

Practical No. 3

Aim:

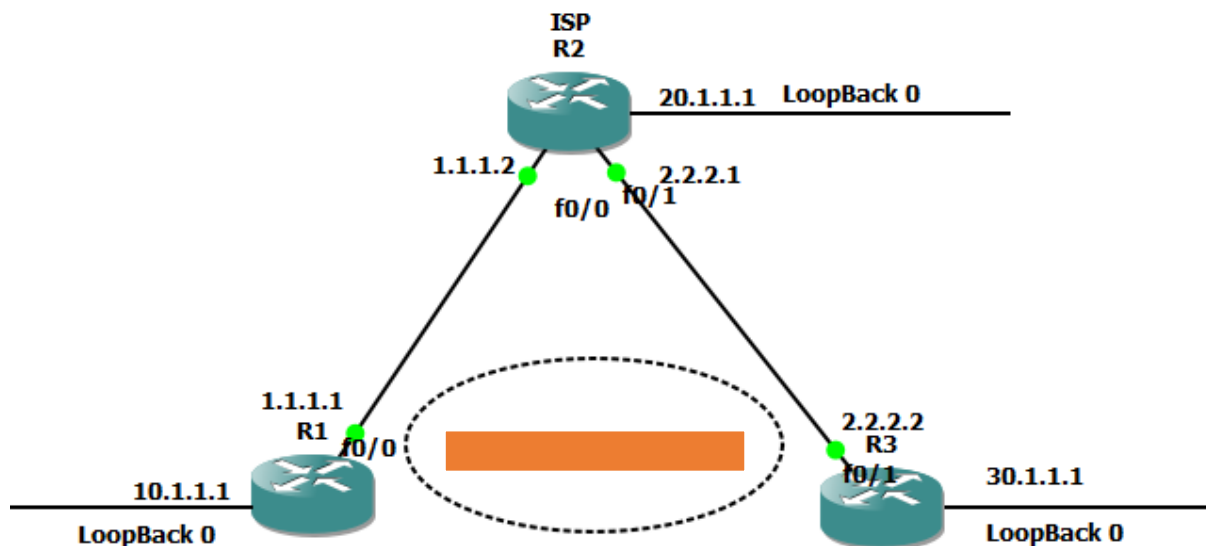
1. Implement a GRE Tunnel
2. Implement VTP
3. Implement NAT

3.1 Implement a GRE Tunnel:

What is GRE Tunnelling?

Generic Routing Encapsulation, or GRE, is a protocol for encapsulating data packets that use one routing protocol inside the packets of another protocol. "Encapsulating" means wrapping one data packet within another data packet, like putting a box inside another box. GRE is one way to set up a direct point-to-point connection across a network, for the purpose of simplifying connections between separate networks. It works with a variety of network layer protocols. Encapsulating packets within other packets is called "tunnelling." GRE tunnels are usually configured between two routers, with each router acting like one end of the tunnel. The routers are set up to send and receive GRE packets directly to each other. Any routers in between those two routers will not open the encapsulated packets; they only reference the headers surrounding the encapsulated packets in order to forward them.

Step 1: Design the Topology.



Step 2: Configure the System.

- **R1:**

```
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface fastEthernet 0/0
R1(config-if)#ip addr 1.1.1.1 255.0.0.0
R1(config-if)#no shut
R1(config-if)#exit
*Mar 1 00:07:52.019: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar 1 00:07:53.019: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R1(config-if)#exit
R1(config)#interface loopback 0
R1(config-if)#ip addr 10.1.1.1 255.255.255.255
R1(config-if)#no shut
R1(config-if)#exit
R1(config)#
*Mar 1 00:08:07.683: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up
R1(config)#
```

- **R2:**

```
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#hostname ISP
ISP(config)#interface fastEthernet 0/0
ISP(config-if)#ip addr 1.1.1.2 255.0.0.0
ISP(config-if)#no shut
ISP(config-if)#exit
ISP(config)#
*Mar 1 00:10:20.751: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar 1 00:10:21.751: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
ISP(config)#interface fastEthernet 0/1
ISP(config-if)#ip addr 2.2.2.1 255.0.0.0
ISP(config-if)#no shut
ISP(config-if)#exit
ISP(config)#
*Mar 1 00:10:34.275: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
*Mar 1 00:10:35.275: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
```

```
ISP(config)#interface loopback 0
ISP(config-if)#ip addr 20.1.1.1 255.255.255.255
ISP(config-if)#no shut
ISP(config-if)#exit
```

