

CSEE4119 Project 2 Stage A Report

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Task 1 - Set up interfaces and set up OSPF

The screenshot of ping results from MIAM-host to BOST-host.

```

1.LOND_host 2.LOND_router 3.PARI_host 4.PARI_router 5.NEWY_host 6.NEWY_router 7.BOST_host 8.BOST_router 9.ATLA_host 10.ATLA_router MIAM_host X
ssh - 4119-project2:2049
[23:38:48] 1 Linux g49-proxy 5.15.0-1021-gcp #20~20.04.1-Ubuntu SMP Mon Oct 17 11:37:54 UTC 2022 x86_64
[23:38:48] 2
[23:38:48] 3
[23:38:48] 4      Columbia CSEE 4119 Fall 2022 - Routing Project
[23:38:48] 5      Build your mini-Internet!
[23:38:48] 6
[23:38:48] 7
[23:38:48] 8      You can modify this welcoming message by
[23:38:48] 9      modifying the file welcoming_message.txt
[23:38:48] 10     in the config directory
[23:38:48] 11
[23:38:48] 12     From here, you can access your virtual devices
[23:38:48] 13     with the goto.sh script. For instance:
[23:38:48] 14
[23:38:48] 15     ./goto.sh MIAM router
[23:38:48] 16
[23:38:48] 17
[23:38:48] 18 Last login: Thu Nov 24 04:25:39 2022 from 157.0.0.59
[23:39:07] 19 root@g49-proxy:~# ./goto.sh MIAM host
[23:39:07] 20 Linux MIAM_host 5.15.0-1021-gcp #20~20.04.1-Ubuntu SMP Mon Oct 17 11:37:54 UTC 2022 x86_64
[23:39:07] 21
[23:39:07] 22 The programs included with the Debian GNU/Linux system are free software;
[23:39:07] 23 the exact distribution terms for each program are described in the
[23:39:07] 24 individual files in /usr/share/doc/*/copyright.
[23:39:07] 25
[23:39:07] 26 Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
[23:39:07] 27 permitted by applicable law.
[23:39:07] 28 Last login: Thu Nov 24 04:25:58 2022 from 158.49.0.2
[23:40:18] 29 root@MIAM_host:~# ping 49.106.0.1 -c 10
[23:40:18] 30 PING 49.106.0.1 (49.106.0.1) 56(84) bytes of data.
[23:40:18] 31 64 bytes from 49.106.0.1: icmp_seq=1 ttl=61 time=0.532 ms
[23:40:19] 32 64 bytes from 49.106.0.1: icmp_seq=2 ttl=61 time=0.242 ms
[23:40:20] 33 64 bytes from 49.106.0.1: icmp_seq=3 ttl=61 time=0.300 ms
[23:40:21] 34 64 bytes from 49.106.0.1: icmp_seq=4 ttl=61 time=0.649 ms
[23:40:22] 35 64 bytes from 49.106.0.1: icmp_seq=5 ttl=61 time=0.339 ms
[23:40:23] 36 64 bytes from 49.106.0.1: icmp_seq=6 ttl=61 time=0.315 ms
[23:40:24] 37 64 bytes from 49.106.0.1: icmp_seq=7 ttl=61 time=0.265 ms
[23:40:25] 38 64 bytes from 49.106.0.1: icmp_seq=8 ttl=61 time=0.271 ms
[23:40:26] 39 64 bytes from 49.106.0.1: icmp_seq=9 ttl=61 time=0.244 ms
[23:40:27] 40 64 bytes from 49.106.0.1: icmp_seq=10 ttl=61 time=0.323 ms
[23:40:27] 41
[23:40:27] 42 --- 49.106.0.1 ping statistics ---
[23:40:27] 43 10 packets transmitted, 10 received, 0% packet loss, time 921ms
[23:40:27] 44 rtt min/avg/max/mdev = 0.242/0.348/0.649/0.127 ms
[23:40:27] 45 root@MIAM_host:~#
  
