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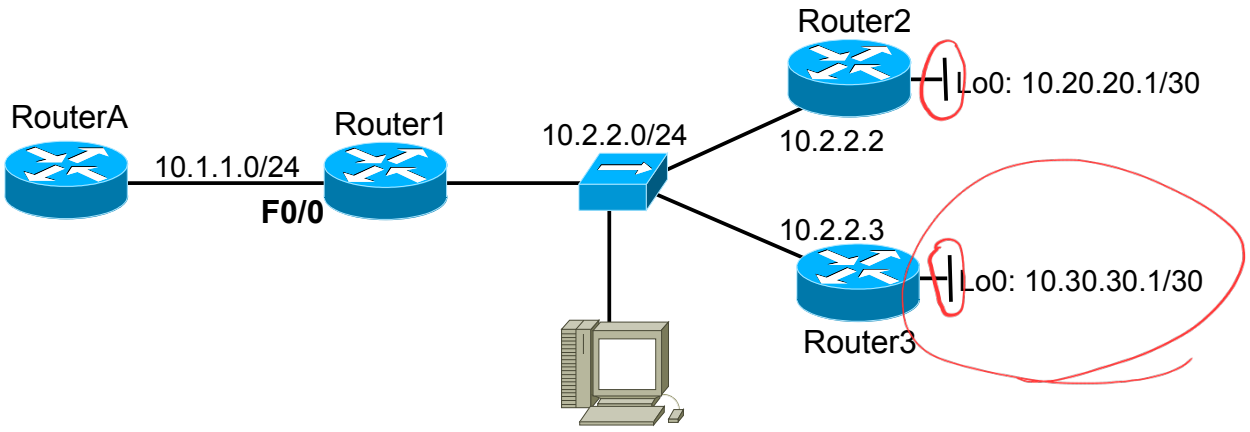
Arquitetura e Gestão de Redes

Laboratory Guide

Objectives

- Study of the route maps mechanisms.

Route-Maps



1. Set up a network including 3 routers interconnected by Ethernet networks as specified in the previous figure. Configure the IP addresses of the router interfaces (including the *loopback* interfaces) in agreement with the specified IP networks (for Router2 and Router3 use the IP addresses depicted in the figure). To configure the *loopback* interfaces use the following commands:

```
Router2(config)# interface loopback 0
Router2(config-if)# ip address 10.20.20.1 255.255.255.252
Router2(config-if)# ip ospf network point-to-point
!!!
Router3(config)# interface loopback 0
Router3(config-if)# ip address 10.30.30.1 255.255.255.252
Router3(config-if)# ip ospf network point-to-point
```

Activate OSPF in all routers for all networks (all in area 0):

```
Router(config)# router ospf 1
Router(config-router)# network 10.0.0.0 0.255.255.255 area 0
```

Verify the routing tables in all routers. Start a capture in the network 10.2.2.0/24. From RouterA ping Router3 loopback0 interface. Analyze the captured packets and verify that the capture agrees with the content of the routing table from Router1.

2. Define in Router1 a Policy-Based Routing route-map to force all traffic to network 10.30.30.0/30 to go via Router2. First, configure the rule (access-list) that defines which traffic will be processed by the route-map:

```
Router1(config)# access-list 101 permit ip any 10.30.30.0 0.0.0.255
```

Then, define the route-map that will change the next-hop (to be Router2) for the traffic defined in the access list 101:

```
Router1(config)# route-map ForceRouting permit 10
Router1(config-route-map)# match ip address 101
Router1(config-route-map)# set ip next-hop 10.2.2.2
```

The underlined part of the commands are user defined names/strings (i.e. the name of the route-map) and the numeric value (10) defines the order of processing when multiple rules are present in a route-map. Apply the route-map to Router1 interface with network 10.1.1.0/24:

```
Router1(config)# interface FastEthernet0/0
Router1(config-if)# ip policy route-map ForceRouting
```

This will make all traffic entering Router1 from network 10.1.1.0/24 to be tested by the route-map. Re-verify the routing tables in all routers. Start a capture in the network 10.2.2.0/24. From RouterA ping Router3 loopback0 interface (10.30.30.1). Analyze the captured packets and verify the correct operation of the route-map.

3. Configure a secondary IP address on Router3 loopback0 interface:

```
Router3(config)# interface loopback 0
Router3(config-if)# ip address 10.30.30.2 255.255.255.252 secondary
```

From RouterA ping the secondary IP address of Router3 loopback0 interface (10.30.30.2). Analyze the captured packets and verify the correct operation of the route-map.

4. Configure another rule (access-list 102) that identifies all traffic to IP address 10.30.30.2:

```
Router1(config)# access-list 102 permit ip any host 10.30.30.2
```

Then, define another rule in route-map (with higher order of processing: **20**) that will change the next-hop (to be Router3) for the traffic defined in the access list 102 (traffic to 10.30.30.2):

```
Router1(config)# route-map ForceRouting permit 20
Router1(config-route-map)# match ip address 102
Router1(config-route-map)# set ip next-hop 10.2.2.3
```

Start a capture in the network 10.2.2.0/24. From RouterA ping both address of Router3 loopback0 interface (10.30.30.1 and 10.30.30.2). Analyze the captured packets and verify if the new route-map rule worked.

5. Erase the new rule and define another rule in the original route-map (with lower order of processing: **5**) that will change the next-hop (to be Router3) for the traffic defined in the access list 102 (traffic to 10.30.30.2):

```
Router1(config)# no route-map ForceRouting permit 20
Router1(config)# route-map ForceRouting permit 5
Router1(config-route-map)# match ip address 102
Router1(config-route-map)# set ip next-hop 10.2.2.3
```

Start a capture in the network 10.2.2.0/24. From RouterA ping both address of Router3 loopback0 interface (10.30.30.1 and 10.30.30.2). Analyze the captured packets and verify the correct operation of all rules of the route-map, based on the order of processing value of the rules.