- **R3:**

```
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#interface fastEthernet 0/1
R3(config-if)#ip addr 2.2.2.2 255.0.0.0
R3(config-if)#no shut
R3(config-if)#exit
R3(config)#
*Mar 1 00:12:06.907: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
*Mar 1 00:12:07.907: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
R3(config)#interface loopback 0
R3(config-if)#ip addr 30.1.1.1 255.255.255.255
R3(config-if)#no shut
R3(config-if)#exit
R3(config)#
*Mar 1 00:12:23.975: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up
R3(config)#
```

Step 3: Check the connection between R1, ISP, R3.

```
ISP#ping 1.1.1.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 1.1.1.1, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 24/31/36 ms
ISP#ping 2.2.2.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.2.2.2, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 28/32/40 ms
ISP#
```

Step 4: Create the GRE Tunnel.

- **R1:**

```
R1(config)#int tunnel 1
R1(config-if)#tunnel source fastEthernet 0/0
R1(config-if)#tunnel destination 2.2.2.2
R1(config-if)#ip addr 192.168.13.1 255.255.255.0
R1(config-if)#no shut
R1(config-if)#end
R1#
```

```
R1#sh ip int br
Interface                IP-Address      OK? Method Status      Protocol
FastEthernet0/0          1.1.1.1         YES manual up          up
FastEthernet0/1          unassigned      YES unset  administratively down down
Serial1/0                 unassigned      YES unset  administratively down down
Serial1/1                 unassigned      YES unset  administratively down down
Serial1/2                 unassigned      YES unset  administratively down down
Serial1/3                 unassigned      YES unset  administratively down down
Serial2/0                 unassigned      YES unset  administratively down down
Serial2/1                 unassigned      YES unset  administratively down down
Serial2/2                 unassigned      YES unset  administratively down down
Serial2/3                 unassigned      YES unset  administratively down down
Loopback0                 10.1.1.1        YES manual up          up
Tunnel1                   192.168.13.1    YES manual up          down
R1#
```

- **R3:**

```
R3(config)#int tunnel 1
R3(config-if)#tunnel source fastEthernet 0/1
R3(config-if)#tunnel destination 1.1.1.1
R3(config-if)#ip addr 192.168.13.2 255.255.255.0
R3(config-if)#no shut
R3(config-if)#end
R3#
*Mar  1 00:24:02.883: %LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel1, changed state to down
*Mar  1 00:24:03.583: %SYS-5-CONFIG_I: Configured from console by console
R3#
```

```
R3#sh ip int br
Interface                IP-Address      OK? Method Status        Protocol
FastEthernet0/0          unassigned      YES unset  administratively down down
FastEthernet0/1          2.2.2.2         YES manual    up            up
Serial1/0                 unassigned      YES unset  administratively down down
Serial1/1                 unassigned      YES unset  administratively down down
Serial1/2                 unassigned      YES unset  administratively down down
Serial1/3                 unassigned      YES unset  administratively down down
Serial2/0                 unassigned      YES unset  administratively down down
Serial2/1                 unassigned      YES unset  administratively down down
Serial2/2                 unassigned      YES unset  administratively down down
Serial2/3                 unassigned      YES unset  administratively down down
Loopback0                 30.1.1.1        YES manual    up            up
Tunnel1                  192.168.13.2    YES manual    up            down
R3#
```

Step 5: Assign a Static Route for R1 & R3.

