I had recently got chance to implement GRE over IPSEC, Let us consider following as test environment.

Site A(Centos 6) :-

IP – 192.168.122.66

Ipsec subnet – 10.30.0.0 / 20

Site B(Centos 6) :-

IP – 192.168.122.71

Subnet – 10.2.226.0/23

After installing ipsec on both sides, I have configured Ipsec as follows :-

Site A :-

1 . vi /etc/ipsec.conf

```
conn test
 auto=start #any reboot causes immediate renegotiation
 type=tunnel #transport mode ipsec
 authby=secret
 ike=3des-sha1-modp1024 #phase 1 aka isakmp sa
 ikelifetime=8h #phase 1 sa lifetime
 esp=3des-sha1 #phase 2 aka ipsec sa
 keylife=1h #phase 2 sa lifetime
 pfs=yes
 ###our gateway
 left=192.168.122.66
 leftsubnet=10.30.0.0/20
 leftnexthop=192.168.122.1
 leftprotoport=gre #match the GRE traffic, this line is very important
 ###remote peer
 right=192.168.122.71 #Other side main
 rightsubnet=10.2.226.0/23 #Subnet
 rightnexthop=%defaultroute
 rightprotoport=gre #match the GRE traffic
```

2. vi /etc/ipsec.secerts

192.168.122.66 192.168.122.71 : PSK “test”

3. Now you can choose one IP from subnet 10.30.0.0/20 and it will be site A GRE outer IP. I selected 10.30.0.1 and configured GRE like below:-

vi /etc/sysconfig/network-scripts/ifcfg-mygre1

```
DEVICE=mygre1
 BOOTPROTO=none
 ONBOOT=yes
```

```
TYPE=GRE
MY_OUTER_IPADDR=10.30.0.1
PEER_OUTER_IPADDR=10.2.226.1
MY_INNER_IPADDR=10.200.52.141
PEER_INNER_IPADDR=10.200.52.142
```

That’s all on site A , Now you need to configure Site B with same steps.

Site B :-

1 . vi /etc/ipsec.conf

```
conn test
 auto=start #any reboot causes immediate renegotiation
 type=tunnel #transport mode ipsec
 authby=secret
 ike=3des-sha1-modp1024 #phase 1 aka isakmp sa
 ikelifetime=8h #phase 1 sa lifetime
 esp=3des-sha1 #phase 2 aka ipsec sa
 keylife=1h #phase 2 sa lifetime
 pfs=yes
 ###our gateway
 left=192.168.122.71
 leftsubnet=10.2.226.0/23
 leftnexthop=192.168.122.1
 leftprotoport=gre #match the GRE traffic, this line is very important
 ###remote peer
 right=192.168.122.66 #Other side main
 rightsubnet= 10.30.0.0/20#Subnet
 rightnexthop=%defaultroute
 rightprotoport=gre #match the GRE traffic
```

2. vi /etc/ipsec.secerts

192.168.122.71 192.168.122.66 : PSK “test”

3. Now you can choose one IP from subnet 10.2.226.0/23 and it will be site B GRE outer IP. I selected 10.2.226.1 and configured GRE like below:-

vi /etc/sysconfig/network-scripts/ifcfg-mygre1

```
DEVICE=mygre1
 BOOTPROTO=none
 ONBOOT=yes
 TYPE=GRE
 MY_OUTER_IPADDR=10.2.226.1
 PEER_OUTER_IPADDR=10.30.0.1
 MY_INNER_IPADDR=10.200.52.142
 PEER_INNER_IPADDR=10.200.52.141
```

Now you can test VPN connection with ping and do tcpdump on other end, you can see IKE pre-shared key in vpn, I pinged from site A to 10.200.52.142 and ran tcpdump on site B.

```
tcpdump -i eth0 -nn host 192.168.122.66
 tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
 listening on eth0, link-type EN10MB (Ethernet), capture size 65535 bytes
 23:36:43.772311 IP 192.168.122.66 > 192.168.122.71: ESP(spi=0xf0548a51,seq=0×14), length 140
 23:36:43.772408 IP 192.168.122.71 > 192.168.122.66: ESP(spi=0x31e04035,seq=0×7), length 140
 23:36:44.772295 IP 192.168.122.66 > 192.168.122.71: ESP(spi=0xf0548a51,seq=0×15), length 140
```