**BGP, EIGRP and OSPF Lab**

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![Diagram

Description automatically generated]()

Purpose

The purpose of this lab was to learn how to redistribute OSPFv2 into BGP as well as EIGRP into BGP and vice versa. This lab helped with practicing how to set up BGP as well as review how to do OSPFv2 as well as EIGRP with IPv4. It helped with learning how to redistribute BGP into OSPF how to redistribute OSPF into BGP. It also helped with learning how to redistribute EIGRP into BGP and redistribute BGP into EIGRP.

Background Information

A big part of this lab was BGP. BGP is the Border Gateway Protocol that serves as a type of postal service for the internet. This protocol helps deliver data across the internet from different recipients. It’s very efficient since it always chooses the most efficient routes that will allow the data to be delivered to a recipient. It does this by hopping between different Autonomous Systems (AS). AS are smaller networks across the internet. What BGP does is by hopping from different AS, it eventually delivers data. What BGP does is, it analyzes what route will require the least amount of hops to get to its destination and once it knows that it is able to deliver the data.

The internet is a huge network that’s made up of smaller and smaller networks. Just as this implies, that means there are different AS across the internet and not all of them are owned by the same organization. Sometimes when needing to travel across an organization, some costs are added to the route the data will travel through, and so this affects the route BGP will use. Different organizations have their own costs for choosing to send information through their network, which also changes the cost of the route which will make BGP choose different routes.

With so many AS across the internet, they must be managed by larger organizations. These organizations are ISPs and other organizations such as governments, companies, universities and such. In order for these organizations to be able to communicate with each other, each AS needs to have a registered autonomous system number (ASN). Only the Internet Assigned Numbers Authority (IANA) can assign these ASNs to the organizations.

There is two types of BGP: iBGP and eBGP. Internal Border Gateway Protocol is what allows eBGP advertisements to be sent throughout a network. iBGP is a protocol that works on the inside of the AS. iBGP helps maintain every router in the network stay up to date with information about all the routes in the network. Internal BGP makes the networks be mesh type networks where all the routers are connected to each other so that the information stays up to date. This is what allows eBGP to send advertisements from outside of the network to the inside of the network. External BGP on the other hand works on the outside of a network. eBGP usually works on the routers that are on the edge of the network. This allows it to communicate with other AS, in the internet, it is responsible for communicating with different organizations.

Along with OSPF, BGP can also work with Enhanced Interior Gateway Routing Protocol (EIGRP). EIGRP is an efficient network protocol that allows for faster communication between routers in a network. EIGRP is also more efficient when updating routing tables since it only sends the updates about changing routes to its neighbors, it does this by using PDMs. Protocol-dependent modules are used to decide what routes are added to the routing table as well as adding routes to the routing topology table. In order to deliver packets to its neighbors, EIGRP uses Reliable Transport Protocol (RTP) to deliver them. This ensures that the packets are delivered successfully to all the neighbors in the topology. RTP helps keep the convergence time to remain low when sending packets by sending multicast packets even when unacknowledged packets are still pending.

External Border Gateway Protocols are helpful when a network needs to communicate between other networks and OSPF can help serve as the interior protocol in a network. Unlike iBGP, OSPF does not need a mesh topology and redistribution between eBGP and OSPF is rather simple. While iBGP has a shorter administrative distance than OSPF it also requires a mesh topology which also uses a lot of resources. EIGRP is also a really helpful interior protocol that can help eBGP. EIGRP is also has faster convergence times between packets and has an easier transition for both IPv4 and IPv6. Just like OSPF, EIGRP can be redistributed into BGP but the difference is that EIGRP is much more simpler than OSPF when redistributing from EIGRP into BGP as well as BGP into EIGRP.

Lab Summary

In Packet Tracer, I set up 7 4321 routers. I connected all of them with gigabit connections and set up IPv6 and IPv4 on all of the networks. OSPFv2 and OSPFv3 was set up in networks 5.0.0.0/24, 6.0.0.0/24 with routers 5, 6 and 7 in area 0 and AS 65000. EIGRP was set up on the other side of the topology in networks 1.0.0.0/24, 2.0.0.0/24, with routers 1, 2 and 3 in area 1 and AS 65001. Finally eBGP was set up in networks 3.0.0.0/24, 4.0.0.0/24 with routers 3 and 4 in area 2 and AS 65002. Redistribution was done in routers 3 and 4 from EIGRP to BGP, BGP to EIGRP, OSPF to BGP and BGP to OSPF.

Lab Commands

* Router ospf *process id*: starts the configuration of ospf for a router
* Network *network address wildmask address* area #: assigns a network to have ospf
* Traceroute *destination address*: traces how many hops it takes a route to ping
* Show ip ospf neighbor: shows the adjacent neighbors of the router
* Show ip ospf interface: shows the status of ospf in the interfaces of the router
* Show ip ospf: shows information regarding any ospf neighbors, interfaces, states, neighbor’s addresses, and router id
* Router-id *router id*: assigns the router an id
* Show ip route: shows ipv4 routing table
* Redistribute ospf 1 metric: distributes OSPF in EIGRP
* Redistribute eigrp 1 subnets: distributes EIGRP in OSPF

Configurations

**Router 1:**

Building configuration...

