

Configure EIGRP IPV6 on ASA

Contents

[Introduction](#)

[Prerequisites](#)

[Minimum Supported Software and Hardware Platforms](#)

[Requirements](#)

[Components Used](#)

[EIGRP for IPV6](#)

[What is New](#)

[Limitations](#)

[Supported](#)

[Not Supported](#)

[Feature Details](#)

[Functional Feature Description](#)

[EIGRP Features](#)

[EIGRP Functional Overview](#)

[How It Works](#)

[EIGRP Message Flows](#)

[Establishing Neighborhood](#)

[Internal View / ASA CLI](#)

[Neighborhood: Basic Config and Multi/Unicast](#)

[Neighborhood: Specify Interface and Router ID](#)

[Basic Neighborhood](#)

[Verify](#)

[Check Neighborhood State](#)

[Hello and Hold Interval Configuration](#)

[Passive Interface Configuration](#)

[Distribute List for Route Filtering](#)

[Redistributing Routes from Other Protocols](#)

[EIGRP IPv6 in ASDM](#)

[Overview of New Options for EIGRPv6](#)

[EIGRPv6 Configuration in Interface](#)

[Configure EIGRPv6 Settings for an Interface](#)

[Process Instances and Passive Interfaces](#)

[Passive Interfaces Configuration](#)

[Router EIGRP and Default Metrics Configuration](#)

[Filter Rules \(Distribute-List\) Configuration](#)

[Redistribute Routes Configuration](#)

[Neighbor: Unicast Router Mode](#)

[Multicast Router Mode](#)

[IPv6 EIGRP in CSM](#)

[Overview of New Options in CSM for EIGRPv6](#)

[Enable EIGRP IPv6 Support](#)

[EIGRP IPv6 Setup Tab](#)

[EIGRP IPv6 Neighbors Tab](#)

[EIGRP IPv6 Redistribution Tab](#)

[EIGRP IPv6 Summary Address Tab](#)

[EIGRP IPv6 Interfaces Tab](#)

Troubleshooting

[Steps to Troubleshoot](#)

[Sample Problem](#)

[Revision History](#)

Introduction

This document describes how to configure EIGRP IPV6 on Cisco Adaptive Security Appliance (ASA).

Prerequisites

Minimum Supported Software and Hardware Platforms

Min Supported Manager Version	Managed Devices	Min Supported Managed Device Version Required	Notes
ASA	All ASA platforms	9.20.1	CLI
CSM	All ASA platforms	4.27	CSM GUI
ASDM	All ASA platforms	7.20.1	ASDM GUI

Requirements

Cisco recommends that you have knowledge of these topics:

- Cisco Security Manager
- Adaptive Security Device Manager

Components Used

The information in this document is based on these software and hardware versions:

- Cisco Adaptive Security Appliance (ASA), 9.20.1 or higher
- Cisco Security Manager (CSM) running 4.27
- Cisco Adaptive Security Device Manager running 7.20.1

The information in this document was created from the devices in a specific lab environment. All of the

devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

EIGRP for IPV6

- EIGRP is already supported and available on ASA. The demand for EIGRP IPV6 is increasing.
- The configuration for EIGRPv4 and EIGRPv6 are similar, but they can be configured and managed independently.
- Due to differences in protocols, configuration and operation differ slightly.

What is New

- In earlier releases EIGRP was supported only for IPv4 and from ASA 9.20 onwards, EIGRP would be supported with IPV6.
- Support for EIGRP IPv6 with link-local address on ASA only.

Limitations

Supported

- EIGRPv6 is currently supported on ASA only on routed mode, HA, and cluster.
- EIGRPv6 neighborship can be enabled only with link local address.

Not Supported

- Transparent mode
- Multi Context
- Authentication
- On FTD

Feature Details

Functional Feature Description

- EIGRP for IPv6 uses the same framework as EIGRP for IPv4.
- EIGRP IPv6 would communicate only with IPv6 peers and advertise only IPv6 routes.

EIGRP IPV4 and EIGRP IPv6 share similar characteristics as well like:

- Neighbor, routing, and topology tables are maintained.
- It uses DUAL stack for fast convergence and loop free network.

The differences are:

- The network command under router-mode is not used for EIGRP IPv6.
- Use `ipv6 router eigrp <AS>` to enable EIGRP IPV6 router process.
- Explicitly configure `ipv6 eigrp <AS>` to enable EIGRP IPv6 on specific interface.
- User configured IPv6 address cannot be used to establish neighborship.
- Authentication is not supported in current release.

EIGRP Features

EIGRP Functional Overview

- EIGRP for IPv6 would be same as EIGRP IPv4.
- EIGRP uses the Diffusing Update Algorithm (DUAL) to achieve rapid convergence.
 - DUAL not only calculates the best routes but also loop free routes.
 - There are mainly two tables used by DUAL to for calculation of best route. They are neighbor routing table, topology table.
 - DUAL calculates alternative path based on reported feasible distance.
- The neighbor table keeps track of all directly connected neighbors. Hello packets are used to check that status of neighbor.
- Topology table keeps information on metrics of all routes in the network. Successor and feasible successor keep the best path and alternate path information.

How It Works

Hello messages are used to discover neighbor before establishing adjacency.

Update messages are exchanged between neighbors to build topology table and routing table.

Query messages are sent to other EIGRP neighbors for a feasible successor when DUAL is re-computing a route in which the firewall does not have a feasible successor.

Reply messages are sent as the response to an EIGRP Query packet.

Acknowledge messages are used to acknowledge EIGRP Updates, Queries, and Replies.

EIGRP Message Flows

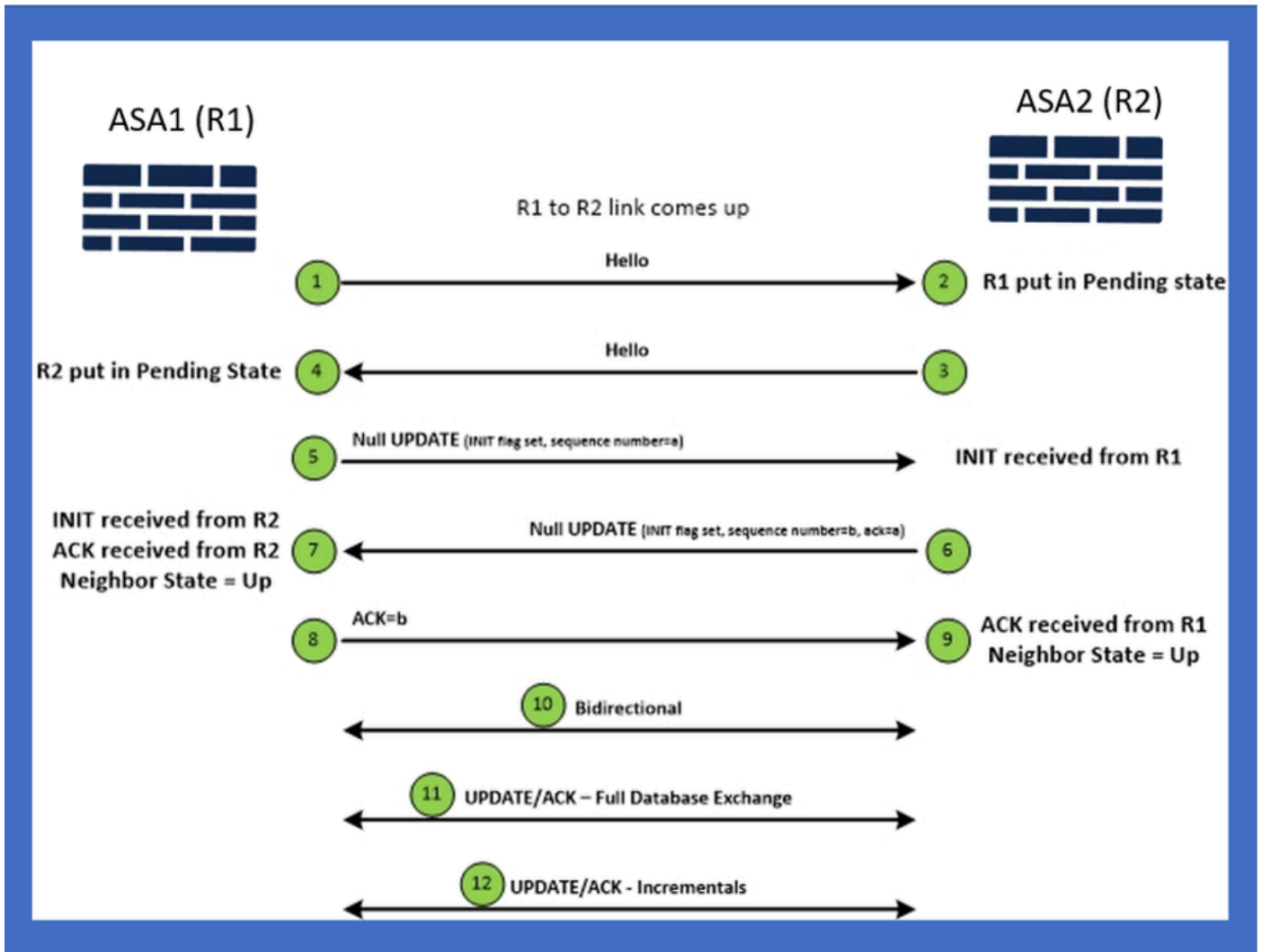
EIGRP IPv6 uses a Hello packet to discover other EIGRP-capable devices on directly attached links and to form neighbor relationships.

EIGRP IPv6 transmits Hello packets with a source address being the link-local address of the transmitting interface.

Hello messages are like keep alive messages to keep track of the neighbor status.

Default timer of hello message is 5 seconds. Upon Hello message exchange, an update message is received and sent. This is used to build the topology table and install the routes in the RIB accordingly.

Establishing Neighborship



Internal View / ASA CLI

Neighborship: Basic Config and Multi/Unicast

To establish neighborship, router mode config is needed. It is the same for IPv4 except for the config starts with IPv6 keyword.

It also needs to attach the participating interface to autonomous system.

Neighborship can be formed in two ways, using either multicast or unicast.

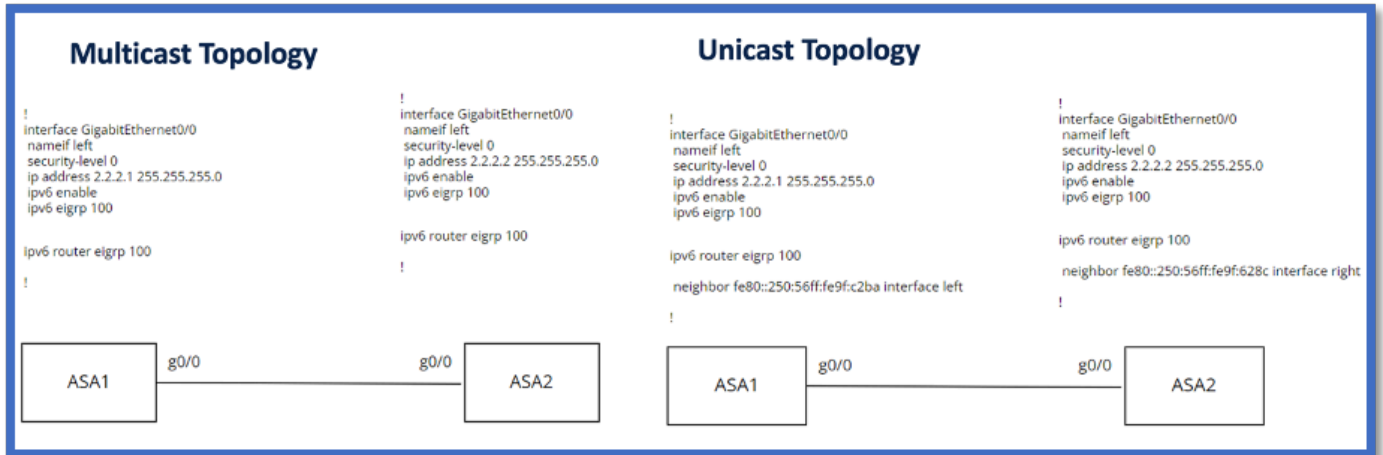
Multicast router mode config	Unicast router mode config
<pre> ciscoasa(config-rtr)# ipv6 router eigrp 100 ciscoasa(config-rtr)# show run ipv6 ! ipv6 router eigrp 100 ! </pre>	<pre> ipv6 router eigrp 100 neighbor fe80::250:56ff:fe9f:9e3d interface r0 ! </pre>

Neighborship: Specify Interface and Router ID

- In addition to router mode configuration, the interface participating in the neighborship needs to be attached to respective autonomous system.
- Make sure to enable IPv6 on the interface.
- Router id is needed for neighborship to form. It would be taken implicitly from the IPv4 interface, or it has to be configured explicitly under router mode, else neighborship would not be formed.

