Lab Practical #07: Application Layer Protocols - DNS, DHCP, FTP

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Aim

Implement DNS, DHCP, and FTP protocols using Cisco Packet Tracer and verify connectivity.

Theory

- **DNS:** Translates domain names to IP addresses (Port 53)
- **DHCP:** Automatically assigns IP addresses (Ports 67/68)

- **FTP:** File transfer protocol (Ports 20/21)

Network Setup

Topology

```
    [Switch]
        |
+-------+-------+
|       |       |
PC1    PC2   [Servers]
              /   |   \
         DNS  DHCP  FTP
```

IP Configuration

Device	IP Address	Role
DNS Server	192.168.1.10	Domain resolution
DHCP Server	192.168.1.11	IP assignment

Device	IP Address	Role
FTP Server	192.168.1.12	File transfer
PC1	192.168.1.100 (DHCP)	Client
PC2	192.168.1.101 (DHCP)	Client

DNS Configuration Steps:

1. Configure server with static IP address
2. Enable DNS service
3. Add DNS records:
    - www.example.com → 192.168.1.20
    - mail.example.com → 192.168.1.30
    - ftp.example.com → 192.168.1.40

2. DHCP Server Configuration

Server IP: 192.168.1.11
Subnet Mask: 255.255.255.0
Default Gateway: 192.168.1.1

Configuration Steps

1. DNS Server (192.168.1.10)

- Enable DNS service
- Add records: www.example.com → 192.168.1.20

2. DHCP Server (192.168.1.11)

- Enable DHCP service
- Pool: 192.168.1.100-150, Gateway: 192.168.1.1

3. FTP Server (192.168.1.12)

- Enable FTP service
- Users: admin/admin123, user1/user123

Testing Results

Connectivity Tests

```
# PC1 to DNS Server
C:\> ping 192.168.1.10
Reply from 192.168.1.10: bytes=32 time<1ms TTL=128

# DNS Resolution
C:\> nslookup www.example.com
Server: 192.168.1.10
Address: 192.168.1.20

# FTP Access
C:\> ftp 192.168.1.12
Connected to 192.168.1.12
User: admin
230 User logged in
```

DHCP Verification

- PC1 auto-assigned: 192.168.1.100
- PC2 auto-assigned: 192.168.1.101

Conclusion

Successfully implemented and tested DNS, DHCP, and FTP protocols. All services working properly with confirmed connectivity.

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