Current configuration : 755 bytes

version 15.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname R1

no ip cef

no ipv6 cef

spanning-tree mode pvst

interface GigabitEthernet0/0/0

ip address 1.0.0.1 255.255.255.0

duplex auto

speed auto

interface GigabitEthernet0/0/1

no ip address

duplex auto

speed auto

shutdown

interface Serial0/1/0

no ip address

clock rate 2000000

shutdown

interface Serial0/1/1

no ip address

clock rate 2000000

shutdown

interface Vlan1

no ip address

shutdown

router eigrp 1

network 1.0.0.0 0.0.0.255

ip classless

ip flow-export version 9

line con 0

line aux 0

line vty 0 4

login

end

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, E - EGP

i - IS-IS, 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

Gateway of last resort is not set

1.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 1.0.0.0/24 is directly connected, GigabitEthernet0/0/0

L 1.0.0.1/32 is directly connected, GigabitEthernet0/0/0

2.0.0.0/24 is subnetted, 1 subnets

D 2.0.0.0/24 [90/3072] via 1.0.0.2, 04:56:18, GigabitEthernet0/0/0

3.0.0.0/24 is subnetted, 1 subnets

D EX 3.0.0.0/24 [170/2586112] via 1.0.0.2, 04:56:18, GigabitEthernet0/0/0

4.0.0.0/24 is subnetted, 1 subnets

D EX 4.0.0.0/24 [170/2586112] via 1.0.0.2, 03:53:18, GigabitEthernet0/0/0

5.0.0.0/24 is subnetted, 1 subnets

D EX 5.0.0.0/24 [170/2586112] via 1.0.0.2, 03:53:18, GigabitEthernet0/0/0

6.0.0.0/24 is subnetted, 1 subnets

D EX 6.0.0.0/24 [170/2586112] via 1.0.0.2, 03:53:18, GigabitEthernet0/0/0

IP-EIGRP neighbors for process 1

H Address Interface Hold Uptime SRTT RTO Q Seq

(sec) (ms) Cnt Num

0 1.0.0.2 Gig0/0/0 14 04:56:46 40 1000 0 21

IP-EIGRP Topology Table for AS 1/ID(1.0.0.1)

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

r - Reply status

P 1.0.0.0/24, 1 successors, FD is 2816

via Connected, GigabitEthernet0/0/0

P 2.0.0.0/24, 1 successors, FD is 3072

via 1.0.0.2 (3072/2816), GigabitEthernet0/0/0

P 3.0.0.0/24, 1 successors, FD is 2586112

via Rstatic (2586112/2585856)

P 4.0.0.0/24, 1 successors, FD is 2586112

via Rstatic (2586112/2585856)

P 5.0.0.0/24, 1 successors, FD is 2586112

via Rstatic (2586112/2585856)

P 6.0.0.0/24, 1 successors, FD is 2586112

via Rstatic (2586112/2585856)

**Pings:**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 1.0.0.2, timeout is 2 seconds:

.!!!!

Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/0 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2.0.0.2, timeout is 2 seconds:

.!!!!

Success rate is 80 percent (4/5), round-trip min/avg/max = 0/2/7 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 3.0.0.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 4.0.0.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 5.0.0.2, timeout is 2 seconds:

.!!!!

Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 6.0.0.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

**Router 2:**

Building configuration…

Current configuration : 791 bytes

version 15.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname R2

no ip cef

no ipv6 cef

spanning-tree mode pvst

interface GigabitEthernet0/0/0

ip address 1.0.0.2 255.255.255.0

duplex auto

speed auto

interface GigabitEthernet0/0/1

ip address 2.0.0.1 255.255.255.0

duplex auto

speed auto

interface Serial0/1/0

no ip address

clock rate 2000000

shutdown

interface Serial0/1/1

no ip address

clock rate 2000000

shutdown

interface Vlan1

no ip address

shutdown

router eigrp 1

network 1.0.0.0 0.0.0.255

network 2.0.0.0 0.0.0.255

ip classless

ip flow-export version 9

line con 0

line aux 0

line vty 0 4

login

end

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, E - EGP

i - IS-IS, 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

Gateway of last resort is not set

1.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 1.0.0.0/24 is directly connected, GigabitEthernet0/0/0

L 1.0.0.2/32 is directly connected, GigabitEthernet0/0/0

2.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 2.0.0.0/24 is directly connected, GigabitEthernet0/0/1