Basic Neighborship

You have simply directed connected topology and configuration for unicast and multicast neighborship.



Verify

Check Neighborship State

`show ipv6 eigrp neighbors` is used to check the neighborship state.

```
<#root>
```

```
ciscoasa(config-rtr)# show ipv6 eigrp neighbors
```

```
EIGRP-IPv6 Neighbors for AS(50)
```

H	Address	Interface	Hold	Uptime	SRTT	RTO	Q	Seq
				(sec)	(ms)		Cnt	Num
1	Link-local address:	m3	12	1w3d	270	1620	0	153 fe80::250:56ff:fe9f:e7e8
0	Link-local address:	m2	12	1w3d	174	1044	0	152 fe80::250:56ff:fe9f:8d83

Hello and Hold Interval Configuration

- Hello interval and Hold interval can be configured using the configurations under interface.
- For non-broadcast multiple access network (NBMA) interfaces, the default value of hello timer is **5 seconds** and hold time default value is **15 seconds**.

```
<#root>
```

```
ciscoasa(config-if)# ipv6 hello-interval eigrp 100 ?
```

interface mode commands/options:

<1-65535> Seconds between hello transmissions

ciscoasa(config-if)#

ciscoasa(config-if)# ipv6 hold-time eigrp 200 ?

interface mode commands/options:

<1-65535> Seconds before neighbor is considered down

ciscoasa(config-if)#

Passive Interface Configuration

- In case you do not want an interface to form neighborhood, **passive-interface** config can be used so that Hellos on the interface would not be sent and not form adjacency.

<#root>

ciscoasa(config-rtr)# passive-interface ?

ipv6-router mode commands/options:

Current available interface(s):

default Suppress routing updates on all interfaces

g0 Name of interface GigabitEthernet0/0

mgmt Name of interface Management0/0

ciscoasa(config-rtr)#

Distribute List for Route Filtering

- Distribute list can be used along with the prefix config to filter routing updates either incoming or outgoing for given interface.

<#root>

ciscoasa(config-rtr)# distribute-list prefix-list abc ?

ipv6-router mode commands/options:

in Filter incoming routing updates

out Filter outgoing routing updates

```
ciscoasa(config-rtr)#
```

Redistributing Routes from Other Protocols

- Routes from other routing protocols can be redistributed into EIGRP.
- Use the **redistribute** command under router.

```
<#root>
```

```
ciscoasa(config-rtr)# redistribute ?
```

ipv6-router mode commands/options:

bgp	Border Gateway Protocol (BGP)
connected	Connected Routes
eigrp	Enhanced Interior Gateway Routing Protocol (EIGRP)
isis	ISO IS-IS
ospf	Open Shortest Path First (OSPF)
static	Static Routes

```
ciscoasa(config-rtr)#
```

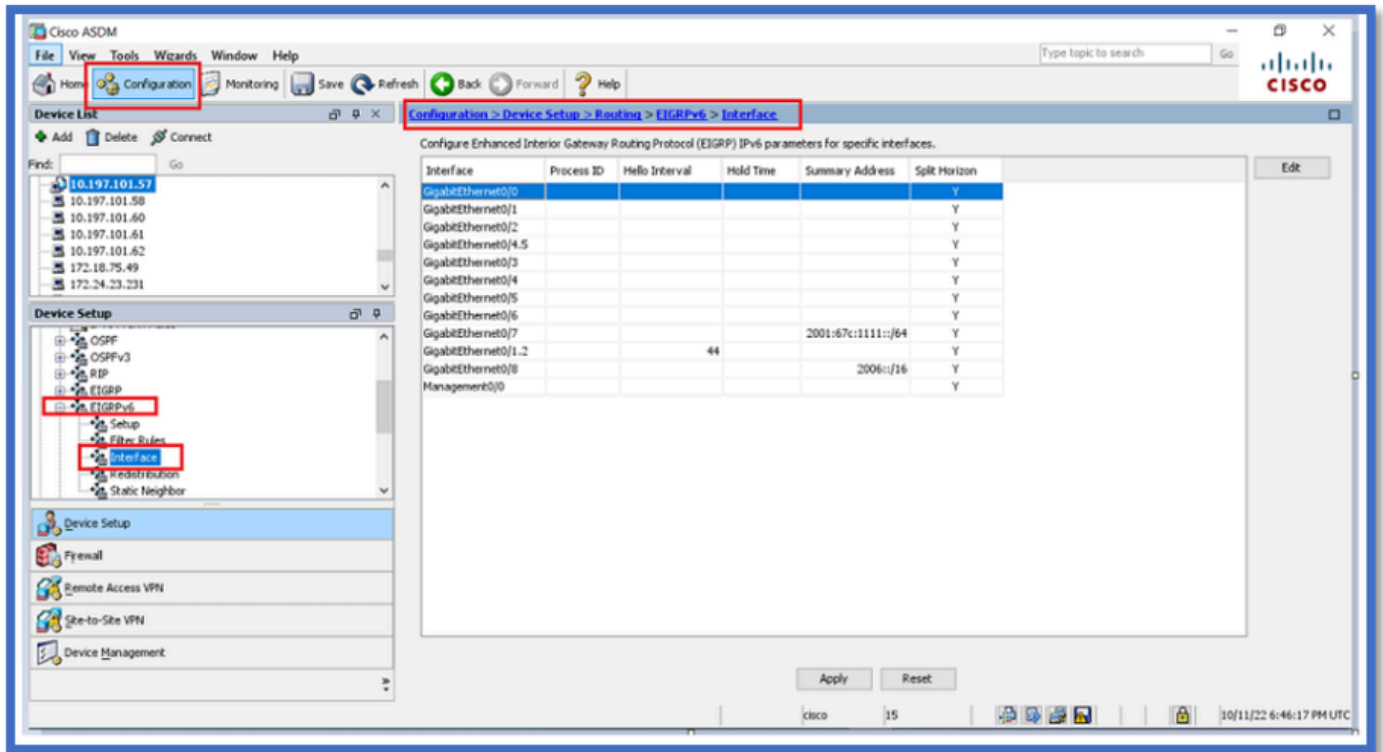
EIGRP IPv6 in ASDM

Overview of New Options for EIGRPv6

- EIGRPv6 support is added as part of ASDM 7.20.1.
- EIGRPv6 configuration added as part of interfaces sub CLI command.
- EIGRPv6 configuration added in router and support router commands.

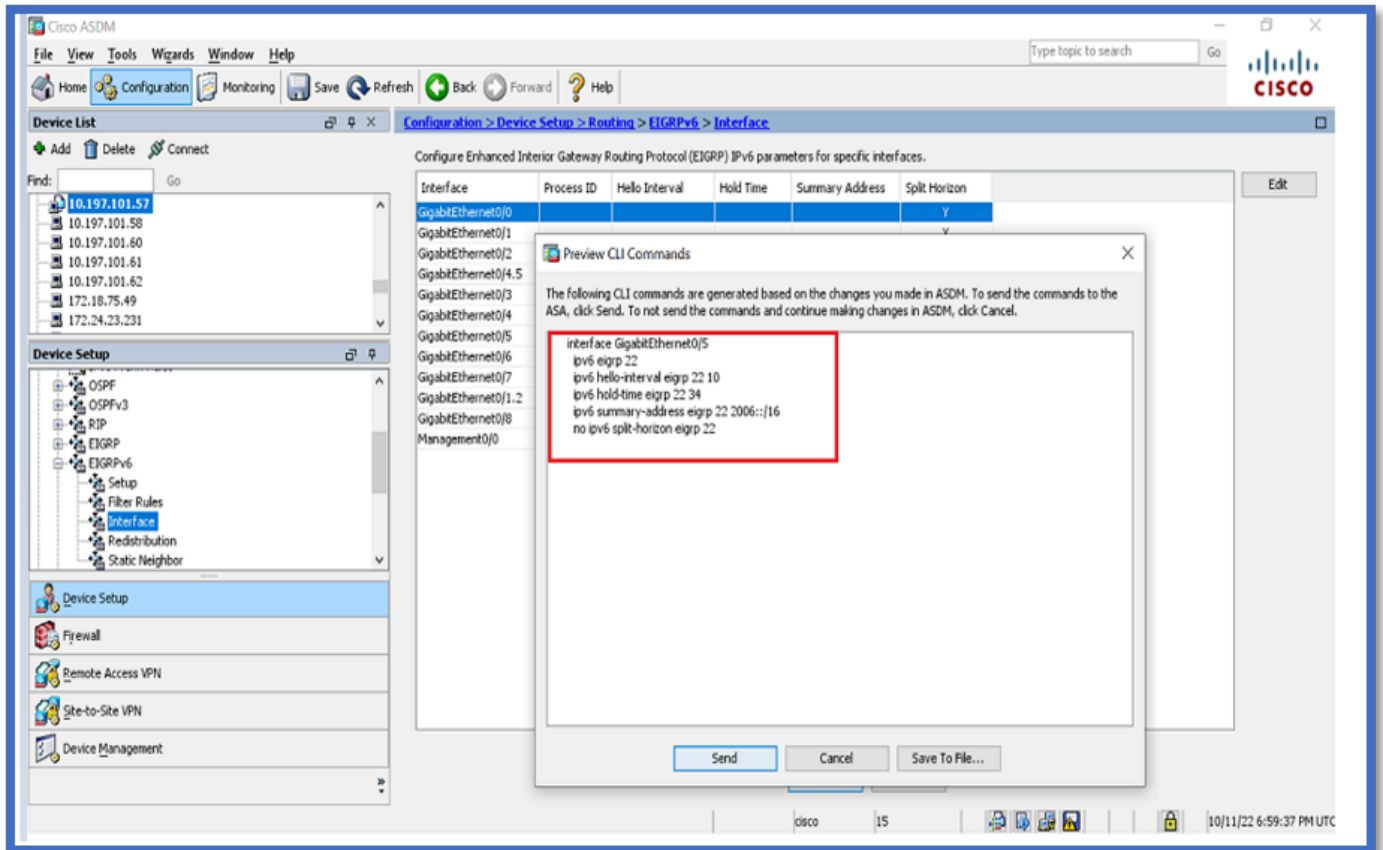
EIGRPv6 Configuration in Interface

1. Navigate to **Configuration > Device Setup > Routing > EIGRPv6**.
2. Select **Interface** to be able to see all the interfaces which are supported.



