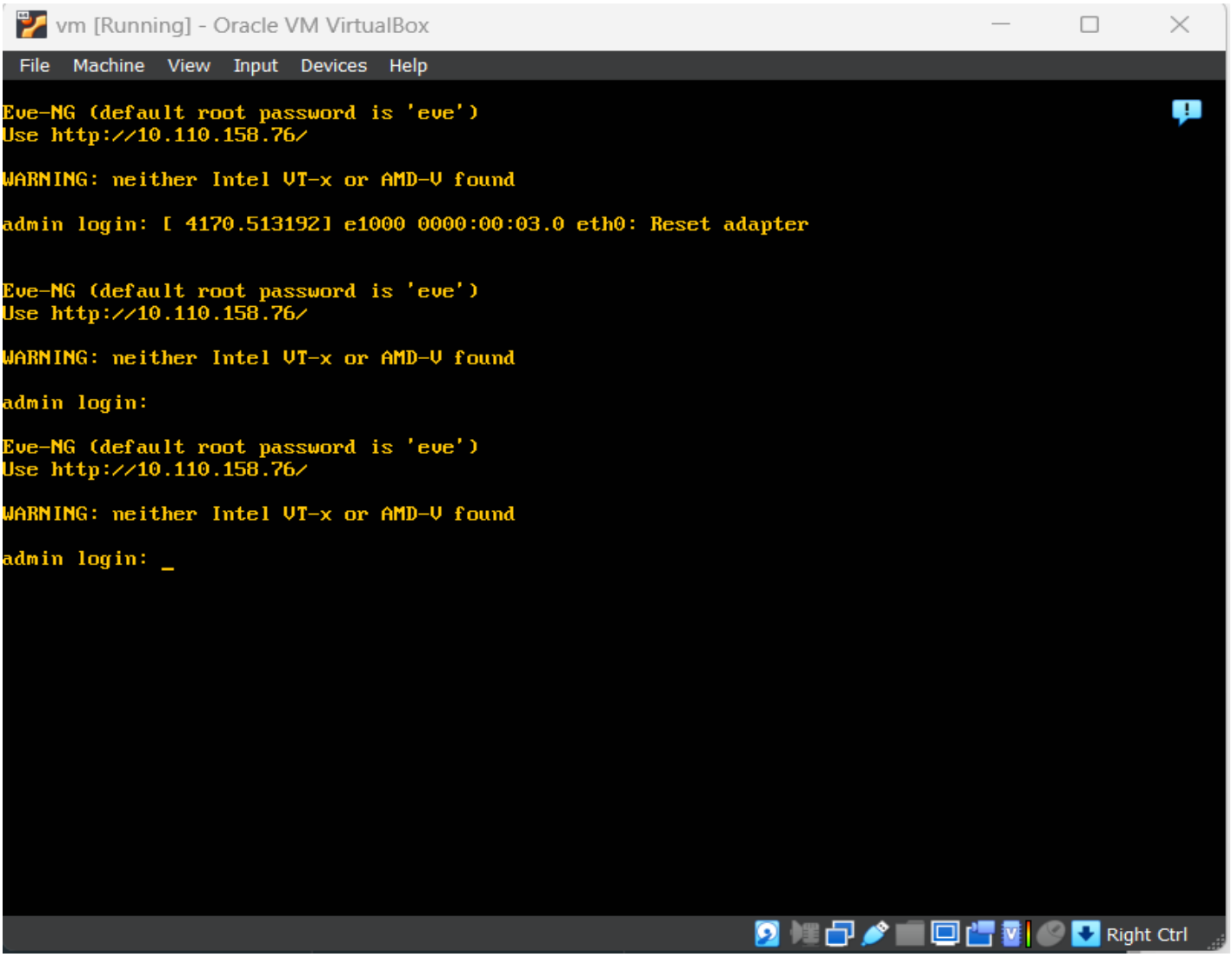
# Lab 4 – Network Troubleshooting

## Configuration:

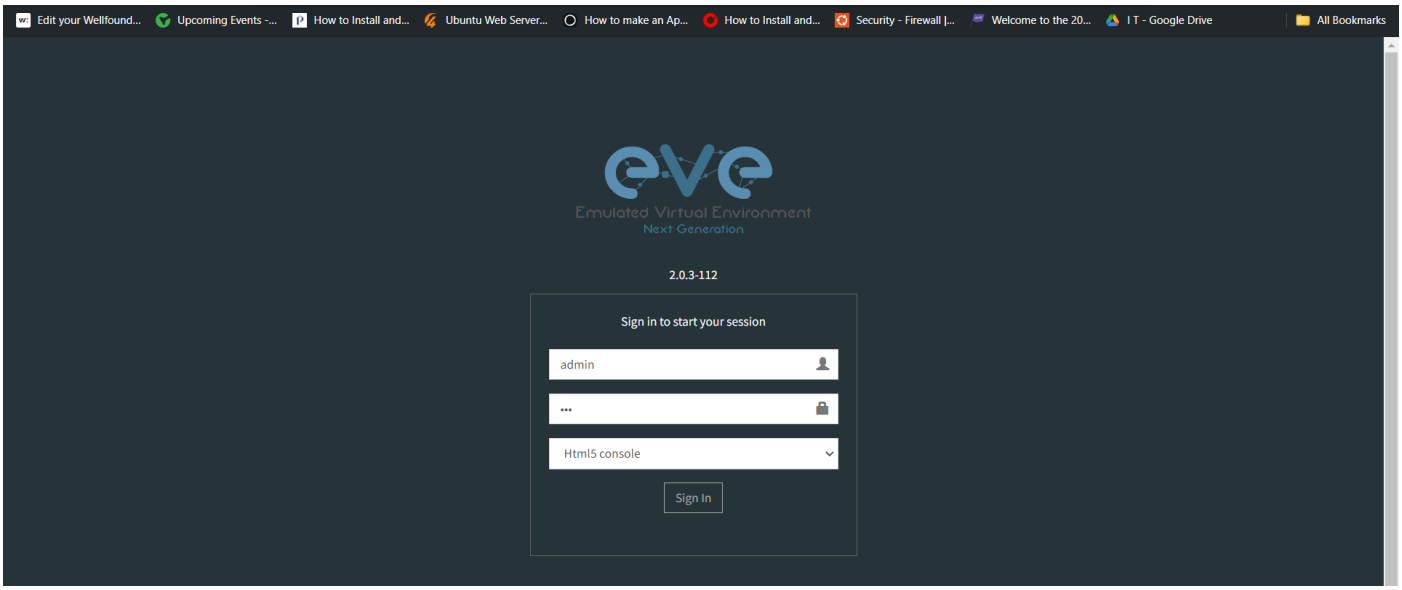
1. Firstly, we must import the EVE-NG VM into a VM Workstation or into a VM ware by accessing the given link in the lab document.
2. Now run the Ubuntu VM in the VM Ware software.
3. When the Virtual machine is fully loaded, we can see an IP address shown on the screen for GUI access in the web browser as shown in the below figure.