L 2.0.0.1/32 is directly connected, GigabitEthernet0/0/1

3.0.0.0/24 is subnetted, 1 subnets

D EX 3.0.0.0/24 [170/2585856] via 2.0.0.2, 05:01:39, GigabitEthernet0/0/1

4.0.0.0/24 is subnetted, 1 subnets

D EX 4.0.0.0/24 [170/2585856] via 2.0.0.2, 03:58:39, GigabitEthernet0/0/1

5.0.0.0/24 is subnetted, 1 subnets

D EX 5.0.0.0/24 [170/2585856] via 2.0.0.2, 03:58:39, GigabitEthernet0/0/1

6.0.0.0/24 is subnetted, 1 subnets

D EX 6.0.0.0/24 [170/2585856] via 2.0.0.2, 03:58:39, GigabitEthernet0/0/1

IP-EIGRP neighbors for process 1

H Address Interface Hold Uptime SRTT RTO Q Seq

(sec) (ms) Cnt Num

0 1.0.0.1 Gig0/0/0 11 05:02:06 40 1000 0 20

1 2.0.0.2 Gig0/0/1 12 05:02:06 40 1000 0 18

IP-EIGRP Topology Table for AS 1/ID(2.0.0.1)

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

r - Reply status

P 1.0.0.0/24, 1 successors, FD is 2816

via Connected, GigabitEthernet0/0/0

P 2.0.0.0/24, 1 successors, FD is 2816

via Connected, GigabitEthernet0/0/1

P 3.0.0.0/24, 1 successors, FD is 2585856

via Rstatic (2585856/2585600)

P 4.0.0.0/24, 1 successors, FD is 2585856

via Rstatic (2585856/2585600)

P 5.0.0.0/24, 1 successors, FD is 2585856

via Rstatic (2585856/2585600)

P 6.0.0.0/24, 1 successors, FD is 2585856

via Rstatic (2585856/2585600)

**Pings:**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 1.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 3.0.0.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 4.0.0.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 5.0.0.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 6.0.0.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

**Router 3:**

Building configuration...

Current configuration : 975 bytes

version 15.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname R3

no ip cef

no ipv6 cef

spanning-tree mode pvst

interface GigabitEthernet0/0/0

ip address 2.0.0.2 255.255.255.0

duplex auto

speed auto

interface GigabitEthernet0/0/1

ip address 3.0.0.1 255.255.255.0

duplex auto

speed auto

interface Serial0/1/0

no ip address

clock rate 2000000

shutdown

interface Serial0/1/1

no ip address

clock rate 2000000

shutdown

interface Vlan1

no ip address

shutdown

router eigrp 1

redistribute bgp 65001 metric 1000 10 255 255 1500

network 2.0.0.0 0.0.0.255

router bgp 65001

bgp log-neighbor-changes

no synchronization

neighbor 3.0.0.2 remote-as 65002

network 3.0.0.0 mask 255.255.255.0

redistribute eigrp 1

ip classless

ip flow-export version 9

line con 0

line aux 0

line vty 0 4

login

end

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, E - EGP

i - IS-IS, 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

Gateway of last resort is not set

1.0.0.0/24 is subnetted, 1 subnets

D 1.0.0.0/24 [90/3072] via 2.0.0.1, 05:05:23, GigabitEthernet0/0/0

2.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 2.0.0.0/24 is directly connected, GigabitEthernet0/0/0

L 2.0.0.2/32 is directly connected, GigabitEthernet0/0/0

3.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 3.0.0.0/24 is directly connected, GigabitEthernet0/0/1

L 3.0.0.1/32 is directly connected, GigabitEthernet0/0/1

4.0.0.0/24 is subnetted, 1 subnets

B 4.0.0.0/24 [20/0] via 3.0.0.2, 00:00:00

5.0.0.0/24 is subnetted, 1 subnets

B 5.0.0.0/24 [20/0] via 3.0.0.2, 00:00:00

6.0.0.0/24 is subnetted, 1 subnets

B 6.0.0.0/24 [20/0] via 3.0.0.2, 00:00:00

IP-EIGRP neighbors for process 1

H Address Interface Hold Uptime SRTT RTO Q Seq

(sec) (ms) Cnt Num

0 2.0.0.1 Gig0/0/0 12 05:05:47 40 1000 0 22

IP-EIGRP Topology Table for AS 1/ID(3.0.0.1)

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

r - Reply status

P 1.0.0.0/24, 1 successors, FD is 3072

via 2.0.0.1 (3072/2816), GigabitEthernet0/0/0

P 2.0.0.0/24, 1 successors, FD is 2816

via Connected, GigabitEthernet0/0/0

P 3.0.0.0/24, 1 successors, FD is 2585600

via Redistributed (2585600/0)

P 4.0.0.0/24, 1 successors, FD is 2585600

via Redistributed (2585600/0)

P 5.0.0.0/24, 1 successors, FD is 2585600

via Redistributed (2585600/0)

P 6.0.0.0/24, 1 successors, FD is 2585600

via Redistributed (2585600/0)

BGP neighbor is 3.0.0.2, remote AS 65002, external link

BGP version 4, remote router ID 4.0.0.1

BGP state = Established, up for 04:03:23

Last read 04:03:23, last write 04:03:23, hold time is 180, keepalive interval is 60 seconds

Neighbor capabilities:

Route refresh: advertised and received(new)

Address family IPv4 Unicast: advertised and received

Message statistics:

InQ depth is 0

OutQ depth is 0

Sent Rcvd

Opens: 2 2

Notifications: 0 1

Updates: 7 10

Keepalives: 306 306

Route Refresh: 0 2

Total: 315 321

Default minimum time between advertisements runs is 30 seconds

For address family: IPv4 Unicast

BGP table version 13, neighbor version 6/0

Output queue size : 0

Index 1, Offset 0, Mask 0x2

1 update-group member

Sent Rcvd

Prefix activity: ---- ----

Prefixes Current: 3 4 (Consumes 161 bytes)

Prefixes total: 3 4

Implicit Withdraw: 0 0

Explicit Withdraw: 0 0

Used as bestpath: n/a 1

Used as multipath: n/a 0

Outbound Inbound

Local Policy Denied Prefixes: -------- -------

Total: 0 0

Number of NLRIs in the update sent: max 3, min 1

Address tracking is enabled, the RIB does have a route to 3.0.0.2

Connections established 2; dropped 0

Last reset never

Transport(tcp) path-mtu-discovery is enabled

Connection state is ESTAB, I/O status: 1, unread input bytes: 0

Connection is ECN Disabled, Minimum incoming TTL 0, Outgoing TTL 1

Local host: 3.0.0.1, Local port: 1026

Foreign host: 3.0.0.2, Foreign port: 179

Connection tableid (VRF): 0

Enqueued packets for retransmit: 0, input: 0 mis-ordered: 0 (0 bytes)

Event Timers (current time is 0xC69F4):

Timer Starts Wakeups Next

Retrans 0 0 0x0

TimeWait 0 0 0x0

AckHold 316 0 0x0

SendWnd 0 0 0x0

KeepAlive 306 0 0x0

GiveUp 0 0 0x0

PmtuAger 0 0 0x0

DeadWait 0 0 0x0

Linger 0 0 0x0

ProcessQ 0 0 0x0

iss: 2057115318 snduna: 2057115748 sndnxt: 2057115748 sndwnd: 15955

irs: 3480424370 rcvnxt: 3480424751 rcvwnd: 16004 delrcvwnd: 380

SRTT: 259 ms, RTTO: 579 ms, RTV: 320 ms, KRTT: 0 ms

minRTT: 16 ms, maxRTT: 300 ms, ACK hold: 200 ms

Status Flags: passive open, gen tcbs

Option Flags: nagle, path mtu capable

IP Precedence value : 6

Datagrams (max data segment is 1460 bytes):

Rcvd: 319 (out of order: 0), with data: 2, total data bytes: 48

Sent: 308 (retransmit: 0, fastretransmit: 0, partialack: 0, Second Congestion: 0), with data: 7, total data bytes: 168

Packets received in fast path: 0, fast processed: 0, slow path: 0

fast lock acquisition failures: 0, slow path: 0

**Pings:**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 1.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 3.0.0.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 4.0.0.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 5.0.0.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 6.0.0.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

**Router 4:**

Building configuration...

Current configuration : 923 bytes

version 15.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname R4

no ip cef

no ipv6 cef

spanning-tree mode pvst

interface GigabitEthernet0/0/0

ip address 3.0.0.2 255.255.255.0

duplex auto

speed auto

interface GigabitEthernet0/0/1

ip address 4.0.0.1 255.255.255.0

duplex auto

speed auto

interface Serial0/1/0

no ip address

clock rate 2000000

shutdown

interface Serial0/1/1

no ip address

clock rate 2000000

shutdown

interface Vlan1

no ip address

shutdown

router bgp 65002

bgp log-neighbor-changes

no synchronization

neighbor 3.0.0.1 remote-as 65001

neighbor 4.0.0.2 remote-as 65000

network 3.0.0.0 mask 255.255.255.0

network 4.0.0.0 mask 255.255.255.0

ip classless

ip flow-export version 9

line con 0

line aux 0

line vty 0 4

login

end

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, E - EGP

i - IS-IS, 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

Gateway of last resort is not set

1.0.0.0/24 is subnetted, 1 subnets

B 1.0.0.0/24 [20/3072] via 3.0.0.1, 00:00:00

2.0.0.0/24 is subnetted, 1 subnets

B 2.0.0.0/24 [20/2816] via 3.0.0.1, 00:00:00

3.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 3.0.0.0/24 is directly connected, GigabitEthernet0/0/0

L 3.0.0.2/32 is directly connected, GigabitEthernet0/0/0

4.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 4.0.0.0/24 is directly connected, GigabitEthernet0/0/1

L 4.0.0.1/32 is directly connected, GigabitEthernet0/0/1

5.0.0.0/24 is subnetted, 1 subnets

B 5.0.0.0/24 [20/20] via 4.0.0.2, 00:00:00

6.0.0.0/24 is subnetted, 1 subnets

B 6.0.0.0/24 [20/2] via 4.0.0.2, 00:00:00

BGP neighbor is 3.0.0.1, remote AS 65001, external link

BGP version 4, remote router ID 3.0.0.1

BGP state = Established, up for 04:09:09

Last read 04:09:09, last write 04:09:09, hold time is 180, keepalive interval is 60 seconds

Neighbor capabilities:

Route refresh: advertised and received(new)

