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| Image result for cisco backgroun |
| Interior Border Gateway Protocol (IBGP)Derek Liu |
| Periods 0,3,4  Mr. Mason & Mr. Hansen  CCNP Lab 4 |

**Implementing IBGP (7 routers)***Derek Liu*

Purpose

The purpose of this lab is to continue exploring the functions of BGP, specifically IBGP. IBGP will allow routes not only shared across networks but through networks as well. In this lab, we will be sharing routes between two different EIGRP networks through an OSPF network through IBGP.

Background Information

BGP or border gateway protocol is an inter-autonomous system routing protocol designed for TCP/IP. This protocol is extremely important as it is used extensively throughout the internet to link different networks together. However, when trying to route between the same autonomous system, it had to be a full mesh network in order for it to function. This created scalability problems which IBGP was able to solve.

IBGP as an extension of BGP allowed for routing information to be exchanged within the same autonomous system without the need of creating a full-mesh network. This process is called route-reflection and was designed with simplicity, an easy transition between full-mesh and IBGP, and compatibility in mind. In the context of this lab, there was only one new command that established and IBGP connection. IBGP functions by reflecting all routes from non-client IBGP peers to all client IBGP peers and reflecting all routes from client-IBGP peers to both non-client IBGP peers and client IBGP peers. In this lab, there were multiple routers with route-reflection. In this case, IBGP treats other route-reflector routers like another client IBGP peer. IBGP is configured with redundancy in mind so redundant routes can be configured without breaking the network. The main difference between IBGP and BGP is the use of cluster lists which differentiate between IBGP clients and non-IBGP clients and originator IDs which carry information about the BGP identifier and the originator of the route in the local autonomous system. The main problem with IBGP is the possibility of routing loops.

IBGP should only be used after careful consideration of a network as it will not work with IGP if configured incorrectly.

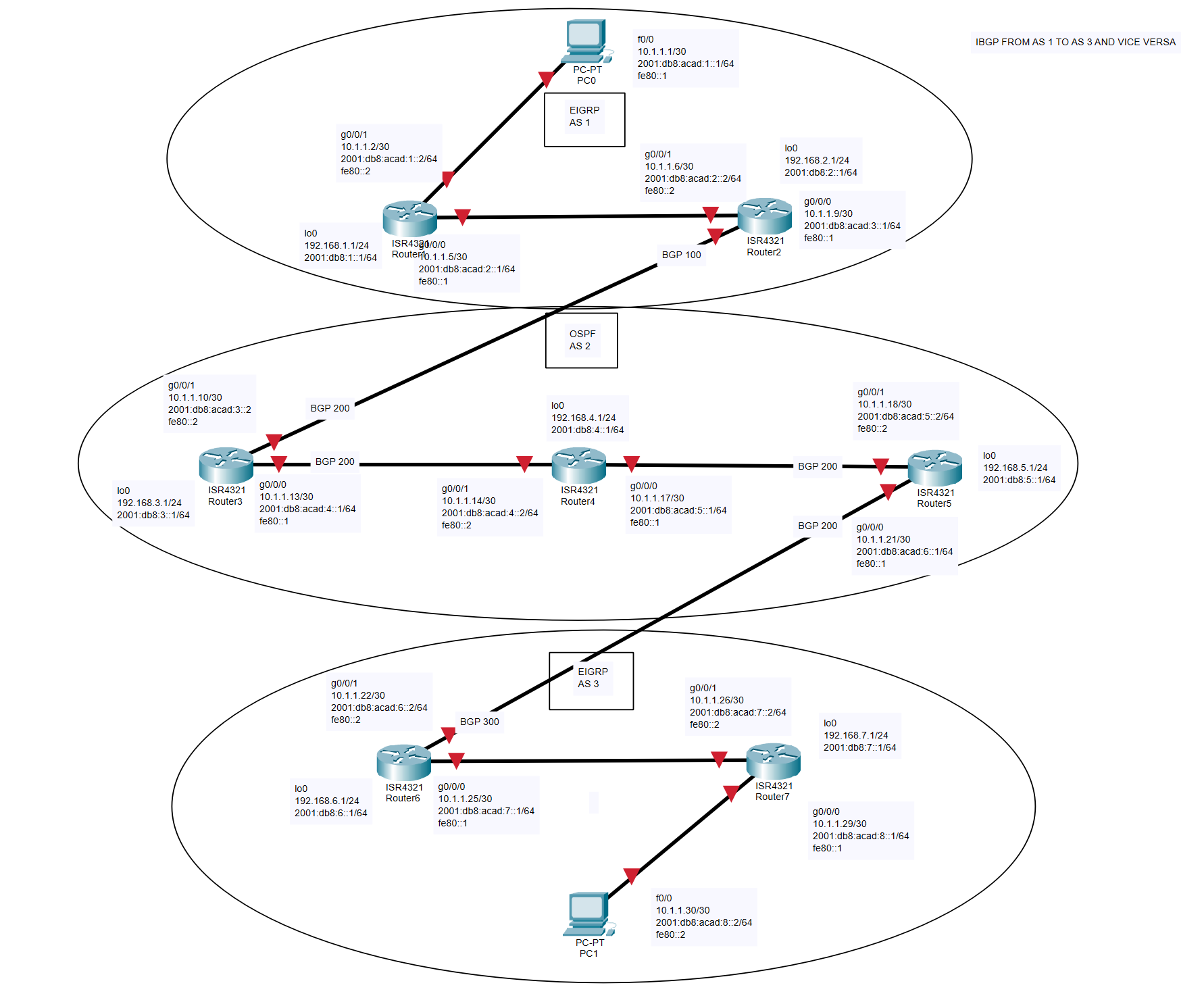
Lab Summary

In this lab we used seven Cisco 4321 routers connected in a linear fashion with copper straight-through cables. Interfaces g0/0/0 and g0/0/1 were used on the routers. The routers were accessed through a terminal emulator at a workstation with a console cord. The first two routers had interfaces configured with the EIGRP routing protocol to share routes throughout the network. The next three routers were configured with the OSPF routing protocol, and the remaining two configured with another EIGRP network. BGP was set up between the OSPF and EIGRP networks to allow routes to be shared between the different routing protocols. IBGP was configured by setting up internal neighbors in the OSPF network. This allowed for the EIGRP networks on either ends of the OSPF networks to also share routes. Both IPv4 and IPv6 routes were configured in this lab. Connection was tested by examining the routing table on each router and by sending pings across the network.

Lab Commands

New commands: neighbor 10.1.1.18 next-hop-self **the neighbor in both IPv6 and IPv4 will be the interface facing inside the network at the edge of the internal network.**

Network Diagrams with IP



Configurations

***Pings (ipv4):***

From PC1

C:\Users\user>ping 10.1.1.1

Pinging 10.1.1.1 with 32 bytes of data:

Reply from 10.1.1.1: bytes=32 time<1ms TTL=128

Reply from 10.1.1.1: bytes=32 time<1ms TTL=128

Reply from 10.1.1.1: bytes=32 time<1ms TTL=128

Reply from 10.1.1.1: bytes=32 time<1ms TTL=128

Ping statistics for 10.1.1.1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\user>ping 10.1.1.2

Pinging 10.1.1.2 with 32 bytes of data:

Reply from 10.1.1.2: bytes=32 time<1ms TTL=255

Reply from 10.1.1.2: bytes=32 time<1ms TTL=255

Reply from 10.1.1.2: bytes=32 time<1ms TTL=255

Reply from 10.1.1.2: bytes=32 time<1ms TTL=255

Ping statistics for 10.1.1.2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\user>ping 10.1.1.6

Pinging 10.1.1.6 with 32 bytes of data:

Reply from 10.1.1.6: bytes=32 time<1ms TTL=254

Reply from 10.1.1.6: bytes=32 time<1ms TTL=254

Reply from 10.1.1.6: bytes=32 time<1ms TTL=254

Reply from 10.1.1.6: bytes=32 time<1ms TTL=254

Ping statistics for 10.1.1.6:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\user>ping 10.1.1.5

Pinging 10.1.1.5 with 32 bytes of data:

Reply from 10.1.1.5: bytes=32 time<1ms TTL=255

Reply from 10.1.1.5: bytes=32 time<1ms TTL=255

Reply from 10.1.1.5: bytes=32 time<1ms TTL=255

Reply from 10.1.1.5: bytes=32 time<1ms TTL=255

Ping statistics for 10.1.1.5:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\user>ping 10.1.1.9

Pinging 10.1.1.9 with 32 bytes of data:

Reply from 10.1.1.9: bytes=32 time<1ms TTL=254

Reply from 10.1.1.9: bytes=32 time<1ms TTL=254

Reply from 10.1.1.9: bytes=32 time<1ms TTL=254

Reply from 10.1.1.9: bytes=32 time<1ms TTL=254

Ping statistics for 10.1.1.9:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\user>ping 10.1.1.10

Pinging 10.1.1.10 with 32 bytes of data:

Reply from 10.1.1.10: bytes=32 time<1ms TTL=253

Reply from 10.1.1.10: bytes=32 time<1ms TTL=253

Reply from 10.1.1.10: bytes=32 time<1ms TTL=253

Reply from 10.1.1.10: bytes=32 time<1ms TTL=253

Ping statistics for 10.1.1.10:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\user>ping 10.1.1.13