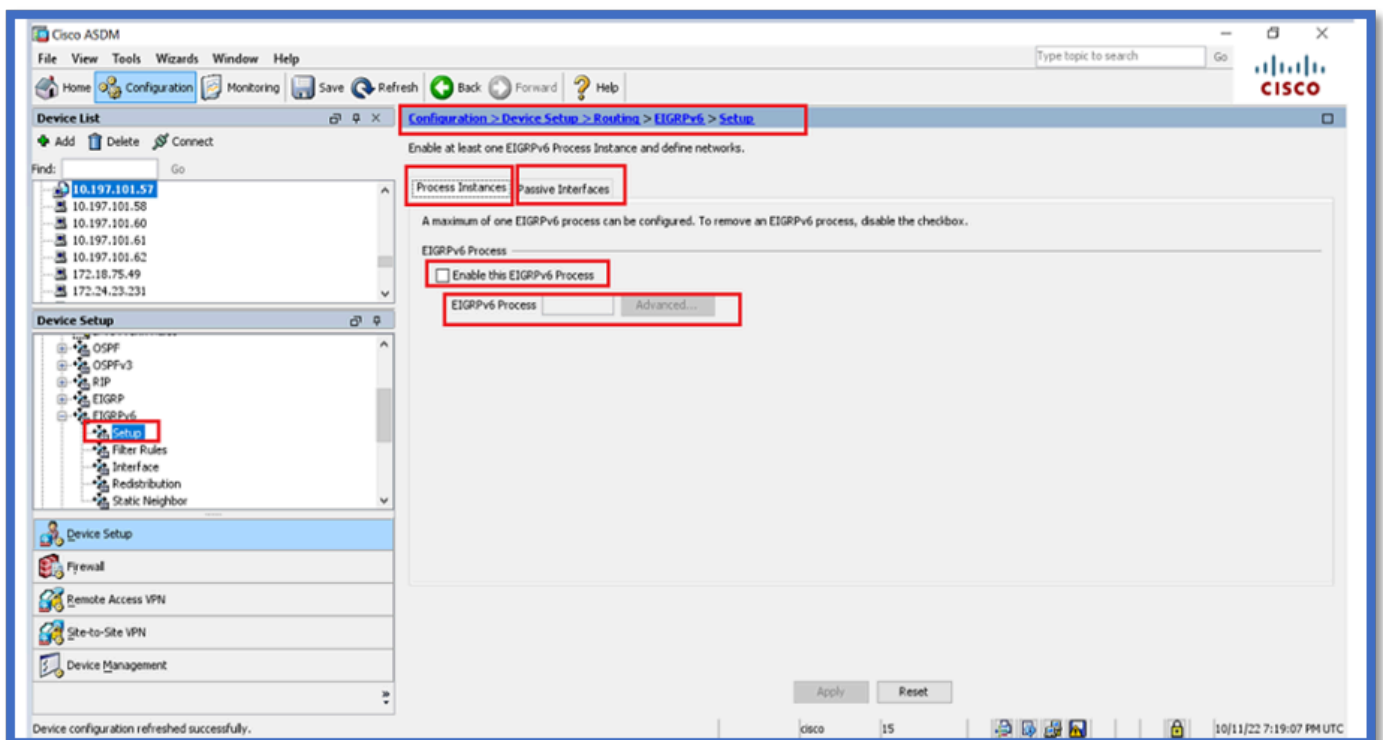
Configure EIGRPv6 Settings for an Interface

1. Navigate to **Configuration > Device Setup > Routing > EIGRPv6 > Interface**.
2. Select **Interface** and click **Edit**.
3. Select checkbox(es) to configure **process ID, Hello Interval, Hold Time, Split Horizon, and/or Summary Address**.
4. Configure the settings, then click **OK**.
5. Click **Send**.
6. When the CLI's appear, Click **Send, Cancel, or Save to File**.



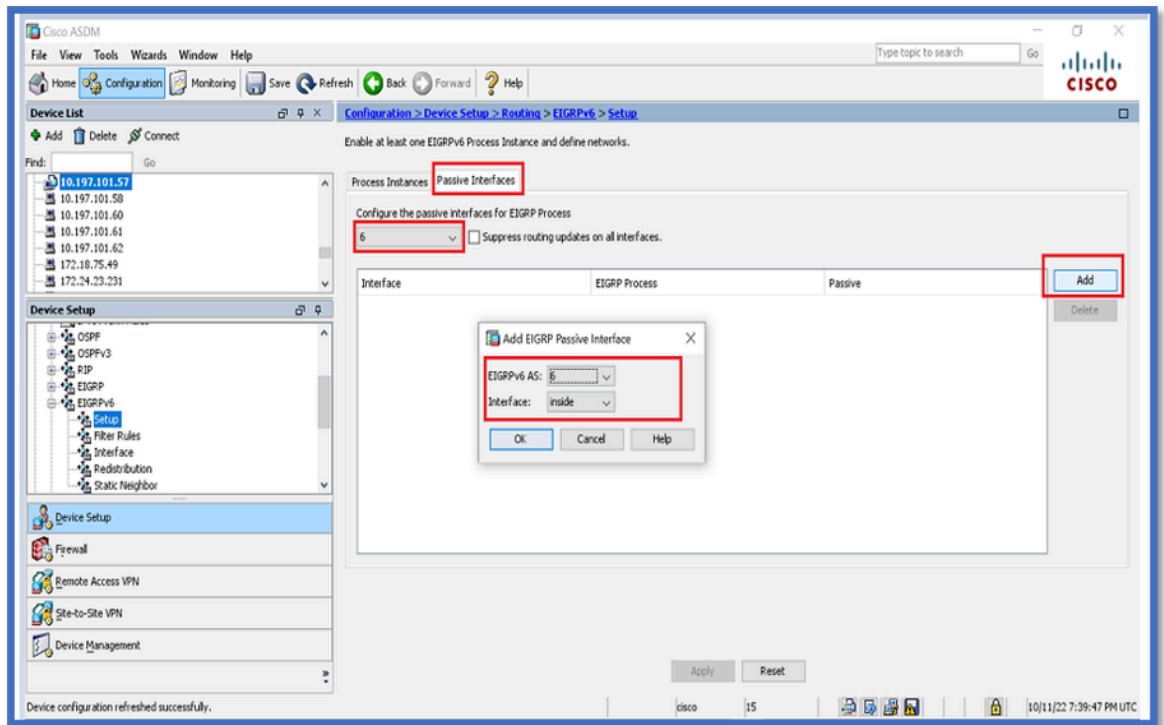
Process Instances and Passive Interfaces

1. Navigate to **Configuration > Device Setup > Routing > EIGRPv6 > Set up**.
2. Able to See Process Instances and Passive Interfaces.
3. Under Process Instances, **Enable EIGRPv6 Process**.

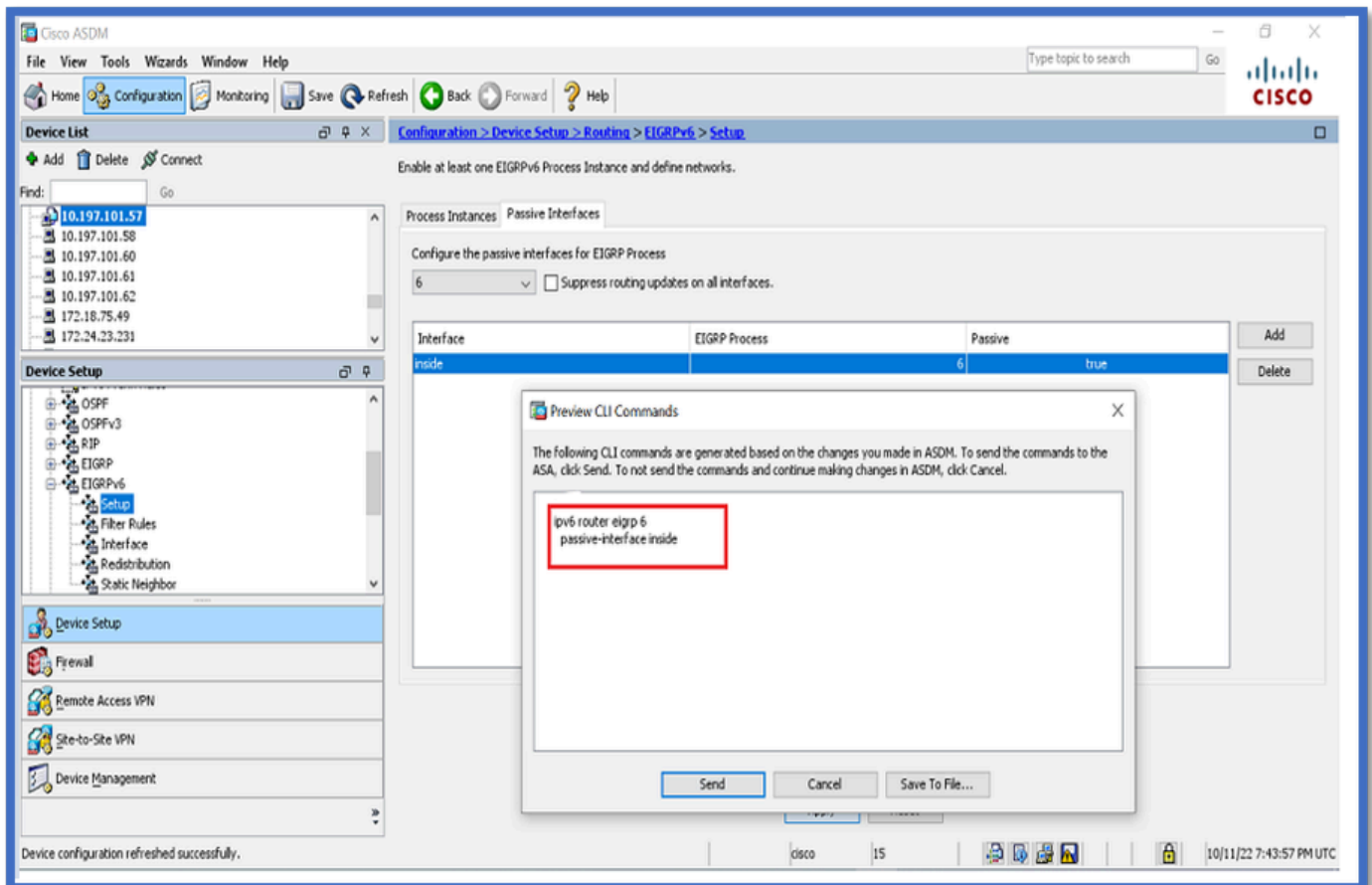


Passive Interfaces Configuration

1. Navigate to **Configuration > Device Setup > Routing > EIGRPv6 > Set up.**
2. Click **Passive Interfaces > Add > Select Interface.**

