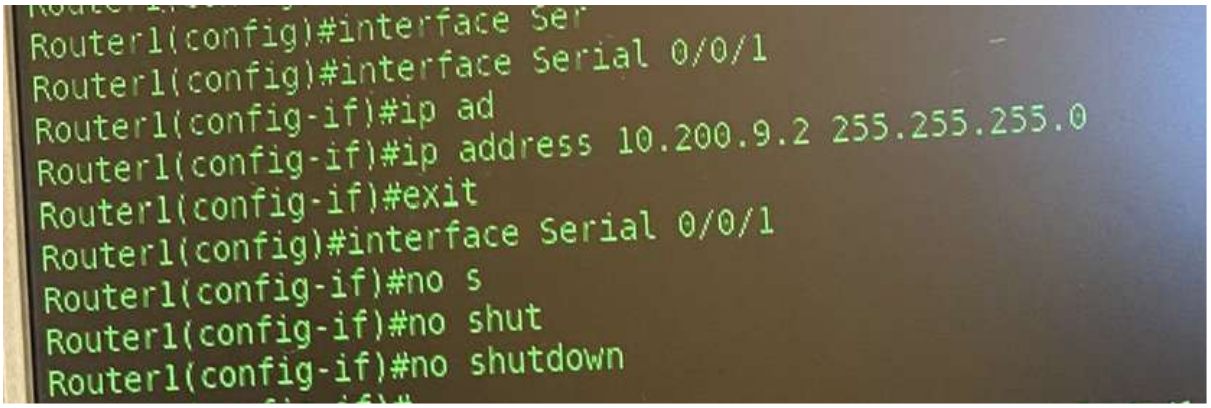
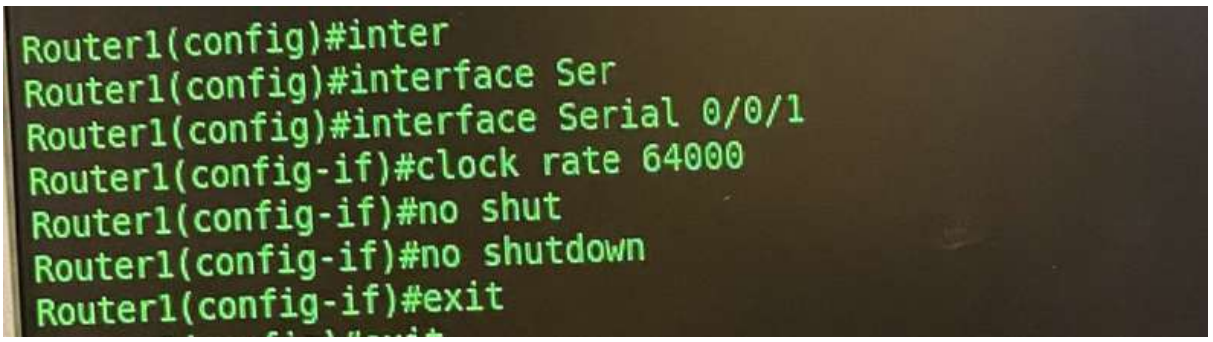
Group No: 10, 41
Name/Surname of Members: Javid Guliyev, Halil Bülke, Ahmet Eren Akbaş, Yiğit Emir İşıkçı

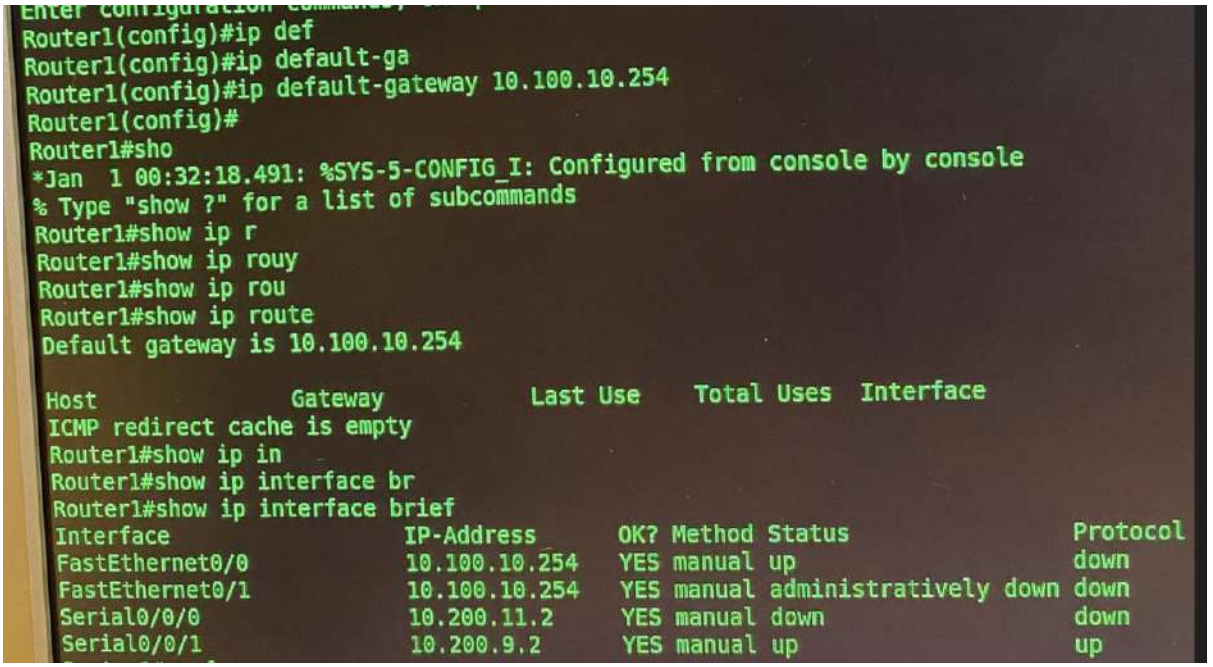
Student Number of Members:2200356863, 21945944, 21945757, 2200356028

