

Using the EGI Federated Cloud for the provisioning of Grid Worker Nodes

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Summary

We showcase the usage of a cloud infrastructure for the on demand provisioning of additional Worker Nodes under an EMI based Grid infrastructure. The need of being able to add computing resources on-the-fly has gradually emerged over the years as a way to leverage the large number of jobs that may occasionally be routed towards a Grid site. After considering several PaaS based alternatives that could be used to harness such a need we decided to use the EGI Federated Cloud for our purposes by developing an OCCI interface for our service.

Impact

This work, in a way, introduces elasticity to the Grid. Using if not the same but also similar implementations administrators of Grid resources can modify on demand the number computing resources offered based on certain thresholds (i.e. the total number of submitted jobs and the underlying number of physical job slots). We feel that the user experience of the Grid will be enhanced through such implementations, especially for users that rely heavily on parametric job types or large parallel jobs (or both).

URL

<https://github.com/auth-scc/emi-grid-scaler>

Description

Using the EGI Federated Cloud Infrastructure we introduce the concept of elasticity to our Grid site by adding and removing on demand computing resources in the form of virtualized Worker Nodes (vWNs). The vWNs are added under the central batch job queueing system whenever a large number of jobs is directed towards the site (i.e. whenever the number of queued jobs exceeds the total number of physical job slots offered). Such situations are not uncommon in our experience as several users rely heavily on the usage of parametric jobs. Large batches of parametric jobs may be directed by the WMS (Workload Management Service) to a single site as at the time of submission the WMS does not calculate dynamically the impact of the total number of jobs on the Grid site but rather treats them independently using the information supplied at some earlier given point in time by the information system. By bringing elasticity to the Grid we manage to leverage such abrupt demands on computing resources by deploying vWNs to handle the large number of jobs. Distinguishing among serial and parallel jobs we do so by provisioning two types of instances one for single CPU jobs and one for multi-CPU jobs consisting in the later case of 8 CPUs per instance. Once the number of queued jobs decreases to a number lower than the number of available job slots (physical not virtualized) no additional vWNs are created and the system is left to 'cool off'.

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