PROJECT REPORT

MAIN FACTORY BUILDING DESIGN

When starting to create the project, firstly I prepared the design of the factory building. There are 3 floors in our factory building. I placed a router and a PC on each of the 3 floors. I connected the router and PCs, I placed with the help of a cable. I also used switch to connect the routers. I named the routers according to the number of floors. (For example : First floor => R1, Second Floor => R2, Third Floor => R3). Likewise, the names of the PCs on the floors are the same as the floor numbers.(For example ; First Floor => R1--------PC1, Second Floor => R2 ------ PC2, Third Floor => R3 ------ PC3). Since at least 8 Ethernet ports are required for each of the routers, I had to configure them. I put NM-4E ethernet ports in slot0 and slot1 values for a router of its. Then I ran the console to configure the router and PC's ip settings. In order to add ip values to the ethernet ports in the router, I have applied the following operations respectively.

For Router Console Settings

I did this for R1, but the same for R2 and R3.

- **R1# conf t**
- **R1(config)# int eth 0/0**
- **R1(config-if)# ip address 192.168.1.1 255.255.255.0**
- **R1(config-if)# full-dublex**
- **R1(config-if)# no shutdown**
- **R1# wr mem**

I determined the ip values of the etherhet ports in the routers as follows.

Eth (0/0) => 192.168.1.1 (R1)

Eth (0/1) => 192.168.2.1 (R1)

Eth (0/2) => 192.168.88.2 (R1)

Eth (0/0) => 192.168.1.2 (R2)

Eth (0/1) => 192.168.3.1 (R2)

Eth (0/0) => 192.168.1.3 (R3)

Eth (0/1) => 192.168.4.1 (R3)

Se (3/0) => 192.168.92.2(R1)

For PC Console Settings

- **PC1 > ip 192.168.2.2 255.255.255.0 192.168.2.1**
- **PC1 > save**
- **PC2 > ip 192.168.3.2 255.255.255.0 192.168.3.1**
- **PC2 > save**
- **PC3 > ip 192.168.4.2 255.255.255.0 192.168.4.1**
- **PC3 > save**

Ping Test Between PCs

```
PC1> ping 192.168.3.2
84 bytes from 192.168.3.2 icmp_seq=1 ttl=62 time=63.492 ms
84 bytes from 192.168.3.2 icmp_seq=2 ttl=62 time=61.416 ms
84 bytes from 192.168.3.2 icmp_seq=3 ttl=62 time=48.794 ms
84 bytes from 192.168.3.2 icmp_seq=4 ttl=62 time=61.578 ms
84 bytes from 192.168.3.2 icmp_seq=5 ttl=62 time=61.062 ms

PC1> ping 192.168.4.2
192.168.4.2 icmp_seq=1 timeout
192.168.4.2 icmp_seq=2 timeout
84 bytes from 192.168.4.2 icmp_seq=3 ttl=62 time=63.577 ms
84 bytes from 192.168.4.2 icmp_seq=4 ttl=62 time=61.271 ms
84 bytes from 192.168.4.2 icmp_seq=5 ttl=62 time=62.268 ms

PC1> ping 192.168.4.2
84 bytes from 192.168.4.2 icmp_seq=1 ttl=62 time=61.661 ms
84 bytes from 192.168.4.2 icmp_seq=2 ttl=62 time=63.222 ms
84 bytes from 192.168.4.2 icmp_seq=3 ttl=62 time=62.404 ms
84 bytes from 192.168.4.2 icmp_seq=4 ttl=62 time=64.481 ms
84 bytes from 192.168.4.2 icmp_seq=5 ttl=62 time=61.505 ms
```

