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Integrating multiple scientific computing needs via a Private Cloud Infrastructure

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In a typical scientific computing centre, diverse applications coexist and share a single physical infrastructure. An underlying Private Cloud infrastructure eases the management and maintenance of such heterogeneous applications (such as multipurpose or application-specific batch farms, Grid sites catering to different communities, parallel interactive data analysis facilities and others), allowing to dynamically and efficiently allocate resources to any application, precisely tailoring the virtual machines according to the applications' requirements. Furthermore, the maintenance of large deployments of complex and rapidly evolving middleware and application software is eased by the use of virtual images and contextualization techniques; for example, rolling updates can be performed easily and minimizing the downtime. In this contribution we describe the Private Cloud infrastructure at the INFN-Torino Computer Centre, that hosts a full-fledged WLCG Tier-2 centre, a dynamically expandable PROOF-based Interactive Analysis Facility for the ALICE experiment at the CERN LHC and several smaller scientific computing applications. The private cloud building blocks include the OpenNebula software stack, the GlusterFS filesystem (used in two different configurations for worker- and service-class hypervisors) and the OpenWRT Linux distribution (used for network virtualization); a future integration into a federated higher-level infrastructure is made possible by exposing commonly used APIs like EC2 and OCCI. In this talk we describe the operational experience and the latest developments in the integration with evolving experiment Computing Models.

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