	N/A
	G0/2	200.10.1.97	255.255.255.240	
	S0/3/0	200.10.1.114	255.255.255.252	
HQ_SW1 (Switch)	VLAN1	200.10.1.2	255.255.255.224	200.10.1.1
HQ_SW2 (Switch)	VLAN1	200.10.1.66	255.255.255.240	200.10.1.65
BR_SW1 (Switch)	VLAN1	200.10.1.34	255.255.255.224	200.10.1.33
BR_SW2 (Switch)	VLAN1	200.10.1.82	255.255.255.240	200.10.1.81
BR_SW3 (Switch)	VLAN1	200.10.1.98	255.255.255.240	200.10.1.97
PCA-1	NIC	200.10.1.93	255.255.255.240	200.10.1.81
PCA-2	NIC	200.10.1.94	255.255.255.240	200.10.1.81
PCB-1	NIC	200.10.1.61	255.255.255.224	200.10.1.33
PCB-2	NIC	200.10.1.62	255.255.255.224	200.10.1.33
LaptopC-1	NIC	200.10.1.109	255.255.255.240	200.10.1.97
LaptopC-2	NIC	200.10.1.110	255.255.255.240	200.10.1.97
Printer1	NIC	200.10.1.108	255.255.255.240	200.10.1.97
Web Server	NIC	200.10.1.78	255.255.255.240	200.10.1.65
File Server	NIC	200.10.1.30	255.255.255.224	200.10.1.1

Figure 10 Addressing Table For Assigning Sixth Subnet To Network C

5.2 Network Addresses, VLANs, Routing Configurations On Networking Devices

5.2.1 Final Addressing Table

Devices	Interface	IP Address	Subnet Mask	Default Gateway	Remarks
HQ_RTR (Router)	G0/0	200.10.1.65	255.255.255.240		
	G0/1	200.10.1.1	255.255.255.224	N/A	
	S0/3/0	200.10.1.113	255.255.255.252		
BR_RTR (Router)	G0/0	200.10.1.81	255.255.255.240		
	G0/1	200.10.1.33	255.255.255.224	N/A	
	G0/2	200.10.1.97	255.255.255.240		
	S0/3/0	200.10.1.114	255.255.255.252		
HQ_SW1 (Switch)	VLAN1	200.10.1.2	255.255.255.224	200.10.1.1	
HQ_SW2 (Switch)	VLAN1	200.10.1.66	255.255.255.240	200.10.1.65	
BR_SW1 (Switch)	VLAN1	200.10.1.34	255.255.255.224	200.10.1.33	
BR_SW2 (Switch)	VLAN1	200.10.1.82	255.255.255.240	200.10.1.81	
BR_SW3 (Switch)	VLAN1	200.10.1.98	255.255.255.240	200.10.1.97	Follow BR_RTR G0/2 IP Address
PCA-1	NIC	200.10.1.93	255.255.255.240	200.10.1.81	
PCA-2	NIC	200.10.1.94	255.255.255.240	200.10.1.81	
PCB-1	NIC	200.10.1.61	255.255.255.224	200.10.1.33	
PCB-2	NIC	200.10.1.62	255.255.255.224	200.10.1.33	
LaptopC-1	NIC	200.10.1.109	255.255.255.240	200.10.1.97	Follow BR_RTR G0/2 IP Address
LaptopC-2	NIC	200.10.1.110	255.255.255.240	200.10.1.97	Follow BR_RTR G0/2 IP Address
Printer1	NIC	200.10.1.108	255.255.255.240	200.10.1.97	Follow BR_RTR G0/2 IP Address
Web Server	NIC	200.10.1.78	255.255.255.240	200.10.1.65	
File Server	NIC	200.10.1.30	255.255.255.224	200.10.1.1	

Figure 11 Final Addressing Table

Figure 11 depicts that the finalization of Step 1.1 – 1.6 of the IP Addresses Assignments.

6.0 Enhancements

This network design includes Secure Socket Shell (SSH) and ACL additions to the structure network design.

6.1 Enhancement I: Secure Socket Shell

The setup of SSH network communication protocol is enabled in the network design to secure remote login from one computer to another, SSH-5, SSH 1.99 is significant for YDC Interior as the firm requires back and forth file transferring while containing sensitive client data. This is done by implementing a username/password authentication system to establish a secure connection.

