GNS3 Recommended Settings

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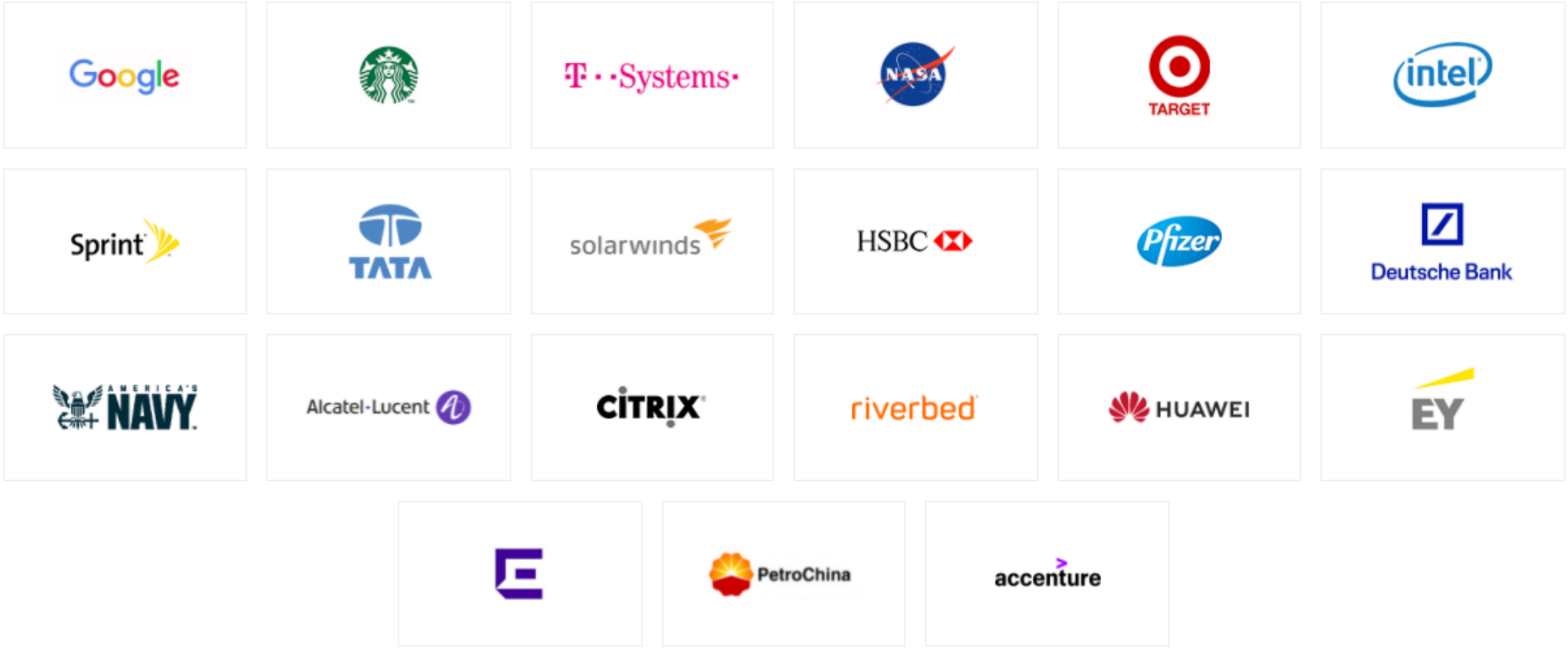
GNS3 (Graphical Network Simulator-3)

Open-source network software emulator that allows the combination of virtual and real devices, used to simulate complex networks.



