Technological Institute of the Philippines
Computer Engineering Department

Designing an Enterprise Network

In partial fulfilment of the requirements in
Computer Networks 3 (CPE314)

Submitted by:

YAOTO, Charlz Matthew M.
SANGALANG, Edjie

Submitted to:

Engr. Mon Arjay Malbog

15/04/2024

Background / Scenario
A network administrator is tasked to configure the connection for a computer shop so that the owner can manage the computers even from home. Create a topology that will configure the routers with ACL, Static NAT, and GRE tunneling.

II.   Objectives
A. Configure basic switch/router configuration
B. Apply extended ACL on all routers
C. Implement dynamic NAT
D. Create a GRE Tunnel that will connect R1 to R2
III.   Topology
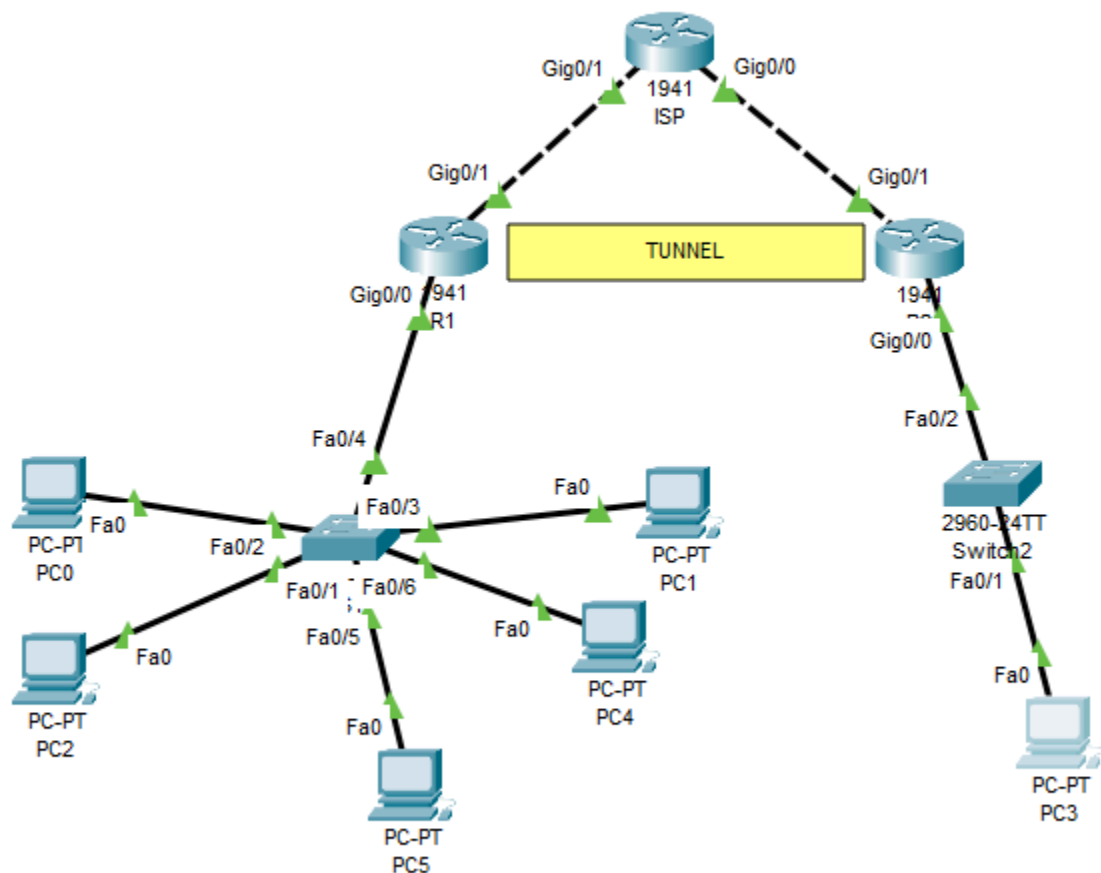
IV.   Addressing Table