Lab11 Dynamic Routing

Experiment Steps:
1-2-3)
Firstly, we have created the topology we have created before in Lab10







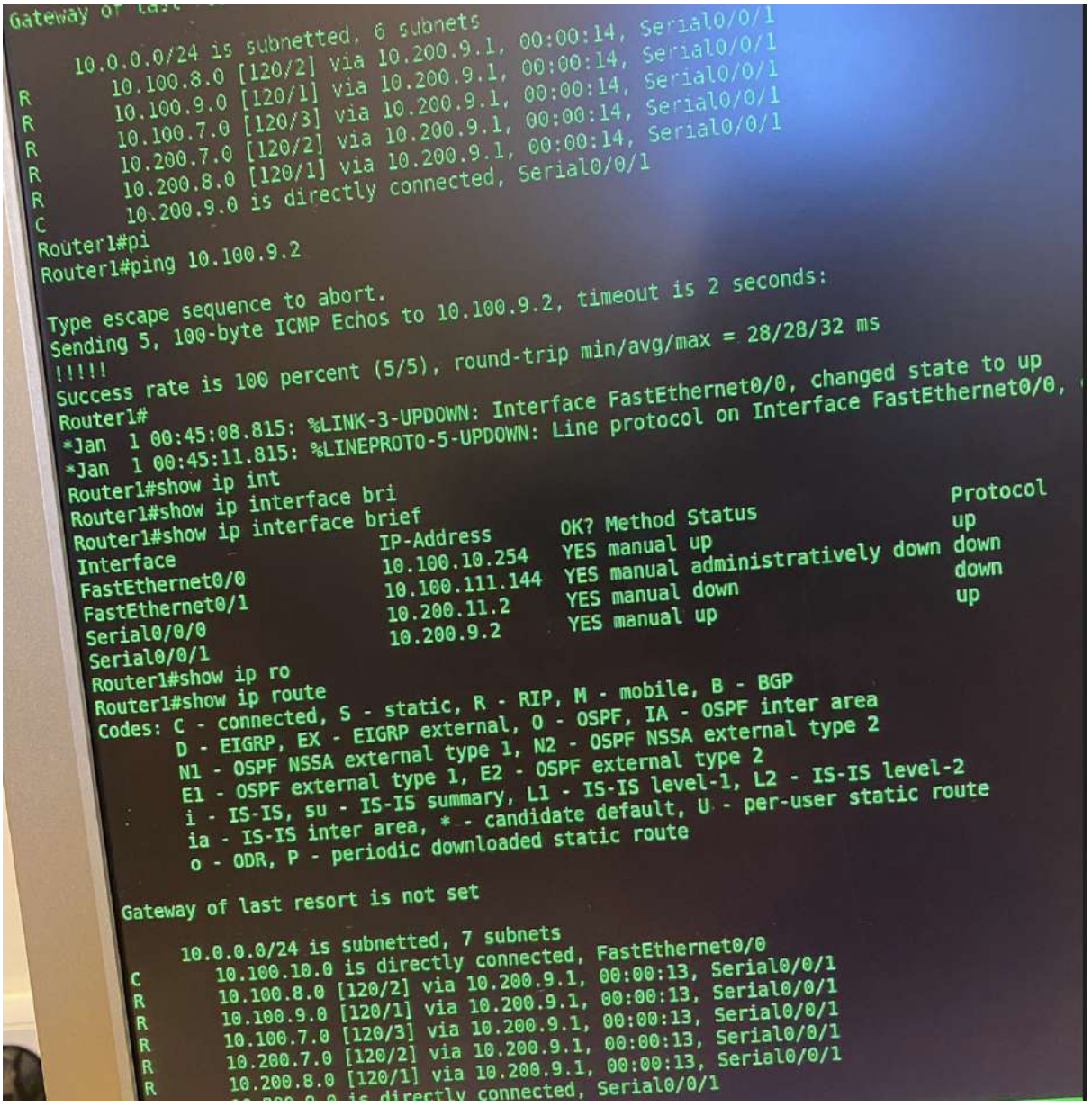
```
Router1(config)#inter
Router1(config)#interface Ser
Router1(config)#interface Serial 0/0/1
Router1(config-if)#enca
Router1(config-if)#encapsulation
% Incomplete command.

Router1(config-if)#encapsulation hd
Router1(config-if)#encapsulation hdlc
```

```
Router1#show ip interface brI
Router1#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        10.100.10.254   YES manual up                    up
FastEthernet0/1        10.100.111.144  YES manual administratively down down
Serial0/0/0            10.200.11.2     YES manual down                  down
Serial0/0/1            10.200.9.2      YES manual up                    up
Router1#show ip ro
Router1#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/24 is subnetted, 7 subnets
C       10.100.10.0 is directly connected, FastEthernet0/0
R       10.100.8.0 [120/2] via 10.200.9.1, 00:00:13, Serial0/0/1
R       10.100.9.0 [120/1] via 10.200.9.1, 00:00:13, Serial0/0/1
R       10.100.7.0 [120/3] via 10.200.9.1, 00:00:13, Serial0/0/1
R       10.200.7.0 [120/2] via 10.200.9.1, 00:00:13, Serial0/0/1
R       10.200.8.0 [120/1] via 10.200.9.1, 00:00:13, Serial0/0/1
C       10.200.9.0 is directly connected, Serial0/0/1
Router1#
```

```
Router1#show controller Ser
Router1#show controller Serial 0/0/1
Interface Serial0/0/1
Hardware is GT96K
DCE V.35, clock rate 2000000
idb at 0x62B388C8, driver data structure at 0x62B4008C
wic_info 0x62B40688
Physical Port 2, SCC Num 2
MPSC Registers:
MMCR_L=0x000304C0, MMCR_H=0x00000000, MPCR=0x00000000
CHR1=0x00FE007E, CHR2=0x00000000, CHR3=0x000005F4, CHR4=0x00000000
CHR5=0x00000000, CHR6=0x00000000, CHR7=0x00000000, CHR8=0x00000000
CHR9=0x00000000, CHR10=0x00003008
SDMA Registers:
SDC=0x00002201, SDCM=0x00000080, SGC=0x0000C000
CRDP=0x073D72E0, CTDP=0x073D74F0, FTDB=0x073D74F0
Main Routing Register=0x0003FE38 BRG Conf Register=0x00490013
Rx Clk Routing Register=0x76543818 Tx Clk Routing Register=0x76543210
GPP Registers:
```

