This is a guide to the Lab 1 implementation:

First, install all necessary files for Container lab:

curl -sL https://containerlab.dev/setup | sudo -E bash -s "all"

Then create a “clab” file with format: clab.(NAME).yml

Here’s a snippet of what this file looks like:

A screenshot of a computer

Description automatically generated

To get the images, we have to import them using docker, in my case we are using Arista cEOS for the routers and switches, and Ubuntu for the server and hosts.

Arista cEOS download:

Sudo docker import cEOS64-lab-4.32.0F.tar.xz ceos:4.32.0F

Ubuntu download:

Here I created a Dockerfile to create the docker image as I want:

FROM ubuntu:20.04

RUN apt-get update && \

        apt-get install -y iputils-ping net-tools isc-dhcp-client

Then run the command to import into docker:

Sudo docker build -t myUbuntu

Now we have the images ready to run as seen from the .yml file before.

Next run the containerlab with this command:

sudo containerlab destroy -t clab.TEST.yml

It will output this line of text when it is successfully ran:

A screenshot of a computer screen

Description automatically generated

Now to ssh to the Arista devices for example, R1, type this command:

Ssh [admin@172.20.20.15](mailto:admin@172.20.20.15)

Username: admin Password: admin

To ssh to the Ubuntu instances, type this in with the respective container ID

Docker exec -it <container ID> bash

Now comes the configuration. Simply log into to the devices as shown above and add these configurations:

Web\_Server configuration:

Route add default gw <gateway IP> eth1

Host configuration:

Route add default gw <gateway IP> eth1

Dhclient eth1

Dhclient -6 eth1

Router and Switch configurations:

R1:

interface Ethernet1

   no switchport

!

interface Ethernet1.10

   encapsulation dot1q vlan 10

   ip address 21.0.0.2/24

!

interface Ethernet1.20

   encapsulation dot1q vlan 20

   ip address 22.0.0.2/24

!

interface Ethernet1.30

   encapsulation dot1q vlan 30

   ipv6 address 2300::2/64

!

interface Ethernet2

   no switchport

!

interface Ethernet2.40

   encapsulation dot1q vlan 40

   ip address 10.40.0.20/29

!

interface Ethernet2.100

   encapsulation dot1q vlan 100

   ip address 10.100.0.6/24

!

interface Loopback0

   ip address 10.40.1.1/32

!

interface Management0

   ip address 172.20.20.15/24

   ipv6 address 2001:172:20:20::f/64

!

interface Vlan100

!

ip routing

!

router ospf 40

   router-id 10.40.1.1

   network 10.40.0.16/29 area 0.0.0.0

   network 21.0.0.0/24 area 0.0.0.0

   network 22.0.0.0/24 area 0.0.0.0

   max-lsa 12000

!

router rip

   network 21.0.0.0/24

   network 22.0.0.0/24

   no shutdown

!

R2:

dhcp server

   subnet 21.0.0.0/24

      range 21.0.0.4 21.0.0.254

      name VLAN10

      default-gateway 21.0.0.1

   !

   subnet 22.0.0.0/24

      range 22.0.0.4 22.0.0.254

      name VLAN20

      default-gateway 22.0.0.1

   !

   subnet 2100::/64

      range 2100::4 2100::ffff:ffff:fffe

      name VLAN10

   !

   subnet 2200::/64

      range 2200::4 2200::ffff:ffff:fffe

      name VLAN 20

   !

   subnet 2300::/64

      range 2300::4 2300::ffff:ffff:fffe

      name VLAN30

!

vlan 10

   name vlan10

!

vlan 20

   name vlan20

!

vlan 30

   name vlan30

!

interface Ethernet1

   no switchport

!

interface Ethernet1.10

   encapsulation dot1q vlan 10

   ip address 21.0.0.1/24

   dhcp server ipv4

   dhcp server ipv6

   ipv6 address 2100::1/64

!

interface Ethernet1.20

   encapsulation dot1q vlan 20

   ip address 22.0.0.1/24

   dhcp server ipv4

   dhcp server ipv6

   ipv6 address 2200::1/64

!

interface Ethernet1.30

   encapsulation dot1q vlan 30

   dhcp server ipv6

   ipv6 address 2300::1/64

!

interface Ethernet2

   no switchport

!

interface Ethernet2.40

   encapsulation dot1q vlan 40

   ip address 10.40.0.19/29

!

interface Ethernet2.100

   encapsulation dot1q vlan 100

   ip address 10.100.0.7/24

!

interface Loopback0

   ip address 10.40.2.1/32

!

interface Vlan10

   dhcp server ipv4

   dhcp server ipv6

!

interface Vlan20

   dhcp server ipv4

   dhcp server ipv6

!

interface Vlan30

   dhcp server ipv4

   dhcp server ipv6

!

ip routing

!

router ospf 40

   router-id 10.40.2.1

   network 10.40.0.16/29 area 0.0.0.0

   network 21.0.0.0/24 area 0.0.0.0

   network 22.0.0.0/24 area 0.0.0.0

   max-lsa 12000

!

router rip

   network 21.0.0.0/24

   network 22.0.0.0/24

   shutdown

!

