

UNICORE – Globus Interoperability: Getting the Best of Both Worlds

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Abstract

This work describes a software prototype developed at Research Center Jülich to demonstrate the interoperability between UNICORE (Uniform Interface to Computer Resources) [1] and Globus [2] without changes to any of the systems. Combining UNICORE's workflow oriented approach to job submission with Globus, Grid users can gain seamless access to a wide number of Globus enabled systems.

We define the following scenario of a job submission from UNICORE to Globus: The user prepares the job via UNICORE's graphical user interface, chooses a Globus site where the job is to be computed and submits it to UNICORE's Target System Interface (TSI). This is the entity normally interfacing with the local batch system. It is enhanced to communicate with Globus. The TSI translates the job description from the UNICORE specific Abstract Job Object (AJO) into the GRAM Resource Specification Language (RSL) and submits it to the GRAM Gatekeeper. Standard Globus mechanisms are used to monitor the status of the job and transfer the output back to the TSI.

The chosen scenario determines clearly the key aspects to be developed: (α) UNICORE requests for job submission, job monitoring and output retrieval have to be translated into the corresponding Globus constructs and (β) permanent UNICORE certificates have to be used to map the UNICORE username into a Globus user proxy certificate.

To accomplish this without changes to neither UNICORE nor Globus the Target System Interface has been enhanced. The entity mapping job description and submission, job monitoring and output retrieval from one system to the other is the Job Request Interface (JRI). This interface translates the AJO job description into RSL and maps the job status given by Globus via callbacks to the status information polled by the UNICORE client. Furthermore the JRI initializes a GASS server to which all file transfer actions are directed. Upon job completion Globus returns the compu-

tational results to the GASS server which saves the data in a standard predefined location.

The user proxy certificate used by Globus is created by the Proxy-CA module communicating with the TSI via the CA Interface. The UNICORE job submitted to the target system is signed with a UNICORE user certificate. The CA Interface extracts the username from the job request and transfers it to the Proxy-CA. The Proxy-CA runs on a dedicated server to protect it from unauthorized access and maintains a database containing usernames and the corresponding Globus user certificates and user proxy certificates. In case the username does not exist in the database, a Globus user certificate is created. If the user name exists, the user proxy certificate is checked for validity. If it is expired, a new one is generated and signed with the Globus certificate. The valid user proxy is returned to the TSI and is made accessible to Globus.

The prototype has been implemented and its capabilities have been demonstrated successfully at SC Global 2001 in Denver. For a full integration of all tasks required by Grid users (e.g. multi-step and multi-site jobs) additional development is needed. To accomplish this, the project GRIP (Grid Interoperability Project) [3] is funded by the European Commission.

References

- [1] UNICORE Forum. www.unicore.org.
- [2] The Globus Project. www.globus.org.
- [3] GRIP. www.grid-interoperability.org.