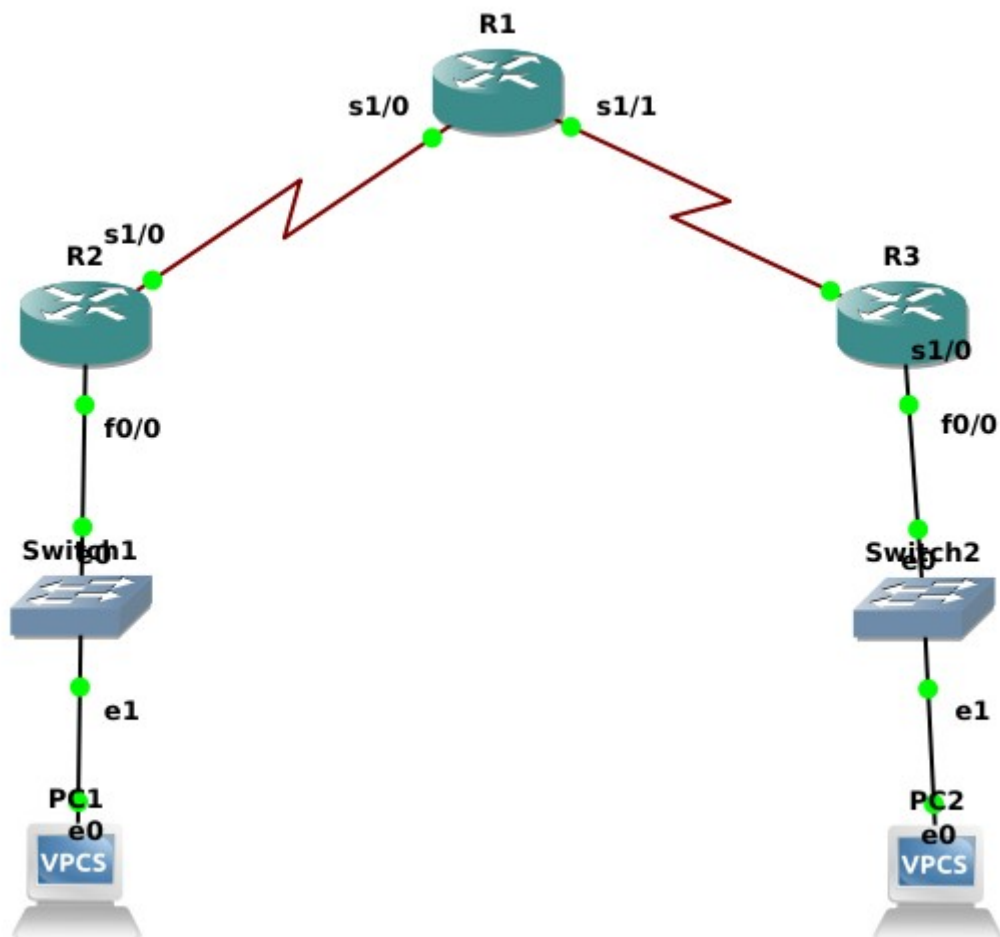**Pratham U-210905407**

Lab 10 :Study of Dynamic Routing Protocols using GNS3

Configuration
R1:

```
R1(config)#hostname pratham-1
pratham-1(config)#int s1/0
pratham-1(config-if)#ip addr 100.1.1.2 255.255.255.0
pratham-1(config-if)#no shut
pratham-1(config-if)#int
*Mar  1 00:03:20.391: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up
pratham-1(config-if)#int s1
*Mar  1 00:03:21.395: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0,
 changed state to up
pratham-1(config-if)#int s1/1
pratham-1(config-if)#ip addr 20.1.1.1 255.255.255.0
pratham-1(config-if)#no sh
*Mar  1 00:03:42.471: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0,
 changed state to down
pratham-1(config-if)#no shut
pratham-1(config-if)#exit
```

Router RIP:

```
pratham-1(config-router)#version 2
pratham-1(config-router)#network 20.1.1.0
pratham-1(config-router)#
*Mar  1 00:04:12.491: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/1,
 changed state to down
pratham-1(config-router)#network 100.1.1.0
pratham-1(config-router)#end
```