(PC1 ping test to PC2 and PC3)

```
PC2> ping 192.168.2.2
84 bytes from 192.168.2.2 icmp_seq=1 ttl=62 time=63.181 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=62 time=62.199 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=62 time=61.486 ms
84 bytes from 192.168.2.2 icmp_seq=4 ttl=62 time=63.137 ms
84 bytes from 192.168.2.2 icmp_seq=5 ttl=62 time=62.133 ms

PC2> ping 192.168.4.2
192.168.4.2 icmp_seq=1 timeout
84 bytes from 192.168.4.2 icmp_seq=2 ttl=62 time=62.022 ms
84 bytes from 192.168.4.2 icmp_seq=3 ttl=62 time=46.738 ms
84 bytes from 192.168.4.2 icmp_seq=4 ttl=62 time=63.484 ms
84 bytes from 192.168.4.2 icmp_seq=5 ttl=62 time=61.854 ms
```

(PC2 ping test to PC1 and PC3)

```
PC3> ping 192.168.2.2
192.168.2.2 icmp_seq=1 timeout
192.168.2.2 icmp_seq=2 timeout
84 bytes from 192.168.2.2 icmp_seq=3 ttl=62 time=61.123 ms
84 bytes from 192.168.2.2 icmp_seq=4 ttl=62 time=63.262 ms
84 bytes from 192.168.2.2 icmp_seq=5 ttl=62 time=62.039 ms

PC3> ping 192.168.3.2
192.168.3.2 icmp_seq=1 timeout
192.168.3.2 icmp_seq=2 timeout
84 bytes from 192.168.3.2 icmp_seq=3 ttl=62 time=45.768 ms
84 bytes from 192.168.3.2 icmp_seq=4 ttl=62 time=61.224 ms
84 bytes from 192.168.3.2 icmp_seq=5 ttl=62 time=62.263 ms
```

(PC3 ping test to PC1 and PC2)

OFFICE BUILDING DESIGN

Now I will talk about the design of the office building..There are 2 floors in our office building. I placed a router and a PC on each of the 2 floors. I connected the router and PCs, I placed with the help of a cable. I named the routers. (For example : First floor => R4, Second Floor => R5) Likewise, the PC numbers were the same as the router numbers. (For example ; First Floor => R4 PC4, Second Floor => R5 PC5). Since at least 2 Ethernet ports are required for each of the routers, I had to configure them. I put NM-4E ethernet ports in slot0 and slot1 values for a router of its. Then I ran the console to configure the router and PC's ip settings. In order to add ip values to the ethernet ports in the router, I have applied the following operations respectively. Then I connected the R4 cable to R1 and established the connection between the office and factory buildings. While doing the ping tests, I tested the PCs in the office building by pinging the PCs in the factory building.

For Router Console Settings

I did this for R4, but the same for R5.

- **R4# conf t**
- **R4(config)# int eth 0/0**
- **R4(config-if)# ip address 192.168.88.1 255.255.255.0**
- **R4(config-if)# full-dublex**
- **R4(config-if)# no shutdown**
- **R4# wr mem**

I determined the ip values of the etherhet ports in the routers as follows.

Eth (0/0) => 192.168.88.1 (R4)

Eth (0/1) => 192.168.5.1 (R4)

Eth (0/2) => 192.168.89.2 (R4)

Eth (0/0) => 192.168.89.1 (R5)

Eth (0/1) => 192.168.6.1 (R5)

Se(3/0) => 192.168.91.2 (R4)

For PC Console Settings

- **PC4 > ip 192.168.5.2 255.255.255.0 192.168.5.1**
- **PC4 > save**
- **PC5 > ip 192.168.6.2 255.255.255.0 192.168.6.1**
- **PC5 > save**