- **R1:**

```
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip route 2.0.0.0 255.0.0.0 1.1.1.2
R1(config)#end
R1#
*Mar  1 00:26:37.851: %SYS-5-CONFIG_I: Configured from console by console
R1#
*Mar  1 00:26:41.379: %LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel1,
```

- **R3:**

```
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#ip route 1.0.0.0 255.0.0.0 2.2.2.1
R3(config)#end
R3#
*Mar  1 00:26:47.747: %SYS-5-CONFIG_I: Configured from console by console
R3#
*Mar  1 00:26:52.875: %LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel1,
R3#
```

Step 6: Check whether the tunnel works.

```
R1#ping 192.168.13.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.13.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 52/65/76 ms
R1#
```

```
R3#ping 192.168.13.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.13.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 56/62/68 ms
R3#
```

Step 7: Configure EIGRP for R1 & R3.

- **R1:**

```
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router eigrp 1
R1(config-router)#network 10.0.0.0
R1(config-router)#network 192.168.13.0
R1(config-router)#no auto-summary
R1(config-router)#end
R1#
*Mar  1 00:31:32.283: %SYS-5-CONFIG_I: Configured from console by console
R1#
*Mar  1 00:31:42.195: %DUAL-5-NBRCHANGE: IP-EIGRP(0) 1: Neighbor 192.168.13.2 (Tunnel1) is up: new adjacency
```

- **R3:**

```
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router eigrp 1
R3(config-router)#network 30.0.0.0
R3(config-router)#network 192.168.13.0
R3(config-router)#no auto-summary
R3(config-router)#end
R3#
*Mar  1 00:31:39.223: %DUAL-5-NBRCHANGE: IP-EIGRP(0) 1: Neighbor 192.168.13.1 (Tunnel1) is up: new adjacency
R3#
*Mar  1 00:31:40.223: %SYS-5-CONFIG_I: Configured from console by console
```

Step 8: Check whether EIGRP is configured for R1 & R3.

- **R1:**

```
R1#sh 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

C    1.0.0.0/8 is directly connected, FastEthernet0/0
C    192.168.13.0/24 is directly connected, Tunnel1
S    2.0.0.0/8 [1/0] via 1.1.1.2
     10.0.0.0/32 is subnetted, 1 subnets
C      10.1.1.1 is directly connected, Loopback0
     30.0.0.0/32 is subnetted, 1 subnets
D      30.1.1.1 [90/297372416] via 192.168.13.2, 00:01:13, Tunnel1
```

- **R3:**

```
R3#sh 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

S    1.0.0.0/8 [1/0] via 2.2.2.1
C    192.168.13.0/24 is directly connected, Tunnel1
C    2.0.0.0/8 is directly connected, FastEthernet0/1
     10.0.0.0/32 is subnetted, 1 subnets
D      10.1.1.1 [90/297372416] via 192.168.13.1, 00:01:47, Tunnel1
     30.0.0.0/32 is subnetted, 1 subnets
C      30.1.1.1 is directly connected, Loopback0
```

Step 9: To set MTU as the GRE Head.

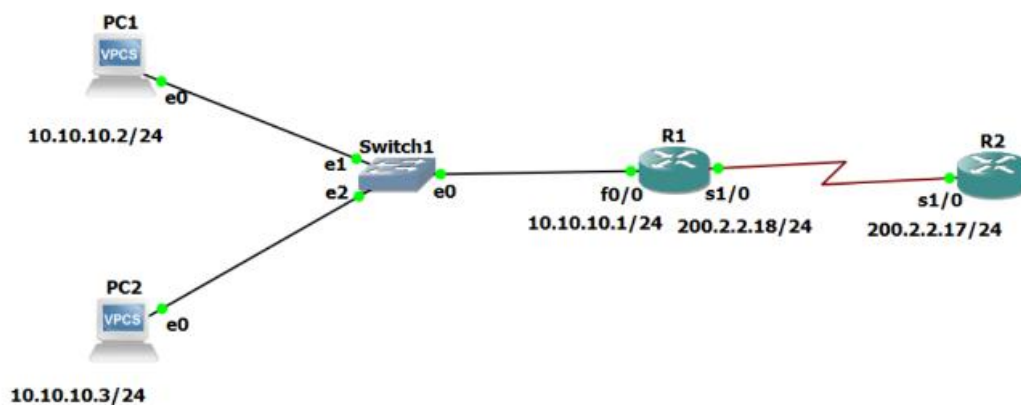
```
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#interface tunnel 1
R1(config-if)#ip mtu 1300
R1(config-if)#ip tcp adjust-mss 1360
R1(config-if)#end
R1#
*Mar  1 00:36:00.959: %SYS-5-CONFIG_I: Configured from console by console
```

3.2 Implement NAT:

What is NAT?