Key-name: HQ_Rtr.ccna-lab.com

6.2 Enhancement II : ACL

In this proposal, standard ACLs are being utilized. It provides a basic auto-filter and aid in limiting network traffic to increase network performance, control traffic flow, and provide basic level of security for network access within the radius of the working space. It also enables hosts to permit or deny access to network services and prioritize certain classes of network traffic.

An ACL allows YDC Interior to prevent intentional or unintentional data loss or data exfiltration. This reduces any form of risks of reputational damages to the brand, or loss of customers and revenue.

7.0 Budget Estimate

The Cost Benefit Analysis (CBA) is used to determine if the benefits to be gained outweigh the costs (Hayes, 2021). Devices and cabling are selected based on the brief requirements outlined. The key measures in choosing the devices and cabling for a structural network system are cost, number of ports, speed, expandability and manageability.

7.1 Cost Benefit Analysis (CBA)

Cost Analysis			
Tangible Costs			
Product	**Price**	**Quantity**	**Total**
2911 Router	**$2,500**	**2**	**$5,000**
2960 Switches	**$3,000**	**4**	**$12,000**
PC(s)	**$2,000**	**4**	**$8,000**
Laptop	**$3,000**	**2**	**$6,000**
Web Server	**$8,000**	**1**	**$8,000**
File Server	**$5,000**	**1**	**$5,000**
Printer	**$1,100**	**1**	**$1,100**
Subtotal of Tangible Costs			**$45,100**
Intangible Costs			
Product	**Price**	**Quantity**	**Total**
Network Down Time (Estimated at 12 hrs/yr)	**$3,000.00**	**1**	**$3,000**
Subtotal of Intangible Costs			**$3,000**
		Total 3-year Cost Analysis	**$144,300**
		Total Annualized Cost	**$48,100**

7.2 Benefit Analysis

Benefit Analysis	
Products	**Price**
Increased Productivity	**$25,000 / yr**
Decreased Anxiety (from increased reliability)	**$4,000 / yr**
Ease of Record Keeping (i.e. fewer lost files and faster availability)	**$25,000 / yr**
Increased Security	**$25,000 / yr**
Increased Staff Morale	**$15,000 / yr**
Intangible Benefits	
Increased Staff Morale	**$15,000 / yr**
Increased Brand Reputation	**$25,000 / yr**
Total Benefit Analysis =	$134,000/year

7.3 Cost-Benefit Ratio

Cost-Benefit Ratio Table		
Total Cost	**Total Benefit**	**Ratio**
$48,100/year	**$134,000/year**	**0.35** (rounded up to next decimal point)

As calculated in the Cost Benefit Ratio Table, the annual benefit exceeds the annualized cost where the project is expected to pay for itself in 12 months. The projected time to functional obsolescence of equipment is estimated at about 36 months. If the Benefit Cost Ratio (BCR) value is less than 1, then the project cost can be expected to be higher than the returns, and therefore, it should be discarded (Weller, 2016). It is to be noted that the values of intangibles are subjected to interpretation, to which the values of the products and benefits are averaged and accurate at the time this proposal was written.

Given the results shown, it is therefore recommended that the project is essential to implement for higher productivity and efficiency within a progressively growing corporate structure.

8.0 Conclusion

To increase accuracy in this proposal, YDC Interior's business processes should be discussed in greater detail.

The CBA does not include the realistic wiring blueprint of the office space. As such, where a floor plan is currently not obtainable, a site survey and diagram of the floor plan will be required to indicate size and locations of working spaces. It is ideal to make measurements on how cables should be run best and be aware of structural buildings that may affect latency and connectivity. Upon approval of the network design with possible device add-ons, the implementation of the network may then commence.

As part of the requirement discovery and with a higher budget, it is suggested that the network can be built in phases per ¾ of a year. Hence, it does not restrict a Two-tier FTP system, where an administrative tier gain full access to the servers, while the teams have limited access but are still able to access necessary across departments.

9.0 References

References are cited according to APA styling format.