Pinging 10.1.1.13 with 32 bytes of data:

Reply from 10.1.1.13: bytes=32 time=1ms TTL=253

Reply from 10.1.1.13: bytes=32 time<1ms TTL=253

Reply from 10.1.1.13: bytes=32 time<1ms TTL=253

Reply from 10.1.1.13: bytes=32 time<1ms TTL=253

Ping statistics for 10.1.1.13:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\user>ping 10.1.1.14

Pinging 10.1.1.14 with 32 bytes of data:

Reply from 10.1.1.14: bytes=32 time=1ms TTL=252

Reply from 10.1.1.14: bytes=32 time<1ms TTL=252

Reply from 10.1.1.14: bytes=32 time<1ms TTL=252

Reply from 10.1.1.14: bytes=32 time<1ms TTL=252

Ping statistics for 10.1.1.14:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\user>ping 10.1.1.17

Pinging 10.1.1.17 with 32 bytes of data:

Reply from 10.1.1.17: bytes=32 time=1ms TTL=252

Reply from 10.1.1.17: bytes=32 time<1ms TTL=252

Reply from 10.1.1.17: bytes=32 time<1ms TTL=252

Reply from 10.1.1.17: bytes=32 time<1ms TTL=252

Ping statistics for 10.1.1.17:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\user>ping 10.1.1.18

Pinging 10.1.1.18 with 32 bytes of data:

Reply from 10.1.1.18: bytes=32 time=1ms TTL=251

Reply from 10.1.1.18: bytes=32 time=1ms TTL=251

Reply from 10.1.1.18: bytes=32 time<1ms TTL=251

Reply from 10.1.1.18: bytes=32 time=1ms TTL=251

Ping statistics for 10.1.1.18:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\user>ping 10.1.1.21

Pinging 10.1.1.21 with 32 bytes of data:

Reply from 10.1.1.21: bytes=32 time=1ms TTL=251

Reply from 10.1.1.21: bytes=32 time=1ms TTL=251

Reply from 10.1.1.21: bytes=32 time=1ms TTL=251

Reply from 10.1.1.21: bytes=32 time=1ms TTL=251

Ping statistics for 10.1.1.21:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\user>ping 10.1.1.22

Pinging 10.1.1.22 with 32 bytes of data:

Reply from 10.1.1.22: bytes=32 time=1ms TTL=250

Reply from 10.1.1.22: bytes=32 time=1ms TTL=250

Reply from 10.1.1.22: bytes=32 time=1ms TTL=250

Reply from 10.1.1.22: bytes=32 time=1ms TTL=250

Ping statistics for 10.1.1.22:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\user>ping 10.1.1.25

Pinging 10.1.1.25 with 32 bytes of data:

Reply from 10.1.1.25: bytes=32 time=1ms TTL=250

Reply from 10.1.1.25: bytes=32 time=1ms TTL=250

Reply from 10.1.1.25: bytes=32 time=1ms TTL=250

Reply from 10.1.1.25: bytes=32 time=1ms TTL=250

Ping statistics for 10.1.1.25:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\user>ping 10.1.1.26

Pinging 10.1.1.26 with 32 bytes of data:

Reply from 10.1.1.26: bytes=32 time=1ms TTL=249

Reply from 10.1.1.26: bytes=32 time<1ms TTL=249

Reply from 10.1.1.26: bytes=32 time<1ms TTL=249

Reply from 10.1.1.26: bytes=32 time<1ms TTL=249

Ping statistics for 10.1.1.26:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\user>ping 10.1.1.29

Pinging 10.1.1.29 with 32 bytes of data:

Reply from 10.1.1.29: bytes=32 time=1ms TTL=249

Reply from 10.1.1.29: bytes=32 time<1ms TTL=249

Reply from 10.1.1.29: bytes=32 time<1ms TTL=249

Reply from 10.1.1.29: bytes=32 time<1ms TTL=249

Ping statistics for 10.1.1.29:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\user>ping 10.1.1.30

Pinging 10.1.1.30 with 32 bytes of data:

Reply from 10.1.1.30: bytes=32 time=1ms TTL=121

Reply from 10.1.1.30: bytes=32 time=1ms TTL=121

Reply from 10.1.1.30: bytes=32 time=1ms TTL=121

Reply from 10.1.1.30: bytes=32 time=1ms TTL=121

Ping statistics for 10.1.1.30:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

***Pings (ipv6):***

From PC1

C:\Users\user>ping 2001:db8:acad:1::1

Pinging 2001:db8:acad:1::1 with 32 bytes of data:

Reply from 2001:db8:acad:1::1: time<1ms

Reply from 2001:db8:acad:1::1: time<1ms

Reply from 2001:db8:acad:1::1: time<1ms

Reply from 2001:db8:acad:1::1: time<1ms

Ping statistics for 2001:db8:acad:1::1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\user>ping 2001:db8:acad:1::2

Pinging 2001:db8:acad:1::2 with 32 bytes of data:

Reply from 2001:db8:acad:1::2: time<1ms

Reply from 2001:db8:acad:1::2: time<1ms

Reply from 2001:db8:acad:1::2: time<1ms

Reply from 2001:db8:acad:1::2: time<1ms

Ping statistics for 2001:db8:acad:1::2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\user>ping 2001:db8:acad:2::1

Pinging 2001:db8:acad:2::1 with 32 bytes of data:

Reply from 2001:db8:acad:2::1: time<1ms

Reply from 2001:db8:acad:2::1: time<1ms

Reply from 2001:db8:acad:2::1: time<1ms

Reply from 2001:db8:acad:2::1: time<1ms

Ping statistics for 2001:db8:acad:2::1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\user>ping 2001:db8:acad:2::2

Pinging 2001:db8:acad:2::2 with 32 bytes of data:

Reply from 2001:db8:acad:2::2: time<1ms

Reply from 2001:db8:acad:2::2: time<1ms

Reply from 2001:db8:acad:2::2: time<1ms

Reply from 2001:db8:acad:2::2: time<1ms

Ping statistics for 2001:db8:acad:2::2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\user>ping 2001:db8:acad:3::1

Pinging 2001:db8:acad:3::1 with 32 bytes of data:

Reply from 2001:db8:acad:3::1: time<1ms

Reply from 2001:db8:acad:3::1: time=1ms

Reply from 2001:db8:acad:3::1: time<1ms

Reply from 2001:db8:acad:3::1: time<1ms

Ping statistics for 2001:db8:acad:3::1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\user>ping 2001:db8:acad:3::2

Pinging 2001:db8:acad:3::2 with 32 bytes of data:

Reply from 2001:db8:acad:3::2: time<1ms

Reply from 2001:db8:acad:3::2: time<1ms

Reply from 2001:db8:acad:3::2: time<1ms

Reply from 2001:db8:acad:3::2: time<1ms

Ping statistics for 2001:db8:acad:3::2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\user>ping 2001:db8:acad:4::1

Pinging 2001:db8:acad:4::1 with 32 bytes of data:

Reply from 2001:db8:acad:4::1: time<1ms

Reply from 2001:db8:acad:4::1: time<1ms

Reply from 2001:db8:acad:4::1: time<1ms

Reply from 2001:db8:acad:4::1: time<1ms

Ping statistics for 2001:db8:acad:4::1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\user>ping 2001:db8:acad:4::2

Pinging 2001:db8:acad:4::2 with 32 bytes of data:

Reply from 2001:db8:acad:4::2: time=1ms

Reply from 2001:db8:acad:4::2: time=1ms

Reply from 2001:db8:acad:4::2: time=1ms

Reply from 2001:db8:acad:4::2: time=1ms

Ping statistics for 2001:db8:acad:4::2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\user>ping 2001:db8:acad:5::1

Pinging 2001:db8:acad:5::1 with 32 bytes of data:

Reply from 2001:db8:acad:5::1: time=1ms

Reply from 2001:db8:acad:5::1: time<1ms

Reply from 2001:db8:acad:5::1: time=1ms

Reply from 2001:db8:acad:5::1: time<1ms

Ping statistics for 2001:db8:acad:5::1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\user>ping 2001:db8:acad:5::2

Pinging 2001:db8:acad:5::2 with 32 bytes of data:

Reply from 2001:db8:acad:5::2: time=1ms

Reply from 2001:db8:acad:5::2: time=1ms

Reply from 2001:db8:acad:5::2: time=1ms

Reply from 2001:db8:acad:5::2: time=1ms

Ping statistics for 2001:db8:acad:5::2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\user>ping 2001:db8:acad:6::1

Pinging 2001:db8:acad:6::1 with 32 bytes of data:

Reply from 2001:db8:acad:6::1: time=1ms

Reply from 2001:db8:acad:6::1: time=1ms

Reply from 2001:db8:acad:6::1: time=1ms

Reply from 2001:db8:acad:6::1: time=1ms

Ping statistics for 2001:db8:acad:6::1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\user>ping 2001:db8:acad:6::2

Pinging 2001:db8:acad:6::2 with 32 bytes of data:

Reply from 2001:db8:acad:6::2: time=1ms

Reply from 2001:db8:acad:6::2: time=1ms

Reply from 2001:db8:acad:6::2: time=1ms

Reply from 2001:db8:acad:6::2: time=1ms

Ping statistics for 2001:db8:acad:6::2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\user>ping 2001:db8:acad:7::1

Pinging 2001:db8:acad:7::1 with 32 bytes of data:

Reply from 2001:db8:acad:7::1: time=1ms

Reply from 2001:db8:acad:7::1: time=1ms

Reply from 2001:db8:acad:7::1: time=1ms

Reply from 2001:db8:acad:7::1: time=1ms

Ping statistics for 2001:db8:acad:7::1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\user>ping 2001:db8:acad:7::2

Pinging 2001:db8:acad:7::2 with 32 bytes of data:

Reply from 2001:db8:acad:7::2: time=1ms

Reply from 2001:db8:acad:7::2: time=1ms

Reply from 2001:db8:acad:7::2: time=1ms

Reply from 2001:db8:acad:7::2: time=1ms

Ping statistics for 2001:db8:acad:7::2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\user>ping 2001:db8:acad:8::1

Pinging 2001:db8:acad:8::1 with 32 bytes of data:

Reply from 2001:db8:acad:8::1: time=1ms

Reply from 2001:db8:acad:8::1: time=1ms

Reply from 2001:db8:acad:8::1: time=1ms

Reply from 2001:db8:acad:8::1: time=1ms

Ping statistics for 2001:db8:acad:8::1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\user>ping 2001:db8:acad:8::2

Pinging 2001:db8:acad:8::2 with 32 bytes of data:

Reply from 2001:db8:acad:8::2: time=5ms

Reply from 2001:db8:acad:8::2: time=1ms

Reply from 2001:db8:acad:8::2: time=1ms

Reply from 2001:db8:acad:8::2: time=1ms

Ping statistics for 2001:db8:acad:8::2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 5ms, Average = 2ms

***Ip routes:***

IPV4 Routes:

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R1:

10.0.0.0/8 is variably subnetted, 10 subnets, 2 masks

C 10.1.1.0/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.2/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.4/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.5/32 is directly connected, GigabitEthernet0/0/0

D 10.1.1.8/30 [90/3072] via 10.1.1.6, 00:53:46, GigabitEthernet0/0/0

D EX 10.1.1.12/30

[170/281856] via 10.1.1.6, 00:52:26, GigabitEthernet0/0/0

D EX 10.1.1.16/30

[170/281856] via 10.1.1.6, 00:51:53, GigabitEthernet0/0/0

D EX 10.1.1.20/30

[170/281856] via 10.1.1.6, 00:50:52, GigabitEthernet0/0/0

D EX 10.1.1.24/30

[170/281856] via 10.1.1.6, 00:25:28, GigabitEthernet0/0/0

D EX 10.1.1.28/30

[170/281856] via 10.1.1.6, 00:25:28, GigabitEthernet0/0/0

192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.1.0/24 is directly connected, Loopback0

L 192.168.1.1/32 is directly connected, Loopback0

D 192.168.2.0/24 [90/130816] via 10.1.1.6, 00:54:42, GigabitEthernet0/0/0

192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks

D EX 192.168.3.0/24

[170/281856] via 10.1.1.6, 00:52:26, GigabitEthernet0/0/0

D EX 192.168.3.1/32

[170/281856] via 10.1.1.6, 00:50:21, GigabitEthernet0/0/0

D EX 192.168.4.0/24 [170/281856] via 10.1.1.6, 00:51:23, GigabitEthernet0/0/0

192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks

D EX 192.168.5.0/24

[170/281856] via 10.1.1.6, 00:50:21, GigabitEthernet0/0/0

D EX 192.168.5.1/32

[170/281856] via 10.1.1.6, 00:50:52, GigabitEthernet0/0/0

D EX 192.168.6.0/24 [170/281856] via 10.1.1.6, 00:25:28, GigabitEthernet0/0/0

D EX 192.168.7.0/24 [170/281856] via 10.1.1.6, 00:13:51, GigabitEthernet0/0/0

R2:

10.0.0.0/8 is variably subnetted, 10 subnets, 2 masks

D 10.1.1.0/30 [90/3072] via 10.1.1.5, 00:53:49, GigabitEthernet0/0/1

C 10.1.1.4/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.6/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.8/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.9/32 is directly connected, GigabitEthernet0/0/0

B 10.1.1.12/30 [20/0] via 10.1.1.10, 00:51:36

B 10.1.1.16/30 [20/2] via 10.1.1.10, 00:51:03

B 10.1.1.20/30 [20/3] via 10.1.1.10, 00:50:02

B 10.1.1.24/30 [20/0] via 10.1.1.10, 00:24:38

B 10.1.1.28/30 [20/0] via 10.1.1.10, 00:24:38

D 192.168.1.0/24 [90/130816] via 10.1.1.5, 00:53:49, GigabitEthernet0/0/1

192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.2.0/24 is directly connected, Loopback0

L 192.168.2.1/32 is directly connected, Loopback0

192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks

B 192.168.3.0/24 [20/0] via 10.1.1.10, 00:51:36

B 192.168.3.1/32 [20/0] via 10.1.1.10, 00:49:31

B 192.168.4.0/24 [20/0] via 10.1.1.10, 00:50:33

192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks

B 192.168.5.0/24 [20/0] via 10.1.1.10, 00:49:31

B 192.168.5.1/32 [20/3] via 10.1.1.10, 00:50:02

B 192.168.6.0/24 [20/0] via 10.1.1.10, 00:24:38

B 192.168.7.0/24 [20/0] via 10.1.1.10, 00:13:01

R3:

10.0.0.0/8 is variably subnetted, 10 subnets, 2 masks

B 10.1.1.0/30 [20/3072] via 10.1.1.9, 00:50:55

B 10.1.1.4/30 [20/0] via 10.1.1.9, 00:50:55

C 10.1.1.8/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.10/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.12/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.13/32 is directly connected, GigabitEthernet0/0/0

O 10.1.1.16/30 [110/2] via 10.1.1.14, 00:49:38, GigabitEthernet0/0/0

O 10.1.1.20/30 [110/3] via 10.1.1.14, 00:24:02, GigabitEthernet0/0/0

O E2 10.1.1.24/30 [110/1] via 10.1.1.14, 00:24:00, GigabitEthernet0/0/0

O E2 10.1.1.28/30 [110/1] via 10.1.1.14, 00:24:00, GigabitEthernet0/0/0

B 192.168.1.0/24 [20/130816] via 10.1.1.9, 00:50:55

B 192.168.2.0/24 [20/0] via 10.1.1.9, 00:50:55

192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.3.0/24 is directly connected, Loopback0

L 192.168.3.1/32 is directly connected, Loopback0

O E2 192.168.4.0/24 [110/1] via 10.1.1.14, 00:50:41, GigabitEthernet0/0/0

192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks

B 192.168.5.0/24 [200/0] via 10.1.1.18, 00:49:13

O 192.168.5.1/32 [110/3] via 10.1.1.14, 00:49:38, GigabitEthernet0/0/0

O E2 192.168.6.0/24 [110/1] via 10.1.1.14, 00:24:00, GigabitEthernet0/0/0

O E2 192.168.7.0/24 [110/1] via 10.1.1.14, 00:12:20, GigabitEthernet0/0/0

R4:

10.0.0.0/8 is variably subnetted, 10 subnets, 2 masks

O E2 10.1.1.0/30 [110/1] via 10.1.1.13, 00:46:57, GigabitEthernet0/0/1

O E2 10.1.1.4/30 [110/1] via 10.1.1.13, 00:46:57, GigabitEthernet0/0/1

O 10.1.1.8/30 [110/2] via 10.1.1.13, 00:46:57, GigabitEthernet0/0/1

C 10.1.1.12/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.14/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.16/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.17/32 is directly connected, GigabitEthernet0/0/0

O 10.1.1.20/30 [110/2] via 10.1.1.18, 00:20:18, GigabitEthernet0/0/0

O E2 10.1.1.24/30 [110/1] via 10.1.1.18, 00:20:16, GigabitEthernet0/0/0

O E2 10.1.1.28/30 [110/1] via 10.1.1.18, 00:20:16, GigabitEthernet0/0/0

O E2 192.168.1.0/24 [110/1] via 10.1.1.13, 00:46:57, GigabitEthernet0/0/1

O E2 192.168.2.0/24 [110/1] via 10.1.1.13, 00:46:57, GigabitEthernet0/0/1

192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks

B 192.168.3.0/24 [200/0] via 10.1.1.13, 00:46:34

O 192.168.3.1/32 [110/2] via 10.1.1.13, 00:46:57, GigabitEthernet0/0/1

192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.4.0/24 is directly connected, Loopback0

L 192.168.4.1/32 is directly connected, Loopback0

192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks

B 192.168.5.0/24 [200/0] via 10.1.1.18, 00:45:29

O 192.168.5.1/32 [110/2] via 10.1.1.18, 00:45:54, GigabitEthernet0/0/0

O E2 192.168.6.0/24 [110/1] via 10.1.1.18, 00:20:16, GigabitEthernet0/0/0

O E2 192.168.7.0/24 [110/1] via 10.1.1.18, 00:08:35, GigabitEthernet0/0/0

R5:

