

NETWORKS AND PROTOCOLS

Lab 6

Introduction

The objectives of this lab are to :

- Dynamic routing configuration (using RIP - Routing Internet Protocol),
- Test and verify configurations.

Instructions

- Both topologies will be implemented via packet tracer following the same principles and approach, namely :
 - mounting,
 - interface configuration,
 - application of static routing rules,
 - and perform tests after each operation to ensure that it has been corrected before the next step.
 - On Packet Tracer, use the first generic router (router-PT).
- Use IP addresses 192.168.1.x, 192.168.2.x, 192.168.3.x and 192.168.4.x for networks LAN1, LAN2, LAN3 and LAN4 respectively, and addresses 192.168.5.x, 192.168.6.x and 192.168.7.x for each of the extended networks E1, E2 and E3 respectively.

Lab topology

See figure 1

Task 1. & Task 2.

Same tasks as the previous lab (Lab 5)

Task 3. Configuring RIP

Step 1:

- In each router's CLI, run the `show ip route` command in privileged mode;
- If the configuration is correct, the routing table of router 'router1' should look like this the following figure 2:

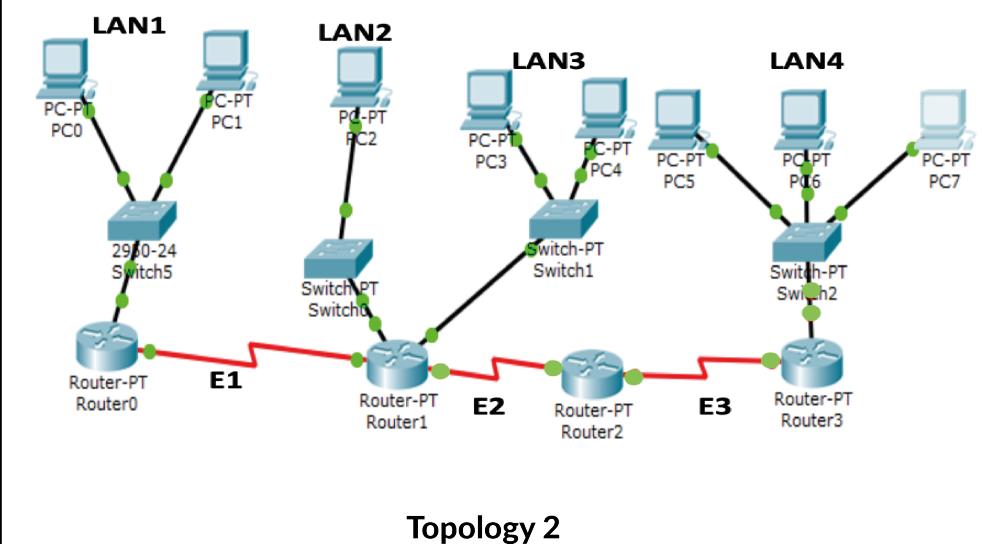
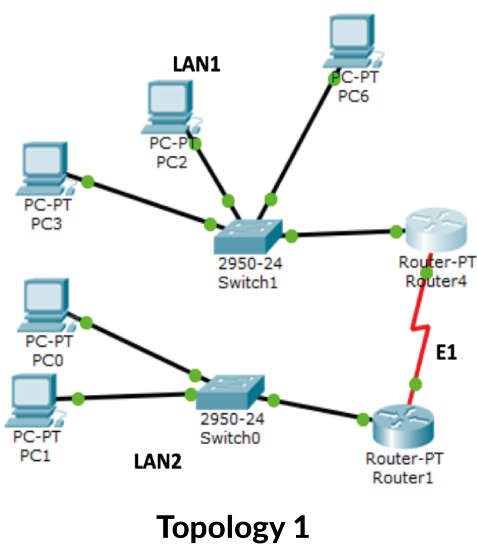


Figure 1: Lab topologies

```

Router#
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
        i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
        * - candidate default, U - per-user static route, o - ODR
        P - periodic downloaded static route

Gateway of last resort is not set

C    192.168.1.0/24 is directly connected, FastEthernet0/0
C    192.168.5.0/24 is directly connected, Serial2/0
Router#

```

Copy Paste

Figure 2: Simple routing table

In the figure 2, the possible routing codes on this router are displayed, for example :

- **C** represents networks connected directly to the router,
- **S** represents networks configured statically using the ip route command,
- **I, R, B, ...** represent the routes learned respectively by the dynamic routing protocols **IGRP, RIP, BGP, ...**
- You can see that connected networks are automatically recognized by the router router, as they are directly attached to its interfaces.

Step 2: Dynamic routing configuration.

After configuring all of the devices we need to assign the routes to the routers.

To assign RIP routes to the particular router:

- First, click on **router0** then Go to CLI.
- Then type the commands and IP information given below.

```
router rip
version 2
network <network address>
```

As you can see, to configure rip on each router, we enable enable RIP using router rip command then advertise the networks directly connected to the router interfaces using network command. You can see that **Router0** has learned about the 192.168.2.0/24 network. The letter R indicates that the route was learned using RIP. Note the administrative distance of 120 and the metric of 3 in the [120/3] part, figure 3.

IOS Command Line Interface

```
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up
ip address 192.168.1.1 255.255.255.0
Router(config-if)#
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#network 192.168.7.0
Router(config-router)#network 192.168.1.0
Router(config-router)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, GigabitEthernet0/0/0
L       192.168.1.1/32 is directly connected, GigabitEthernet0/0/0
R       192.168.2.0/24 [120/3] via 192.168.7.1, 00:00:08, Serial0/1/0
R       192.168.3.0/24 [120/2] via 192.168.7.1, 00:00:08, Serial0/1/0
R       192.168.4.0/24 [120/2] via 192.168.7.1, 00:00:08, Serial0/1/0
R       192.168.5.0/24 [120/2] via 192.168.7.1, 00:00:08, Serial0/1/0
R       192.168.6.0/24 [120/1] via 192.168.7.1, 00:00:08, Serial0/1/0
    192.168.7.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.7.0/30 is directly connected, Serial0/1/0
L       192.168.7.2/32 is directly connected, Serial0/1/0

Router#
```

Command+F6 to exit CLI focus

Copy

Paste

Figure 3: Routing table (ip route)

Step 3:

- Check that dynmic routing has been established.
- As described above, the `show ip route` command in privileged mode can be used to to display the routing table and check that it is correct.

Step 4:

- Check connectivity.
- Connectivity on each local network has already been checked (step 3 of the previous task).
- This step involves checking connectivity outside each local network. So, from each computer, ping all other computers. Also ping between computers and router interfaces and vice versa.

Task 4: Creating topology 2 with Packet Tracer

Step 1: Propose an addressing plan for topology 2 using the following network address address: 192.168.1.0/24

Step 2:

- Set up and configure network topology 2,
- Establish dynamic routing protocol,
- Perform the necessary connectivity tests.

Step 3:

- Remove a link from any switch and check all routing tables, what happens ?
.....
.....
- Add a new network (switch + two terminals) to Router 2
 - Configure the new interface of the router
 - Configure terminals
 - Add the new network to the routing protocol (Task1/Step2)
 - Display all routing table, what did you notice ?
.....
.....