SCSR1213 NETWORK COMMUNICATION

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Date	:	14/1/2021	LAB #	:	3	

Task 1 Step 1

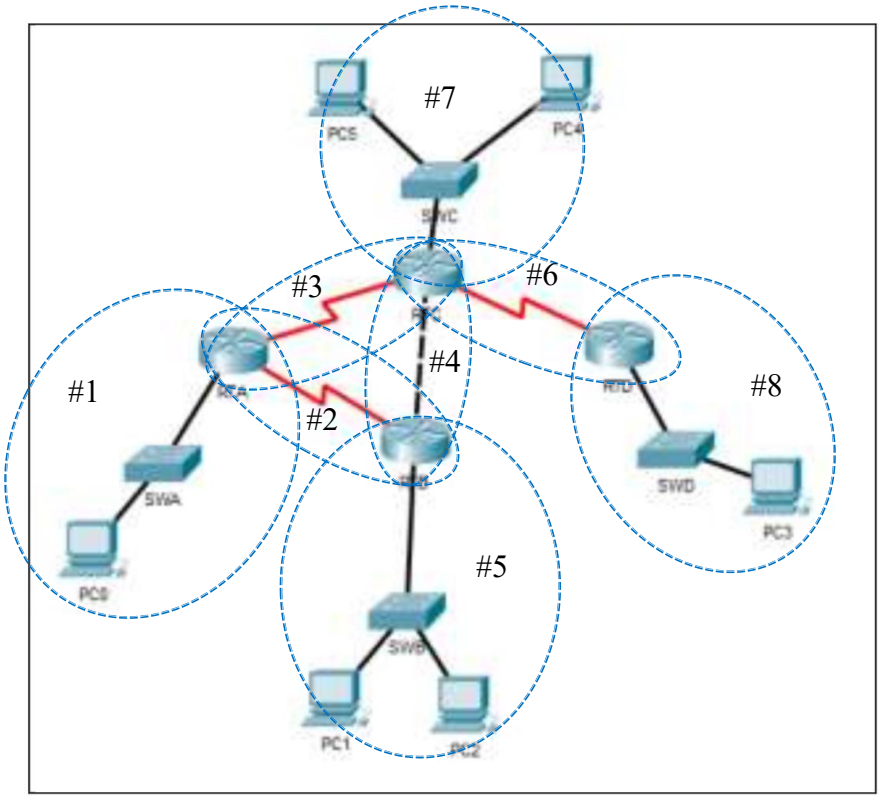
#	Device Name	Interface	IP Address	Subnet Mask
1	RTA	Se2/0	172.16.230.5	255.255.255.252
2		Se3/0	172.16.230.1	255.255.255.252
3		Fa0/0	172.16.224.255	255.255.254.0
4	RTB	Se2/0	172.16.230.2	255.255.255.252
5		Fa0/0	172.16.230.9	255.255.255.252
6		Fa1/0	172.16.226.11	255.255.254.0
7	RTC	Se2/0	172.16.230.6	255.255.255.252
8		Se3/0	172.16.230.13	255.255.255.252
9		Fa0/0	172.16.230.10	255.255.255.252
10		Fa1/0	172.16.228.11	255.255.255.0
10	RTD	Se2/0	172.16.230.14	255.255.255.252
11		Fa0/0	172.16.229.222	255.255.255.0

2(a) 8 subnets.

2(b)

Subnet#	Network Address	Broadcast Address	Range of usable address
1	172.16.224.0	172.16.225.255	172.16.224.1 - 172.16.225.254
2	172.16.230.0	172.16.230.3	172.16.230.1 - 172.16.230.2
3	172.16.230.4	172.16.230.7	172.16.230.5 - 172.16.230.6
4	172.16.230.8	172.16.230.11	172.16.230.9 - 172.16.230.10
5	172.16.226.0	172.16.227.255	172.16.226.1 – 172.16.227.254
6	172.16.230.12	172.16.230.15	172.16.230.13 - 172.16.230.14
7	172.16.228.0	172.16.228.255	172.16.228.1 - 172.16.228.254

8	172.16.229.0	172.16.229.255	172.16.229.1 - 172.16.229.254



2(c)