R2:

```
R2(config)#hostname pratham-2
pratham-2(config)#int f1/0
                      ^
% Invalid input detected at '^' marker.

pratham-2(config)#int f0/0
pratham-2(config-if)#ip addr 172.16.2.1 255.255.0.0
pratham-2(config-if)#no shut
pratham-2(config-if)#int
*Mar  1 00:03:46.843: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
*Mar  1 00:03:47.843: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up
pratham-2(config-if)#int s1/0
pratham-2(config-if)#ip addr 100.1.1.1 255.255.255.0
pratham-2(config-if)#no shut
pratham-2(config-if)#exi
```

Router RIP:

```
pratham-2(config)#router rip
pratham-2(config-router)#version 2
pratham-2(config-router)#network 172.16.0.0
pratham-2(config-router)#network 100.1.1.0
pratham-2(config-router)#end
```

R3

```
R3(config)#hostname pratham-3
pratham-3(config)#int s1/0
pratham-3(config-if)#ip addr 20.1.1.2 255.255.255.0
pratham-3(config-if)#no shut
pratham-3(config-if)#int f
*Mar  1 00:16:12.031: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up
*Mar  1 00:16:13.031: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0,
 changed state to up
pratham-3(config-if)#int f0/0
pratham-3(config-if)#ip addr 10.2.2.1 255.255.255.0
pratham-3(config-if)#no shut
pratham-3(config-if)#exit
*Mar  1 00:16:39.663: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
*Mar  1 00:16:40.663: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up
pratham-3(config-if)#exit
```

Router RIP:

```
pratham-3(config)#router rip
pratham-3(config-router)#ver 2
pratham-3(config-router)#network 10.2.2.0
pratham-3(config-router)#network 20.1.1.0
pratham-3(config-router)#end
pratham-3#
*Mar  1 00:17:30.279: %SYS-5-CONFIG_I: Configured from console by console
```

Setting Up PC:
PC1:

```
prathampc-1> ip 172.16.2.10/16 172.16.2.1
Checking for duplicate address...
prathampc-1 : 172.16.2.10 255.255.0.0 gateway 172.16.2.1
```

PC2:

```
prathampc-2> ip 10.2.2.20/24 10.2.2.1
Checking for duplicate address...
prathampc-2 : 10.2.2.20 255.255.255.0 gateway 10.2.2.1
```
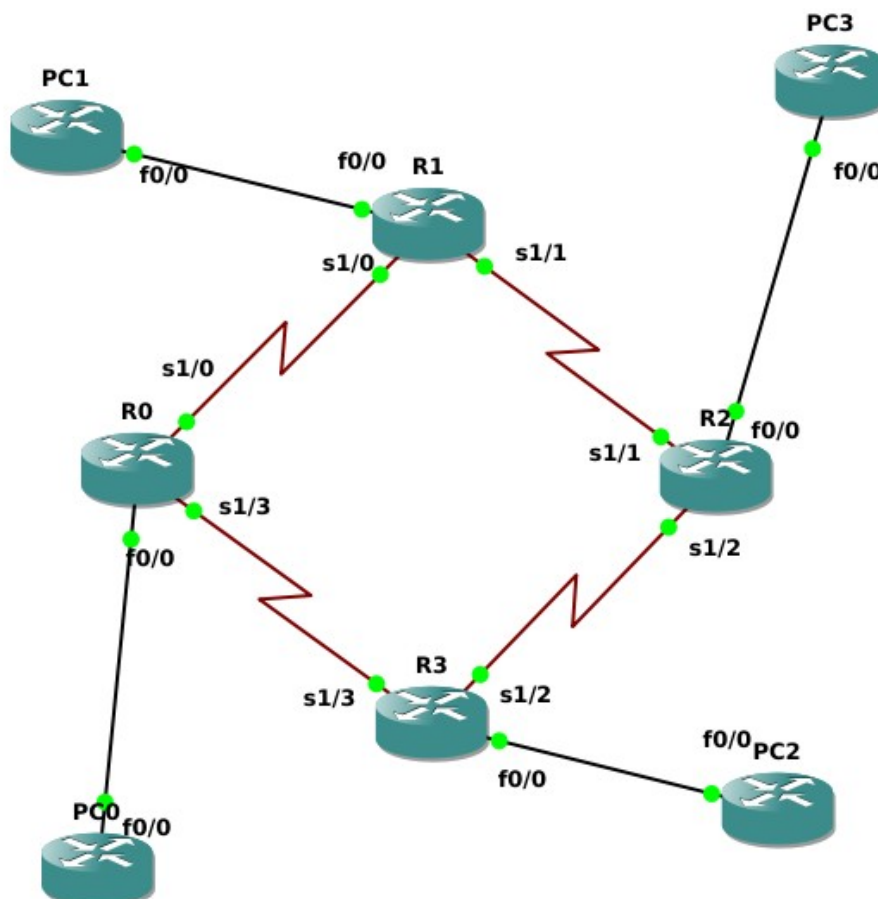
Testing
Ping from PC1 to PC2:

```
prathampc-1> ping 10.2.2.20

84 bytes from 10.2.2.20 icmp_seq=1 ttl=61 time=34.166 ms
84 bytes from 10.2.2.20 icmp_seq=2 ttl=61 time=39.757 ms
84 bytes from 10.2.2.20 icmp_seq=3 ttl=61 time=40.111 ms
84 bytes from 10.2.2.20 icmp_seq=4 ttl=61 time=39.764 ms
84 bytes from 10.2.2.20 icmp_seq=5 ttl=61 time=39.308 ms
```