Network Address Translation (NAT) is a process in which one or more local IP address is translated into one or more Global IP address and vice versa in order to provide Internet access to the local hosts. Also, it does the translation of port numbers i.e. masks the port number of the host with another port number, in the packet that will be routed to the destination. It then makes the corresponding entries of IP address and port number in the NAT table. NAT generally operates on a router or firewall.

Step 1: Design the Topology. Use c7200 Router IOS



Step 2: Configure the network.

- **R1(gateway):**

```
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#hostname Gateway
Gateway(config)#int se 1/0
Gateway(config-if)#ip addr 200.2.2.18 255.255.255.252
Gateway(config-if)#no shut
Gateway(config-if)#end
Gateway#
*Oct 22 13:22:49.375: %SYS-5-CONFIG_I: Configured from console by console
Gateway#
*Oct 22 13:22:49.691: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up
Gateway#
*Oct 22 13:22:50.695: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0, changed state to up
Gateway#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Gateway(config)#interface fastEthernet 0/0
Gateway(config-if)#ip addr 10.10.10.1 255.255.255.0
Gateway(config-if)#no shut
Gateway(config-if)#exit
Gateway(config)#
*Oct 22 13:23:01.407: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Oct 22 13:23:02.407: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
Gateway(config)#
```

- **R2(ISP):**

```
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#hostname ISP
ISP(config)#int se 1/0
ISP(config-if)#ip addr 200.2.2.17 255.255.255.252
ISP(config-if)#no shut
ISP(config-if)#end
ISP#
*Oct 22 13:23:47.091: %SYS-5-CONFIG_I: Configured from console by console
ISP#
*Oct 22 13:23:47.843: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up
ISP#
*Oct 22 13:23:48.851: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0, changed state to up
ISP#conf t
Enter configuration commands, one per line. End with CNTL/Z.
ISP(config)#interface loopback 0
ISP(config-if)#ip addr 17.16.1.1 255.255.255.255
ISP(config-if)#no shut
ISP(config-if)#exit
ISP(config)#
*Oct 22 13:23:57.547: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up
```

- **PC1:**

```
PC1> ip 10.10.10.2 255.255.255.0 10.10.10.1
Checking for duplicate address...
PC1 : 10.10.10.2 255.255.255.0 gateway 10.10.10.1

PC1> sh ip

NAME       : PC1[1]
IP/MASK    : 10.10.10.2/24
GATEWAY    : 10.10.10.1
DNS        :
MAC        : 00:50:79:66:68:00
LPORT      : 10014
RHOST:PORT : 127.0.0.1:10015
MTU        : 1500
```

- **PC2:**

```
PC2> ip 10.10.10.3 255.255.255.0 10.10.10.1
Checking for duplicate address...
PC2 : 10.10.10.3 255.255.255.0 gateway 10.10.10.1

PC2> sh ip

NAME       : PC2[1]
IP/MASK    : 10.10.10.3/24
GATEWAY    : 10.10.10.1
DNS        :
MAC        : 00:50:79:66:68:01
LPORT      : 10016
RHOST:PORT : 127.0.0.1:10017
MTU        : 1500
```


Step 3: Create a Static Route.

```
ISP#conf t
Enter configuration commands, one per line. End with CNTL/Z.
ISP(config)#ip route 199.99.9.32 255.255.255.224 200.2.2.18
ISP(config)#end
ISP#
*Oct 22 13:27:52.783: %SYS-5-CONFIG_I: Configured from console by console
```

Step 4: Create a Default Route.

```
Gateway#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Gateway(config)#ip route 0.0.0.0 0.0.0.0 200.2.2.17
Gateway(config)#end
Gateway#
*Oct 22 13:29:22.351: %SYS-5-CONFIG_I: Configured from console by console
Gateway#
```

Step 5: Make a pool of IP Address which can be used as Public IP Address:

