

**COGSI - Configuração e Gestão de Sistemas**  
Mestrado em Engenharia Informática, Ramo Sistemas Computacionais  
Lecture 08.1  
*P1.4 - Network and System Simulation*

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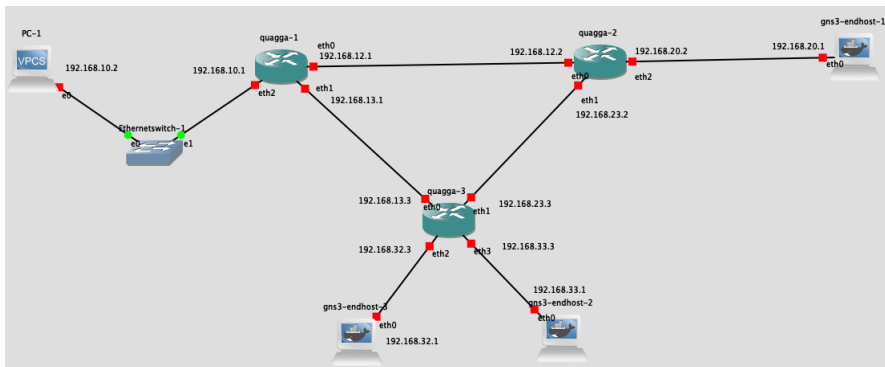
Dep. de Engenharia Informática – ISEP

2018/2019

- **Start Date:** 8, April
- **End Date:** 28, April (no commits after this date!)
- **Development Repository:** Your individual repository
  - Create Issue(s) for your work
  - Expected several commits (at least 1 for each lab class!)
  - You should commit to the repository only files that you created or edited (e.g., do not commit the nagios directory!)
  - Documentation should be provided **only in the readme.md file related to the assignment!**
- **Presentation/Review:**
  - Lecture on April 29 (for Students with Lab Class on Mondays)
  - Lecture on May 2 (for Students with Lab Class on Thursdays)
- All students can/should attend both presentations/reviews
- **If you are selected for presentation** then you should **pull request** the final version of your work into the class shared repository (<https://bitbucket.org/mei-isep/cogsi-18-19-class-rep>) before the deadline.

## P1.4: Topic

- The topic of this sprint is **Network and System Simulation with GNS3**.
- For this exercise it is **mandatory to use GNS3**.
- You should also integrate the work from the previous exercises.
- The system monitoring tool should be **Nagios**.
- The following figure is only an example:



## P1.4: Specific Concerns

The goal is to simulate a local network with components from the previous exercises.

### Simulation

- The simulation should include 3 routers, as depicted in the previous figure.
  - The routers should be simulated using a docker image based on quagga (follow the tutorial in <https://www.gns3.com/news/article/running-quagga-router-as-a-conta>)
- You should include at least one switch in your simulation (see previous figure)
- You should include in the simulation
  - A monitoring system based on Nagios
  - A system running the Todd Java application
  - A system running Tomcat
- They should be directly connected (or via a switch) to different routers.
- Your simulation should aim at consume the lowest resources of the host system, i.e., you should **use Docker containers**.

### Monitoring

- You should "model" the topology of the network in the monitoring system (i.e., use the "parents" attribute in the Nagios configuration of hosts)
- The monitoring system should include a solution to automatically identify new hosts in the monitored networks.
- You should replicated the monitored solutions developed in the previous exercises (i.e., active and passive monitoring with NRPE, JMX and NSCA).
- You should monitor all the elements in the network (i.e., include routers and switches)

- As an alternative for this exercise you should use a different monitoring application (i.e., Zabbix vs Nagios)
- The scenario should be similar but use an alternative monitoring application.
- You should use the GNS3/Wireshark integration (i.e., in a link use the "Start Capture" right menu option) to explore differences in the monitoring protocols between the Active and Passive monitoring approaches in both monitoring applications.
  - How network traffic compares between active and passive?
  - And between Nagios and the Alternative?

## P1.4: Technical Report and Included Artifacts

You should produce a **technical report** documenting your assignment.

- The technical report **must be produced** in the **readme.md** file located in the repository folder related to P1.4 (e.g., 1133224-maria-ferreira/p1.4/)
- The report should include:
  - The Analysis of the Problem
  - The Design of your Solution
    - Present an overview of the tools (e.g., software used, major concepts, major processes, architecture of the tools)
    - Present an overview of the solution (e.g., the architecture and major configurations required)
  - The Steps required to Reproduce your Solution (it should include references/links to configuration files, scripts or code included in the same folder of the repository)
- You may also include:
  - Justification of Design Options
  - Analysis of the Alternative
  - The Steps required to Reproduce the Alternative

You should include in your repository a file containing the **GNS3 Portable Project**

- In GNS3, choose "File/Export portable project" to generate a file containing your project.
- You should commit this file to your repository.
- **Attention:** This option may fail if your network includes VirtualBox VMs.

## P1.4: How to Submit to the Class Shared Repository

If you have been selected to make a presentation for this component you must share your work with the class using the shared repository.

- The shared repository is located in <https://bitbucket.org/mei-isep/cogsi-18-19-class-rep>.
- You should make a fork of this repository.
- You should then clone the forked repository into your local computer.
- Copy to this repository only the folder where you developed P1.4 (e.g., 1133224-maria-ferreira/p1.4/).
- Commit and push the changes to the forked repository.
- In Bitbucket do a pull request against the original shared class repository in <https://bitbucket.org/mei-isep/cogsi-18-19-class-rep>.
- The teacher will review your pull request and, once accepted, it will become available to all other students.