R3:

interface Ethernet1

   no switchport

   ip address 10.40.0.9/30

!

interface Ethernet2

   no switchport

   ip address 10.40.0.1/30

!

interface Ethernet3

   no switchport

!

interface Ethernet3.40

   encapsulation dot1q vlan 40

   ip address 10.40.0.18/29

!

interface Ethernet3.100

   encapsulation dot1q vlan 100

   ip address 10.100.0.8/24

!

interface Loopback0

   ip address 10.40.3.1/32

!

interface Management0

   ip address 172.20.20.14/24

   ipv6 address 2001:172:20:20::e/64

!

ip routing

!

router bgp 65001

   router-id 10.40.3.1

   neighbor 10.40.0.2 remote-as 65005

   neighbor 10.40.0.10 remote-as 65001

   network 10.40.0.16/29

   network 10.40.3.1/32

   redistribute ospf

!

router ospf 40

   router-id 10.40.3.1

   redistribute bgp

   network 10.40.0.16/29 area 0.0.0.0

   max-lsa 12000

!

R4:

interface Ethernet1

   no switchport

   ip address 10.40.0.10/30

!

interface Ethernet2

   no switchport

   ip address 10.40.0.6/30

!

interface Ethernet3

   no switchport

!

interface Ethernet3.40

   encapsulation dot1q vlan 40

   ip address 10.40.0.17/29

!

interface Ethernet3.100

   encapsulation dot1q vlan 100

   ip address 10.100.0.9/24

!

interface Loopback0

   ip address 10.40.4.1/32

!

interface Management0

   ip address 172.20.20.12/24

   ipv6 address 2001:172:20:20::c/64

!

ip routing

!

router bgp 65001

   router-id 10.40.4.1

   neighbor 10.40.0.5 remote-as 65005

   neighbor 10.40.0.9 remote-as 65001

   network 10.40.0.16/29

   network 10.40.4.1/32

   redistribute ospf

!

router ospf 40

   router-id 10.40.4.1

   redistribute bgp

   network 10.40.0.16/29 area 0.0.0.0

   max-lsa 12000

!

R5:

interface Ethernet1

   no switchport

   ip address 10.40.0.2/30

!

interface Ethernet2

   no switchport

   ip address 10.40.0.5/30

!

interface Ethernet3

   no switchport

   ip address 1.1.1.1/30

!

interface Loopback0

   ip address 10.40.5.1/32

!

interface Management0

   ip address 172.20.20.20/24

   ipv6 address 2001:172:20:20::14/64

!

ip routing

!

router bgp 65005

   router-id 10.40.5.1

   maximum-paths 2

   neighbor 10.40.0.1 remote-as 65001

   neighbor 10.40.0.6 remote-as 65001

   network 1.1.1.0/30

   network 10.40.0.16/29

   network 10.40.5.1/32

!

S1:

vlan 10

   name HOST\_10

!

vlan 20

   name HOST\_20

!

vlan 30

   name HOST\_30

!

vlan 200

   name MGMT

!

vlan 240

   name PROD

!

interface Ethernet1

   switchport mode trunk

!

interface Ethernet2

   switchport mode trunk

!

interface Ethernet3

   switchport access vlan 10

!

interface Ethernet4

   switchport access vlan 20

!

no ip routing

!

S2:

vlan 10

   name HOST\_10

!

vlan 20

   name HOST\_20

!

vlan 30

   name HOST\_30

!

vlan 200

   name MGMT

!

vlan 240

   name PROD

!

interface Ethernet1

   switchport mode trunk

!

interface Ethernet2

   switchport mode trunk

!

interface Ethernet3

   switchport access vlan 10

!

interface Ethernet4

   switchport access vlan 30

!

interface Vlan40

!

S3:

vlan 40,100

   name PROD

!

interface Ethernet1

   switchport mode trunk

!

interface Ethernet2

   switchport mode trunk

!

interface Ethernet3

   switchport mode trunk

!

interface Ethernet4

   switchport access vlan 100

!

interface Management0

   ip address 172.20.20.22/24

   ipv6 address 2001:172:20:20::16/64

!

interface Vlan100

   ip address 10.100.0.3/24

!

no ip routing

!

S4:

vlan 40

   name PROD

!

vlan 100

   name MGMT

!

interface Ethernet1

   switchport mode trunk

!

interface Ethernet2

   switchport mode trunk

!

interface Ethernet3

   switchport mode trunk

!

interface Management0

   ip address 172.20.20.18/24

   ipv6 address 2001:172:20:20::12/64

!

interface Vlan100

   ip address 10.100.0.4/24

!

no ip routing

!

Once these configurations are installed, feel free to log into the hosts and text connectivity!