Run the command: `ip nat pool public-access 199.99.9.32 199.99.9.35 netmask 255.255.255.252`

```
Gateway(config)#$ccess 199.99.9.40 199.99.9.35 netmask 255.255.255.252
%End address less than start address
```

Step 6: Make an access list that will map the public IP addresses to the inside private IP addresses and define the NAT translation from inside list to outside pool.

```
Gateway(config)#access-list 1 permit 10.10.10.0 0.0.0.255
```

Step 7: Now we will define which interface is inside and which one is outside.

```
Gateway(config)#ip nat inside source list 1 pool public-access overload
Gateway(config)#int fastEthernet 0/0
Gateway(config-if)#ip nat inside
Gateway(config-if)#exit
Gateway(config)#int se 1/0
Gateway(config-if)#ip nat outside
Gateway(config-if)#end
Gateway#
*Oct 22 13:36:51.331: %SYS-5-CONFIG_I: Configured from console by console
```

Step 8: Now ping from the PC to the loopback of ISP.

- **PC1:**

```
PC1> ping 172.16.1.1
*200.2.2.17 icmp_seq=1 ttl=254 time=45.216 ms
*200.2.2.17 icmp_seq=2 ttl=254 time=45.398 ms
*200.2.2.17 icmp_seq=3 ttl=254 time=45.404 ms
*200.2.2.17 icmp_seq=4 ttl=254 time=45.321 ms
*200.2.2.17 icmp_seq=5 ttl=254 time=45.476 ms
```

- **PC2:**

```
PC2> ping 172.16.1.1
84 bytes from 172.16.1.1 icmp_seq=1 ttl=254 time=77.379 ms
84 bytes from 172.16.1.1 icmp_seq=2 ttl=254 time=73.820 ms
84 bytes from 172.16.1.1 icmp_seq=3 ttl=254 time=69.066 ms
84 bytes from 172.16.1.1 icmp_seq=4 ttl=254 time=97.600 ms
84 bytes from 172.16.1.1 icmp_seq=5 ttl=254 time=98.037 ms
```

Step 9: Verify NAT & PAT Translations.

```
gateway#sh ip nat translations
Pro Inside global      Inside local           Outside local          Outside global
icmp 199.99.9.33:51377 10.10.10.2:51377       172.16.1.1:51377      172.16.1.1:51377
icmp 199.99.9.33:51889 10.10.10.2:51889       172.16.1.1:51889      172.16.1.1:51889
icmp 199.99.9.33:52401 10.10.10.2:52401       172.16.1.1:52401      172.16.1.1:52401
icmp 199.99.9.33:52913 10.10.10.2:52913       172.16.1.1:52913      172.16.1.1:52913
icmp 199.99.9.33:53425 10.10.10.2:53425       172.16.1.1:53425      172.16.1.1:53425
icmp 199.99.9.33:54961 10.10.10.2:54961       172.16.1.1:54961      172.16.1.1:54961
icmp 199.99.9.33:55473 10.10.10.2:55473       172.16.1.1:55473      172.16.1.1:55473
icmp 199.99.9.33:55985 10.10.10.2:55985       172.16.1.1:55985      172.16.1.1:55985
icmp 199.99.9.33:56497 10.10.10.2:56497       172.16.1.1:56497      172.16.1.1:56497
icmp 199.99.9.33:57009 10.10.10.2:57009       172.16.1.1:57009      172.16.1.1:57009
icmp 199.99.9.33:57265 10.10.10.3:57265       172.16.1.1:57265      172.16.1.1:57265
icmp 199.99.9.33:57777 10.10.10.3:57777       172.16.1.1:57777      172.16.1.1:57777
icmp 199.99.9.33:58289 10.10.10.3:58289       172.16.1.1:58289      172.16.1.1:58289
icmp 199.99.9.33:58801 10.10.10.3:58801       172.16.1.1:58801      172.16.1.1:58801
icmp 199.99.9.33:59313 10.10.10.3:59313       172.16.1.1:59313      172.16.1.1:59313
gateway#
```

