



# ARQUITETURA E GESTÃO DE REDES

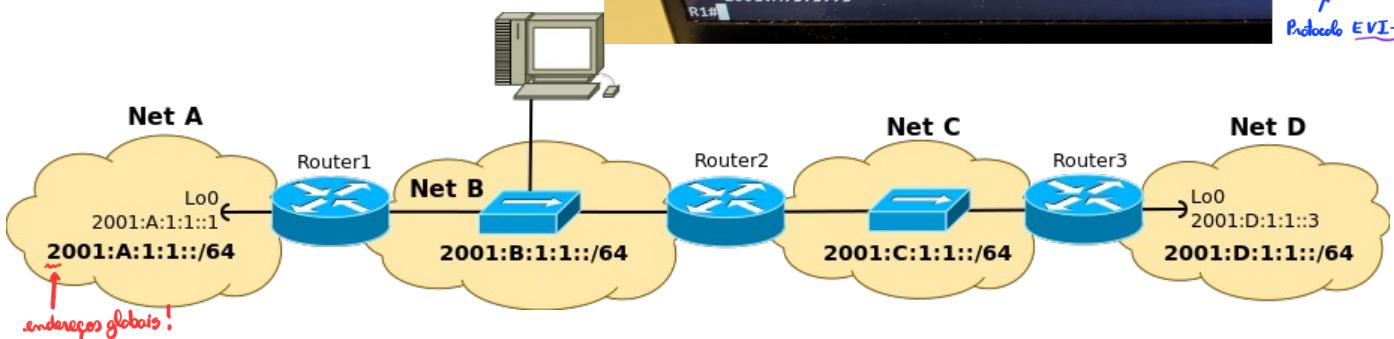
## LABORATORY GUIDE

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### Objectives

- IPv6 internal routing: RIPng and OSPFv3

## RIPng



- Configure the network illustrated in the above figure. Activate IPv6 routing with the command `ipv6 unicast-routing`. Activate the protocol RIPng (process number 1) in all interfaces:

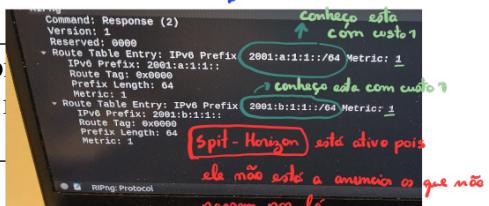
```
Router1(config)# interface <if-name>
Router1(config-if)# ipv6 rip 1 enable
```

Verify also the RIPng information in routers:

```
show ipv6 rip 1
show ipv6 rip 1 database
show ipv6 rip 1 next-hops
```

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

- Restart a capture on PC's Ethernet interface. Wait for 1 minute and discover network A. Analyze the RIPng packets being captured. Wait for 1 minute between Router1 and network A. Analyze the captured RIPng packets.



- Restart a capture on PC's Ethernet interface in promiscuous mode. In Router2 perform a filtering of RIPng Routing Updates in order to prevent the announcement of network `2001:C:1:1::/64` → este diretamente ligada...

```
Router2(config)# ipv6 prefix-list <pl-name> seq 2 deny 2001:C:1:1::/64
Router2(config)# ipv6 prefix-list <pl-name> seq 4 permit 2001:D:1:1::/64
Router2(config)# ipv6 router rip 1 !The process identifier can be any string
Router2(config-rtr)# distribute-list prefix-list <pl-name> out <interface>
```

Note: `<pl-name>` can be any string, and will identify the prefix-list.

Note 2: `seq n` defines the order of the filtering rules.

Verify the prefix-lists configured:

```
Router2# sh ipv6 prefix-list
```

*(clear ipv6 route \*)*

*(D para forçar o cálculo...)*

A sair da interface

→ Ele sempre que envia por ali vai ter estes negros...

Re-verify the routing tables/databases and analyze the captured RIPng packets.

- Configure Router2's interface to network B to announce (to be) the default route by RIPng:

```
Router2(config)# interface <if-name>
Router2(config-if)# ipv6 rip 1 default-information originate
```

Re-verify the routing tables/databases and analyze the captured RIPng packets.

Redo with a different default metric value:

```
Router2(config-if)# ipv6 rip 1 default-information originate metric 10
```

Re-verify the routing tables/databases and analyze the captured RIPng packets.

Agora é possível chegar à rede C porque temos uma rota default

↑  
Continua sem mandar a C

?