#	Device Name	IP Address	Subnet Mask	Default Gateway
1	PCA	172.16.225.254	255.255.254.0	172.16.224.255
2	PCB	172.16.227.254	255.255.254.0	172.16.226.11
3	PCC	172.16.228.254	255.255.255.0	172.16.228.11
4	PCD	172.16.229.254	255.255.255.0	172.16.229.222

5

Routing Table for RTA

Type	Network	Port	Next Hop IP	Metric
C	172.16.224.0/23	FastEthernet0/0	---	0/0
C	172.16.230.0/30	Serial3/0	---	0/0
C	172.16.230.4/30	Serial2/0	---	0/0

Routing Table for RTB

Type	Network	Port	Next Hop IP	Metric
C	172.16.226.0/23	FastEthernet1/0	---	0/0
C	172.16.230.0/30	Serial2/0	---	0/0
C	172.16.230.8/30	FastEthernet0/0	---	0/0

Routing Table for RTC

Type	Network	Port	Next Hop IP	Metric
C	172.16.228.0/24	FastEthernet1/0	---	0/0
C	172.16.230.4/30	Serial2/0	---	0/0
C	172.16.230.8/30	FastEthernet0/0	---	0/0
C	172.16.230.12/30	Serial3/0	---	0/0

Routing Table for RTD

Type	Network	Port	Next Hop IP	Metric
C	172.16.229.0/24	FastEthernet0/0	---	0/0
C	172.16.230.12/30	Serial2/0	---	0/0

6(a) No.

6(b) The network addresses for the ports are different for each routers.

6(c)

#	Ping between devices	Successful (✓)	Unsuccessful (×)
1	PCA-PCB		×
2	PCA-PCC		×
3	PCA-PCD		×
4	PCB-PCC		×
5	PCB-PCD		×
6	PCC-PCD		×

6(d) Routers only know directly connected network, if there is no static route or dynamic routing protocol added, PCs from different network cannot ping each other.

Task 2

Step 1.1(a)

Routing Table for RTA

Type	Network	Port	Next Hop IP	Metric
C	172.16.224.0/23	FastEthernet0/0	---	0/0
C	172.16.230.0/30	Serial3/0	---	0/0
C	172.16.230.4/30	Serial2/0	---	0/0

Routing Table for RTB

Type	Network	Port	Next Hop IP	Metric
C	172.16.226.0/23	FastEthernet1/0	---	0/0
C	172.16.230.0/30	Serial2/0	---	0/0
C	172.16.230.8/30	FastEthernet0/0	---	0/0

2.1(a)

Routing Table for RTA

Type	Network	Port	Next Hop IP	Metric
C	172.16.224.0/23	FastEthernet0/0	---	0/0
R	172.16.226.0/23	Serial3/0	172.16.230.2	120/1
C	172.16.230.0/30	Serial3/0	---	0/0
C	172.16.230.4/30	Serial2/0	---	0/0
R	172.16.230.8/30	Serial3/0	172.16.230.2	120/1

Routing Table for RTB

Type	Network	Port	Next Hop IP	Metric
R	172.16.224.0/23	Serial2/0	172.16.230.1	120/1
C	172.16.226.0/23	FastEthernet1/0	---	0/0
C	172.16.230.0/30	Serial2/0	---	0/0
R	172.16.230.4/30	Serial2/0	172.16.230.1	120/1
C	172.16.230.8/30	FastEthernet0/0	---	0/0

2.2(b) There are RIP routes that RTA and RTB learned from each other in the routing tables in 2.1(a).

4(a) No.

4(b)

Router	Network	Next Hop IP	Metric
RTC	172.16.224.0/23	172.16.230.5	120/1
RTD	172.16.224.0/23	172.16.230.13	120/2

4(c) To go to network 172.16.224.0/23, the route from RTC is to go to RTA hence the next hop ip is RTA's and there is only one hop from RTC to RTA. For the route from RTD to network 172.16.224.0/23, it has to go through RTC first before going to RTA hence the next hop ip is RTC's and there is 2 hops from RTD to RTA, hence the metric is 120/2.

