

B2 - Lab 3

Stage -1 - Instructions

This lab should be done by groups of 1 or 2 people.

Your markdown document will be used to generate a pandoc pdf so respect the markdown spec and use previews (available in any decent text editor).

the following header should be present at the top of your markdown document (obviously adapted to match your group).

```
---
title: "B2 - Lab 3 - GROUP X"
author:
- GROUP MEMBER 1
- GROUP MEMBER 2
output:
  pdf_document: default
---
```

Only ONE file drop will be allowed per group so verify that your document contains VALID markdown and image links.

When unzipped in a new folder the output the following file structure SHOULD be followed.

```
lab3.GROUP_NB.zip
lab3.GROUP_NB
├── images
│   ├── bar.jpeg
│   ├── foo.png
│   └── ...
└── lab3.GROUP_NB.md
```

Replace GROUP_NB by your group number. Penalties will be applied if the required format is not respected.

the pdf corresponding your exercise will be generated as follow

```
unzip lab3.GROUP_NB.zip
cd lab3.GROUP_NB
pandoc lab3.GROUP_NB.md -o lab3.GROUP_NB.pdf
```

Your explanations will be followed strictly and should be precise enough in order to be able to redo the full exercise. Exercises should be done with GNS3 using only the following appliances: ethernet switches, alpine linux, OpenWRT.

From Stage 1 to Stage 4 only ipv4 is mandatory. From stage 5 to the end only explanations are required. If explanations contains ipv6 in addition to ipv4 more points are given.

Stage 0 - Setup

Describe the procedure to create a new blank gns3 project. Describe the procedures to install the required appliances.

Stage 1 - Basic LAN

Create a nat in gns3 and name it **lan-X** where X is your group number. Your lan should use the following subnet: 192.168.GROUP_NB.0/24. The chosen router management interface should only be accessible within the lan.

Describe the procedure to add a router to your lan, and configure handle the rest of your lan. Explain how to add machines to the lan and what elements should be configured:

- Machines should have dynamic ips
- Machines may be added or removed anytime
- Machines should use the router defined DNS

Stage 2 - Remote LAN

Create another nat network and name it **Company-X**. Document the same procedure as **lan-X** for **Company-X** but use $\text{GROUP_NB} + 1$ instead for the subnet.

In theory the router from **lan-X** should be able to communicate to the one in **Company-X** explain how and why and take a screenshot of the proof.

Stage 3 - VPN mesh

Install and configure wireguard on both routers so that they are in the same subnet (172.16.GROUP_NB.0/24).

Describe the procedure to add and connect clients from both lans (using wg-quick). 2 configurations should be proposed:

- one that redirects all of the traffic from a client through the vpn
- one that forward only the vpn subnet packets

Stage 4 - Remote access

Configure and allow ssh access (with openssh) on port 22 to the **Company-X** router only to machines connected to the vpn. Document how to allow and connect new machines with ssh within the vpn. Connections should work from any machine inside **lan-X** and any machine inside **Company-X**. SSH should not be accessible outside of the vpn.

Stage 5 - Some theory

Part 1: VPN & leaks

VPN leak: describe what a vpn leak is. Identify potential leaks (present and non present) in the setup the current setup, and explain how we could fix them.

Part 2: DNS

Explain briefly what a DNS do.

Find 3 DNS providers that you could use at home.

Find and explain what is a root dns and list them.

Describe how you could use a DNS in the current setup to disable ads, find at least one opensource suite that does that.