

PEOPLE'S DEMOCRATIC REPUBLIC OF ALGERIA

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SIQ Department

Network Security Project

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1 Overview

This project is part of the Network Security module that is part of the Information System security curriculum suggested by Mr Zeraoulia. the project is structured into four main phases:

1. **Phase1:** Network Topology mounting
2. **Phase2:** Network mapping and validation
3. **Phase3:** Red Teaming and Blue Teaming
4. **Phase4:** Migration solutions and applications improvement

2 Phase one: Network Topology mounting

The following figure showcases the enterprise network that we aimed to mount:

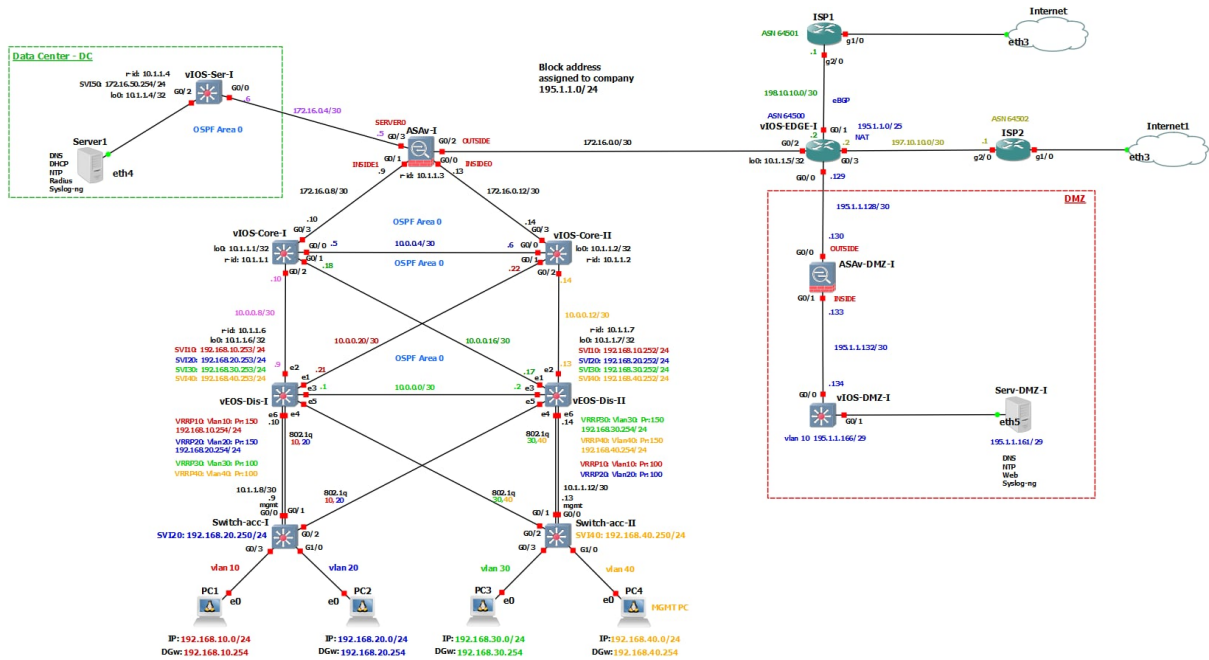


Figure 1: Network Enterprise topology

This topology is a replica of an enterprise network topology that can be found in the following link:

<https://brezular.com/2017/09/07/enterprise-network-on-gns3-part-1-introduction/>

For the most part, we followed the same configuration steps using the same IP addresses, the major difference in our work was that our topology was divided into three sub-topologies mounted on two different hardware and then integrated into one enterprise network topology, in addition, we changed the versions of some software. in the following sections, we will detail more on the changes made.

2.1 Hosts specifications

- **Host Hardware 1:**

This first hardware will be hosting our data center, the campus as well as the ASA firewall connecting the ISP and Edge routers, campus, and data center with the following specification:

1. CPU: Intel(R) Core(TM) i7-8550U CPU @ 1.80GHz 1.99GHz
2. RAM: 16GB
3. Etherent Card

- **Host Hardware 2:**

As for the second hardware will be hosting the DMZ and the ISP and EDGE routers with the following specifications:

1. CPU: Intel(R) Core(TM) i5-8250U
2. RAM: 20GB
3. Etherent Card

- **Host Software:**

This project was mounted using :

- GNS3: version 2.2.46

2.2 Campus

This part of the network contains the access layer , the distribution, and core layers and ASA firewall. following the same configuration steps in the article previously shared, we made a few changes in the versions of appliances to more functional and time-optimizing ones:

- access layer:
 - PC1 and PC4: Tiny Core Linux 6.4
 - Access switches: Cisco vIOS l2 software, version 15.2
- Distribution and core layer:
 - Distribution switches: Arista vEOS, version 4.31.2F
 - Core switches: Cisco vIOS l2 software, version 15.2
- ASA Firewall:
 - Cisco Firewall ASAv version 9.9.1

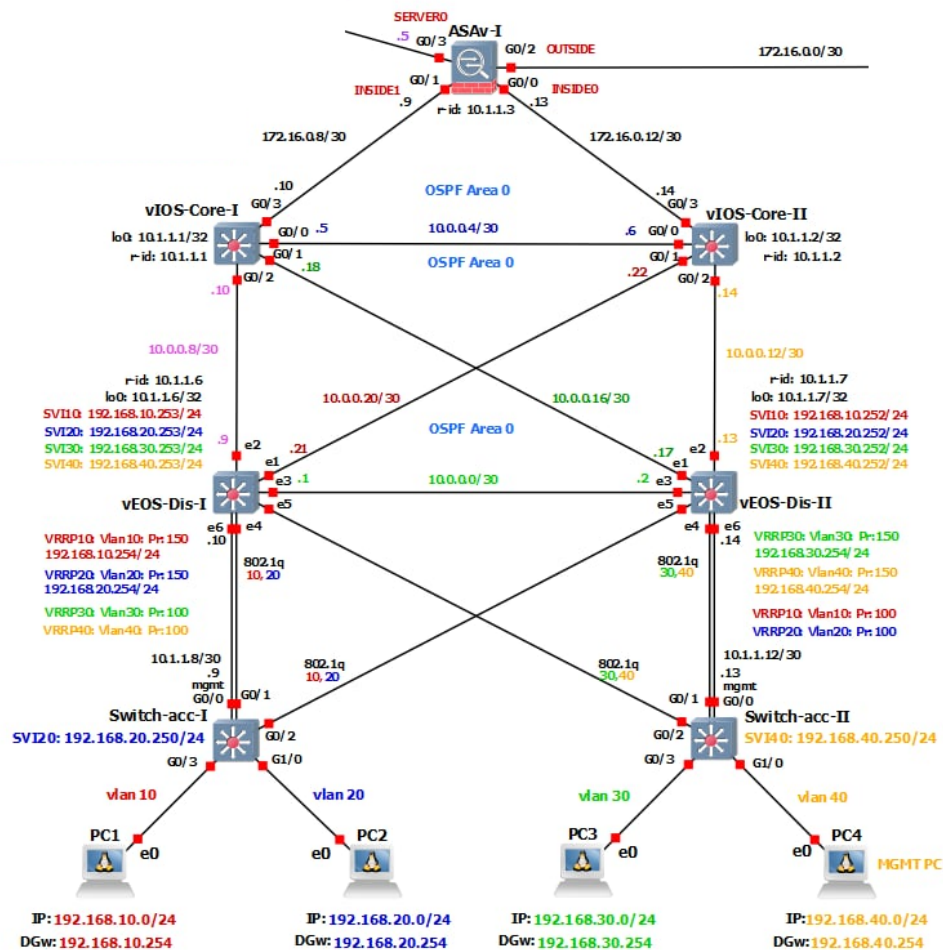


Figure 2: Campus

2.3 Data center:

The following figure showcases the data center architecture

- **Server1:** Ubuntu Server 20.40 virtual machine
- **vIOS-Ser-I:** Cisco vIOS version 15.2

