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ARQUITETURA DE REDES

AUXILIARY GUIDE

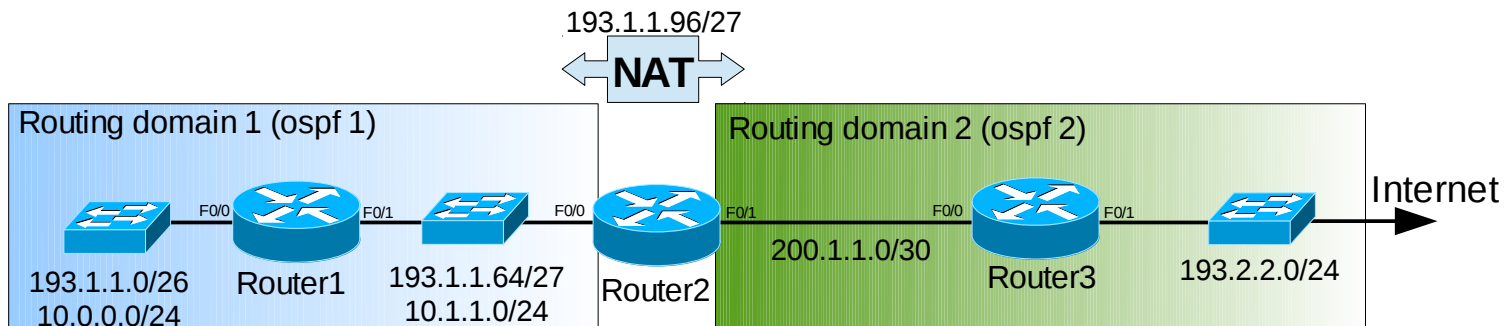
MULTIDOMAIN ROUTING WITH NAT

Objectives

- Understand how routes are exchange between different routing domains
- Understand how to filter private networks announcements
- Understand how to announce NAT target networks

Multidomain Routing with NAT

- Configure the following network according to the following figure and the following constraints:
 - Routing domain 1 has the 193.1.1.0/25 public IPv4 network for their own use.
 - Routing domain 1 uses the 10.0.0.0/8 private IPv4 network for internal connectivity.
 - Outside of the routing domain 1 only the network 193.1.1.0/25 should be visible (announced).
 - Outside of the routing domain 1 none of the sub-networks of 193.1.1.0/25 should be visible (announced).



- Start by performing the following basic IPv4 and OSPF configurations in Router2:

```

Router2(config)# int f0/0
Router2(config-if)# ip address 193.1.1.66 255.255.255.224
Router2(config-if)# ip address 10.1.1.2 255.255.255.0 secondary
Router2(config-if)# int f0/1
Router2(config-if)# ip address 200.1.1.1 255.255.255.252
Router2(config-if)# router ospf 1
Router2(config-router)# network 10.0.0.0 0.255.255.255 area 0
Router2(config-router)# network 193.1.1.0 0.0.0.127 area 0
Router2(config-router)# default-information originate always
Router2(config-if)# router ospf 2
Router2(config-router)# network 200.1.1.0 0.0.0.3 area 0
Do similar configurations in Router1 and Router3. Analyze all routing tables.
  
```

- Configure the NAT/PAT mechanisms in Router2:

```

Router2(config)# ip nat pool POOL1 193.1.1.97 193.1.1.127 netmask 255.255.255.224
Router2(config)# ip nat inside source list 1 pool POOL1 overload
Router2(config)# access-list 1 permit 10.0.0.0 0.255.255.255
Router2(config)# int f0/0
Router2(config-if)# ip nat inside
Router2(config-if)# int f0/1
Router2(config-if)# ip nat outside
  
```

Test the correctness of the NAT/PAT configurations. Ping from Router1 the interface F0/0 of Router3 using as IPv4 source the private address of Router1's F0/0 interface:

```

Router1# ping 200.1.1.x source 10.1.1.y
Analyze the NAT translations table in Router2:
  
```

```

Router2# show ip nat translations
  
```

Why the the ping command has been unsuccessful?

4. Redistribute routes from OSPF 1 process in OSPF 2 process, and vice-versa:

```
Router2(config-if)# router ospf 1
Router2(config-router)# redistribute ospf 2 subnets
Router2(config-router)# router ospf 2
Router2(config-router)# redistribute ospf 1 subnets
```

Analyze again the routing tables, note that all private networks are being announced to routing domain 2. Ping again from Router1 the interface F0/0 of Router3 using as IPv4 source the private address of Router1's F0/0 interface. Why the the ping command is still unsuccessful?

5. To filter the announcement of private network from ospf 1 to ospf 2, perform the following commands in Router2.

```
Router2(config)# access-list 50 deny 10.0.0.0 0.255.255.255
Router2(config)# access-list 50 permit any
Router2(config)# router ospf 2
Router2(config-router)# distribute-list 50 out
```

Analyze again the routing tables, verify if private networks announcements problem have been solved. If necessary restart the OSPF processes:

```
Router2# clear ip ospf process
```

Ping again from Router1 the interface F0/0 of Router3 using as IPv4 source the private address of Router1's F0/0 interface. Why the the ping command is still unsuccessful?

6. Since only a network present in the routing table is redistributed to another routing domain, it is necessary to place the full public IPv4 network in the routing table (as a static route dummy entry to null0):

```
Router2# ip route 193.1.1.0 255.255.255.128 Null0
```

Restart the OSPF processes. Analyze again the routing tables. Ping again from Router1 the interface F0/0 of Router3 using as IPv4 source the private address of Router1's F0/0 interface. Is ping command successful?

7. Is still necessary to aggregate the networks being announced:

```
Router2(config)# router ospf 2
Router2(config-router)# summary-address 193.1.1.0 255.255.255.128
```

Restart the OSPF processes. Analyze again the routing tables. Ping again from Router1 the interface F0/0 of Router3 using as IPv4 source the private address of Router1's F0/0 interface. Is ping command successful?

8. As an alternative, remove the redistribution of OSPF1 and do only a redistribution of static routers:

```
Router2(config)# router ospf 2
Router2(config-router)# no redistribute ospf 1 subnets
Router2(config-router)# redistribute static subnets
```

Restart the OSPF processes. Analyze again the routing tables. Is this solution equivalent?