Tool for automation of resource application and allocation from a federated EGI pool

Mini-project proposal

1 Project goal overview

Managing coordinated resources application and allocation in the federated infrastructure is needed to ease the matching of resource demand and offering for the support of international collaborations and to ensure that the impact of usage of EGI resources and services is properly acknowledged.

In November 2012 the EGI Council approved the start of experimentation activities around coordinated offering of federated resources, and a task force of resource providers, operators and user communities was constituted to define the processes and related activities needed to support them[1].

In this project we propose to support the processes defined by the task force through a tool which automates negotiation of resource application and offering. The expected output of the project is a web-based operations application - integrated with existing production operations tools - which enables easy and lightweight process support by ensuring: **1) traceability of demand and offer, 2) authentication of customers and providers, 3) programmatic scalable processing of demand and offer, 4) cost reduction by automating the human processes around service offering following the ITIL best practices.**

The tool will reuse code already developed for a similar system already running in production at a national level in PL-Grid (NGI_PL). Code will be modified and extended to support the EGI processes being defined. The project includes testing activities in collaboration with user communities and resource providers to improve the tools and to provide further feedback to the Resource Allocation task force about the processes being defined and implemented.

Expertise gained from running a tool in production allows us to provide a production level, sustainable tool in a few months time. Operation of the tool once ready for production, will be at no extra cost in EGI being it integrated into existing production solutions.

The Resources allocation tool is extensible and can be adapted to other future scenarios like IaaS service offering in the federated cloud of EGI, pay-per-use allocations, brokering in EGI-NGI-Sites hierarchy, and open-market service provisioning models.

With its output the project contributes to the accomplishment of one of the four EGI Core Values: Innovation - “EGI will continue to meet the needs of research communities operating at unparalleled geographic and technical scale by partnering to bringing new technologies into production” [3].

2 Consortium

2.1 Project leader and organization with contact details

Project leader: Tomasz Szepieniec, t.szepieniec@cyfronet.pl, tel. +48 693488328
organization: ACC CYFRONET AGH, Nawojki 11, Kraków 30-950, Poland

2.2 Project consortium

The project consortium is composed of the two EGI-InSPIRE partners experienced in resource allocation in computing infrastructures. Cyfronet will contribute to the resources allocation tool development and CNRS(IN2P3) will be responsible for integration in EGI operation tools environment, additionally providing alpha testing in collaboration with the Biomed VO.

Participant no.	Participant organization name	Participant short name	EGI-InSPIRE participant no.	Country

1 https://wiki.egi.eu/wiki/Resource_Allocation_Task_Force

1 (coordinator)	Akademickie Centrum Komputerowe CYFRONET AGH	CYFRONET	28	Poland
2	Centre National de la Recherche Scientifique	CNRS	14	France

The work of this project is related to EGI Resource Allocation Task Force (RATF) [4], where current participation includes NGI_IT (Italy), IBERGRID (Portugal and Spain), NGI_AEGIS (Serbia), NGI_CZ (Czech Republic), NGI_PL (Poland), NGI_FR (France). RATF complements the works of this mini-project by providing the procedural aspects. The participation of the consortium partners to the RATF ensures good coordination between the works of the task force and the progress and outcome of this project.

2.3 Experience relevant to the proposed project – both individual expertise and as a team (e.g. through a Virtual Team or existing project task) – should be provided.

CYFRONET is a coordinator of PL-Grid Infrastructure which has a role of Polish NGI. PL-Grid Infrastructure is composed of 5 independent large computer centres coordinated by the Operations Centre operated by Cyfronet. Since 2011 PL-Grid operates resource allocation system based on a SLA concept. This system is supported by the Bazaar tool[2], in which the entire process is carried out, including negotiations between the customer and resources providers (sites in coordination by NGI). In December 2012, the system had 90 active, so calleed, large SLAs (with 220 underpinning OLAs) which amounts to average monthly usage over 6000 cores and 260 TB of data. Additionally, about 1500 small SLAs are registered for each site. The resource allocation process in PL-Grid was aligned with rules of IT Service Management (ITSM) in collaboration with the gSLM project [5].

CNRS JRU member IN2P3, which will be involved in this project, developed and hosts the EGI Operations Portal since November 2004. It is one of the centralized tool used for the Operations in the EGI Infrastructure. The Operations Portal is providing information to various actors (NGI Operations Centers, VO managers, etc.) along with related facilities, such as the VO administration tool and the VO management module, the different dashboards (Operations dashboard , security dashboard, VO Operations dashboard). Thanks to modular structure of Operation Portal resource and application allocation module without compromising the functionality of the other production modules.

3 Overview of the Proposed Technical Activity and its Strategic Impact

3.1 How does the proposed project impact with EGI's Strategic Goals?

The tool proposed in this mini-project directly supports a goal to enable **provision of computing and storage resources for European Research Communities** [3, page 23], by providing means for planning strategic computation campaigns, and define the limits and guaranties for particular usage across the whole infrastructure. In the long-term, the proposed tool would be one of the main components to support **EGI Personalised for the Researcher** vision [3, page 14], where a EGI customers would collect the service environment with associated service level guarantees according to their needs.

In short term, the tool would be used to support resource allocation in the current scenarios, like resource allocation in the process of **demonstrating excellent European Science on EGI's shared resources** [1, page 3], allocation resources for computation campaigns for international VOs, or even **EGI Pay-per-Use** [2] model.

Additionally, this mini-project supports the strategy of **customisation of the community facing operational tools**, by providing clear view of customer's allocations and service levels (including availability/reliability, either negotiated or guarantied based on general OLAs), that can be associated with related monitoring and accounting.