4(d)

#	Ping between devices	Successful (✓)	Unsuccessful (×)
1	PCA-PCB	✓	
2	PCA-PCC	✓	
3	PCA-PCD	✓	
4	PCB-PCC	✓	
5	PCB-PCD	✓	
6	PCC-PCD	✓	

4(e) PCs can now ping each other because the routers have learned the RIP routes from each other.

5

RTA on

Routing Table for RTB

Type	Network	Port	Next Hop IP	Metric
R	172.16.224.0/23	Serial2/0	172.16.230.1	120/1
C	172.16.226.0/23	FastEthernet1/0	---	0/0
R	172.16.228.0/24	FastEthernet0/0	172.16.230.10	120/1
R	172.16.229.0/24	FastEthernet0/0	172.16.230.10	120/2
C	172.16.230.0/30	Serial2/0	---	0/0
R	172.16.230.4/30	FastEthernet0/0	172.16.230.10	120/1
R	172.16.230.4/30	Serial2/0	172.16.230.1	120/1
C	172.16.230.8/30	FastEthernet0/0	---	0/0
R	172.16.230.12/30	FastEthernet0/0	172.16.230.10	120/1

Routing Table for RTC

Type	Network	Port	Next Hop IP	Metric
R	172.16.224.0/23	Serial2/0	172.16.230.5	120/1
R	172.16.226.0/23	FastEthernet0/0	172.16.230.9	120/1
C	172.16.228.0/24	FastEthernet1/0	---	0/0
R	172.16.229.0/24	Serial3/0	172.16.230.14	120/1
R	172.16.230.0/30	Serial2/0	172.16.230.5	120/1
R	172.16.230.0/30	FastEthernet0/0	172.16.230.9	120/1
C	172.16.230.4/30	Serial2/0	---	0/0
C	172.16.230.8/30	FastEthernet0/0	---	0/0
C	172.16.230.12/30	Serial3/0	---	0/0

RTA off

Routing Table for RTB

Type	Network	Port	Next Hop IP	Metric
C	172.16.226.0/23	FastEthernet1/0	---	0/0
R	172.16.228.0/24	FastEthernet0/0	172.16.230.10	120/1
R	172.16.229.0/24	FastEthernet0/0	172.16.230.10	120/2
C	172.16.230.8/30	FastEthernet0/0	---	0/0
R	172.16.230.12/30	FastEthernet0/0	172.16.230.10	120/1

Routing Table for RTC

Type	Network	Port	Next Hop IP	Metric
R	172.16.226.0/23	FastEthernet0/0	172.16.230.9	120/1
C	172.16.228.0/24	FastEthernet1/0	---	0/0
R	172.16.229.0/24	Serial3/0	172.16.230.14	120/1
C	172.16.230.8/30	FastEthernet0/0	---	0/0
C	172.16.230.12/30	Serial3/0	---	0/0

Routing Table for RTD

Type	Network	Port	Next Hop IP	Metric
R	172.16.224.0/23	Serial2/0	172.16.230.13	120/2
R	172.16.226.0/23	Serial2/0	172.16.230.13	120/2
R	172.16.228.0/24	Serial2/0	172.16.230.13	120/1
C	172.16.229.0/24	FastEthernet0/0	---	0/0
R	172.16.230.0/30	Serial2/0	172.16.230.13	120/2
R	172.16.230.4/30	Serial2/0	172.16.230.13	120/1
R	172.16.230.8/30	Serial2/0	172.16.230.13	120/1
C	172.16.230.12/30	Serial2/0	---	0/0

Routing Table for RTD

Type	Network	Port	Next Hop IP	Metric
R	172.16.224.0/23	Serial2/0	172.16.230.13	120/16
R	172.16.226.0/23	Serial2/0	172.16.230.13	120/2
R	172.16.228.0/24	Serial2/0	172.16.230.13	120/1
C	172.16.229.0/24	FastEthernet0/0	---	0/0
R	172.16.230.0/30	Serial2/0	172.16.230.13	120/16
R	172.16.230.4/30	Serial2/0	172.16.230.13	120/16
R	172.16.230.8/30	Serial2/0	172.16.230.13	120/1
C	172.16.230.12/30	Serial2/0	---	0/0

The route learned from RTA is no longer in routing tables in RTB and RTC, while the routing table in RTD the metric for networks in RTA is 120/16 because it indicates that the route is invalid.

