LAB REPORT

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Course Code : CSE-318

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Project Overview

This project aims to develop a network infrastructure that connects multiple branches and configures essential services, such as DNS, web, email, and DHCP servers. The design ensures smooth communication between the headquarters (HQ) and branches while providing support for key services.

2. Network Topology

The network comprises:

- **HQ Router** (Router1)
- Branch 1 Router
- Branch 2 Router
- Server (DNS, Web, Email, and DHCP services)
- Multiple PCs at HQ, Branch 1, and Branch 2

There are 5 subnets.

They are:

1.S0 LAN-5 hosts

2.S2 LAN-5 hosts

3.S1 LAN-3 hosts

4.WAN 1 – 2 hosts

5.WAN 2-2 hosts

PHYSICAL

HQ -

R1(S0/1/0) → R1(S0/1/0)

R1(S0/1/1) → R3(S0/1/0)

R1(F0/0) → S0(F0/1)

S0(F0/2) →PC0(F0)

S0(F0/3) →PC1(F0)

S0(F0/4) →PC2(F0)

S0(F0/5) →PC3(F0)

BRANCH-1:

R2(S0/1/0) → R1(S0/1/0)

R2(F0/0) → S2(F0/1)

S2(F0/2) →PC4(F0)

S2(F0/3) →PC5(F0)

S2(F0/4) →PC6(F0)

BRANCH-2:

R3(S0/1/0) → R1(S0/1/1)

R3(F0/0) → S1(F0/1)

SUBNET	GIVEN HOST	ACTUAL HOST	IP ASSIGNMENT 2^n	HOST BIT h	NETWORK BIT 32-h	PREFIX
S0 LAN	5	7	2^3 =8	3	29	/29
S2 LAN	5	7	2^3 =8	3	29	/29
S1 LAN	3	5	2^3 =8	3	29	/29
WAN 1	2	4	2^2=4	2	30	/30
WAN 2	2	4	2^2=4	2	30	/30

Addressing Table

DEVICE	INTERFACE	IPV4 ADDRESS	SUBNET MASK	DEFAULT GATEWAY
R1	S0/1/0	172.16.0.25	255.255.255.252	N/A
	S0/1/1	172.16.0.29	255.255.255.252	
	F0/0	172.16.0.1	255.255.255.248	
R2	S0/1/0	172.16.0.26	255.255.255.252	N/A
	F0/0	172.16.0.9	255.255.255.248	
R3	S0/1/0	172.16.0.30	255.255.255.252	N/A
	F0/0	172.16.0.17	255.255.255.248	
PC0	F0	172.16.0.2	255.255.255.248	172.16.0.1
PC1	F0	172.16.0.3	255.255.255. 248	172.16.0.1
PC2	F0	172.16.0.4	255.255.255. 248	172.16.0.1
PC3	F0	172.16.0.5	255.255.255. 248	172.16.0.1
PC4	F0	172.16.0.11	255.255.255. 248	172.16.0.9
PC5	F0	172.16.0.12	255.255.255. 248	172.16.0.9
PC6	F0	172.16.0.13	255.255.255. 248	172.16.0.9
PC7	F0	172.16.0.18	255.255.255. 248	172.16.0.17
PC8	F0	172.16.0.19	255.255.255. 248	172.16.0.17
SERVER	F0	172.16.1.2	255.255.255. 248	172.16.0.9

Server Configuration

Server Details

- **IP Address**: 172.16.1.2
- Subnet: 255.255.255.248
- **Default Gateway**: 172.16.1.9

Services Configured

DNS

- DNS Server IP: 172.16.1.2
- **Record Added**: www.project.com → 172.16.1.2

Web Server

<html>

project

<hr>Welcome to Cisco Packet Tracer. Opening doors to new opportunities. Mind Wide Open.

<p>Quick Links:

A small page

Copyrights

Image page

Image

</html>

Email Server

Accounts: Username: aditta, Password: addita

Username: udipta, Password: 1234

HCP

Default Gateway: 172.16.0.9

DNS Server: 172.16.1.2

Subnet Mask: 255.255.255.248

Max Users: 8

Routing Configuration

Static Routes

HQ

ip route 172.16.0.8 255.255.255.248 172.16.0.25

ip route 172.16.0.16 255.255.255.248 172.16.0.29

Branch 1

ip route 172.16.0.0 255.255.255.248 172.16.0.25

ip route 172.16.0.16 255.255.255.248 172.16.0.25

Branch 2

ip route 172.16.0.0 255.255.255.248 172.16.0.29

ip route 172.16.0.8 255.255.255.248 172.16.0.29

Testing and Troubleshooting

Successful Tests

Branch PCs ↔ HQ PCs: Successful

DNS Lookup: nslookup www.messi.com: Resolves to 172.16.1.2

Web Access: Accessing www.messi.com from Branch PCs and HQ PCs: Displays webpage.

Email Access: Email accounts configured on the server are accessible from the network.

Troubleshooting Steps

Adjusted the server's subnet to 172.16.1.0/24 for better IP management.

Verified static routes to ensure proper connectivity.

Resolved DNS timeouts by correcting the DNS server IP in DHCP pools.

Conclusion

The project effectively established communication between branches and configured critical server services, including DNS, web, email, and DHCP. The infrastructure is designed to be scalable, ensuring efficient operations for both the HQ and branches. Future enhancements may involve setting up NAT for internet access or implementing security measures such as ACLs.