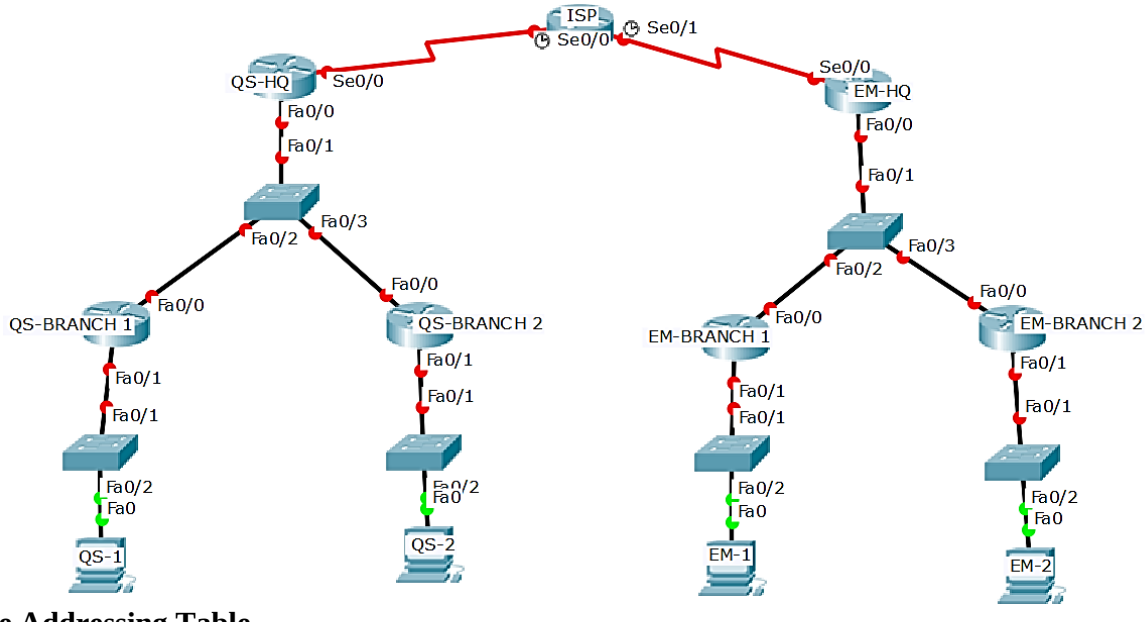
FACULTY OF INFORMATION TECHNOLOGY
BACHELOR OF SCIENCE INFORMATICS AND COMPUTER SCIENCE
ICS 2203: Advanced Networking
Lab Assignment 4– Configuring OSPF and EIGRP
Submission Deadline: Friday 26th October 2018 11:55pm

The Topology



The Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
ISP	S0/0	11.0.0.1	255.255.255.252	N/A
ISP	S0/1	11.0.0.5	255.255.255.252	N/A
QS-HQ	S0/0	11.0.0.2	255.255.255.252	N/A
QS-HQ	Fa0/0	172.16.3.1	255.255.255.0	N/A
QS-Branch 1	Fa0/0	172.16.3.2	255.255.255.0	N/A
QS-Branch 1	Fa0/1	172.16.0.1	255.255.254.0	N/A
QS-Branch 2	Fa0/0	172.16.3.3	255.255.255.0	N/A
QS-Branch 2	Fa0/1	172.16.2.1	255.255.255.0	N/A
EM-HQ	S0/0	11.0.0.6	255.255.255.252	N/A
EM-HQ	Fa0/0	192.168.19.1	255.255.255.0	N/A
EM-Branch 1	Fa0/0	192.168.19.2	255.255.255.0	N/A
EM-Branch 1	Fa0/1	192.168.20.1	255.255.255.0	N/A
EM-Branch 2	Fa0/0	192.168.19.3	255.255.255.0	N/A
EM-Branch 2	Fa0/1	192.168.21.1	255.255.255.192	N/A
PC-QS-1	NIC	172.16.0.2	255.255.254.0	172.16.0.1
PC-QS-	NIC	172.16.2.2	255.255.255.0	172.16.2.1
PC-EM-1	NIC	192.168.20.2	255.255.255.0	192.168.20.1
PC-EM-2	NIC	192.168.21.2	255.255.255.192	192.168.21.1

The topology above shows the networks of two companies: Quick Solutions (QS) and Easy Money (EM) and how they are connected to their ISP. The companies use different routing protocols within

their internal networks and a static route configured to their Internet Service Provider's network. Examine the topology then perform the following tasks.

Required:

Task 1: Basic Configurations

a. Connect your devices as in the topology. Take note of the port connections.
   - Use the 2621XM routers found in miscellaneous devices in Packer Tracer 7.0
   - Use 2960 switches for the entire topology

b. Perform the following standard router configuration on all routers
   i. Host names
   ii. Interface addresses *(refer to the given addressing table)*
   iii. Clock rate of 128000 on the ISP router's serial interfaces

   NB: DO NOT configure passwords or any other basic configurations

c. Test for connectivity.
   i. PCs – QS-1 and QS-2 should be able to ping the fa0/1 interface of the QS Branch router to which each PC sis connected respectively
   ii. PCs – EM-1 and EM-2 should be able to ping the fa0/1 interface of the EM Branch router to which each PC is connected respectively
   iii. QS-HQ should be able to ping the ISP s0/0 IP address.
   iv. EM-HQ should be able to ping the ISP s0/1 IP address.
   v. Any other ping will most likely fail.