We have assigned all interfaces (FastEthernet, Serial) described in the Lab Topology.

4) Configure RIP Protocol



We have set the RIP protocol. Then we sent ping to 10.100.9.2. You can see our ip interfaces.

5) Remove RIP configuration and configure OSPF protocol.

```
Router1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router1(config)#no router rip
Router1(config)#router ospf 1
Router1(config-router)#network 10.0.0.0 255.255.255.0 area 1
Router1(config-router)#
                        9600 8N1 | NOR | Minicom 2.2 | VT102 |
```

```
--- 10.100.9.2 ping statistics ---
4 packets transmitted, 0 received, +3 errors, 100% packet loss, time 2999m
, pipe 3
[root@localhost ~]# ping 10.100.9.2
PING 10.100.9.2 (10.100.9.2) 56(84) bytes of data.
64 bytes from 10.100.9.2: icmp_seq=1 ttl=62 time=25.9 ms
64 bytes from 10.100.9.2: icmp_seq=2 ttl=62 time=23.7 ms
64 bytes from 10.100.9.2: icmp_seq=3 ttl=62 time=24.0 ms
^C
--- 10.100.9.2 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2001ms
rtt min/avg/max/mdev = 23.792/24.597/25.962/0.986 ms
[root@localhost ~]#
```

```
Router1#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/24 is subnetted, 2 subnets
C       10.100.10.0 is directly connected, FastEthernet0/0
C       10.200.9.0 is directly connected, Serial0/0/1
```