Address family IPv4 Unicast: advertised and received

Message statistics:

InQ depth is 0

OutQ depth is 0

Sent Rcvd

Opens: 2 2

Notifications: 1 0

Updates: 10 7

Keepalives: 312 310

Route Refresh: 0 1

Total: 325 320

Default minimum time between advertisements runs is 30 seconds

For address family: IPv4 Unicast

BGP table version 12, neighbor version 6/0

Output queue size : 0

Index 1, Offset 0, Mask 0x2

1 update-group member

Sent Rcvd

Prefix activity: ---- ----

Prefixes Current: 5 3 (Consumes 184 bytes)

Prefixes total: 5 3

Implicit Withdraw: 0 0

Explicit Withdraw: 0 0

Used as bestpath: n/a 1

Used as multipath: n/a 0

Outbound Inbound

Local Policy Denied Prefixes: -------- -------

Total: 0 0

Number of NLRIs in the update sent: max 3, min 1

Address tracking is enabled, the RIB does have a route to 3.0.0.1

Connections established 2; dropped 0

Last reset never

Transport(tcp) path-mtu-discovery is enabled

Connection state is ESTAB, I/O status: 1, unread input bytes: 0

Connection is ECN Disabled, Minimum incoming TTL 0, Outgoing TTL 1

Local host: 3.0.0.2, Local port: 179

Foreign host: 3.0.0.1, Foreign port: 1026

Connection tableid (VRF): 0

Enqueued packets for retransmit: 0, input: 0 mis-ordered: 0 (0 bytes)

Event Timers (current time is 0xC69F4):

Timer Starts Wakeups Next

Retrans 0 0 0x0

TimeWait 0 0 0x0

AckHold 317 0 0x0

SendWnd 0 0 0x0

KeepAlive 312 0 0x0

GiveUp 0 0 0x0

PmtuAger 0 0 0x0

DeadWait 0 0 0x0

Linger 0 0 0x0

ProcessQ 0 0 0x0

iss: 2057115318 snduna: 2057115748 sndnxt: 2057115748 sndwnd: 15955

irs: 3480424370 rcvnxt: 3480424751 rcvwnd: 16004 delrcvwnd: 380

SRTT: 259 ms, RTTO: 579 ms, RTV: 320 ms, KRTT: 0 ms

minRTT: 16 ms, maxRTT: 300 ms, ACK hold: 200 ms

Status Flags: passive open, gen tcbs

Option Flags: nagle, path mtu capable

IP Precedence value : 6

Datagrams (max data segment is 1460 bytes):

Rcvd: 319 (out of order: 0), with data: 1, total data bytes: 24

Sent: 315 (retransmit: 0, fastretransmit: 0, partialack: 0, Second Congestion: 0), with data: 10, total data bytes: 240

Packets received in fast path: 0, fast processed: 0, slow path: 0

fast lock acquisition failures: 0, slow path: 0

BGP neighbor is 4.0.0.2, remote AS 65000, external link

BGP version 4, remote router ID 5.0.0.1

BGP state = Established, up for 05:12:09

Last read 05:12:09, last write 05:12:09, hold time is 180, keepalive interval is 60 seconds

Neighbor capabilities:

Route refresh: advertised and received(new)

Address family IPv4 Unicast: advertised and received

Message statistics:

InQ depth is 0

OutQ depth is 0

Sent Rcvd

Opens: 1 1

Notifications: 0 0

Updates: 11 5

Keepalives: 313 313

Route Refresh: 0 2

Total: 325 321

Default minimum time between advertisements runs is 30 seconds

For address family: IPv4 Unicast

BGP table version 12, neighbor version 6/0

Output queue size : 0

Index 1, Offset 0, Mask 0x2

1 update-group member

Sent Rcvd

Prefix activity: ---- ----

Prefixes Current: 6 3 (Consumes 207 bytes)

Prefixes total: 6 3

Implicit Withdraw: 0 0

Explicit Withdraw: 0 0

Used as bestpath: n/a 1

Used as multipath: n/a 0

Outbound Inbound

Local Policy Denied Prefixes: -------- -------

Total: 0 0

Number of NLRIs in the update sent: max 3, min 1

Address tracking is enabled, the RIB does have a route to 4.0.0.2

Connections established 1; dropped 0

Last reset never

Transport(tcp) path-mtu-discovery is enabled

Connection state is ESTAB, I/O status: 1, unread input bytes: 0

Connection is ECN Disabled, Minimum incoming TTL 0, Outgoing TTL 1

Local host: 4.0.0.1, Local port: 179

Foreign host: 4.0.0.2, Foreign port: 1025

Connection tableid (VRF): 0

Enqueued packets for retransmit: 0, input: 0 mis-ordered: 0 (0 bytes)

Event Timers (current time is 0xC69F4):

