Main Office Network

1. Place a ROUTER PT, a 2960 Switch and 8 PCs on the screen.
2. Connect all PCs to Switch on Fast Ethernet ports.
3. Connect Switch to Router.
4. Put every 2 PCs into a VAN network and give each PC an IP address and a gateway.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Department | Network Address | Subnet Mask | Gateway | Usable IPs |
| Admin | 192.168.0.0 | 255.255.255.128 | 192.168.0.1 | 192.168.0.2–192.168.0.126 |
| HR | 192.168.0.128 | 255.255.255.128 | 192.168.0.129 | 192.168.0.130–192.168.0.254 |
| Sales | 192.168.1.0 | 255.255.255.128 | 192.168.1.1 | 192.168.1.2–192.168.1.126 |
| IT | 192.168.1.128 | 255.255.255.128 | 192.168.1.129 | 192.168.1.130–192.168.1.254 |

**Assigned IP Addresses to PCs**

1. **Admin PCs**:
   * **PC1**: 192.168.0.8, Subnet Mask: 255.255.255.128, Gateway: 192.168.0.1
   * **PC2**: 192.168.0.10, Subnet Mask: 255.255.255.128, Gateway: 192.168.0.1
2. **HR PCs**:
   * **PC3**: 192.168.0.140, Subnet Mask: 255.255.255.128, Gateway: 192.168.0.129
   * **PC4**: 192.168.0.142, Subnet Mask: 255.255.255.128, Gateway: 192.168.0.129
3. **Sales PCs**:
   * **PC1**: 192.168.1.8, Subnet Mask: 255.255.255.128, Gateway: 192.168.1.1
   * **PC2**: 192.168.1.10, Subnet Mask: 255.255.255.128, Gateway: 192.168.1.1
4. **IT PCs**:
   * **PC3**: 192.168.1.140, Subnet Mask: 255.255.255.128, Gateway: 192.168.1.129
   * **PC4**: 192.168.1.142, Subnet Mask: 255.255.255.128, Gateway: 192.168.1.129
5. Then Configure the switch using Command Line Interface (CLI) for VLANs

Switch>enable

Switch#configure terminal

Switch(config)#vlan 10

Switch(config-vlan)#name Admin

Switch(config-vlan)#exit

Switch(config)#vlan 20

Switch(config-vlan)#name HR

Switch(config-vlan)#exit

Switch(config)#vlan 30

Switch(config-vlan)#name Sales

Switch(config-vlan)#exit

Switch(config)#vlan 40

Switch(config-vlan)#name IT

Switch(config-vlan)#exit

Switch(config)#int fa0/1

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 10

Switch(config-if)#exit

Switch(config)#int fa0/2

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 10

Switch(config-if)#exit

Switch(config)#int fa0/3

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 20

Switch(config-if)#exit

Switch(config)#int fa0/4

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 20

Switch(config-if)#exit

Switch(config)#int fa0/5

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 30

Switch(config-if)#exit

Switch(config)#int fa0/6

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 30

Switch(config-if)#exit

Switch(config)#int fa0/7

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 40

Switch(config-if)#exit

Switch(config)#int fa0/8

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 40

Switch(config-if)#exit

Switch(config)#int fa0/9

Switch(config-if)#switchport mode trunk

Switch(config-if)#exit

1. Access CLI of Router for Inter-VLAN configuration

Router>enable

Router#configure terminal

Router(config)#int fa0/0

Router(config-if)#no shutdown

Router(config-if)#exit

Router(config)#int fa0/0.10

Router(config-subif)#encapsulation dot1q 10

Router(config-subif)#ip address 192.168.0.1 255.255.255.128

Router(config-subif)#exit

Router(config)#int fa0/0.20

Router(config-subif)#encapsulation dot1q 20

Router(config-subif)#ip address 192.168.0.129 255.255.255.128

Router(config-subif)#exit

Router(config)#int fa0/0.30

Router(config-subif)#encapsulation dot1q 30

Router(config-subif)#ip address 192.168.1.1 255.255.255.128

Router(config-subif)#exit

Router(config)#int fa0/0.40

Router(config-subif)#encapsulation dot1q 40

Router(config-subif)#ip address 192.168.1.129 255.255.255.128

Router(config-subif)#exit

1. Drag a Wireless router and connect it with Main Office Router using crossover cable
2. Doble click on Wireless Router ---> Config-🡪 Internet -🡪 Choose Static

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

1. Then place 2 end devices that can access internet from public wireless router and connect then with public wifi network.
2. Now configure the connection between Main Office router and Public Wireless Router by accessing CLI on Main Office Router and run these commands.