LAB EXERCISE:

Setting up Router as PC:
PC0:

```
PC0(config)#hostname PRATHAM-PC0
PRATHAM-PC0(config)#int f0/0
PRATHAM-PC0(config-if)#ip addr 10.1.1.18 255.255.255.248
```

PC1:

```
PC1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
PC1(config)#hostname PRATHAM-PC1
PRATHAM-PC1(config)#int f0/0
PRATHAM-PC1(config-if)#ip addr 10.1.1.26 255.255.255.248
```

PC2:

```
PC2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
PC2(config)#hostname PRATHAM-PC2
PRATHAM-PC2(config)#int f0/0
PRATHAM-PC2(config-if)#ip addr 10.1.1.42 255.255.255.248
```

PC3:

```
PC3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
PC3(config)#hostname PRATHAM-PC3
PRATHAM-PC3(config)#int f0/0
PRATHAM-PC3(config-if)#ip addr 10.1.1.34 255.255.255.248
```

Configuration of router:

R0:

```
R0(config)#hostname PRATHAM-0
PRATHAM-0(config)#int f0/0
PRATHAM-0(config-if)#ip addr 10.1.1.17 255.255.255.248
PRATHAM-0(config-if)#int s1/0
PRATHAM-0(config-if)#ip addr 10.1.1.1 255.255.255.252
PRATHAM-0(config-if)#int s1/3
PRATHAM-0(config-if)#ip addr 10.1.1.14 255.255.255.252
```

R1:

```
R1(config)#hostname PRATHAM-1
PRATHAM-1(config)#int f0/0
PRATHAM-1(config-if)#ip addr 10.1.1.17 255.255.255.248
PRATHAM-1(config-if)#ip addr 10.1.1.25 255.255.255.248
PRATHAM-1(config-if)#int s1/0
PRATHAM-1(config-if)#ip addr 10.1.1.2 255.255.255.252
PRATHAM-1(config-if)#int s1/1
PRATHAM-1(config-if)#ip addr 10.1.1.5 255.255.255.252
```

R2:

```
R2(config)#hostname PRATHAM-2
PRATHAM-2(config)#int f0/0
PRATHAM-2(config-if)#ip addr 10.1.1.41 255.255.255.248
PRATHAM-2(config-if)#int s1/2
PRATHAM-2(config-if)#ip addr 10.1.1.10 255.255.255.252
PRATHAM-2(config-if)#int s1/3
PRATHAM-2(config-if)#ip addr 10.1.1.13 255.255.255.252
```

