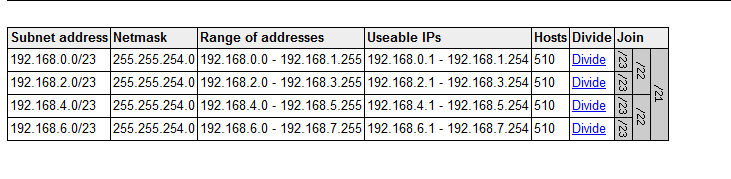
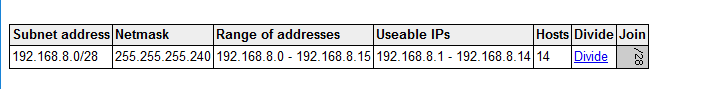
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Vlan ID | Vlan Name | New Network addreess | Subnet | First avail ip ADDRESS |
| VLAN 10 | Users | 192.168.0.0 | 255.255.254.0 | 192.168.0.1 vitual ip hsrp |
| VLAN 20 | Finance | 192.168.2.0 | 255.255.254.0 | 192.168.2.1 |
| VLAN 30 | Sales | 192.168.4.0 | 255.255.254.0 | 192.168.4.1 |
| VLAN 40 | Corp | 192.168.6.0 | 255.255.254.0 | 192.168.6.1 |
| VLAN 99  (default gateway) | Management | 192.168.8.0 | 255.255.240.0 | 192.168.8.1 |
| Vlan 50 | Router-connect | 10.10.10.8 | 255.255.255.252 | 10.10.10.9 - 10.10.10.10 |

sn





**Vlan 99** 255.255.240.0

|  |  |  |  |
| --- | --- | --- | --- |
| Dist\_Switch\_1 | 192.168.8.2 | 255.255.240.0 | Int vlan 99 |
| Dist\_Switch\_2 | 192.168.8.3 | 255.255.240.0 | Int vlan 99 |
| Acc\_Switch\_1 | 192.168.8.4 | 255.255.240.0 | Int vlan 99 |
| Acc\_Switch\_2 | 192.168.8.5 | 255.255.240.0 | Int vlan 99 |
| Acc\_Switch\_3 | 192.168.8.6 | 255.255.240.0 | Int vlan 99 |
| Dist\_Switch\_1 | 10.10.10.9 | 255.255.255.252 | Int vlan 50 |
| Dist\_Switch\_2 | 10.10.10.10 | 255.255.255.252 | Int vlan 50 |

Vlan 50

Dist 1 10.10.10.9 - dist 210.10.10.10

**End devices**

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Vlan + IP | Subnet | Gateway |
| PC\_Sales vlan 30 | Vlan 10 192.168.0.2 | 255.255.254.0 | 192.168.0.1 |
| HO\_User | Vlan 20 192.168.2.2 | 255.255.254.0 | 192.168.2.1 |
| PC\_Corp | Vlan 30 192.168.4.2 | 255.255.254.0 | 192.168.4.1 |
| PC\_Finance | Vlan 40 192.168.6.2 | 255.255.254.0 | 192.168.6.1 |
|  |  |  |  |

**Dist\_Switch\_1**

|  |  |  |  |
| --- | --- | --- | --- |
| Fa0/1 | Connection to Acc\_Switch\_1 | 10,20,30,40,99 |  |
| Fa0/2 | Connection to Acc\_Switch\_1 | 10,20,30,40,99 |  |
| Fa0/3 | to Acc\_Switch\_2 | 10,20,30,40,99 |  |
| Fa0/4 | to Acc\_Switch\_2 | 10,20,30,40,99 |  |
| Fa0/5 | to Acc\_Switch\_3 | 10,20,30,40,99 |  |
| Fa0/7 | to Acc\_Switch\_3 | 10,20,30,40,99 |  |
| Fa0/8 | to Acc\_Switch\_3 | 10,20,30,40,99 |  |
| Fa0/9 | To Dist\_Switch\_2 | 10,20,30,40,99 |  |
| G0/1 | description Connection to Head Office Router 1 | 10,20,30,40,99 |  |

