

### Objective

This tech note outlines the main differences in advanced Border Gateway Protocol (BGP) support between Cisco® NX-OS Software and Cisco IOS® Software. Sample configurations are included for Cisco NX-OS and Cisco IOS Software for some common features to demonstrate the similarities and differences. Please refer to the [NX-OS documentation on Cisco.com](#) for a complete list of supported features.

### BGP Overview

BGPv4 is a standard exterior routing protocol defined in [RFC 4271](#), commonly used to exchange network reachability information between autonomous systems. This document discusses route reflectors, confederations, peer templates, route-map policies and the prefix-list (route-filtering) feature.

### Important Cisco NX-OS and Cisco IOS Software Differences

In Cisco NX-OS:

- When configuring route reflectors, the **route-reflector-client** command is assigned per neighbor under the neighbor-specific address family.
- When configuring confederations, the confederation is configured under the autonomous system without the leading **bgp** keyword.
- Cisco NX-OS uses a peer template instead of a peer group to reuse common BGP policies.
- Multiple policy templates can be applied to a single neighbor. Cisco IOS Software allows only one policy template per neighbor.
- Cisco NX-OS does not require a manual reset for a neighbor when its routing policy is modified. Cisco IOS Software requires a hard or soft reset depending on the neighbor capabilities exchanged.

### Things You Should Know

The following list provides some additional facts about Cisco NX-OS that should be helpful when designing, configuring, and maintaining an advanced BGP network configuration.

- Peer and session templates define neighbor attributes such as security passwords, timers, and transport options.
- Peer templates and session templates have identical configuration capabilities with one exception: peer templates can configure address families.
- Peer and session templates are inherited by a neighbor through the BGP neighbor configuration mode.
- Only one peer template and session template can be inherited by a single BGP neighbor.
- Peer templates can inherit session templates.
- Session templates can inherit other session templates.
- Policy templates define address-family policies for inbound or outbound policies, including default-route origination, filter lists, route-map policies, prefix lists, etc.
- Multiple policy templates can be assigned per neighbor. Policy templates are executed in order based on the configured sequence number.
- Policy templates are inherited by a neighbor through the neighbor and address-family configuration mode.

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- Route-map polices can configure BGP attributes such as as-path, community lists, community attributes, dampening, local preference, metric type, origin, and weight.
- Route-map polices can be applied per neighbor for inbound and outbound routing policies.

### Configuration Comparison

The following sample code shows the configuration similarities and differences between the Cisco NX-OS and Cisco IOS Software CLIs. The configurations are very similar with the exception of the hierarchy used in Cisco NX-OS.

#### *Cisco IOS CLI*

#### *Cisco NX-OS CLI*

##### Configuring a Route-Reflector

```
router bgp 10
address-family ipv4 unicast
network 192.168.11.1/32
neighbor 192.168.2.1 remote-as 10
update-source loopback0
address-family ipv4 unicast
route-reflector-client
```

##### Configuring Confederations

```
router bgp 65534
confederation identifier 10
confederation peers 65535
address-family ipv4 unicast
network 192.168.11.1/32
neighbor 192.168.10.2 remote-as 65535
address-family ipv4 unicast
```

##### Configuring a Peer Template

```
router bgp 10
address-family ipv4 unicast
network 192.168.11.1/32
```

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```
template peer IBGP-Template
password 3 a667d47acc18ea6b
update-source loopback0
address-family ipv4 unicast
neighbor 192.168.2.1 remote-as 10
inherit peer IBGP-Template
```

### Configuring a Policy Template

#### **router bgp 10**

```
address-family ipv4 unicast
network 192.168.11.1/32
template peer-policy EBGPolicy
send-community
default-originate
neighbor 192.168.10.2 remote-as 20
address-family ipv4 unicast
inherit peer-policy EBGPolicy 10
```

### Configuring an Outbound Neighbor Route-Map Policy

#### **route-map EBGPolicy permit 10**

```
set as-path prepend 10 10 10
```

#### router bgp 10

```
address-family ipv4 unicast
network 192.168.11.1/32
neighbor 192.168.10.2 remote-as 20
address-family ipv4 unicast
route-map EBGPolicy out
```

### Configuring an Outbound Prefix-List