Ping Test Between PCs

```
PC4> ping 192.168.6.2
192.168.6.2 icmp_seq=1 timeout
192.168.6.2 icmp_seq=2 timeout
84 bytes from 192.168.6.2 icmp_seq=3 ttl=62 time=62.652 ms
84 bytes from 192.168.6.2 icmp_seq=4 ttl=62 time=62.847 ms
84 bytes from 192.168.6.2 icmp_seq=5 ttl=62 time=62.125 ms

PC4> ping 192.168.3.2
84 bytes from 192.168.3.2 icmp_seq=1 ttl=61 time=94.270 ms
84 bytes from 192.168.3.2 icmp_seq=2 ttl=61 time=93.033 ms
84 bytes from 192.168.3.2 icmp_seq=3 ttl=61 time=78.829 ms
84 bytes from 192.168.3.2 icmp_seq=4 ttl=61 time=93.563 ms
84 bytes from 192.168.3.2 icmp_seq=5 ttl=61 time=93.856 ms

PC4> ping 192.168.4.2
84 bytes from 192.168.4.2 icmp_seq=1 ttl=61 time=93.129 ms
84 bytes from 192.168.4.2 icmp_seq=2 ttl=61 time=78.929 ms
84 bytes from 192.168.4.2 icmp_seq=3 ttl=61 time=79.699 ms
84 bytes from 192.168.4.2 icmp_seq=4 ttl=61 time=92.964 ms
84 bytes from 192.168.4.2 icmp_seq=5 ttl=61 time=77.465 ms

PC4> ping 192.168.2.2
84 bytes from 192.168.2.2 icmp_seq=1 ttl=62 time=47.923 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=62 time=62.482 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=62 time=63.193 ms
84 bytes from 192.168.2.2 icmp_seq=4 ttl=62 time=61.993 ms
84 bytes from 192.168.2.2 icmp_seq=5 ttl=62 time=48.418 ms
```

(PC4 ping test to PC1, PC2, PC3 and PC5)

```
PC5> ping 192.168.5.2
84 bytes from 192.168.5.2 icmp_seq=1 ttl=62 time=62.655 ms
192.168.5.2 icmp_seq=2 timeout
192.168.5.2 icmp_seq=3 timeout
84 bytes from 192.168.5.2 icmp_seq=4 ttl=62 time=62.543 ms
84 bytes from 192.168.5.2 icmp_seq=5 ttl=62 time=62.485 ms

PC5> ping 192.168.4.2
192.168.4.2 icmp_seq=1 timeout
192.168.4.2 icmp_seq=2 timeout
84 bytes from 192.168.4.2 icmp_seq=3 ttl=60 time=125.505 ms
84 bytes from 192.168.4.2 icmp_seq=4 ttl=60 time=109.314 ms
84 bytes from 192.168.4.2 icmp_seq=5 ttl=60 time=125.047 ms

PC5> ping 192.168.3.2
192.168.3.2 icmp_seq=1 timeout
192.168.3.2 icmp_seq=2 timeout
84 bytes from 192.168.3.2 icmp_seq=3 ttl=60 time=94.383 ms
84 bytes from 192.168.3.2 icmp_seq=4 ttl=60 time=124.475 ms
84 bytes from 192.168.3.2 icmp_seq=5 ttl=60 time=93.260 ms

PC5> ping 192.168.2.2
192.168.2.2 icmp_seq=1 timeout
192.168.2.2 icmp_seq=2 timeout
84 bytes from 192.168.2.2 icmp_seq=3 ttl=61 time=93.595 ms
84 bytes from 192.168.2.2 icmp_seq=4 ttl=61 time=77.353 ms
84 bytes from 192.168.2.2 icmp_seq=5 ttl=61 time=77.636 ms
```

(PC5 ping test to PC1,PC2,PC3 and PC4)

BRANCH BUILDING DESIGN

And then last building is branch building. I used serial ports to communicate with the remote branch. I have defined ip addresses for the serial ports. Later, I enabled it to communicate with all PCs in the office building and factory building. I shared PC6 ping test screenshot.

For Router Console Settings

I did this for R4, but the same for R5.

- **R6# conf t**
- **R6(config)# int eth 0/0**
- **R6(config-if)# ip address 192.168.7.1 255.255.255.0**
- **R6(config-if)# full-dublex**
- **R6(config-if)# no shutdown**
- **R6# wr mem**

I determined the ip values of the etherhet ports in the routers as follows.

