**Capstone Project—version 2**

**Objectives**

* Explain how a small network of directly connected segments is created, configured and verified.

**Background/Scenario**

* Design and build a network from scratch.
* You may consult with another individual, but each person must turn in an assignment.
* Your design must include:
  + one router (model 2911)
  + 3 switches (model 2960)
  + 6 end devices.
* Fully configure the network using both IPv4 and IPv6 subnetting.
* Verify the network configuration
* Verify connectivity
* Secure the network using SSH, secure passwords, and console passwords.

**Required Resources**

* Packet Tracer

You work for a small company that wants to separate the Purchasing, Operations and Design departments into different networks. Your supervisor has tasked you with designing a network and private addressing scheme to support both IPv4 and IPv6. The Purchasing department needs at least 116 devices, the Operations department at least 417, and Design needs addresses for 22 devices. Configure addressing to reflect this need and conserve addresses. (Use VLSM for the IPv4 networks). Subnet the following.

192.168.50.0/20

|  |  |
| --- | --- |
| **IPv4 Requirements** | **IPv6 Requirements** |
| 1st available address assigned to the router interfaces | 1st available address assigned to the router interfaces |
| Last available address assigned to the switches’ SVI. | Second IPv6 addresses are assigned to the switch SVIs.  (Note—in IPv6 switches will only be reachable within their LAN.) |
| PC addresses are assigned in that network. | Router’s link-local address is FE80::12  Switches’ link-local address is fe80::B |
|  | PC addresses are assigned in their respective networks. |

2001:db8:cafe:19::/64

Complete the addressing table for both IPv4 and IPv6. (The number of lines are not a hint; you will need more.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Hosts | Network | 1st available | Last available | Broadcast | Subnet Mask |
| 417 | 192.168.50.0 | 192.168.50.1 | 192.168.51.254 | 192.168.51.255 | 255.255.240.0 |
| 116 | 192.168.52.0 | 192.168.52.1 | 192.168.52.126 | 192.168.52.127 | 255.255.255.128 |
| 22 | 192.168.52.128 | 192.168.52.129 | 192.168.52.158 | 192.168.52.159 | 255.255.255.224 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Device | Interface | IP address | Subnet Mask | Default Gateway |
| Router0 | G0/0 | 192.168.50.1 | 255.255.254.0 | n/a |
| G0/1 | 192.168.52.1 | 255.255.255.128 | n/a |
| G0/2 | 192.168.52.129 | 255.255.255.224 | n/a |
| Operations | VLAN 1 | 192.168.51.254 | 255.255.254.0 | 192.168.50.1 |
| Purchasing | VLAN 1 | 192.168.52.126 | 255.255.255.128 | 192.168.52.1 |
| Designs | VLAN 1 | 192.168.52.158 | 255.255.255.224 | 192.168.52.129 |
| OPER1 | NIC | 192.168.50.5 | 255.255.254.0 | 192.168.50.1 |
| OPER2 | NIC | 192.168.50.6 | 255.255.254.0 | 192.168.50.1 |
| PUR1 | NIC | 192.168.52.5 | 255.255.255.128 | 192.168.52.1 |
| PUR2 | NIC | 192.168.52.6 | 255.255.255.128 | 192.168.52.1 |
| DES1 | NIC | 192.168.52.130 | 255.255.255.224 | 192.168.52.129 |
| DES2 | NIC | 192.168.52.131 | 255.255.255.224 | 192.168.52.129 |

|  |  |
| --- | --- |
| Network address | Prefix |
| 2001:db8:cafe:19:: | 64 |
| 2001:db8:cafe:1a:: | 64 |
| 2001:db8:cafe:1b:: | 64 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Device | Interface | IPv6 Address | Prefix Length | Default Gateway |
| BR1 | G0/0 | 2001:db8:cafe:19::1 | 64 | FE80::12 |
| G0/1 | 2001:db8:cafe:1a::1 | 64 | FE80::12 |
| G0/2 | 2001:db8:cafe:1b::1 | 64 | FE80::12 |
| Operations | VLAN 1 | 2001:db8:cafe:19::2 | 64 | fe80::B |
| Purchasing | VLAN 1 | 2001:db8:cafe:1a::2 | 64 | fe80::B |
| Designs | VLAN 1 | 2001:db8:cafe:1b::2 | 64 | fe80::B |
| OPER1 | NIC | 2001:db8:cafe:19::3 | 64 | FE80::12 |
| OPER2 | NIC | 2001:db8:cafe:19::4 | 64 | FE80::12 |
| PUR1 | NIC | 2001:db8:cafe:1a::3 | 64 | FE80::12 |
| PUR2 | NIC | 2001:db8:cafe:1a::4 | 64 | FE80::12 |
| DES1 | NIC | 2001:db8:cafe:1b::3 | 64 | FE80::12 |
| DES2 | NIC | 2001:db8:cafe:1b::4 | 64 | FE80::12 |

**Routers & Switches**

* Hostnames should be set to yourlastname\_Router# (i.e. Edmondson\_Router0 or Edmondson\_Switch2)
* Banner messages will read “Unauthorized Access Prohibited”
* Set the correct time on the router and switches.
* On all devices secure all lines with encrypted passwords. Use the password **ciscoline.** Configure the lines to close after 7 minutes of inactivity.
* Secure privileged executive mode with an encrypted password using **ciscopriv1** as the password.
* Assign both IPv4 and IPv6 addressing to each of the devices based on the addressing table for both IPv4 and IPv6. Assign appropriate descriptions to all interfaces.
* Enable and secure ssh for all intermediary devices.
  + Domain name: mynetwork.com
  + Username: **Administrator**
  + Password: **class\_ssh123**
* Save the configuration.

**Routers Only**

* Require password be at least 9 characters long and protect the device from brute force attacks by blocking logins for 4 minutes after 4 failed attempted logins within a minute.

**Verification Snips**

* Verify connectivity. (Attach at least 5 snip-its to confirm.)
* Verify configuration. (Attach at least 5 snip-its to confirm.)

**Final Checks**

* Do you have full connectivity in both IPv4 and IPv6? Yes
* Can you ssh into all intermediary devices?
* When completed submit
  + The pka/pkz/pkt file of the completed network
  + This completed network document to the dropbox in netacad.
  + **All snip-its must be included in this document. Do NOT attach jpegs or other pictures into the netacad dropbox.**

A screenshot of a computer

Description automatically generated

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A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

A close-up of a computer screen

Description automatically generated

A computer screen shot of a program

Description automatically generated

A computer screen shot of a black and white screen

Description automatically generated

A screenshot of a computer program

Description automatically generated

A screenshot of a computer program

Description automatically generated

A screenshot of a computer program

Description automatically generated

A computer screen with white text

Description automatically generated