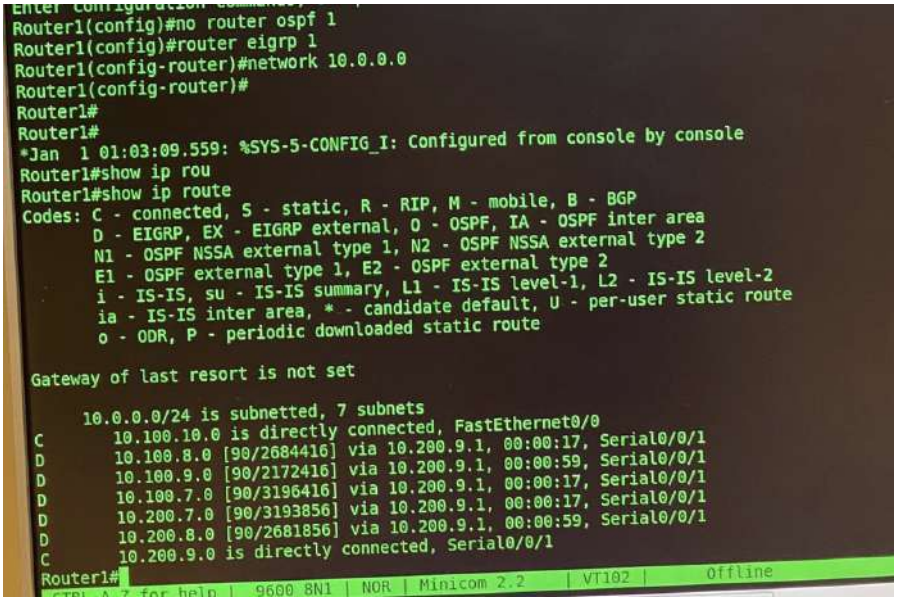
Here, we firstly tried this protocol with area 1. However it did not work as we want. We could send ping to just 10.100.9.2 2 which is connected as C. Then, we tried it again with area 0.

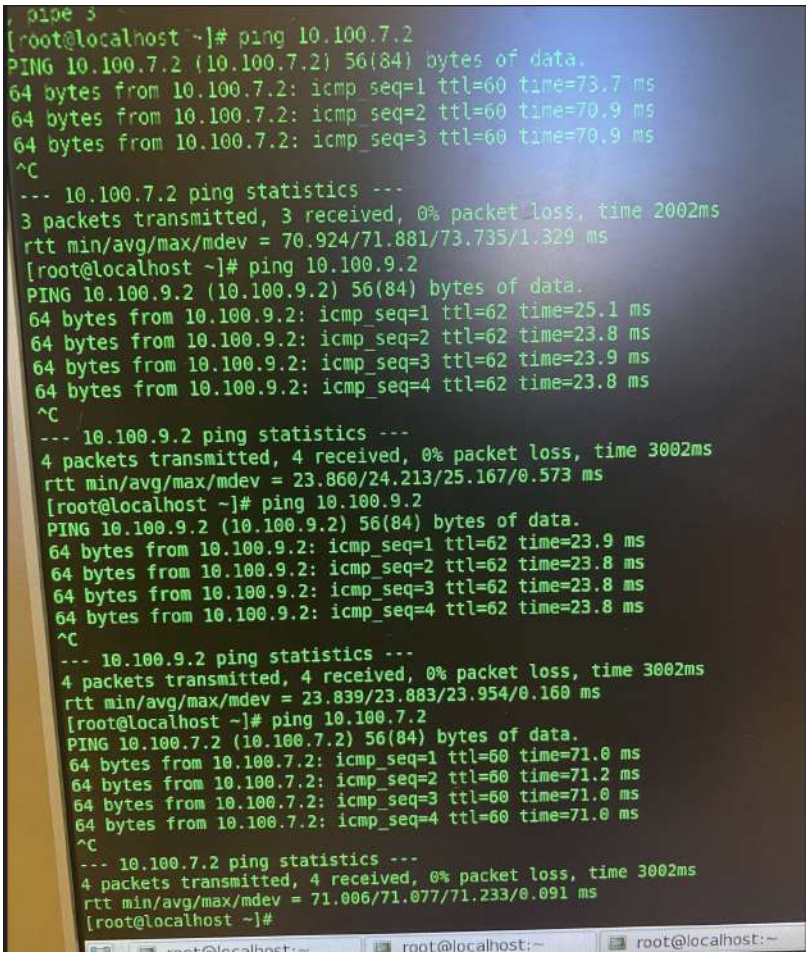
```
Router1(config)#router ospf 1
Router1(config-router)#network 10.0.0.0 0.255.255.255 area 0
Router1(config-router)#
```

```
Router1#
*Jan  1 00:59:54.299: %OSPF-5-ADJCHG: Process 1, Nbr 10.200.9.1 on Serial0/0/1 from LOADING to FULL, Lo
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/24 is subnetted, 7 subnets
C       10.100.10.0 is directly connected, FastEthernet0/0
O       10.100.8.0 [110/129] via 10.200.9.1, 00:01:15, Serial0/0/1
O       10.100.9.0 [110/65] via 10.200.9.1, 00:01:15, Serial0/0/1
O       10.100.7.0 [110/193] via 10.200.9.1, 00:01:15, Serial0/0/1
O       10.200.7.0 [110/192] via 10.200.9.1, 00:01:15, Serial0/0/1
O       10.200.8.0 [110/128] via 10.200.9.1, 00:01:15, Serial0/0/1
C       10.200.9.0 is directly connected, Serial0/0/1
                                                    Offline
```

And we could send ping to other remote computers. Since we forgot to take a screenshot of pings i could not add here.

6) Remove OSPF configuration and configure EIGRP protocol.





