COMPUTER NETWORKING TIPS

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EIGRP configuration in Packet Tracer

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Hello and welcome! In this tutorial, we'll do an overview of **EIGRP** and see how to configure it on a Cisco Router in Packet Tracer.

Overview of EIGRP

Enhanced Interior Gateway Routing Protocol (EIGRP) is an hybrid routing protocol possessing characteristics of both distance-vector and and link-state routing protocols. It was a proprietary Cisco routing protocol but Cisco decided to convert it to an open standard in 2013.

Let's see some **key features** that makes EIGRP helpful especially for large and complex networks.

- It supports both **IPv4** and **IPv6**
- Supports classless routing and **VLSM** (Variable Length Subnet Masking)
- Allows **route summarization** on any router in the network

- Supports **MD5 authentication**

EIGRP uses a **multicast** address of 224.0.0.10 and uses Cisco's Reliable Transport Protocol (RTP) to send messages to the multicast address. It has a default **administrative distance** of 90, which is less than the default administrative distances of RIP and OSPF, implying that EIGRP routes will be preferred over RIP and OSPF routes.

For EIGRP, **routing metric** is calculated using bandwidth, delay, reliability and load.

EIGRP Neighborhood establishment

Before exchanging routing information, routers that run EIGRP must first become neighbors. EIGRP Routers send hello packets to the multicast address of 224.0.0.10 to dynamically discover neighbors on directly attached networks.
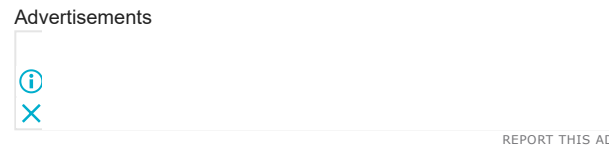
In order for routers in a network to become neighbors:

- They must be configured with the **same ASN** (Autonomous System Number). An autonomous system number is a group of EIGRP-enabled routers that should become EIGRP neighbors and exchange routes.
- The routers must also be using the **same parameters to calculate metric.**These parameters are called *K* **values** (components of metric). Just as we've seen, the K values are *bandwidth,delay,reliability* and *load.*

By default, the only parameters used to calculate EIGRP metric are **bandwith** and **delay.**The other two parameters are disabled by default ; so the network admin has to enable them on the router when desired for use.

EIGRP tables Explained

Each EIGRP router uses three tables to store routing information.

Neighborhood table -which stores information about EIGRP neighbors. Remember we said that routers need first to become neighbors before they can exchange routing information. A neighborhood table is thus used to keep neighborhood information such as the IP address of the neighbor, the local interface on which hellos were received , the hold down timer and others neighbor information.

Topology table– stores routing information learnt from neighbor routing tables. Every EIGRP route inside the autonomous system is stored here.The topology table also holds the metrics for each of the listed EIGRP routes, the feasible successor and the successor routes.

Routing table -Stores only the best routes to reach a remote network.

EIGRP configuration on a Router

Now we're ready to configure EIGRP. It is configured using these commands:

*1. (config) router eigrp ASN – T*his command starts EIGRP on the router.In order to become EIGRP neighbors,routers must be configured with the same AS number.You can use any number between 1 and 65,535

2.(config-router) network SUBNET [WILCARD_MASK]. This command advertises a network directly connected to the router to other routers.

Let's configure this on Packet tracer

1.Build the network topology as shown below.
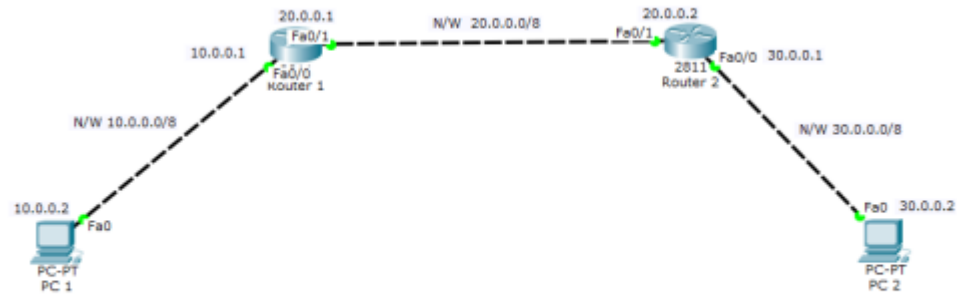
2. Do IP configurations on the PCs and the routers

Router1

R1(config)#
R1(config)#int fa0/0
R1(config-if)#ip add 10.0.0.1 255.0.0.0
R1(config-if)#no shut

R1(config-if)#int fa0/1
R1(config-if)#ip address 20.0.0.1 255.0.0.0
R1(config-if)#no shut