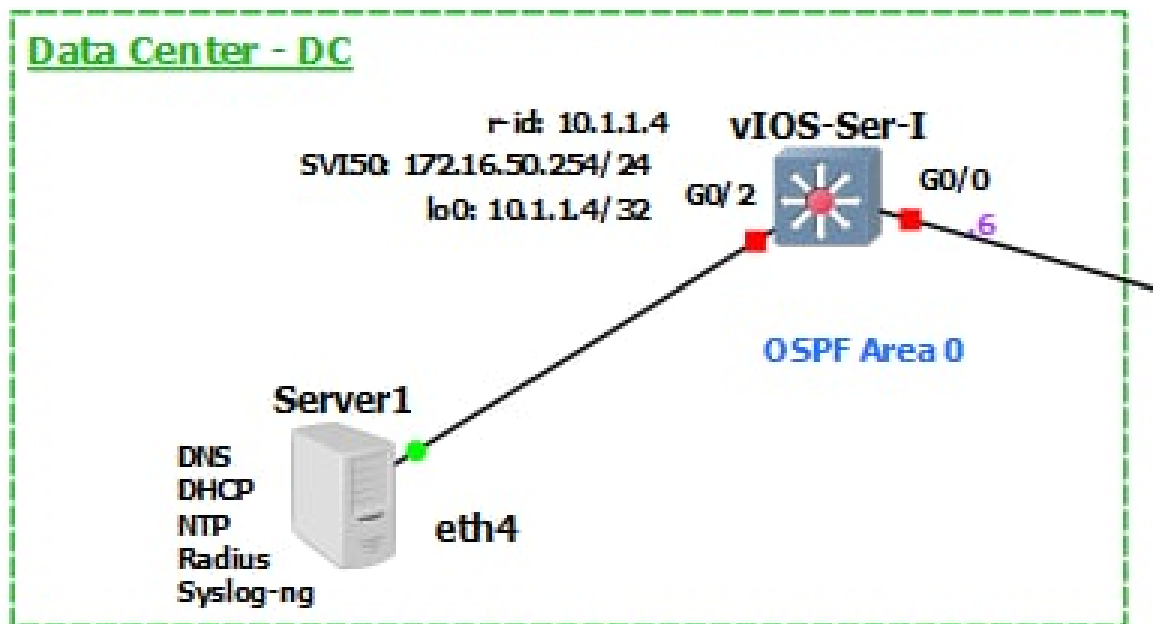


Figure 3: Data Center

2.4 DMZ , Edge Router and ISPs:

- **Serv-DMZ-I:** Linux-microcore version 6.4
- **ASAv-DMZ-I:** Cisco Firewall ASAv version 9.9.1
- **vIOS-DMZ-I:** Cisco vIOS version 15.2
- **ISP1/ISP2:** Cisco 7200 version 15.3(3)XB
- **vIOS-EDGE-I:** Cisco vIOS version 15.9(3)M