Timer Starts Wakeups Next

Retrans 0 0 0x0

TimeWait 0 0 0x0

AckHold 318 0 0x0

SendWnd 0 0 0x0

KeepAlive 313 0 0x0

GiveUp 0 0 0x0

PmtuAger 0 0 0x0

DeadWait 0 0 0x0

Linger 0 0 0x0

ProcessQ 0 0 0x0

iss: 2057115318 snduna: 2057115748 sndnxt: 2057115748 sndwnd: 15955

irs: 3480424370 rcvnxt: 3480424751 rcvwnd: 16004 delrcvwnd: 380

SRTT: 259 ms, RTTO: 579 ms, RTV: 320 ms, KRTT: 0 ms

minRTT: 16 ms, maxRTT: 300 ms, ACK hold: 200 ms

Status Flags: passive open, gen tcbs

Option Flags: nagle, path mtu capable

IP Precedence value : 6

Datagrams (max data segment is 1460 bytes):

Rcvd: 319 (out of order: 0), with data: 2, total data bytes: 48

Sent: 314 (retransmit: 0, fastretransmit: 0, partialack: 0, Second Congestion: 0), with data: 16, total data bytes: 384

Packets received in fast path: 0, fast processed: 0, slow path: 0

fast lock acquisition failures: 0, slow path: 0

**Pings:**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 1.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 3.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 4.0.0.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 5.0.0.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 6.0.0.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

**Router 5:**

Building configuration...

Current configuration : 1000 bytes

version 15.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname R5

no ip cef

no ipv6 cef

spanning-tree mode pvst

interface GigabitEthernet0/0/0

ip address 4.0.0.2 255.255.255.0

duplex auto

speed auto

interface GigabitEthernet0/0/1

ip address 5.0.0.1 255.255.255.0

duplex auto

speed auto

interface Serial0/1/0

no ip address

clock rate 2000000

shutdown

interface Serial0/1/1

no ip address

clock rate 2000000

shutdown

interface Vlan1

no ip address

shutdown

router ospf 1

router-id 5.5.5.5

log-adjacency-changes

redistribute bgp 65000 subnets

network 5.0.0.0 0.0.0.255 area 0

router bgp 65000

bgp log-neighbor-changes

no synchronization

neighbor 4.0.0.1 remote-as 65002

network 4.0.0.0 mask 255.255.255.0

redistribute ospf 1

ip classless

ip flow-export version 9

line con 0

line aux 0

line vty 0 4

login

end

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, E - EGP

i - IS-IS, 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

Gateway of last resort is not set

1.0.0.0/24 is subnetted, 1 subnets

B 1.0.0.0/24 [20/0] via 4.0.0.1, 00:00:00

2.0.0.0/24 is subnetted, 1 subnets

B 2.0.0.0/24 [20/0] via 4.0.0.1, 00:00:00

3.0.0.0/24 is subnetted, 1 subnets

B 3.0.0.0/24 [20/0] via 4.0.0.1, 00:00:00

4.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 4.0.0.0/24 is directly connected, GigabitEthernet0/0/0

L 4.0.0.2/32 is directly connected, GigabitEthernet0/0/0

5.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 5.0.0.0/24 is directly connected, GigabitEthernet0/0/1

L 5.0.0.1/32 is directly connected, GigabitEthernet0/0/1

6.0.0.0/24 is subnetted, 1 subnets

O 6.0.0.0/24 [110/2] via 5.0.0.2, 05:16:01, GigabitEthernet0/0/1

Neighbor ID Pri State Dead Time Address Interface

6.6.6.6 1 FULL/DR 00:00:30 5.0.0.2 GigabitEthernet0/0/1

GigabitEthernet0/0/1 is up, line protocol is up

Internet address is 5.0.0.1/24, Area 0

Process ID 1, Router ID 5.5.5.5, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State BDR, Priority 1

Designated Router (ID) 6.6.6.6, Interface address 5.0.0.2

Backup Designated Router (ID) 5.5.5.5, Interface address 5.0.0.1

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:02

Index 1/1, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1, Adjacent neighbor count is 1

Adjacent with neighbor 6.6.6.6 (Designated Router)

Suppress hello for 0 neighbor(s)

BGP neighbor is 4.0.0.1, remote AS 65002, external link

BGP version 4, remote router ID 4.0.0.1

BGP state = Established, up for 05:17:55

Last read 05:17:55, last write 05:17:55, hold time is 180, keepalive interval is 60 seconds

Neighbor capabilities:

Route refresh: advertised and received(new)

Address family IPv4 Unicast: advertised and received

Message statistics:

InQ depth is 0

OutQ depth is 0

Sent Rcvd

Opens: 1 1

Notifications: 0 0

Updates: 5 16

Keepalives: 318 318

Route Refresh: 0 4

Total: 324 339

Default minimum time between advertisements runs is 30 seconds

For address family: IPv4 Unicast

BGP table version 17, neighbor version 6/0

Output queue size : 0

Index 1, Offset 0, Mask 0x2

1 update-group member

Sent Rcvd

Prefix activity: ---- ----

Prefixes Current: 5 4 (Consumes 207 bytes)