We could send pings to 10.100.9.2 and 10.100.7.2. You can see the ip route table.

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Lab12 NAT

Experiment Steps:

1- Basic Router Configurations

```
Router1(config)#enable password cisco
The enable password you have chosen is the same as your enable secret.
This is not recommended.  Re-enter the enable password.

Router1(config)#line vty 0 4
Router1(config-line)#password ciscot
Router1(config-line)#login
Router1(config-line)#end
```

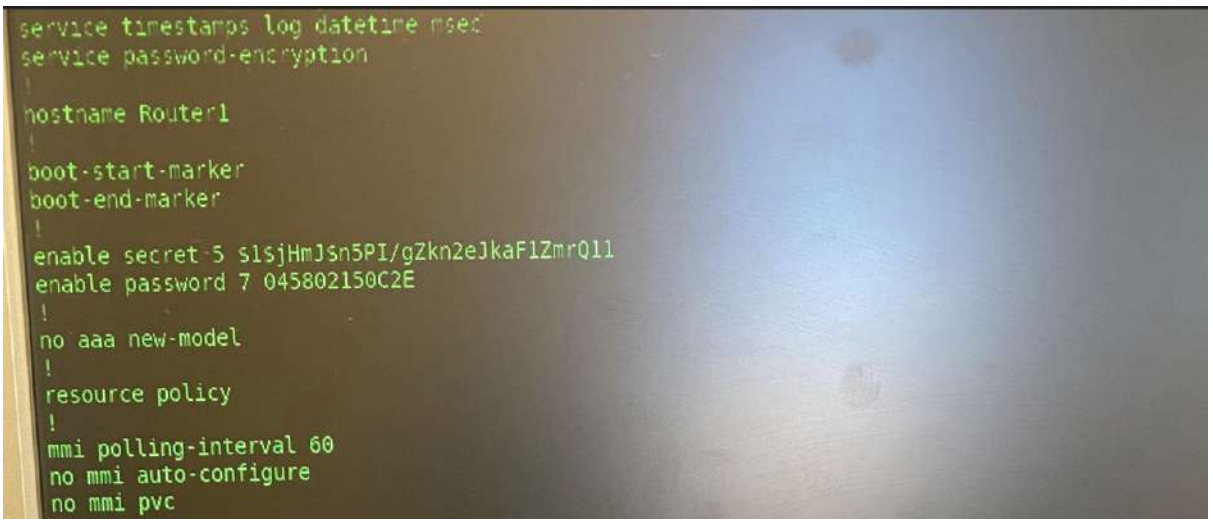
In our running-config, we can see that our password is visible.

```
Router1#show running-config
Building configuration...

Current configuration : 1003 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Router1
!
boot-start-marker
boot-end-marker
!
enable secret 5 $1$jHmJ$n5PI/gZkn2eJkaF1ZmrQ11
enable password cisco
!
no aaa new-model
!
resource policy
!
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
ip subnet-zero
ip cef
!
!
no ip dhcp use vrf connected
!
!
!
!
!
interface FastEthernet0/0
 ip address 10.100.10.254 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 ip address 10.100.111.144 255.255.255.0
 shutdown
 duplex auto
 speed auto
!
interface Serial0/0/0
```

```
line con 0
line aux 0
line vty 0 4
 password ciscot
 login
!
end

Router1#
```

