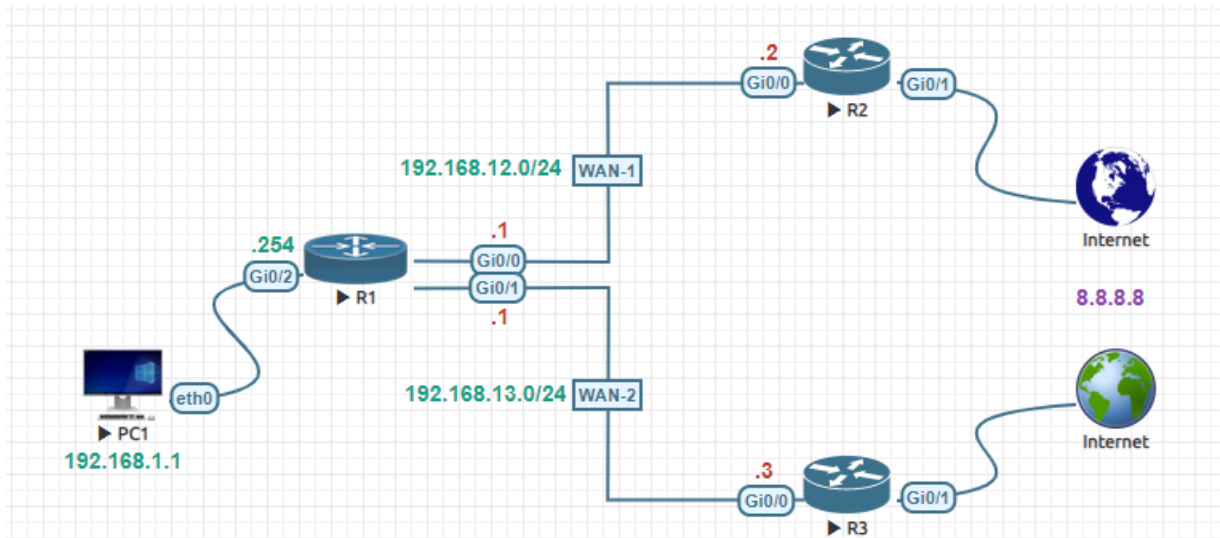


## Floating Static Route Lab:



Internet Cloud	Bridge Cloud
Router Images	vios-adventerprisek9-m.spa.159-3.m2
Client PC	VPCS
R1 G0/0 Interface IP Address	192.168.12.1
R1 G0/1 Interface IP Address	192.168.13.1
R1 G0/2 Interface IP Address	192.168.1.254
R2 G0/0 Interface IP Address	192.168.12.2
R2 G0/1 Interface IP Address	8.8.8.8
R3 G0/0 Interface IP Address	192.168.13.3
R3 G0/1 Interface IP Address	8.8.8.8
Routing Protocols	Static, Floating Static & Default
Static Routing Types	Floating Static Route
Testing	Floating Static Route, ECMP & Backup Interface

### R1 Basic Configuration

```
R1(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 add 192.168.12.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#interface GigabitEthernet0/1
R1(config-if)#ip add 192.168.13.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#interface GigabitEthernet0/2
R1(config-if)#ip add 192.168.1.254 255.255.255.0
R1(config-if)#no shutdown
```

### R2 Basic Configuration

```
R2(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 GigabitEthernet0/0
R2(config-if)#ip add 192.168.12.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#interface GigabitEthernet0/1
R2(config-if)#ip add 8.8.8.8 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#ip route 192.168.1.0 255.255.255.0 192.168.12.1
```

### R3 Basic Configuration

```
R3(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 add 192.168.13.3 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#exit
R3(config)#interface GigabitEthernet0/1
R3(config-if)#ip add 8.8.8.8 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#exit
R3(config)#ip route 192.168.1.0 255.255.255.0 192.168.13.1
```

### PC1 Configuration

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

### R1 Default Route Configuration

```
R1(config)#ip route 0.0.0.0 0.0.0.0 192.168.12.2
R1(config)#ip route 0.0.0.0 0.0.0.0 192.168.13.3
R1#show ip route static
```