## OSPFv3

5. Deactivate the protocol RIPng and activate OSPFv3 (process number 1) in all interfaces (consider a single area - Area0):

```
Router1(config)# ipv6 router ospf 1
Router1(config-rtr)# router-id <n.n.n.n>
Router1(config)# interface <if-name>
Router1(config-if)# ipv6 ospf 1 area 0
```

The process identifier can be any string  
!Manually define OSPFv3 RID

On the loopback interfaces, defined them as a point-to-point network (to force the announcement of the loopback mask) with the command:

```
Router1(config)# interface loopback 0
Router1(config-if)# ipv6 ospf network point-to-point
```

O ospf quando é loopack  
anuncia mesmo o ip! Não  
como rede:

O 2001:c::1:1::3/64

Não é a rede!

Verify and analyze the OSPFv3 database information in routers:

```
show ipv6 ospf 1
show ipv6 ospf 1 database
show ipv6 ospf 1 database network
show ipv6 ospf 1 database router
show ipv6 ospf 1 database prefix
```

!New OSPFv3 database

Re-verify the routing tables and retest the connectivity between the equipments.

6. Restart a capture on PC's Ethernet interface in promiscuous mode. Wait for 1 minute and shutdown the loopback0 interface on Router1 (network A). Analyze the OSPFv3 packets being captured. Wait for 1 minute and reactivate (no shutdown) the loopback interface on Router1 (network A). Analyze the captured OSPFv3 packets.

*↳ Quando algo muda ele envia Link State Update e recebe Link State Acknowledge*

```
R1# show ipv6 ospf 1 database network
OSPFv3 Router with ID (3.3.3.3) (Process ID 1)
Net Link States (Area 0)

LS age: 258
Options: (V6-Bit E-Bit R-bit DC-Bit)
LS Type: Network Links → Id do designated router!
Link State ID: 4 (Interface ID of Designated Router)
Advertising Router: 2.2.2.2 ← id do router,
LS Seq Number: 80000001
Checksum: 0x3ED
Length: 32
Attached Router: 2.2.2.2
Attached Router: 1.1.1.1

LS age: 256
Options: (V6-Bit E-Bit R-bit DC-Bit)
LS Type: Network Links
--More--
```

```
R1
Routing Bit Set on this LSA
LS age: 437
LS Type: Intra-Area-Prefix-LSA
Link State ID: 0
Advertising Router: 1.1.1.1
LS Seq Number: 00000003
Checksum: 0x0905
Length: 44
Referenced LSA Type: 2002
Referenced Link State ID: 0
Referenced Advertising Router: 1.1.1.1
Number of Prefixes: 1
Prefix Address: 2001:0:1:1::1
Prefix Length: 64, Options: None, Metric: 1

Routing Bit Set on this LSA
LS age: 436
LS Type: Intra-Area-Prefix-LSA
Link State ID: 4096
Advertising Router: 2.2.2.2
LS Seq Number: 00000001
Checksum: 0x2350
Length: 44
Referenced LSA Type: 2002
Referenced Link State ID: 4
Referenced Advertising Router: 2.2.2.2
Number of Prefixes: 1
Prefix Address: 2001:0:1:1::1
Prefix Length: 64, Options: None, Metric: 0

Routing Bit Set on this LSA
LS age: 438
LS Type: Intra-Area-Prefix-LSA
Link State ID: 5120
Advertising Router: 2.2.2.2
LS Seq Number: 00000001
Checksum: 0x1756
Length: 44
Referenced LSA Type: 2002
Referenced Link State ID: 5
Referenced Advertising Router: 2.2.2.2
Number of Prefixes: 1
Prefix Address: 2001:0:1:1::1
Prefix Length: 64, Options: None, Metric: 0

Routing Bit Set on this LSA
LS age: 434
LS Type: Intra-Area-Prefix-LSA
Link State ID: 0
Advertising Router: 3.3.3.3
LS Seq Number: 00000002
Checksum: 0xF506
Length: 44
Referenced LSA Type: 2002
Referenced Link State ID: 0
Referenced Advertising Router: 3.3.3.3
Number of Prefixes: 1
Prefix Address: 2001:0:1:1::1
Prefix Length: 64, Options: None, Metric: 1
```

As vezes precisamos de ver o prefixo...

```
R3#
R3# show ipv6 ospf 1 database network
OSPFv3 Router with ID (3.3.3.3) (Process ID 1)
Net Link States (Area 0)

LS Type: Network Links
Link State ID: 4 (Interface ID of Designated Router)
Advertising Router: 2.2.2.2
LS Seq Number: 80000001
Checksum: 0x3ED
Length: 32
Attached Router: 2.2.2.2
Attached Router: 1.1.1.1

LS age: 256
Options: (V6-Bit E-Bit R-bit DC-Bit)
LS Type: Network Links → id S
Link State ID: 5 (Interface ID of Designated Router)
Advertising Router: 2.2.2.2
LS Seq Number: 80000001
Checksum: 0x5D8A
Length: 32
Attached Router: 2.2.2.2
Attached Router: 3.3.3.3

R3#
```

