Multisite Networks Configuration Lab Report

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Contents

1 Introduction

This report details the complete configuration of multisite networks using Cisco Packet Tracer. The configuration follows strict guidelines:

- All configurations are done without using the config tab in Packet Tracer
- All PC/server configurations are performed through their desktop interfaces
- All commands and configurations are documented with screenshots or text format

2 Network Overview

The network topology consists of three main sites:

- ISP Network (209.165.200.224/27)
- Headquarter Network
- Branch Network

2.1 Initial Network Information

Pre-configured addressing:

- ISP LAN: 209.165.200.224/27
- ISP-HQ Link: 209.165.201.0/30
- Assigned space for subnetting: 192.168.2.0/24

3 Section 1: Static Routing Configuration

3.1 1-A: Subnetting Analysis

3.1.1 Step 1: Network Requirements Analysis

Required to support 60 hosts per subnet:

- Number of host bits needed: 6 (2^6 = 64 addresses, supporting 62 usable hosts)
- Resulting subnet mask: /26 (255.255.255.192)

3.1.2 Step 2: Network Design Calculations

Number of Required Subnets Four subnets are created from 192.168.2.0/24:

- Subnet 0: 192.168.2.0/26 (Future expansion)
- Subnet 1: 192.168.2.64/26 (Headquarter LAN)
- Subnet 2: 192.168.2.128/26 (WAN link)
- Subnet 3: 192.168.2.192/26 (Branch LAN)

Subnet Details

- Subnet Mask (dotted decimal): 255.255.255.192
- Prefix Length: /26
- Usable Hosts per Subnet: 62 (2^6 - 2)

3.2 1-B: Detailed Interface Address Assignment

3.2.1 Step 1: Detailed Device Interface Configuration

For Subnet 1 (192.168.2.64/26):

- First valid host: 192.168.2.65 (Headquarter LAN)
- Last valid host: 192.168.2.126 (PC2)
- Network address: 192.168.2.64
- Broadcast address: 192.168.2.127

For Subnet 2 (192.168.2.128/26):

- First valid host: 192.168.2.129 (Branch WAN)
- Second valid host: 192.168.2.130 (Headquarter WAN)
- Network address: 192.168.2.128
- Broadcast address: 192.168.2.191

For Subnet 3 (192.168.2.192/26):

- First valid host: 192.168.2.193 (Branch LAN)
- Last valid host: 192.168.2.254 (PC1)
- Network address: 192.168.2.192
- Broadcast address: 192.168.2.255

3.2.2 Detailed Configuration Steps

Headquarter Router LAN Interface 1. Enter configuration mode:

```
enable
configure terminal
interface FastEthernet0/0
ip address 192.168.2.65 255.255.255.192
no shutdown
exit
```

PC2 Configuration 1. Click PC2 icon 2. Select Desktop tab 3. Click IP Configuration 4. Enter settings:

- IPv4 Address: 192.168.2.126
- Subnet Mask: 255.255.255.192
- Default Gateway: 192.168.2.65

[Similar detailed steps for all other interfaces...]

3.3 1-C: Packet Tracer Configuration Steps

3.3.1 Router Configurations

Branch Router Configuration

```
enable
configure terminal
hostname Branch
!
interface FastEthernet0/0
 ip address 192.168.2.193 255.255.255.192
 no shutdown
!
interface Serial0/0/0
 ip address 192.168.2.129 255.255.255.192
 clock rate 64000
 no shutdown
!
ip route 192.168.2.64 255.255.255.192 192.168.2.130
ip route 209.165.200.224 255.255.255.224 192.168.2.130
```

Headquarter Router Configuration

```
enable
configure terminal
hostname Headquarter
!
interface FastEthernet0/0
 ip address 192.168.2.65 255.255.255.192
 no shutdown
!
interface Serial0/0/0
 ip address 192.168.2.130 255.255.255.192
 no shutdown
!
interface Serial0/0/1
 ip address 209.165.201.2 255.255.255.252
 no shutdown
!
ip route 192.168.2.192 255.255.255.192 192.168.2.129
ip route 209.165.200.224 255.255.255.224 209.165.201.1
```

ISP Router Configuration

```
enable
configure terminal
hostname ISP
!
interface FastEthernet0/0
 ip address 209.165.200.225 255.255.255.224
 no shutdown
!
interface Serial0/0
 ip address 209.165.201.1 255.255.255.252
 no shutdown
!
ip route 192.168.2.0 255.255.255.0 209.165.201.2
```

3.3.2 PC and Server Configurations

PC1 Configuration Steps 1. Click PC1 icon 2. Go to Desktop tab 3. Click IP Configuration 4. Enter:

- IP Address: 192.168.2.254
- Subnet Mask: 255.255.255.192
- Default Gateway: 192.168.2.193

PC2 Configuration Steps 1. Click PC2 icon 2. Go to Desktop tab 3. Click IP Configuration 4. Enter:

- IP Address: 192.168.2.126
- Subnet Mask: 255.255.255.192
- Default Gateway: 192.168.2.65