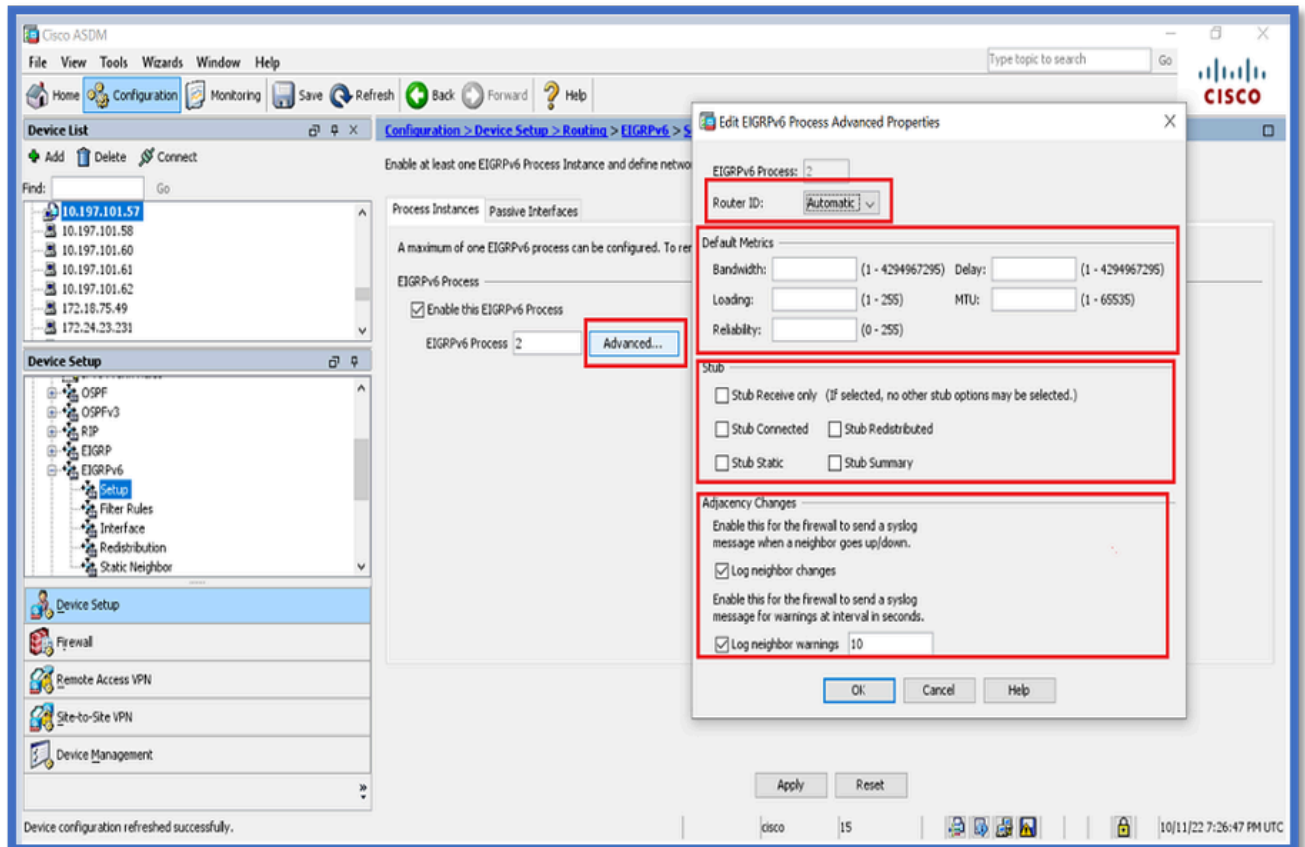


3. Click **OK.**
4. Click **Apply.**
5. The CLI window appears.

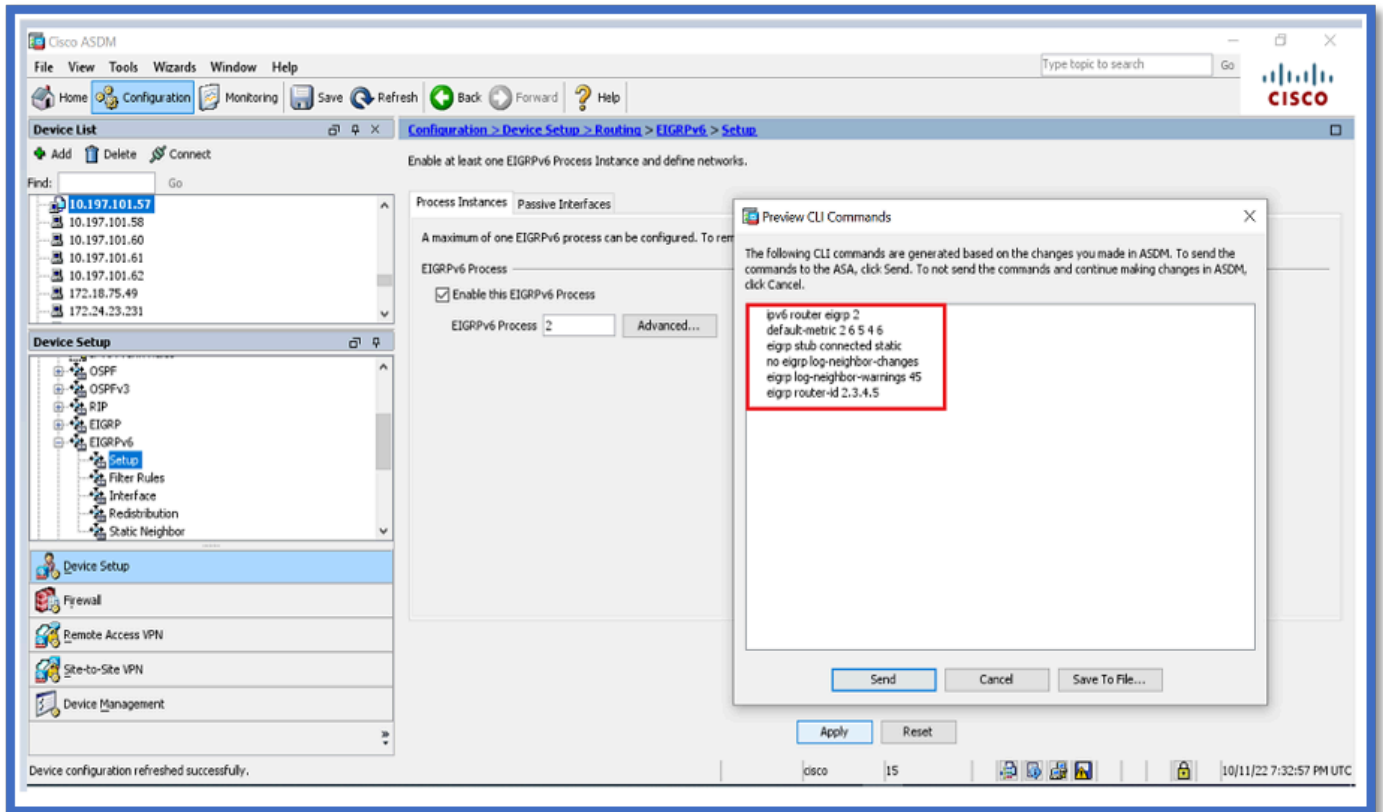


Router EIGRP and Default Metrics Configuration

1. Navigate to **Device Setup > Routing > EIGRPv6 > Set up.**
2. Click **Process Instances > Provide Process ID Value.**
3. Click **Advanced** button.
4. Provide **Router ID, Default Metrics, Stub, and log neighbor values.**

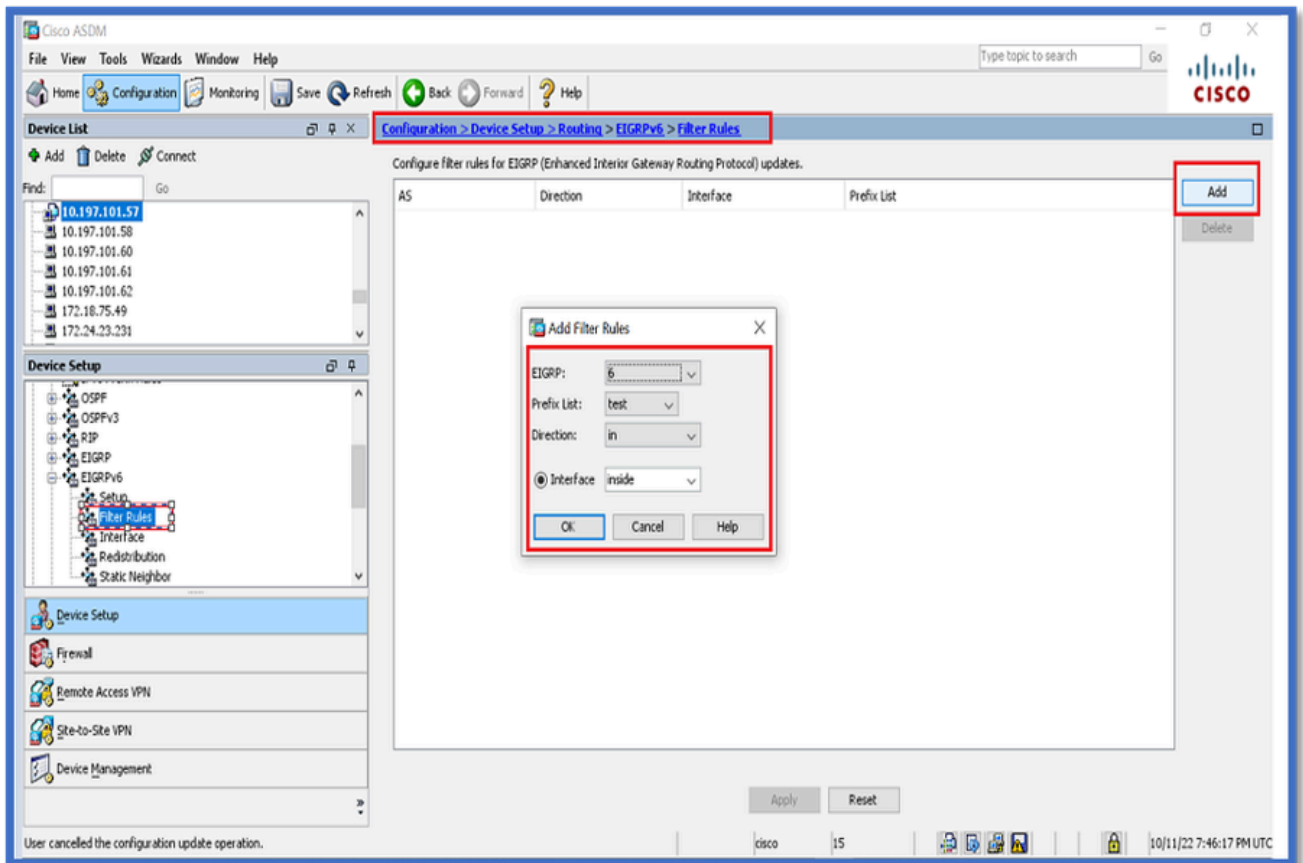


5. Click **Apply.**
6. The CLI window appears.

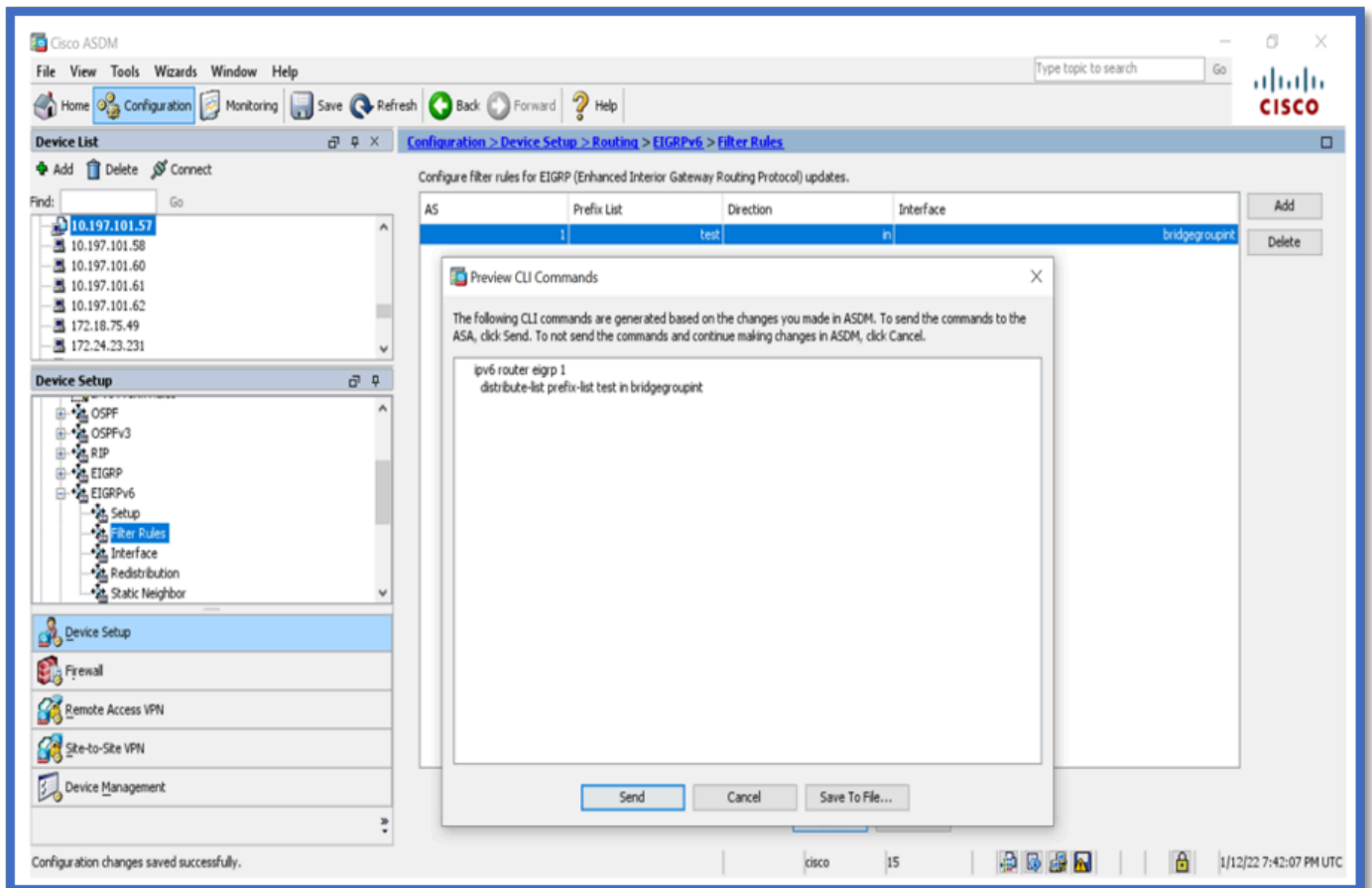


Filter Rules (Distribute-List) Configuration

1. Navigate to **Configuration > Device Setup > Routing > EIGRPv6 > Filter Rules**.
2. Click **Add > Select Prefix list > Direction > Interface**.
3. Click **OK**.