**Dist\_Switch\_2**

|  |  |  |  |
| --- | --- | --- | --- |
| Fa0/1 | Connection to Acc\_Switch\_2 | 10,20,30,40,99 |  |
| Fa0/2 | Connection to Acc\_Switch\_2 | 10,20,30,40,99 |  |
| Fa0/3 | to Acc\_Switch\_1 | 10,20,30,40,99 |  |
| Fa0/4 | to Acc\_Switch\_1 | 10,20,30,40,99 |  |
| Fa0/5 | to Acc\_Switch\_3 | 10,20,30,40,99 |  |
| Fa0/7 | To Dist\_Switch\_2 | 10,20,30,40,99 |  |
| Fa0/8 | to Acc\_Switch\_3 | 10,20,30,40,99 |  |
| Fa0/9 | To Dist\_Switch\_2 | 10,20,30,40,99 |  |
| G0/1 | description Connection to Head Office Router 2 | 10,20,30,40,99 |  |

Access Switch 1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| FastEthernet0/1 | description Connection to Dist\_Switch\_1 | 10,20,30,40,99 |  |  |  |
| FastEthernet0/2 | description Connection to Dist\_Switch\_1 | allowed vlan 10,20,30,40,99  \ |  |  |  |
| Int vlan 99 |  |  |  |  |  |
|  |  |  |  |  |  |
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HO LAN Routers

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Description automatically generated

|  |  |  |  |
| --- | --- | --- | --- |
| **HO Router 1** |  |  |  |
| Int g0/1 | description to site 1 Router 2 | 172.16.0.93 | 255.255.255.252 |
| int s0/1/0 | description serial c  onnection to Site 1 Router 1 | 172.16.0.89 | 255.255.255.252 |
| Int g0/0 | Connection to dist switch 1 | n/a | n/a |
| GigabitEthernet0/1.10 | Sub interface connection for User vlan PCs | 192.168.0.2 | 255.255.254.0 |
| GigabitEthernet0/1.20 | Sub interface connection for Finance PCs | 192.168.2.4 | 255.255.254.0 |
| GigabitEthernet0/1.30 | Sub interface connection for Sales PCs | 192.168.4.4 | 255.255.254.0 |
| GigabitEthernet0/1.40 | Sub interface connection for CorpPCs | 192.168.6.10 | 255.255.254.0 |
| GigabitEthernet0/1.99 | Sub interface connection for Management | 192.168.8.10 | 255.255.254.0 |
|  |  |  |  |

**HO Router 3**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| GigabitEthernet0/1.10 | Sub interface connection for User vlan PCs |  |  |  |
| GigabitEthernet0/1.30 | Sub interface connection for Sales PCs | 192.168.4.5 | 255.255.254.0 |  |
| GigabitEthernet0/1.40 | Sub interface connection for Corp PCs | 192.168.6.11 | 255.255.254.0 |  |
| GigabitEthernet0/1.99 | Sub interface connection for Management | 192.168.8.11 | 255.255.254.0 |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Site 1 Router 1

|  |  |  |  |
| --- | --- | --- | --- |
| GigabitEthernet0/1 | 172.16.0.97 | 255.255.255.252 | description connection to switch 1 router 2 |
| S erial0/1/0 | 172.16.0.90 | 255.255.255.252 |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Site 1 Router 2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Loopback0 | 200.10.11.1 | 255.255.255.0 |  |  |
| GigabitEthernet0/0 | 172.16.0.94 | 255.255.255.252 |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Site 2 Router 1

|  |  |  |  |
| --- | --- | --- | --- |
| GigabitEthernet0/1 | 172.16.0.97 | connection to switch 1 router 2 | 255.255.255.252 |
| Serial0/1/0 | 172.16.0.90 | connection to Head Office router one | 255.255.255.252 |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Site 2 Router 1