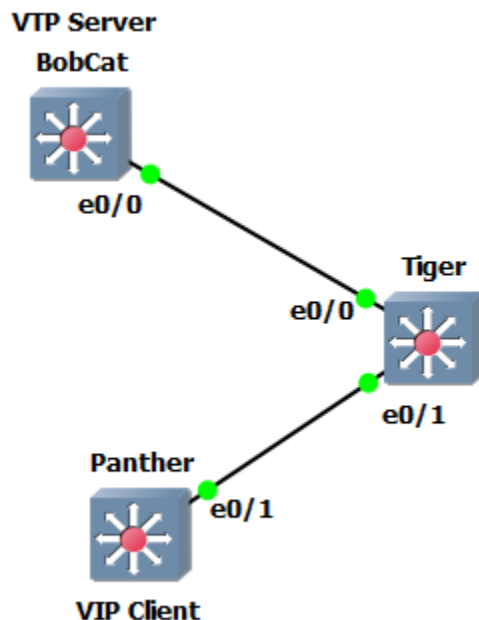
Step 10: Verify NAT & PAT Statistics.

```
Gateway#sh ip nat statistics
Total active translations: 0 (0 static, 0 dynamic; 0 extended)
Outside interfaces:
  Serial1/0
Inside interfaces:
  FastEthernet0/0
Hits: 40 Misses: 0
CEF Translated packets: 20, CEF Punted packets: 20
Expired translations: 20
Dynamic mappings:
-- Inside Source
[Id: 1] access-list 1 pool public-access refcount 0
  pool public-access: netmask 255.255.255.252
    start 199.99.9.32 end 199.99.9.35
    type generic, total addresses 4, allocated 0 (0%), misses 0
nat-limit statistics:
  max entry: max allowed 0, used 0, missed 0
```

3.3 Implement VTP

Objective:

- Create the following VLANS on switch Bobcat:
 - VLAN 10: name Tigers
 - VLAN 20: name Lions
 - VLAN 30: name Panthers
 - Configure the interfaces between the switches as trunks.
 - Configure switch Bobcat to be the VTP server.
 - Configure switch Panther to be a VTP client.
 - Configure switch Tiger so it does not synchronise itself to the latest VTP information, it should forward advertisements to switch Panther though.
 - Change the VTP domain name to "MSCCS".
 - Use the password "MSCCS123" for VTP.
 - Make sure there is no unnecessary vlan traffic flooded on the trunk links.
- Design the Topology.



- **Create The Following VLANS On Switch Bobcat:**

VLAN 10: name Tigers

VLAN 20: name Lions

VLAN 30: name Panthers

```

IOU1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
IOU1(config)#vlan 10
IOU1(config-vlan)#vlan 20
IOU1(config-vlan)#vlan 30
IOU1(config-vlan)#exit
IOU1(config)#end
IOU1#
*Oct 22 09:04:09.352: %SYS-5-CONFIG_I: Configured from console by console
IOU1#show vlan

VLAN Name                Status    Ports
-----
1    default                active    Et0/1, Et0/2, Et0/3, Et1/0
                                           Et1/1, Et1/2, Et1/3, Et2/0
                                           Et2/1, Et2/2, Et2/3, Et3/0
                                           Et3/1, Et3/2, Et3/3
10   VLAN0010                active
20   VLAN0020                active
30   VLAN0030                active
1002 fddi-default           act/unsup
1003 token-ring-default    act/unsup
1004 fddinet-default        act/unsup
1005 trnet-default          act/unsup

VLAN Type  SAID       MTU   Parent RingNo BridgeNo  Stp  BrdgMode Trans1 Trans2
-----
1    enet   100001     1500  -     -     -        -   -         0      0
10   enet   100010     1500  -     -     -        -   -         0      0
20   enet   100020     1500  -     -     -        -   -         0      0
30   enet   100030     1500  -     -     -        -   -         0      0
1002 fddi   101002     1500  -     -     -        -   -         0      0
1003 tr    101003     1500  -     -     -        -   -         0      0
1004 fdnet 101004     1500  -     -     -        ieee -         0      0
1005 trnet 101005     1500  -     -     -        ibm  -         0      0

Primary Secondary Type      Ports
-----