6 The routing tables for each router goes back to the same as before RTA was turned off.

7 PCs can ping each other once RIP protocol is configured in the routers. For RIP protocol, each router only knows the distance to all routers and the next hop ip, does not know the entire network topology and because of that each routing table are different. RIP exchanges state only with directly connected routers.

Task 3 Step 2

Routing Table for RTA

Type	Network	Port	Next Hop IP	Metric
C	172.16.224.0/23	FastEthernet0/0	---	0/0
C	172.16.230.0/30	Serial3/0	---	0/0
C	172.16.230.4/30	Serial2/0	---	0/0

Routing Table for RTB

Type	Network	Port	Next Hop IP	Metric
C	172.16.226.0/23	FastEthernet1/0	---	0/0
C	172.16.230.0/30	Serial2/0	---	0/0
C	172.16.230.8/30	FastEthernet0/0	---	0/0

Routing Table for RTC

Type	Network	Port	Next Hop IP	Metric
C	172.16.228.0/24	FastEthernet1/0	---	0/0
C	172.16.230.4/30	Serial2/0	---	0/0
C	172.16.230.8/30	FastEthernet0/0	---	0/0
C	172.16.230.12/30	Serial3/0	---	0/0

Routing Table for RTD

Type	Network	Port	Next Hop IP	Metric
C	172.16.229.0/24	FastEthernet0/0	---	0/0
C	172.16.230.12/30	Serial2/0	---	0/0

3.1

Routing Table for RTA

Type	Network	Port	Next Hop IP	Metric
C	172.16.224.0/23	FastEthernet0/0	---	0/0
C	172.16.230.0/30	Serial3/0	---	0/0
C	172.16.230.4/30	Serial2/0	---	0/0

3.2(a) No.

3.2(b)

#	Ping between devices	Successful (✓)	Unsuccessful (×)
1	PCA-PCB		×
2	PCA-PCC		×
3	PCA-PCD		×

5

Routing Table for RTA

Type	Network	Port	Next Hop IP	Metric
C	172.16.224.0/23	FastEthernet0/0	---	0/0
O	172.16.226.0/23	Serial3/0	172.16.230.2	110/65
O	172.16.228.0/24	Serial2/0	172.16.230.6	110/65
O	172.16.229.0/24	Serial2/0	172.16.230.6	110/...
C	172.16.230.0/30	Serial3/0	---	0/0
C	172.16.230.4/30	Serial2/0	---	0/0
O	172.16.230.8/30	Serial3/0	172.16.230.2	110/65
O	172.16.230.8/30	Serial2/0	172.16.230.6	110/65
O	172.16.230.12/30	Serial2/0	172.16.230.6	110/...

Routing Table for RTB

Type	Network	Port	Next Hop IP	Metric
O	172.16.224.0/23	Serial2/0	172.16.230.1	110/65
C	172.16.226.0/23	FastEthernet1/0	---	0/0
O	172.16.228.0/24	FastEthernet0/0	172.16.230.10	110/2
O	172.16.229.0/24	FastEthernet0/0	172.16.230.10	110/66
C	172.16.230.0/30	Serial2/0	---	0/0
O	172.16.230.4/30	FastEthernet0/0	172.16.230.10	110/65
C	172.16.230.8/30	FastEthernet0/0	---	0/0
O	172.16.230.12/30	FastEthernet0/0	172.16.230.10	110/65

