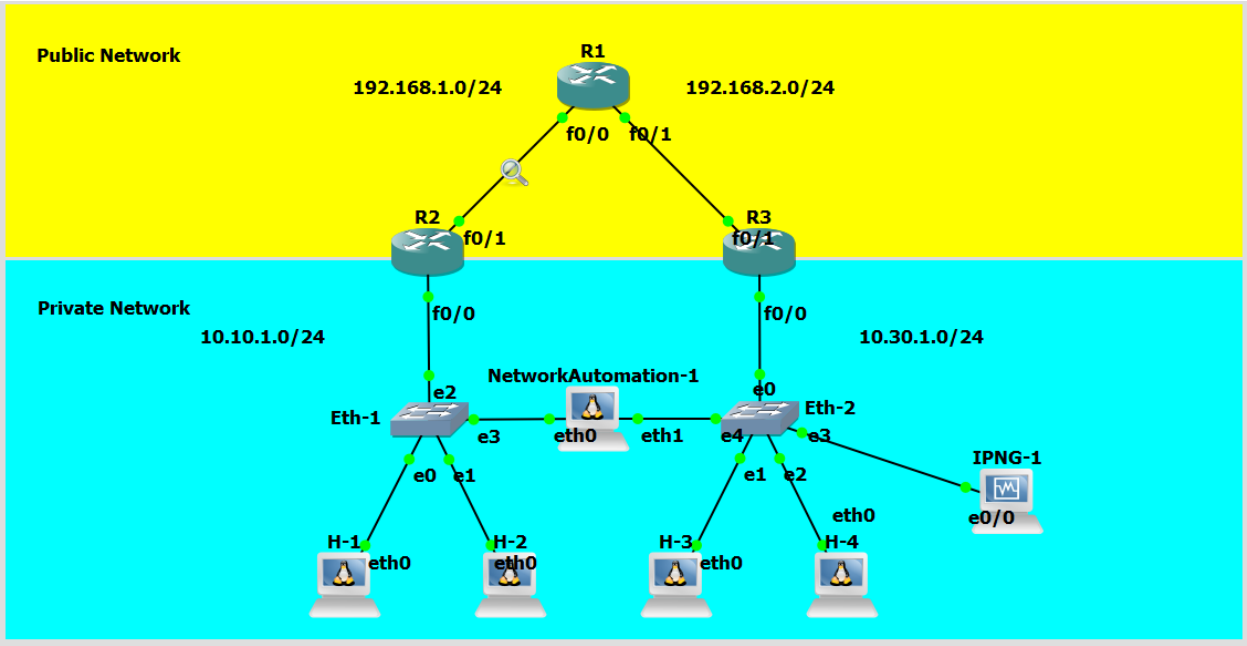
VPN Configuration using Python NetworkAutomation

Introduction :

The purpose of this project is to connect 2 private network using VPN via Public Network. Private network is not routed in **Public Network**, to connect the private networks VPN is needed. The **VPN** will be configured using **python** from **NetworkAutomation** PC.

Topology :



Initial Configuration :

Router	Route	Description
R1	192.168.1.0/24	Direct Connect
	192.168.2.0/24	Direct Connect
R2	192.168.1.0/24	Direct Connect
	192.168.2.0/24	Static
	10.10.1.0/24	Direct Connect
	10.30.1.0/24	Static
R3	192.168.2.0/24	Direct Connect
	192.168.1.0/24	Static
	10.30.1.0/24	Direct Connect
	10.10.1.0/24	Static

Step :

1. R2 must be connected to R1 and R3
2. R3 must be connected to R2 and R3
3. R3 is a representation of Public Network Router that does not route any private networks
4. R2 is configured with VPN to connect to R3 private networks
5. R3 is configured with VPN to connect to R2 private networks
6. Check the connection between private networks
7. Check the packet using wireshark, it must be encapsulated using Security Protocol (IPSec)

Configuration :

