

For implementing the project, At first I designed the model. Then I set network to two parts - public,private. Then I named the LAN, WAN and hosts. After that I set Ip, sub of each network and hosts both manually and dhcp. I fulfilled all number of device requirements. Then I used rip+ospf routing and at last I applied static nat.

IOS Commands:

All router manual configuration:

R1:

Router>en

Router#config t

Router(config)#int gig0/0/0

Router(config-if)#ip address 192.168.10.1 255.255.255.0

Router(config-if)#no shutdown

Router(config-if)#ex

Router(config)#int gig0/0/1

Router(config-if)#ip address 192.168.20.1 255.255.255.0

Router(config-if)#no shutdown

Router(config-if)#ex

Router(config)#int Se0/1/1

Router(config-if)#ip address 10.1.1.1 255.255.255.252

Router(config-if)#clock rate 64000

Router(config-if)#bandwidth 64

Router(config-if)#no shutdown

Router(config-if)#ex

Router(config)#ex

Router#wr

R2:

```
Router>en
Router#config t
Router(config)#int gig0/0/1
Router(config-if)#ip address 192.168.30.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#ex
Router(config)#int gig0/0/0
Router(config-if)#ip address 192.168.40.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#ex
Router(config)#int Se0/1/0
Router(config-if)#ip address 10.1.2.1 255.255.255.252
Router(config-if)#clock rate 64000
Router(config-if)#bandwidth 64
Router(config-if)#no shutdown
Router(config-if)#ex
Router(config)#ex
Router#wr
```

R3:

```
Router#config t
Router(config)#int Se0/1/1
Router(config-if)#ip address 10.1.1.2 255.255.255.252
Router(config-if)#clock rate 64000
Router(config-if)#bandwidth 64
Router(config-if)#no shutdown
```

```
Router(config-if)#ex
Router(config)#int se0/1/0
Router(config-if)#ip address 10.2.1.1 255.255.255.252
Router(config-if)#clock rate 64000
Router(config-if)#bandwidth 64
Router(config-if)#no shutdown
Router(config-if)#ex
Router(config)#int se0/2/0
Router(config-if)#ip address 10.1.2.1 255.255.255.252
Router(config-if)#clock rate 64000
Router(config-if)#bandwidth 64
Router(config-if)#no shutdown
Router(config-if)#ex
Router(config)#ex
Router#wr
```

R4:

```
Router>en
Router#config t
Router(config)#int gig0/0/0
Router(config-if)#ip address 192.168.50.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#ex
Router(config)#int gig0/0/1
Router(config-if)#ip address 192.168.60.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#ex
Router(config)#int se0/1/1
```

```
Router(config-if)#ip address 192.168.1.1 255.255.255.252
Router(config-if)#clock rate 64000
Router(config-if)#bandwidth 64
Router(config-if)#no shutdown
Router(config-if)#ex
Router(config)#ex
Router#wr
```

R5:

```
Router>en
Router#config t
Router(config)#int gig0/0/1
Router(config-if)#ip address 192.168.70.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#ex
Router(config)#int gig0/0/0
Router(config-if)#ip address 192.168.80.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#ex
Router(config)#int se0/1/0
Router(config-if)#ip address 192.168.2.1 255.255.255.252
Router(config-if)#clock rate 64000
Router(config-if)#bandwidth 64
Router(config-if)#no shutdown
Router(config-if)#ex
Router(config)#ex
Router#wr
```

R6:

Router>en

Router#config t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#int se0/1/1

Router(config-if)#ip address 192.168.1.2 255.255.255.252

Router(config-if)#clock rate 64000

Router(config-if)#bandwidth 64

Router(config-if)#no shutdown

Router(config)#int se0/2/0

Router(config-if)#ip address 192.168.2.2 255.255.255.252

Router(config-if)#clock rate 64000

Router(config-if)#bandwidth 64

Router(config-if)#no shutdown

Router(config-if)#ex

Router(config)#int se0/1/0

Router(config-if)#ip address 10.2.1.2 255.255.255.252

Router(config-if)#clock rate 64000

Router(config-if)#bandwidth 64

Router(config-if)#ex

Router(config)#ex

Router#wr

DHCP Configuration:**R1:**

Router>en

Router#config t

```
Router(config)#ip dhcp pool LAN-1
Router(dhcp-config)#network 192.168.10.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.10.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#ex
Router(config)#ip dhcp pool LAN-2
Router(dhcp-config)#network 192.168.20.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.20.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#ex
Router(config)#ip dhcp pool WAN-1
Router(dhcp-config)#network 10.1.1.0 255.255.255.252
Router(dhcp-config)#default-router 10.1.1.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#ex
Router(config)#ex
Router#wr
```