Router 2

R2(config)#

R2(config)#int fa0/0

R2(config-if)#ip add 30.0.0.1 255.0.0.0

R2(config-if)#no shutdown

R2(config-if)#int fa0/1

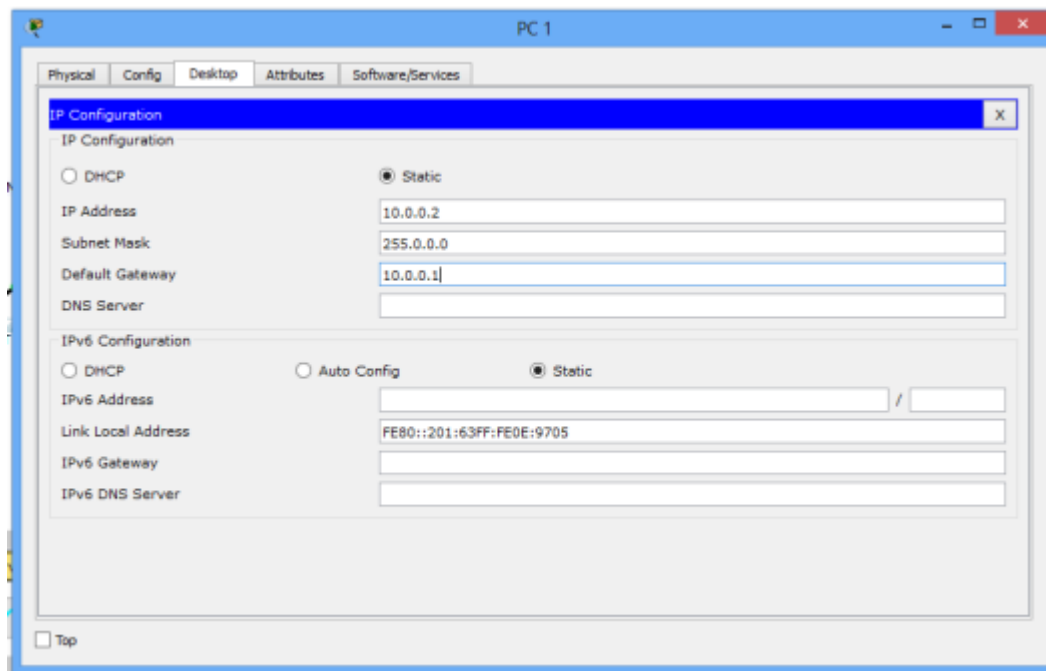R2(config-if)#ip address 20.0.0.2 255.0.0.0

R2(config-if)#no shutdown

PC IP configuration

Click on **PC** –>**Desktop**–>**IP configuration.** Here, fill in **static** IP addresses.
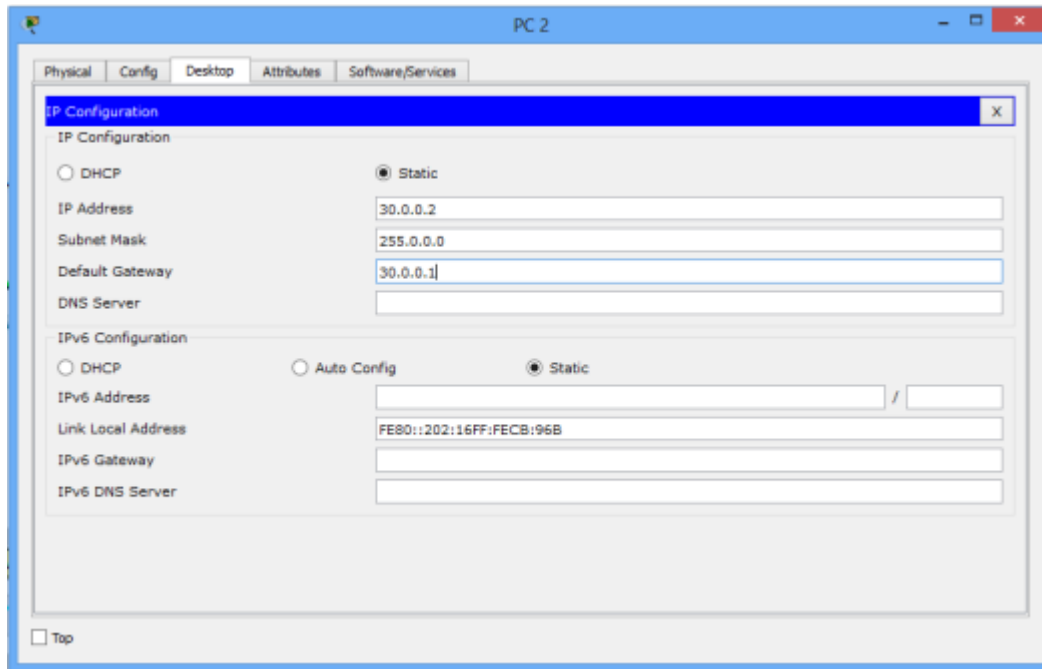
PC1 IP address: 10.0.0.2 **Subnet mask:** 255.0.0.0 **Default Gateway** 10.0.0.1

PC2 IP address: 30.0.0.2 **Subnet mask:** 255.0.0.0 **Default Gateway** 30.0.0.1

PC1

```
PC 1                                                    _  □  ×

Physical   Config   Desktop   Attributes   Software/Services

IP Configuration                                                          x

IP Configuration

○ DHCP                    ● Static

IP Address                10.0.0.2

Subnet Mask               255.0.0.0

Default Gateway           10.0.0.1|

DNS Server

IPv6 Configuration

○ DHCP        ○ Auto Config        ● Static

IPv6 Address                                          /

Link Local Address        FE80::201:63FF:FE0E:9705

IPv6 Gateway

IPv6 DNS Server

□ Top
```

PC2

3. **Configure EIGRP on the routers**. Remember to use the **same ASN** number on both routers. Once configured, the routers become **EIGRP neighbors**.