Classroom Final configuration

Already installed on classroom PCs

- GNS3 version 2.2.21
- VirtualBox

Edit `%APPDATA%\GNS3\2.2\gns3_server.ini` and change `Administrator` to your username (e.g. `alumne`):

```
images_path = C:\Users\alumne\GNS3\images
projects_path = C:\Users\alumne\GNS3\projects
appliances_path = C:\Users\alumne\GNS3\appliances
symbols_path = C:\Users\alumne\GNS3\symbols
configs_path = C:\Users\alumne\GNS3\configs
```

Install GNS3 at home

1. Download `GNS3-2.2.21-all-in-one.exe` from https://github.com/GNS3/gns3-gui/releases/tag/v2.2.21
2. Install selecting VirtualBox.
3. Download and import .ova from `GNS3.VM.VirtualBox.2.2.21.zip`

Emulate PCs ➡️ Alpine Linux dockers

Installation

- File > New template
- Install an appliance from the GNS3 server (recommended)
- Guests > Alpine Linux
- Install the appliance on the GNS3 VM (recommended)

IP Configuration

- Before booting up: Right click > Edit config

Emulate Non-Managed Switches → Ethernet switch

- Run Ethernet switch on **GNS3 VM**

Emulate Cisco Managed Switches → Cisco IOU L2

- Download and extract Switch.rar
- File > Import appliance
- Appliances > MultiLayer Switch - Cisco IOU L2
- **License:** Edit > Preferences > IOS on UNIX

```
[license]
gns3vm=73635fd3b0a13ad0;
```

Emulate Cisco Managed Routers ➡ Cisco IOU L3

- Download and extract Router.rar
- Appliances > Router - Cisco IOU L3
- When imported, right click > Configure template
  - Check `Use default IOU values for memories`. Set RAM size to 512 MB
- **License:** Edit > Preferences > IOS on UNIX

```
[license]
gns3vm=73635fd3b0a13ad0;
```

Cisco Router SSH Connection with Linux

```
ssh -oKexAlgorithms=+diffie-hellman-group14-sha1 -oHostKeyAlgorithms=+ssh-rsa -c aes128-cbc -l admin 10.0.1.1
```

Switch Cisco IOU L2 15.2d Bugs

- 😡 Packets do not pass through switch (e.g. implementing InterVLAN Routing)
  - 😎 Disable CEF: `Switch(conf)# no ip cef`
- 😡 VTP does not synchronize VLANs
  - 😎 Disable VTP domain password: `Switch(conf)# no vtp password`
- 😡 SSH access not enabled
  - 😎 Use telnet connection on 15.2d or change the switch to version 15.6.0.9S

Cisco Switch SSH Connection with Linux (15.6.0.9S)

```
ssh -oKexAlgorithms=+diffie-hellman-group1-sha1 -oHostKeyAlgorithms=+ssh-rsa -c aes128-cbc -l admin 192.168.99.2
```

Emulate OS via VirtualBox

- In VirtualBox, **disconnect all network cards**
- Edit > Preferences > VirtualBox VMs > New
- Run this VirtualBox VM on my local computer
- Choose a VirtualBox VM from the list

Emulate OS via Docker

- Edit > Preferences > Docker container > New
- Run this Docker container on the GNS3 VM
- New Image: image name from Docker Hub (e.g. nginx)

Connect to Internet ➡️ NAT

- Fastest
- Run NAT on **GNS3 VM**
- ⚠️ Cannot access GNS3 topology from external network
- ⚠️ **Only in A22**: A22 uses 192.168.122.0/24 that conflicts with NAT default assigned range.
  - When loaded GNS3VM, press Enter (OK) > Shell
  - `virsh net-edit default`
  - Change `122` to another number (e.g. `112`)

Connect to Internet ➡️ Cloud with bridged interface

- In GNS3VM, add a **3rd Bridged network card**. Check **Promiscous mode: Allow all**.
- Drag **Cloud**, run on **GNS3VM** and connect to **eth2**
- ⚠️ **When using an Edge router:**
  - a. Change MAC address of the interface connected to Cloud (one MAC assigned to each student): `R1(config-if)# mac-address aabb.cc00.0001`
  - b. NAT overload is needed:

```
R1(config-if)# int e0/0
R1(config-if)# ip nat outside
R1(config-if)# int range e0/1-2
R1(config-if)# ip nat inside
R1(config-if)# exit
R1(config)# ip nat inside source list 1 interface e0/0 overload
R1(config)# access-list 1 permit 172.16.100.0 0.0.0.255
R1(config)# access-list 1 permit 172.16.200.0 0.0.0.255
```