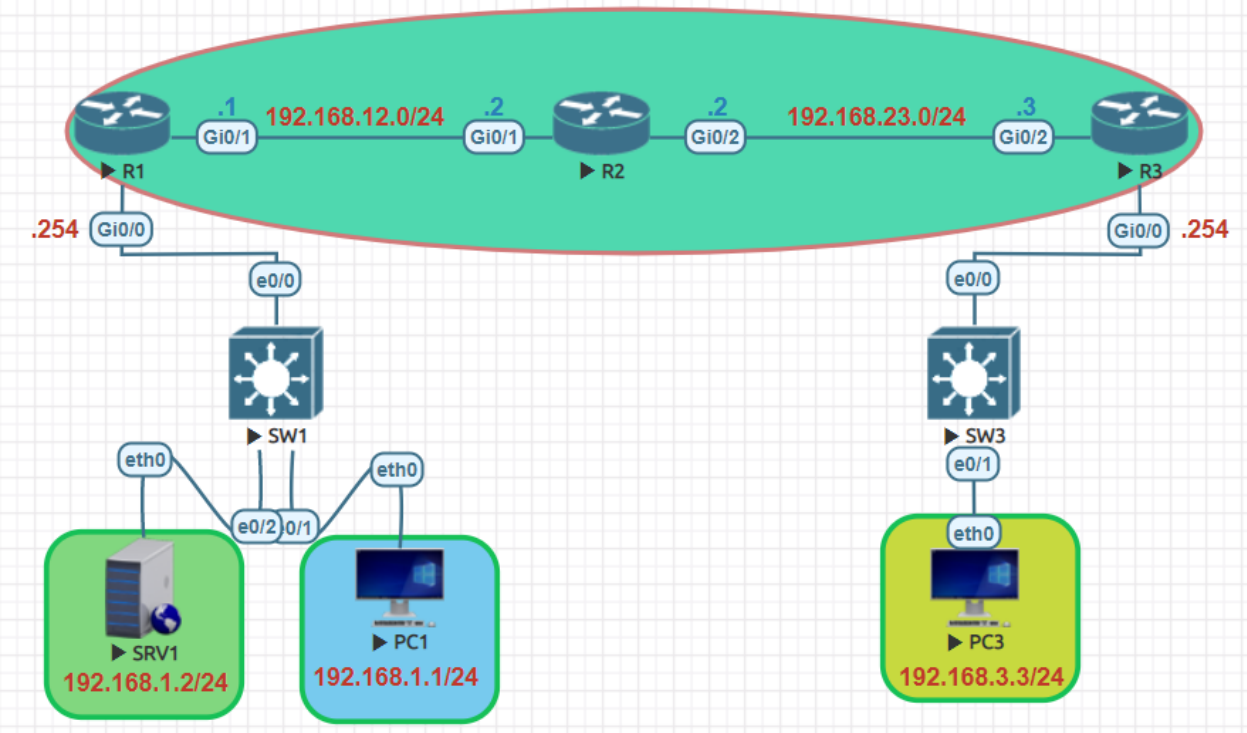
Static Route Types Lab:



Switch Images	I86bi_linuxl2-ipbasek9-ms.high_iron_aug9_2017b
Router Images	vios-adventerprisek9-m.spa.159-3.m2
Client PC	VPCS
VLANs	Default VLAN1
PC1 IP Address	192.168.1.1
SRV1 IP Address	192.168.1.2
PC3 IP Address	192.168.3.3
R1 G0/0 Interface IP Address	192.168.1.254
R1 G0/1 Interface IP Address	192.168.12.1
R2 G0/1 Interface IP Address	192.168.12.2
R2 G0/2 Interface IP Address	192.168.23.2
R3 G0/2 Interface IP Address	192.168.23.3
R3 G0/0 Interface IP Address	192.168.3.254
Routing Protocols	Static, Default, Host, Network
Static Routing Types	Directly Attached Static Routes, Recursive Static Routes, Fully Specified Static Routes and Static Null Routes

R1 Basic Configuration
Router(config)#hostname R1 R1(config)#no ip domain lookup R1(config)#line con 0 R1(config-line)#exec-timeout 0 0 R1(config-line)#logging synchronous R1(config-line)#exit R1(config)#interface GigabitEthernet0/0 R1(config-if)#ip address 192.168.1.254 255.255.255.0 R1(config-if)#no shutdown R1(config-if)#exit R1(config)#interface GigabitEthernet0/1 R1(config-if)#ip address 192.168.12.1 255.255.255.0 R1(config-if)#no shutdown