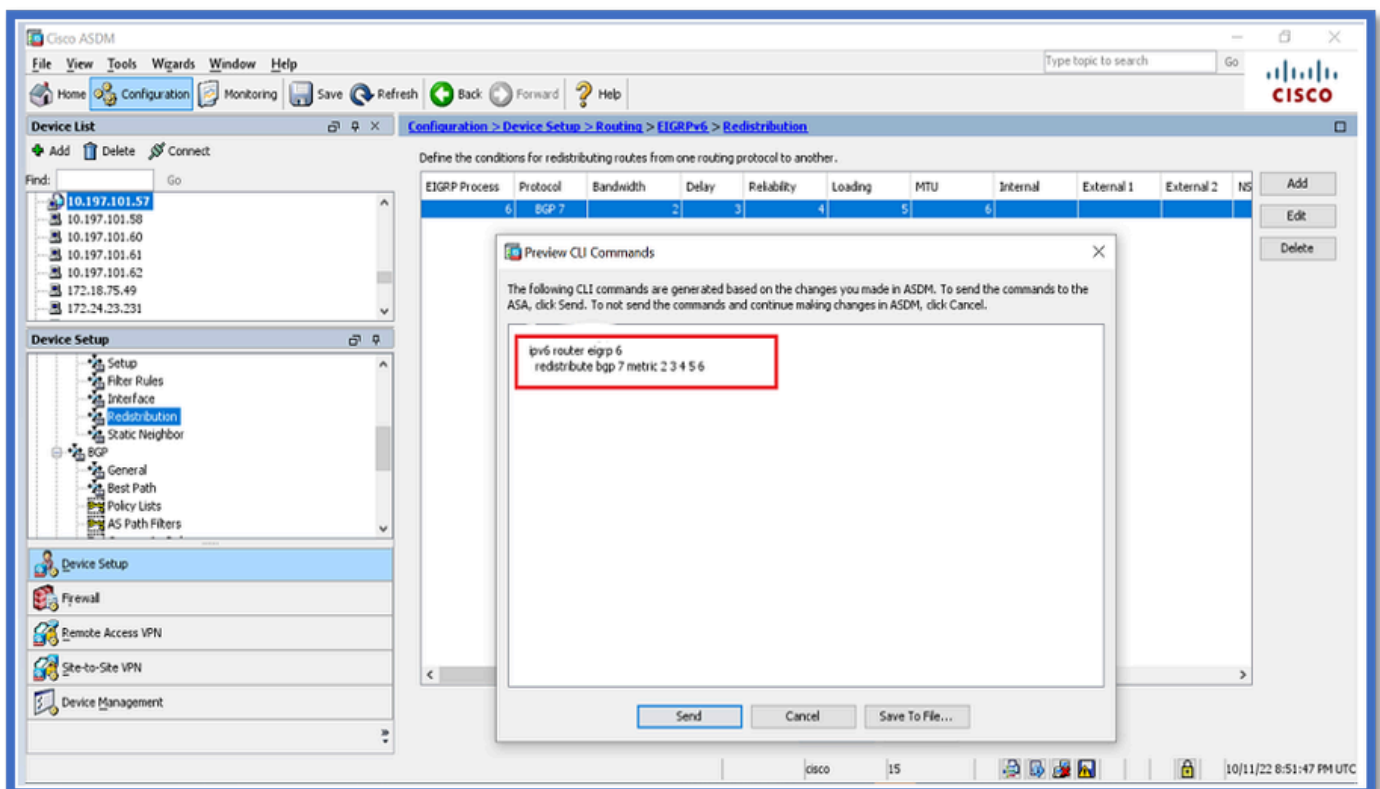
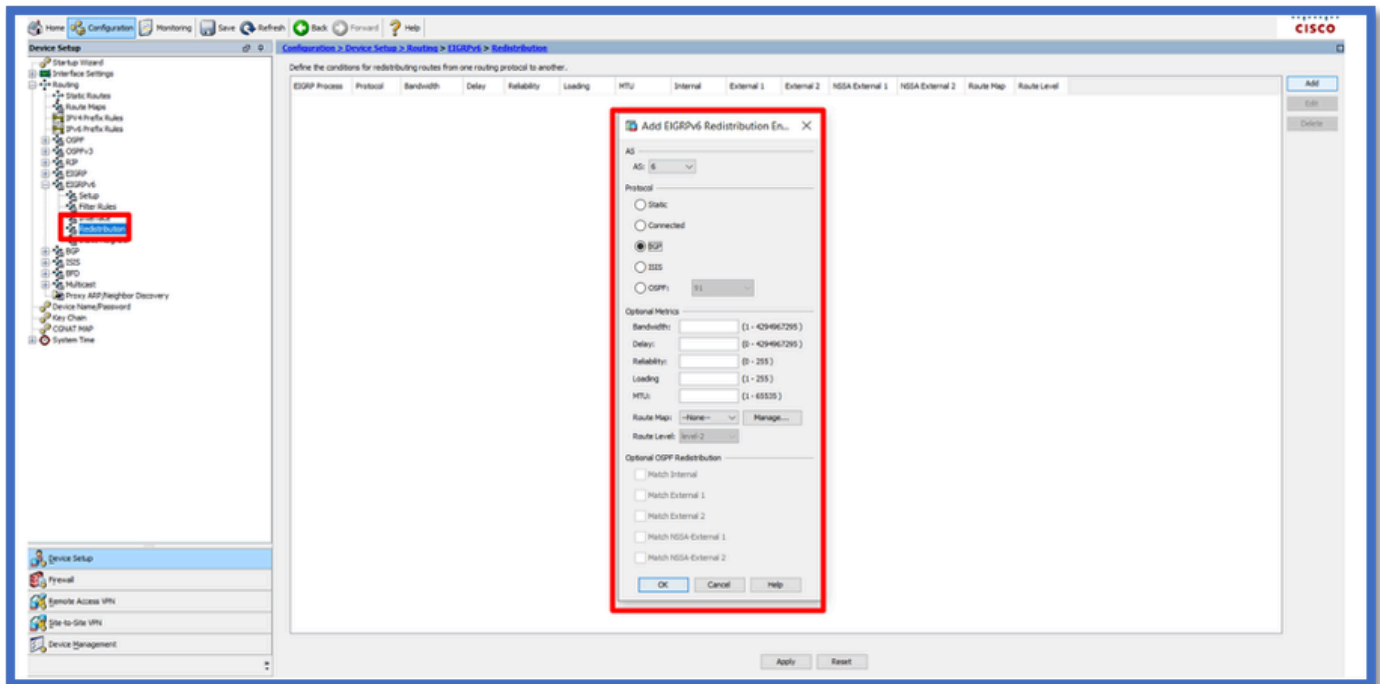


4. Click **Apply**.
5. The CLI window appears.



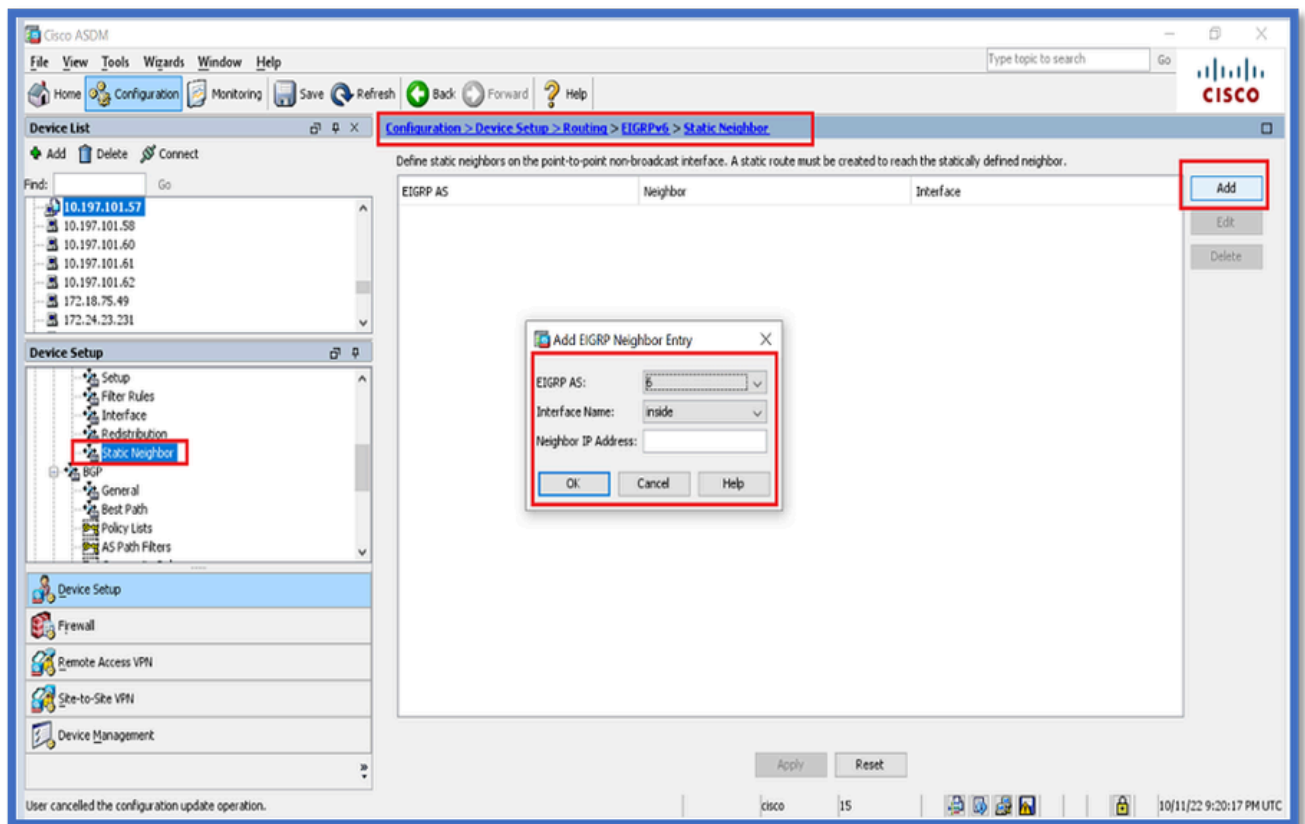
Redistribute Routes Configuration

1. Navigate to **Configuration > Device Setup > Routing > EIGRPv6 > Redistribution**.
2. Click **Add > Select protocol**.
3. Provide Optional metrics
4. Click **OK**.
5. Click **Apply**.
6. The CLI window appears

