

GNS3 Lab Setup (v2.2.31)

GNS3 Client Host Hardware Information:

Below table shows the GNS3 client hardware information.

Hardware	Hardware Details
Model	Dell XPS 15 9570
CPU	Intel(R) Core(TM) i7-8750H CPU @2.20GHz, 2208Mhz 6 Core(s), 12 Log- ical Processor(s)
RAM	16 GB
NIC	Network Controller - Realtek GbE Family Controller, Killer Wireless-n/a/ac 1535 Wireless Network Adapter

Table 1 - GNS3 Client Host Hardware Info

GNS3 Client Host Software Information:

The table provides software and ip address information.

Software	Software Details
OS	Microsoft Windows 10 Enterprise
Lab Setup	GNS3 Client
Client Version	GNS3 2.2.31
IP Address [LAN]	192.168.1. 11
IP Address [Wi-Fi]	192.168.1.9

Table 2 - GNS3 Client Host Software Info

GNS3 Remote Server Hardware Info:

The table shows GNS3 remote server hardware information.

Hardware	Hardware Details
Model	Dell Precision M4700
CPU	Intel(R) Core(TM) i7-3740QM CPU @ 2.70GHz
RAM	32GB
NIC	Network controller - Broadcom Inc. and subsidiaries BCM4313 802.11bgn Wireless Network Adapter

Table 3 - GNS3 Remote Server Hardware Info

GNS3 Remote Server Software Info:

The below tables shows the software information for GNS3 Remote Server.

Software	Software Details
OS	Ubuntu 20.04.4 LTS (GNU/Linux 5.13.0-35-generic x86 64)
Lab	GNS3 Server
Version	Version 2.2.31
IP Address [LAN]	192.168.1.17
IP Address [Wi-Fi]	192.168.1.12
QEMU Emulator Package	Qemu-system-x86
QEMU Version	1:4.2-3ubuntu6.21
Dynamips	Cisco Router Simulation Platform (version 0.2.21- amd64/Linux stable)

Table 4 - GNS3 Remote Server Software Info

Home Lab Setup:

The below figure represents the physical topology of the lab setup infrastructure

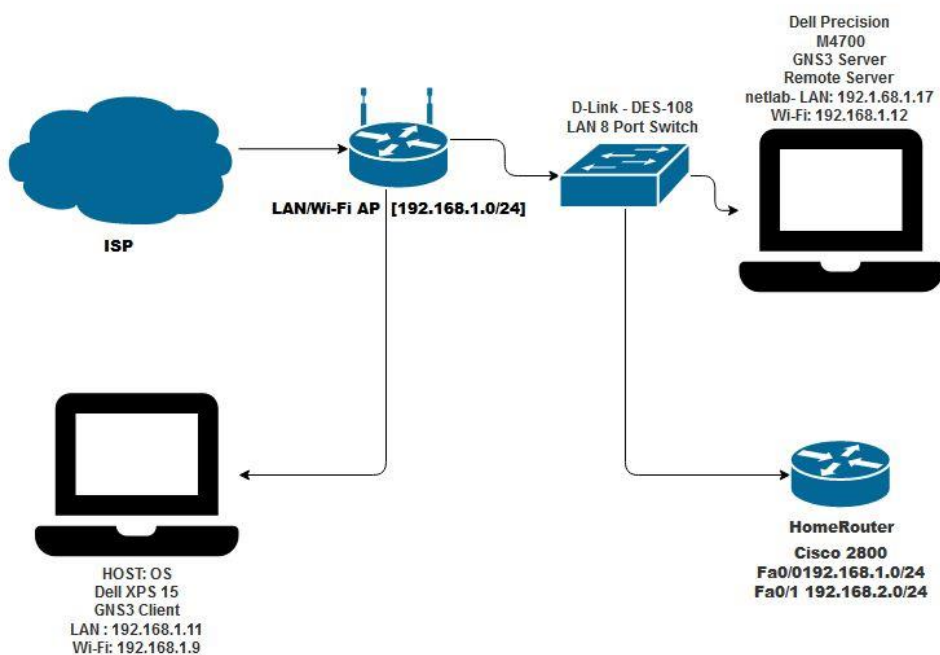


Figure 1 – Home Lab Setup

Adding GNS3 Remote Server to GNS3 Client.