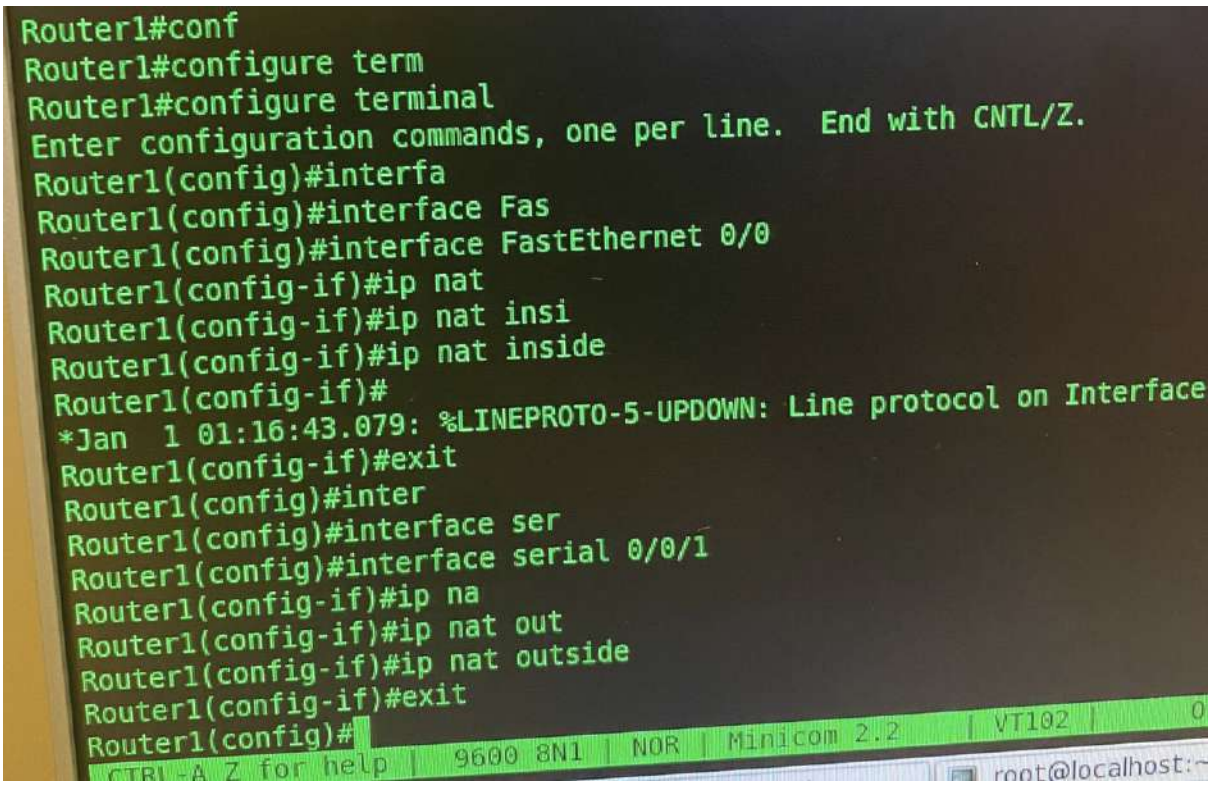
Then, we have configured password encryption.

```
Router1#disable
Router1>enable
Password:
Router1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router1(config)#service password-encryption
Router1(config)#show running-config
                ^
% Invalid input detected at '^' marker.

Router1(config)#^Z
Router1#
*Jan  1 01:14:35.571: %SYS-5-CONFIG_I: Configured from console by console
Router1#show running-config
Building configuration...

Current configuration : 1019 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
!
hostname Router1
!
boot-start-marker
boot-end-marker
!
enable secret 5 $1$jHmJ$n5PI/gZkn2eJkaF1ZmrQ11
enable password 7 045802150C2E
!
no aaa new-model
!
resource policy
!
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
 --More--
CTRL-A Z for help | 9600 8N1 | NOR | Minicom 2.2 | VT102 | Offline
```



The password is encrypted here.