Weller, J. (2016, December 8). *Cost Benefit Analysis: An Expert Guide | Smartsheet*. Smartsheet. https://www.smartsheet.com/expert-guide-cost-benefit-analysis

Hayes, A. (2021, August) *Cost-benefit analysis*. Investopedia. https://www.investopedia.com/terms/c/cost-benefitanalysis.asp

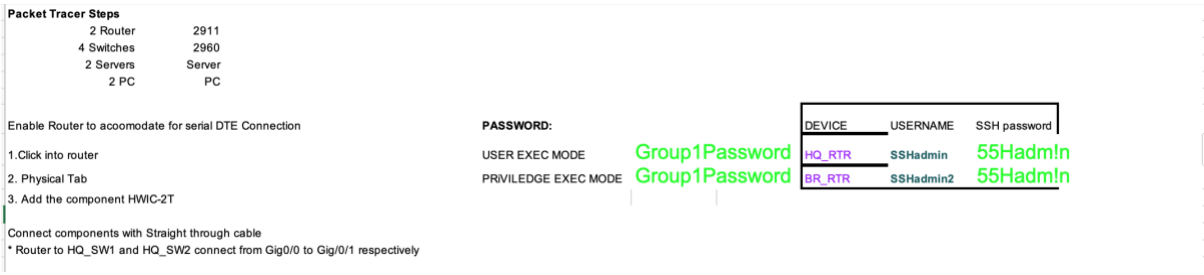
10.0 Appendices

10.1 Appendix A: Members & Contributions

#	Name of Member(s)	Contributions
1	**Sim Yizhun**	- **Packet Tracer Building** - **Structural Design of Network** - **Presentation Creation**
2	**Daryl Goh Da Hui**	- **Packet Tracer Building** - **Enhancement Building** - **Presentation Creation**
3	**Curlynn Tan**	- **Presentation Creation** - **Proposal Creation** - **Documentation Creation & Compilation**
4	**Yann Ngew**	- **Presentation Creation** - **Proposal Creation** - **Documentation Creation & Compilation**

10.2 Appendix B: Packet Tracer Documentation

The Excel Spreadsheet labeled as **<Network and IT Infrastructure Assignment>** is provided in the Team01-Submission Folder, for clearer referencing purposes.



Packet Tracer Steps

2 Router	2911
4 Switches	2960
2 Servers	Server
2 PC	PC

Enable Router to accomodate for serial DTE Connection

1.Click into router

2. Physical Tab

3. Add the component HWIC-2T

Connect components with Straight through cable

* Router to HQ_SW1 and HQ_SW2 connect from Gig0/0 to Gig/0/1 respectively

PASSWORD:

USER EXEC MODE Group1Password

PRIVILEDGE EXEC MODE Group1Password

DEVICE	USERNAME	SSH password
HQ_RTR	SSHadmin	55Hadm!n
BR_RTR	SSHadmin2	55Hadm!n

HQ_RTR

```
Router>
Router>
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname HQ_Rtr
HQ_Rtr(config)#enable secret Group1Password
HQ_Rtr(config)#line console 0
HQ_Rtr(config-line)#password Group1Password
HQ_Rtr(config-line)#login
HQ_Rtr(config-line)#exit
HQ_Rtr(config)#interface gigabitEthernet 0/0
HQ_Rtr(config-if)#ip address 200.10.1.65 255.255.255.240
HQ_Rtr(config-if)#no shutdown
HQ_Rtr(config-if)#description LAN connection to HQ_SW2
HQ_Rtr(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

HQ_Rtr(config-if)#interface gigabitEthernet 0/1
HQ_Rtr(config-if)#ip address 200.10.1.1 255.255.255.224
HQ_Rtr(config-if)#no shutdown
HQ_Rtr(config-if)#description LAN Connection to HQ_SW1
HQ_Rtr(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

HQ_Rtr(config-if)#^Z
HQ_Rtr#
%SYS-5-CONFIG_I: Configured from console by console

HQ_Rtr#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
HQ_Rtr#conf t
Enter configuration commands, one per line. End with CNTL/Z.
HQ_Rtr(config)#interface se
HQ_Rtr(config)#interface serial 1/0
%Invalid interface type and number
HQ_Rtr(config)#interface serial
HQ_Rtr(config)#interface serial 0/3/0
HQ_Rtr(config-if)#ip address 200.10.1.113 255.255.255.252
HQ_Rtr(config-if)#
02:37:37: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial0/3/0 from FULL to DOWN, Neighbor Down: Interface do

HQ_Rtr(config-if)#no shutdo
HQ_Rtr(config-if)#no shutdown
HQ_Rtr(config-if)#description Serial Connection to BR_Rtr

HQ_Rtr(config-if)#exit
HQ_Rtr(config)#ser
HQ_Rtr(config)#service pas
HQ_Rtr(config)#service password-encryption
HQ_Rtr(config)#
```

