perplexity

Step-by-Step: DHCP & VLANs on Two Routers, Two Switches, Four PCs

Here's how you can set up **DHCP** for two VLANs (tech, data), two routers, two switches, and four PCs, ensuring each PC gets its IP via DHCP from the respective router pool. This setup is relevant for CCNA labs and practical GNS3/Packet Tracer work.

1. Topology Overview

- **Router 1 (192.168.10.1):** Tech VLAN
- **Router 2 (192.168.1.1):** Data VLAN
- **Switch 1:** Connects Router 1, Router 2, PCs 1 & 2, and Switch 2
- **Switch 2:** Connects PCs 3 & 4, uplink to Switch 1
- **VLANs:**
  - *Tech VLAN*: PCs 1 & 3
  - *Data VLAN*: PCs 2 & 4

2. Configure VLANs on Both Switches

On Switch 1 and Switch 2:

```
Switch(config)# vlan 10        # Tech VLAN
Switch(config-vlan)# name TECH
Switch(config-vlan)# exit
Switch(config)# vlan 20        # Data VLAN
Switch(config-vlan)# name DATA
Switch(config-vlan)# exit
```

3. Assign Ports to VLANs

- **Switch 1:**
  - PC1 port (e.g., Fa0/1) → VLAN 10
  - PC2 port (e.g., Fa0/2) → VLAN 20
  - Connection to Router 1: (e.g., Fa0/3) → trunk or routed, as required
  - Connection to Router 2: (e.g., Fa0/4) → trunk or routed

- Uplink to Switch 2 (e.g., Fa0/24) → trunk

Example (Switch 1):

```
Switch(config)# interface fa0/1
Switch(config-if)# switchport mode access
Switch(config-if)# switchport access vlan 10
Switch(config)# interface fa0/2
Switch(config-if)# switchport mode access
Switch(config-if)# switchport access vlan 20
Switch(config)# interface fa0/24
Switch(config-if)# switchport mode trunk
```

4. Repeat on Switch 2

- PC3 port (e.g., Fa0/1) → VLAN 10
- PC4 port (e.g., Fa0/2) → VLAN 20
- Uplink to Switch 1 (e.g., Fa0/24) → trunk

5. Configure Inter-VLAN Routing & DHCP on Routers

Router 1: (serves Tech VLAN)

```
Router1(config)# interface g0/0
Router1(config-if)# no shutdown
Router1(config-if)# interface g0/0.10       # Sub-interface for Tech VLAN
Router1(config-if)# encapsulation dot1Q 10
Router1(config-if)# ip address 192.168.10.1 255.255.255.0
Router1(config-if)# exit

Router1(config)# ip dhcp excluded-address 192.168.10.1 192.168.10.10
Router1(config)# ip dhcp pool TECHVLAN
Router1(dhcp-config)# network 192.168.10.0 255.255.255.0
Router1(dhcp-config)# default-router 192.168.10.1
Router1(dhcp-config)# dns-server 8.8.8.8
Router1(dhcp-config)# exit
```

Router 2: (serves Data VLAN)

```
Router2(config)# interface g0/0
Router2(config-if)# no shutdown
Router2(config-if)# interface g0/0.20       # Sub-interface for Data VLAN
Router2(config-if)# encapsulation dot1Q 20
Router2(config-if)# ip address 192.168.1.1 255.255.255.0
Router2(config-if)# exit

Router2(config)# ip dhcp excluded-address 192.168.1.1 192.168.1.10
Router2(config)# ip dhcp pool DATAVLAN
Router2(dhcp-config)# network 192.168.1.0 255.255.255.0
```

```
Router2(dhcp-config)# default-router 192.168.1.1
Router2(dhcp-config)# dns-server 8.8.8.8
Router2(dhcp-config)# exit
```

6. Connect Switch Trunk Ports to Routers & Uplink

- Connect switch trunk ports (fa0/24) to the router interfaces and between switches.
- Ensure correct trunk configs & allowed VLANs on trunk ports.

7. Configure PCs for DHCP

- On each PC (in Packet Tracer or GNS3 VPCS):
  - Set interface to DHCP (or configure 'ip dhcp' in VPCS)
- PCs connected to VLAN 10 get IP from Router1; VLAN 20 from Router2.

8. Verification

- On switch: `show vlan brief`, `show interfaces status`, `show running-config`
- On routers: `show ip dhcp binding`, `show ip dhcp pool`, `show ip interface brief`
- On PCs: Confirm correct DHCP IP, gateway.
- Test connectivity: Ping between PCs in same VLAN, gateway, and across VLANs if routing is required.

Notes & Tips

- Each VLAN requires a separate DHCP pool on its router.
- Router subinterfaces enable routers to serve multiple VLANs via trunking.
- Switch trunk ports must allow both VLANs.
- If using Layer 2 switches, VLAN interfaces typically serve for management; routing and DHCP need to be on routers.
- Save configurations: `copy running-config startup-config`

If you want tailored commands for your specific interface names or clarification of any step, let me know your device models and connection details.

⁂

1. http://www.cisco.com/en/US/docs/routers/access/800/850/software/configuration/guide/dhcpvlan.html
2. https://www.cisco.com/en/US/docs/routers/access/800/850/software/configuration/guide/dhcpvlan.html
3. https://ipcisco.com/lesson/router-dhcp-configuration-with-packet-tracer-ccna/

4. https://www.reddit.com/r/ccna/comments/1dumb0g/set_up_inter_vlan_routing_on_cisco_switch_as_well/
5. https://www.reddit.com/r/networking/comments/qnbycg/making_a_dhcp_server_work_for_multiple_subnets/
6. https://www.reddit.com/r/networking/comments/xm4gul/how_to_assign_a_dhcp_pool_to_a_vlan_cisco/
7. https://www.reddit.com/r/ccna/comments/1dumb0g/set_up_inter_vlan_routing_on_cisco_switch_as_well/?tl=th
8. https://bardimin.com/en/network-en/configuration-dhcp-server-with-multiple-vlan-cisco-packet-tracer/
9. https://www.learncisco.net/courses/icnd-1/lan-connections/router-as-a-dhcp-server.html
10. https://www.youtube.com/watch?v=d29tOBrPztA
11. https://forum.networklessons.com/t/cisco-ios-dhcp-relay-agent/1121
12. https://www.cisco.com/en/US/docs/routers/access/800/860-880-890/software/configuration/guide/dhcpvlan.pdf
13. https://www.youtube.com/watch?v=1ff_RXlndJQ
14. https://www.youtube.com/watch?v=jHv8ZDfVzB0
15. https://www.computernetworkingnotes.com/ccna-study-guide/configure-dhcp-server-for-multiple-vlans-on-the-switch.html
16. https://www.youtube.com/watch?v=u2ldjsji_J4
17. https://www.youtube.com/watch?v=AZ1mf7mSSGM
18. https://bardimin.com/en/network-en/configuration-dhcp-server-with-multiple-vlan-cisco-packet-tracer/?amp=1
19. https://www.scribd.com/document/543030804/Configuring-Vlans-and-DHCP
20. https://www.computernetworkingnotes.com/ccna-study-guide/how-to-configure-dhcp-server-on-cisco-switches.html