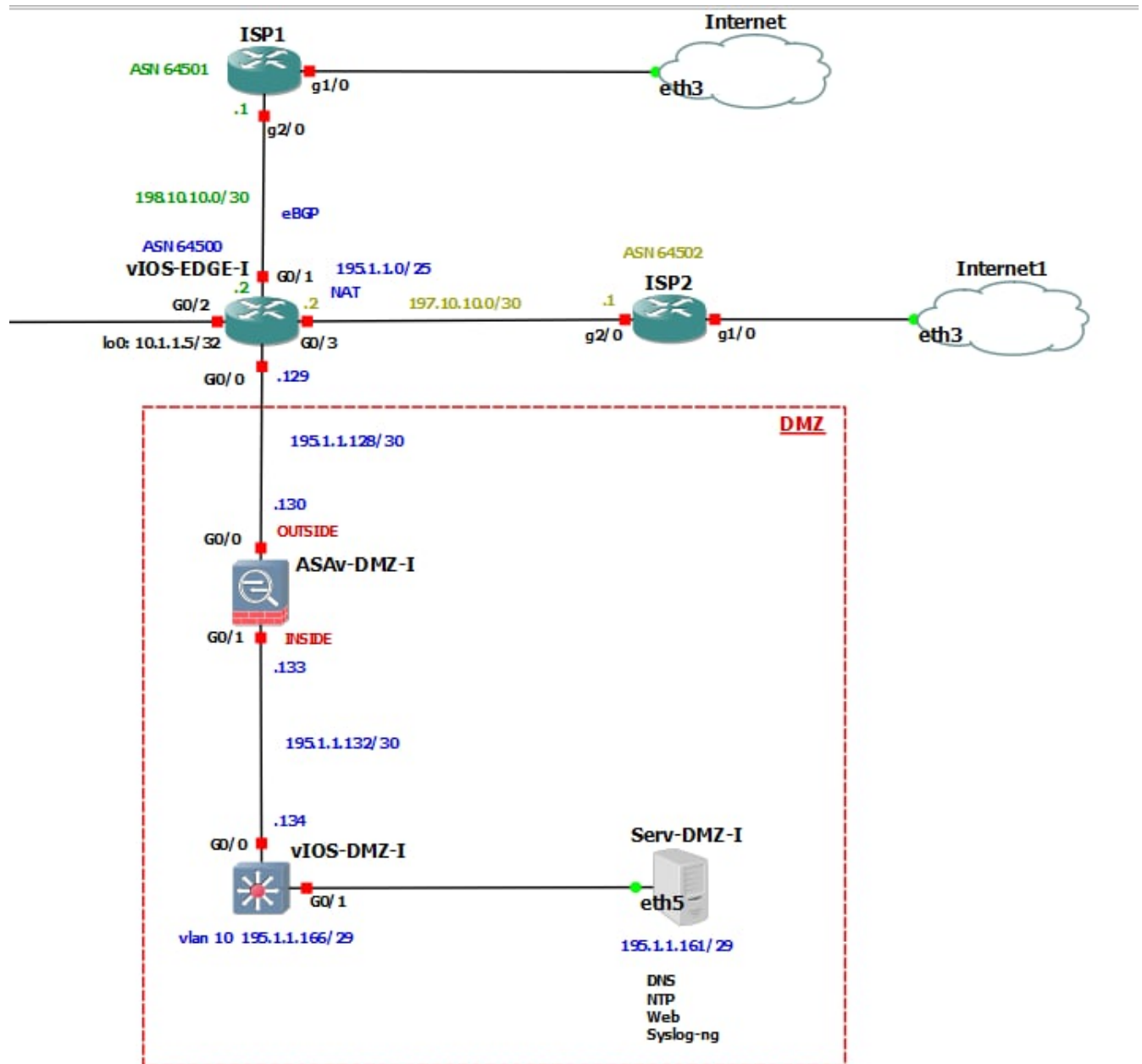


Figure 4: DMZ Edge Router and ISPs

2.5 Integration:

In this section, we will be explaining how we did the integration of the whole network topology, we will be discussing the hardware that hosted the campus and data center but the same steps should be applied to the second hardware to get a fully functioning topology

- **step1:** adjust the virtual network settings, make sure that the vmnet1 of your VMware is set to your Ethernet card (in this case we are using an adapter Realtek USB FE Family controller) and add a new adapter in devices settings of gns3vm as shown in the following figures

