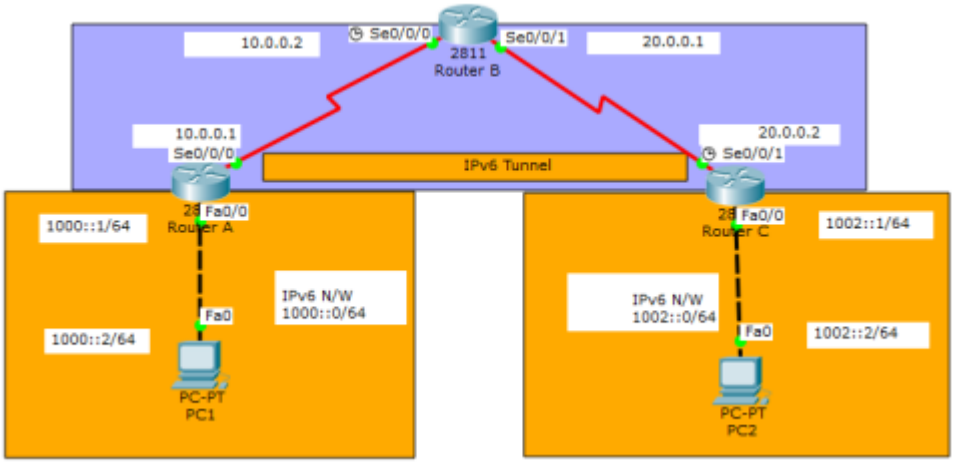
Configuring IPv6 tunneling over an IPv4 network in Packet Tracer

Welcome to this tutorial! The concept of tunneling IPv6 traffic over an IPv4 network is a simple one.

This is what we'll do in Packet Tracer:

- Create IPv6 networks , say, two IPv6 networks (LANs) at two ends of an IPv4 network.
- Create an **IPv6 tunnel** through the IPv4 network through which the IPv6 traffic will be routed.
- Finally configure routing (Both IPv4 and IPv6). This will become clear when we get to do it.

1. Build the network topology.



We've created two 2 IPv6 networks (in orange background) which will have their traffic tunneled through the IPv4 network (in blue background).

That then gives a hint that we should configure interfaces serial 0/0/0 of
both **Router A** and **Router C** with **IPv4 addresses** and interfaces fa0/0 for both routers with **IPv6 addresses.**

For **Router B**, we'll configure **IPv4 address** on both of its interfaces. (Since our intention is to create an IPv6 tunnel through an IPv4 network)

So then let's configure our IPv6 and IPv4 networks.

Router A

```
Router(config)#

Router(config)#ipv6 unicast-routing

Router(config)#int fa0/0

Router(config-if)#ipv6 address 1000::1/64

Router(config-if)#no shutdown

Router(config-if)#int serial 0/0/0

Router(config-if)#ip address 10.0.0.1 255.0.0.0

Router(config-if)#no shutdown
```

Router B

```
Router(config)#

Router(config)#int serial 0/0/0

Router(config-if)#ip add 10.0.0.2 255.0.0.0

Router(config-if)#no shutdown

Router(config-if)#int serial 0/0/1

Router(config-if)#ip address 20.0.0.1 255.0.0.0

Router(config-if)#no shutdown
```

