COURSE: Monitoring and Processing for the Internet of People and Machines

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COURSE DESCRIPTION

The course aims to introduce the student to technologies and solutions for monitoring infrastructures and applications. Specific emphasis will be placed on ultra-scalable stream monitoring and analytic techniques, devised to operate on the data as they come (on-the-fly processing) and therefore meeting the need of big data applications.

LEARNING OUTCOMES

The student will get acquainted with basic monitoring concepts, tools and metrics in a broad range of environments, from simple network deployments up to cloud and distributed systems. Moreover, the student will get introduced to stream-based techniques. Practical examples and laboratories will complement the preparation.

METHODOLOGY - The course combines both frontal lectures and laboratory activities. Based on the students' skills and interests, the mix of theory and practice may be adapted during the course.

ASSESSMENT

Single final test, including questions on laboratory parts.

OUTLINE

Part 1: introduction to Monitoring, Events, Metrics and Measurement, alerts and alert nmanagement; log collection and analysis; storing and graphing metrics; data and metrics visualization.
Part 2: infrastructure monitoring: network monitoring tools, cloud monitoring (VMs and containers), security monitoring and SIEMs; examples and tools
Part 3: stream monitoring and analytics: sketches, Bloom-type filters and their extensions for stream analytics, one-pass filtering, behavioral monitoring via extended state machine models.

TEXTBOOKS

Lecture slides will be provided during the course, along with supplementary ad-hoc material (book chapters, scientific works, standard documents, etc) complementing the slides.

ADDITIONAL SUGGESTED READING

James Turnbull, ***"The Art of Monitoring***", https://artofmonitoring.com/