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Cloud Computing (3IN2047)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
Master en informatique	Cours: 2 ph Exercice: 2 ph	Voir ci-dessous	5

ph=période hebdomadaire, pg=période globale, j=jour, dj=demi-jour, h=heure, min=minute

Période d'enseignement:

- Semestre Automne

Equipe enseignante

Lectures: Dr. Lorenzo Leonini
Assistant:

Objectifs

This Cloud Computing course is proposed in the context of the Swiss Joint Master in Computer Science of the Universities of Bern, Neuchâtel and Fribourg (<http://mcs.unibn.ch>). It targets students with a background in undergraduate distributed systems and operating systems, wishing to get a deep understanding of the concepts, design and implementation of Cloud computing systems. Cloud infrastructures, formed of geographically distributed and very large data centers, power most of today's applications and large company services.

The course covers a range of systems and software engineering aspects at the heart of Cloud computing. Example systems discussed in class are selected from state-of-the-art industry systems.

Contenu

The Cloud Computing course features 10 lectures (will be complemented upon need by tutorials sessions).

Topics covered:

- Cloud Computing model and landscape
- Virtualization and isolation
- Lightweight virtualization and containers (Docker)
- Orchestration (Docker Swarm, Kubernetes)
- Micro-services and RESTful APIs
- Platform-as-a-Service and service-oriented architecture
- Cloud storage / NoSQL
- High availability
- Consistency models and algorithms
- Cloud security

Tutorials:

- Containers and Docker
- TBD

Practical project:

- Scalable REST backend micro-services

Forme de l'évaluation

The evaluation is on the final exam (67% of the grade) and the grade of the project assignments (33% of the grade). The deadlines for the project are announced at the first lecture. Upon failure at the exam, the grade for the assignments will be kept when the student passes the exam another time.

Documentation

No book required. Pointers to online resources will be provided in class.

Pré-requis

Ability to program in general-purpose high-level programming languages, such as Python or Ruby. Assistance will be provided for students who

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do not know these languages. The class requires student to use their own laptops. Students without a laptop should contact the instructor who will seek an arrangement.

Forme de l'enseignement

Lectures, tutorials, practical projects, and reading seminar