NOTE: This lab manual is a joint fruit of Pass4sure and ciscosim. If you have any questions or suggestions, or want to exchange experience, please go to *http://www.ciscosim.net.*

Implementing Secure Converged Wide Area Networks

642-825-Preparation-Labs

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CCNP-ISCW Lab2

Configuring GRE Tunnels

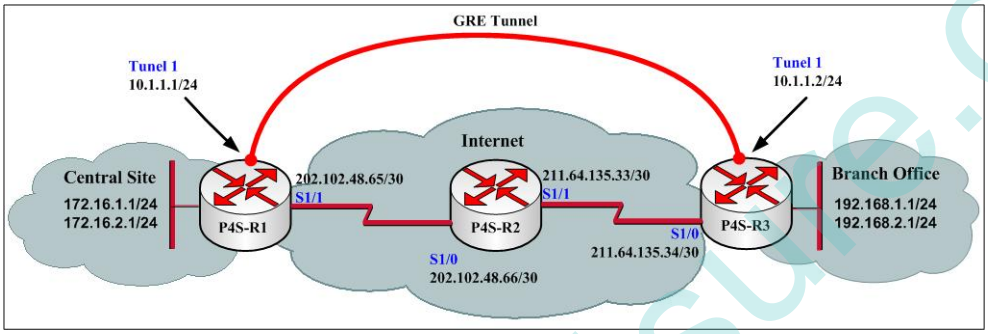
【Lab Objectives】

1. Master the configuration of GRE tunnels

2. GRE tunnels do not support data encryption. Other protocols, such as 3.IPsec are needed for achieving data transmission encryption

3. GRE supports broadcast.

【Lab Topology】



【Lab Steps and Requirements】

1. Configure IP address for each router and use Ping command to confirm the interconnectivity of the inline interfaces on routers

2. Configure static route on P4S-R1 and P4S-R3 to make sure that Internet backbone networks can communicate with each other.

```
P4S-R1(config)#ip route 0.0.0.0 0.0.0.0 202.102.48.66
```

```
P4S-R3(config)#ip route 0.0.0.0 0.0.0.0 211.64.135.33
```

Configuring static route on P4S-R1 and P4S-R3 is not only used to simulate access router, but also to make sure that the tunnel source IP address and the tunnel destination IP address can see each other to facilitate the realization of the tunnel when created.

3. Make sure that P4S-R1 can ping the IP address of the public network interface on P4S-R3.

```
P4S-R1#ping 211.64.135.34

Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 211.64.135.34, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 168/204/264 ms
P4S-R1#
```

4. Ping loopback interfaces of P4S-R3 or P4S-R1 on routers P4S-R1 or P4S-R3

```
P4S-R1#ping 192.168.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.1, timeout is 2 seconds:
U.U.U
Success rate is 0 percent (0/5)
P4S-R1#
```

5. Configure GRE tunnels on the router P4S-R1.

```
P4S-R1(config)#interface tunnel 0
P4S-R1(config-if)#ip address 10.1.1.1 255.255.255.0
P4S-R1(config-if)#tunnel source serial 1/1
P4S-R1(config-if)#tunnel destination 211.64.135.34
P4S-R1(config-if)#exit
P4S-R1(config)#
```

6. Configure GRE tunnels on the router P4S-R2.

```
P4S-R3(config)#interface tunnel 0
P4S-R3(config-if)#ip address 10.1.1.2 255.255.255.0
P4S-R3(config-if)#tunnel source serial 1/0
P4S-R3(config-if)#tunnel destination 202.102.48.65
P4S-R3(config-if)#exit
P4S-R3(config)#exit
```

7. Check interface tunnel information of the router P4S-R1

```
P4S-R1#show interfaces tunnel 0
Tunnel0 is up, line protocol is up
  Hardware is Tunnel
  Internet address is 10.1.1.1/24
  MTU 1514 bytes, BW 9 Kbit, DLY 500000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation TUNNEL, loopback not set
  Keepalive not set
  Tunnel source 202.102.48.65 (Serial1/1), destination 211.64.135.34
  Tunnel protocol/transport GRE/IP, key disabled, sequencing disabled
  Tunnel TTL 255
.....
P4S-R1#
```

8. Check the routing table of P4S-R1

Comment [k1]: The router P4S-R1 uses the default route to forward the ICMP data packet reaching 192.168.1.1/24 to the router P4S-R2. Since the router P4S-R2 is on the private network route which the Internet backbone network can not reach. Here will receive U, that is unreachable information which P4S-R2 ICMP returns. ... [1]

Comment [k2]: Enable GRE tunnel.

