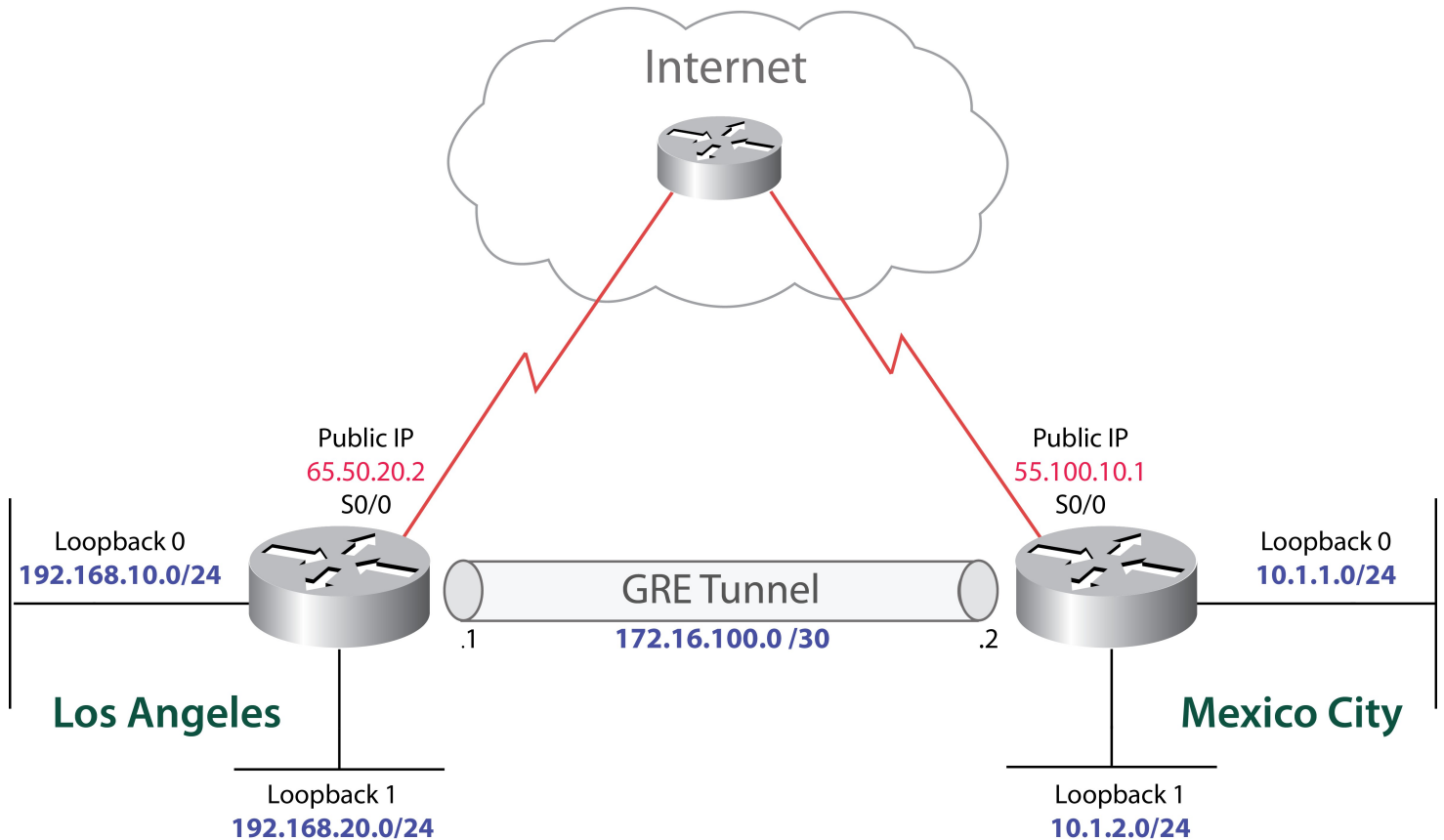


# GRE P2P Tunnel Configuration with EIGRP Routing

(By Angel Cool; Saturday, March 2, 2013 )



Topology Layout

## Introduction

We will set-up a GRE tunnel connection between Los Angeles and Mexico City, this configuration allows dynamic routing with EIGRP (or other routing protocol) because the Internet is used (emulated) as a point-to-point link, consequently the two locations can exchange routes dynamically. This is a GRE-tunnel demonstration only, a complete solution would also include IPsec configuration.