Network Device	Interface	IP Address
R1	G0/0	192.168.1.1
	G0/1	192.168.2.1

Device	Interface	Address
R2	G0/0	192.168.3.1
	G0/1	192.168.4.1
ISP	G0/0	192.168.5.1
	G0/1	192.168.6.1
S1	Fa0/1	-
	Fa0/2	-
	Fa0/3	-
	Fa0/4	-
	Fa0/5	-
	Fa0/6	-
S2	Fa0/1	-
	Fa0/2	-
PC0	Fa/0	DHCP
PC1	Fa/0	DHCP
PC2	Fa/0	DHCP
PC3	Fa/0	DHCP
PC4	Fa/0	DHCP
PC5	Fa/0	DHCP

V.   Required Resources
-    Packet Tracer
VI.   Network Configuration (Screenshots with description)
   a. Basic Router / Switch Configuration
   b. NAT / PAT Configuration
       This is the Dynamic NAT created upon R1 as R1 has many connected devices which
       dynamic NAT will provide solutions for.

```
R1(config)#ip nat pool YAOTO 209.168.1.10 209.168.1.11 netmask 255.255.255.252
R1(config)#ip nat inside source list 1 pool YAOTO
R1(config)#int g0/0
R1(config-if)#ip nat outside
R1(config-if)#int g0/1
R1(config-if)#ip nat inside
```

This is the Static NAT configured upon R2.

```
R2(config)#ip nat inside source static 209.168.1.10 209.168.1.11
R2(config)#int g0/0
R2(config-if)#ip nat inside
R2(config-if)#int g0/1
R2(config-if)#ip nat outside
R2(config-if)#exit
R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console
show ip
% Incomplete command.
R2#show ip nat trans
Pro  Inside global     Inside local      Outside local     Outside global
---  209.168.1.11      209.168.1.10      ---               ---
```

c. ACL Configuration

Both R1 and R2 were configured with an extended acl configuration which gives more control to the user when making changes to the router or even blocking/permitting specific data types to pass through. In R1 shows both g0/0 and g0/1 are configured to be an "in" but the difference is that the access group 110 denies all access or stops the data from exiting the router while the access group 120 permits all incoming traffic to the router. Moving forward to the R2 we can see that all outgoing traffic will be permitted by the router due to the access group 100 set as permit any.

```
R1#show access-lists
Extended IP access list 110
    10 deny ip any any
Extended IP access list 120
    10 permit ip any any

show access-lists
Extended IP access list 100
    10 permit ip any any (17 match(es))

R2#
```

d. GRE tunnelingConfiguration

A GRE over IPsec tunneling was made for R1 and R2 to allow connection from both routers so that direct and secure connection will be available.

```
R2#show ip route
Codes: L - local, 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, E - EGP
       i - IS-IS, 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

     192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.3.0/24 is directly connected, GigabitEthernet0/0
L       192.168.3.1/32 is directly connected, GigabitEthernet0/0
     192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.4.0/24 is directly connected, GigabitEthernet0/1
L       192.168.4.1/32 is directly connected, GigabitEthernet0/1

R1#show ip route
Codes: L - local, 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, E - EGP
       i - IS-IS, 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

     192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, GigabitEthernet0/0
L       192.168.1.1/32 is directly connected, GigabitEthernet0/0
     192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.2.0/24 is directly connected, GigabitEthernet0/1
L       192.168.2.1/32 is directly connected, GigabitEthernet0/1
```

```
interface Tunnel0
 ip address 192.168.12.2 255.255.255.252
 mtu 1476
 tunnel source GigabitEthernet0/1
 tunnel destination 192.168.2.1

interface Tunnel1
 ip address 192.168.12.1 255.255.255.252
 mtu 1476
 tunnel source GigabitEthernet0/1
 tunnel destination 192.168.4.1
```