**NETWORKIBG PROJECT – CAMPUS NETWORK**

A close-up of a document

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A screenshot of a computer program

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Network Design

A diagram of a network

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VLAN Configuration

|  |  |  |
| --- | --- | --- |
| Department | Network | VLAN |
| Admin | 192.168.1.0/24 | 10 |
| Business | 192.168.2.0/24 | 20 |
| HR | 192.168.3.0/24 | 30 |
| Finance | 192.168.4.0/24 | 40 |
| E&C | 192.168.5.0/24 | 50 |
| A&D | 192.168.6.0/24 | 60 |
| IT | 192.168.7.0/24 | 70 |
| Student Labs | 192.168.8.0/24 | 80 |
| Staff (Branch) | 192.168.9.0/24 | 90 |
| Student Labs (Branch) | 192.168.10.0/24 | 100 |

Router Networks

|  |  |
| --- | --- |
| Main and Branch campus | 10.10.10.0/30 |
| Main and cloud | 10.10.10.2./30 |
| Email server and cloud router | 20.0.0.0/30 |

Enable the Router Interfaces

Main Campus Router

* En
* Config t
* Int gig0/0
* No shutdown
* Int se0/2/0
* No shutdown
* Int se0/2/1
* No shutdown
* Do wr

The serial DCE cables have on e end as the DCE (identified with a clock symbol) and the other end as DTE. To allow traffic flow the interfaces connected to the DCE end must be enabled with a clock rate.

* En
* Config t
* Int se0/2/0
* Clock rate 64000
* Int 0/2/1
* clock rate 64000
* do wr
* exit

Cloud Router

* En
* Config t
* Int gig0/0
* No shutdown
* Int se0/2/0
* No shutdown
* Do wr

Branch Router

* En
* Config t
* Int gig0/0
* No shutdown
* Int se0/2/0
* No shutdown
* Do wr

Configuring VLAN on Layer 2 Switch (access layer)

Management Dept switch

* En
* Config t
* Int range fa0/2-24
* Switchport mode access
* Switchport access vlan 10
* Do wr

Business Dept Switch

* En
* Config t
* Int range fa0/2-24
* Switchport mode access
* Switchport access vlan 20
* Do wr

HR Dept Switch

* En
* Config t
* Int range fa0/2-24
* Switchport mode access
* Switchport access vlan 30
* Do wr

Finance Dept Switch

* En
* Config t
* Int range fa0/2-24
* Switchport mode access
* Switchport access vlan 40
* Do wr

E&C Dept Switch

* En
* Config t
* Int range fa0/2-24
* Switchport mode access
* Switchport access vlan 50
* Do wr

A&D Dept Switch

* En
* Config t
* Int range fa0/2-24
* Switchport mode access
* Switchport access vlan 60
* Do wr

IT Dept Switch

* En
* Config t
* Int range fa0/2-24
* Switchport mode access
* Switchport access vlan 70
* Do wr

Student labs Switch (Main Campus)

* En
* Config t
* Int range fa0/2-24
* Switchport mode access
* Switchport access vlan 80
* Do wr

Staff Dept Switch (Branch Campus)

* En
* Config t
* Int range fa0/2-24
* Switchport mode access
* Switchport access vlan 90
* Do wr

Student Labs Switch (Branch Campus)

* En
* Config t
* Int range fa0/2-24
* Switchport mode access
* Switchport access vlan 100
* Do wr

Configuring Main Campus Switch (MultiLayer Switch )

* The interface of the L3 switch connected to the L2 switch should also be in the same VLAN as the L2 switch
* En
* Config t
* Int fa0/9
* Switchport mode access
* Switchport access vlan 10
* Do wr
* Exit

Repeat the same for all other interfaces of the multilayer switch and add them to the respective vlans of the layer 2 switch

|  |  |
| --- | --- |
| Fa0/9 | 10 |
| Fa0/2 | 20 |
| Fa0/3 | 30 |
| Fa0/4 | 40 |
| Fa0/5 | 50 |
| Fa0/6 | 60 |
| Fa0/7 | 70 |
| Fa0/8 | 80 |

**Main Campus Multilayer Switch Interfaces**

|  |  |
| --- | --- |
| Fa0/2 | 90 |
| Fa0/3 | 100 |

**Branch Campus Multilayer Switch Interfaces and Vlans**

Configure IP Addresses

Main Campus Serial DCE Interfaces

* En
* Config t
* Int se0/2/0
* Ip address 10.0.0.5 255.255.255.252
* Do wr
* Exit
* Int se0/2/1
* Ip address 10.0.0.1 255.255.255.252
* Do wr
* Exit