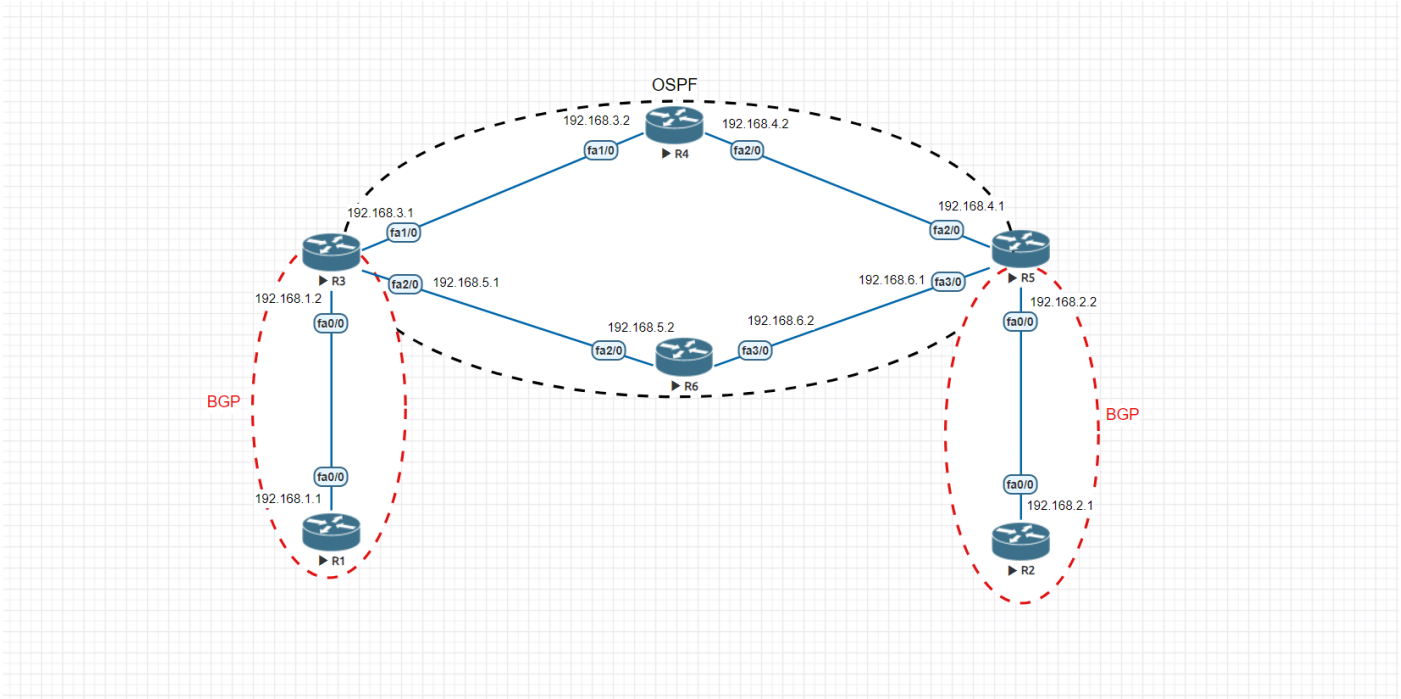

4. Now, go to the browser and type the IP address as shown in the figure(here it is **10.110.158.76**).

5. Once you enter the IP address, we can access the EVE-NG screen. So, there we must enter the following credentials inorder to access the lab environment and use only HTML5 console.

   **Username:** admin
   **Password:** eve




6. Now after logging in you can see the Network Topology.




7. In the above topology **R1, R2** are CE (Customer Edge) routers, **R3, R5** are PE (Provider Edge) routers and **R4, R6** are P (Provider) routers.
8. Routers **R1 and R2** are configured with **BGP** protocol.
9. Routers **R3 and R5** are the **ASBR** routers so they are configured with both **BGP and OSPF** protocols.
10. Routers **R4 and R6** are configured with **OSPF** protocol.
11. Routers **R3 and R5** are forming **BGP neighborship** with **R1 and R2** by using **VRF ( Virtual Routing and Forwarding)** with address family **VPNv4** within the **BGP** process as shown in the below figure.

```
R5#show run | section vrf
ip vrf ONE
 rd 1:1
 route-target export 1:1
 route-target import 1:1
 ip vrf forwarding ONE
```

```
R5#show run | section bgp
router bgp 100
 bgp log-neighbor-changes
 neighbor 3.3.3.3 remote-as 100
 neighbor 3.3.3.3 update-source Loopback0
 !
 address-family ipv4
  neighbor 3.3.3.3 activate
  no auto-summary
  no synchronization
 exit-address-family
 !
 address-family vpnv4
  neighbor 3.3.3.3 activate
  neighbor 3.3.3.3 send-community extended
 exit-address-family
 !
 address-family ipv4 vrf ONE
  neighbor 192.168.2.1 remote-as 2
  neighbor 192.168.2.1 activate
  no synchronization
 exit-address-family
```

12. And also I can see that the **VRF** configuration is missing in router **R3** which is why it is unable to form the neighborship with **R1.**
13. Now copy the same configuration and apply it in router **R3** so that it can now form the neighborship with router **R1.**

```
ip vrf ONE
 rd 1:1
 route-target export 1:1
 route-target import 1:1
 ip vrf forwarding ONE
```

```
router bgp 100
 bgp log-neighbor-changes
 neighbor 5.5.5.5 remote-as 100
 neighbor 5.5.5.5 update-source Loopback0
 !
 address-family ipv4
  neighbor 5.5.5.5 activate
  no auto-summary
  no synchronization
 exit-address-family
 !
 address-family vpnv4
  neighbor 5.5.5.5 activate
  neighbor 5.5.5.5 send-community extended
 exit-address-family
 !
 address-family ipv4 vrf ONE
  neighbor 192.168.1.1 remote-as 1
  neighbor 192.168.1.1 activate
  no synchronization
 exit-address-family
```

