Generic Routing Encapsulation:

- GRE is a term, which is stand for the Generic Routing Encapsulation.
- Generic Routing Encapsulation is a tunneling protocol developed by Cisco.
- GRE is the mechanism that encapsulate one protocol in another protocol.
- GRE is a tunneling protocol that supports many different layer 3 protocols.
- Generic Routing Encapsulation (GRE) is default encapsulation for IOS tunnels.
- In GRE basically, tunneling is a concept where to put packets into packets.
- Tunneling is used to hide the packet and transported over certain networks.
- In Generic Routing Encapsulation terminology, tunneling also call encapsulation.
- GRE tunnels are used to create point-to-point connections between two networks.
- GRE adds 20-byte IP header and 4-byte GRE header to encapsulate the existing packet.
- The GRE header includes a protocol type field for the OSI Model layer 3 protocol.
- Generic Routing Encapsulation is a method to tunnel IP packets between two end points.
- GRE does not encrypt packets; it can be used along with IPsec to encrypt the packets.
- Generic Routing Encapsulation supports encapsulating IPv4 broadcast & multicast traffic.
- Generic Routing Encapsulation, to verify the tunnel, use show ip interface brief command.

GRE Configuration Steps:

Step 1:

Create tunnel interfaces on R1 and R2 using the interface tunnel *number* command.

Step 2:

Choose a subnet to be used on tunnel interfaces and assign an IP address from the subnet to both end points.

Step 3:

Configure the source IP address of the tunnel interface using the tunnel source *interface* or the tunnel source *ip-address* command. The source interface or IP address must be the one that connects the router to the public part of the network.

Step 4:

Configure the destination IP address of the tunnel interface using the tunnel destination *ip-address* command. The destination IP address must be the remote one that connects the router to the public part of the network.

Step 5:

Configure the routers to use the tunnel interfaces to reach remote subnets. Use either static routing or a dynamic routing protocol to enable on tunnel interfaces to achieve that.

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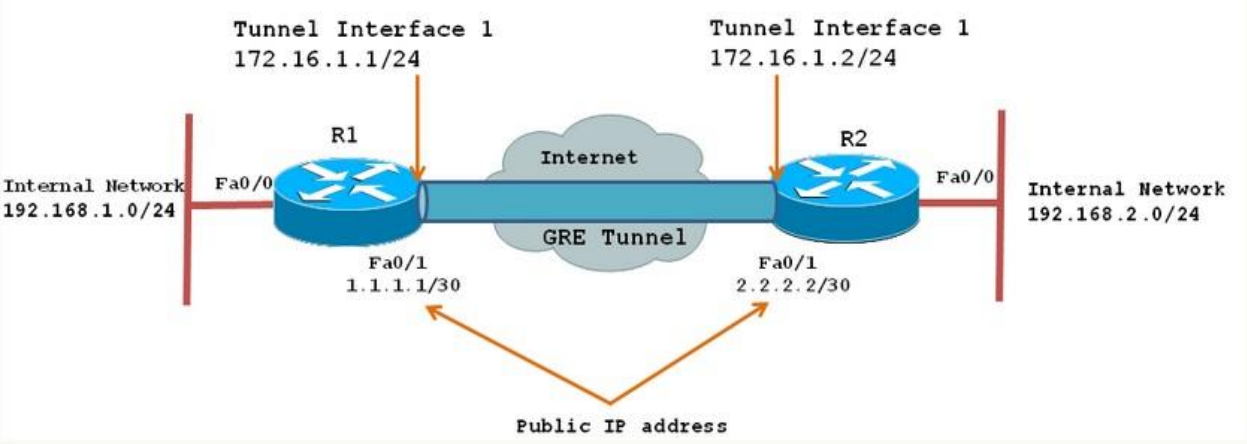

R1 Basic Configuration
R1(config)#interface FastEthernet0/0 R1(config-if)#ip address 1.1.1.10 255.0.0.0 R1(config-if)#no shutdown R1(config-if)#interface Loopback0 R1(config-if)#ip address 192.168.1.1 255.255.255.0

R2 Basic Configuration
R2(config)#interface FastEthernet0/0 R2(config-if)#ip address2.2.2.10 255.0.0.0 R2(config-if)#no shutdown R2(config-if)#interface Loopback0 R2(config-if)#ip address 192.168.2.1 255.255.255.0

Internet Basic Configuration
Internet(config)#interface FastEthernet0/0 Internet(config-if)#ip address 2.2.2.20 255.0.0.0 Internet(config-if)#no shutdown Internet(config-if)#interface GigabitEthernet1/0 Internet(config-if)#ip address 1.1.1.20 255.0.0.0 Internet(config-if)#no shutdown

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R1 GRE Configuration
R1(config-if)#ip route 2.0.0.0 255.0.0.0 1.1.1.20
R1(config)#interface Tunnel1 R1(config-if)#ip address 172.16.1.1 255.255.255.0 R1(config-if)#tunnel source 1.1.1.10 R1(config-if)#tunnel destination 2.2.2.10 R1(config)#router eigrp 11 R1(config-router)#network 192.168.1.0 R1(config-router)#network 172.16.1.0

R2 GRE Configuration
R2(config-if)#ip route 1.0.0.0 255.0.0.0 2.2.2.20
R2(config)#interface Tunnel1 R2(config-if)#ip address 172.16.1.2 255.255.255.0 R2(config-if)#tunnel source 2.2.2.10 R2(config-if)#tunnel destination 1.1.1.10 R2(config)#router eigrp 11 R2(config-router)#network 192.168.1.0 R2(config-router)#network 172.16.1.0

Verification Commands
R1#traceroute 192.168.2.1
R2#traceroute 192.168.1.1
R1#ping 192.168.2.1 source loopback 0
R2#ping 192.168.1.1 source loopback 0
R1#show ip eigrp neighbors
R2#show ip eigrp neighbors

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