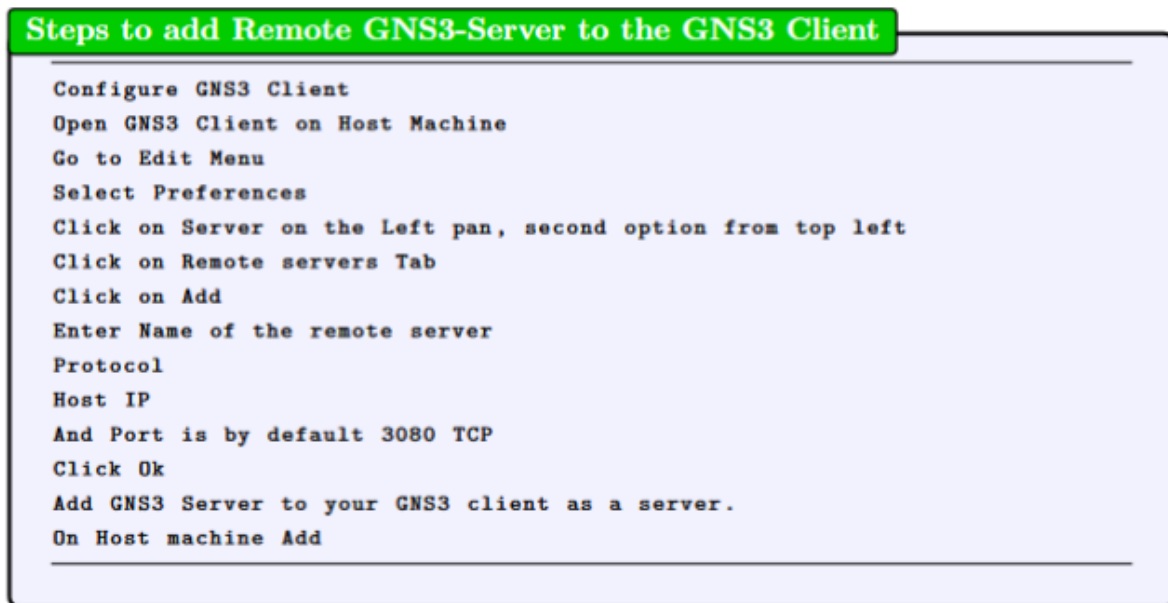


Figure 2 - Add GNS3 Server to GNS3 Client

Figure 3 shows the dialogue box on GNS3 client to add remote server.

