

Agile Infrastructure at CERN

Moving 9'000 Servers into a Private Cloud

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Abstract: CERN, the big particle physics lab close to Geneva (Switzerland), is home to the Large Hadron Collider (LHC) and its four data-intensive experiments. In 2012, a new particle was detected that was identified in 2013 as the long-sought Higgs boson. The experiments deliver some 30 Petabytes of data per year to the CERN computer centre that runs almost 10'000 servers in order to process them. For the next years, data rates will grow, and so will the number of servers. In order to cope with this increase without corresponding increase of personnel, CERN reviewed the way it runs its computer centre, and launched the "Agile Infrastructure" project with the aim of organising services into horizontal layers; moving to a private cloud is an integral part of the strategy. Major work areas are configuration, cloud computing, and monitoring. Whenever possible, existing free, open-source solutions have been selected as components for well-confined functionality, with CERN adding just a bit of glue to make the components work together, with the aim of being able to easily replace a component, should a better solution become available. Cornerstones of the new system include Puppet and PuppetDB, Foreman, Openstack, Elasticsearch and Kibana, Flume and others. As of January 2014, some 7'000 servers (physical or virtual) are managed with Puppet, and some 2'100 physical servers have been moved into the private cloud. The presentation will discuss the motivation, describe the current choices of tools, report on experience made so far, and give an outlook of what is expected to come.

BRIEF BIOGRAPHY

Helge Meinhard studied physics and obtained his Ph. D. in experimental particle physics in 1991. After two years of research at CERN, he provided computing support to the CHORUS and ATLAS experiments at CERN. In 2001 he joined CERN's IT Department, where until 2009 he was responsible of server and storage procurements. Since 2010 he has been the head of the "Platform and Engineering Services" group; the group provides large-scale services to the physics and the engineering communities, most notably a batch computing service on about 4'500 servers.