Cloud Router Serial DCE Interfaces

* En
* Config t
* Int se0/2/0
* Ip address 10.0.0.5 255.255.255.252
* Do wr
* Exit
* Int gig0/0
* Ip address 20.0.0.1 255.255.255.252
* Do wr
* Exit

Branch Campus Serial DCE Interfaces

* En
* Config t
* Int se0/2/0
* Ip address 10.0.0.6 255.255.255.252
* Do wr
* Exit
* Int se0/2/1
* Ip address 10.0.0.2 255.255.255.252
* Do wr
* Exit

Assign IP Address to the Email Server Statically

A computer screen shot of a computer

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Configuring Inter-vlan Routing

To configure inter vlan routing we create sub interfaces on the router and assign them with an IP address corresponding to the VLAN network. This IP address acts as the gateway in to the VLAN network.

Branch Campus Router

* En
* Config t
* Int gig0/0.90
* Encapsulation dot1q 90
* Ip address 192.168.9.1 255.255.255.0
* Do wr
* Exit
* Int gig0/0.100
* Encapsulation dot1q 100
* Ip address 192.168.10.1 255.255.255.0
* Do wr
* Exit

Main Campus Router

* en
* config t
* int gig0/0.10
* encapsulation dot1q 10
* ip address 192.168.1.1 255.255.255.0
* do wr
* exit
* int gig0/0.20
* encapsulation dot1q 20
* ip address 192.168.2.1 255.255.255.0
* do wr
* exit
* int gig0/0.30
* encapsulation dot1q 30
* ip address 192.168.3.1 255.255.255.0
* do wr
* exit
* int gig0/0.40
* encapsulation dot1q 40
* ip address 192.168.4.1 255.255.255.0
* do wr
* exit
* int gig0/0.50
* encapsulation dot1q 50
* ip address 192.168.5.1 255.255.255.0
* do wr
* exit
* int gig0/0.60
* encapsulation dot1q 60
* ip address 192.168.6.1 255.255.255.0
* do wr
* exit
* int gig0/0.70
* encapsulation dot1q 70
* ip address 192.168.7.1 255.255.255.0
* do wr
* exit
* int gig0/0.80
* encapsulation dot1q 80
* ip address 192.168.8.1 255.255.255.0
* do wr
* exit

DHCP Configuration

Branch Campus

* en
* config t
* service dhcp
* ip dhcp pool staff
* network 192.168.9.0 255.255.255.0
* default router 192.168.9.1
* dns-server 192.168.9.1
* do wr
* exit
* service dhcp
* ip dhcp pool student lab(B)
* network 192.168.10.0 255.255.255.0
* default router 192.168.10.1
* dns-server 192.168.10.1
* do wr
* exit

Main Campus

* en
* config t
* service dhcp
* ip dhcp pool management
* network 192.168.1.0 255.255.255.0
* default-router 192.168.1.1
* dns-server 192.168.1.1
* do wr
* exit

Changing L3 switch to Trunk mode

Main Campus L3 switch

* en
* config t
* int fa0/1
* switchport trunk encapsulation dot1q
* switchport mode trunk
* exit
* do wr

Branch Campus Switch

* en
* config t
* int fa0/1
* switchport trunk encapsulation dot1q
* switchport mode trunk
* exit
* do wr

Implementing RIPv2

While implementing RIP v2 we need to configure the routers in such a way that all the networks associated with the router are advertised.

Branch Campus Router

* en
* config t
* router rip
* version 2
* network 192.168.9.0
* network 192.168.10.0
* network 10.0.0.0
* exit
* do wr

Main Campus Router

* en
* config t
* router rip
* version 2
* network 192.168.1.0
* network 192.168.2.0
* network 192.168.3.0
* network 192.168.4.0
* network 192.168.5.0
* network 192.168.6.0
* network 192.168.7.0
* network 192.168.8.0
* network 10.0.0.0
* network 10.0.0.4
* exit
* do wr

Cloud Router

* en
* config t
* router rip
* version 2
* network 10.0.0.4
* network 20.0.0.0
* exit
* do wr

A computer screen shot of a program

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As we can see from the above images all networks are active and the devices in each network are able to communicate with each other

A diagram of a network

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**Final Network Diagram**