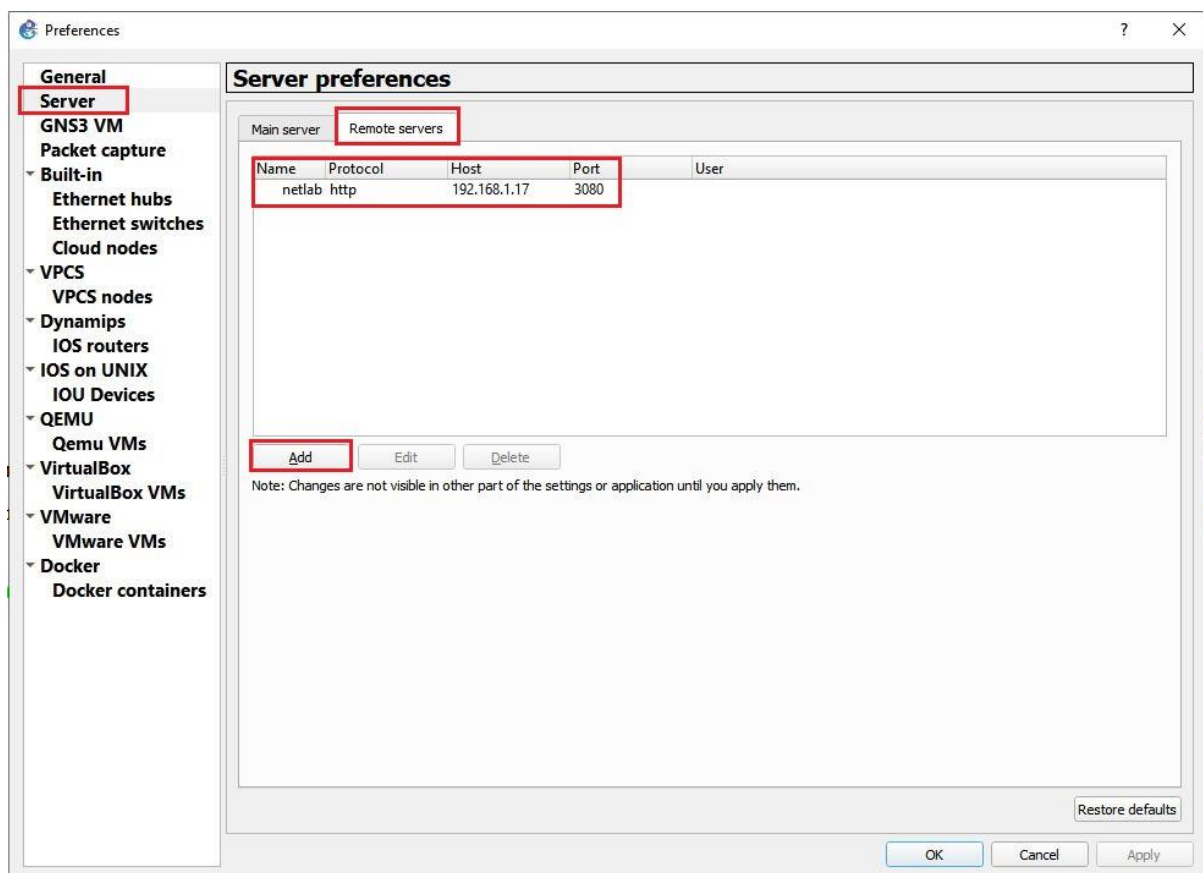


Figure 3 - Add GNS3 Server - GNS3 Client Preferences

GNS3 Remote Server Setup:

Commands to install gns3 on remote server, step by step guide.

1. GNS3 Server Installation Guide

1. `sudo apt-get update`
2. `sudo apt-get upgrade`
3. `sudo add-apt-repository ppa:gns3/ppa`

1.1 Installation of GNS3-Server and GNS3-GUI Version 2.2.31

1. `sudo apt-get install gns3-server gns3-gui`
2. `sudo dpkg --add-architecture i386`
3. `sudo apt-get update`

Figure 4 -GNS3 Server Installation Guide

Add IOU Support and Installation, Docker CE Installation :

2. Add support for IOU & Installation

1. `sudo dpkg --add-architecture i386`
2. `sudo apt-get update`
3. `sudo apt-get install gns3-iou`

3. Docker CE installation and add support for Docker on GNS3

1. `sudo apt-get update`
2. `sudo apt remove docker docker-engine docker.io 2>/dev/null`
3. `sudo apt update`

Figure 5 IOU & Docker Installation

3.1 Get stable repository over https for Docker

1. `sudo apt -y install apt-transport-https ca-certificates curl software-properties-common`
2. `curl -fsSL https://download.docker.com/linux/ubuntu/gpg -- sudo apt-key add -`
3. `sudo add-apt-repository "deb [arch=amd64] https://download.docker.com/linux/ubuntu (lsb_release -cs) stable"`

