Enhancing Grid Infrastructures with Virtualization and Cloud Technologies

September 2010

STRATUSLAB is developing and deploying cloud technologies with the aim of simplifying and optimizing the use and operation of distributed computing infrastructures such as the European Grid Infrastructure (EGI).

The StratusLab Toolkit will integrate cloud and virtualization technologies and services within grid sites and enrich existing computing infrastructures with "Infrastructure as a Service" (IaaS) provisioning paradigms.

The StratusLab Toolkit

StratusLab will integrate, distribute and maintain a sustainable open-source cloud distribution to bring cloud to existing and new grid sites. The StratusLab toolkit will be composed of existing cutting-edge open source software and the innovative service and cloud management technologies developed in the project. It will create a production grade distribution that will be demonstrated through the operation of production-level grid sites in the project.

Benefits

StratusLab brings several benefits to the e-Infrastructure ecosystem, in terms of simplification, added flexibility, increased maintainability, quality, energy efficiency and resilience of computing sites. The new StratusLab Toolkit cloud distribution complements existing grid middleware services: the aim is for the cloud layer to be fully transparent to layers above.

Interoperability

Existing grid middleware, as provided by EMI, continues to provide the glue to federate the distributed resources and the services for high-level job and data management. StratusLab will help to improve the usability of distributed computing infrastructures; attract scientific user communities; appeal equally to industrial users; keep European research infrastructures at the technological forefront, and strengthen the know-how in virtualization and cloud computing of European industry.

Action plan

StratusLab is a two-phase project. In the *first phase*, the project will focus on cloud computing for resource provisioning in grid sites. This will entail development of the initial StratusLab cloud platform and creation of virtual appliances for the scientific application domains in the project.

In the *second phase* the emphasis will shift towards developing new cloud-like delivery paradigms in grid sites. This will build on the first phase, including new IaaS cloud interfaces that can be used for community services, directly by users, and to deploy novel cloud-based services

Project details

Contract n^o	RI-261552
Project type	CP-CSA
Start date	01/06/2010
Duration	24 months
Total budget	€ 3 317 657
EC Funding	€ 2 300 000
Effort	340 person-months

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Partners

Centre National de la Recherche Scientifique (CNRS), *France*

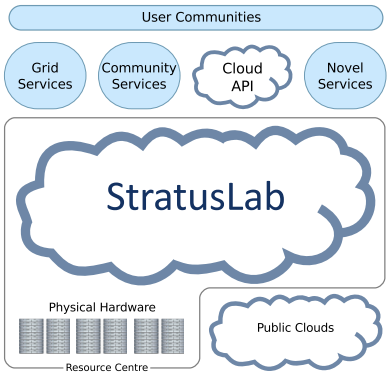
Universidad Complutense de Madrid (UCM), *Spain*

Greek Research And Technology Network S.A. (GRNET), *Greece*

SixSq Sàrl, *Switzerland*

Telefonica Investigacion y Desarrollo S.A. (TID), *Spain*

Trinity College Dublin (TCD), *Ireland*



User communities

StratusLab benefits a wide variety of users; from scientists to system administrators.

Scientists	End-users that take advantage of existing machine images to run their scientific analyses.
Software Scientists and Engineers	Scientists and engineers that write and maintain core scientific community software and associated machine images.
Community Service Administrators	Scientists and engineers who are responsible for running community specific data management and analysis services.
System Administrators	Engineers or technicians who are responsible for running grid and non-grid services in a particular resource centre.
Hardware Technicians	Technicians who are responsible for maintaining the hardware and infrastructure at a resource centre.

Achievements June–September 2010

SURVEYS StratusLab surveyed target communities of system administrators and users, providing valuable input for the project's direction.

USER COMMUNITIES The project has developed contacts with the ATLAS high-energy physics community, and to the bioinformatics community through CNRS IBCP. Design has begun on a bioinformatics virtual appliance.

BENCHMARKS The project has developed benchmarks for realistic scientific application workloads.

DISSEMINATION StratusLab has undertaken dissemination activities including press releases, website and other online media, and invited talks and keynotes.

BUILD SYSTEM The project has established a build system for its developers to support continuous integration and product packaging.

CLOUD TOOLS Command-line tools have been created to make installing and managing a StratusLab cloud straightforward.

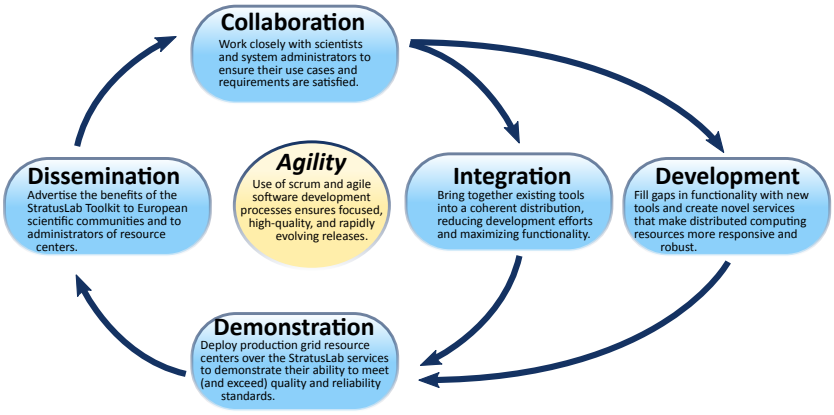
CLOUD TESTBED A cloud testbed has been set up for testing the StratusLab toolkit. Deployment has helped to uncover problems and provide feedback to developers.

GRID INTEGRATION Grid services using gLite middleware have been installed and configured on a StratusLab cloud.

QUATTOR Configuration components for the Quattor fabric management system (`http://quattor.org/`) – widely used for grid site management – have been created to simplify integration of StratusLab into Quattor-managed sites.

APPLIANCE REPOSITORY A repository for virtual appliances has been set-up and populated with useful virtual machine images. There is initial support for customizing appliances from the repository.

Development process



StratusLab has adopted the Scrum agile software development method, delivering releasable increments every three weeks, daily stand-up meetings, and collegial management of priorities. The result is the StratusLab Toolkit, supporting public, private and hybrid clouds.

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