10.0.0.0/8 is variably subnetted, 10 subnets, 2 masks

O E2 10.1.1.0/30 [110/1] via 10.1.1.17, 00:45:18, GigabitEthernet0/0/1

O E2 10.1.1.4/30 [110/1] via 10.1.1.17, 00:45:18, GigabitEthernet0/0/1

O 10.1.1.8/30 [110/3] via 10.1.1.17, 00:45:18, GigabitEthernet0/0/1

O 10.1.1.12/30 [110/2] via 10.1.1.17, 00:45:18, GigabitEthernet0/0/1

C 10.1.1.16/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.18/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.20/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.21/32 is directly connected, GigabitEthernet0/0/0

B 10.1.1.24/30 [20/0] via 10.1.1.22, 00:19:36

B 10.1.1.28/30 [20/3072] via 10.1.1.22, 00:19:36

O E2 192.168.1.0/24 [110/1] via 10.1.1.17, 00:45:18, GigabitEthernet0/0/1

O E2 192.168.2.0/24 [110/1] via 10.1.1.17, 00:45:18, GigabitEthernet0/0/1

192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks

B 192.168.3.0/24 [200/0] via 10.1.1.13, 00:44:49

O 192.168.3.1/32 [110/3] via 10.1.1.17, 00:45:18, GigabitEthernet0/0/1

O E2 192.168.4.0/24 [110/1] via 10.1.1.17, 00:45:18, GigabitEthernet0/0/1

192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.5.0/24 is directly connected, Loopback0

L 192.168.5.1/32 is directly connected, Loopback0

B 192.168.6.0/24 [20/0] via 10.1.1.22, 00:19:36

B 192.168.7.0/24 [20/130816] via 10.1.1.22, 00:07:55

R6:

10.0.0.0/8 is variably subnetted, 10 subnets, 2 masks

B 10.1.1.0/30 [20/0] via 10.1.1.21, 00:18:53

B 10.1.1.4/30 [20/0] via 10.1.1.21, 00:18:53

B 10.1.1.8/30 [20/3] via 10.1.1.21, 00:18:53

B 10.1.1.12/30 [20/2] via 10.1.1.21, 00:18:53

B 10.1.1.16/30 [20/0] via 10.1.1.21, 00:18:53

C 10.1.1.20/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.22/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.24/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.25/32 is directly connected, GigabitEthernet0/0/0

D 10.1.1.28/30 [90/3072] via 10.1.1.26, 00:18:54, GigabitEthernet0/0/0

B 192.168.1.0/24 [20/0] via 10.1.1.21, 00:18:53

B 192.168.2.0/24 [20/0] via 10.1.1.21, 00:18:53

192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks

B 192.168.3.0/24 [20/0] via 10.1.1.21, 00:18:53

B 192.168.3.1/32 [20/3] via 10.1.1.21, 00:18:53

B 192.168.4.0/24 [20/0] via 10.1.1.21, 00:18:53

192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks

B 192.168.5.0/24 [20/0] via 10.1.1.21, 00:18:53

B 192.168.5.1/32 [20/0] via 10.1.1.21, 00:18:53

192.168.6.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.6.0/24 is directly connected, Loopback0

L 192.168.6.1/32 is directly connected, Loopback0

D 192.168.7.0/24 [90/130816] via 10.1.1.26, 00:07:12, GigabitEthernet0/0/0

R7:

10.0.0.0/8 is variably subnetted, 10 subnets, 2 masks

D EX 10.1.1.0/30

[170/281856] via 10.1.1.25, 00:15:49, GigabitEthernet0/0/1

D EX 10.1.1.4/30

[170/281856] via 10.1.1.25, 00:15:49, GigabitEthernet0/0/1

D EX 10.1.1.8/30

[170/281856] via 10.1.1.25, 00:15:49, GigabitEthernet0/0/1

D EX 10.1.1.12/30

[170/281856] via 10.1.1.25, 00:15:49, GigabitEthernet0/0/1

D EX 10.1.1.16/30

[170/281856] via 10.1.1.25, 00:15:49, GigabitEthernet0/0/1

D 10.1.1.20/30 [90/3072] via 10.1.1.25, 00:15:53, GigabitEthernet0/0/1

C 10.1.1.24/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.26/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.28/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.29/32 is directly connected, GigabitEthernet0/0/0

D EX 192.168.1.0/24

[170/281856] via 10.1.1.25, 00:15:49, GigabitEthernet0/0/1

D EX 192.168.2.0/24

[170/281856] via 10.1.1.25, 00:15:49, GigabitEthernet0/0/1

192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks

D EX 192.168.3.0/24

[170/281856] via 10.1.1.25, 00:15:49, GigabitEthernet0/0/1

D EX 192.168.3.1/32

[170/281856] via 10.1.1.25, 00:15:49, GigabitEthernet0/0/1

D EX 192.168.4.0/24

[170/281856] via 10.1.1.25, 00:15:49, GigabitEthernet0/0/1

192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks

D EX 192.168.5.0/24

[170/281856] via 10.1.1.25, 00:15:49, GigabitEthernet0/0/1

D EX 192.168.5.1/32

[170/281856] via 10.1.1.25, 00:15:49, GigabitEthernet0/0/1

D 192.168.6.0/24 [90/130816] via 10.1.1.25, 00:15:53, GigabitEthernet0/0/1

192.168.7.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.7.0/24 is directly connected, Loopback0

L 192.168.7.1/32 is directly connected, Loopback0

IPV6 Routes:

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R1:

C 2001:DB8:1::/64 [0/0]

via Loopback0, directly connected

L 2001:DB8:1::1/128 [0/0]

via Loopback0, receive

D 2001:DB8:2::/64 [90/130816]

via FE80::2, GigabitEthernet0/0/0

EX 2001:DB8:3::/64 [170/281856]

via FE80::2, GigabitEthernet0/0/0

EX 2001:DB8:3::1/128 [170/281856]

via FE80::2, GigabitEthernet0/0/0

EX 2001:DB8:4::1/128 [170/281856]

via FE80::2, GigabitEthernet0/0/0

EX 2001:DB8:5::/64 [170/281856]

via FE80::2, GigabitEthernet0/0/0

EX 2001:DB8:5::1/128 [170/281856]

via FE80::2, GigabitEthernet0/0/0

EX 2001:DB8:6::/64 [170/281856]

via FE80::2, GigabitEthernet0/0/0

EX 2001:DB8:7::/64 [170/281856]

via FE80::2, GigabitEthernet0/0/0

C 2001:DB8:ACAD:1::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:1::2/128 [0/0]

via GigabitEthernet0/0/1, receive

C 2001:DB8:ACAD:2::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:2::1/128 [0/0]

via GigabitEthernet0/0/0, receive

D 2001:DB8:ACAD:3::/64 [90/3072]

via FE80::2, GigabitEthernet0/0/0

EX 2001:DB8:ACAD:4::/64 [170/281856]

via FE80::2, GigabitEthernet0/0/0

EX 2001:DB8:ACAD:5::/64 [170/281856]

via FE80::2, GigabitEthernet0/0/0

EX 2001:DB8:ACAD:6::/64 [170/281856]

via FE80::2, GigabitEthernet0/0/0

EX 2001:DB8:ACAD:7::/64 [170/281856]

via FE80::2, GigabitEthernet0/0/0

EX 2001:DB8:ACAD:8::/64 [170/281856]

via FE80::2, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

R2:

D 2001:DB8:1::/64 [90/130816]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:2::/64 [0/0]

via Loopback0, directly connected

L 2001:DB8:2::1/128 [0/0]

via Loopback0, receive

B 2001:DB8:3::/64 [20/0]

via FE80::2, GigabitEthernet0/0/0

B 2001:DB8:3::1/128 [20/0]

via FE80::2, GigabitEthernet0/0/0

B 2001:DB8:4::1/128 [20/1]

via FE80::2, GigabitEthernet0/0/0

B 2001:DB8:5::/64 [20/0]

via FE80::2, GigabitEthernet0/0/0

B 2001:DB8:5::1/128 [20/2]

via FE80::2, GigabitEthernet0/0/0

B 2001:DB8:6::/64 [20/0]

via FE80::2, GigabitEthernet0/0/0

B 2001:DB8:7::/64 [20/0]

via FE80::2, GigabitEthernet0/0/0

D 2001:DB8:ACAD:1::/64 [90/3072]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:ACAD:2::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:2::2/128 [0/0]

via GigabitEthernet0/0/1, receive

C 2001:DB8:ACAD:3::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:3::1/128 [0/0]

via GigabitEthernet0/0/0, receive

B 2001:DB8:ACAD:4::/64 [20/0]

via FE80::2, GigabitEthernet0/0/0

B 2001:DB8:ACAD:5::/64 [20/2]

via FE80::2, GigabitEthernet0/0/0

B 2001:DB8:ACAD:6::/64 [20/3]

via FE80::2, GigabitEthernet0/0/0

B 2001:DB8:ACAD:7::/64 [20/0]

via FE80::2, GigabitEthernet0/0/0

B 2001:DB8:ACAD:8::/64 [20/0]

via FE80::2, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

R3:

B 2001:DB8:1::/64 [20/130816]

via FE80::1, GigabitEthernet0/0/1

B 2001:DB8:2::/64 [20/0]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:3::/64 [0/0]

via Loopback0, directly connected

L 2001:DB8:3::1/128 [0/0]

via Loopback0, receive

O 2001:DB8:4::1/128 [110/1]

via FE80::2, GigabitEthernet0/0/0

B 2001:DB8:5::/64 [200/0]

via 2001:DB8:ACAD:5::2

O 2001:DB8:5::1/128 [110/2]

via FE80::2, GigabitEthernet0/0/0

OE2 2001:DB8:6::/64 [110/10000]

via FE80::2, GigabitEthernet0/0/0

OE2 2001:DB8:7::/64 [110/10000]

via FE80::2, GigabitEthernet0/0/0

B 2001:DB8:ACAD:1::/64 [20/3072]

via FE80::1, GigabitEthernet0/0/1

B 2001:DB8:ACAD:2::/64 [20/0]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:ACAD:3::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:3::2/128 [0/0]

via GigabitEthernet0/0/1, receive

C 2001:DB8:ACAD:4::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:4::1/128 [0/0]

via GigabitEthernet0/0/0, receive

O 2001:DB8:ACAD:5::/64 [110/2]

via FE80::2, GigabitEthernet0/0/0

O 2001:DB8:ACAD:6::/64 [110/3]

via FE80::2, GigabitEthernet0/0/0

OE2 2001:DB8:ACAD:7::/64 [110/10000]

via FE80::2, GigabitEthernet0/0/0

OE2 2001:DB8:ACAD:8::/64 [110/10000]

via FE80::2, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

R4:

OE2 2001:DB8:1::/64 [110/10000]

via FE80::1, GigabitEthernet0/0/1

OE2 2001:DB8:2::/64 [110/10000]

via FE80::1, GigabitEthernet0/0/1

O 2001:DB8:3::1/128 [110/1]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:4::/64 [0/0]

via Loopback0, directly connected

L 2001:DB8:4::1/128 [0/0]

via Loopback0, receive

O 2001:DB8:5::1/128 [110/1]

via FE80::2, GigabitEthernet0/0/0

OE2 2001:DB8:6::/64 [110/10000]

via FE80::2, GigabitEthernet0/0/0

OE2 2001:DB8:7::/64 [110/10000]

via FE80::2, GigabitEthernet0/0/0

OE2 2001:DB8:ACAD:1::/64 [110/10000]

via FE80::1, GigabitEthernet0/0/1

OE2 2001:DB8:ACAD:2::/64 [110/10000]

via FE80::1, GigabitEthernet0/0/1

O 2001:DB8:ACAD:3::/64 [110/2]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:ACAD:4::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:4::2/128 [0/0]

via GigabitEthernet0/0/1, receive

C 2001:DB8:ACAD:5::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:5::1/128 [0/0]

via GigabitEthernet0/0/0, receive

O 2001:DB8:ACAD:6::/64 [110/2]

via FE80::2, GigabitEthernet0/0/0

OE2 2001:DB8:ACAD:7::/64 [110/10000]

via FE80::2, GigabitEthernet0/0/0

OE2 2001:DB8:ACAD:8::/64 [110/10000]

via FE80::2, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

R5

OE2 2001:DB8:1::/64 [110/10000]

via FE80::1, GigabitEthernet0/0/1

OE2 2001:DB8:2::/64 [110/10000]

via FE80::1, GigabitEthernet0/0/1

B 2001:DB8:3::/64 [200/0]

via 2001:DB8:ACAD:4::1

O 2001:DB8:3::1/128 [110/2]

via FE80::1, GigabitEthernet0/0/1

O 2001:DB8:4::1/128 [110/1]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:5::/64 [0/0]

via Loopback0, directly connected

L 2001:DB8:5::1/128 [0/0]

via Loopback0, receive

B 2001:DB8:6::/64 [20/0]

via FE80::2, GigabitEthernet0/0/0

B 2001:DB8:7::/64 [20/130816]

via FE80::2, GigabitEthernet0/0/0

OE2 2001:DB8:ACAD:1::/64 [110/10000]

via FE80::1, GigabitEthernet0/0/1

OE2 2001:DB8:ACAD:2::/64 [110/10000]

via FE80::1, GigabitEthernet0/0/1

O 2001:DB8:ACAD:3::/64 [110/3]

via FE80::1, GigabitEthernet0/0/1

O 2001:DB8:ACAD:4::/64 [110/2]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:ACAD:5::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:5::2/128 [0/0]

via GigabitEthernet0/0/1, receive

C 2001:DB8:ACAD:6::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:6::1/128 [0/0]

via GigabitEthernet0/0/0, receive

B 2001:DB8:ACAD:7::/64 [20/0]

via FE80::2, GigabitEthernet0/0/0

B 2001:DB8:ACAD:8::/64 [20/3072]

via FE80::2, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

R6:

B 2001:DB8:1::/64 [20/0]

via FE80::1, GigabitEthernet0/0/1

B 2001:DB8:2::/64 [20/0]

via FE80::1, GigabitEthernet0/0/1

B 2001:DB8:3::/64 [20/0]

via FE80::1, GigabitEthernet0/0/1

B 2001:DB8:3::1/128 [20/2]

via FE80::1, GigabitEthernet0/0/1

B 2001:DB8:4::1/128 [20/1]

via FE80::1, GigabitEthernet0/0/1

B 2001:DB8:5::/64 [20/0]

via FE80::1, GigabitEthernet0/0/1

B 2001:DB8:5::1/128 [20/0]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:6::/64 [0/0]

via Loopback0, directly connected

L 2001:DB8:6::1/128 [0/0]

via Loopback0, receive

D 2001:DB8:7::/64 [90/130816]

via FE80::2, GigabitEthernet0/0/0

B 2001:DB8:ACAD:1::/64 [20/0]

via FE80::1, GigabitEthernet0/0/1

B 2001:DB8:ACAD:2::/64 [20/0]

via FE80::1, GigabitEthernet0/0/1

B 2001:DB8:ACAD:3::/64 [20/3]

via FE80::1, GigabitEthernet0/0/1

B 2001:DB8:ACAD:4::/64 [20/2]

via FE80::1, GigabitEthernet0/0/1

B 2001:DB8:ACAD:5::/64 [20/0]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:ACAD:6::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:6::2/128 [0/0]

via GigabitEthernet0/0/1, receive

C 2001:DB8:ACAD:7::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:7::1/128 [0/0]

via GigabitEthernet0/0/0, receive

D 2001:DB8:ACAD:8::/64 [90/3072]

via FE80::2, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

R7:

EX 2001:DB8:1::/64 [170/281856]

via FE80::1, GigabitEthernet0/0/1

EX 2001:DB8:2::/64 [170/281856]

via FE80::1, GigabitEthernet0/0/1

EX 2001:DB8:3::/64 [170/281856]

via FE80::1, GigabitEthernet0/0/1

EX 2001:DB8:3::1/128 [170/281856]

via FE80::1, GigabitEthernet0/0/1

EX 2001:DB8:4::1/128 [170/281856]

via FE80::1, GigabitEthernet0/0/1

EX 2001:DB8:5::/64 [170/281856]

via FE80::1, GigabitEthernet0/0/1

EX 2001:DB8:5::1/128 [170/281856]

via FE80::1, GigabitEthernet0/0/1

D 2001:DB8:6::/64 [90/130816]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:7::/64 [0/0]

via Loopback0, directly connected

L 2001:DB8:7::1/128 [0/0]

via Loopback0, receive

EX 2001:DB8:ACAD:1::/64 [170/281856]

via FE80::1, GigabitEthernet0/0/1

EX 2001:DB8:ACAD:2::/64 [170/281856]

via FE80::1, GigabitEthernet0/0/1

EX 2001:DB8:ACAD:3::/64 [170/281856]

via FE80::1, GigabitEthernet0/0/1

EX 2001:DB8:ACAD:4::/64 [170/281856]

via FE80::1, GigabitEthernet0/0/1

EX 2001:DB8:ACAD:5::/64 [170/281856]

via FE80::1, GigabitEthernet0/0/1

D 2001:DB8:ACAD:6::/64 [90/3072]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:ACAD:7::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:7::2/128 [0/0]

via GigabitEthernet0/0/1, receive

C 2001:DB8:ACAD:8::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:8::1/128 [0/0]

via GigabitEthernet0/0/0, receive

L FF00::/8 [0/0]