3.2 Installation of Docker CLI

1. `sudo apt update`
2. `sudo apt -y install docker-ce docker-ce-cli containerd.io`

3.2 Check Docker Status

- `sudo systemctl status docker`

Figure 6 - Docker repository and CLI and Status check

Just make sure the docker is running on GNS3 remote server.

```
netlab@lab:~$ systemctl status docker
● docker.service - Docker Application Container Engine
   Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor preset: enabled)
   Active: active (running) since Wed 2022-05-04 08:45:41 IST; 3h 32min ago
     TriggeredBy: ● docker.socket
   Docs: https://docs.docker.com
   Main PID: 1406 (dockerd)
      Tasks: 52
     Memory: 1.6G
    CGroup: /system.slice/docker.service
            └─1406 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock

May 04 08:45:27 lab dockerd[1406]: time="2022-05-04T08:45:27.706144157+01:00" level=info msg="Loading containers: start."
May 04 08:45:32 lab dockerd[1406]: time="2022-05-04T08:45:32.006125246+01:00" level=info msg="Default bridge (docker0) is assigned with an IP address 172.17.0.0/16. Daemon option --bip "
May 04 08:45:32 lab dockerd[1406]: time="2022-05-04T08:45:32.046336608+01:00" level=info msg="Loading containers: done."
May 04 08:45:40 lab dockerd[1406]: time="2022-05-04T08:45:40.444557973+01:00" level=info msg="Docker daemon" commit=67a9dc graphdriver(s)=overlay2 version=20.10.14
May 04 08:45:40 lab dockerd[1406]: time="2022-05-04T08:45:40.77338013+01:00" level=info msg="Daemon has completed initialization"
May 04 08:45:41 lab systemd[1]: Started Docker Application Container Engine.
May 04 08:45:41 lab dockerd[1406]: time="2022-05-04T08:45:41.313532195+01:00" level=info msg="API listen on /run/docker.sock"
```

Figure 7 - GNS3 Docker Service Status

After installation of we need to make some modification to the groups and create GNS3 service and configure GNS3 server as a service.

4. Modify Users/Create GNS3 Service

Modify usergroups by adding user to ubridge, libvirt, kvm and docker

1. `sudo usermod -aG docker $USER`
2. `sudo usermod -aG ubridge libvirt kvm wireshark $USER`

Create GNS3 service and configure GNS3 Server as a service

3. `sudo nano /etc/systemd/system/gns3.service`

Edit the following parameters to this blank file[gns3.service]:

```
[Unit]
Description=GNS3 Server

[Service]
ExecStart=/usr/share/gns3/gns3-server/bin/gns3server

[Install]
WantedBy=multi-user.target
```

Save the file and exit.

To make this file executable, enable and start the created service:

```
sudo chmod +x /etc/systemd/system/gns3.service
sudo systemctl enable gns3
sudo systemctl start gns3
```

Now check to see if the service is properly working :

```
sudo systemctl status gns3
```