R2:

```
Router>en
Router#config t
Router(config)#ip dhcp pool LAN-3
Router(dhcp-config)#network 192.168.30.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.30.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#ex
Router(config)#ip dhcp pool LAN-4
Router(dhcp-config)#network 192.168.40.0 255.255.255.0
```

```
Router(dhcp-config)#default-router 192.168.40.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#ex
Router(config)#ip dhcp pool WAN-2
Router(dhcp-config)#network 10.10.2.0 255.255.255.252
Router(dhcp-config)#default-router 10.10.2.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#ex
Router(config)#ex
Router#wr
```

R3:

```
Router>en
Router#config t
Router(config)#ip dhcp pool WAN-1
Router(dhcp-config)#network 10.1.1.0 255.255.255.252
Router(dhcp-config)#default-router 10.1.1.2
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#ex
Router(config)#ip dhcp pool WAN-2
Router(dhcp-config)#network 10.1.2.0 255.255.255.252
Router(dhcp-config)#default-router 10.1.2.2
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#ex
Router(config)#ip dhcp pool WAN-5
Router(dhcp-config)#network 10.2.1.0 255.255.255.252
Router(dhcp-config)#default-router 10.2.1.1
Router(dhcp-config)#dns-server 8.8.8.8
```

```
Router(dhcp-config)#ex
```

```
Router(config)#ex
```

```
Router#
```

```
wr
```

R4:

```
Router>en
```

```
Router#config t
```

```
Router(config)#ip dhcp pool LAN-5
```

```
Router(dhcp-config)#network 192.168.50.0 255.255.255.0
```

```
Router(dhcp-config)#default-router 192.168.50.1
```

```
Router(dhcp-config)#dns-server 8.8.8.8
```

```
Router(dhcp-config)#ex
```

```
Router(config)#ip dhcp pool LAN-6
```

```
Router(dhcp-config)#network 192.168.60.0 255.255.255.0
```

```
Router(dhcp-config)#default-router 192.168.60.1
```

```
Router(dhcp-config)#dns-server 8.8.8.8
```

```
Router(dhcp-config)#ex
```

```
Router(config)#ip dhcp pool WAN-3
```

```
Router(dhcp-config)#network 192.168.1.0 255.255.255.252
```

```
Router(dhcp-config)#default-router 192.168.1.1
```

```
Router(dhcp-config)#dns-server 8.8.8.8
```

```
Router(dhcp-config)#ex
```

```
Router(config)#ex
```

```
Router#wr
```

R5:

```
Router>en
```


Router#config t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#ip dhcp pool LAN-7

Router(dhcp-config)#network 192.168.70.0 255.255.255.0

Router(dhcp-config)#default-router 192.168.70.1

Router(dhcp-config)#dns-server 8.8.8.8

Router(dhcp-config)#ex

Router(config)#ip dhcp pool LAN-8

Router(dhcp-config)#network 192.168.80.0 255.255.255.0

Router(dhcp-config)#default-router 192.168.80.1

Router(dhcp-config)#dns-server 8.8.8.8

Router(dhcp-config)#ex

Router(config)#ip dhcp pool WAN-4

Router(dhcp-config)#network 192.168.2.0 255.255.255.252

Router(dhcp-config)#default-router 192.168.2.1

Router(dhcp-config)#dns-server 8.8.8.8

Router(dhcp-config)#ex

Router(config)#ex

Router#

%SYS-5-CONFIG_I: Configured from console by console

wr

Building configuration...

[OK]

Router#

R6:

Router>en

Router#config t

Enter configuration commands, one per line. End with CNTL/Z.

```
Router(config)#ip dhcp pool WAN-3
Router(dhcp-config)#network 192.168.1.0 255.255.255.252
Router(dhcp-config)#default-router 192.168.1.2
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#ex
Router(config)#ip dhcp pool WAN-4
Router(dhcp-config)#network 192.168.2.0 255.255.255.252
Router(dhcp-config)#default-router 192.168.2.2
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#ex
Router(config)#ip dhcp pool WAN-5
Router(dhcp-config)#network 10.2.1.0 255.255.255.252
Router(dhcp-config)#default-router 10.2.1.2
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#ex
Router(config)#ex
Router#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
```

Dynamic Routing configuration:

R1:

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
```

```
Router(config-router)#version 2
Router(config-router)#network 192.168.10.0
Router(config-router)#network 192.168.20.0
Router(config-router)#network 10.1.1.0
Router(config-router)#ex
Router(config)#ex
Router#
```

%SYS-5-CONFIG_I: Configured from console by console

wr

Building configuration...

[OK]

R1:

```
Router>en
```

```
Router#config t
```

Enter configuration commands, one per line. End with CNTL/Z.