2- Router NAT Configurations

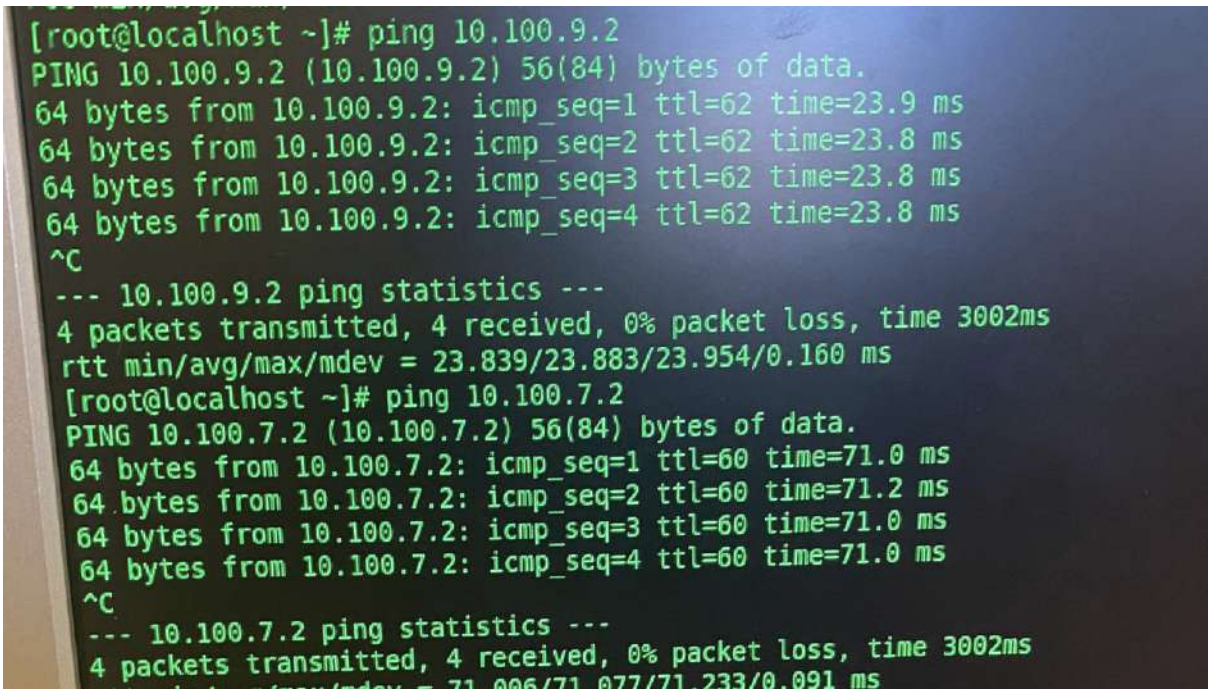


2- Dynamic NAT Configurations

```
Router1(config-if)#exit
Router1(config)#ip nat pool pool10 10.100.10.99 10.100.10.99 netmask 255.255.2$
Router1(config)#acc
Router1(config)#access-list 10 perm
Router1(config)#access-list 10 permit 10.100.10.0 0.0.0.255
Router1(config)#ip nat ins
Router1(config)#ip nat inside source list 10 pool pool10 overload
Router1(config)#
```

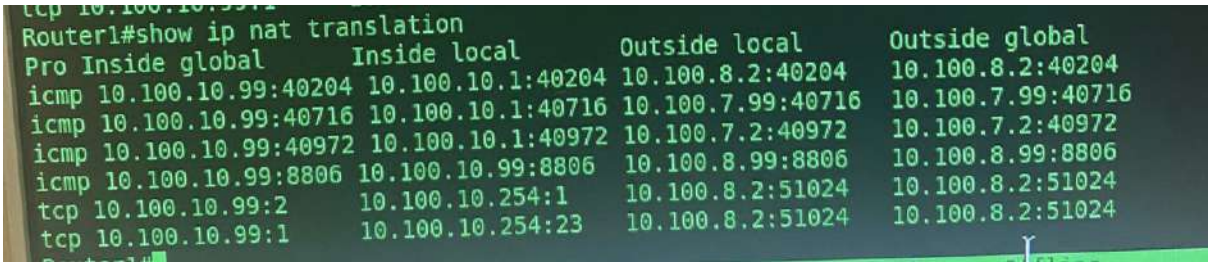
After we have configured nat, we tried to send ping.

```
[root@localhost ~]# ping 10.100.7.99
PING 10.100.7.99 (10.100.7.99) 56(84) bytes of data.
64 bytes from 10.100.7.99: icmp_seq=1 ttl=252 time=72.5 ms
64 bytes from 10.100.7.99: icmp_seq=2 ttl=252 time=72.1 ms
64 bytes from 10.100.7.99: icmp_seq=3 ttl=252 time=71.9 ms
64 bytes from 10.100.7.99: icmp_seq=4 ttl=252 time=71.7 ms
64 bytes from 10.100.7.99: icmp_seq=5 ttl=252 time=71.8 ms
^C
--- 10.100.7.99 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4004ms
rtt min/avg/max/mdev = 71.724/72.047/72.542/0.406 ms
[root@localhost ~]# ping 10.100.9.99
PING 10.100.9.99 (10.100.9.99) 56(84) bytes of data.
64 bytes from 10.100.9.99: icmp_seq=1 ttl=62 time=24.5 ms
64 bytes from 10.100.9.99: icmp_seq=2 ttl=62 time=24.2 ms
64 bytes from 10.100.9.99: icmp_seq=3 ttl=62 time=24.1 ms
64 bytes from 10.100.9.99: icmp_seq=4 ttl=62 time=24.2 ms
^C
--- 10.100.9.99 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3003ms
rtt min/avg/max/mdev = 24.194/24.301/24.521/0.169 ms
[root@localhost ~]# ping 10.100.8.99
PING 10.100.8.99 (10.100.8.99) 56(84) bytes of data.
64 bytes from 10.100.8.99: icmp_seq=1 ttl=61 time=48.2 ms
64 bytes from 10.100.8.99: icmp_seq=2 ttl=61 time=47.8 ms
64 bytes from 10.100.8.99: icmp_seq=3 ttl=61 time=47.9 ms
64 bytes from 10.100.8.99: icmp_seq=4 ttl=61 time=47.8 ms
^C
--- 10.100.8.99 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3003ms
rtt min/avg/max/mdev = 47.836/47.970/48.270/0.175 ms
[root@localhost ~]# ping 10.100.7.99
PING 10.100.7.99 (10.100.7.99) 56(84) bytes of data.
64 bytes from 10.100.7.99: icmp_seq=1 ttl=252 time=72.0 ms
64 bytes from 10.100.7.99: icmp_seq=2 ttl=252 time=88.0 ms
64 bytes from 10.100.7.99: icmp_seq=3 ttl=252 time=71.9 ms
64 bytes from 10.100.7.99: icmp_seq=4 ttl=252 time=72.0 ms
^C
--- 10.100.7.99 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3002ms
rtt min/avg/max/mdev = 71.990/76.030/88.049/6.939 ms
```