Configure OSPF Routing between Router

```
HQ_Rtr#conf t
Enter configuration commands, one per line. End with CNTL/Z.
HQ_Rtr(config)#router ospf
% Incomplete command.
HQ_Rtr(config)#router ospf 1
HQ_Rtr(config-router)#router-id 1.1.1.1
HQ_Rtr(config-router)#do show ip route connected
C 200.10.1.0/27 is directly connected, GigabitEthernet0/1
C 200.10.1.64/28 is directly connected, GigabitEthernet0/0
C 200.10.1.112/30 is directly connected, Serial0/3/0

HQ_Rtr(config-router)#network 200.10.1.0 0.0.0.31 area 0
HQ_Rtr(config-router)#network 200.10.1.64 0.0.0.15 area 0
HQ_Rtr(config-router)#no network 200.10.1.96 0.0.0.3 area 0
HQ_Rtr(config-router)#network 200.10.1.112 0.0.0.3 area 0
HQ_Rtr(config-router)#p                                    Old Config to replace
04:20:20: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial0/3/0 from LOADING to FULL, Loading Done

HQ_Rtr(config-router)#passive int
HQ_Rtr(config-router)#passive int
HQ_Rtr(config-router)#passive interface gi

HQ_Rtr(config-router)#passive-
HQ_Rtr(config-router)#passive-interface gi
```

BR_RTR

```
Router>
Router>
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname BR_Rtr
BR_Rtr(config)#enable secret Group1Password
BR_Rtr(config)#line console 0
BR_Rtr(config-line)#password Group1Password
BR_Rtr(config-line)#login
BR_Rtr(config-line)#exit
BR_Rtr(config)#interface gigabitEternet 0/0
^
% Invalid input detected at '^' marker.
BR_Rtr(config)#interface gigabitEt 0/0
BR_Rtr(config)#interface giga
BR_Rtr(config)#interface gigabitEthernet 0/0
BR_Rtr(config-if)#ip address 200.10.1.81 255.255.255.240
BR_Rtr(config-if)#no shutdown
BR_Rtr(config-if)#description LAN Connection to BR_SW2
BR_Rtr(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

BR_Rtr(config-if)#interface g
BR_Rtr(config-if)#interface gi
BR_Rtr(config-if)#exit
BR_Rtr(config)#int gi
BR_Rtr(config)#int gigabitEthernet 0/1
BR_Rtr(config-if)#ip address 200.10.1.33 255.255.255.224
BR_Rtr(config-if)#no shutdown
BR_Rtr(config-if)#description LAN Connection to BR_SW1
BR_Rtr(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

BR_Rtr(config-if)#exit
BR_Rtr(config)#exit
BR_Rtr#
%SYS-5-CONFIG_I: Configured from console by console

BR_Rtr#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BR_Rtr(config)#interface s
BR_Rtr(config)#interface serial 0/3/0
BR_Rtr(config-if)#ip address 200.10.1.114 255.255.255.252
BR_Rtr(config-if)#no shutdown
BR_Rtr(config-if)#description Serial Connection to HQ_Rtr
BR_Rtr(config-if)#
BR_Rtr(config-if)#exit
BR_Rtr(config)#conf t
%Invalid hex value
BR_Rtr(config)#int
BR_Rtr(config)#interface gigabi
BR_Rtr(config)#interface gigabitEthernet 0/2
BR_Rtr(config-if)#ip address 200.10.1.97 255.255.255.240

BR_Rtr(config-if)#no shutdown
BR_Rtr(config-if)#description LAN connection to BR_SW3
BR_Rtr(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to up

BR_Rtr(config-if)#
BR_Rtr#
%SYS-5-CONFIG_I: Configured from console by console

BR_Rtr#
BR_Rtr#cop
BR_Rtr#copy run
BR_Rtr#copy running-config st
BR_Rtr#copy running-config startup-config
Destination filename [startup-config]?

Building configuration...
[OK]
BR_Rtr#
```