Router#enable

Router#configure terminal

Router(config)#int fa1/0

Router(config-if)#no shutdown

Router(config-if)#ip address 192.168.3.1 255.255.255.252

**Remote Office 1 Configuration:**

1. Place a ROUTER PT, a 2960 Switch and 4 PCs on the screen.
2. Connect all PCs to Switch on Fast Ethernet ports.
3. Connect Switch to Router.
4. Put every 2 PCs for each department and give each PC an IP address and a gateway.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Department | Network Address | Subnet Mask | Gateway | Usable IPs |
| Customer Support | 192.168.2.0/26 | 255.255.255.192 | 192.168.2.1 | 192.168.2.2–192.168.2.62 |
| Marketing | 192.168.2.64/26 | 255.255.255.192 | 192.168.2.65 | 192.168.2.66–192.168.2.126 |

**Assigned IP Addresses to PCs**

1. **Customer Support PCs**:
   * **PC1**: 192.168.2.8, Subnet Mask: 255.255.255.192, Gateway: 192.168.2.1
   * **PC2**: 192.168.2.10, Subnet Mask: 255.255.255.192, Gateway: 192.168.2.1
2. **Marketing PCs**:
   1. **PC3**: 192.168.2.70, Subnet Mask: 255.255.255.192, Gateway: 192.168.2.65
   2. **PC4**: 192.168.2.72, Subnet Mask: 255.255.255.192, Gateway: 192.168.2.65
3. Configure the Branch Office 1 Router on CLI using these commands.

Router>enable

Router#configure terminal

Router(config)#hostname BranchOffice1Router

BranchOffice1Router(config)#interface FastEthernet0/0

BranchOffice1Router(config-if)#no shutdown

BranchOffice1Router(config-if)#exit

BranchOffice1Router(config)#interface FastEthernet0/0.10

BranchOffice1Router(config-subif)#encapsulation dot1Q 10

BranchOffice1Router(config-subif)#ip address 192.168.2.1 255.255.255.192

BranchOffice1Router(config-subif)#exit

BranchOffice1Router(config)#interface FastEthernet0/0.20

BranchOffice1Router(config-subif)#encapsulation dot1Q 20

BranchOffice1Router(config-subif)#ip address 192.168.2.65 255.255.255.192

BranchOffice1Router(config-subif)#exit

1. Then Configure the Branch Office 1 Switch using Command Line Interface (CLI) for VLANs

Switch>enable

Switch#configure terminal

Switch(config)#vlan 10

Switch(config-vlan)#name CustomerSupport

Switch(config-vlan)#exit

Switch(config)#vlan 20

Switch(config-vlan)#name Marketing

Switch(config-vlan)#exit

Switch(config)#interface FastEthernet0/1

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 10

Switch(config-if)#exit

Switch(config)#interface FastEthernet0/2

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 10

Switch(config-if)#exit

Switch(config)#interface FastEthernet0/3

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 20

Switch(config-if)#exit

Switch(config)#interface FastEthernet0/4

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 20

Switch(config-if)#exit

Switch(config)#interface FastEthernet0/5

Switch(config-if)#switchport mode trunk

Switch(config-if)#exit

**Remote Office 2 Configuration:**

1. Place a ROUTER PT, a 2960 Switch and 4 PCs on the screen.
2. Connect all PCs to Switch on Fast Ethernet ports.
3. Connect Switch to Router.
4. Put every 2 PCs for each department and give each PC an IP address and a gateway.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Department | Subnet Address | Subnet Mask | Gateway | Usable IPs |
| Finance | 192.168.6.0/26 | 255.255.255.192 | 192.168.6.1 | 192.168.6.2–192.168.6.62 |
| R&D | 192.168.6.64/26 | 255.255.255.192 | 192.168.6.65 | 192.168.6.66–192.168.6.126 |

**Assigned IP Addresses to PCs**

1. Finance PCs:
   1. **PC1**: 192.168.6.8, Subnet Mask: 255.255.255.192, Gateway: 192.168.6.1
   2. **PC2**: 192.168.6.10, Subnet Mask: 255.255.255.192, Gateway: 192.168.6.1
2. R & D PCs:
   1. **PC3**: 192.168.6.70, Subnet Mask: 255.255.255.192, Gateway: 192.168.6.65
   2. **PC4**: 192.168.6.72, Subnet Mask: 255.255.255.192, Gateway: 192.168.6.65
3. Configure the Branch Office 1 Router on CLI using these commands.

