Introduction to Systems Virtualization

Florent Glück - florent.gluck@hesge.ch

February 17, 2025

ISC - HEPIA

Course's resources

- Course's portal on Cyberlearn
  - HEPIA ISC Virtualisation des Systèmes
  - https://cyberlearn.hes-so.ch/course/view.php?id=14241
  - enrollment key: sysv25
- Course's material on git
  - link to git repository on Cyberlearn
- Course's chat on Mattermost
  - Mattermost enrollment link on Cyberlearn
- Make sure to **enroll** both on Cyberlearn and Mattermost!

Goals

- Acquire a good understanding of virtualization concepts, their technologies, and their use
- Understand major technical aspects of:
  - platform virtualization
  - storage virtualization
  - containers (operating system virtualization)
- Be able to configure and deploy:
  - virtual machines
  - containers

Topics

- Introduction to virtualization

Topics

- Introduction to virtualization
- Platform virtualization
  - QEMU

Topics

- Introduction to virtualization
- Platform virtualization
  - QEMU
- Storage virtualization
  - LVM

Topics

- Introduction to virtualization
- Platform virtualization
  - QEMU
- Storage virtualization
  - LVM
- Operating system virtualization (containers)
  - Docker

Exercises and practical labs

Throughout the semester, many exercises and practical labs must be completed

- Work in class as well as **at home**

Exercises and practical labs

Throughout the semester, many exercises and practical labs must be completed

- Work in class as well as **at home**
- Exercises and practical labs are not assessed directly:
  - live-exams will be based directly on practical labs
  - **imperative** that you **complete** exercises and practical labs **yourself** to **greatly increase your chances of passing** the exams

Exercises and practical labs

Throughout the semester, many exercises and practical labs must be completed

- Work in class as well as **at home**
- Exercises and practical labs are not assessed directly:
  - live-exams will be based directly on practical labs
  - **imperative** that you **complete** exercises and practical labs **yourself** to **greatly increase your chances of passing** the exams
- High probability of **failing** otherwise!

Work method (1/2)

- **Be present and focused**: information will often be given on the spot
  - missing lessons = missing explanations and useful advice!

Work method (1/2)

- **Be present and focused**: information will often be given on the spot
  - missing lessons = missing explanations and useful advice!
- **Take notes** as slides are **incomplete**!

Work method (1/2)

- **Be present and focused**: information will often be given on the spot
  - missing lessons = missing explanations and useful advice!
- **Take notes** as slides are **incomplete**!
- **Work on a regular basis**: last minute work won't cut it 😢

Work method (2/2)

- Be **proactive** and **ask questions**, there are no dumb questions 😀
  - no questions = I assume everything is understood...

Work method (2/2)

- Be **proactive** and **ask questions**, there are no dumb questions 😀
  - no questions = I assume everything is understood...
- Don't **blindly** copy/paste code found elsewhere (ChatGPT, Stack Overflow, etc.)

Work method (2/2)

- Be **proactive** and **ask questions**, there are no dumb questions 😀
  - no questions = I assume everything is understood...
- Don't **blindly** copy/paste code found elsewhere (ChatGPT, Stack Overflow, etc.)
  - the goal is that **you truly understand** what's going on and what you're doing!
  - best way to understand: **take the time** to complete the work and think by **yourself**

Evaluation

- Graded multiple-choice questions (QCMs)
  - very frequent
  - questions on course and labs contents
- Live-exam on containers

⚠ **In all cases, unjustified absence, cheating or plagiarism = 1**

Exams

- QCMs will be done on paper, without any documents
- Live-exams will be done on virtual machines:
  - without Internet access (or with limited access)
  - access to course slides (sometimes partially)
  - access to the system manual (`man`)

Grading

Semester grade:

- Average of all QCMs: 60%
- Live-exam on containers: 40%

Questions