Configure OSPF Routing between Router

```
BR_Rtr>en
```

```
HQ_Rtr(config-router)#passive-interface gigabitEthernet 0/0
HQ_Rtr(config-router)#passive-interface gigabitEthernet 0/1
HQ_Rtr(config-router)#exit
HQ_Rtr(config)#exit
HQ_Rtr#
```

SSH Setup

HQ_RTR

Setting Up SSH On HQ_Rtr

```
HQ_Rtr>en
HQ_Rtr>enable

Password:
HQ_Rtr#conf t
HQ_Rtr#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
HQ_Rtr(config)#username SSHadmin secret 55Hadm!n
HQ_Rtr(config)#crypto key generate rsa
% Please define a domain-name first.
HQ_Rtr(config)#1024
^
% Invalid input detected at '^' marker.
HQ_Rtr(config)#ip domain-name ccna-lab.com
HQ_Rtr(config)#crypto key generate rsa
The name for the keys will be: HQ_Rtr.ccna-lab.com
Choose the size of the key modulus in the range of 360 to 2048 for your
General Purpose Keys. Choosing a key modulus greater than 512 may take
a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

HQ_Rtr(config)#
*Mar 1 2:34:11.411: %SSH-5-ENABLED: SSH 1.99 has been enabled
HQ_Rtr(config)#line console 0
HQ_Rtr(config-line)#password Group1Password
HQ_Rtr(config-line)#login
HQ_Rtr(config-line)#exect-t
HQ_Rtr(config-line)#exe
HQ_Rtr(config-line)#exec-timeout 6
HQ_Rtr(config-line)#logging sync
HQ_Rtr(config-line)#logging synchronous
HQ_Rtr(config-line)#exit
HQ_Rtr(config)#line vty 0 15
HQ_Rtr(config-line)#password Group1Password
HQ_Rtr(config-line)#login local
HQ_Rtr(config-line)#exect-time
HQ_Rtr(config-line)#exec
HQ_Rtr(config-line)#exec-timeout 6
HQ_Rtr(config-line)#trans
HQ_Rtr(config-line)#transport inp
HQ_Rtr(config-line)#transport input ssh
HQ_Rtr(config-line)#exit
HQ_Rtr(config)#banner motd "Unauthorized access is strictly prohibited"
HQ_Rtr(config)#
HQ_Rtr(config)#service password-encryption
HQ_Rtr(config)#end
HQ_Rtr#
%SYS-5-CONFIG_I: Configured from console by console
HQ_Rtr#copy run
HQ_Rtr#copy running-config st
HQ_Rtr#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
HQ_Rtr#
```

```
Password:
BR_Rtr#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
BR_Rtr(config)#router ospf 1
BR_Rtr(config-router)#router-
BR_Rtr(config-router)#router-id 2.2.2.2
BR_Rtr(config-router)#do show ip route co
BR_Rtr(config-router)#do show ip route con
C 200.10.1.32/27 is directly connected, GigabitEthernet0/1
C 200.10.1.80/28 is directly connected, GigabitEthernet0/0
C 200.10.1.96/28 is directly connected, GigabitEthernet0/2
C 200.10.1.112/30 is directly connected, Serial0/3/0
BR_Rtr(config-router)#network 200.10.1.32 0.0.0.31 area 0
BR_Rtr(config-router)#network 200.10.1.80 0.0.0.15 area 0
BR_Rtr(config-router)#network 200.10.1.96 0.0.0.3 area 0
BR_Rtr(config-router)#network 200.10.1.112 0.0.0.3 area 0
BR_Rtr(config-router)#
02:13:16: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/3/0 from LOADING to FULL, Loading Done

BR_Rtr(config-router)#
BR_Rtr(config-router)#passi
BR_Rtr(config-router)#passive-interface g
BR_Rtr(config-router)#passive-interface gigabitEthernet 0/0
BR_Rtr(config-router)#pas
BR_Rtr(config-router)#passive-interface gi
BR_Rtr(config-router)#passive-interface gigabitEthernet 0/1
BR_Rtr(config-router)#passive-interface gigabitEthernet 0/2
BR_Rtr#
```

