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# Dynamic storage provisioning for elastic cloud services with dCache

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DESY contributes computing and storage infrastructure to the EGI Federated Cloud that is used by Photon and Neutron Research Infrastructures (PaN RIs) in European H2020 projects, working towards the European Open Science Cloud (EOSC). Building on this federated Infrastructure-as-a-Service (IaaS), DESY - as a research centre of the Helmholtz association - provides integrated Platform-as-a-Service (PaaS) solutions to EGI users and to Helmholtz Federated IT Services (HIFIS). Serving for scientific cloud computing applications, which need dynamically provisioned local data access for an optimized resource usage, dCache adds robust, elastic storage for private
and hybrid cloud solutions.

The PaN RIs are producing petabytes of data with free electron laser, synchrotron light and neutron sources and provide FAIR data services to a wide scientific user community. The Photon and Neutron Data Service (ExPaNDS) project expands and accelerates access to this data through the EOSC. Use-cases include the integration with high performance computing infrastructure at site and span to data lake type scenarios with federated storage systems. The development of the Photon and Neutron Open Science Cloud (PaNOSC) comprises a spectrum of use-cases that reach from environments for development and testing of containerized applications to running compute intensive simulations.

To support these use-cases for federated cloud computing resources, DESY integrates services for the whole life cycle of user supplied virtual machines and containers, adopting solutions from the EOSC and providing incentives for scaling to the enormous demands of the PaN RIs.

This builds on enabling efficient and secure distribution of private and public container images as shared ready-to-use environments, that can auto-scale user jobs. Users and service providers, who realize their work leveraging Kubernetes' orchestration capabilities can provision virtualized compute nodes, abstracting away most of the required interaction with the underlying Cloud Platform and benefiting from additional building blocks for monitoring, logging and alerting functionality as well as an application catalog. This service adds centralized authentication and role-based access control (RBAC).

This talk will highlight how the dCache storage system taylors for this platform and use cases running on federated cloud projects at DESY, effectively enabling federated AAI, token-based access, and dynamically provisioning access to the storage for elastic virtual scientific computing environments on hybrid cloud and contawiner orchestration systems.

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