R2 Basic Configuration
Router(config)#hostname R2 R2(config)#no ip domain lookup R2(config)#line con 0 R2(config-line)#exec-timeout 0 0 R2(config-line)#logging synchronous R2(config-line)#exit R2(config)#interface GigabitEthernet0/1 R2(config-if)#ip address 192.168.12.2 255.255.255.0 R2(config-if)#no shutdown R2(config)#interface GigabitEthernet0/2 R2(config-if)#ip address 192.168.23.2 255.255.255.0 R2(config-if)#no shutdown

R3 Basic Configuration
Router(config)#hostname R3 R3(config)#no ip domain lookup R3(config)#line con 0 R3(config-line)#exec-timeout 0 0 R3(config-line)#logging synchronous R3(config-line)#exit R3(config)#interface GigabitEthernet0/0 R3(config-if)#ip address 192.168.3.254 255.255.255.0 R3(config-if)#no shutdown R3(config)#interface GigabitEthernet0/2 R3(config-if)#ip address 192.168.23.3 255.255.255.0 R3(config-if)#no shutdown

PC1 Configuration
VPCS> set pcname PC1 PC1> ip 192.168.1.1/24 192.168.1.254

SRV1 Configuration
VPCS> set pcname SRV1 SRV1> ip 192.168.1.2/24 192.168.1.254

PC3 Configuration
VPCS> set pcname PC3 PC1> ip 192.168.3.3/24 192.168.3.254

R1 Default Route Configuration
R1(config)#ip route 0.0.0.0 0.0.0.0 192.168.12.2

R2 Static Route Configuration
R2(config)#ip route 192.168.3.0 255.255.255.0 192.168.23.3 R2(config)#ip route 192.168.1.0 255.255.255.0 192.168.12.1

R3 Default Route Configuration
R3(config)#ip route 0.0.0.0 0.0.0.0 192.168.23.2

Verification
R1#show ip route R2#show ip route R3#show ip route
R1#show ip route static R2#show ip route static R3#show ip route static

Ping Hosts
PC3> ping 192.168.1.1 PC3> ping 192.168.1.2
PC1> ping 192.168.3.3

Directly Attached Static Routes Configuration
R3(config)#do show run | sec ip route
R3(config)#no ip route 192.168.1.0 255.255.255.0 192.168.23.2 R3(config)#ip route 192.168.1.0 255.255.255.0 gigabitEthernet 0/2

```
R3(config)#do show 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
       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, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

S     192.168.1.0/24 is directly connected, GigabitEthernet0/2
      192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.3.0/24 is directly connected, GigabitEthernet0/0
L        192.168.3.254/32 is directly connected, GigabitEthernet0/0
      192.168.23.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.23.0/24 is directly connected, GigabitEthernet0/2
L        192.168.23.3/32 is directly connected, GigabitEthernet0/2
```

Recursive Static Routes Configuration
R3(config)#do show run | sec ip route
R3(config)#no ip route 192.168.1.0 255.255.255.0 gigabitEthernet 0/2 R3(config)#ip route 192.168.1.0 255.255.255.0 192.168.23.2

```
R3(config)#do show 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
       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, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

S     192.168.1.0/24 [1/0] via 192.168.23.2
      192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.3.0/24 is directly connected, GigabitEthernet0/0
L        192.168.3.254/32 is directly connected, GigabitEthernet0/0
      192.168.23.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.23.0/24 is directly connected, GigabitEthernet0/2
L        192.168.23.3/32 is directly connected, GigabitEthernet0/2
```

Fully Specified Static Routes Configuration
R3(config)#do show run | sec ip route
R3(config)#no ip route 192.168.1.0 255.255.255.0 192.168.23.2 R3(config)#ip route 192.168.1.0 255.255.255.0 gigabitEthernet 0/2 192.168.23.2

```
R3(config)#do show 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
       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, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

S     192.168.1.0/24 [1/0] via 192.168.23.2, GigabitEthernet0/2
      192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.3.0/24 is directly connected, GigabitEthernet0/0
L        192.168.3.254/32 is directly connected, GigabitEthernet0/0
      192.168.23.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.23.0/24 is directly connected, GigabitEthernet0/2
L        192.168.23.3/32 is directly connected, GigabitEthernet0/2
```

Static Null Routes Configuration
R3(config)#do show run | sec ip route
R3(config)#ip route 192.168.1.0 255.255.255.0 gigabitEthernet 0/2 192.168.23.2 R3(config)#ip route 192.168.1.2 255.255.255.255 null0

```
R3(config)#do show 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
       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, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

      192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
S        192.168.1.0/24 [1/0] via 192.168.23.2, GigabitEthernet0/2
S        192.168.1.2/32 is directly connected, Null0
      192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.3.0/24 is directly connected, GigabitEthernet0/0
L        192.168.3.254/32 is directly connected, GigabitEthernet0/0
      192.168.23.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.23.0/24 is directly connected, GigabitEthernet0/2
L        192.168.23.3/32 is directly connected, GigabitEthernet0/2
```