SSH Setup

BR_RTR

Setting Up SSH On BR_Rtr

```
BR_Rtr>enable

Password:
BR_Rtr#conf t
BR_Rtr#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.

BR_Rtr(config)#username SSHadmin2 secret 55Hadm!n
BR_Rtr(config)#ip domain-name ccna-lab2.com
BR_Rtr(config)#crypto key generate rsa
The name for the keys will be: BR_Rtr.ccna-lab2.com
Choose the size of the key modulus in the range of 360 to 2048 for your
General Purpose Keys. Choosing a key modulus greater than 512 may take
a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

BR_Rtr(config)#line console 0
*Mar 1 2:56:23.79: %SSH-5-ENABLED: SSH 1.99 has been enabled
BR_Rtr(config-line)#password Group1Password
BR_Rtr(config-line)#login
BR_Rtr(config-line)#ex
BR_Rtr(config-line)#exec
BR_Rtr(config-line)#exec-timeout 6
BR_Rtr(config-line)#loggin sy
BR_Rtr(config-line)#logging synchronous
BR_Rtr(config-line)#exit
BR_Rtr(config)#line vty 0 15
BR_Rtr(config-line)#password Group1Password
BR_Rtr(config-line)#login local
BR_Rtr(config-line)#exect-ti
BR_Rtr(config-line)#exec-t
BR_Rtr(config-line)#exec-timeout 6
BR_Rtr(config-line)#transport input ssh
BR_Rtr(config-line)#exit
BR_Rtr(config)#banner motd "Unauthorized access is strictly prohibited"
BR_Rtr(config)#service password-encryption
BR_Rtr(config)#end
BR_Rtr#
%SYS-5-CONFIG_I: Configured from console by console
BR_Rtr#copy run
BR_Rtr#copy running-config st
BR_Rtr#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
BR_Rtr#
```

HQ_SW1

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface vlan 1
Switch(config-if)#ip address 200.10.1.2 255.255.255.224
Switch(config-if)#no shutdown

Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

Switch(config-if)#exit
Switch(config)#ip default-gateway 200.10.1.1
Switch(config)#^Z
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]

Switch#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname HQ_SW1
HQ_SW1(config)#
```

HQ_SW2

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface vlan 1
Switch(config-if)#ip address 200.10.1.66 255.255.255.240
Switch(config-if)#no shutdown

Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

Switch(config-if)#exit
Switch(config)#ip default-gateway 200.10.1.65
Switch(config)#^Z
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Switch#conf ter
Switch#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname HQ_SW2
HQ_SW2(config)#
```

BR_SW1

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname BR_SW1
BR_SW1(config)#interface vlan 1
BR_SW1(config-if)#ip address 200.10.1.34 255.255.255.224
BR_SW1(config-if)#no shutdown

BR_SW1(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

BR_SW1(config-if)#exit
BR_SW1(config)#ip default-gateway 200.10.1.33
BR_SW1(config)#^Z
BR_SW1#
%SYS-5-CONFIG_I: Configured from console by console

BR_SW1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
BR_SW1#
```

Standard ACL Setup

HQ_Rtr

```
HQ_Rtr>enable
Password:
HQ_Rtr#conf t
Enter configuration commands, one per line. End with CNTL/Z.
HQ_Rtr(config)#ip acce
HQ_Rtr(config)#ip access-list standard File_Server_Restrictions
HQ_Rtr(config-std-nacl)#permit 200.10.1.93
HQ_Rtr(config-std-nacl)#permit 200.10.1.94
HQ_Rtr(config-std-nacl)#permit 200.10.1.61
HQ_Rtr(config-std-nacl)#permit 200.10.1.62
HQ_Rtr(config-std-nacl)#permit 200.10.1.109
HQ_Rtr(config-std-nacl)#permit 200.10.1.110
HQ_Rtr(config-std-nacl)#permit 200.10.1.108
HQ_Rtr(config-std-nacl)#deny any
HQ_Rtr(config-std-nacl)#show acce
HQ_Rtr(config-std-nacl)#show access-lists
^
% Invalid input detected at '^' marker.
HQ_Rtr(config-std-nacl)#end
HQ_Rtr#
%SYS-5-CONFIG_I: Configured from console by console

HQ_Rtr#show acc
HQ_Rtr#show access-lists

Standard IP access list File_Server_Restrictions
10 permit host 200.10.1.93
20 permit host 200.10.1.94

30 permit host 200.10.1.61
40 permit host 200.10.1.62
50 permit host 200.10.1.109
60 permit host 200.10.1.110
70 permit host 200.10.1.108
80 deny any

HQ_Rtr#conf t
Enter configuration commands, one per line. End with CNTL/Z.
HQ_Rtr(config)#interfa
HQ_Rtr(config)#interface Gig0/1
HQ_Rtr(config-if)#ip access-g
HQ_Rtr(config-if)#ip access-group File_Server_Restrictions out
HQ_Rtr(config-if)#
HQ_Rtr(config-if)#^Z
HQ_Rtr#
%SYS-5-CONFIG_I: Configured from console by console

HQ_Rtr#copy ru
HQ_Rtr#copy running-config sta
HQ_Rtr#copy running-config startup-config
Destination filename [startup-config]?