3.2 Who will be the main beneficiaries of the work?

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2 For more details please refer:
https://indico.egi.eu/indico/contributionDisplay.py?contribId=223&sessionId=77&confId=1019

The main beneficiaries are the **user communities**, that currently have neither coordinated way for resources allocation nor single point of contact for this, and need this features. Resources providers, both **NGI and Sites**, can benefit by having clear SLAs with customers and platform for resources allocation in which they can decide on how their resources are used. This bridge the remote relation between VO and Resources Providers and improve understanding and maturity in this relation. Finally, for **EGI.eu**, the solution gives not only data about current resources provisioning in the infrastructure, but enable EGI.eu to take convinient position in the process of resource allocation depending on interest in particular scenario. The EGI.eu role would range from *market supervisor,* who runs the market but not have active role in it, to *active integrator*, who adds the value by improving guaranties based on the services provided by NGIs and Sites (e.g. by offering back-up service instances).

3.3 What will the main strategic and technical outcomes of the project be?

The main technical outcome is the **a tool for resource application and allocation integrated with EGI Infrastructure and existing operations tools** that will enable convenient resources allocation for various scenarios, including:

- centralized controlled pool
- enable resources-allocation in hierarchical structure of EGI

Available functions will include: various set-ups of federated and centralized SLA negotiations, support of allocation decision by visualizing current and potential allocation will be available. The tool will be fully integrated with EGI Operations Portal and available for the infrastructure users (VRC/VOs) and NGIs and Sites (according to the scenario). It will be integrated as an independent module into the portal, but will get needed data directly from an API provided by the portal backend.

The development within the project will be steered by outputs of recently established Resources Allocation Task Force (RAFT) [4], chaired by EGI Operations Director. In particular, RATF will decide which scenarios will be implemented and tested.

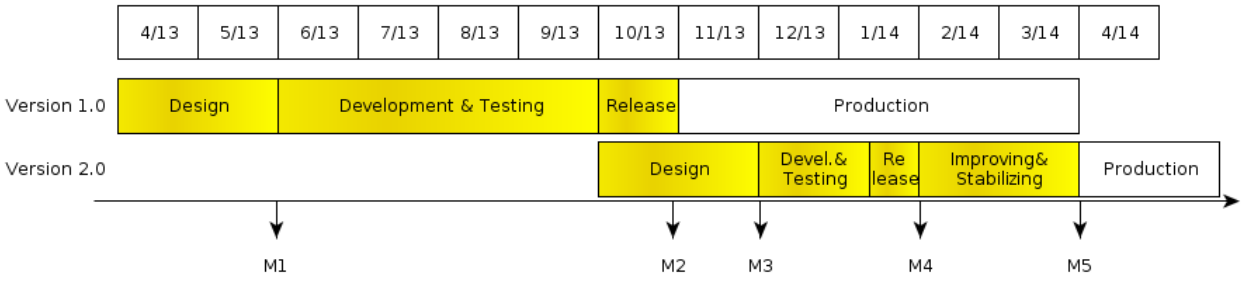
Strategically, this mini-project enables extended relations with customers by more coordinated service delivery and improve maturity of EGI operations. Additionally, deployment of such tool is aligned with EGI.eu efforts within FedSM Project [6].

3.4 How will you measure that you achieved the expected technical and strategic impact?

The technical results of the project will be verified by Resource Allocation Task Force. The resource allocation tool must support the processes defined by RATF. The release produced after first 6 months of the mini-project will be ready ready for deployment in EGI infrastructure. Availability for the tool instance is aligned with target EGI availability for core services i.e. 99%. Strategic impact could be measured by number of sites and NGIs and VOs involved in the resources allocation processes.

4 Technical Workplan

The plan of work is build around two main releases of resource allocation platform deployed in EGI environment. The first release (v1), limited in functionality, would be aimed at existing pilot processes, like special EGI pool of services and resources and negotiated in one-layer federation. The final release (v2) will have possibility to enable resources allocation in the whole EGI environment (EGI, NGIs, Sites) based on identified scenarios. The final version will be customizable to cover emerging, future scenarios. Both releases will be based on requirements and design build upon results of RAFT. Short release cycles are possible as development will be based on the matured tool existing in PL-Grid.



List of milestones:

Milestone number	Date	Description
M1	May 2013	Technical design of the tool and definition of initial first set of high priority functions for the 1st release of the tool. Functions will be discussed with the Resource Allocation Task Force.
M2	Oct 2013	Release of Version 1 of the tool and deployment in the Operation Portal
M3	Nov 2013	Implementation plan of Version 2 of the tool
M4	Jan 2014	Release of Version 2 of the tool (beta-version) and deployment in the Operations Portal for final testing
M5	Mar 2014	Release of Version 2 of the tool (final version) including user-guide, and configuration manual. Enabling this version in production operation infrastructure.

Beyond the mini-project lifetime maintenance and support for resources allocation tool will be guaranteed by Cyfronet until the end of 2017 due to the fact that the same platform is used in PL-Grid Infrastructure (at NGI level). Sustainability of Operations Portal will not be affected by this mini-project.

5 Budget details

6 References

1 Demonstrating Excellent European Science on EGI's Shared Resources
https://documents.egi.eu/public/ShowDocument?docid=1415

2 EGI Pay-per-Use
https://documents.egi.eu/public/ShowDocument?docid=1391

3 Seeking New Horizons: EGI's Role in 2020, EU Deliverable D2.30
https://documents.egi.eu/public/ShowDocument?docid=1098

4 EGI Resource Allocation Task Force, wiki-page: https://wiki.egi.eu/wiki/Resource_Allocation_Task_Force

5 gSLM project results: http://gslm.eu/results

6 FedSM Project, web page: http://fedsm.eu/