```

- Configure the interfaces between the switches as trunks.

```

IOU1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
IOU1(config)#int range e0/0
IOU1(config-if-range)#switchport mode trunk
Command rejected: An interface whose trunk encapsulation is "Auto" can not be configured to "trunk" mode.
% Range command terminated because it failed on Ethernet0/0
IOU1(config-if-range)#switchport trunk encapsulation dot1q
IOU1(config-if-range)#

```

```
IOU2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
IOU2(config)#int range e0/0
IOU2(config-if-range)#switchport mode trunk
Command rejected: An interface whose trunk encapsulation is "Auto" can not be configured to "trunk" mode.
% Range command terminated because it failed on Ethernet0/0
IOU2(config-if-range)#switchport trunk encapsulation dot1q
IOU2(config-if-range)#exit
IOU2(config)#int range e0/1
IOU2(config-if-range)#switchport mode trunk
Command rejected: An interface whose trunk encapsulation is "Auto" can not be configured to "trunk" mode.
% Range command terminated because it failed on Ethernet0/1
IOU2(config-if-range)#switchport trunk encapsulation dot1q
IOU2(config-if-range)#exit
```

```
IOU3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
IOU3(config)#int range e0/1
IOU3(config-if-range)#switchport mode trunk
Command rejected: An interface whose trunk encapsulation is "Auto" can not be configured to "trunk" mode.
% Range command terminated because it failed on Ethernet0/1
IOU3(config-if-range)#switchport trunk encapsulation dot1q
IOU3(config-if-range)#exit
IOU3(config)#
```

- **Configure switch Bobcat to be the VTP server.**

```
IOU1(config)#int e0/0
IOU1(config-if)#vtp mode server
Device mode already VTP Server for VLANs.
IOU1(config)#
```

- **Configure switch Panther to be a VTP client.**

```
IOU3(config)#int e0/1
IOU3(config-if)#vtp mode client
Setting device to VTP Client mode for VLANs.
IOU3(config)#
```

- **Configure switch Tiger so it does not synchronise itself to the latest VTP information, it should forward advertisements to switch Panther though.**

```
IOU2(config)#int e0/1
IOU2(config-if)#vtp mode trans
Setting device to VTP Transparent mode for VLANs.
```

- **Change the VTP domain name to "MSCCS".**

```
IOU2(config)#vtp domain MSCCS
Changing VTP domain name from NULL to MSCCS
```

```
IOU1(config)#vtp domain MSCCS
Changing VTP domain name from NULL to MSCCS
```

```
IOU3(config)#vtp domain MSCCS
Domain name already set to MSCCS.
```

- Use the password "MSCCS123" for VTP.

```
IOU1(config)#vtp password MSCCS123
Setting device VTP password to MSCCS123
```

```
IOU2(config)#vtp password MSCCS123
Setting device VTP password to MSCCS123
```

```
IOU3(config)#vtp password MSCCS123
Setting device VTP password to MSCCS123
```

- Check and verify the VLANs

```
IOU1#show vlan
```

VLAN	Name	Status	Ports
1	default	active	Et0/1, Et0/2, Et0/3, Et1/0 Et1/1, Et1/2, Et1/3, Et2/0 Et2/1, Et2/2, Et2/3, Et3/0 Et3/1, Et3/2, Et3/3
10	VLAN0010	active	
20	VLAN0020	active	
30	VLAN0030	active	
1002	fddi-default	act/unsup	
1003	token-ring-default	act/unsup	
1004	fddinet-default	act/unsup	
1005	trnet-default	act/unsup	

VLAN	Type	SAID	MTU	Parent	RingNo	BridgeNo	Stp	BrdgMode	Trans1	Trans2
1	enet	100001	1500	-	-	-	-	-	0	0
10	enet	100010	1500	-	-	-	-	-	0	0
20	enet	100020	1500	-	-	-	-	-	0	0
30	enet	100030	1500	-	-	-	-	-	0	0
1002	fddi	101002	1500	-	-	-	-	-	0	0
1003	tr	101003	1500	-	-	-	-	-	0	0
1004	fdnet	101004	1500	-	-	-	ieee	-	0	0
1005	trnet	101005	1500	-	-	-	ibm	-	0	0

