

ARQUITETURA E GESTÃO DE REDES

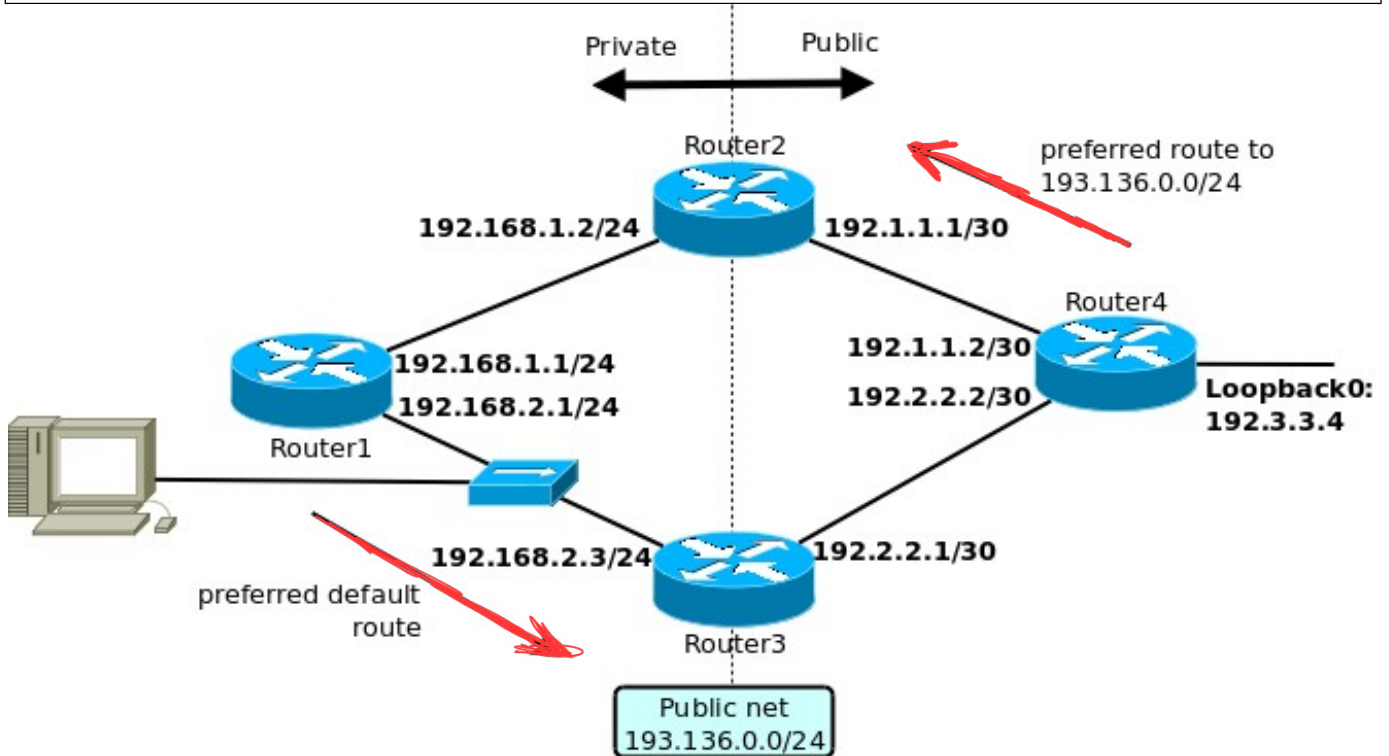
LABORATORY GUIDE

Objectives

- NAT, PAT, SNAT
- Dynamic default routes propagation
- Weighted static routes

NAT/PAT and Stateful NAT (SNAT) mechanisms

1. Configure the following network according to the following figure and the following constraints:
 - Router2 and Router3 have the following pool of IP public addresses: 193.136.0.1-128
 - Routers1, 2 and 3 have OSPF routing protocol active in the interfaces connected to the private networks, Router1 should have a **dynamic** preferential default route via Router3.
 - Router4 should have a **static** route to network 192.136.0.0/24 via Router2.