Figure 8 - GNS3 Service & Configuration

GNS3 Service Status:

```
● gns3.service - GNS3 Server
   Loaded: loaded (/etc/systemd/system/gns3.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2022-05-03 22:36:00 IST; 13h ago
     Main PID: 809 (gns3server)
       Tasks: 171 (limit: 38366)
        Memory: 1.46
      CGroup: /system.slice/gns3.service
              └─ 809 /usr/share/gns3/gns3-server/bin/python /usr/share/gns3/gns3-server/bin/gns3server
                 8315 /usr/bin/ubridge -H 0.0.0.0:37217
                 8318 /usr/bin/dynamips -N1 -l dynamips_11_log.txt -H 41215
                 8334 /usr/bin/dynamips -N1 -l dynamips_12_log.txt -H 39487
                 8350 /usr/bin/dynamips -N1 -l dynamips_13_log.txt -H 42267
                 8366 /usr/bin/dynamips -N1 -l dynamips_14_log.txt -H 33895
                 8382 /usr/bin/dynamips -N1 -l dynamips_15_log.txt -H 35147
                 8398 /usr/bin/dynamips -N1 -l dynamips_16_log.txt -H 59891
                 8422 /usr/bin/dynamips -N1 -l dynamips_17_log.txt -H 57287
                 8443 /usr/bin/ubridge -H 0.0.0.0:43533
                 8450 /usr/bin/ubridge -H 0.0.0.0:44841
                 8461 /usr/bin/ubridge -H 0.0.0.0:43863
                 167695 /usr/bin/ubridge -H 0.0.0.0:33277
                 188941 docker exec -i ba0108f217bbab7f5fedc6cbc7194ef035e05b7423bf4afc45583be29430c60e /gns3/bin/busybox script -qfc while true; do TERM=vt100 /gns3/bin/busybox sh; done

May 04 11:54:35 lab gns3server[809]: 2022-05-04 11:54:35 INFO base_node.py:206 Docker: NetLabUbuntuDockerGuest-1 [e05f4fe6-ebfc-43fb-be46-d739f05f1fa9] renamed to UbuntuDocker-1
May 04 11:54:35 lab gns3server[809]: 2022-05-04 11:54:35 INFO docker_vm.py:878 Docker container 'UbuntuDocker-1' [gns3/Ubuntu: focal] removed
May 04 11:54:37 lab gns3server[809]: 2022-05-04 11:54:37 INFO docker_vm.py:412 Docker container 'UbuntuDocker-1' [e05f4fe6-ebfc-43fb-be46-d739f05f1fa9] created
May 04 11:54:37 lab gns3server[809]: 2022-05-04 11:54:37 INFO web_log.py:206 192.168.1.12 [04/May/2022:10:54:35 +0000] "PUT /v2/compute/projects/500c3db4-64c9-4111-b0a0-cefa751b2f94/do
```

Figure 9 - GNS3 Server Status Check

GNS3 Client Host, GNS3 VM Server & GNS3 Remote Server(netlab):

Figure 10 shows remote SSH connection to GNS3 Server.

```

05/06/2022 19:28.16 /home/mobaxterm ssh netlab@192.168.1.17
Welcome to Ubuntu 20.04.4 LTS (GNU/Linux 5.13.0-44-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

59 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Your Hardware Enablement Stack (HWE) is supported until April 2025.
Last login: Sat Jun  4 17:10:15 2022 from 192.168.1.5
netlab@lab:~$