Building configuration
[OK]
```

PCA

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 200.10.1.30

Pinging 200.10.1.30 with 32 bytes of data:

Request timed out.
Reply from 200.10.1.30: bytes=32 time=15ms TTL=126
Reply from 200.10.1.30: bytes=32 time=16ms TTL=126
Reply from 200.10.1.30: bytes=32 time=6ms TTL=126

Ping statistics for 200.10.1.30:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 6ms, Maximum = 16ms, Average = 12ms
```

Web Server

```
Cisco Packet Tracer SERVER Command Line 1.0
C:\>ping 200.10.1.30

Pinging 200.10.1.30 with 32 bytes of data:

Reply from 200.10.1.30: bytes=32 time<1ms TTL=127
Reply from 200.10.1.30: bytes=32 time=1ms TTL=127
Reply from 200.10.1.30: bytes=32 time<1ms TTL=127
Reply from 200.10.1.30: bytes=32 time<1ms TTL=127

Ping statistics for 200.10.1.30:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

PCB

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 200.10.1.30

Pinging 200.10.1.30 with 32 bytes of data:

Reply from 200.10.1.97: Destination host unreachable.
Reply from 200.10.1.97: Destination host unreachable.
Reply from 200.10.1.97: Destination host unreachable.
Reply from 200.10.1.97: Destination host unreachable.

Ping statistics for 200.10.1.30:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Standard ACL Connectivity Test

SSH Connectivity Test To HQ_RTR and BR_RTR

File Server

File Server SSH into HQ_Rtr

```
Cisco Packet Tracer SERVER Command Line 1.0
C:\>ssh -l SSHadmin 200.10.1.1

Password: 55Hadm!n

Unauthorized access is strictly prohibited

HQ_Rtr>
```

PCA

PCA SSH into BR_Rtr

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ssh -l SSHadmin2 200.10.1.81

Password: 55Hadm!n

Unauthorized access is strictly prohibited

BR_Rtr>
```

Web Server

Web Server SSH into HQ_Rtr

```
Cisco Packet Tracer SERVER Command Line 1.0
C:\>ssh -l SSHadmin 200.10.1.65

Password: 55Hadm!n

Unauthorized access is strictly prohibited

HQ_Rtr>
```

PCB

PCA SSH into BR_Rtr

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ssh -l SSHadmin2 200.10.1.33

Password: 55Hadm!n

Unauthorized access is strictly prohibited

BR_Rtr>
```

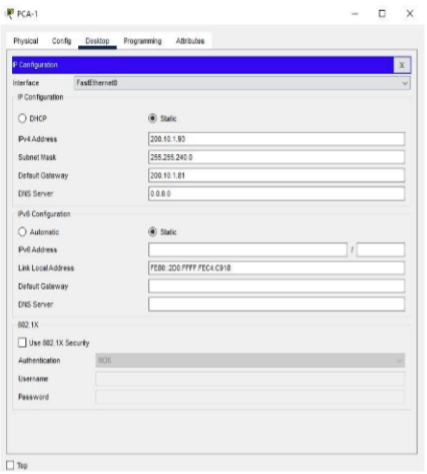
BR_SW2

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname BR_SW2
BR_SW2(config)#interface vlan 1
BR_SW2(config-if)#ip address 200.10.1.82 255.255.255.240
BR_SW2(config-if)#no shutdown

BR_SW2(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

BR_SW2(config-if)#exit
BR_SW2(config)#ip default-gateway 200.10.1.81
BR_SW2(config)#^Z
BR_SW2#
%SYS-5-CONFIG_I: Configured from console by console

BR_SW2#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
BR_SW2#
```