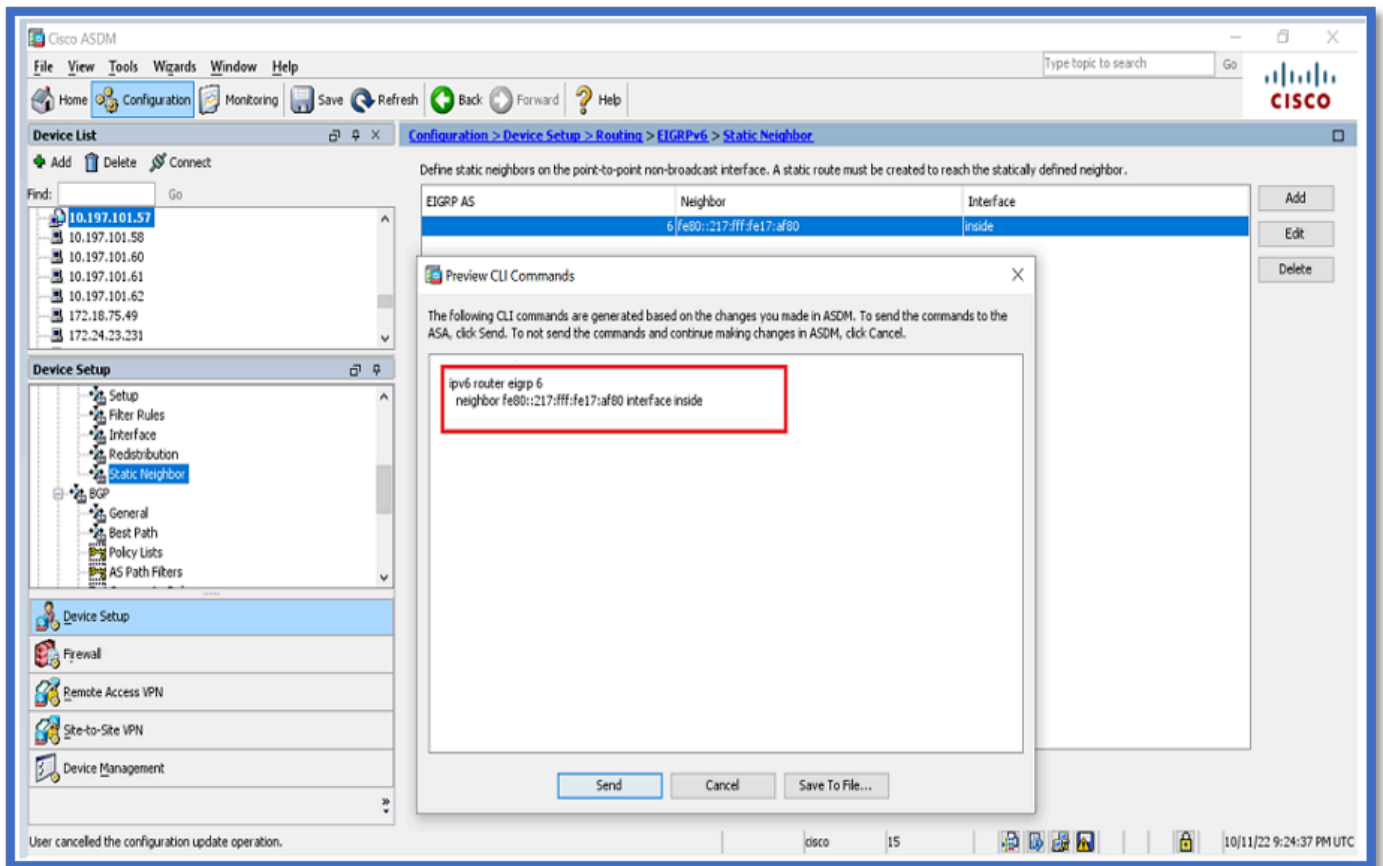


Neighbor: Unicast Router Mode

1. Navigate to **Configuration > Device Setup > Routing > EIGRPv6 > Static Neighbor**.
2. Click **Add > Select Interface**.
3. Provide **Neighbor Address**.
4. Click **OK**.



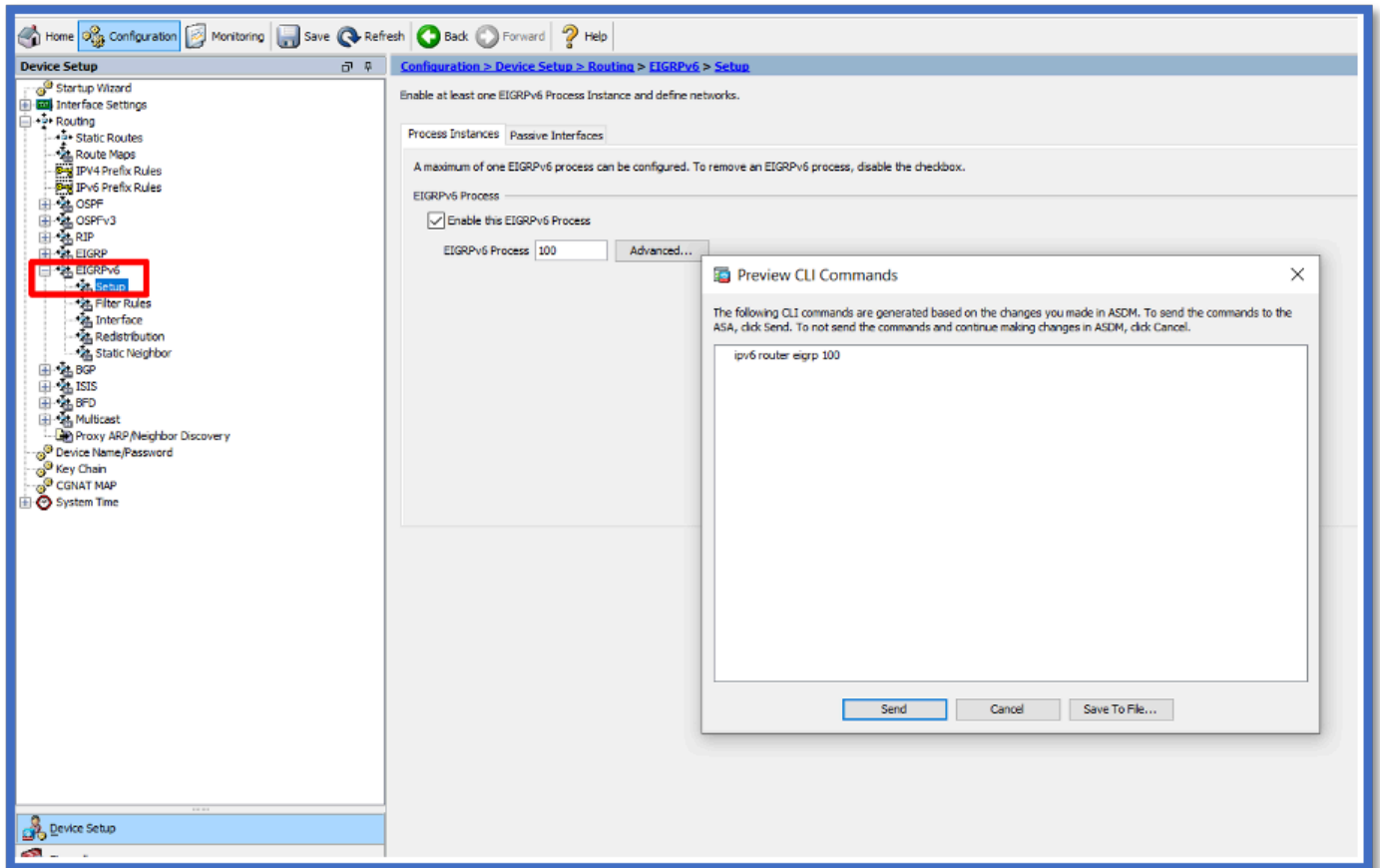
5. Click **Apply**.
6. The CLI window appears.



Multicast Router Mode

The configuration for Multicast router mode is similar to that for Unicast Router Mode.

1. Navigate to **Configuration > Device Setup > Routing > EIGRPv6 > Setup**.
2. Enable checkbox to enable EIGRPv6 Process.
3. Enter value in **EIGRPv6 Process input** field.
4. Click **Apply**.
5. Able to see the CLI.



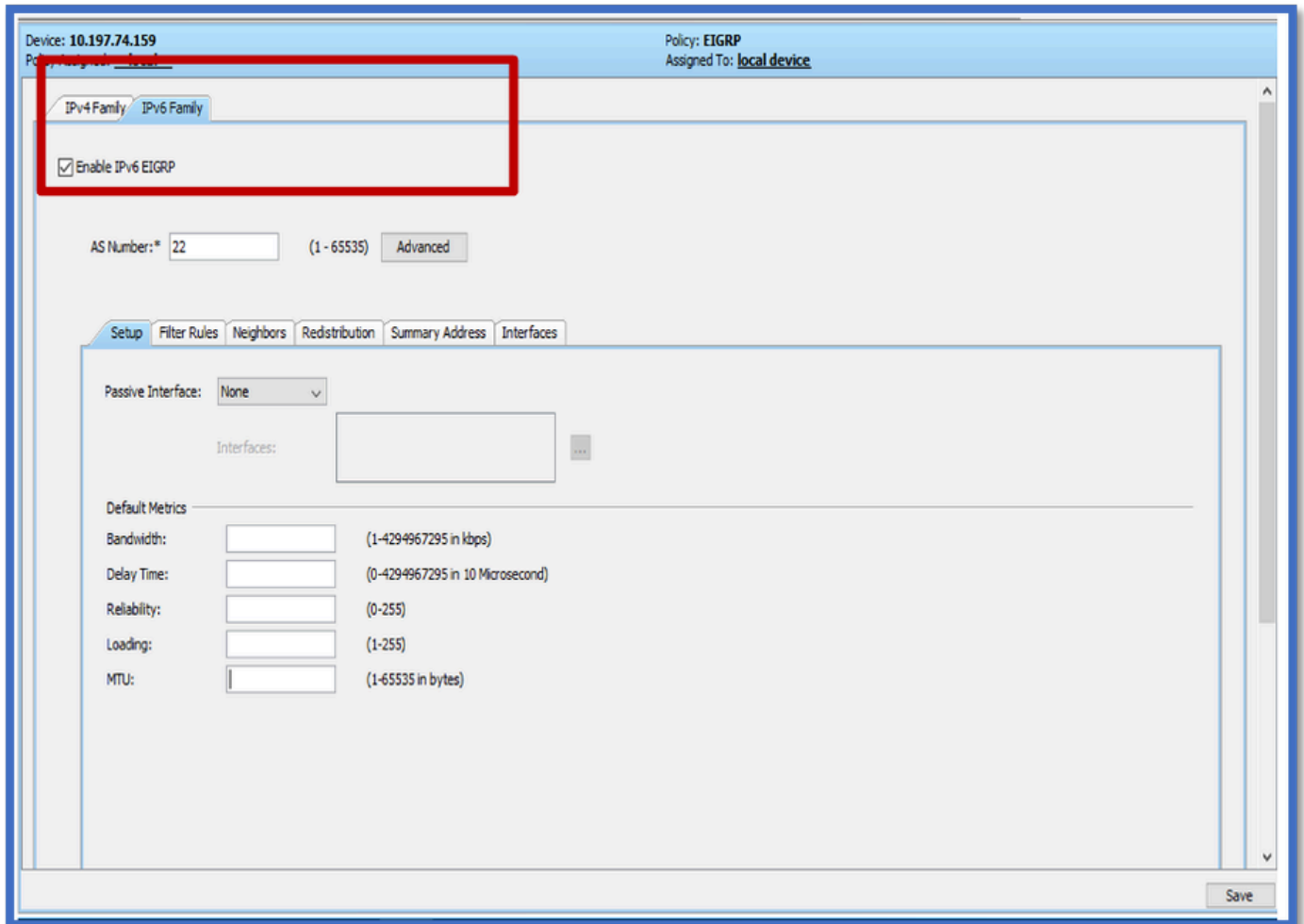
IPv6 EIGRP in CSM

Overview of New Options in CSM for EIGRPv6

- EIGRPv6 support is added as part of CSM 4.27.
- EIGRPv6 configuration added as part of Interfaces Sub CLI command.
- EIGRPv6 configuration added in Router and Support Router commands.