Primary	Secondary	Type	Ports

```
IOU2#show vlan
```

VLAN	Name	Status	Ports
1	default	active	Et0/2, Et0/3, Et1/0, Et1/1 Et1/2, Et1/3, Et2/0, Et2/1 Et2/2, Et2/3, Et3/0, Et3/1 Et3/2, Et3/3
1002	fddi-default	act/unsup	
1003	token-ring-default	act/unsup	
1004	fddinet-default	act/unsup	
1005	trnet-default	act/unsup	

VLAN	Type	SAID	MTU	Parent	RingNo	BridgeNo	Stp	BrdgMode	Trans1	Trans2
1	enet	100001	1500	-	-	-	-	-	0	0
1002	fddi	101002	1500	-	-	-	-	-	0	0
1003	tr	101003	1500	-	-	-	-	-	0	0
1004	fdnet	101004	1500	-	-	-	ieee	-	0	0
1005	trnet	101005	1500	-	-	-	ibm	-	0	0

Primary	Secondary	Type	Ports
---------	-----------	------	-------

```
IOU3#show vlan
```

VLAN	Name	Status	Ports
1	default	active	Et0/0, Et0/2, Et0/3, Et1/0 Et1/1, Et1/2, Et1/3, Et2/0 Et2/1, Et2/2, Et2/3, Et3/0 Et3/1, Et3/2, Et3/3
10	VLAN0010	active	
20	VLAN0020	active	
30	VLAN0030	active	
1002	fddi-default	act/unsup	
1003	token-ring-default	act/unsup	
1004	fddinet-default	act/unsup	
1005	trnet-default	act/unsup	

VLAN	Type	SAID	MTU	Parent	RingNo	BridgeNo	Stp	BrdgMode	Trans1	Trans2
1	enet	100001	1500	-	-	-	-	-	0	0
10	enet	100010	1500	-	-	-	-	-	0	0
20	enet	100020	1500	-	-	-	-	-	0	0
30	enet	100030	1500	-	-	-	-	-	0	0
1002	fddi	101002	1500	-	-	-	-	-	0	0
1003	tr	101003	1500	-	-	-	-	srp	0	0
1004	fdnet	101004	1500	-	-	-	ieee	-	0	0
1005	trnet	101005	1500	-	-	-	ibm	-	0	0

Primary	Secondary	Type	Ports
---------	-----------	------	-------

```
IOU3#show vtp status
VTP Version capable      : 1 to 3
VTP version running      : 1
VTP Domain Name          : MSCCS
VTP Pruning Mode         : Disabled
VTP Traps Generation     : Disabled
Device ID                : aabb.cc00.0300
Configuration last modified by 0.0.0.0 at 10-22-24 09:04:03

Feature VLAN:
-----
VTP Operating Mode       : Client
Maximum VLANs supported locally : 1005
Number of existing VLANs : 8
Configuration Revision    : 3
MD5 digest               : 0xE1 0x62 0xBD 0x80 0x24 0xC3 0xFE 0x3F
                        : 0x2C 0xF9 0xEE 0xA0 0x6B 0x8B 0xC2 0x15
```

- Make sure there is no unnecessary vlan traffic flooded on the trunk links.

```
IOU1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
IOU1(config)#vtp pruning
Pruning switched on
IOU1(config)#
```

```
IOU3#show vtp status
VTP Version capable      : 1 to 3
VTP version running      : 1
VTP Domain Name          : MSCCS
VTP Pruning Mode         : Enabled
VTP Traps Generation     : Disabled
Device ID                : aabb.cc00.0300
Configuration last modified by 0.0.0.0 at 10-22-24 09:22:57

Feature VLAN:
-----
VTP Operating Mode       : Client
Maximum VLANs supported locally : 1005
Number of existing VLANs : 8
Configuration Revision    : 4
MD5 digest               : 0x1D 0x4F 0x8B 0x72 0x1E 0xF3 0xE8 0x9B
                        : 0x47 0x72 0x71 0x05 0x0D 0x77 0x18 0x60

IOU3#
```