

IPv4 Unnumbered Interfaces

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Description

This feature adds industry standard “unnumbered” interface support for IPv4 routed interfaces. That means that, unlike numbered config where each routed interface must have a unique v4 address, with unnumbered config we specify a “lending” interface from which many interfaces may “borrow” the same address. This reduces the number of unique IPv4 addresses needed and may be convenient to operate with.

In the 4.23.0 release, we will support the configuration of IPv4 unnumbered interfaces and their usage by protocols like OSPF and ISIS. This is supported in both single and multi-agent modes. (Unnumbered support for other protocols is not yet available.)

Platforms

All Platforms

Configuration

Interface Config

Lending Interface Config

The interface type which is supported as a lending interface is a “loopback” interface. They are configured with the usual config. Multiple different loopbacks may be used as lending interfaces however any one borrowing interface can only be referenced to one lender at a time.

Borrowing (Unnumbered) Interface Config

Interfaces are configured as “unnumbered” with a reference to a lending interface with the command: “ip address unnumbered <lendingIntf>”.

Any IPv4 routed interface may be configured as unnumbered interface and can be referenced to one lending interface. Unnumbered interfaces may reference the same (or different) lending interfaces.

```
rtr1(config)# interface Ethernet1
rtr1(config-if-Et1)# ip address unnumbered Loopback1
```

OSPF Config

To enable OSPF on an unnumbered interface, we need to configure BOTH, the area and set the network type to point-to-point under the **interface config mode**.

NOTE: The “ **network** ” command under “ **router ospf** ” config mode is not supported for the configuration of unnumbered interfaces. The user must specify the area and “ **network point-to-point** ” commands in the config context of the unnumbered interface.

```
retry(config-if-Et1)# ip ospf area 1
rtr1(config-if-Et1)# ip ospf network point-to-point
```

It is also recommended to enable OSPF on the lending interface in the same area as the borrowing interfaces (In case different unnumbered interfaces belong in different areas, configure them to use different loopbacks.):

```
rtr1(config)# interface loopback 1
rtr1(config-if-Lo1)# ip address 1.1.1.1/32
rtr1(config-if-Lo1)# ip ospf area 1
```

ISIS Config

To enable ISIS on an unnumbered interface, one must enable isis and should specify point-to-point mode under the **interface config mode**:

```
rtr1(config-if-Et1)# isis enable inst1
rtr1(config-if-Et1)# isis network point-to-point
```

It is also recommended to enable ISIS on the lending interface (with ISIS levels matching those of the borrowing unnumbered interfaces):

```
rtr1(config)# interface loopback 1
rtr1(config-if-Lo1)# ip address 1.1.1.1/32
rtr1(config-if-Lo1)# isis enable inst1
rtr1(config-if-Lo1)# isis network point-to-point
```

Show Commands

The same IP address may now be in use on multiple interfaces at the same time. This is visible via some show commands:

show ip interface brief

This command has an added column indicating, for unnumbered interfaces, the interface from which an address is being borrowed. Note in this example that Ethernet2-5 are all unnumbered and are borrowing from Loopback1.

```
ip1.06:36:11(config-if-Et2)#sh ip int brief
```

Interface	IP Address	Status	Protocol	MTU	Address Owner
-----	-----	-----	-----	-----	-----
Ethernet1	1.1.2.1/24	up	up	1500	
Ethernet2	1.1.1.1/32	up	up	1500	Lo1
Ethernet3	1.1.1.1/32	up	up	1500	Lo1
Ethernet4	1.1.1.1/32	up	up	1500	Lo1
Ethernet5	1.1.1.1/32	up	up	1500	
Lo1					
Loopback1	1.1.1.1/32	up	up	65535	

show ip ospf neighbor

If a router is configured with multiple unnumbered interfaces to the same neighbor, each adjacency with that neighbor may show the same neighbor id. In this example, OSPF has two adjacencies with the same peer (via Ethernet2 and Ethernet 3). While this is an OSPF example, ISIS behaves the same as well.

```
ip1.06:36:53(config-if-Et2)#sh ip ospf neighbor
```

Neighbor ID	Instance	VRF	Pri	State	Dead Time	Address
Interface						
2.2.1.1	1	default	0	FULL	00:00:36	2.2.1.1
Ethernet3						
2.2.1.1	1	default	0	FULL	00:00:34	2.2.1.1
Ethernet2						

Limitations/Recommendations

- It is strongly recommended to configure the addresses on the lending loopbacks as /32. In order to resolve routes via an unnumbered peer, we need to know where the peer is (i.e., we need a /32 route to the address of the peer via the unnumbered interface). Configuring a lending loopback as /32 and enabling OSPF/ISIS on it will naturally propagate that prefix.
- Loopback interfaces are the only interface type that should be used as a lending interface.
- It's recommended that only one IGP is enabled on a lending loopback interface. If multiple IGPs are used, then they should be enabled on different loopbacks.
- BFD multihop sessions may be configured over unnumbered interfaces, with the caveat that only one BFD multi-hop session may be configured per loopback.
- SSO is not supported for BFD multihop sessions over unnumbered interfaces.

- OSPFv3 does not support unnumbered interface addressing