- R2 Configuration :

```
root@NetworkAutomation-1:~# python VPN_auto.py
VPN_auto.py:51: SyntaxWarning: name 'tn' is assigned to before global declaration
  global tn
========================================
Welcome to 'VPN app configuration' !
by Bagas Adi Pamungkas

Enter Target Telnet IP (example 10.10.1.1): 10.10.1.1
Enter your Telnet username: bagas
Password:
Login Success!

Access-list Configuration ========================================
Enter Network IP Source (example 10.10.1.0): 10.10.1.0
Enter Network Wildcard Source (example 0.0.0.255): 0.0.0.255
Enter Network IP Destination (example 10.30.1.0): 10.30.1.0
Enter Network Wildcard Destination (example 0.0.0.255): 0.0.0.255

Crypto & Gateway Configuration ========================================
Enter Your interface as VPN Gateway (fa0/0): fa0/1
Enter Network Name (jkt-sby): jkt-sby
Enter your peer router's IP (example 192.168.1.2): 192.168.2.2
Enter your peer router's subnet (example 255.255.255.0): 255.255.255.0
Enter VPN Key Name (vpnxyz): vpnxyz
Enter Crypto Map Name (vpn-ngn): vpn-ngn
```

- R3 Configuration :

```
root@NetworkAutomation-1:~# python VPN_auto.py
VPN_auto.py:51: SyntaxWarning: name 'tn' is assigned to before global declaration
  global tn
========================================
Welcome to 'VPN app configuration' !
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Enter Target Telnet IP (example 10.10.1.1): 10.30.1.1
Enter your Telnet username: bagas
Password:
Login Success!

Access-list Configuration ========================================
Enter Network IP Source (example 10.10.1.0): 10.30.1.0
Enter Network Wildcard Source (example 0.0.0.255): 0.0.0.255
Enter Network IP Destination (example 10.30.1.0): 10.10.1.0
Enter Network Wildcard Destination (example 0.0.0.255): 0.0.0.255

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Enter VPN Key Name (vpnxyz): vpnxyz
Enter Crypto Map Name (vpn-ngn): vpn-ngn
```

Result :

- Host 1's IP :

```
root@H-1:~# ifconfig eth0 10.10.1.2/24; ifconfig
eth0      Link encap:Ethernet  HWaddr 2e:19:96:83:ff:32
          inet addr:10.10.1.2  Bcast:10.10.1.255  Mask:255.255.255.0
```

- IPNG (Debian)'s IP :

```
root@debian:/home/bagas# ifconfig enp0s3 10.30.1.20/24; ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.30.1.20  netmask 255.255.255.0  broadcast 10.30.1.255
```

- Check Connection Host 1 to IPNG :

```
root@H-1:~# ping 10.30.1.20
PING 10.30.1.20 (10.30.1.20) 56(84) bytes of data.
64 bytes from 10.30.1.20: icmp_seq=38 ttl=62 time=48.9 ms
64 bytes from 10.30.1.20: icmp_seq=40 ttl=62 time=58.1 ms
64 bytes from 10.30.1.20: icmp_seq=42 ttl=62 time=51.9 ms
64 bytes from 10.30.1.20: icmp_seq=44 ttl=62 time=69.7 ms
64 bytes from 10.30.1.20: icmp_seq=46 ttl=62 time=33.3 ms
```

- Check Telnet Connection Host 1 to IPNG :

```
root@H-1:~# telnet 10.30.1.20
Trying 10.30.1.20...
Connected to 10.30.1.20.
Escape character is '^]'.
Debian GNU/Linux 9
debian login: bagas
Password:
Last login: Wed Apr 24 19:43:06 PDT 2019 on pts/2
Linux debian 4.9.0-8-amd64 #1 SMP Debian 4.9.144-3.1 (2019-02-19) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
bagas@debian:~$ ls
```

- Check packet using wireshark :

80	171.093945	192.168.2.2	192.168.1.2	ESP	166	0.035218
81	173.124879	192.168.1.2	192.168.2.2	ESP	126	2.030934
82	173.155609	192.168.2.2	192.168.1.2	ESP	126	0.030730
83	177.974347	192.168.2.2	192.168.1.2	ESP	270	4.818738
84	177.996157	192.168.1.2	192.168.2.2	ESP	118	0.021810

```
> Frame 81: 126 bytes on wire (1008 bits), 126 bytes captured (1008 bits) on interface 0
> Ethernet II, Src: c2:02:07:15:00:01 (c2:02:07:15:00:01), Dst: c2:01:07:04:00:00 (c2:01:07:04:00:00)
> Internet Protocol Version 4, Src: 192.168.1.2, Dst: 192.168.2.2
v Encapsulating Security Payload
    ESP SPI: 0xbb759745 (3145045829)
    ESP Sequence: 95
```