via Null0, receive

***Router 1 Config:***

hostname r1

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

login on-success log

ipv6 unicast-routing

subscriber templating

multilink bundle-name authenticated

crypto pki trustpoint TP-self-signed-4144679456

enrollment selfsigned

subject-name cn=IOS-Self-Signed-Certificate-4144679456

revocation-check none

rsakeypair TP-self-signed-4144679456

crypto pki certificate chain TP-self-signed-4144679456

certificate self-signed 01

30820330 30820218 A0030201 02020101 300D0609 2A864886 F70D0101 05050030

31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D 43657274

69666963 6174652D 34313434 36373934 3536301E 170D3232 31303034 31373138

31365A17 0D333030 31303130 30303030 305A3031 312F302D 06035504 03132649

4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D34 31343436

37393435 36308201 22300D06 092A8648 86F70D01 01010500 0382010F 00308201

0A028201 010087CC 266FCB7F CBF7B4EE 138D3485 B2401F70 519C8EDA B5D1E5EC

D3C8D992 21065BCF 869991E0 795A9990 E7E8D247 1D55DCF8 EF12BE1F F6C8CB1E

17C6FEEE 8E10B242 D2C0E98D 679DC16A 9D5D11C6 9617EA8C 2845DC66 21251470

59442738 719AB69D C0F3311E DF116EB7 C6C223E4 A6C06D3D A822AAB8 91369FC1

679B9582 E8BFC5EE 070945EC 4E6E2D5C C4820706 F40E5C42 A0F02B86 7A471330

516082A5 91C02659 F5591812 1B85EDEF 58693D0E 3D1334D8 AA3010BA 12CBB929

E1D7B9B3 2FD29D3E 15A7F473 42A17035 05FE7F9E CA973314 389BADD9 04910E99

EE3904C5 4B5D4BE0 47D895EE 91B0A71A 77181933 A2F0AECB 740E5100 3414F677

5D86C36F 5C7B0203 010001A3 53305130 0F060355 1D130101 FF040530 030101FF

301F0603 551D2304 18301680 14BEAF09 270773AD 4353C83A 6020F1BC 0A05B90D

5E301D06 03551D0E 04160414 BEAF0927 0773AD43 53C83A60 20F1BC0A 05B90D5E

300D0609 2A864886 F70D0101 05050003 82010100 8142B8C1 5EA90A17 2A9D2B3E

C44BA6C1 F460EB6E 1F465E6E 8F0A8EEB 3DB59EDC 80AEDC55 4C38F05A 6CA34F3B

E9CB5D16 B072846A F56E988F 7535D239 77595A89 C828E3AF AA8BF4E2 A796B46F

9819500F 69A36EC0 579C9FB1 971AB1AA 090EF2A7 B9ECA02B E1E64147 03ADAB1A

256F3FD4 E9D768D7 0FED6A34 4825B486 F874025A 3952BA2D FC251D67 216E38CB

B45C6CCD 7B15BB04 6656DA4E 381FE2F5 1F5467E5 172B3945 D3F40EC0 9F2623AB

BD73FFAC EC51537D CF073BF9 41C32E30 78EFBDB9 FEA8D7D1 5C205F0F F68822B6

5FED0266 1060C191 1427F936 DD2076EC 389828DF 819BB112 FF2F4814 3D208BDF

A38EABA2 87CA8C8E 4000A356 413FCE86 0D7415F9

quit

license udi pid ISR4321/K9 sn FDO214421CF

spanning-tree extend system-id

redundancy

mode none

vlan internal allocation policy ascending

interface Loopback0

ip address 192.168.1.1 255.255.255.0

ipv6 address 2001:DB8:1::1/64

ipv6 eigrp 10

interface GigabitEthernet0/0/0

ip address 10.1.1.5 255.255.255.252

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:2::1/64

ipv6 enable

ipv6 eigrp 10

interface GigabitEthernet0/0/1

ip address 10.1.1.2 255.255.255.252

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:1::2/64

ipv6 enable

ipv6 eigrp 10

interface Serial0/1/0

no ip address

interface Serial0/1/1

no ip address

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

negotiation auto

interface Vlan1

no ip address

router eigrp 10

network 10.1.1.0 0.0.0.3

network 10.1.1.4 0.0.0.3

network 192.168.1.0

ip forward-protocol nd

no ip http server

no ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router eigrp 10

eigrp router-id 1.1.1.1

redistribute bgp 100 metric 10000 100 255 1 1500

control-plane

line con 0

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

end

***Router 2 Config:***

hostname r2

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

ipv6 unicast-routing

subscriber templating

multilink bundle-name authenticated

license udi pid ISR4321/K9 sn FDO211216BL

spanning-tree extend system-id

redundancy

mode none

vlan internal allocation policy ascending

interface Loopback0

ip address 192.168.2.1 255.255.255.0

ipv6 address 2001:DB8:2::1/64

ipv6 eigrp 10

interface GigabitEthernet0/0/0

ip address 10.1.1.9 255.255.255.252

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:3::1/64

ipv6 enable

ipv6 eigrp 10

interface GigabitEthernet0/0/1

ip address 10.1.1.6 255.255.255.252

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:2::2/64

ipv6 enable

ipv6 eigrp 10

interface Serial0/1/0

no ip address

interface Serial0/1/1

no ip address

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

negotiation auto

interface Vlan1

no ip address

router eigrp 10

network 10.1.1.4 0.0.0.3

network 10.1.1.8 0.0.0.3

network 192.168.2.0

redistribute bgp 100 metric 10000 100 255 1 1500

eigrp router-id 2.2.2.2

router bgp 100

bgp router-id 2.2.2.2

bgp log-neighbor-changes

no bgp default ipv4-unicast

neighbor 10.1.1.10 remote-as 200

neighbor 2001:DB8:ACAD:3::2 remote-as 200

address-family ipv4

network 10.1.1.8

redistribute eigrp 10

neighbor 10.1.1.10 activate

exit-address-family

address-family ipv6

redistribute eigrp 10

network 2001:DB8:2::/64

network 2001:DB8:ACAD:2::/64

network 2001:DB8:ACAD:3::/64

neighbor 2001:DB8:ACAD:3::2 activate

exit-address-family

ip forward-protocol nd

no ip http server

no ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router eigrp 10

eigrp router-id 2.2.2.2

redistribute bgp 100 metric 10000 100 255 1 1500

control-plane

line con 0

logging synchronous

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

end

***Router 3 Config:***

hostname r3

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

ipv6 unicast-routing

subscriber templating

vtp domain cisco

vtp mode transparent

multilink bundle-name authenticated

license udi pid ISR4321/K9 sn FDO214420G7

spanning-tree extend system-id

redundancy

mode none

vlan internal allocation policy ascending

vlan 10,20

interface Loopback0

ip address 192.168.3.1 255.255.255.0

ipv6 address 2001:DB8:3::1/64

ipv6 ospf 10 area 0

interface GigabitEthernet0/0/0

ip address 10.1.1.13 255.255.255.252

ip ospf 10 area 0

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:4::1/64

ipv6 ospf 10 area 0

interface GigabitEthernet0/0/1

ip address 10.1.1.10 255.255.255.252

ip ospf 10 area 0

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:3::2/64

ipv6 ospf 10 area 0

interface Serial0/1/0

no ip address

shutdown

interface Serial0/1/1

no ip address

shutdown

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

interface Vlan1

no ip address

shutdown

router ospf 10

router-id 3.3.3.3

redistribute bgp 200 subnets

network 10.1.1.8 0.0.0.3 area 0

network 10.1.1.12 0.0.0.3 area 0

network 192.168.3.0 0.0.0.255 area 0

router bgp 200

bgp router-id 3.3.3.3

bgp log-neighbor-changes

no bgp default ipv4-unicast

neighbor 10.1.1.9 remote-as 100

neighbor 10.1.1.14 remote-as 200

neighbor 10.1.1.18 remote-as 200

neighbor 2001:DB8:ACAD:3::1 remote-as 100

neighbor 2001:DB8:ACAD:4::2 remote-as 200

neighbor 2001:DB8:ACAD:5::2 remote-as 200

address-family ipv4

network 10.1.1.8

network 10.1.1.12

network 192.168.3.0

redistribute ospf 10

neighbor 10.1.1.9 activate

neighbor 10.1.1.14 activate

neighbor 10.1.1.18 activate

neighbor 10.1.1.18 next-hop-self

exit-address-family

address-family ipv6

redistribute ospf 10

network 2001:DB8:3::/64

network 2001:DB8:ACAD:3::/64

network 2001:DB8:ACAD:4::/64

neighbor 2001:DB8:ACAD:3::1 activate

neighbor 2001:DB8:ACAD:4::2 activate

neighbor 2001:DB8:ACAD:5::2 activate

neighbor 2001:DB8:ACAD:5::2 next-hop-self

exit-address-family

ip forward-protocol nd

no ip http server

no ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router ospf 10

router-id 3.3.3.3

redistribute bgp 200 metric 10000

control-plane

line con 0

logging synchronous

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

end

***Router 4 Config:***

hostname r4

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

ipv6 unicast-routing

