

InstantLab - OS Experiments in the Cloud

Alexander Schmidt
Operating Systems and Middleware Group
Hasso Plattner Institute

Resource management is one of the most prominent tasks of an operating system. The OS virtualizes and abstracts away physical resources, such as processor (CPU), memory, input/output subsystems, and networking. Managed runtimes of modern programming languages, such as Java or .NET go even further in hiding implementation details of the actual hardware from the programmer. However, with the end of the Gigahertz-race the single-threaded performance of next generation CPUs will not longer increase compared to its predecessor. Instead, central computer architecture principles, such as memory hierarchies, multiprocessor scheduling, and co-location of data and computation (for NUMA architectures) will again become relevant to many programmers when optimizing their code. This applies not only to local computers, but to applications running on the cloud as well.

InstantLab is targeted at using cloud resources for much-needed operating system education. Here, we develop an approach for teleporting out previously developed labs for the Windows Research Kernel (WRK) into the cloud. Students may use this infrastructure for running a set of well-documented experiments and exercises on the Windows kernel (such as changing Memory Manager or scheduling) without the hassle of installing source code and build infrastructures locally.

In the talk we present our experiences with using the Cloud as a platform for our service, which also includes several drawbacks and limitations we faced with today's Cloud implementations. We will also give a demonstration of our platform and present early evaluation results.