Seminar (Master): Principles of Distributed Systems  
(Winter Term 2015)

Software-defined Environments

Software-defined environments – a term coined by IBM – are currently a big trend in industry and academia. Software-defined environments (SDE) optimize the entire computing infrastructure consisting of distributed processing, networking, and storage resources, such that the infrastructure can be adapted to application demands easily and to increase flexibility.

One frequently used method in software-defined environments is virtualization. For instance, virtual machines (VM) provide increased flexibility by offering the ability to migrate VMs between physical hosts. By migrating VMs, the load of physical hosts can be balanced, and compute resources can be utilized more efficiently.

Another essential part of SDE are software-defined networks (SDN). With SDN, the configuration of the network is out-sourced from the network switches to a software process executed on an external host (called the network controller), which is configuring the network, e.g., by calculating optimal paths for communication flows to maximize throughput or to reduce communication latency. This configuration is performed by a “logically centralized” controller with a global view onto all resources to find an optimal solution and facilitate the configuration. Real-world deployments of SDN – for instance at Google – have shown that SDN increase the utilization of network resources substantially.

In this Master’s seminar, we discuss basic architectures, concepts, technologies, and standards to enable and implement SDE including the whole spectrum of distributed resources including distributed processing resources, distributed storage resources, and networking resources.

Prerequisites: Basic knowledge of computer networks and/or distributed systems.

For further information, please visit the course web-site: http://goo.gl/tdRiT9

If you have any further questions about this seminar, please contact Frank Dürr: frank.duerr@ipvs.uni-stuttgart.de

This seminar is not targeted at Master CS or INFOTECH (presentations might be in German).