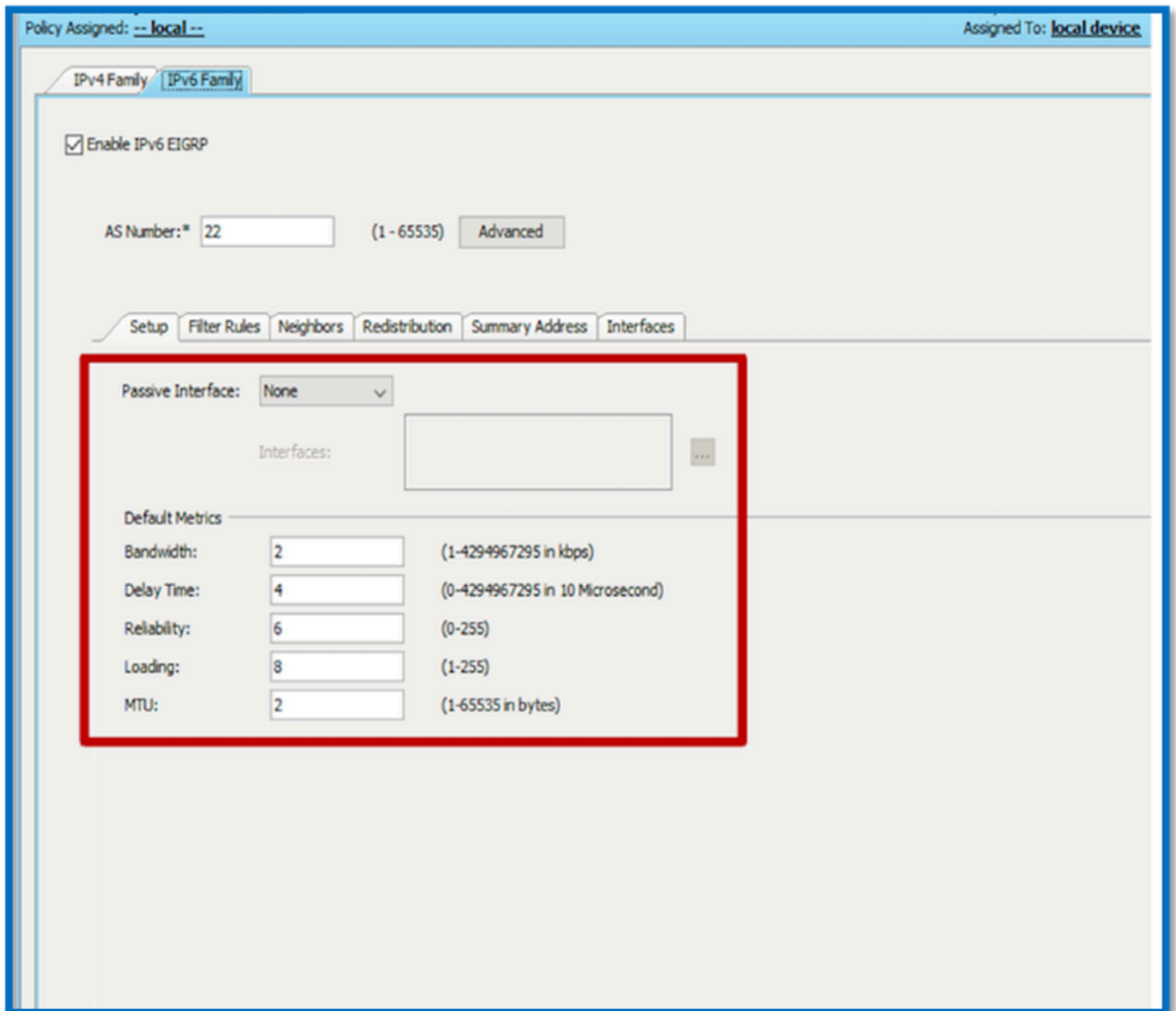
Enable EIGRP IPv6 Support

1. Navigate to **Platform > Routing > EIGRP > IPv6 Family**.
2. Enable IPv6 by clicking the **Enable IPv6 EIGRP** checkbox.
3. Provide **AS Number** between **1** and **65535**.
4. Tabs allow for configuring **Setup** (shown here), **Filter Rules**, **Neighbors**, **Redistribution**, **Summary Address**, and **Interfaces**.



EIGRP IPv6 Setup Tab

1. Navigate to **Platform > Routing > EIGRP > IPv6 Family > Setup Tab.**
2. Passive Interface has 3 options
 1. None
 2. Default
 3. Specific Interface
3. Default Suppress routing updates on all interfaces.
4. In **Specific Interface**, select **interface** from Interface selector.
5. Assign values to **Default Metrics**.
6. Click **OK** and **Save**.



EIGRP IPv6 Filter Rules Tab

1. Navigate to **Platform > Routing > EIGRP > IPv6 Family > Filter Rules** tab.
2. Select **Eigrp Filter Direction** according to Direction (either Inbound or Outbound).
3. Select **Interface**.
4. Enter the **IPv6 Prefix-list** to filter connections based on an IPv6 prefix-list.



Device: **10.197.74.159** Policy: **EIGRP**
Policy Assigned: **-- local --** Assigned To: **lo**

IPv4 Family IPv6 Family

Enable IPv6 EIGRP

AS Number:* (1 - 65535)

Setup Filter Rules Neighbors Redistribution Summary Address Interfaces

No.	Direction	Interface	Prefix List
1	Inbound	 outside	IPv6Prefix
2	Outbound	 sstest	IPv6Prefix

Add/Edit IPv6 Eigrp Filter Page

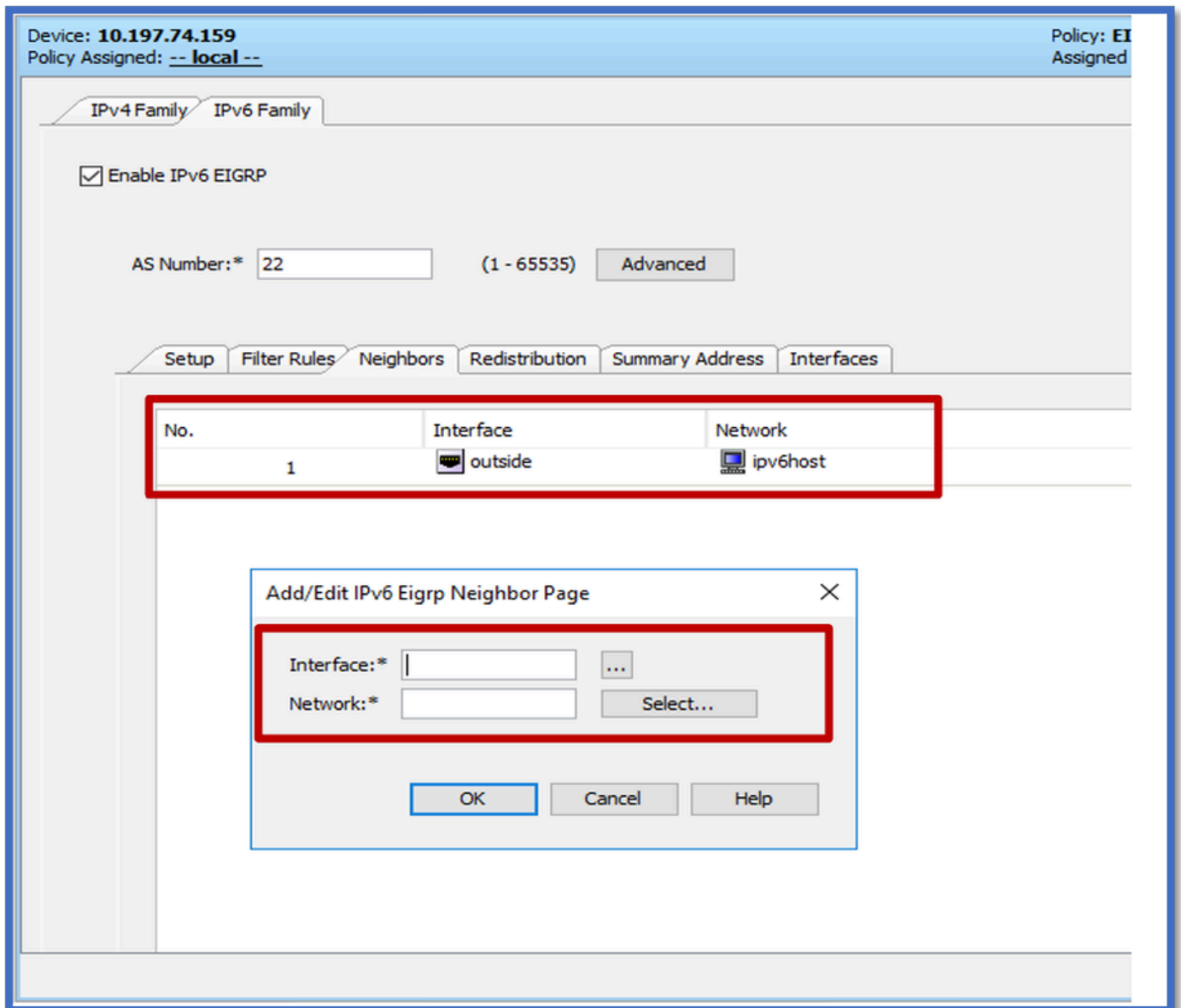
Eigrp Filter Direction: ▾

Interface :* ...

IPv6 Prefix List:* ...

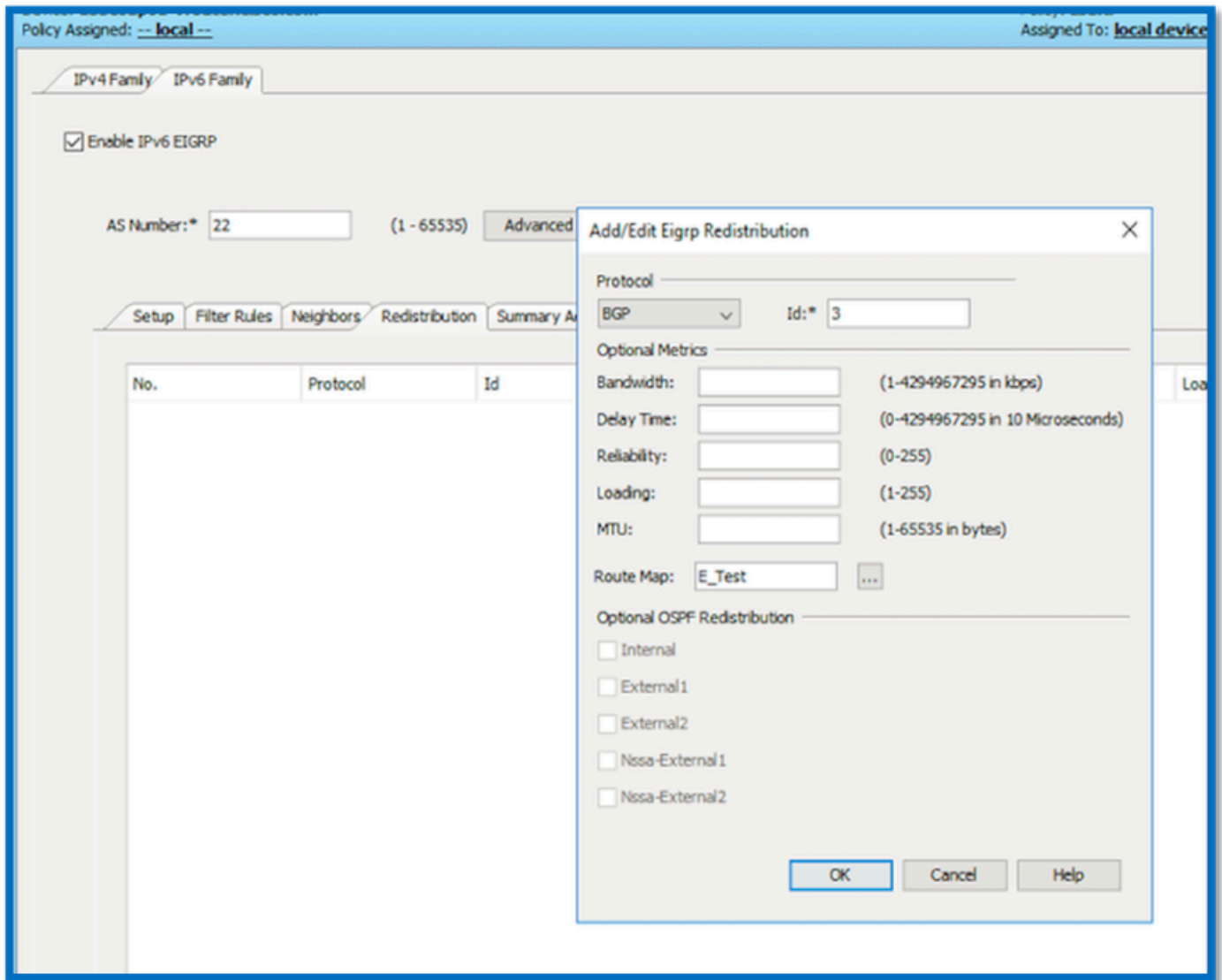
EIGRP IPv6 Neighbors Tab

1. Navigate to **Platform > Routing > EIGRP > IPv6 Family > Neighbors** tab.
2. Enter the **Interface** and **Network** in the **Add/Edit IPv6 Eigrp Neighbor Page** dialog.



