IP Phone with Data Network Configuration Guide for Cisco Packet Tracer Lab

Lab Overview

This lab demonstrates an IP Phone setup integrated with a data network using VLANs to segregate voice and data traffic. The topology includes:

- One router (Router0)
- One switch (Switch0)
- Eight IP Phones (IP Phone0 to IP Phone7)
- Seven PCs (PC0 to PC6)
- IP addressing as per the diagram

Network Details

- **Voice VLAN (VLAN 10):** 192.168.10.0/24
  - Router Subinterface (Fa0/0.10): 192.168.10.1
  - IP Phones: Assigned via DHCP
- **Data VLAN (VLAN 20):** 192.168.20.0/24
  - Router Subinterface (Fa0/0.20): 192.168.20.1
  - PCs: Assigned via DHCP
- **DHCP Pools:**
  - Voice: 192.168.10.0/24, Gateway 192.168.10.1, Option 150 192.168.10.1
  - Data: 192.168.20.0/24, Gateway 192.168.20.1

Step-by-Step Configuration

Step 1: Configure the Switch

1. Enter global configuration mode:

```
enable
configure terminal
```

2. Create VLANs for voice and data:

```
vlan 10
name voice
exit
vlan 20
name data
exit
```

3. Configure ports for IP Phones and PCs (Fa0/2 to Fa0/7):

```
interface range FastEthernet0/2-7
switchport mode access
switchport access vlan 20
switchport voice vlan 10
exit
```

4. Configure additional ports for PCs (Fa0/8 to Fa0/9):

```
interface range FastEthernet0/8-9
switchport mode access
switchport access vlan 20
switchport voice vlan 10
exit
```

5. Configure the trunk link to the router:

```
interface FastEthernet0/1
switchport mode trunk
exit
```

Step 2: Configure the Router

1. Enter global configuration mode:

```
enable
configure terminal
```

2. Enable the physical interface:

```
interface FastEthernet0/0
no shutdown
exit
```

3. Configure subinterfaces for VLANs:

```
interface FastEthernet0/0.10
encapsulation dot1Q 10
ip address 192.168.10.1 255.255.255.0
exit
interface FastEthernet0/0.20
encapsulation dot1Q 20
ip address 192.168.20.1 255.255.255.0
exit
```

4. Set up DHCP exclusions:

```
ip dhcp excluded-address 192.168.10.1
ip dhcp excluded-address 192.168.20.1
```

5. Configure DHCP pools:

```
ip dhcp pool voice
network 192.168.10.0 255.255.255.0
default-router 192.168.10.1
option 150 ip 192.168.10.1
exit
ip dhcp pool data
network 192.168.20.0 255.255.255.0
default-router 192.168.20.1
exit
```

6. Configure telephony service:

```
telephony-service
max-ephones 8
max-dn 8
ip source-address 192.168.10.1 port 2000
auto assign 1 to 8
exit
```

7. Configure ephones:

```
ephone 1
type 7960
exit
ephone 2
type 7960
exit
ephone 3
type 7960
exit
ephone 4
type 7960
exit
ephone 5
type 7960
exit
ephone 6
type 7960
exit
ephone 7
type 7960
exit
ephone 8
type 7960
exit
```

8. Configure ephone-dns:

```
ephone-dn 1
number 0001
exit
ephone-dn 2
number 0002
exit
ephone-dn 3
number 0003
exit
ephone-dn 4
```

```
number 0004
exit
ephone-dn 5
number 0005
exit
ephone-dn 6
number 0006
exit
ephone-dn 7
number 0007
exit
ephone-dn 8
number 0008
exit
```

Step 3: Configure PCs and IP Phones

1. Ensure PCs (PC0 to PC6) are connected to switch ports (e.g., Fa0/2 to Fa0/8).
2. Ensure IP Phones (IP Phone0 to IP Phone7) are connected to the same switch ports as PCs, with phones handling VLAN tagging.
3. PCs and IP Phones will automatically obtain IP addresses from the respective DHCP pools.

Step 4: Verify Configuration

1. Check VLAN configuration on the switch:

   ```
   show vlan brief
   ```

2. Verify trunk status on the switch:

   ```
   show interfaces trunk
   ```

3. Check routing table on the router:

   ```
   show ip route
   ```

4. Test voice and data connectivity:
   - From any IP Phone, dial another extension (e.g., 0001 to 0008) to test VoIP.

- From any PC, ping another PC or the router (e.g., 192.168.20.1) to test data network.

5. If connectivity fails, troubleshoot:
   - Verify IP assignments with `show ip dhcp binding`.
   - Ensure trunk link and VLAN configurations are correct.
   - Check phone registration with `show ephone`.

Troubleshooting Tips

- Use `ping` to test data network connectivity.
- Verify DHCP assignments with `show ip dhcp binding`.
- Ensure switch ports are correctly configured for voice and data VLANs.
- Check telephony service status with `show telephony-service`.

Conclusion

This configuration sets up an IP Phone system with a separate data network using VLANs for voice (VLAN 10) and data (VLAN 20). Test VoIP calls and data connectivity to confirm the setup works as intended.