

NETWORK DESIGN

Functions of BGP and EIGRP routing protocols will be shown with examples here.

Border Gateway Protocol (BGP)

BGP is an inter domain routing protocol that is designed to provide loop-free routing between organizations. Configure and customize BGP peers, implement BGP route aggregation, configure BGP route origination, and define BGP backdoor routes. BGP peer group definition is documented, peer session templates are introduced

This example shows how to enter neighbor address family configuration mode:

```
switch(config)# router bgp 64496
switch(config-router)# neighbor 192.0.2.1
switch(config-router-neighbor)# address-family ipv4 unicast
switch(config-router-neighbor-af)#
```

This example shows how to enter VRF neighbor address family configuration mode:

```
switch(config)# router bgp 64497
switch(config-router)# vrf vrf_A
switch(config-router-vrf)# neighbor 209.165.201.1
switch(config-router-vrf-neighbor)# address-family ipv6 unicast
switch(config-router-vrf-neighbor-af)#
```

This example shows how to enable BGP with the IPv4 unicast address family and manually add one network to advertise:

```
switch# configure terminal
switch(config)# router bgp 64496
switch(config-router)# address-family ipv4 unicast
switch(config-router-af)# network 192.0.2.0
switch(config-router-af)# copy running-config startup-config
```

This example shows how to configure a BGP peer:

```
switch# configure terminal
switch(config)# router bgp 64496
switch(config-router)# neighbor 192.0.2.1 remote-as 64497
switch(config-router-neighbor)# description Peer Router B
switch(config-router-neighbor)# address-family ipv4 unicast
switch(config-router-neighbor-af)# copy running-config startup-config
```

This example shows how to configure dynamic AS numbers for a prefix peer:

```
switch# configure terminal
switch(config)# route-map BGPPeers
switch(config-route-map)# match as-number 64496, 64501-64510
switch(config-route-map)# match as-number as-path-list List1, List2
switch(config-route-map)# exit
switch(config)# router bgp 64496
switch(config-router)# neighbor 192.0.2.0/8 remote-as route-map BGPPeers
switch(config-router-neighbor)# description Peer Router B
switch(config-router-neighbor)# address-family ipv4 unicast
switch(config-router-neighbor-af)# copy running-config startup-config
```

Enhanced Interior Gateway Routing Protocol (EIGRP) Protocol

Authentication

You can configure authentication on EIGRP messages to prevent unauthorized or invalid routing updates in your network. EIGRP authentication supports MD5 authentication digest.

You can configure the EIGRP authentication per virtual routing and forwarding (VRF) instance or interface using key-chain management for the authentication keys. Key-chain management allows you to control changes to the authentication keys used by MD5 authentication digest. See the *Cisco Nexus 6000 Series NX-OS Security Configuration Guide, Release 6.0*, for more details about creating key-chains.

For MD5 authentication, you configure a password that is shared at the local router and all remote EIGRP neighbors. When an EIGRP message is created, Cisco NX-OS creates an MD5 one-way message digest based on the message itself and the encrypted password and sends this digest along with the EIGRP message. The receiving EIGRP neighbor validates the digest using the same encrypted password. If the message has not changed, the calculation is identical and the EIGRP message is considered valid.

MD5 authentication also includes a sequence number with each EIGRP message that is used to ensure that no message is replayed in the network.

This example shows how to create an EIGRP process and configure an interface for EIGRP:

```
switch# configure terminal
switch(config-router)# router eigrp Test1
switch(config-router)# address-family ipv4 unicast
switch(config-router-af)# autonomous-system 1
switch(config-router-af)# exit
switch(config-router)# exit
switch(config)# interface ethernet 1/2
switch(config-if)# no switchport
switch(config-if)# ipv6 router eigrp Test1
switch(config-if)# no shutdown
switch(config-if)# copy running-config startup-config
```

This example shows how to configure MD5 message digest authentication for EIGRP over Ethernet interface 1/2:

```
switch# configure terminal
switch(config)# router eigrp Test1
switch(config-router)# exit
switch(config)# interface ethernet 1/2
switch(config-if)# no switchport
switch(config-if)# ip router eigrp Test1
switch(config-if)# ip authentication key-chain eigrp Test1 routeKeys
switch(config-if)# ip authentication mode eigrp Test1 md5
switch(config-if)# copy running-config startup-config
```

This example shows how to configure a stub router to advertise directly connected and redistributed routes:

```
switch# configure terminal
switch(config)# router eigrp Test1
switch(config-router)# address-family ipv4 unicast
```

```
switch(config-router-af)# stub direct redistributed
```

```
switch(config-router-af)# copy running-config startup-config
```

This example shows the output from the show ip eigrp neighbor detail command:

```
Router# show ip eigrp neighbor detail
```

```
IP-EIGRP neighbors for process 201
```

```
H Address Interface Hold Uptime SRTT RTO Q Seq Type
```

```
(sec) (ms) Cnt Num
```

```
0 10.1.1.2 Se3/1 11 00:00:59 1 4500 0 7
```

```
Version 12.1/1.2, Retrans: 2, Retries: 0
```

```
Stub Peer Advertising ( CONNECTED SUMMARY) Routes
```

This example shows how to redistribute BGP into EIGRP for IPv4:

```
switch# configure terminal
```

```
switch(config)# router eigrp Test1
```

```
switch(config-router)# redistribute bgp 100 route-map BGPFilter
```

```
switch(config-router)# default-metric 500000 30 200 1 1500
```

```
switch(config-router)# copy running-config startup-config
```

This example shows how to limit the number of redistributed routes into EIGRP:

```
switch# configure terminal
```

```
switch(config)# router eigrp Test1
```

```
switch(config-router)# redistribute bgp route-map FilterExternalBGP
```

```
switch(config-router)# redistribute maximum-prefix 1000 75
```

This example shows how to configure equal cost load balancing for EIGRP over IPv4 with a maximum of six equal cost paths:

```
switch# configure terminal
```

```
switch(config)# router eigrp Test1
```

```
switch(config-router)# maximum-paths 6
```

```
switch(config-router)# copy running-config startup-config
```