Router>enable

Router#configure terminal

Router(config)#hostname BranchOffice2Router

BranchOffice2Router(config)#interface FastEthernet0/0

BranchOffice2Router(config-if)#no shutdown

BranchOffice2Router(config-if)#exit

BranchOffice2Router(config)#interface FastEthernet0/0.10

BranchOffice2Router(config-subif)#encapsulation dot1Q 10

BranchOffice2Router(config-subif)#ip address 192.168.6.1 255.255.255.192

BranchOffice2Router(config-subif)#exit

BranchOffice2Router(config)#interface FastEthernet0/0.20

BranchOffice2Router(config-subif)#encapsulation dot1Q 20

BranchOffice2Router(config-subif)#ip address 192.168.6.65 255.255.255.192

BranchOffice2Router(config-subif)#exit

1. Then Configure the Branch Office 2 Switch using Command Line Interface (CLI) for VLANs

Switch>enable

Switch#configure terminal

Switch(config)#vlan 10

Switch(config-vlan)#name Finance

Switch(config-vlan)#exit

Switch(config)#vlan 20

Switch(config-vlan)#name R&D

Switch(config-vlan)#exit

Switch(config)#interface FastEthernet0/1

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 10

Switch(config-if)#exit

Switch(config)#interface FastEthernet0/2

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 10

Switch(config-if)#exit

Switch(config)#interface FastEthernet0/3

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 20

Switch(config-if)#exit

Switch(config)#interface FastEthernet0/4

Switch(config-if)#switchport mode access

Switch(config-if)#switchport access vlan 20

Switch(config-if)#exit

Switch(config)#interface FastEthernet0/5

Switch(config-if)#switchport mode trunk

Switch(config-if)#exit

**Configuring OSPF between all 3 Offices:**

1. Connect all 3 routers of 3 offices using Serial DCE Cable.
2. Configure Branch Office 2 as follows:

BranchOffice2Router>enable

BranchOffice2Router#configure terminal

BranchOffice2Router(config)#interface Serial2/0

BranchOffice2Router(config-if)#clock rate 64000

BranchOffice2Router(config-if)#ip address 10.0.0.1 255.0.0.0

BranchOffice2Router(config-if)#no shutdown

BranchOffice2Router(config-if)#exit

BranchOffice2Router(config)#interface Serial3/0

BranchOffice2Router(config-if)#no shutdown

BranchOffice2Router(config-if)#ip address 30.0.0.1 255.0.0.0

BranchOffice2Router(config-if)#clock rate 64000

BranchOffice2Router(config-if)#exit

BranchOffice2Router(config)#router ospf 1

BranchOffice2Router(config-router)#network 10.0.0.0 0.255.255.255 area 0

BranchOffice2Router(config-router)#network 30.0.0.0 0.255.255.255 area 0

BranchOffice2Router(config-router)#network 192.168.6.0 0.0.0.63 area 0

BranchOffice2Router(config-router)#network 192.168.6.64 0.0.0.63 area 0

BranchOffice2Router(config-router)#exit

1. Configure Main Office Router as follows:

Router#enable

Router#configure terminal

Router(config)#hostname MainOfficeRouter

MainOfficeRouter(config)#interface Serial2/0

MainOfficeRouter(config-if)#ip address 10.0.0.2 255.0.0.0

MainOfficeRouter(config-if)#no shutdown

(Also, here clock rate should be Not Set)

MainOfficeRouter(config-if)#exit

MainOfficeRouter(config)#interface Serial3/0

MainOfficeRouter(config-if)#no shutdown

MainOfficeRouter(config-if)#clock rate 64000

MainOfficeRouter(config-if)#ip address 20.0.0.1 255.0.0.0

MainOfficeRouter(config-if)#exit

MainOfficeRouter(config)#router ospf 1

MainOfficeRouter(config-router)#network 10.0.0.0 0.255.255.255 area 0

MainOfficeRouter(config-router)#network 20.0.0.0 0.255.255.255 area 0

MainOfficeRouter(config-router)#network 192.168.0.0 0.0.0.127 area 0

MainOfficeRouter(config-router)#network 192.168.0.128 0.0.0.127 area 0

MainOfficeRouter(config-router)#network 192.168.1.0 0.0.0.127 area 0

MainOfficeRouter(config-router)#network 192.168.1.128 0.0.0.127 area 0

MainOfficeRouter(config-router)#network 192.168.3.0 0.0.0.3 area 0

MainOfficeRouter(config-router)#network 192.168.4.0 0.0.0.255 area 0

MainOfficeRouter(config-router)#exit

1. Configure Branch Office 1 Router as follows:

BranchOffice1Router>enable

BranchOffice1Router#configure terminal

BranchOffice1Router(config)#interface Serial3/0

BranchOffice1Router(config-if)#no shutdown

BranchOffice1Router(config-if)#ip address 20.0.0.2 255.0.0.0

(Also, here clock rate should be Not Set)

BranchOffice1Router(config-if)#exit

BranchOffice1Router(config)#interface Serial2/0

BranchOffice1Router(config-if)#no shutdown

BranchOffice1Router(config-if)#ip address 30.0.0.2 255.0.0.0

(Also, here clock rate should be Not Set)

BranchOffice1Router(config-if)#exit

BranchOffice1Router(config)#router ospf 1

BranchOffice1Router(config-router)#network 20.0.0.0 0.255.255.255 area 0

BranchOffice1Router(config-router)#network 30.0.0.0 0.255.255.255 area 0

BranchOffice1Router(config-router)#network 192.168.2.0 0.0.0.63 area 0

BranchOffice1Router(config-router)#network 192.168.2.64 0.0.0.63 area 0

BranchOffice1Router(config-router)#exit