```
ip prefix-list EBGPolicy seq 5 permit
192.168.11.1/32
```

```
router bgp 10
```

```
neighbor 192.168.10.2 remote-as 20
```

```
address-family ipv4 unicast
```

```
prefix-list EBGPolicy out
```

### Verification Command Comparison

The following table compares some useful **show** commands for verifying and troubleshooting a BGP network configuration.

Cisco NX-OS BGP	Cisco IOS Software BGP	Command Description
<b>show bgp convergence</b>	-	Displays global convergence information
<b>show bgp process</b>	-	Displays global BGP process information
<b>show bgp sessions</b>	-	Displays information for all neighbors
<b>show bgp statistics</b>	-	Displays global BGP process statistics
<b>show ip bgp &lt;option&gt;</b>	show ip bgp	Displays BGP Process and BGP table entries
<b>show ip bgp x.x.x.x</b>	show ip bgp x.x.x.x	Displays a specific network in the BGP table
<b>show ip bgp x.x.x.x vrf</b>	-	Displays a network in a specified VRF BGP table
<b>show ip bgp x.x.x.x/len</b>	show ip bgp x.x.x.x mask	Displays a specific prefix in the BGP table
<b>show ip bgp x.x.x.x/len longer-prefix</b>	show ip bgp x.x.x.x mask longer-prefix	Displays a prefix in the table with longer prefixes
<b>show ip bgp all</b>	show ip bgp all	Displays the BGP table for all protocol families
<b>show ip bgp community &lt;word&gt;</b>	show ip bgp community <#>	Displays routes with a specific regular expression
<b>show ip bgp community &lt;aa:nn&gt;</b>	-	Displays routes with a specific community value
<b>show ip bgp community internet</b>	-	Displays BGP routes advertised to the Internet
<b>show ip bgp community no-advertise</b>	show ip bgp community no-advertise	Displays BGP routes not advertised to peers

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<b>show ip bgp community no-export</b>	show ip bgp community no-export	Displays BGP routes not exported to next AS
<b>show ip bgp community no-export-spoofed</b>	-	Displays BGP routes not sent to outside local AS
<b>show ip bgp community-list &lt;name&gt;</b>	show ip bgp community-list <name>	Displays a specific BGP community list
<b>show ip bgp dampening dampened-paths</b>	show ip bgp dampening dampened-paths	Displays all Dampened paths
<b>show ip bgp dampening flap-statistics</b>	show ip bgp dampening flap-statistics	Displays flap statistics for BGP routes
<b>show ip bgp dampening history-paths</b>	-	Displays all history paths
<b>show ip bgp dampening parameters</b>	show ip bgp dampening parameters	Displays all of the Dampening parameters
<b>show ip bgp extcommunity &lt;word&gt;</b>	-	Displays routes with a specific regular expression for extended communities
<b>show ip bgp extcommunity-list &lt;name&gt;</b>	-	Displays a specific BGP extended community list
<b>show ip bgp filter-list</b>	show ip bgp filter-list	Displays all routes matching a specified filter list
<b>show ip bgp flap-statistics</b>	-	Displays all BGP route flap statistics
<b>show ip bgp ipv4 multicast &lt;option&gt;</b>	show ip bgp ipv4 multicast <option>	Displays BGP IPv4 multicast address families
<b>show ip bgp ipv4 unicast &lt;option&gt;</b>	show ip bgp ipv4 unicast <option>	Displays BGP IPv4 unicast address families
<b>show ip bgp neighbors</b>	show ip bgp neighbors	Displays detailed neighbor information
<b>show ip bgp neighbors x.x.x.x</b>	show ip bgp neighbors x.x.x.x	Displays detailed information for a neighbor
<b>show ip bgp nexthop x.x.x.x</b>	-	Displays all routes matching a specified next-hop
<b>show ip bgp nexthop-database</b>	-	Displays the next-hop database
<b>show ip bgp paths</b>	show ip bgp paths	Displays all BGP paths
<b>show ip bgp peer-policy</b>	-	Displays BGP peer policy by specified name
<b>show ip bgp peer-session</b>	-	Displays information about a peer session
<b>show ip bgp peer-template</b>	show ip bgp unicast ipv4 template	Displays information about a peer template
<b>show ip bgp prefix-list</b>	show ip bgp prefix-list	Displays routes matching a specified prefix-list
<b>show ip bgp regexp</b>	show ip bgp regexp	Displays routes matching a regular-expression
<b>show ip bgp received-paths</b>	-	Displays the paths stored for soft reconfiguration
<b>show ip bgp route-map</b>	show ip bgp route-map	Displays BGP routes matching a route-map
<b>show ip bgp summary</b>	show ip bgp summary	Displays a summary list of neighbors and statistics

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<b>show ip bgp vrf</b>	show ip bgp vpnv4 vrf	Displays information for a specified BGP VRF
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