```

Task 2 - Setup iBGP

1. The screenshot of `show ip bgp summary` results from ATLA router.

```

1.PARI_router 2.LOND_router 3.NEWY_router 4.BOST_router 5.ATLA_router x 6.MIAM_router 7.GENE_router 8.ZURI_router 9.ATLA_router2 10.4119-Project2
ssh - 4119-project2:2049
[23:48:33] 1 Linux g49-proxy 5.15.0-1021-gcp #28-20.04.1-Ubuntu SMP Mon Oct 17 11:37:54 UTC 2022 x86_64
[23:48:33] 2
[23:48:33] 3
[23:48:33] 4 Columbia CSEE 4119 Fall 2022 - Routing Project
[23:48:33] 5 Build your mini-Internet!
[23:48:33] 6
[23:48:33] 7
[23:48:33] 8 You can modify this welcoming message by
[23:48:33] 9 modifying the file welcoming_message.txt
[23:48:33] 10 in the config directory
[23:48:33] 11
[23:48:33] 12 From here, you can access your virtual devices
[23:48:33] 13 with the goto.sh script. For instance:
[23:48:33] 14
[23:48:33] 15 ./goto.sh MIAM router
[23:48:33] 16
[23:48:33] 17
[23:48:33] 18 Last login: Fri Nov 25 04:39:58 2022 from 157.0.0.59
[23:48:50] 19 root@g49-proxy:~# ./goto.sh ATLA router
[23:48:50] 20
[23:48:50] 21 Hello, this is FRRouting (version 7.5).
[23:48:50] 22 Copyright 1996-2005 Kunihiro Ishiguro, et al.
[23:48:50] 23
[23:48:56] 24 ATLA_router# show ip bgp summary
[23:48:56] 25
[23:48:56] 26 IPv4 Unicast Summary:
[23:48:56] 27 BGP router identifier 49.157.0.1, local AS number 49 vrf-id 0
[23:48:56] 28 BGP table version 12
[23:48:56] 29 RIB entries 3, using 576 bytes of memory
[23:48:56] 30 Peers 7, using 149 KiB of memory
[23:48:56] 31
[23:48:56] 32 Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd PfxSnt
[23:48:56] 33 49.151.0.1 4 49 67 68 0 0 0 01:04:07 0 0
[23:48:56] 34 49.152.0.1 4 49 0 0 0 0 0 0 never Active 0
[23:48:56] 35 49.153.0.1 4 49 69 68 0 0 0 01:04:10 2 0
[23:48:56] 36 49.154.0.1 4 49 0 0 0 0 0 0 never Active 0
[23:48:56] 37 49.155.0.1 4 49 67 68 0 0 0 01:04:03 0 0
[23:48:56] 38 49.156.0.1 4 49 67 68 0 0 0 01:04:00 0 0
[23:48:56] 39 49.158.0.1 4 49 63 66 0 0 0 01:00:52 0 0
[23:48:56] 40
[23:48:56] 41 Total number of neighbors 7
[23:48:56] 42 ATLA_router#

```

2. The screenshot of `show ip route bgp` results from ATLA router.

```

1.PARI_router 2.LOND_router 3.NEWY_router 4.BOST_router 5.ATLA_router x 6.MIAM_router 7.GENE_router 8.ZURI_router 9.ATLA_router2 10.4119-Project2
ssh - 4119-project2:2049
[23:50:16] 1 Linux g49-proxy 5.15.0-1021-gcp #28-20.04.1-Ubuntu SMP Mon Oct 17 11:37:54 UTC 2022 x86_64
[23:50:16] 2
[23:50:16] 3
[23:50:16] 4 Columbia CSEE 4119 Fall 2022 - Routing Project
[23:50:16] 5 Build your mini-Internet!
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[23:50:16] 8 You can modify this welcoming message by
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[23:50:16] 14
[23:50:16] 15 ./goto.sh MIAM router
[23:50:16] 16
[23:50:16] 17
[23:50:16] 18 Last login: Fri Nov 25 04:48:32 2022 from 157.0.0.59
[23:50:21] 19 root@g49-proxy:~# ./goto.sh ATLA router
[23:50:21] 20
[23:50:21] 21 Hello, this is FRRouting (version 7.5).
[23:50:21] 22 Copyright 1996-2005 Kunihiro Ishiguro, et al.
[23:50:21] 23
[23:50:31] 24 ATLA_router# show ip route bgp
[23:50:31] 25
[23:50:31] 26 Codes: K - kernel route, C - connected, S - static, R - RIP,
[23:50:31] 27 O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
[23:50:31] 28 T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,
[23:50:31] 29 F - PBR, f - OpenFabric,
[23:50:31] 30 > - selected route, * - FIB route, q - queued, r - rejected, b - backup
[23:50:31] 31
[23:50:31] 32 B> 49.0.0.0/8 [200/0] via 49.153.0.1 (recursive), weight 1, 01:05:44
[23:50:31] 33 * via 49.0.11.1, port_NEWY, weight 1, 01:05:44
[23:50:31] 34 * via 49.0.13.2, port_MIAM, weight 1, 01:05:44
[23:50:31] 35 B> 100.0.0.0/8 [200/0] via 49.153.0.1 (recursive), weight 1, 01:05:44
[23:50:31] 36 * via 49.0.11.1, port_NEWY, weight 1, 01:05:44
[23:50:31] 37 * via 49.0.13.2, port_MIAM, weight 1, 01:05:44
[23:50:31] 38 ATLA_router#

```

3, 4, 5. Solving the important problem for iBGP connections

To solving the iBGP connection problem, using loopback interface for BGP peering, and the command,

```
1 neighbor update-source ${INTERFACE_NAME} # lo for loopback interface
```

is used for specify the using of interfaces [1] and avoiding the important problem regarding to the assignment document.

Using loopback interface peering because it will not make BGP session down if the physical interface used to establishing the session goes down [1].

For iBGP, loopback address peering is more commonly to use since there often has multiple path between two iBGP peers. However, in eBGP there is more likely to have one path between two eBGP peers, so it is not essential for eBGP, while eBGP use loopback address peering for load-balancing [2].

References

- [1] *Sample Configuration for iBGP and eBGP With or Without a Loopback Address* . (n.d.). Cisco. Retrieved 24 November 2022, from <https://www.cisco.com/c/en/us/support/docs/ip/border-gateway-protocol-bgp/13751-23.html>
- [2] *bgp 'neighbor': Do you use loopback or physical interface?* (2007, May 31). <https://community.cisco.com/t5/routing/bgp-neighbor-do-you-use-loopback-or-physical-interface/td-p/726356>