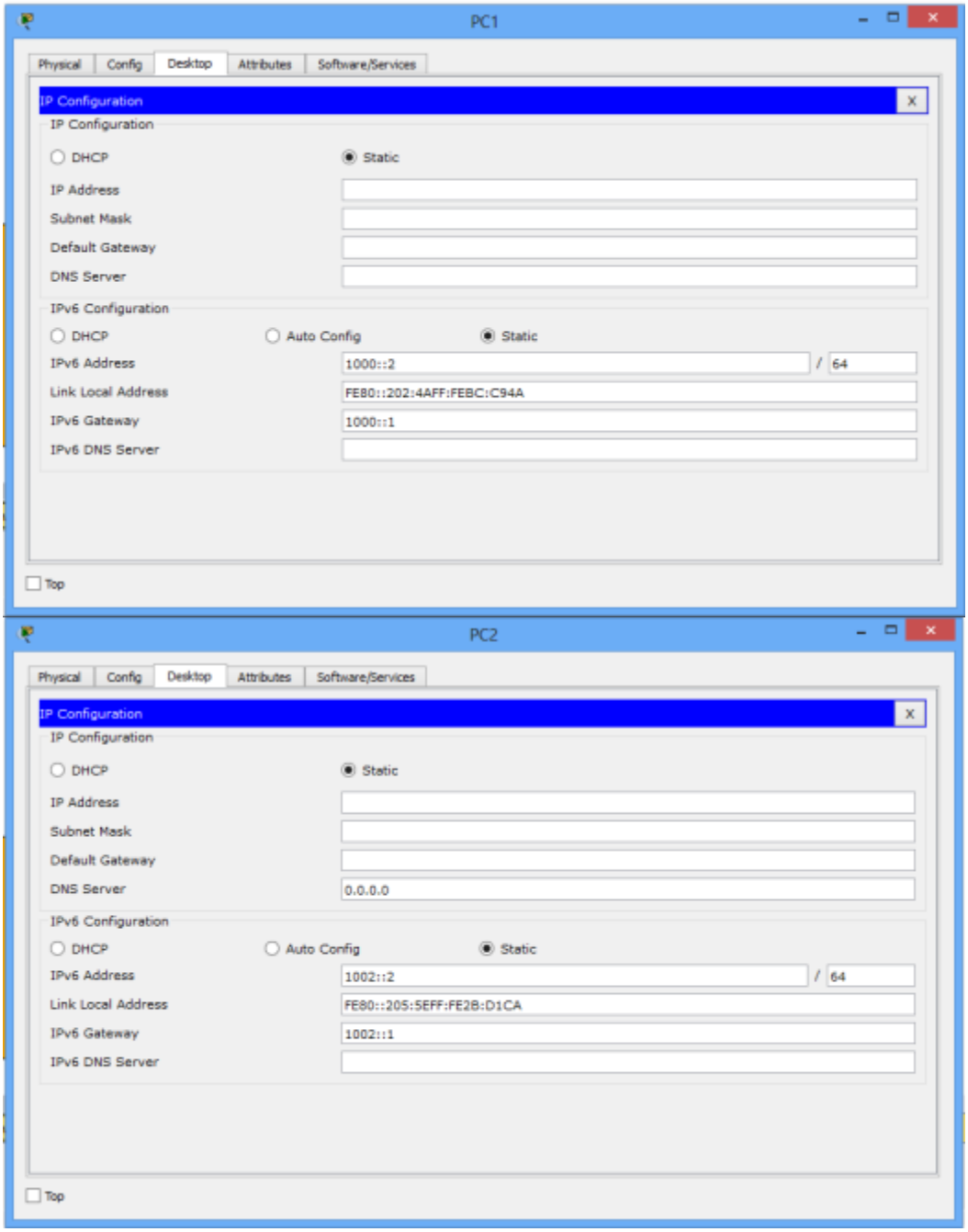
Router C

```
Router(config)#ipv6 unicast-routing

Router(config)#int serial 0/0/1
```

```
Router(config-if)#ip add 20.0.0.2 255.0.0.0

Router(config-if)#no shutdown

Router(config-if)#int fa0/0

Router(config-if)#ipv6 add 1002::1/64

Router(config-if)#no shutdown
```

Now do:

IPv6 address configuration for PCs



Next,

Step 2: Create an **IPv6 tunnel** over the IPv4 network. To do this:

1. Specify tunnel **source**,
2. Specify tunnel **destination**,

3. Configure tunnel source and destination IPv6 addresses
4. Specify tunnel mode (IPv6 over IPv4)

Before you get to configure, have in mind that its Routers **A** and **C** which will be our tunnel routers. We'll see this shortly. A **tunnel** is a type of interface just like Fast Ethernet.

Having that in mind, **configure tunneling** using the following commands:

Router A

```
Router(config)#int tunnel 0

Router(config-if)#tunnel source serial 0/0/0

Router(config-if)#tunnel destination 20.0.0.2

Router(config-if)#tunnel mode ipv6ip

Router(config-if)#ipv6 address 1001::1/64
```

Router C

```
Router(config)#int tunnel 0

Router(config-if)#tunnel source serial 0/0/1

Router(config-if)#tunnel destination 10.0.0.1

Router(config-if)#tunnel mode ipv6ip

Router(config-if)#ipv6 add 1001::2/64
```

Next,

Step 3: The final step is to configure both **IPv4 and IPv6 routing.**

Just before you configure, get it clear why we do both IPv4 and IPv6 routing. Why then? Observe that **Router B** knows about IPv4 networks only; since all its interfaces use IPv4, it is not aware of IPv6 networks existing around it. But this router is the only way for communication between the two LANs (which are utilizing IPv6) . So for **Router B** to pass any packet, it has to know the IPv4 destination networks for the packets, which is enabled through IPv4 routing. Simple!