|  |  |  |  |
| --- | --- | --- | --- |
| Serial0/0/0 | 2001:DB8:CAFE:4::1/64 | description Connection to Site-2-R2 | FE80::1 link-local |
| Serial0/1/0 | 2001:DB8:CAFE:2::1/64 | Connection to Site-2-R3 | FE80::1 link-local |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Site 2 Router 2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| GigabitEthernet0/1.10 | 2001:DB8:CAFE:6::1/64 | FE80::2 link-local | Sub interface connection for VLAN 10 |  |
| GigabitEthernet0/1.30 |  | FE80::2 link-local | Sub interface connection for VLAN 30 |  |
| GigabitEthernet0/1.40 | 2001:DB8:CAFE:7::1/64 | FE80::2 link-local | description Connection to Site 2 VLAN 40 |  |
| Serial0/0/0 | 2001:DB8:CAFE:4::2/64 |  | connection to Site 2 Router 1 |  |

Site Router 3

|  |  |  |  |
| --- | --- | --- | --- |
| GigabitEthernet0/1.10 | FE80::3 link-local | 2001:DB8:CAFE:A::1/64 | Connection to Site 1 VLAN 10 |
| GigabitEthernet0/1.20 | FE80::3 | 2001:DB8:CAFE:B::1/64 | Connection to Site 1 VLAN 20 |
|  |  |  |  |
|  |  |  |  |

Hierarchial networking model composes of an access, distribution and core level. The distribution layer aggregates data received from the access layer before sending it to the core layer to be routed. The access layer is where end devices can be found. The core layer is considered the network backbone, and is responsible for transporting traffic & connectivity. Utilizing this model helps with designing and implementing a cost effective network. In this assignment, we have implemented a two tier collapsed core design. Because our network is small and not designed for scalability, we have opted to for a collapsed core. The primary reason for using a collapsed core topology is reducing network cost. Using a herichachical model helps with modularity as the designer is able to break areas down to certain functions. In addition to this, adhering to the same workflow and topology can make expansion easier, making the network more scalable.

4

In STP Root bridge are determined based on a priority that defaults to 32768, from a scale of 0 to 61440 where 0 is the lowest and 61440 is the highest. The lower the priority is the more likely the switch is to become the root bridge. In the instance that all switches have the same priority, the root bridge is then elected based on MAC address. Again, the lower the MAC address the higher chance the switch will become root bridge. Because all switches start with a priority of 32768, this means that the the Root Bridge is determined at first by mac address. To alter the Bridge ID we can adjust the priority. The values by which we can change the priority is in increments of 4096. The following images demonstrate this method. Take note of the priority in the second screenshot, which we made 4106, as opposed to 24586. To see the commands to do this note the second screenshot. We can see that our switch has now been elected as root bridge.

A screenshot of a cell phone

Description automatically generated

A screenshot of a cell phone

Description automatically generated

6

Using portfast allows interfaces to connect to the network immediately, bypassing the listening and learning states. Ports with the portfast command enabled are activated 6 times faster than a port using spanning tree. Portfast can only be enabled on access ports, which accelerates the transition to a forwarding state. By ensuring we issue the portfast command on the appropriate interfaces we can increase the speed of our network.

7

The purpose of bpdu portfast guard is to disable all non-trunking ports from participating in the Spanning Tree Protocol process. Spanning tree can be problematic in the instance a switching loop occurs. When you apply BPDU guard on a switch, spanning tree will apply it to all portfast interfaces. When BPDU guard is enabled on the switch, STP shuts down all the portfast interfaces which helps prevent loops.