```
Router(config)#router ospf 10
```

```
Router(config-router)#router-id 1.1.1.1
```

```
Router(config-router)#network 192.168.10.0 0.0.0.255 area 0
```

```
Router(config-router)#network 192.168.20.0 0.0.0.255 area 0
```

```
Router(config-router)#network 10.1.1.0 0.0.0.3 area 0
```

```
Router(config-router)#ex
```

```
Router(config)#ex
```

```
Router#
```

%SYS-5-CONFIG_I: Configured from console by console

wr

Building configuration...

[OK]

R2:

Router>en

Router#config t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#router ospf 10

Router(config-router)#router-id 1.1.1.1

Router(config-router)#network 192.168.30.0 0.0.0.255 area 0

Router(config-router)#network 192.168.40.0 0.0.0.255 area 0

Router(config-router)#network 10.1.2.0 0.0.0.3 area 0

Router(config-router)#ex

Router(config)#ex

Router#

%SYS-5-CONFIG_I: Configured from console by console

wr

Building configuration...

[OK]

R2:

Router(config)#router rip

Router(config-router)#version 2

Router(config-router)#network 10.1.2.0

Router(config-router)#network 192.168.30.0

Router(config-router)#network 192.168.40.0

Router(config-router)#ex

Router(config)#ex

Router#

%SYS-5-CONFIG_I: Configured from console by console

wr

Building configuration...

[OK]

R3:

Router>en

Router#config t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#router rip

Router(config-router)#version 2

Router(config-router)#network 10.1.1.0

Router(config-router)#network 10.1.2.0

Router(config-router)#network 10.2.1.0

Router(config-router)#ex

Router(config)#ex

Router#

%SYS-5-CONFIG_I: Configured from console by console

wr

Building configuration...

[OK]

R3:

Router#config t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#router rip

Router(config-router)#version 2

Router(config-router)#network 10.1.1.0

Router(config-router)#network 10.1.2.0

Router(config-router)#network 10.2.1.0

Router(config-router)#ex

Router(config)#ex

Router#

%SYS-5-CONFIG_I: Configured from console by console

wr

Building configuration...

[OK]

R4:

Router>en

Router#config t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#router rip

Router(config-router)#version 2

Router(config-router)#network 192.168.50.0

Router(config-router)#network 192.168.60.0

Router(config-router)#network 192.168.1.0

Router(config-router)#ex

Router(config)#ex

Router#

%SYS-5-CONFIG_I: Configured from console by console

wr

Building configuration...

[OK]

R4:

Router>en

Router#config t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#router ospf 10

```
Router(config-router)#router-id 1.1.1.1
Router(config-router)#network 192.168.50.0 0.0.0.255 area 0
Router(config-router)#network 192.168.60.0 0.0.0.255 area 0
Router(config-router)#network 192.168.1.0 0.0.0.3 area 0
Router(config-router)#ex
Router(config)#ex
Router#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
```

R5:

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#network 192.168.70.0
Router(config-router)#network 192.168.80.0
Router(config-router)#network 192.168.2.0
Router(config-router)#ex
Router(config)#ex
Router#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
```

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router ospf 10
Router(config-router)#router-id 1.1.1.1
Router(config-router)#network 192.168.70.0 0.0.0.255 area 0
Router(config-router)#network 192.168.80.0 0.0.0.255 area 0
Router(config-router)#network 192.168.2.0 0.0.0.3 area 0
Router(config-router)#ex
Router(config)#ex
Router#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
```

R6:

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#network 10.2.1.0
Router(config-router)#network 192.168.1.0
Router(config-router)#network 192.168.2.0
Router(config-router)#ex
Router(config)#ex
```


Router#

%SYS-5-CONFIG_I: Configured from console by console

wr

Building configuration...

[OK]

R6:

Router>en

Router#config t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#router ospf 10

Router(config-router)#router-id 1.1.1.1

Router(config-router)#network 192.168.1.0 0.0.0.3 area 0

Router(config-router)#network 192.168.2.0 0.0.0.3 area 0

Router(config-router)#network 10.2.1.0 0.0.0.3 area 0

Router(config-router)#ex

Router(config)#ex

Router#

%SYS-5-CONFIG_I: Configured from console by console

wr

Building configuration...

[OK]

Set NAT static:

R1:

Router>en

Router#config t

Enter configuration commands, one per line. End with CNTL/Z.

```
Router(config)#int se0/1/1
Router(config-if)#ip nat inside
Router(config-if)#ex
Router(config)#int se0/2/0
Router(config-if)#ip nat inside
Router(config-if)#ex
Router(config)#int se0/1/0
Router(config-if)#ip nat outside
Router(config-if)#ex
Router(config)#ip nat inside source static 192.168.1.1 10.1.1.2
Router(config)#ex
Router#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
```

Challenges:

1. I set some network with RIP, and some With OSPF at first and it was conflicting when sending ping. Set both RIP and OSPF fix this problem.