COGSI - Configuração e Gestão de Sistemas

Mestrado em Engenharia Informática, Ramo Sistemas Computacionais

Class Assignment

P4 - Network and System Simulation

Alexandre Bragança atb@isep.ipp.pt

Dep. de Engenharia Informática – ISEP

2022/2023

P4: Overview

- **Start Date:** 19, April
- **End Date:** 3, May
- **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:**
  - Lectures: May 3
- **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-22-23-class-rep`) before the deadline.

P4: 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**.

P4: Specific Concerns

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

Simulation

- The hosts in the network should be connected through a switch
- The network should have a monitoring system based on Nagios
- The network should have a host running the Todd Java application
- The network should have a host running Tomcat
- Your simulation should aim at consume the lowest resources of the host system, i.e., you should **use Docker containers**.
- Your solution should be based in the example presented in the lectures (i.e., use gns3/ipterm, gns3/webterm and NAT nodes)

Monitoring

- You should, **as much as possible**, replicated the monitored solutions developed in the previous exercises (i.e., active and passive monitoring with NRPE and JMX).
- You should monitor all the elements in the network (i.e., including the router)

P4: Alternative/Analysis

The alternative for this exercise is to build a similar simulation but where we include a **router**.

- Please see the slides of GNS3 (in the lectures) for suggestion on how to simulate a router
- In the alternative network topology the Nagios host should be in a different network than the other elements/hosts of the solution (i.e., Nagios on one "side" of the router and the other hosts in another "side")
- Use the "parents" property of host in the Nagios configuration to inform Nagios of the network topology
- Explore using WireShark with GNS3 to analyze network traffic (for instance, see the difference in network traffic between active and passive checks in Nagios)

P4: Technical Report

You should produce a technical report documenting the assignment.

- The technical report **must be produced** in the **readme.md** file located in the repository folder related to P4 (e.g., 1133224-maria-ferreira/p4/)
- 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

P4: 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-22-23-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 P4 (e..g, 1133224-maria-ferreira/p4/).
- 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-22-23-class-rep`.
- The teacher will review your pull request and, once accepted, it will become available to all other students.