Prefixes total: 5 4

Implicit Withdraw: 0 0

Explicit Withdraw: 0 0

Used as bestpath: n/a 1

Used as multipath: n/a 0

Outbound Inbound

Local Policy Denied Prefixes: -------- -------

Total: 0 0

Number of NLRIs in the update sent: max 3, min 1

Address tracking is enabled, the RIB does have a route to 4.0.0.1

Connections established 1; dropped 0

Last reset never

Transport(tcp) path-mtu-discovery is enabled

Connection state is ESTAB, I/O status: 1, unread input bytes: 0

Connection is ECN Disabled, Minimum incoming TTL 0, Outgoing TTL 1

Local host: 4.0.0.2, Local port: 1025

Foreign host: 4.0.0.1, Foreign port: 179

Connection tableid (VRF): 0

Enqueued packets for retransmit: 0, input: 0 mis-ordered: 0 (0 bytes)

Event Timers (current time is 0xC69F4):

Timer Starts Wakeups Next

Retrans 0 0 0x0

TimeWait 0 0 0x0

AckHold 334 0 0x0

SendWnd 0 0 0x0

KeepAlive 318 0 0x0

GiveUp 0 0 0x0

PmtuAger 0 0 0x0

DeadWait 0 0 0x0

Linger 0 0 0x0

ProcessQ 0 0 0x0

iss: 2057115318 snduna: 2057115748 sndnxt: 2057115748 sndwnd: 15955

irs: 3480424370 rcvnxt: 3480424751 rcvwnd: 16004 delrcvwnd: 380

SRTT: 259 ms, RTTO: 579 ms, RTV: 320 ms, KRTT: 0 ms

minRTT: 16 ms, maxRTT: 300 ms, ACK hold: 200 ms

Status Flags: passive open, gen tcbs

Option Flags: nagle, path mtu capable

IP Precedence value : 6

Datagrams (max data segment is 1460 bytes):

Rcvd: 335 (out of order: 0), with data: 7, total data bytes: 168

Sent: 319 (retransmit: 0, fastretransmit: 0, partialack: 0, Second Congestion: 0), with data: 5, total data bytes: 120

Packets received in fast path: 0, fast processed: 0, slow path: 0

fast lock acquisition failures: 0, slow path: 0

**Pings:**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 1.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 3.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 4.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 5.0.0.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 6.0.0.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

**Router 6:**

Building configuration...

Current configuration : 844 bytes

version 15.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname R6

no ip cef

no ipv6 cef

spanning-tree mode pvst

interface GigabitEthernet0/0/0

ip address 5.0.0.2 255.255.255.0

duplex auto

speed auto

interface GigabitEthernet0/0/1

ip address 6.0.0.1 255.255.255.0

duplex auto

speed auto

interface Serial0/1/0

no ip address

clock rate 2000000

shutdown

interface Serial0/1/1

no ip address

clock rate 2000000

shutdown

interface Vlan1

no ip address

shutdown

router ospf 1

router-id 6.6.6.6

log-adjacency-changes

network 6.0.0.0 0.0.0.255 area 0

network 5.0.0.0 0.0.0.255 area 0

ip classless

ip flow-export version 9

line con 0

line aux 0

line vty 0 4

login

end

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, E - EGP

i - IS-IS, 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

Gateway of last resort is not set

1.0.0.0/24 is subnetted, 1 subnets

O E2 1.0.0.0/24 [110/20] via 5.0.0.1, 04:20:16, GigabitEthernet0/0/0

2.0.0.0/24 is subnetted, 1 subnets

O E2 2.0.0.0/24 [110/20] via 5.0.0.1, 04:20:16, GigabitEthernet0/0/0

3.0.0.0/24 is subnetted, 1 subnets

O E2 3.0.0.0/24 [110/20] via 5.0.0.1, 04:20:16, GigabitEthernet0/0/0

4.0.0.0/24 is subnetted, 1 subnets

O E2 4.0.0.0/24 [110/20] via 5.0.0.1, 05:22:33, GigabitEthernet0/0/0

5.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 5.0.0.0/24 is directly connected, GigabitEthernet0/0/0

L 5.0.0.2/32 is directly connected, GigabitEthernet0/0/0

6.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 6.0.0.0/24 is directly connected, GigabitEthernet0/0/1

L 6.0.0.1/32 is directly connected, GigabitEthernet0/0/1

Neighbor ID Pri State Dead Time Address Interface

5.5.5.5 1 FULL/BDR 00:00:32 5.0.0.1 GigabitEthernet0/0/0

7.7.7.7 1 FULL/DR 00:00:32 6.0.0.2 GigabitEthernet0/0/1

GigabitEthernet0/0/0 is up, line protocol is up

Internet address is 5.0.0.2/24, Area 0

Process ID 1, Router ID 6.6.6.6, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 6.6.6.6, Interface address 5.0.0.2

Backup Designated Router (ID) 5.5.5.5, Interface address 5.0.0.1

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:07

Index 1/1, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1, Adjacent neighbor count is 1

Adjacent with neighbor 5.5.5.5 (Backup Designated Router)

Suppress hello for 0 neighbor(s)

GigabitEthernet0/0/1 is up, line protocol is up

Internet address is 6.0.0.1/24, Area 0

Process ID 1, Router ID 6.6.6.6, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State BDR, Priority 1

Designated Router (ID) 7.7.7.7, Interface address 6.0.0.2

Backup Designated Router (ID) 6.6.6.6, Interface address 6.0.0.1

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:01

Index 2/2, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1, Adjacent neighbor count is 1

Adjacent with neighbor 7.7.7.7 (Designated Router)

Suppress hello for 0 neighbor(s)

**Pings:**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 1.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 3.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 4.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 5.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 6.0.0.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

**Router 7:**

Building configuration...