### R2 Static Route Configuration

```
R2(config)#ip route 192.168.1.0 255.255.255.0 192.168.12.1
```

### R3 Static Route Configuration

```
R3(config)#ip route 192.168.1.0 255.255.255.0 192.168.13.1
```

### 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

```
PC1> ping 8.8.8.8
```

```
PC1> ping 8.8.8.8

84 bytes from 8.8.8.8 icmp_seq=1 ttl=254 time=3.140 ms
84 bytes from 8.8.8.8 icmp_seq=2 ttl=254 time=4.220 ms
84 bytes from 8.8.8.8 icmp_seq=3 ttl=254 time=2.304 ms
84 bytes from 8.8.8.8 icmp_seq=4 ttl=254 time=3.507 ms
84 bytes from 8.8.8.8 icmp_seq=5 ttl=254 time=6.835 ms
```

Traceroute show only one route to use. This is default behavior.

```
PC1> trace 8.8.8.8
trace to 8.8.8.8, 8 hops max, press Ctrl+C to stop
 1  192.168.1.254    1.315 ms  1.216 ms  1.157 ms
 2  *192.168.13.3    2.336 ms (ICMP type:3, code:3, Destination port unreachable) *
```

## R1 Load Sharing Configuration

```
R1#show ip cef 8.8.8.8 detail
```

```
R1(config)#interface gigabitEthernet 0/0
```

```
R1(config-if)#ip load-sharing per-packet
```

```
R1(config-if)#exit
```

```
R1(config)#interface gigabitEthernet 0/1
```

```
R1(config-if)#ip load-sharing per-packet
```

```
R1(config-if)#exit
```

```
R1#show ip cef 8.8.8.8 detail
0.0.0.0/0, epoch 0, flags [default route], per-destination sharing
  recursive via 192.168.12.2
    attached to GigabitEthernet0/0
  recursive via 192.168.13.3
    attached to GigabitEthernet0/1
```

After changed Load Sharing method to Per Packet

```
PC1> trace 8.8.8.8
trace to 8.8.8.8, 8 hops max, press Ctrl+C to stop
 1  192.168.1.254    1.689 ms  1.862 ms  1.231 ms
 2  *192.168.12.2    3.164 ms (ICMP type:3, code:3, Destination port unreachable) *
 3  *192.168.13.3    3.209 ms (ICMP type:3, code:3, Destination port unreachable) *
 4  *192.168.12.2    2.266 ms (ICMP type:3, code:3, Destination port unreachable) *
 5  *192.168.13.3    2.189 ms (ICMP type:3, code:3, Destination port unreachable) *
 6  *192.168.12.2    3.174 ms (ICMP type:3, code:3, Destination port unreachable) *
 7  *192.168.13.3    2.366 ms (ICMP type:3, code:3, Destination port unreachable) *
 8  *192.168.12.2    4.315 ms (ICMP type:3, code:3, Destination port unreachable) *
```

## Floating Static Route Configuration:

Before apply Floating Static Route let's check out Routing Table.

```
R1#show ip route static
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 192.168.13.3 to network 0.0.0.0

```
S* 0.0.0.0/0 [1/0] via 192.168.13.3
    [1/0] via 192.168.12.2
```



### R1 Floating Static Configuration

```
R1#show running-config | section ip route
```

```
R1(config)#no ip route 0.0.0.0 0.0.0.0 192.168.13.3
```

```
R1(config)#ip route 0.0.0.0 0.0.0.0 192.168.13.3 10
```

```
R1#show ip route static
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 192.168.12.2 to network 0.0.0.0

```
S* 0.0.0.0/0 [1/0] via 192.168.12.2
```

```
PC1> trace 8.8.8.8
trace to 8.8.8.8, 8 hops max, press Ctrl+C to stop
 1 192.168.1.254 1.189 ms 0.982 ms 1.195 ms
 2 *192.168.12.2 2.556 ms (ICMP type:3, code:3, Destination port unreachable)
```

```
PC1> ping 8.8.8.8 -t
84 bytes from 8.8.8.8 icmp_seq=1 ttl=254 time=2.656 ms
84 bytes from 8.8.8.8 icmp_seq=2 ttl=254 time=2.511 ms
84 bytes from 8.8.8.8 icmp_seq=3 ttl=254 time=2.299 ms
84 bytes from 8.8.8.8 icmp_seq=4 ttl=254 time=1.945 ms
```