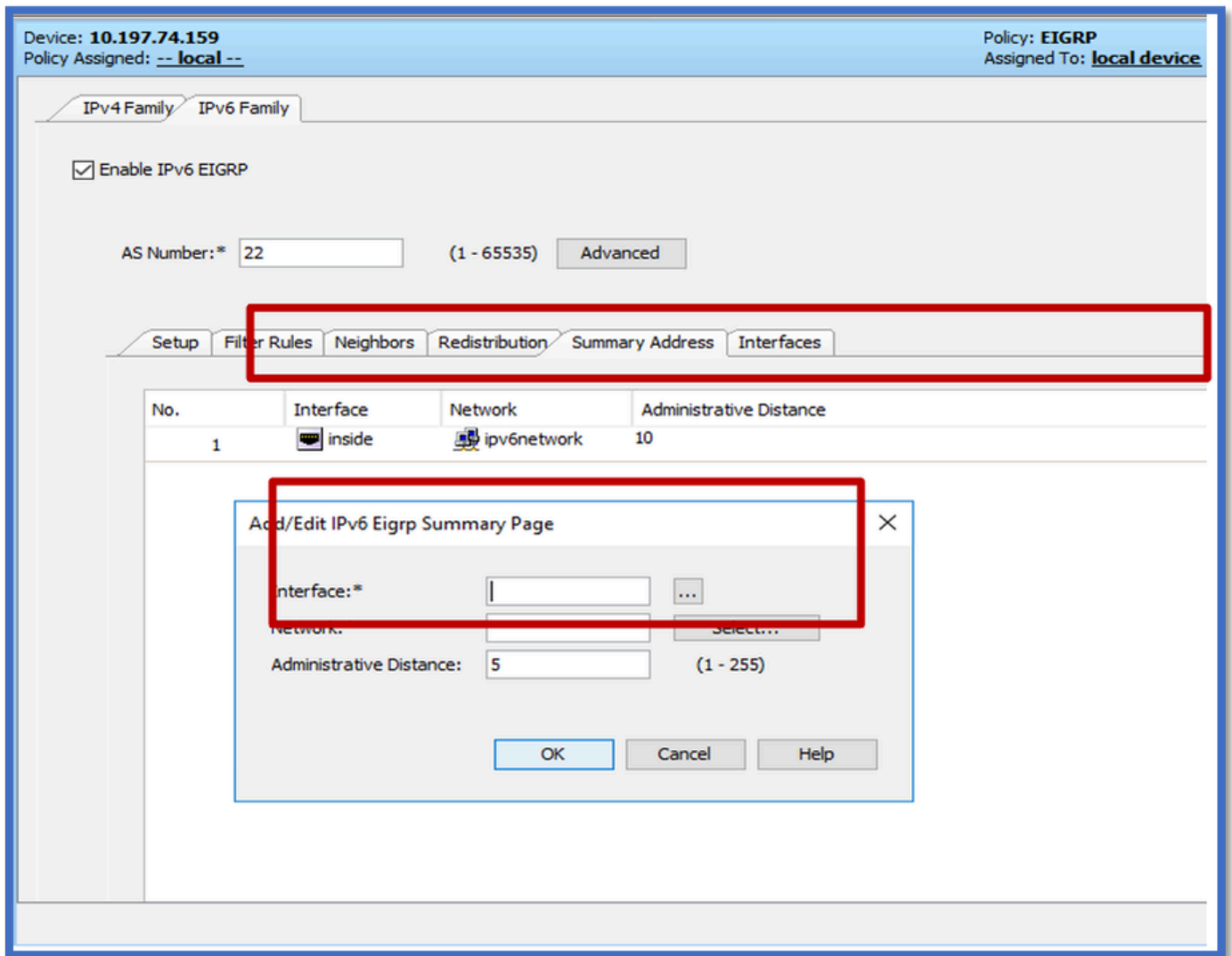
EIGRP IPv6 Redistribution Tab

1. Navigate to **Platform > Routing > EIGRP > IPv6 Family > Redistribution** tab.
2. Click the **Add** button and select **Protocol**. Based on the Protocol selection, other options get enabled.
3. For BGP and OSPF, **ID** textbox enabled.
4. If OSPF is enabled, Optional OSPF Redistribution options enabled
5. If ISIS is enabled ISIS Level is enabled.



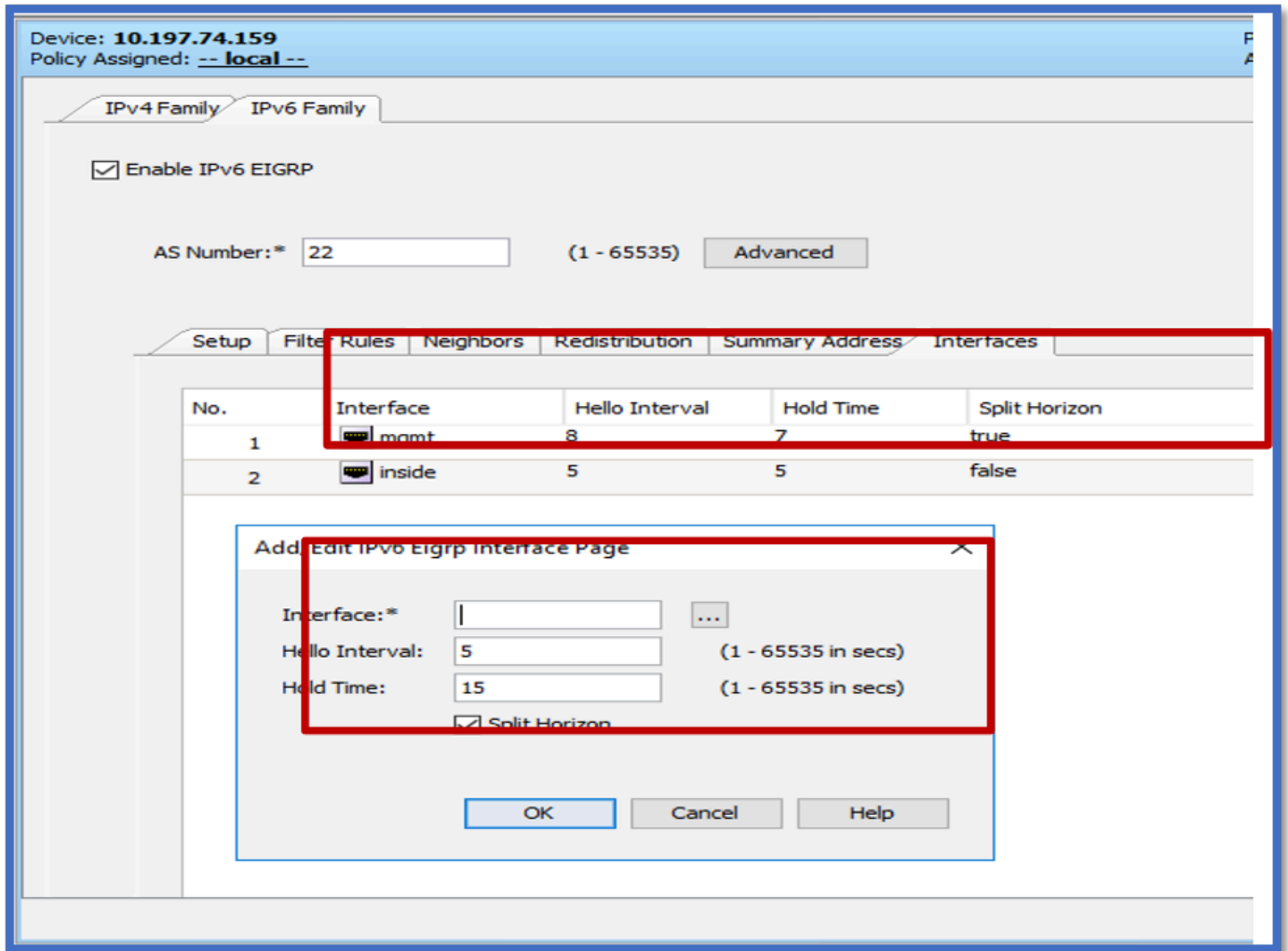
EIGRP IPv6 Summary Address Tab

1. Navigate to **Platform > Routing > EIGRP > IPv6 Family > Summary Address** tab.
2. Click the **Add** button and select **interface** from Interface selector.
3. In **Network**, select **IPv6 address** and **Administrative Distance** value.
4. Click **OK** and **Save**.



EIGRP IPv6 Interfaces Tab

1. Navigate to **Platform > Routing > EIGRP > IPv6 Family > Interfaces** tab.
2. Click **Add** button and select **interface** from Interface selector.
3. You can change the **Hello Interval** and **Hold Time** (optional).
4. Split Horizon is enabled by default. It can be unchecked.
5. Click **OK** and **Save**.



Troubleshooting

Steps to Troubleshoot

- Check the neighborship state using the show commands.
- Check **show ipv6 eigrp topology** output to verify the contents of topology table.
- Use the **show ipv6 eigrp events** command, which can give useful info on the major events related to EIGRP.
- Use **show eigrp tech-support detailed** to check neighborship and topology table timer values.

Show ipv6 eigrp events

show ipv6 eigrp events displays important event logging in the systems which are helpful in debugging.

```
<#root>
```

```
ciscoasa(config-rtr)# show ipv6 eigrp events
```

Event information for AS 50:

```
1 18:05:56.203 Metric set: 1001::/64 768
```

```
2 18:05:56.203 Route installing: 1001::/64 fe80::250:56ff:fe9f:e7e8
```

```
4 18:05:56.203 FC sat rdbmet/succmet: 768 512
5 18:05:56.203 Rcv update dest/nh: 1001::/64 fe80::250:56ff:fe9f:e7e8
6 18:05:56.203 Change queue emptied, entries: 1
7 18:05:56.203 Metric set: 1001::/64 768
8 18:05:56.203 Update reason, delay: new if 4294967295
```

Show ipv6 eigrp timers

show ipv6 eigrp timers shows the current hello timer and the hold timer applied.

- Default timer for hello interval and hold timer is 5 seconds and 15 seconds.
- If NBMA interface with lower bandwidth, the default value for hello timer is 15 seconds; for hold timer, 180 seconds

<#root>

```
ciscoasa(config-rtr)# show ipv6 eigrp timers
```

EIGRP-IPv6 Timers for AS(50)

Hello Process

	Expiration	Type
	0 .406	(parent)
	0 .406	Hello (m2)

Update Process

	Expiration	Type
	11.600	(parent)
	11.600	(parent)
	11.600	Peer holding
	11.930	(parent)
	11.930	Peer holding

Show ipv6 eigrp topology

show ipv6 eigrp topology The topology table consists of all destinations advertised by a neighboring router.

<#root>

```
ciscoasa(config-rtr)# show ipv6 eigrp topology
```

EIGRP-IPv6 Topology Table for AS(50)/ID(172.27.173.103)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,

r - reply Status, s - sia Status

```
P 1001::/64, 1 successors, FD is 768, serno 8907
    via fe80::250:56ff:fe9f:8d83 (768/512), m2
P 3001::/64, 1 successors, FD is 768, serno 8906
    via fe80::250:56ff:fe9f:8d83 (768/512), m2
P 2001::/64, 1 successors, FD is 768, serno 8905
    via fe80::250:56ff:fe9f:8d83 (768/512), m2
```

Show Tech for EIGRP

Show tech can be used for troubleshooting as it collects useful information including timer parameters, neighborship details, traffic statistics for EIGRP, memory usage counters, and others.

<#root>

```
ciscoasa(config-if)# show eigrp tech-support detailed ?
```

exec mode commands/options:

| Output modifiers

<cr>

```
ciscoasa(config-if)#
```

Sample Problem

Problem Seen with Neighbor Formation

- If problem seen with neighbor formation:
 - Check if you have at least an IPv4 address configured if router-id is not explicitly configured under router-mode configuration.
 - Make sure to configure router-id under router mode configuration.

Revision History

Revision	Publish Date	Comments
2.0	19-Jul-2024	Updated Formatting.
1.0	18-Jul-2024	Initial Release