

In this unit, hands-on labs and assignments will be conducted on a virtual environment. You are required to follow the guidelines given in the **Lab Environment Setup** document to setup your lab environment before starting this lab. The goal of this lab is to get yourself familiar with the lab environment.

1 Adding a new GNS3 Project

Through out the unit we will provide various different projects for you to work on. In this week we will be working on the SecureCorp project.

1.1 Download SecureCorp Project

Connect to the Shell of the VM via your host operating system's Terminal. Please refer to the Appendix section at the end of this document for instructions on how to access the terminal.

Once you connect to the VM Shell, run the below command (one command) on the VM Shell to download and install the SecureCorp project. This will take a few minutes to complete depending on your internet speed.

```
gdown 1hhDuc2S7MMdz2K06tfr85PSx7W4t87Pp ; sudo bash ./install_SecureCorp.sh
```

```
gns3@gns3vm: ~  
gns3@gns3vm:~$ gdown 1hhDuc2S7Mdz2K06tfr8SPsx7W4t87Pp ; sudo bash ./install_SecureCorp.sh  
Downloading...  
From (original): https://drive.google.com/uc?id=1hhDuc2S7Mdz2K06tfr8SPsx7W4t87Pp  
From (redirected): https://drive.google.com/uc?id=1hhDuc2S7Mdz2K06tfr8SPsx7W4t87Pp&confirm=t&uuid=d337ea3c-9450-4650-a5a7-b267f4cd9121  
To: /home/gns3/install_SecureCorp.sh  
100%|██████████████████████████████| 2.06k/2.06k [00:00<00:00, 1.77MB/s]  
Downloading project:  
Downloading...  
From (original): https://drive.google.com/uc?id=179y0RslsFTg_9mEwG5lJ0o-prbDtFB8N  
From (redirected): https://drive.google.com/uc?id=179y0RslsFTg_9mEwG5lJ0o-prbDtFB8N&confirm=t&uuid=38e2a29f-abdf-4d00-a40t-a32ddb6234c0  
To: /opt/gns3/projects/SecureCorp.tar.xz  
100%|██████████████████████████████| 1.23G/1.23G [02:01<00:00, 10.1MB/s]  
Extracting project:  
.....  
.....  
.....  
.....mv: '/opt/gns3/projects/SecureCorp/SecureCorp.gns3' and '/opt/  
t/gns3/projects/SecureCorp/SecureCorp.gns3' are the same file  
  
SecureCorp project was successfully installed as SecureCorp.  
  
gns3@gns3vm:~$ |
```

Figure 1: Download SecureCorp project from VM Shell

1.2 Open SecureCorp Project

Once the project is installed, Open GNS3 and from the File menu, Select Open project > Go to Project library tab > Select SecureCorp project.

You can now start the project (i.e., all nodes) by clicking the green Play button. To open a console of a node, simply double-click it.

2 Using GNS3

Using GNS3 we can emulate real hardware devices. All the devices in **SecureCorp** network have real operating systems loaded in them. You can double-click on any of the devices to access the **console** to execute commands.

The workstations/servers in the project are Ubuntu docker containers and the routers are Mikrotik routers running RouterOS and switches are generic switches.