14. After doing this now there is a neighborship formed between router **R1** and **R3.**

```
R1#show ip bgp summary
BGP router identifier 11.11.11.11, local AS number 1
BGP table version is 7, main routing table version 7
6 network entries using 792 bytes of memory
6 path entries using 312 bytes of memory
3/2 BGP path/bestpath attribute entries using 504 bytes of memory
1 BGP AS-PATH entries using 24 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
Bitfield cache entries: current 1 (at peak 1) using 32 bytes of memory
BGP using 1664 total bytes of memory
BGP activity 6/0 prefixes, 6/0 paths, scan interval 60 secs

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
192.168.1.2     4          100     138     138        7    0    0 02:14:52        3
```

```
R3#show bgp vpnv4 unicast all summary
BGP router identifier 3.3.3.3, local AS number 100
BGP table version is 14, main routing table version 14
6 network entries using 936 bytes of memory
6 path entries using 408 bytes of memory
4/2 BGP path/bestpath attribute entries using 672 bytes of memory
2 BGP AS-PATH entries using 48 bytes of memory
1 BGP extended community entries using 24 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
Bitfield cache entries: current 2 (at peak 2) using 64 bytes of memory
BGP using 2152 total bytes of memory
BGP activity 6/0 prefixes, 6/0 paths, scan interval 15 secs

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
5.5.5.5         4          100     154     153       14    0    0 02:31:14        3
192.168.1.1     4            1     138     138       14    0    0 02:14:39        3
```

15. Now add the **network 192.168.1.0 mask 255.255.255.0** command in the **BGP** configuration of router **R1** which will start advertising its network to the router **R3.** Similarly, do add **network 192.168.2.0 mask 255.255.255.0** in **R2** as well.

```
R1#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#router bgp 1
R1(config-router)#network 192.168.1.0 mask 255.255.255.0
R1(config-router)#exit
R1(config)#exit
R1#wr
```

```
R2#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#router bgp 2
R2(config-router)#network 192.168.2.0 mask 255.255.255.0
R2(config-router)#exit
R2(config)#exit
R2#wr
```

16. Even adding this I can't see that router **R3** is able to share the routes of **R1** to **R5.**
17. In the next step I can see that there is a command call **neighbor 192.168.1.2 route-map STOP out** which is stopping **R1** to advertise it's routes to it's neighbor **R3.**

```
R1(config)#router bgp 1
R1(config-router)#no neighbor 192.168.1.2 route-map STOP out
R1(config-router)#exit
R1(config)#exit
R1#wr
```

18. And also I can see that in router **R4** interface **fa1/0** with network address **192.168.3.0** is not advertised in the **OSPF area 0.**
19. Now I have added the command **network 192.168.3.0 area 0** in the **OSPF** configuration and removed the **network 192.168.33.0 area 0** which is wrongly done.

```
R4#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R4(config)#router ospf 1
R4(config-router)#no network 192.168.33.0 0.0.0.255 area 0
R4(config-router)#network 192.168.3.0 0.0.0.255 area 0
R4(config-router)#exit
R4(config)#exit
R4#wr
```

20. Now, I can see that **R5** is able to get the routes from router **R3**.

```
R5#show ip bgp vpnv4 vrf ONE
BGP table version is 11, local router ID is 5.5.5.5
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network          Next Hop            Metric LocPrf Weight Path
Route Distinguisher: 1:1 (default for vrf ONE)
*>i1.1.1.1/32       3.3.3.3                  0    100      0 1 i
*> 2.2.2.2/32       192.168.2.1              0             0 2 i
*>i11.11.11.11/32   3.3.3.3                  0    100      0 1 i
*> 22.22.22.22/32   192.168.2.1              0             0 2 i
*>i192.168.1.0      3.3.3.3                  0    100      0 1 i
r> 192.168.2.0      192.168.2.1              0             0 2 i
```

21. Finally, networks behind **R1 and R2** are able to reach each other.

```
R1#ping 192.168.2.0

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.2.0, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 96/137/188 ms
R1#ping 2.2.2.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.2.2.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 124/194/308 ms
R1#ping 22.22.22.22

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 22.22.22.22, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 152/215/280 ms
```

```
R2#ping 192.168.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 136/193/216 ms
R2#ping 1.1.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 1.1.1.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 180/199/224 ms
R2#ping 11.11.11.11

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 11.11.11.11, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 140/178/244 ms
```