Comment [k3]: Designate IP address for tunnel

Comment [k4]: Configure the tunnel with the local source port.

Comment [k5]: Configure the tunnel with the destination port. The reach ability of the destination port IP address is assured by the default route configured locally. ... [2]

Comment [k6]: Upon the completion of the tunnel configuration of P4S-R1 and P4S-R2, the tunnel interface status should be up when checked locally. ... [3]

Comment [k7]: Tunnel-based interface.

Comment [k8]: GRE tunnel protocol is used for data encapsulation. That is re-encapsulating a GRE header on the basis of the original data packet. ... [4]

Comment [k9]: The tunnel protocol is GRE.

```
P4S-R1#show ip route

Gateway of last resort is 202.102.48.66 to network 0.0.0.0

     202.102.48.0/30 is subnetted, 1 subnets
C       202.102.48.64 is directly connected, Serial1/1
     172.16.0.0/24 is subnetted, 2 subnets
C       172.16.1.0 is directly connected, Loopback0
C       172.16.2.0 is directly connected, Loopback1
     10.0.0.0/24 is subnetted, 1 subnets
C       10.1.1.0 is directly connected, Tunnel0
S*   0.0.0.0/0 [1/0] via 202.102.48.66
P4S-R1#
```

Comment [k10]: The inline route of the tunnel interface.

9. Ping tunnel interface of P4S-R3 on P4S-R1.

```
P4S-R1#ping 10.1.1.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.1.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 80/169/264 ms
P4S-R1#
```

10. Configure loopbacks of P4S-R1 and P4S-R3 as the route of the next hop of the tunnel interface.

```
P4S-R1(config)#ip route 192.168.0.0 255.255.0.0 10.1.1.2
P4S-R3(config)#ip route 172.16.0.0 255.255.0.0 10.1.1.1
```

11. Use the PING command on routers P4S-R1 and P4S-R3 again to detect whether or not being able to ping the private address of the loopback interface of the other side successfully.

```
P4S-R1#ping 192.168.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 140/178/248 ms
P4S-R1#
P4S-R1#ping 192.168.2.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.2.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 116/164/216 ms
P4S-R1#
```

12. The following commands can be used to check other information about the GRE tunnels

```
P4S-R1#show interfaces tunnel 0 stats
Tunnel0
          Switching path    Pkts In   Chars In   Pkts Out  Chars Out
               Processor         15       1860         15       1860
             Route cache          0        360          0          0
                   Total         15       2220         15       1860
P4S-R1#
```

13. Completion of the lab.

Page 4: [1] Comment [k1] kaka 2008-11-1 20:02:00

The router P4S-R1 uses the default route to forward the ICMP data packet reaching 192.168.1.1/24 to the router P4S-R2. Since the router P4S-R2 is on the private network route which the Internet backbone network can not reach. Here will receive U, that is unreachable information which P4S-R2 ICMP returns.

Page 4: [2] Comment [k5] kaka 2008-11-1 20:53:00

Configure the tunnel with the destination port.The reach ability of the destination port IP address is assured by the default route configured locally.

Page 4: [3] Comment [k6] kaka 2008-11-1 20:02:00

Upon the completion of the tunnel configuration of P4S-R1 and P4S-R2, the tunnel interface status should be up when checked locally.

Page 4: [4] Comment [k8] kaka 2008-11-1 20:02:00

GRE tunnel protocol is used for data encapsulation. That is re-encapsulating a GRE header on the basis of the original data packet.