On the other hand, **IPv6 routing** will be configured on **Router A** and **Router C** since PC1 in one LAN is not aware of an IPv4 network along the way to PC2 in the other LAN . So we configure IPv6 routing so that the two PCs can communicate **through an IPv6 tunnel going through the IPv4 network.** And this will be configured for Routers A and C since Router B doesn't bother about IPv6 networks around it. Hope this doesn't make it more difficult !

So then,

Let's first configure **IPv4 routing**

Router A

```
Router(config)#router eigrp 1

Router(config-router)#net 10.0.0.0
```

Router B

```
Router(config)#router eigrp 1

Router(config-router)#net 10.0.0.0

Router(config-router)#net 20.0.0.0
```

Router C

```
Router(config)#router eigrp 1

Router(config-router)#net 20.0.0.0
```

Now configure IPv6 routing

Just as stated above, IPv6 will only be configured on Routers A and C.Router B is not aware of any ipv6 networks around it, since all its interfaces use IPv4. Therefore IPv6 packets are routed over an IPv4 network. This gives a comprehensive meaning to IPv6 tunneling.

So let's configure IPv6 static routing on Router A and C. Don't forget that these are the tunnel routers.

Router A

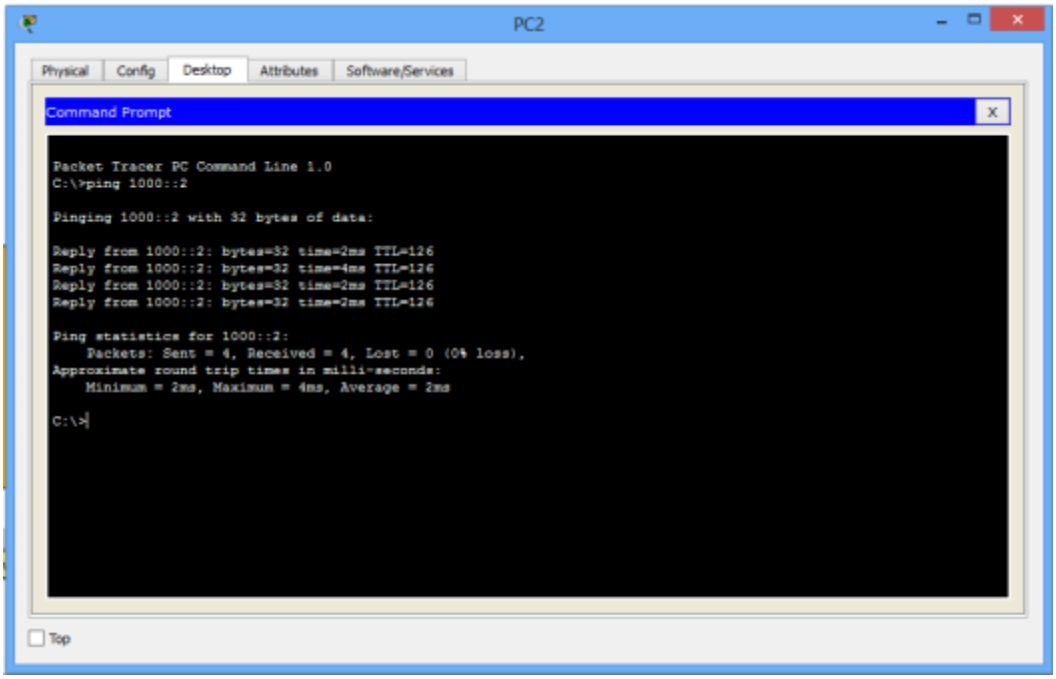
```
Router(config)#

Router(config)# ipv6 route 1002::0/64 1001::2
```

Router C

```
Router(config)#

Router(config)#ipv6 route 1000::0/64 1001::1
```

The last thing to get you confident in tunneling is to test this network for connectivity.

So ping host A from host B or the other way round. If everything is okay, ping should be successful.



And I too say, Success! Success!

Hope you found this tutorial of help to you.

Link:

https://computernetworking747640215.wordpress.com/2019/10/20/ipv6-tunneling-over-an-ipv4-network-2/