

# ARQUITETURA E GESTÃO DE REDES

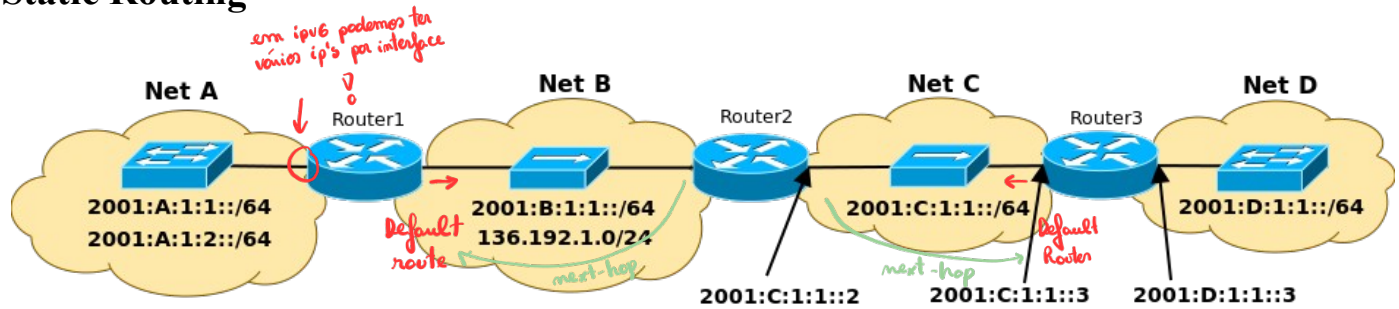
## LABORATORY GUIDE

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### Objectives

- Static routing
- IPv6 tunneling

## Static Routing



1. Assemble the above depicted network, start by configuring all interfaces' IPv6 and IPv4 addresses. Note that you should first activate routing in global configuration mode and enable IPv6 in interface configuration mode. For example, at Router 1:

```
Router1(config)# ipv6 unicast-routing Para construir a routing table
Router1(config)# interface <if-name>
Router1(config-if)# ipv6 enable Activar a interface ...
Router1(config-if)# no shutdown
```

Then, Verify the interfaces' configurations, routing tables, IPv6 neighbors and running IPv6 protocols:

```
Router1# show ipv6 interface brief
Router1# show ipv6 route
Router1# show ipv6 neighbors
Router1# show ipv6 protocols
```

Execute multiple ping commands to test the connectivity between the equipments.

2. Configure all necessary static routes to achieve full IPv6 connectivity:

```
Router1(config)# ipv6 route <ipv6-net> <ipv6_next_hop>
```

Reverify the routing tables and retest the connectivity between the equipments.

*rotas estaticas!*

*R1 → Rede C { Next-hop: 2001:B:1:1::2*  
*R1 → Rede D {*

*Podemos fazer rota estatica..*

*2001:A:1:1::/64 { 2001:B:1:1::/64*  
*2001:A:1:2::/64 {*  
*0001 2 bits, 64-2=62*  
*00100*  
*(.)*

## IPv6 Tunneling

3. Remove the IPv6 addresses from the Ethernet interfaces connected to network B. Configure in Router1 and Router2 a manual IPv6 overlay tunnel:

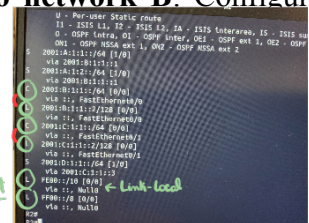
```
Router1(config)# interface Tunnel1
Router1(config-if)# ipv6 address 2001:B:100:1::1/64
Router1(config-if)# tunnel source <if-name>
Router1(config-if)# tunnel destination <ipv4-address>
Router1(config-if)# tunnel mode ipv6ip
```

*Temos 64 bits...*

*Local ipv6*

*Local ipv6*

*Multicast*



Repeat similar configuration in Router2. Reverify the routing tables and retest the connectivity between the equipments.

4. Restart a capture on Net B. From Router2 ping Router1's network B IPv6 address. Analyze the captured packets.

5. Restart a capture on Net B. Execute all necessary static routing configurations in order to obtain full connectivity. From Router2 ping Router1's interface to network A. Analyze the captured packets.

6. Restart a capture on Net C. From Router1 ping Router3's interface to network C. Analyze the captured packets.

Ativa tunnel GRE

7. Reconfigure in Router1 and Router2 the tunnel to GRE over IPv4 mode to transport IPv6 traffic:

```
Router(config-if)# tunnel mode gre ip
```

Restart a capture on Net B. If necessary, execute all necessary static routing configurations in order to obtain full connectivity. From Router2 ping Router1's interface to network A. Analyze the captured packets.

8. Reconfigure in Router1 and Router2 the tunnel to Auto 6to4 mode, by removing the tunnel destination, changing the tunnel endpoint IPv6 address to a 6to4 address (2002:<ipv4 address:ress-hex>::/48) and changing the tunnel mode:

↳ ipv6 over ipv4

```
Router1(config)# interface Tunnel 1
```

```
Router1(config-if)# no ipv6 address 2001:B:100:1::1/64
```

```
Router1(config-if)# ipv6 address 2002:<ipv4-add:ress-hex>::<nnnn>/48
```

```
Router1(config-if)# no tunnel destination <ipv4-address>
```

```
Router1(config-if)# tunnel mode ipv6ip 6to4
```

```
Router1(config-if)# exit
```

special prefix

```
Router1(config-if)# ipv6 route 2002::/16 Tunnel 1
```

Repeat similar configuration in Router2. Define an IPv4 default route from Router2 to Router 1 and vice-versa.

```
Router1(config)# ip route 0.0.0.0 0.0.0.0 <ip-address-R2>
```

Restart a capture on Net B. From Router1 execute the following commands:

```
Router1# ping 2002:A00:1::1
```

```
Router1# ping 2002:88C0:1::1
```

```
Router1# ping 2002:101:101::1
```

Analyze the captured packets.

**6to4 address example: 10.11.1.2 → 2002:0A0B:0102::...**

9. Define the necessary IPv6 static routes in order to obtain full IPv6 connectivity using the Auto 6to4 tunnel.