Specific configurations. Basic configurations are not included.

```
#In Router2
Router2(config)# router ospf 1
Router2(config-router)# network 192.168.1.0 0.0.0.255 area 0
#To announce default route with metric 10 (not preferred/backup) !
Router2(config-router)# default-information originate always metric 10
#Default route via 192.1.1.2
Router2(config)# ip route 0.0.0.0 0.0.0.0 192.1.1.2 {static route!}

#In Router3
Router3(config)# router ospf 1
Router3(config-router)# network 192.168.2.0 0.0.0.255 area 0
#To announce default route with metric 5 (preferred)
Router3(config-router)# default-information originate always metric 5
#Default route via 192.2.2.2
Router3(config)# ip route 0.0.0.0 0.0.0.0 192.2.2.2
```

```
#In Router4
#Creation/activation of a loopback interface
Router4(config)# interface Loopback0
Router4(config-if)# ip address 192.3.3.4 255.255.255.0
Router4(config-if)# no shutdown
#Weighted static routes to network 193.136.0.0/25
#using Router 2 metric 1 (preferred)
Router4(config)# ip route 193.136.0.0 255.255.255.128 192.1.1.1
```

→ Rede pública do NAT!

#using Router 2 metric 10 (not preferred/backup)

```
Router4(config)# ip route 193.136.0.0 255.255.255.128 192.2.2.1 10
```

2. Verify the full connectivity within the private networks. Test the connectivity between Router1 and Router4's Loopback0 interface. Explain the obtained results.

*Se fizer um ping R1 → R4 ele vai!
(Mas o R4 → R1 não funciona! Falta o NAT)*

3. Activate the NAT/PAT mechanism in Router2 and Router3. Test the connectivity between Router1 and Router4's Loopback0 interface. Explain the obtained results.

#In Router2

#Private networks

```
Router2(config)# access-list 1 permit 192.168.1.0 0.0.0.255
```

```
Router2(config)# access-list 1 permit 192.168.2.0 0.0.0.255
```

#Public addresses pool (first half) *Pool enorme! é exagerada...*

```
Router2(config)# ip nat pool POOLR 193.136.0.1 193.136.0.128 netmask 255.255.255.0
```

#Association between public pool address and private networks (NAT+PAT)

```
Router2(config)# ip nat inside source list 1 pool POOLR overload
```

também os pontos

#In Router3

#Private networks

```
Router3(config)# access-list 1 permit 192.168.1.0 0.0.0.255
```

```
Router3(config)# access-list 1 permit 192.168.2.0 0.0.0.255
```

#Public addresses pool (second half)

```
Router3(config)# ip nat pool POOLR 193.136.0.1 193.136.0.128 netmask 255.255.255.0
```

#Association between public pool address and private networks (NAT+PAT)

```
Router3(config)# ip nat inside source list 1 pool POOLR overload
```

Activate the NAT mechanisms at the respective interfaces using the commands `ip nat inside` and `ip nat outside`. Verify the NAT mechanism status (in Router2 and Router3) with the commands:

```
show ip nat translations
```

```
show ip nat translations verbose
```

4. Activate the SNAT mechanism between Router2 and Router3 (Router3 as primary and Router2 as backup). Test the connectivity between Router1 and Router4's Loopback0 interface. Explain the obtained results.

#In Router2

#SNAT configuration

```
Router2(config)# ip nat Stateful id 2
```

```
Router2(config-ipnat-snat)# backup 192.168.1.2
```

```
Router2(config-ipnat-snat-bkp)# peer 192.168.2.3
```

```
Router2(config-ipnat-snat-bkp)# mapping-id 10
```

#Association between public pool address and private networks (NAT+PAT+SNAT)

```
Router2(config)# no ip nat inside source list 1 pool POOLR overload
```

```
Router2(config)# ip nat inside source list 1 pool POOLR mapping-id 10 overload
```

#In Router3

#SNAT configuration

```
Router3(config)# ip nat Stateful id 3
```

```
Router3(config-ipnat-snat)# primary 192.168.2.3
```

```
Router3(config-ipnat-snat-bkp)# peer 192.168.1.2
```

```
Router3(config-ipnat-snat-bkp)# mapping-id 10
```

#Association between public pool address and private networks (NAT+PAT+SNAT)

```
Router3(config)# no ip nat inside source list 1 pool POOLR overload
```

```
Router3(config)# ip nat inside source list 1 pool POOLR mapping-id 10 overload
```

Verify the SNAT mechanism status (in Router2 and Router3) with the commands:

```
show ip snat distributed verbose
```