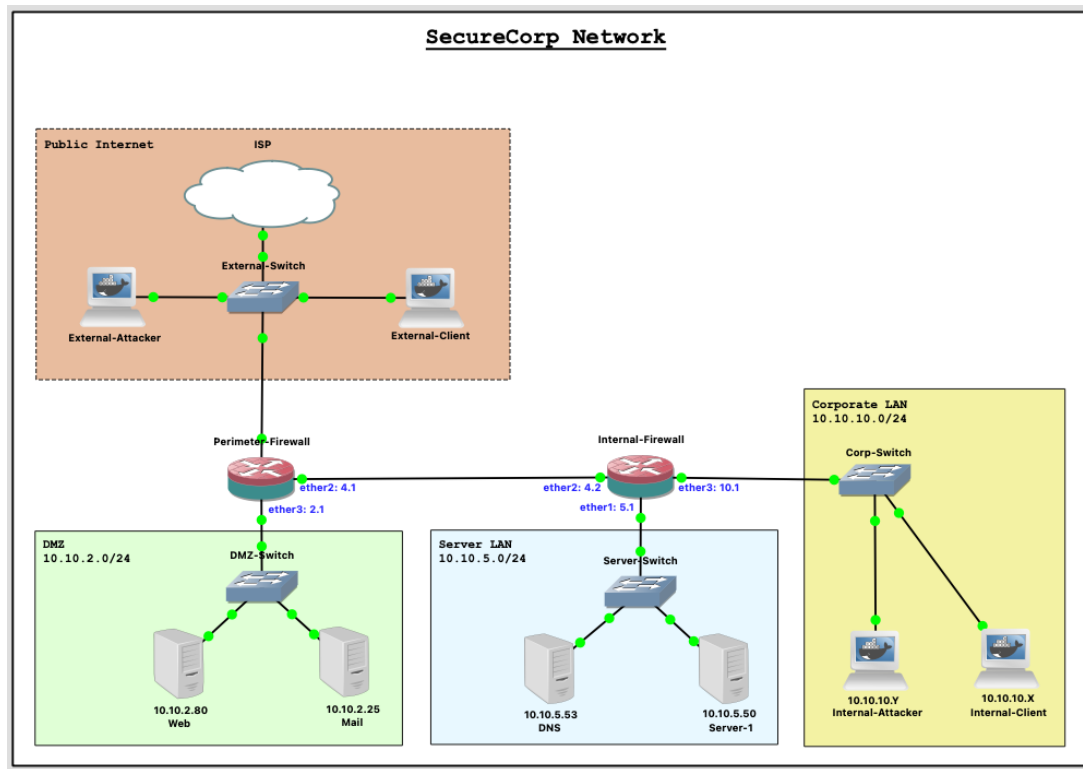


Figure 2: SecureCorp network topology

The containers only have the most essential tools installed on them. We will install relevant applications as we progress in the labs. Familiarize yourself with GNS3 and the SecureCorp network, the topology is self explanatory, however if you have any questions, please ask your tutors or post on the the Ed forum.

3 Docker

Docker is an open source containerization platform. Containers simplify delivery of distributed applications and are made possible by process isolation and virtualization capabilities built into the Linux kernel. We use Docker containers as light-weight virtual machines in GNS3 networks.

4 Lab Tasks

1. Open SecureCorp project in GNS3 and start all nodes.
2. Add a new `Ubuntu-24.04-plus-essentials` node to the Corporate LAN and name the node as `Internal-Client-2`.
3. Connect Internal-Client-2 to the Corp-Switch
4. Configure Internal-Client-2 network adapter with DHCP IP configuration.
5. Start the node.
6. Check connectivity to the Internet, verify communication with other nodes in the Corporate LAN, and ensure connectivity with nodes in other subnets of the SecureCorp network.
7. Stop the node and re-configure network adapter with static IP configuration to match the IP subnet of the LAN.
8. Start the node. Check connectivity to the Internet, verify communication with other nodes in the Corporate LAN, and ensure connectivity with nodes in other subnets of the SecureCorp network.
9. Explain the roles of the Corporate Switch, Internal Firewall, and Perimeter Firewall during the connectivity tests described above.
10. Can you resolve public names from `Internal-Client-2` console? Discuss the role of DNS.

5 GNS3 Tips

1. Please note that NOT all folders in the provided GNS3 Docker containers are persistent. Any files saved outside the persistent folders will be deleted when GNS3 is closed. You can view the list of persistent folders by right-clicking on the node and navigating to "Configure->Advanced" section. We recommend always working within your home directory (/home).
2. All changes made to GNS3 networks are saved automatically and cannot be undone. The most reliable way to preserve a working version of your project is to take a snapshot of the entire virtual machine. This will be useful when working on your assignments.
3. When starting a project in GNS3, it may take some time for all nodes to finish loading. Monitor the CPU usage in the right bottom pane of GNS3 window, and wait until the usage drops below 90% and all nodes turn green.
4. If you want to restart a single node, instead of restarting the entire project, right click on that particular node and stop it, wait for it to turn red, and then start again.
5. When you start a project for the first time, the Docker containers configured with DHCP may not get an IP. The reason for this is that the firewall which acts as the DHCP server takes more time to start than the Docker containers. To fix this, after the project finish loading, manually stop and start the Docker containers with DHCP configurations.
6. You can add multiple copies of the same project. Use the same command to download a new copy of the project.

A Appendix: Accessing GNS3 VM Shell

You will need to access the shell of the GNS3 VM for various tasks throughout the unit. To access the shell, first SSH into the VM using the below command on Windows Terminal or MacOS Terminal (Password: gns3).

```
ssh gns3@gns3 VM IP address>  
ex: ssh gns3@192.168.20.128
```

Always SSH into the VM before accessing the Shell. You cannot copy and paste text directly into the VMWare console.