Routing Table for RTC

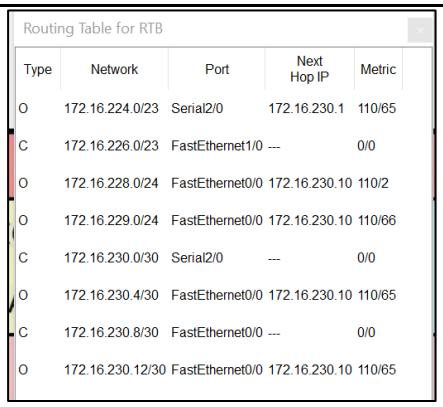
Type	Network	Port	Next Hop IP	Metric
O	172.16.224.0/23	Serial2/0	172.16.230.5	110/65
O	172.16.226.0/23	FastEthernet0/0	172.16.230.9	110/2
C	172.16.228.0/24	FastEthernet1/0	---	0/0
O	172.16.229.0/24	Serial3/0	172.16.230.14	110/65
O	172.16.230.0/30	FastEthernet0/0	172.16.230.9	110/65
C	172.16.230.4/30	Serial2/0	---	0/0
C	172.16.230.8/30	FastEthernet0/0	---	0/0
C	172.16.230.12/30	Serial3/0	---	0/0

Routing Table for RTD

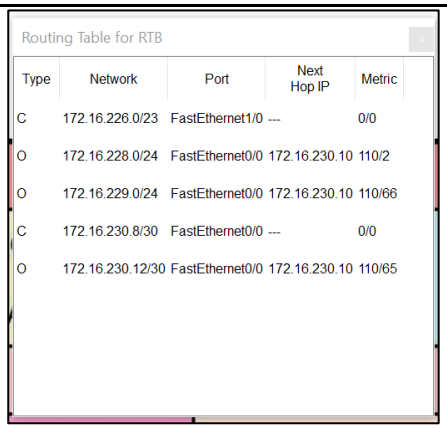
Type	Network	Port	Next Hop IP	Metric
O	172.16.224.0/23	Serial2/0	172.16.230.13	110/...
O	172.16.226.0/23	Serial2/0	172.16.230.13	110/66
O	172.16.228.0/24	Serial2/0	172.16.230.13	110/65
C	172.16.229.0/24	FastEthernet0/0	---	0/0
O	172.16.230.0/30	Serial2/0	172.16.230.13	110/...
O	172.16.230.4/30	Serial2/0	172.16.230.13	110/...
O	172.16.230.8/30	Serial2/0	172.16.230.13	110/65
C	172.16.230.12/30	Serial2/0	---	0/0

6

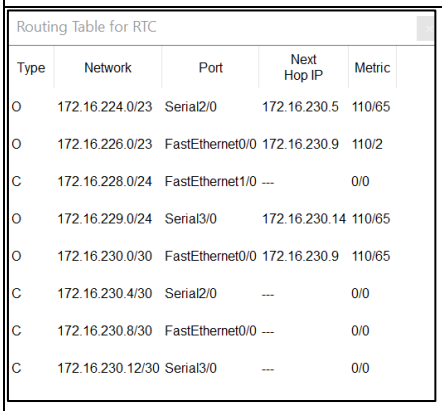
RTA switched on	RTA switched off


Routing Table for RTB

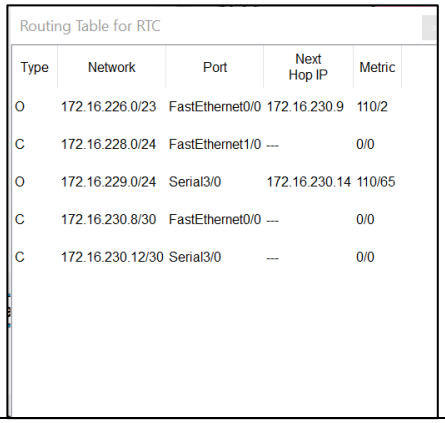
Type	Network	Port	Next Hop IP	Metric
O	172.16.224.0/23	Serial2/0	172.16.230.1	110/65
C	172.16.226.0/23	FastEthernet1/0	---	0/0
O	172.16.228.0/24	FastEthernet0/0	172.16.230.10	110/2
O	172.16.229.0/24	FastEthernet0/0	172.16.230.10	110/66
C	172.16.230.0/30	Serial2/0	---	0/0
O	172.16.230.4/30	FastEthernet0/0	172.16.230.10	110/65
C	172.16.230.8/30	FastEthernet0/0	---	0/0
O	172.16.230.12/30	FastEthernet0/0	172.16.230.10	110/65