```

Figure 10 GNS3 Server - SSH Session

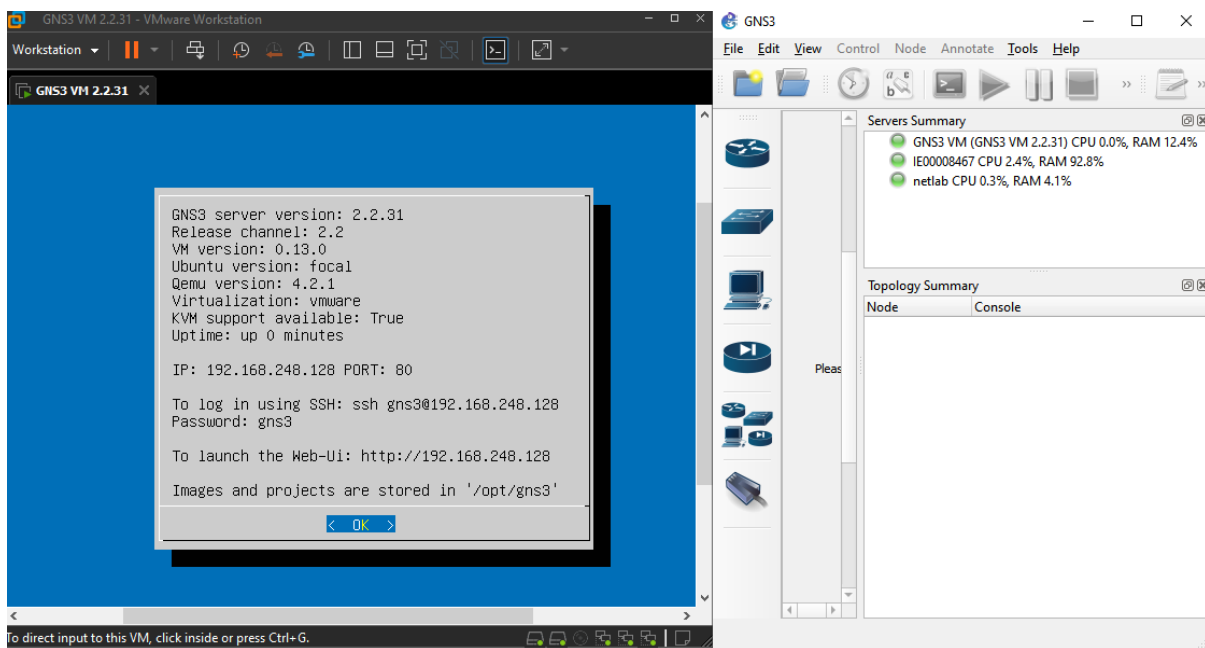


Figure 11 GNS3 VM, GNS3 Client – Servers Summary on host

Figure 11 shows the GNS3 VM, GNS3 Client and Servers Summary on host machine.

GNS3 Server – Web- User Interface:

Figure 12 represents the GNS3 web interface

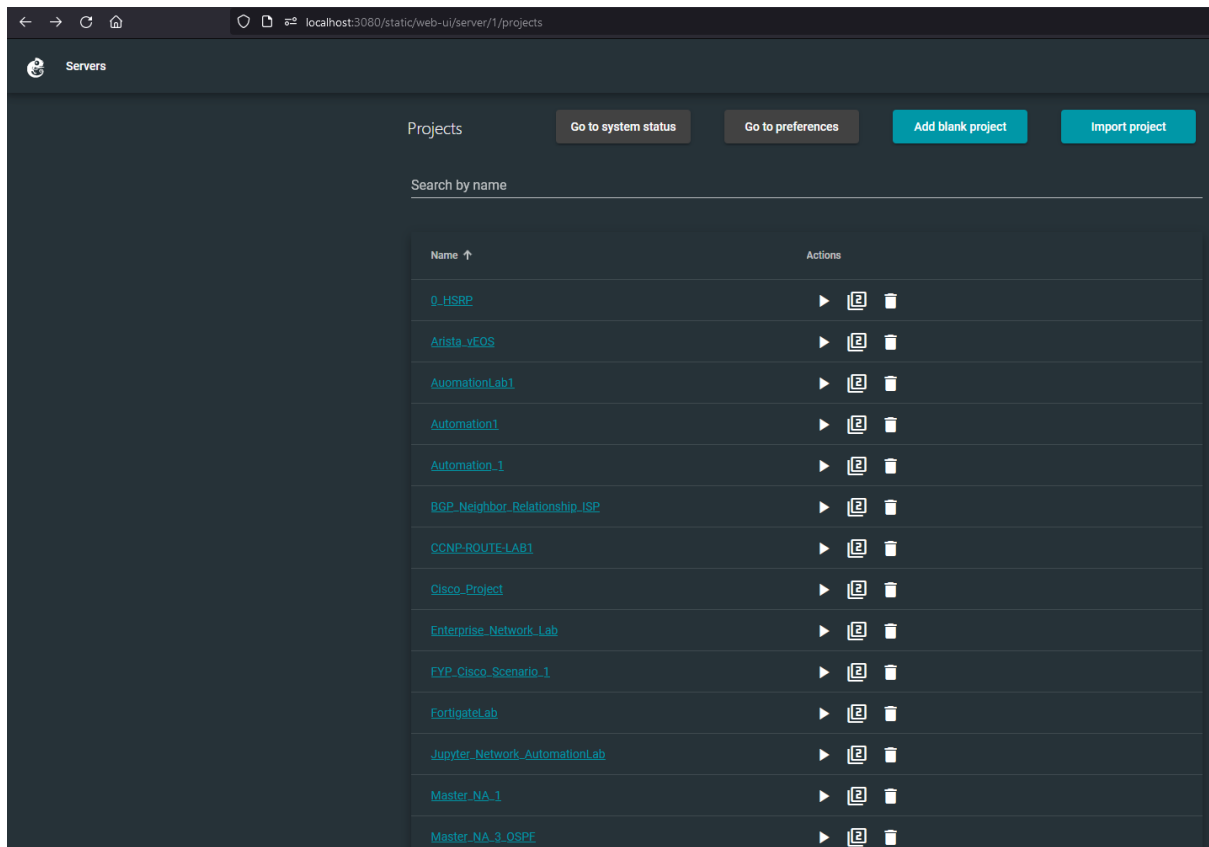


Figure 12 GNS3 - Web User Interface – Projects

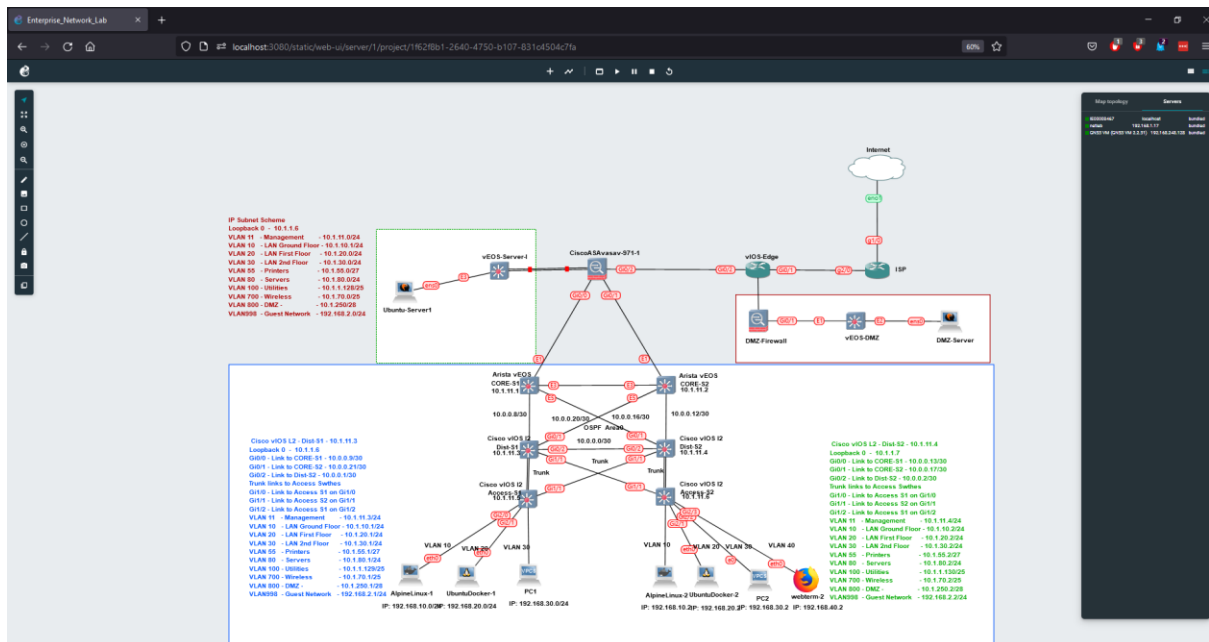


Figure 13 GN3 Project from Web UI