subscriber templating

vtp domain cisco

vtp mode transparent

multilink bundle-name authenticated

license udi pid ISR4321/K9 sn FDO21442B21

spanning-tree extend system-id

redundancy

mode none

vlan internal allocation policy ascending

vlan 10,20

interface Loopback0

ip address 192.168.4.1 255.255.255.0

ipv6 address 2001:DB8:4::1/64

ipv6 ospf 10 area 0

interface GigabitEthernet0/0/0

ip address 10.1.1.17 255.255.255.252

ip ospf 10 area 0

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:5::1/64

ipv6 ospf 10 area 0

interface GigabitEthernet0/0/1

ip address 10.1.1.14 255.255.255.252

ip ospf 10 area 0

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:4::2/64

ipv6 ospf 10 area 0

interface Serial0/1/0

no ip address

shutdown

interface Serial0/1/1

no ip address

shutdown

interface GigabitEthernet0/2/0

no ip address

shutdown

negotiation auto

interface GigabitEthernet0/2/1

no ip address

shutdown

negotiation auto

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

interface Vlan1

no ip address

shutdown

router ospf 10

router-id 4.4.4.4

redistribute bgp 200 subnets

network 10.1.1.12 0.0.0.3 area 0

network 10.1.1.16 0.0.0.3 area 0

network 192.167.4.0 0.0.0.255 area 0

router bgp 200

bgp router-id 4.4.4.4

bgp log-neighbor-changes

no bgp default ipv4-unicast

neighbor 10.1.1.13 remote-as 200

neighbor 10.1.1.18 remote-as 200

address-family ipv4

network 10.1.1.12

network 10.1.1.16

network 192.168.4.0

redistribute ospf 10

neighbor 10.1.1.13 activate

neighbor 10.1.1.18 activate

exit-address-family

address-family ipv6

redistribute ospf 10

network 2001:DB8:4::/64

network 2001:DB8:ACAD:4::/64

exit-address-family

ip forward-protocol nd

no ip http server

no ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router ospf 10

router-id 4.4.4.4

redistribute bgp 200

control-plane

line con 0

logging synchronous

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

end

***Router 5 Config:***

hostname r5

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

login on-success log

subscriber templating

ipv6 unicast-routing

multilink bundle-name authenticated

crypto pki trustpoint TP-self-signed-2270144787

enrollment selfsigned

subject-name cn=IOS-Self-Signed-Certificate-2270144787

revocation-check none

rsakeypair TP-self-signed-2270144787

crypto pki certificate chain TP-self-signed-2270144787

certificate self-signed 01

30820330 30820218 A0030201 02020101 300D0609 2A864886 F70D0101 05050030

31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D 43657274

69666963 6174652D 32323730 31343437 3837301E 170D3232 31313130 31373536

33385A17 0D333030 31303130 30303030 305A3031 312F302D 06035504 03132649

4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D32 32373031

34343738 37308201 22300D06 092A8648 86F70D01 01010500 0382010F 00308201

0A028201 01009829 E8C41F14 3A435358 2EAF2403 F077FF8A 55B7704F D3FE6970

1A2B6DC2 6F7FD1EB 1272C2B9 23E4B566 A85523B2 123D3BB4 0B8A1F95 496513A8

1DC6DEFD 7FD5D901 BC33E489 93B284F3 A0FA6B17 42D9B937 4E03A89D E9F29F0B

FBBC8B8A FBC83A05 2230706C 215BC545 E0238D1C 6333B807 5ED988B5 EB74C37F

434B2C94 0080EB88 23CD5763 62EAC216 799BB46F 2DB3F2AE F587C111 355C50A8

42146174 4FF2ED16 C7B0ECF6 CB6744B1 C1E8040D 838F429E 99A118CD 45E37E38

9B73CF19 8CECA946 A16DFC4A 6AABBD10 AAC2E56D E47096E5 0DC8C6EC 87F29C17

F0259793 799AA50B 6819FC6E 4FD3D536 F843CFAA 1F820D6D B0BCEB90 25CC7BDD

875C97F9 AB850203 010001A3 53305130 0F060355 1D130101 FF040530 030101FF

301F0603 551D2304 18301680 14A39AAE 64FB66E8 F207BDF0 18E58A84 30ED1E30

ED301D06 03551D0E 04160414 A39AAE64 FB66E8F2 07BDF018 E58A8430 ED1E30ED

300D0609 2A864886 F70D0101 05050003 82010100 8501D8F3 B031975E 5BD18983

61010A83 18A7E5B0 5220D982 13D258B4 461EBE6B 2F456965 BA1979EB 4531EA38

2E7F4C2E 51C58E19 CD165867 F8D6B0A8 287A77DA CD188998 9835004A F6F1392D

9A08A9C2 5C1BB142 313B9F2C 58A9A412 C7677D19 14CC3ED2 281503A2 50BEC58A

771582A6 887B47A0 D2B24C62 12A3963C 98777629 DE74CAC3 6340F260 A9136452

387E5E05 230AA544 11BA09E4 6EDC7F18 56381F2A B1B3E7A6 5A3433DE 2FD3B402

8534FD8A 90092515 F02B7A6C A126CC56 0666CB71 031A89F9 2850658D 1EE7D845

B7BCD784 765602BF C62EDEA9 E9EBBEE0 AA2175E8 DF639665 6C778D5B 560CED32

C084F7C2 E9F95A58 4294991F 0CBFBCD4 25C7F8A5

quit

license udi pid ISR4321/K9 sn FLM24060912

no license smart enable

diagnostic bootup level minimal

spanning-tree extend system-id

redundancy

mode none

interface Loopback0

ip address 192.168.5.1 255.255.255.0

ipv6 address 2001:DB8:5::1/64

ipv6 ospf 10 area 0

interface GigabitEthernet0/0/0

ip address 10.1.1.21 255.255.255.252

ip ospf 10 area 0

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:6::1/64

ipv6 ospf 10 area 0

interface GigabitEthernet0/0/1

ip address 10.1.1.18 255.255.255.252

ip ospf 10 area 0

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:5::2/64

ipv6 ospf 10 area 0

interface GigabitEthernet0/2/0

no ip address

shutdown

negotiation auto

interface GigabitEthernet0/2/1

no ip address

shutdown

negotiation auto

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

router ospf 10

router-id 5.5.5.5

redistribute bgp 200 subnets

network 10.1.1.16 0.0.0.3 area 0

network 10.1.1.20 0.0.0.3 area 0

network 192.168.5.0 0.0.0.255 area 0

router bgp 200

bgp router-id 5.5.5.5

bgp log-neighbor-changes

no bgp default ipv4-unicast

neighbor 10.1.1.13 remote-as 200

neighbor 10.1.1.17 remote-as 200

neighbor 10.1.1.22 remote-as 300

neighbor 2001:DB8:ACAD:4::1 remote-as 200

neighbor 2001:DB8:ACAD:5::1 remote-as 200

neighbor 2001:DB8:ACAD:6::2 remote-as 300

address-family ipv4

network 10.1.1.20

network 192.168.5.0

redistribute ospf 10

neighbor 10.1.1.13 activate

neighbor 10.1.1.13 next-hop-self

neighbor 10.1.1.17 activate

neighbor 10.1.1.22 activate

exit-address-family

address-family ipv6

redistribute ospf 10

network 2001:DB8:5::/64

network 2001:DB8:ACAD:5::/64

network 2001:DB8:ACAD:6::/64

network 2001:DB8:ACAD:7::/64

neighbor 2001:DB8:ACAD:4::1 activate

neighbor 2001:DB8:ACAD:4::1 next-hop-self

neighbor 2001:DB8:ACAD:5::1 activate

neighbor 2001:DB8:ACAD:6::2 activate

exit-address-family

ip forward-protocol nd

ip http server

ip http authentication local

ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router ospf 10

router-id 5.5.5.5

redistribute bgp 200 metric 10000

control-plane

line con 0

logging synchronous

transport input none

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

end

***Router 6 Config:***

hostname r6

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

login on-success log

subscriber templating

ipv6 unicast-routing

multilink bundle-name authenticated

crypto pki trustpoint TP-self-signed-4144679456

enrollment selfsigned

subject-name cn=IOS-Self-Signed-Certificate-4144679456

revocation-check none

rsakeypair TP-self-signed-4144679456

crypto pki certificate chain TP-self-signed-4144679456

certificate self-signed 01

30820330 30820218 A0030201 02020101 300D0609 2A864886 F70D0101 05050030

31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D 43657274

69666963 6174652D 34313434 36373934 3536301E 170D3232 31313130 31383032

30325A17 0D333030 31303130 30303030 305A3031 312F302D 06035504 03132649

4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D34 31343436

37393435 36308201 22300D06 092A8648 86F70D01 01010500 0382010F 00308201

0A028201 0100A832 52F38549 AF78B1EA 14008DFF FD2B06BD 20E6DC0C BC69D311

CC0C194A D93F5091 96DCCFD8 CA5CAB4D 8A4989E6 704EE787 E83C861D D3DB3730

559CF5F6 BCBACB2D D6E517B2 6A3A184E 3855F2D6 414C4DE0 5BCFE617 F919C9A6

7CD084F4 063CB550 C8ED1C13 2BD463EA B7DFCE95 4FA8F535 E6A66174 1B5B1613

5CFA7CED BF096D9A 86413C66 D9CEDA10 7D555EDD 65295778 23CE80BC D744C731