Routing Table for RTB

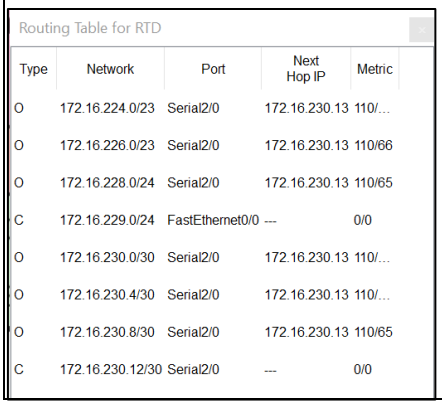
Type	Network	Port	Next Hop IP	Metric
C	172.16.226.0/23	FastEthernet1/0	---	0/0
O	172.16.228.0/24	FastEthernet0/0	172.16.230.10	110/2
O	172.16.229.0/24	FastEthernet0/0	172.16.230.10	110/66
C	172.16.230.8/30	FastEthernet0/0	---	0/0
O	172.16.230.12/30	FastEthernet0/0	172.16.230.10	110/65


Routing Table for RTC

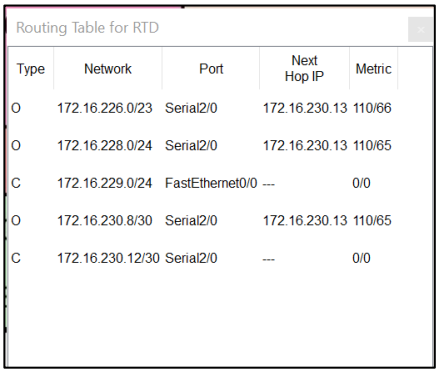
Type	Network	Port	Next Hop IP	Metric
O	172.16.224.0/23	Serial2/0	172.16.230.5	110/65
O	172.16.226.0/23	FastEthernet0/0	172.16.230.9	110/2
C	172.16.228.0/24	FastEthernet1/0	---	0/0
O	172.16.229.0/24	Serial3/0	172.16.230.14	110/65
O	172.16.230.0/30	FastEthernet0/0	172.16.230.9	110/65
C	172.16.230.4/30	Serial2/0	---	0/0
C	172.16.230.8/30	FastEthernet0/0	---	0/0
C	172.16.230.12/30	Serial3/0	---	0/0


Routing Table for RTC

Type	Network	Port	Next Hop IP	Metric
O	172.16.226.0/23	FastEthernet0/0	172.16.230.9	110/2
C	172.16.228.0/24	FastEthernet1/0	---	0/0
O	172.16.229.0/24	Serial3/0	172.16.230.14	110/65
C	172.16.230.8/30	FastEthernet0/0	---	0/0
C	172.16.230.12/30	Serial3/0	---	0/0


Routing Table for RTD

Type	Network	Port	Next Hop IP	Metric
O	172.16.224.0/23	Serial2/0	172.16.230.13	110/...
O	172.16.226.0/23	Serial2/0	172.16.230.13	110/66
O	172.16.228.0/24	Serial2/0	172.16.230.13	110/65
C	172.16.229.0/24	FastEthernet0/0	---	0/0
O	172.16.230.0/30	Serial2/0	172.16.230.13	110/...
O	172.16.230.4/30	Serial2/0	172.16.230.13	110/...
O	172.16.230.8/30	Serial2/0	172.16.230.13	110/65
C	172.16.230.12/30	Serial2/0	---	0/0


Routing Table for RTD

Type	Network	Port	Next Hop IP	Metric
O	172.16.226.0/23	Serial2/0	172.16.230.13	110/66
O	172.16.228.0/24	Serial2/0	172.16.230.13	110/65
C	172.16.229.0/24	FastEthernet0/0	---	0/0
O	172.16.230.8/30	Serial2/0	172.16.230.13	110/65
C	172.16.230.12/30	Serial2/0	---	0/0

The route learned dynamically from RTA using the OSPF protocol is no longer in routing tables of RTB, RTC, RTD.

7 The routing tables goes back to the same as before RTA was switched off.

8 PCs can ping each other once OSPF protocol is configured in the routers. In OSFP, it sends information to all routers in the network, so all routers know the network topology hence the addresses in the routing table for all routers are the same. If anything in the network changed, the router will send information to all routers.