L50 - Lab 4, System Characterisation

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This lab, as well as the following one, will explore the characterisation of an artifact. Students receive different artifacts, and each student defines and executes a characterisation plan for the artifact. In the next (and last) lab, each student reproduces an experiment by another student.
The goal of these labs is to demonstrate your knowledge in system and network performance measurements, building upon the lectures and your previous lab experiments.

1 The artifact

This year the artifact is the cloud, or rather a set of three virtual machines (VMs) running in the cloud. Each student is assigned a different set of VMs, and the VMs are different in their characteristics.

Your goal is to characterise the 3-nodes system based on the practices learned in the course. There is no single definitive set of tests that need to be conducted, but your tests should cover most of the course's topics. You may choose to focus on a specific element, e.g., latency, bandwidth, but we request that you should at least conduct rudimentary measurements of each type.

2 Characterisation plan

Before starting your experiments, you should prepare a characterisation plan. The characterisation plan should include all the aspects that you intend to cover as part of your tests, and which experiments you are going to conduct as part of the characterisation.

This plan is not for submission, and will not be graded, however during the lab the instructors will the review the plans with you to make sure you are on the right track. For ease of discussion, it is best if your plan is formatted as a list or a table.

3 Measurement tools

You can use any measurement tool discussed in class, as well as any other open source tool available. This may include also tools not discussed in class.
The evaluation of your work will focus on your ability to demonstrate an understanding of obtained results, rather than a multitude of those, and in particular the understanding on tools' limitations, and the analysis of unexpected results. You should pick your measurement tools accordingly.

3.1 Practical tools available

This section will be amended before the lab with links and information on various available tools.

4 Reproducibility

As in the following lab you will be requested to reproduce each other's experiments, you should employ proper reproducibilty methodologies, and in particular the use of scripts, repositories etc. You can use Jupyter notebooks as a mean to script your experiments, and you can reuse code from previous experiments. You can also reuse code and test environments openly released by the measurements community.

You should prepare instructions for reproducing your experiments, and your peers will use those instructions to repeat your tests. We will provide during the lab a form to be completed with feedback on the reproduction.

5 Use of the cloud environment

This section will be amended before the lab.

6 Lab report

A lab report summarising your work is required.

Submission Deadline: 29/11/2017, 12:00
Submission: submit through Moodle. Three files are required:

1. The lab report, as a single pdf file.
2. The reproduction environment, as a single compressed file (tar, zip).
3. A dump of the measurements' results, as a single compressed file (tar, zip)

The reproduction environment and the results files should include a README file, explaining the organization of the folder, file name conventions and the meaning of different files.
There is a size limitation for file submission. Please contact the course's team if your measurements result is bigger than that. The reproduction environment and the report must be (significantly) smaller than the file size limitation.

6.1 Structure

The report must be **No more than 5000 words**. Longer reports will not be accepted nor graded. Figures, graphs and citations, referenced within the text, are not counted toward the word count. Please use a font size of at least 10pt.

If you encounter exceptional results, which can lead to a report longer than the word limit, you can include those in an appendix. The appendix will not be graded, but the course's team is happy to discuss and follow up on such results.
We request that you indicate in your report if you are happy that we share any interesting measurement results with the cloud provider.
While not mandatory, we suggest the following format for the report:

- A description of the artifact and relevant metadata.
- Platform information and experiments.
- Topology experiments.
- Latency experiments.
- Throughput experiments.
- Advanced or focused experiments.
- Instructions for reproducing the experiments.

Each experiment should detail, shortly, the following:

- The goal of the experiment.
- Setup and tools used.
- The methodology used.
- Results.
- Analysis and discussion of the results.

There is no requirement on the formatting of the pages or the sections.
As always, you should look for odd or surprising results, and try to explain them. Note that sometimes exceptional results indicate a problem in your setup or scripts.