Follow the instructions below to access the Shell.

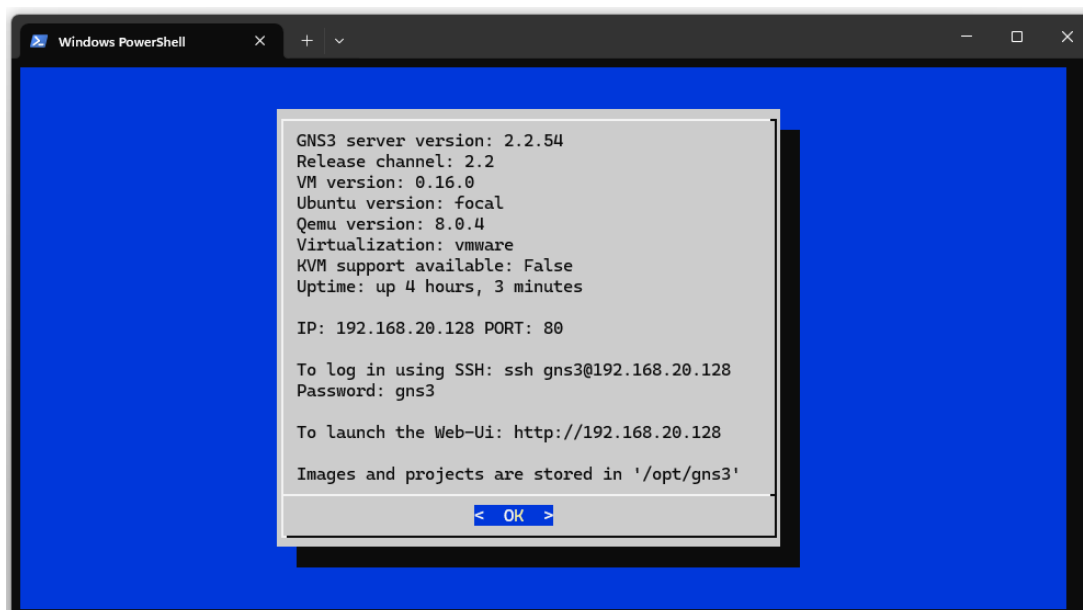


Figure 3: Select OK

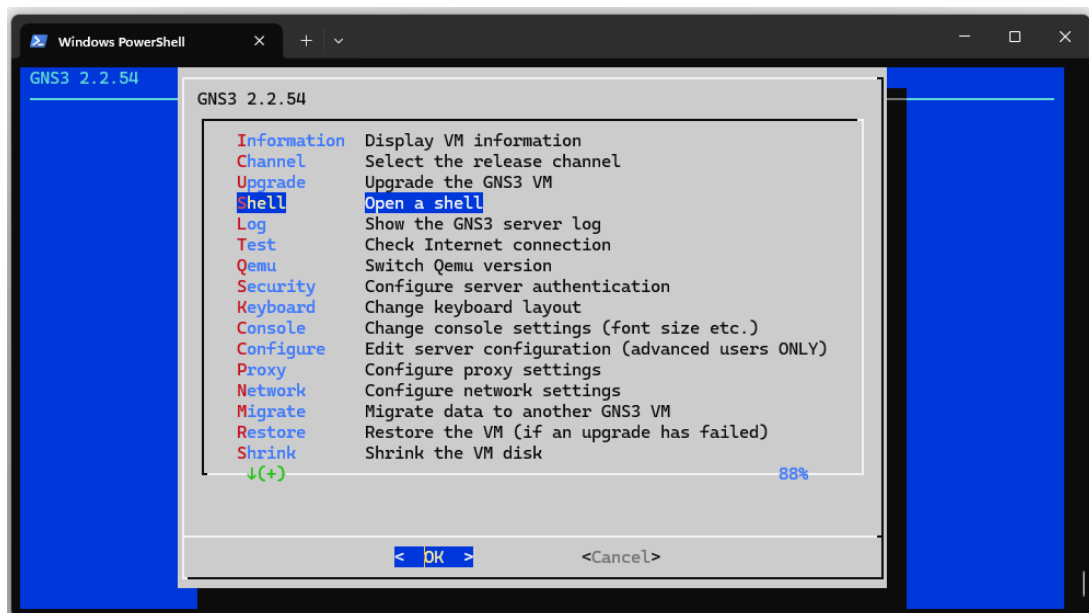


Figure 4: Select Shell from the menu