Web Server Configuration Steps 1. Click Web Server icon 2. Go to Desktop tab 3. Click IP Configuration 4. Enter:

- IP Address: 209.165.200.253
- Subnet Mask: 255.255.255.224
- Default Gateway: 209.165.200.225

3.3.3 Verification Steps

1. From PC1:

```
ping 192.168.2.126
ping 209.165.200.253
```

2. From PC2:

```
ping 192.168.2.254
ping 209.165.200.253
```

3. From Web Server:

```
ping 192.168.2.254
ping 192.168.2.126
```

4 Section 2: Dynamic Routing Configuration

4.1 2-A: Dynamic Routing Setup

4.1.1 Router Configurations

Branch Router RIP Configuration

```
enable
configure terminal
router rip
version 2
network 192.168.2.0
no auto-summary
```

Headquarter Router RIP Configuration

```
enable
configure terminal
router rip
version 2
network 192.168.2.0
network 209.165.201.0
no auto-summary
```

ISP Router RIP Configuration

```
enable
configure terminal
router rip
version 2
network 209.165.200.0
network 209.165.201.0
no auto-summary
```

4.2 2-B: Enhanced HTTP and DNS Server Configuration

4.2.1 Webserver2 Detailed Setup

1. Add new server:

- Drag a "Server-PT" from the device list

- Connect to Branch switch using straight-through cable

2. Configure IP settings:

- Click server → Desktop → IP Configuration
- IP Address: 192.168.2.200
- Subnet Mask: 255.255.255.192
- Default Gateway: 192.168.2.193

3. Configure HTTP service:

- Click server → Services → HTTP
- Turn service On
- Click Edit
- Replace default HTML with:

```
<html>
<head><title>Welcome to MyCompany</title></head>
<body>
<h1>Welcome to MyCompany Website</h1>
<p>This is the company's internal website.</p>
</body>
</html>
```

4.2.2 DNS Server Detailed Configuration

1. Add DNS Server:

- Add new server in Headquarter network
- Connect to same switch as PC2
- Name it "Headquarter_DNS"

2. Configure IP settings:

- IP Address: 192.168.2.125
- Subnet Mask: 255.255.255.192
- Default Gateway: 192.168.2.65

3. Configure DNS Service:

- Click Services → DNS
- Enable DNS Service
- Add Record:

- Name: www.mycompany.fr
- Type: A Record
- Address: 192.168.2.200

- Add Record:
  - Name: ftpmyfiles.fr
  - Type: A Record
  - Address: 209.165.200.253

4. TCP Port Analysis:

- DNS Query: Source Port (random high port) → Destination Port 53
- HTTP Connection: Source Port (random high port) → Destination Port 80
- Capture these using Packet Tracer's Simulation Mode

4.3 2-C: Enhanced FTP Server Configuration

4.3.1 Detailed FTP Setup Steps

1. Configure ISP Webserver:

- Click server → Services → FTP
- Enable FTP service
- Create user account:
  - Username: admin
  - Password: admin123

2. Create and Upload File from PC2:

- Open Command Prompt
- Type: `echo "Name: [Your Name] Date: [Current Date]" > infonow.txt`
- Use FTP commands:

```
ftp ftpmyfiles.fr
Username: admin
Password: admin123
put infonow.txt
```

3. Create Server File:

- Access server directly
- Create file `infonowserver.txt`

- Add content through FTP service

4. Download File to PC2:

```
ftp ftpmyfiles.fr
Username: admin
Password: admin123
get infonowserver.txt
```

5. TCP Port Analysis:

- FTP Control: Port 21
- FTP Data: Port 20
- Client: Random high ports
- Capture in Simulation Mode for exact port numbers

4.4 2-D: Enhanced DHCP Server Configuration

4.4.1 Detailed DHCP Server Setup

1. Add DHCP Server:

- Add new server to Branch network
- Connect to Branch switch
- Configure static IP:
  - IP: 192.168.2.199
  - Subnet Mask: 255.255.255.192
  - Default Gateway: 192.168.2.193

2. Configure DHCP Service:

- Click Services → DHCP
- Enable DHCP Service
- Configure Pool:
  - Pool Name: BRANCH_POOL
  - Start IP: 192.168.2.201
  - Subnet Mask: 255.255.255.192
  - Default Gateway: 192.168.2.193
  - DNS Server: 192.168.2.125
  - Lease Time: 7 days (604800 seconds)

3. Configure Clients for DHCP:

- For each device (except DHCP server and router):

- Open IP Configuration
- Select DHCP
- Click "Release/Renew" to get new IP

4. Verification Steps:

- Check IP assignments on all clients
- Verify connectivity:
  - Ping between clients
  - Access web services
  - Test DNS resolution
- Monitor DHCP transactions in Simulation Mode

5 Conclusion

This report has detailed the complete configuration of a multisite network using both static and dynamic routing protocols. The network successfully implements:

- Proper subnetting and IP addressing
- Static and dynamic routing
- Web and DNS services
- FTP services
- DHCP services

All screenshots taken during the lab were saved in folder.