Router 1:

R1(config)#
R1(config)#router eigrp 1
R1(config-router)#network 10.0.0.0
R1(config-router)#network 20.0.0.0

Router 2:

```
R2(config)#
R2(config)#router eigrp 1
R2(config-router)#network 20.0.0.0
R2(config-router)#network 30.0.0.0
```

You can see that we're simply enabling EIGRP on the routers, then advertising networks **directly connected to each router**. Simple!

4. Now **verify** EIGRP configuration.

First let's verify **EIGRP neighborhood** relationship of the routers.

Lets do this on **Router 1**

```
R1#
R1#show ip eigrp neighbors
```

Then observe the neighborhood:

```
R1#
R1#show ip eigrp neighbors
IP-EIGRP neighbors for process 1
H   Address          Interface      Hold Uptime    SRTT   RTO   Q
Seq
                                    (sec)          (ms)         Cnt
Num
0    20.0.0.2        Fa0/1          12   00:05:27  40     1000  0
4

R1#
```

In the picture above,you can see that **R1** has a single neighbor with the IP address of 20.0.0.2

Secondly, we'll verify whether **R1** has received a route to reach the 30.0.0.0/8 network. We can use the *show ip route eigrp* command.

```
R1#show ip route eigrp
D    30.0.0.0/8 [90/30720] via 20.0.0.2, 01:33:56,
FastEthernet0/1
.
```

Lastly, let's ping **PC2** from **PC1**. Ping should succeed because. **R1** has learnt the route to 30.0.0.0/8 through EIGRP as denoted by letter **D**.

Try also to ping **PC1** from **PC2**. Ping should work.
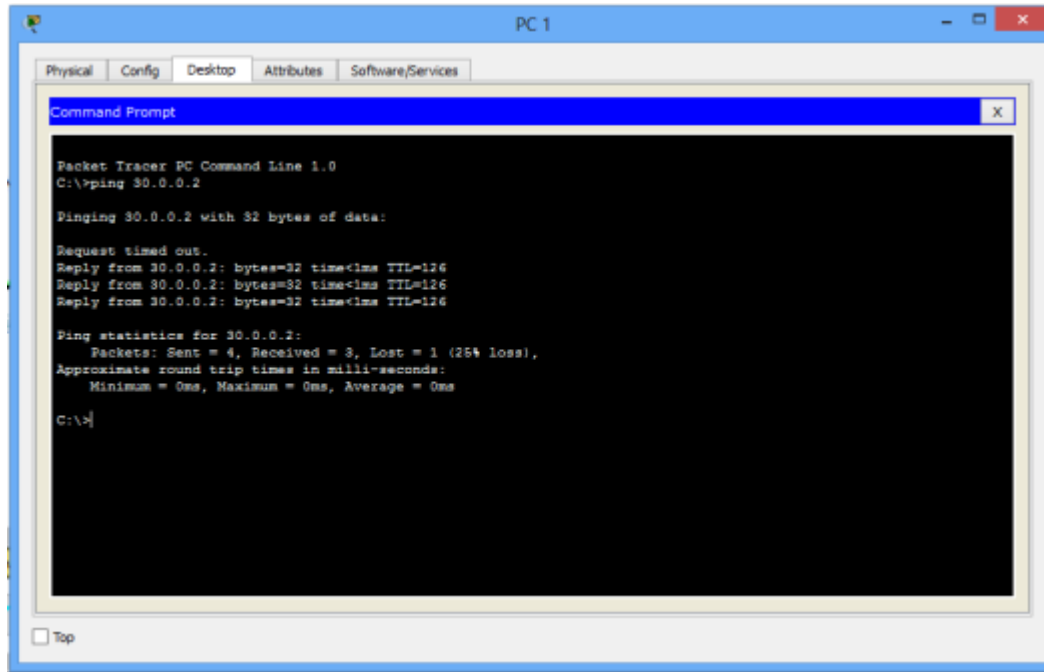
That's it! Hope you found this tutorial helpful. Share your comments in the comments section to help improve this article.

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- RIP configuration in Packet Tracer
- EIGRP for IPv6 (EIGRPv6) configuration in Packet Tracer
- OSPF for IPv6 (OSPFv3) configuration in Packet Tracer
- Configuring RIP next generation(RIPng) in Packet Tracer

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\# **EIGRP, EIGRP IN PACKET TRACER, IPV4 ROUTING PROTOCOLS**

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