Cloud Computing: From Infrastructures to Applications

Administrivia

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About me

Associate professor

- Since 2015
- LIG Laboratory

Research topics

- Reliability and efficiency of large-scale systems
- Current research work:
  - Algorithms for new memory/storage hierarchies (Pmem, CXL, etc.)
  - Carbon footprint of cloud platforms
  - ML approaches for optimizing distributed systems

Teaching staff

- Didier Donsez (didier.donsez@univ-grenoble-alpes.fr)
- Olivier Gruber
  (olivier.gruber@univ-grenoble-alpes.fr)
- Thomas Ropars
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Organization of the course

Webpage

All the resources are published on our web page:
`https://m2-mosig-cloud.gitlab.io/`

Grading

- A continuous assesment grade (30%)
  - A programming project
  - Reading of articles
- A final exam (70%)

About the reading of articles

The rules

- One scientific article to read each week
  - Everybody has to read the paper
  - We discuss the paper during next lecture

- 3 students are picked randomly at the beginning of next session
  - 1 student presents the paper
    - 5 to 10 minutes to present the paper to the class
  - 2 students ask questions
    - Prepared questions
    - And/or based on what has been presented
  - You can work in groups of 2 if you want
  - Everybody participates to the discussions

About the project

- Deployment and management of a containerized microservice application in a public cloud platform
- Public cloud platfrom: GCP
  - You will receive credits very soon
- By groups of at most 2

Goals and topics for these lectures (1/2)

- This class aims at providing students with an overview of **the history, the current state and the upcoming challenges** of data center / cloud computing.

- The progresses in the above domain shave help democratized the access to computing resources and shaped the way to develop and manage applications. Thus, this class should be useful for diverse types of students in computer science & engineering.

- We will **focus on the software aspects at the infrastructure level (i.e., operating systems and middleware)**, while keeping an eye on the evolution of the hardware and the applications.

Goals and topics for these lectures (2/2)

The following topics will be covered:

- An overview of the **main software building blocks** available from cloud platform providers
- The design principles and challenges of **cloud-native applications** and **microservices**
- **Resource management** and coordination services
- **Data processing** architectures and systems