R3:

```
R3(config)#hostname PRATHAM-3
PRATHAM-3(config)#int f0/0
PRATHAM-3(config-if)#ip addr 10.1.1.33 255.255.255.248
PRATHAM-3(config-if)#int s1/1
PRATHAM-3(config-if)#ip addr 10.1.1.6 255.255.255.252
PRATHAM-3(config-if)#int s1/2
PRATHAM-3(config-if)#ip addr 10.1.1.9 255.255.255.252
```

RIP commands :

R0:

```
PRATHAM-0(config)#router rip
PRATHAM-0(config-router)#version 2
PRATHAM-0(config-router)#network 10.1.1.0
PRATHAM-0(config-router)#network 10.1.1.12
PRATHAM-0(config-router)#network 10.1.1.16
```

R1:

PRATHAM-1(config)#router rip
PRATHAM-1(config-router)#version 2
PRATHAM-1(config-router)#network 10.1.1.4
PRATHAM-1(config-router)#network 10.1.1.0
PRATHAM-1(config-router)#network 10.1.1.24

R2:

PRATHAM-2(config)#router rip
PRATHAM-2(config-router)#version 2
PRATHAM-2(config-router)#network 10.1.1.8
PRATHAM-2(config-router)#network 10.1.1.12
PRATHAM-2(config-router)#network 10.1.1.40

R3:

PRATHAM-3(config)#router rip
PRATHAM-3(config-router)#version 2
PRATHAM-3(config-router)#network 10.1.1.4
PRATHAM-3(config-router)#network 10.1.1.8
PRATHAM-3(config-router)#network 10.1.1.32

Configuration of OSPF:

R0:

```
PRATHAM-0(config)#router ospf 200
PRATHAM-0(config-router)#network 10.1.1.16 0.0.0.7 area 1
PRATHAM-0(config-router)#network 10.1.1.0 0.0.0.3 area 0
PRATHAM-0(config-router)#network 10.1.1.12 0.0.0.3 area 0
```

R1:

```
PRATHAM-1(config)#router ospf 200
PRATHAM-1(config-router)#network 10.1.1.24 0.0.0.7 area 2
PRATHAM-1(config-router)#network 10.1.1.4 0.0.0.3 area 0
PRATHAM-1(config-router)#network 10.1.1.0 0.0.0.3 area 0
```

R2:

```
PRATHAM-2(config)#router ospf 200
PRATHAM-2(config-router)#network 10.1.1.40 0.0.0.7 area 3
PRATHAM-2(config-router)#network 10.1.1.8 0.0.0.3 area 0
PRATHAM-2(config-router)#network 10.1.1.12 0.0.0.3 area 0
```

R3:

```
PRATHAM-3(config)#router ospf 200
PRATHAM-3(config-router)#network 10.1.1.32 0.0.0.7 area 4
PRATHAM-3(config-router)#network 10.1.1.4 0.0.0.3 area 0
PRATHAM-3(config-router)#network 10.1.1.8 0.0.0.3 area 0
```

PC0:

```
PRATHAM-PC0(config)#router ospf 200
PRATHAM-PC0(config-router)#network 10.1.1.16 0.0.0.7 area 1
```

PC1:

```
PRATHAM-PC1(config)#router ospf 200
PRATHAM-PC1(config-router)#network 10.1.1.24 0.0.0.7 area 2
PRATHAM-PC1(config-router)#exit
```

PC2:

```
PRATHAM-PC2(config)#router ospf 200
PRATHAM-PC2(config-router)#network 10.1.1.40 0.0.0.7 area 3
```

PC3:

```
PRATHAM-PC3(config)#router ospf 200
PRATHAM-PC3(config-router)#network 10.1.1.32 0.0.0.7 area 4
```

Verification :

>show ip route

```
PRATHAM-0#show ip route
Codes: 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
       i - IS-IS, su - IS-IS summary, 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

     10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
C       10.1.1.0/30 is directly connected, Serial1/0
O IA    10.1.1.24/29 [110/74] via 10.1.1.2, 00:06:24, Serial1/0
C       10.1.1.16/29 is directly connected, FastEthernet0/0
```

Ping
PC0 to PC1:

```
PRATHAM-PC0#ping 10.1.1.26

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.1.26, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 24/36/60 ms
```