Eth (0/0) => 192.168.7.1(R6)

Se(2/0) => 192.168.91.1 (R6)

Se(2/1) => 192.168.92.1(R6)

```
PC6> ping 192.168.6.2
192.168.6.2 icmp_seq=1 timeout
192.168.6.2 icmp_seq=2 timeout
84 bytes from 192.168.6.2 icmp_seq=3 ttl=61 time=94.102 ms
84 bytes from 192.168.6.2 icmp_seq=4 ttl=61 time=110.507 ms
84 bytes from 192.168.6.2 icmp_seq=5 ttl=61 time=110.618 ms

PC6> ping 192.168.5.2
192.168.5.2 icmp_seq=1 timeout
192.168.5.2 icmp_seq=2 timeout
84 bytes from 192.168.5.2 icmp_seq=3 ttl=62 time=60.929 ms
84 bytes from 192.168.5.2 icmp_seq=4 ttl=62 time=48.854 ms
84 bytes from 192.168.5.2 icmp_seq=5 ttl=62 time=62.251 ms

PC6> ping 192.168.3.2
192.168.3.2 icmp_seq=1 timeout
192.168.3.2 icmp_seq=2 timeout
84 bytes from 192.168.3.2 icmp_seq=3 ttl=61 time=108.850 ms
84 bytes from 192.168.3.2 icmp_seq=4 ttl=61 time=111.355 ms
84 bytes from 192.168.3.2 icmp_seq=5 ttl=61 time=110.351 ms

PC6> ping 192.168.2.2
192.168.2.2 icmp_seq=1 timeout
192.168.2.2 icmp_seq=2 timeout
84 bytes from 192.168.2.2 icmp_seq=3 ttl=62 time=78.536 ms
84 bytes from 192.168.2.2 icmp_seq=4 ttl=62 time=47.940 ms
84 bytes from 192.168.2.2 icmp_seq=5 ttl=62 time=77.991 ms
```

(PC6 ping test to PC1,PC2,PC3,PC4,PC5)

SHOW AND CONF SCREEN SHOTS

```
interface Ethernet0/0
 ip address 192.168.1.1 255.255.255.0
 full-duplex
!
interface Ethernet0/1
 ip address 192.168.2.1 255.255.255.0
 full-duplex
!
interface Ethernet0/2
 ip address 192.168.88.2 255.255.255.0
 full-duplex
!
interface Ethernet0/3
 no ip address
 shutdown
 half-duplex
!
interface Ethernet1/0
 no ip address
 shutdown
 half-duplex
!
interface Ethernet1/1
 no ip address
 shutdown
 half-duplex
!
interface Ethernet1/2
 no ip address
 shutdown
 half-duplex
!
interface Ethernet1/3
 no ip address
 shutdown
 half-duplex
!
interface Serial3/0
 ip address 192.168.92.2 255.255.255.0
 encapsulation ppp
 compress stac
 serial restart-delay 0
 ppp quality 80
```

(R1 show conf)

```
:
interface Ethernet0/0
 ip address 192.168.7.1 255.255.255.0
 full-duplex
!
interface Serial2/0
 ip address 192.168.91.1 255.255.255.0
 encapsulation ppp
 compress stac
 serial restart-delay 0
 ppp quality 80
 ppp multilink
!
interface Serial2/1
 ip address 192.168.92.1 255.255.255.0
 encapsulation ppp
 compress stac
 serial restart-delay 0
 ppp quality 80
 ppp multilink
!
interface Serial2/2
 no ip address
 shutdown
 serial restart-delay 0
!
interface Serial2/3
 no ip address
 shutdown
 serial restart-delay 0
!
router rip
 network 192.168.7.0
 network 192.168.91.0
 network 192.168.92.0
!
no ip http server
no ip http secure-server
!
```

(R6 show conf)