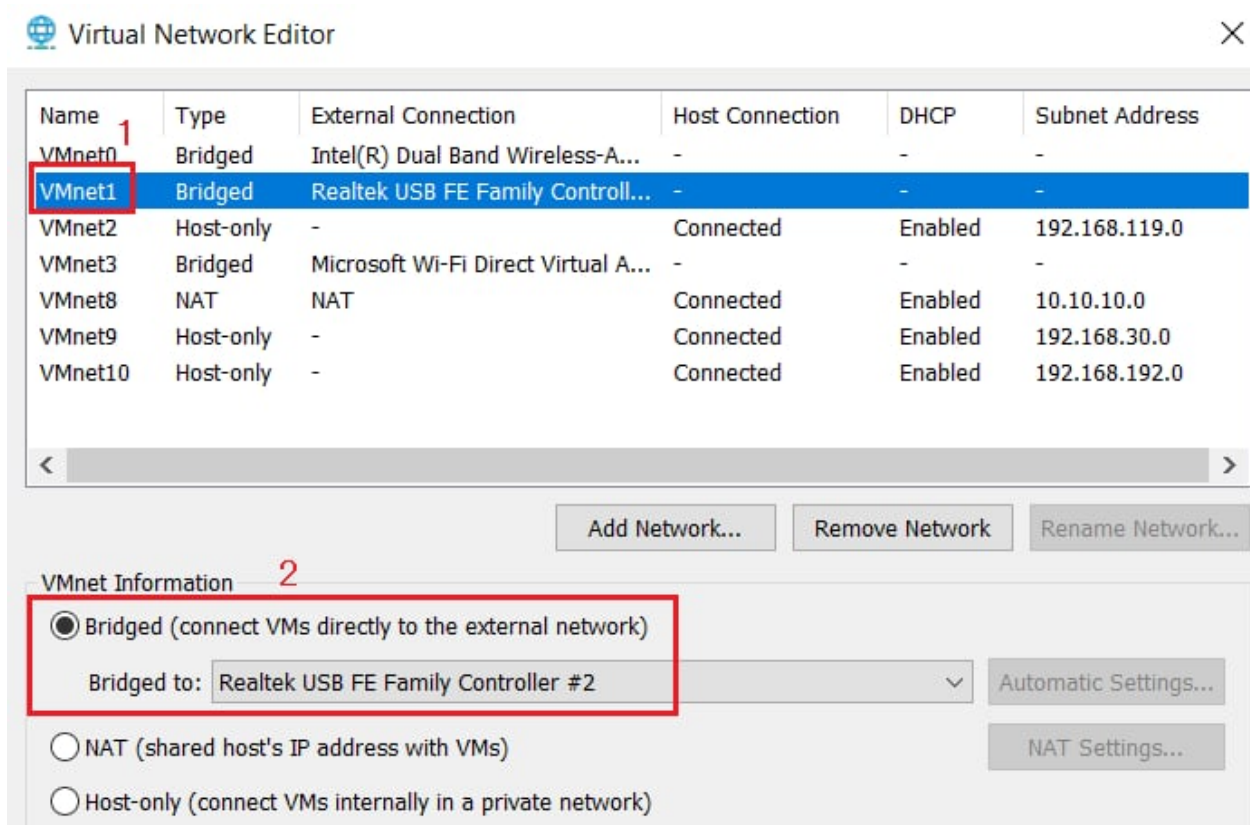


Figure 5: virtual network Editor settings

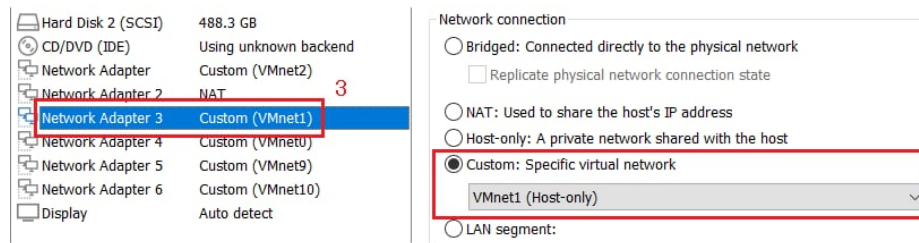


Figure 6: network adapter

- **step2:** connect the ASAv firewall to the Ethernet cable, to do so simply add a cloud and connect it to the ASAv firewall then connect the cloud to the eth2 as shown previously in figure2

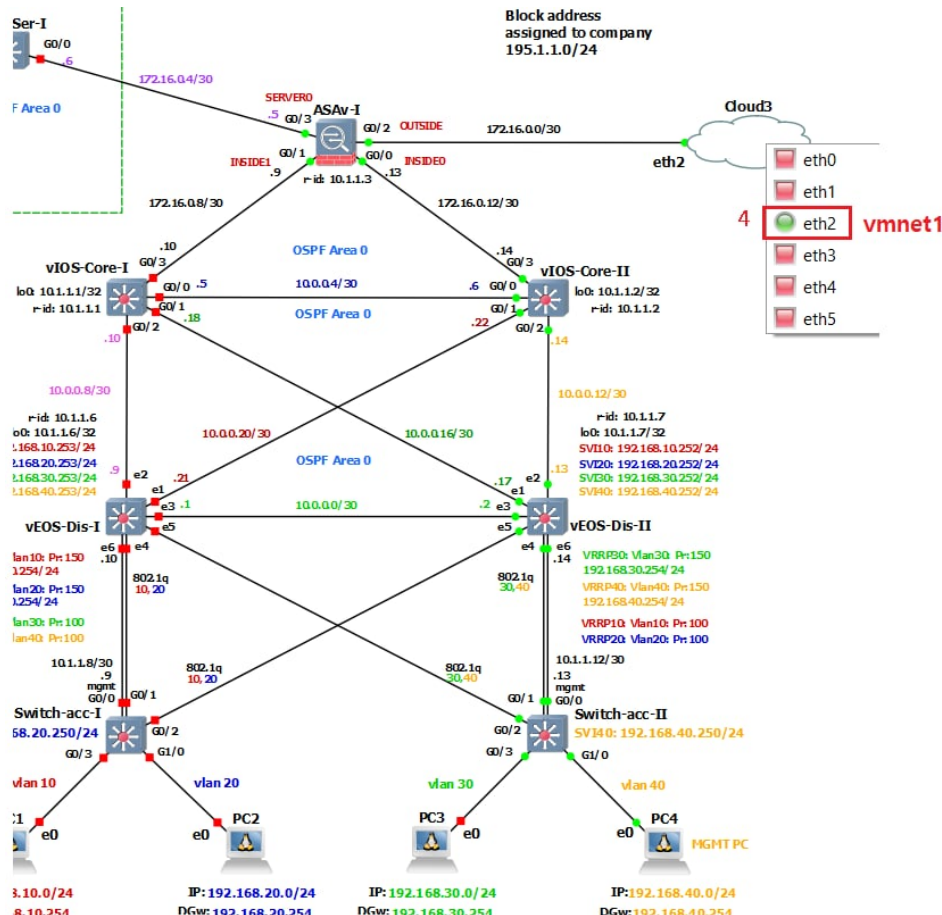


Figure 7: Cloud

- **step3:** make sure that steps 1 and 2 are done on the PC containing the DMZ, Edge Router, and ISPs
- **step4:** connect the two PCs using an Ethernet cable and check the connectivity between the components of the network