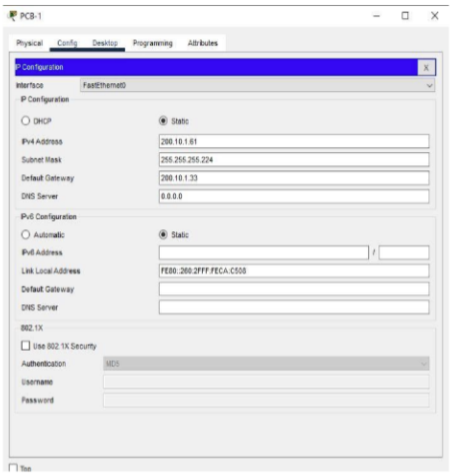
BR_SW3

```
Switch>en
Switch>enable
Switch#conf t
Switch#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname BR_SW3
BR_SW3(config)#interfa
BR_SW3(config)#interface vlan 1
BR_SW3(config-if)#ip address 200.10.1.98 255.255.255.240
BR_SW3(config-if)#no shutdown

BR_SW3(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1
, changed state to up


BR_SW3(config-if)#exit
BR_SW3(config)#ip default-gateway 200.10.1.97
^
% Invalid input detected at '^' marker.
BR_SW3(config)#^Z
BR_SW3#
%SYS-5-CONFIG_I: Configured from console by console

BR_SW3#copy r
BR_SW3#copy running-config star
BR_SW3#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
BR_SW3#
```

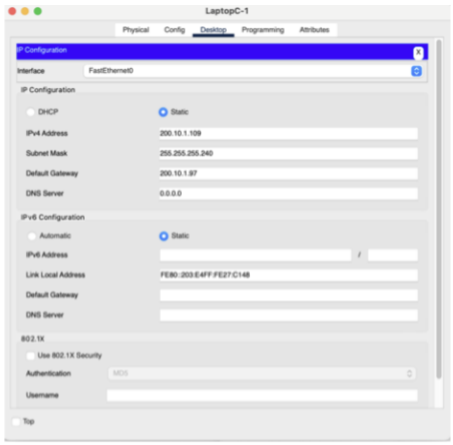
PCA-1



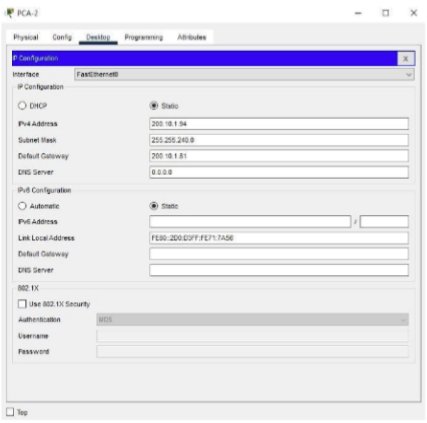
PCB-1



LaptopC-1 (Corrected SS - default-gateway)

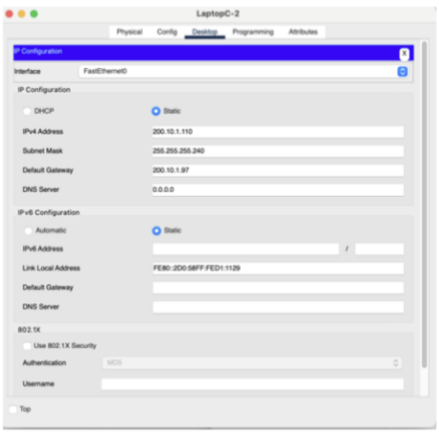


PCA-2



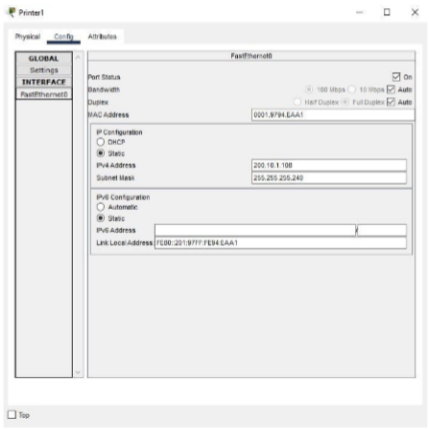
PCB-2

LaptopC-2 (Corrected SS - Default Gateway)



Printer 1 (Corrected SS - Default Gateway)

Printer Interface



Printer Global Settings