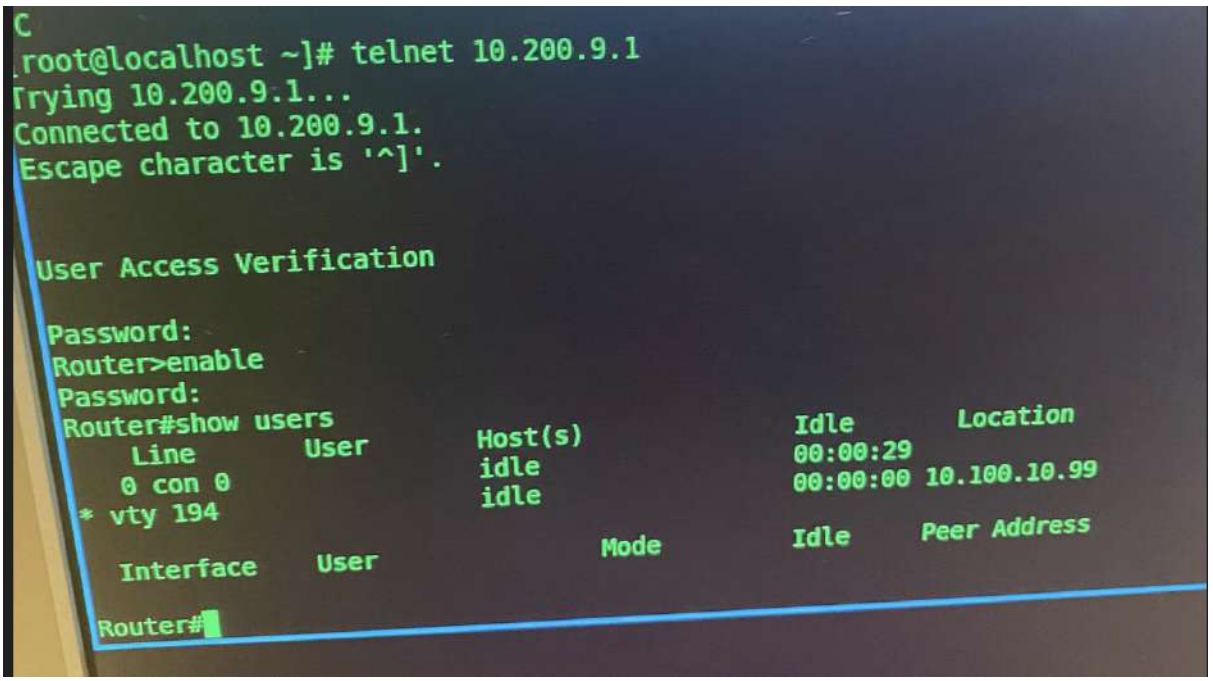
We sent pings to 10.100.9.99, 10.100.8.99, 10.100.7.99 and 10.100.9.2, 10.100.7.2. Both was successful.

3- NAT Table

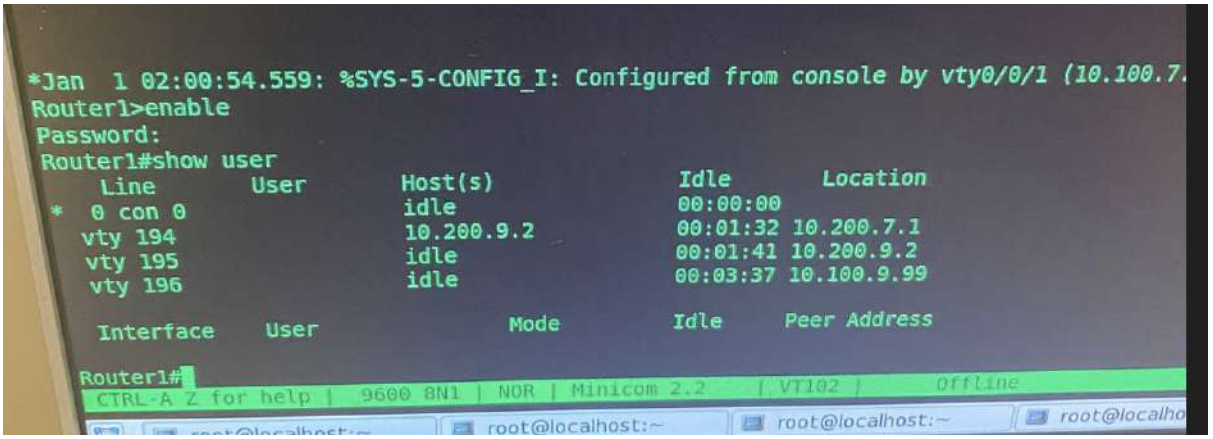


This is our nat translation table. Inside local ip addresses are our actual (private) ip addresses. Inside global ip addresses represents local inside devices to an outside network. that address is routable on the internet. Outside local ip addresses are how the inside devices see the outside device.And finally outside globals are the actual routable IP address of the outside device. It is the address assigned by the device's owner, and is routable on the internet.

4- Telnet



We connected to 10.200.9.1 and we entered show users command. We can see that only us using this router.



This is our router. We can see that 3 users from 2 groups are using our router.