Current configuration : 801 bytes

version 15.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname R7

no ip cef

no ipv6 cef

spanning-tree mode pvst

interface GigabitEthernet0/0/0

ip address 6.0.0.2 255.255.255.0

duplex auto

speed auto

interface GigabitEthernet0/0/1

no ip address

duplex auto

speed auto

shutdown

interface Serial0/1/0

no ip address

clock rate 2000000

shutdown

interface Serial0/1/1

no ip address

clock rate 2000000

shutdown

interface Vlan1

no ip address

shutdown

router ospf 1

router-id 7.7.7.7

log-adjacency-changes

network 6.0.0.0 0.0.0.255 area 0

ip classless

ip flow-export version 9

line con 0

line aux 0

line vty 0 4

login

end

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, E - EGP

i - IS-IS, 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

Gateway of last resort is not set

1.0.0.0/24 is subnetted, 1 subnets

O E2 1.0.0.0/24 [110/20] via 6.0.0.1, 04:24:00, GigabitEthernet0/0/0

2.0.0.0/24 is subnetted, 1 subnets

O E2 2.0.0.0/24 [110/20] via 6.0.0.1, 04:24:00, GigabitEthernet0/0/0

3.0.0.0/24 is subnetted, 1 subnets

O E2 3.0.0.0/24 [110/20] via 6.0.0.1, 04:24:00, GigabitEthernet0/0/0

4.0.0.0/24 is subnetted, 1 subnets

O E2 4.0.0.0/24 [110/20] via 6.0.0.1, 05:26:17, GigabitEthernet0/0/0

5.0.0.0/24 is subnetted, 1 subnets

O 5.0.0.0/24 [110/2] via 6.0.0.1, 05:26:17, GigabitEthernet0/0/0

6.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 6.0.0.0/24 is directly connected, GigabitEthernet0/0/0

L 6.0.0.2/32 is directly connected, GigabitEthernet0/0/0

Neighbor ID Pri State Dead Time Address Interface

6.6.6.6 1 FULL/BDR 00:00:31 6.0.0.1 GigabitEthernet0/0/0

GigabitEthernet0/0/0 is up, line protocol is up

Internet address is 6.0.0.2/24, Area 0

Process ID 1, Router ID 7.7.7.7, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 7.7.7.7, Interface address 6.0.0.2

Backup Designated Router (ID) 6.6.6.6, Interface address 6.0.0.1

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:08

Index 1/1, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1, Adjacent neighbor count is 1

Adjacent with neighbor 6.6.6.6 (Backup Designated Router)

Suppress hello for 0 neighbor(s)

**Pings:**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 1.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 3.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 4.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 5.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 6.0.0.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

Problems

Some of the problems I had with lab was with the redistribution from OSPF to BGP and EIGRP to BGP. I kept confusing the commands between the EIGRP and OSPF which caused some trouble where I was putting in the AS number instead if the OSPF process ID for the OSPF side of things. After multiple attempts and looking at the commands, I realized my mistake and fixed by simply putting in the OSPF process ID. With EIGRP I put in the wrong values and I kept confusing the AS numbers between the BGP area and the EIGRP. Once I realized my problem I was able to fix it fairly fast.

I didn’t run into any big problems with OSPF, it was mostly just reviewing certain commands. I kept putting in the wrong network statement and when I checked the IP routes on the routers I realized where I was making a mistake. With a simple “no network…” statement I was able to fix this relatively fast and after some trouble shooting and pinging to check I truly fixed my errors I was able to move on.

When learning how to do BGP I ran into some problems pretty fast. I kept confusing the area number with the AS number which didn’t allow me to set up neighborhoods from router 4 to router 3 and 5. After realizing this, I changed it to AS numbers which allowed me to set up connections with the other routers and then continue on to redistribution.

Conclusion

This lab was really helpful because it helped me review how to set up EIGRP as well as OSPF with both IPv4 and IPv6. During this lab I was able to learn how to do eBGP and how to redistribute OSPFv2 and OSPFv3 to eBGP and back as well as how to redistribute EIGRP into eBGP and back. This was a good review for setting up different areas as well autonomous systems in the topology and creating BGP neighbors. Setting up BGP was a problem at first when trying to redistribute due to all the different values needed for OSPF to redistribute but after a couple of tries it became easier and I was able to set it up properly. After multiple inputs of the “show ip route,” “show ip ospf neighbor,” “show ip bgp neighbors,” and “show ip eigrp neighbor” I was able to make sure everything worked and after pinging from both sides of the topology I was able to make sure there were not any problems.