Standard-based Interoperability amongst Local, Grid and Cloud Resources Distributed Worldwide

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Impact

The contribution presents a viable and sustainable model to gather distributed resources from all over the regions of the world and get a truly global e-Infrastructure, yet respecting local specificities and exploiting competences of all participating organisations.

URL

http://www.chain-project.eu

Summary

In this contribution we will present the CHAIN Science-Gateway and the results of its program to demonstrate standard-based interoperability amongst local (clustered or opportunistically exploited), grid and cloud resources distributed worldwide and based on several different middleware.

Description

The availability of powerful COTS computers and the decrease of costs of LAN components triggered in the first half of 90's the emergence of cluster computing for High Throughput Computing (HTC) applications. "Farms" of computers with many-core processors, interconnected by very low latency networks, have become the norm also in the domain of High Performance Computing (HPC) and in the last five years about 80% of the Top500 machines are based on such architecture.

Moreover, the steep decrease of costs of large/huge-bandwidth WANs has fostered in the recent years the spread and the uptake of the grid computing paradigm. Grid infrastructures are being built in several areas of the world but, despite the huge investments made by the European Commission and by other funding agencies, both at national and international level, the total number of users is only in the order of magnitude of 10^4. The distributed computing ecosystem has become even more complex with the recent emergence of cloud computing. Private cloud providers rely on "non-disclosed" architectures and have business models that leave very little (if any) room to interoperability and federability. Open federated clouds for research have also started to be created but they are still in an infancy state and the interaction between computing clouds and storage clouds is in many cases quite "fuzzy".

This complexity keeps most of non-IT experts away and forces early adopters to have several accounts on several services if their research communities span across different e-infrastructures.

The Grid team at INFN Catania has developed a framework in the context of the CHAIN project to easily and quickly build Science Gateways which are Service Providers of Identity Federations, potentially accessible by huge numbers of users. The framework makes use of the Simple API for Grid Applications (SAGA) standard, defined by the Open Grid Forum, to perform middleware-independent job and data management.

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