8

If you are confident with VTP it can be incredibly helpful as other devices can inherit vlans created on a single switch, as opposed to having to configure vlans manually on every single switch. VTP is a dangerous tool because vlan configs can be oeverwritten very easily. For instance, when replacing a vlan using VTP, as long as the VTP revision number is greater than the vlan being replaced revision number, thigs will be okay. If the number was lower, then this would affect other vlan configurations on the network, meaning the affected vlans would no longer work. VTP also leaves to room for human error to create a bigger mess than usual. Because of this, many industry vendors consider using vtp bad practice. In addition to this our network is reasonably small and because my VTP knowledge isn’t strong, it makes sense that we would not implement VTP on this network.

**Section 3**

5.

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Description automatically generatedA screenshot of a social media post

Description automatically generated

6

Using portfast allows interfaces to connect to the network immediately, nbypassing the listening and learning states.Ports with the portfast command enabled are activated 6 times faster than a port using spanning tree. Portfast can only be enabled on access ports which accelerates the transition to a forwarding state. By ensuring we issue the portfast command on the appropriate interfaces we can increase the speed of our network.

7

The purpose of bpdu portfast guard is to disable all non-trunking ports from participating in the Spanning Tree Protocol process. Spanning tree can be problematic in the instance a switching loop occurs. When you apply BPDU guard on a switch, spanning tree will apply it to all portfast interfaces.

6

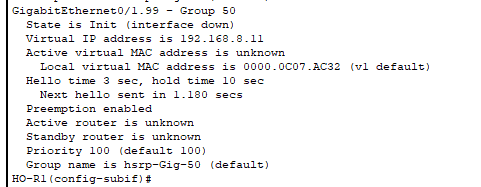
If you are confident with VTP it can be incredibly helpful as other devices can inherit vlans created on a single switch, as opposed to having to configure vlans manually on each and every switch. The danger with VTP lies in creating new vlans as a simple error could make a big mess. As long as the VTP revision number is greater than the vlan being replaced, thigs will be okay. If the number was lower, then this would affect other vlan configurations on the network, meaning the affected vlans would no longer work.VTP also leaves to room for human error to create a bigger mess than usual. Because we are working on a reasonably small network and because my VTP knowledge isn’t strong, it makes sense that we would not implement VTP on this network.

Preemption:

The way HSRSP determines active routers is with priority. The default behaviour of HSRP is that if another routers priority is altered, the active router will remain the same. This is where pre-emption comes in to fix this problem. By using prememption we can allow a device whose priority has become higher/lower to adjust their role accordingly. For example, if another router was to have a lower priority configured than the rest, through the use of pre-emption this router will become the active router.

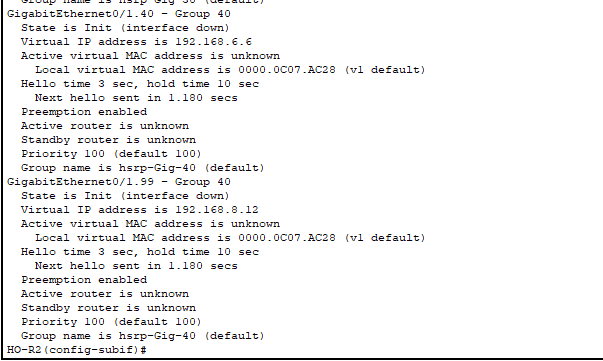
The following screnshots capture the output displaying the standby status on both of my Layer 3 distribution switches in the Head Office Site

A screenshot of a cell phone

Description automatically generated

**A screenshot of a cell phone

Description automatically generated**

****

**Describe the normal process for DR election**

The process for electing the DR and BDR is as follows: The router with the highest priority is DR and the router with the second highest priority is BDR. The default priority is 1. If both routers have the same priority, the DR is then determined by router ID. Again, the router with the highest router ID is DR and the second highest becomes bdr. If a router is created and there is no other predefined routes it will automatically come the DR. If several routers are initiated at the same time, DR delegation will take place. How the DR and BDR is elected determines on the sequence of events. To stop a router form ever becoming a DR/BDR set the priority to 0.

9A screenshot of a cell phone

Description automatically generatedA screenshot of a cell phone

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Md 5 authentication

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