## R1 Main Link down

```
R1(config)#interface g0/0
R1(config-if)#shutdown
```

```
R1#show ip route static
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 192.168.13.3 to network 0.0.0.0

```
S* 0.0.0.0/0 [10/0] via 192.168.13.3
R1#
```

```
PC1> ping 8.8.8.8 -t
```

```
84 bytes from 8.8.8.8 icmp_seq=1 ttl=254 time=2.656 ms
84 bytes from 8.8.8.8 icmp_seq=2 ttl=254 time=2.511 ms
84 bytes from 8.8.8.8 icmp_seq=3 ttl=254 time=2.299 ms
84 bytes from 8.8.8.8 icmp_seq=4 ttl=254 time=1.945 ms
```

```
PC1> trace 8.8.8.8
```

```
trace to 8.8.8.8, 8 hops max, press Ctrl+C to stop
 1  192.168.1.254  1.266 ms  1.124 ms  1.112 ms
 2  *192.168.13.3  2.675 ms (ICMP type:3, code:3, Destination port unreachable)
```

## R1 Main Link Up

```
R1(config)#interface g0/0
R1(config-if)#no shutdown
```

```
R1#show ip route static
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
```

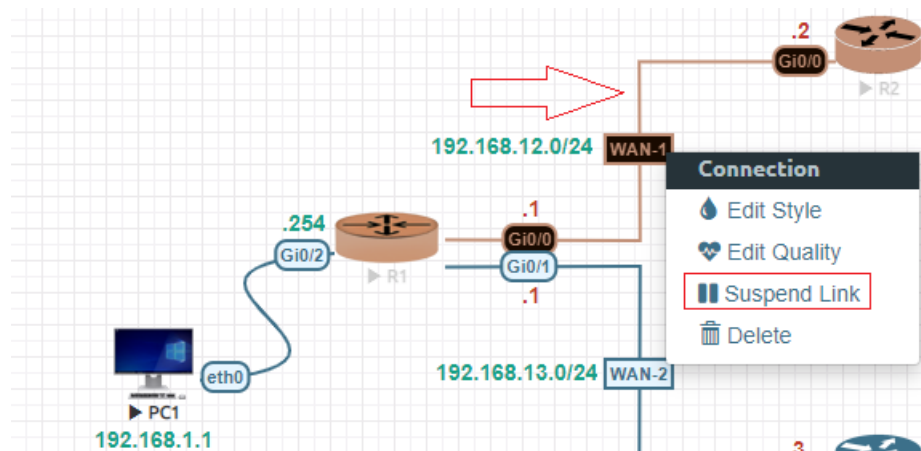
Gateway of last resort is 192.168.12.2 to network 0.0.0.0

```
S* 0.0.0.0/0 [1/0] via 192.168.12.2
```

## Backup Interface:

A backup interface is an interface that stays idle until certain circumstances occur; then it is activated. The backup interface command is placed under the primary link. This is the link that needs to be backed up in case of failure.

<b>R1 Backup Interface Configuration</b>
R1(config)#no ip route 0.0.0.0 0.0.0.0 192.168.13.3 10
R1(config)#ip route 0.0.0.0 0.0.0.0 192.168.13.3
R1(config)#interface g0/0
R1(config-if)#backup interface g0/1
R1(config-if)#backup delay 1 1
R1#show ip interface brief
R1#show ip route static
R1#show ip interface brief



```
R1#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 192.168.13.3 to network 0.0.0.0

```
S* 0.0.0.0/0 [1/0] via 192.168.13.3
   192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.1.0/24 is directly connected, GigabitEthernet0/2
L    192.168.1.254/32 is directly connected, GigabitEthernet0/2
   192.168.13.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.13.0/24 is directly connected, GigabitEthernet0/1
L    192.168.13.1/32 is directly connected, GigabitEthernet0/1
```