Task 2: Configure EIGRP on QS Limited

You may need to research for on the syntax.

a. On the QS Branches, configure EIGRP and advertise the networks on the Fast Ethernet ports only

b. On the Headquarter Router (i.e. QS-HQ) configure EIGRP and advertise the network on the Fast Ethernet port only
   NB: *Do not include the network on the serial interfaces between QS-HQ and ISP in your network statements.*

c. Verify routing table information on QS-HQ and its branches using **`show ip route`**. There should be an 'D' against all remote networks learned via EIGRP
   NB: *Other verification commands can be used (research online*)

d. Ping between the PCs on the QS branches. This ping should work.

Task 3: Configure OSPF on EM Limited

You may need to refer to the lab on configuring OSPF for details on the syntax.

a. On the EM Branches, configure OSPF in area 0 and advertise the networks on the Fast Ethernet ports only

b. On the Headquarter Router (i.e. EM-HQ) configure OSPF in area 0 and advertise the network on the Fast Ethernet port only

NB: *Do not include the network on the serial interface between EM-HQ and ISP in your network statements.*

c. Verify routing table information on EM-HQ and its branches using **`show ip route`**. There should be an 'O' against all remote networks learned via OSPF

NB: *Other verification commands can be used (refer to the lab on configuring OSPF*)

d. Ping between the PCs on the EM branches. This ping should work.

Task 4: Configure Summary Static Routes on ISP

a. On ISP enable the following summary static route to allow connectivity to QS Limited.

```
ISP(config)#ip route 172.16.0.0 255.255.0.0 s0/0
```

b. On ISP enable the following summary static route to allow connectivity to EM Limited.

```
ISP(config #ip route 192.168.0.0 255.255.0.0 s0/1
```

c. Verify routing table of ISP to determine if the static routes were added using **`show ip route`**. There should be an 'S' for each static route configured.

d. From ISP ping all PCs. The ping should fail.

Note:

- A network needs a path to a destination and a return path. From Task 4 (d) above the ping fails because the ISP has two summary static routes configured to reach devices on both QS and EM Limited. But none of the branch routers connecting in these companies is able to reply to the ping request for lack of a return path.

- Note that if you **`show ip route`** on the company branches you will not see any 11.0.0.x networks (i.e. the networks on the serial interfaces between both the HQ routers and the ISP).

- If you **`show ip route`** on the QS branches there are no 192.168.x.x networks and if you **`show ip route`** on the EM branches there are no 172.16.x.x networks

- In this exercise, we will configure default static routes on the Headquarter Routers and propagate or redistribute it to the branches using the protocols configured on each company to provide a return path.

Task 5: Redistribute (or Propagate) Static Routes in the Configured Protocols

a. On QS-HQ configure a **default static route** that will pass traffic to the ISP for routing traffic to all networks that are unknown to QS-HQ. The route should point to the ISP. The syntax is:

```
QS-HQ(config)#ip route 0.0.0.0 0.0.0.0 s0/0
```

b. **Show ip route** on QS-HQ to confirm that there's a default static route **0.0.0.0/0**

c. Propagate or share the default static route configured above with QS Branches using the following commands.

```
QS-HQ(config) #router EIGRP (indicate your process ID)
QS-HQ(config-router)# redistribute static
```

d. **Show ip route** on QS-Branches to confirm that there are default static routes **0.0.0.0/0** added via the EIGRP protocol. They will have an 'D' and you will not need to enable them on the branches since EIGRP propagates / distributes the information

e. On EM-HQ configure a **default static route** that will pass traffic to the ISP for routing traffic to all networks that are unknown to EM-HQ. The route should point to the ISP. The syntax is:

```
EM-HQ(config)#ip route 0.0.0.0 0.0.0.0 s0/0
```

f. **Show ip route** on EM-HQ to confirm that there's a default static route **0.0.0.0/0**

g. Propagate or share the default static route configured above with EM Branches using the following commands.

```
EM-HQ(config) # router Ospf[indicate your process id]
                    e.g. ospf 1
EM-HQ(config-router)# default-information originate
```

h. **Show ip route** on EM-Branches to confirm that there are default static routes **0.0.0.0/0** added via the OSPF protocol. They will have an **'O-Ex'** and you will not need to enable them on the branches since OSPF propagates / distributes the information

Task 6: Test and Upload Work

a. Test for connectivity. Can all devices ping each other now? Explain.
b. Upload your work on e-learning. Ensure that your file(s) have your admission number.
   Note:
   - You will upload two files: A word document with answers to task 6 (a) above and the Packet Tracer File
   - You will upload the files in your respective groups under the assignment name: **Lab Assignment 4**

ASSIGNMENT MARKED OUT OF 50