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EGI Federated Cloud Infrastructure

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This presentation introduces the EGI Task Force on Federated Clouds to the world wide Grid and Cloud communities. Building on the technology and expertise aggregated in over 10 years of successful provisioning and operation of a pan-European Grid Infrastructure, the Task Force further pushes the frontiers of Cloud interoperability enabling user communities to scale their computing needs across multiple Cloud providers, both academic/publicly funded and commercial providers.

Summary

EGI provides a pan-European computing and storage infrastructure for world-wide academic research projects. Stemming from a rich history of high-throughput computing served for heavy user communities such as High Energy Physicists, Earth Sciences academics and molecular biologists, EGI seeks to significantly increase its support for more diverse user communities through the adoption of virtualisation within its data centres to provide a federated IaaS.

To help EGI reaching this goal, a Task Force was set up to examine, document and implement the work needed to federate local, autonomous Cloud Providers within the EGI federation. To begin with, usage scenarios for a federated Cloud infrastructure were elicited through a series of meetings and conferences (e.g. the EGI User Virtualisation workshop, http://go.egi.eu/uvw1), and then refined into six fundamental yet high-level scenarios that form the basis for advanced federated Cloud usage.

The six usage scenarios look at a federated Cloud infrastructure from a user application integrator's point of view and describe key aspects of using a virtualised infrastructure: Dividable into two types of scenarios, the first three scenarios describe the needs that may already be satisfied engaging with only one Cloud Provider in a Private Cloud deployment setting, such as VM management, Data integration and configuration, and an Information Discovery system. The second set of scenarios describe the user's needs when scaling out across multiple Cloud providers within the EGI federation; Accounting, Monitoring and Notification are necessary to accommodate the needs of scaling users into communities, and the model user in the earlier scenarios into customers representing virtual research communities.

Most of the necessary key infrastructure capabilities, including corresponding technical solutions, are already in place within EGI; the operational value and scalability of Storage services, distributed information systems, a European monitoring and accounting infrastructure were already proven in over 10 years of operation of a pan-European Grid Infrastructure supported through the EGEE projects and, since recently, the EGI-InSPIRE and EMI projects. Together with the new capabilities, they will be examined to determine what changes are necessary to accommodate a federated virtualised infrastructure.

In summary, the EGI Federated Clouds Task Force brings together representatives of three key stakeholder communities that are necessary for a successful and technology agnostic federation of virtualised infrastructures: User communities not only formulate and develop use cases and requirements for the infrastructure, they also test the deployed services against the six usage scenarios by integrating the provided test bed into their real-life computing workflows. The Resource providers operate the federated Clouds in a test bed, choosing whichever Cloud infrastructure management software may best suit their specific needs while at the same time satisfying the defined core capabilities. Finally, Technology Providers represent the choice of software components that satisfy not only the key capabilities for Cloud infrastructure management, but also more specific needs of the Resource Providers federated in EGI.

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