Course on "Cloud Computing & Big Data Lab"

Prof. Tommaso Cucinotta

Goal

This is a hands-on and applied course following up to the Cloud Computing & Big-Data course. Here, students will put in practice the theoretical/abstract concepts acquired in the general course on Cloud Computing & Big-Data. During the practical sessions, we'll have a deep dive on such concepts as: machine virtualization and OS-level virtualization on Linux; virtual networking on Linux; programming abstractions for cloud and distributed computing; elasticity in practice; big-data programming frameworks; command-line interface for major public cloud services; popular open-source cloud platforms.

Program at a glance

- Virtualization Fundamentals
  - KVM Command-Line Interface
  - libvirt and virtual-manager
- Virtual Switching on Linux
  - brctl and OpenVSwitch
- Containers
  - LXC and netns
- Public Cloud Services
  - AWS EC2, S3, DynamoDB, CloudWatch
- Open-source cloud and big-data platforms
  - OpenStack Nova, Glance, Neutron
  - OpenStack Heat/Senlin, Ceilometer/Monasca
  - Apache Spark

Requirements

Students need to have attended the Cloud Computing & Big-Data general course, and they must be fluent in programming and shell scripting on Linux.

Why to attend

Students will acquire a unique insight into the world of cloud computing and big-data related technologies, and will be able to master key tools behind their use. This is a fundamental brick in the background of a software engineer / computer scientist who will deal with modern distributed software systems in industry or academia, spanning across high-performance, cloud and even (increasingly connected) embedded systems.

About the course

Duration and format: lab lessons, 30 hours (3 CFU)
Target programs: PhD in AI, PhD in Data Science, PhD in Emerging Digital Technologies
Schedule: flexible, to be agreed with students, with planned beginning on mid'April.
Exam: coding project and oral examination.
More details: available on the course web-page.

About the lecturer

Prof. Tommaso Cucinotta has a MSc in Computer Engineering from University of Pisa and a PhD from Scuola Superiore Sant'Anna. He spent more than 10 years at the Real-Time Systems Laboratory (ReTiS) of Scuola Superiore Sant'Anna carrying out research in security and smart-card based authentication, adaptive deadline-based scheduling in the Linux kernel for embedded, soft real-time and multimedia applications, temporal isolation in virtualized cloud services and novel OS designs for massively parallel and distributed systems. He has been MTS at Bell Labs in Dublin, carrying out industrial research on security and confidentiality, and real-time performance of cloud systems, with a focus on Telco applications. He has also been a Software Development Engineer in AWS DataBase Services in Dublin, Ireland, working on scalability and performance enhancements to the AWS DynamoDB NoSQL real-time data-base. Since 2016, he is back at the ReTiS of Scuola Superiore Sant'Anna as associate professor. He is a member of the PhD board of the Data Science PhD program jointly offered by Scuola Sant'Anna, University of Pisa, Scuola Normale Superiore, IMT Lucca and CNR since its first edition in the a.y. 2017/2018. He is also a member of the PhD board of the National PhD in AI – AI for Society – program jointly offered by Scuola Sant'Anna, University of Pisa and other academic institutions. Since year 2019, he is coordinator of the real-time and embedded systems research area at the RETIS.