F4243908 A3571967 878C3DB2 3AAB6022 80C22135 5C69CE0D 0A4BD734 A24B706C

DA3CF0BB 173152FD 414F3607 828E784E E4065B8A CE5A6339 DDF8A286 960EFB80

9777DBB6 A777E03E FBB6E87E 3EE4B847 D5E60D3E AB9C65EB 9C81A1EA BB728B89

8CE838B5 E5C10203 010001A3 53305130 0F060355 1D130101 FF040530 030101FF

301F0603 551D2304 18301680 14A22D2F 62ABEE6C DA395BD3 9E6403AD 3DD8FE07

A0301D06 03551D0E 04160414 A22D2F62 ABEE6CDA 395BD39E 6403AD3D D8FE07A0

300D0609 2A864886 F70D0101 05050003 82010100 79E72647 85466836 51558896

3420C465 9D9D2857 42A72769 64D93E17 2E94E6ED 189C8E94 38D12550 64330C8D

006CB795 2BA9CABE 81CCCCC2 EEC09611 279B1447 3FEC547E 9118AFE3 327BB074

6414C44F 8BA5B3D5 4D9CF15A 193A6BCA CD228016 EE57B5CB FE15C7F4 A5EC6C55

728C8B43 217210CC 0FE58CDA 535A2006 B635EE97 E3E885BF 3CEF158A C358E6A4

A807A1FA A426F07A 8CF82F1D A52DCAE2 55B48744 BDDE2940 01ED1FFC 3CD0E1D2

6EC18C45 2927CADD 5967C7A8 EBA9FEF7 94C0D6E3 3C09014D 9E84560E 46659300

414A6A7A 83CBC86D 7ACEBCC9 85287BF9 FB4DD5C3 9FAC3B9F 9734277C E2DCB9D8

09E60172 78C26404 F2263B5D 3A4D3F81 10CE8C65

quit

license udi pid ISR4321/K9 sn FLM2408005M

no license smart enable

diagnostic bootup level minimal

spanning-tree extend system-id

redundancy

mode none

interface Loopback0

ip address 192.168.6.1 255.255.255.0

ipv6 address 2001:DB8:6::1/64

ipv6 enable

ipv6 eigrp 20

interface GigabitEthernet0/0/0

ip address 10.1.1.25 255.255.255.252

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:7::1/64

ipv6 enable

ipv6 eigrp 20

interface GigabitEthernet0/0/1

ip address 10.1.1.22 255.255.255.252

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:6::2/64

ipv6 enable

ipv6 eigrp 20

interface GigabitEthernet0/2/0

no ip address

shutdown

negotiation auto

interface GigabitEthernet0/2/1

no ip address

shutdown

negotiation auto

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

router eigrp 20

network 10.1.1.20 0.0.0.3

network 10.1.1.24 0.0.0.3

network 10.1.1.28 0.0.0.3

network 192.168.6.0

redistribute bgp 300 metric 10000 100 255 1 1500

eigrp router-id 6.6.6.6

router bgp 300

bgp router-id 6.6.6.6

bgp log-neighbor-changes

no bgp default ipv4-unicast

neighbor 10.1.1.21 remote-as 200

neighbor 2001:DB8:ACAD:6::1 remote-as 200

address-family ipv4

network 10.1.1.20

redistribute eigrp 20

neighbor 10.1.1.21 activate

exit-address-family

address-family ipv6

redistribute eigrp 20

network 2001:DB8:6::/64

network 2001:DB8:ACAD:6::/64

network 2001:DB8:ACAD:7::/64

neighbor 2001:DB8:ACAD:6::1 activate

exit-address-family

ip forward-protocol nd

no ip http server

ip http authentication local

no ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router eigrp 20

eigrp router-id 6.6.6.6

redistribute bgp 300 metric 10000 100 255 1 1500

control-plane

line con 0

transport input none

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

end

***Router 7 Config:***

hostname r7

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

login on-success log

ipv6 unicast-routing

subscriber templating

multilink bundle-name authenticated

crypto pki trustpoint TP-self-signed-187689846

enrollment selfsigned

subject-name cn=IOS-Self-Signed-Certificate-187689846

revocation-check none

rsakeypair TP-self-signed-187689846

crypto pki certificate chain TP-self-signed-187689846

certificate self-signed 01

3082032E 30820216 A0030201 02020101 300D0609 2A864886 F70D0101 05050030

30312E30 2C060355 04031325 494F532D 53656C66 2D536967 6E65642D 43657274

69666963 6174652D 31383736 38393834 36301E17 0D323231 31303331 38303233

365A170D 33303031 30313030 30303030 5A303031 2E302C06 03550403 1325494F

532D5365 6C662D53 69676E65 642D4365 72746966 69636174 652D3138 37363839

38343630 82012230 0D06092A 864886F7 0D010101 05000382 010F0030 82010A02

82010100 BF6070C6 927A845F 5894218F 7CCB640D FA6B7780 F0005270 135E9D62

88939C7A B6579E7E 0BA8E197 5C639A72 44ACFF57 DE42AA8B 63FD62CC A1723ED1

518D9A8E 5CFA19A2 48E1BB86 7EA2F966 68F5021E FD2A9FFB 8DF3DC8E 04011B5A

A4DA788D A4A616CB DEF37103 6B0B9925 94E851D6 E5C220B0 EBFC20AE 9EEA2360

AAE9ABEE E558ADFB 829868A9 7C70E354 FB9DAEE5 BF2F942E BF6306A8 0E691189

B00FF095 60EB3671 09F9EE6E A1A1C394 F2D0188A 070C3D34 8C310598 5AB10508

2BCC6504 D97F10E4 5EF18340 34B0F75B 10CD02E1 851F9AB9 085C94E7 F09969F3

D66115A2 74612E4A 522010B5 CE41E9EF 1F268695 8AEF2B13 0C80995F F06C4717

BCC71E91 02030100 01A35330 51300F06 03551D13 0101FF04 05300301 01FF301F

0603551D 23041830 1680144F F7019371 95BDC04C FE229FE7 027E514B 04BE8830

1D060355 1D0E0416 04144FF7 01937195 BDC04CFE 229FE702 7E514B04 BE88300D

06092A86 4886F70D 01010505 00038201 010091FF BA855D0C 6D4BBCF3 B5786F90

6C2AF12B A9B8718F 92C61351 78123DD8 D997CA01 27A9E8C9 BC099E99 0218E9C7

CF81E531 D0529D91 7992562D 4127F2CD AA10EF3B 4C04D6D7 8011656E 34869E34

A65972A4 6619D717 386ECD00 D2943A71 60F28C41 07F34E95 389F27EB DBDA9E49

D66CDC6C 3BEFEDD4 F7E8F9EB 987B2932 DC72AE1D BCEE0869 845D1FB3 71008F6E

8BCEB0B8 F6361836 723C92F7 1F96E26F 979FB2B6 66863DD2 54C16BC7 FEEEE2E3

53A3E649 65DC9703 2AF2694B 57DC506F 723C6A30 2511D827 C2AF458C 14666E90

78A2CB78 D3494080 2D41245C CC58B9DD 5634C67F 067C4557 2F8EA3F7 E0F5A52B

89226F82 E70195A9 8D64910C 5D13DBD1 7387

quit

license udi pid ISR4321/K9 sn FDO214421BU

spanning-tree extend system-id

redundancy

mode none

vlan internal allocation policy ascending

interface Loopback0

ip address 192.168.7.1 255.255.255.0

ipv6 address 2001:DB8:7::1/64

ipv6 enable

ipv6 eigrp 20

interface GigabitEthernet0/0/0

ip address 10.1.1.29 255.255.255.252

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:8::1/64

ipv6 enable

ipv6 eigrp 20

interface GigabitEthernet0/0/1

ip address 10.1.1.26 255.255.255.252

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:7::2/64

ipv6 enable

ipv6 eigrp 20

interface Serial0/1/0

no ip address

shutdown

interface Serial0/1/1

no ip address

shutdown

interface Service-Engine0/2/0

no ip address

shutdown

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

interface Vlan1

no ip address

shutdown

router eigrp 20

network 10.1.1.20 0.0.0.3

network 10.1.1.24 0.0.0.3

network 10.1.1.28 0.0.0.3

network 192.168.7.0

eigrp router-id 7.7.7.7

ip forward-protocol nd

no ip http server

no ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router eigrp 20

eigrp router-id 7.7.7.7

redistribute bgp 300 metric 10000 100 255 1 1500

control-plane

line con 0

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

end

Problems

When setting up OSPF and EIGRP for IPv4 and IPv6, no problems arose. When setting up BGP connections between the OSPF and EIGRP for IPv6, EIGRP routes were not being redistributed into BGP. This was caused by two different IPv6 address being put on the interface that linked EIGRP to BGP. After removing the incorrect address, BPG worked throughout the network. After a lot of trial and error and research of implementing IBGP (e.g. trying to set neighbors as router-IDs), we were able to successfully configure IBGP connections with IPv4. The reason why IPv6 wasn’t working was due to missing IPv6 network statements in the BGP configurations. After the networks statements were added, IBGP was functional.

Conclusion

In this lab, we IBGP to allow connections between two different EIGRP networks through an OSPF network. Seven Cisco 4321 routers were connected in a linear fashion and the routers were configured using the PuTTy terminal emulator. The main problem that we ran into while completing this lab was the obscurity of the usage of IBGP so there were few resources to work with when gathering information on how the protocol works and how it should be configured. In the end, we succeeded in distributing IPv4 and IPv6 routes throughout the network through the usage of OSPF, EIGRP, BGP, and IBGP.