## Configuration Steps

1. Configuring the serial interfaces between the Internet router and the local routers.

(a) Internet router configuration

```
ISP(config)#interface S0/0
ISP(config-if)#encapsulation ppp
ISP(config-if)#clock rate 80000
ISP(config-if)#ip address 65.50.20.1 255.255.255.0
ISP(config-if)#no shut
```

```
ISP(config)#interface S0/1
ISP(config-if)#encapsulation ppp
ISP(config-if)#clock rate 80000
ISP(config-if)#ip address 55.100.10.2 255.255.255.0
ISP(config-if)#no shut
```

(b) Los Angeles configuration

```
LA(config)#interface S0/0
LA(config-if)#encapsulation ppp
LA(config-if)#ip address 65.50.20.2 255.255.255.0
LA(config-if)#no shut
```

(c) Mexico City configuration

```
MexicoCity(config)#interface S0/0
MexicoCity(config-if)#encapsulation ppp
MexicoCity(config-if)#ip address 55.100.10.1 255.255.255.0
MexicoCity(config-if)#no shut
```

(d) Create default routes

```
LA(config)#ip route 0.0.0.0 0.0.0.0 S0/0

MexicoCity(config)# ip route 0.0.0.0 0.0.0.0 S0/0
```

(e) Verify connectivity between Los Angeles and Mexico City:

```
LA#ping 55.100.10.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 55.100.10.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/4 ms
```

```
MexicoCity#ping 65.50.20.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 65.50.20.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/4 ms
```

2. Configuring *loopback* interfaces, these represent the local networks in the two sites.

(a) Los Angeles

```
LA(config)#interface loopback 0
LA(config-if)#ip address 192.168.10.1 255.255.255.0

LA(config)#interface loopback 1
LA(config-if)#ip address 192.168.20.1 255.255.255.0
```

(b) Mexico City

```
MexicoCity(config)#interface loopback 0
MexicoCity(config-if)#ip address 10.1.1.1 255.255.255.0

MexicoCity(config)#interface loopback 1
MexicoCity(config-if)#ip address 10.1.2.1 255.255.255.0
```

### 3. Configuring the tunnel

#### (a) Los Angeles

```
LA(config)#interface tunnel 0
LA(config-if)#ip address 172.16.100.1 255.255.255.252
LA(config-if)#tunnel source S0/0
LA(config-if)#tunnel destination 55.100.10.1
```

#### (b) Mexico City

```
LA(config)#interface tunnel 0
LA(config-if)#ip address 172.16.100.2 255.255.255.252
LA(config-if)#tunnel source S0/0
LA(config-if)#tunnel destination 65.50.20.2
```

#### (c) Tunnel verification. Ping each end-point.

```
LA#ping 172.16.100.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 55.100.10.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 3/3/4 ms
```

```
MexicoCity#ping 172.16.100.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.100.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 3/3/4 ms
```

### 4. EIGRP Configuration:

```
LA(config)#router eigrp 1
LA(config-router)#network 172.16.100.0 0.0.0.3
LA(config-router)#network 192.168.10.0
LA(config-router)#network 192.168.20.0
LA(config-router)# no auto-summary
```

```
MexicoCity(config)#router eigrp 1
MexicoCity(config-router)#network 172.16.100.0 0.0.0.3
MexicoCity(config-router)#network 10.1.1.0 0.0.0.255
MexicoCity(config-router)#network 10.1.2.0 0.0.0.255
MexicoCity(config-router)# no auto-summary
```

5. Verification. The routing table of each router should have entries for the neighbor's *loopback* networks.

**LA#show 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 0.0.0.0 to network 0.0.0.0

```
65.0.0.0/24 is subnetted, 1 subnets
C      65.50.20.0 is directly connected, Ethernet0
C      192.168.10.0/24 is directly connected, Loopback0
172.16.0.0/16 is variably subnetted, 2 subnets, 2 masks
C      172.16.100.0/30 is directly connected, Tunnel0
C      192.168.20.0/24 is directly connected, Loopback1
10.0.0.0/24 is subnetted, 2 subnets
D      10.1.2.0 [90/297372416] via 172.16.100.2, 00:00:52, Tunnel0
D      10.1.1.0 [90/297372416] via 172.16.100.2, 00:05:42, Tunnel0
S*    0.0.0.0/0 is directly connected, Ethernet0
LA#
```

**MexicoCity#show 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 0.0.0.0 to network 0.0.0.0

```
55.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C      55.100.10.0/24 is directly connected, Serial0/0
C      55.100.10.2/32 is directly connected, Serial0/0
D      192.168.10.0/24 [90/297372416] via 172.16.100.1, 00:06:20, Tunnel0
172.16.0.0/30 is subnetted, 1 subnets
C      172.16.100.0 is directly connected, Tunnel0
D      192.168.20.0/24 [90/297372416] via 172.16.100.1, 00:06:20, Tunnel0
10.0.0.0/24 is subnetted, 2 subnets
C      10.1.2.0 is directly connected, Loopback1
C      10.1.1.0 is directly connected, Loopback0
S*    0.0.0.0/0 is directly connected, Serial0/0
MexicoCity#
```

**Conclusion**

The two sites can exchange networks dynamically by using a GRE tunnel to emulate the Internet as a point-to-point connection. The tunnel interface defaults to GRE over IP (see: *tunnel mode gre ip* subcommand). This is a configuration sample, do not use for production without IPsec.

Comments or remarks:

<http://www.angelcool.net/sphblog/comments.php?y=13&m=03&entry=entry130302-112409>