



GENERAL INTRODUCTION TO UNICORE 6

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Outline:

- Introduction
- Architecture and Services
- Clients and Application Integration
- Conclusions
- References

UNiform Interface to COmputing Resources

- Job submission service
- seamless, secure, and intuitive
- Initial development started in two German projects funded by the German ministry of education and research (BMBF)
- Results: well defined security architecture with X.509 certificates, intuitive GUI, central job supervisor
- Results: implementation enhancements, extended job control (workflows)
- application specific interfaces (plugins)
- Continuous development since 2002 in several EU projects
- Open Source community development since Summer 2004

Job Submission

UNICORE provides a seamless interface for preparing and submitting jobs to the computing resource. It has a three-tier design:

- a *client GUI*, used for the preparation, submission, monitoring, and administration of jobs,
- a *gateway*, a point of contact for all UNICORE connections, checking the user's certificate and providing the access to the service
- a *Target System Interface (TSI)*, a server that runs on the target machine interfacing to the specific batch scheduler.

Data Management

- Storage Management Service (SMS) provides an abstract “file system” view on a storage resource
- Common operations (e.g. mkdir, delete, listDirectory, etc.)
- Designed for extensibility
- File transfer management

Workflows

- Workflow engine
- Multiple instances can be deployed for scalability
- Trace utility
- Useful for performance evaluations, monitoring and reporting
- Control Constructs: ForEach-Loop, While-Loop, If-Statement, Grouping
- Conditions: exit code, file existence, file size, workflow variables
- Clients
- URC and UCC

Graphical client for UNICORE 6

- Building, submitting and monitoring jobs
- Workflow editor
- Integrated data and storage management
- Pluggable credentials
- “Simple view” for novice users
- Based on Eclipse framework
- Extensibility through GridBeans
- For Windows, Linux/Unix and MacOS/X (with Java 5 and Eclipse 3.5)

The screenshot displays the UNICORE Rich Client interface. The main window is titled "UNICORE Rich Client" and features a menu bar (File, Edit, Window, Help) and a toolbar with various icons and a 100% zoom level. The interface is divided into several panes:

- Grid Browser:** Shows a tree view of the grid infrastructure. The selected node is "Workflow engine at zam025s02.zam.kfa-juelich.de".
- Workflow Editor:** Displays a workflow diagram for "ExampleWorkflow.flow". The workflow starts with a "Start" node (green play button), followed by "Script1" and "Script2" nodes (document icons).
- Tool Palette:** Contains categories for Tools (Select), Control Flow, Applications (Blender v0.2, Generic v1.0, POV-Ray v3.51), Structures (If-Statement, While-Loop, Group), Variables (Declaration, Modifier), and a Modifier tool.
- Details Panel:** Shows a table of key-value pairs for the selected workflow engine.

Key	Value
Name	Workflow engine at zam025s02.zam.kfa-juelich.de
State	Ready
CurrentTime	2010-03-15 12:16:39
Type	WorkflowFactory
Version	2.1.0-rc1
TerminationTime	2020-03-11 15:20:05
Dialects	http://www.chemomomentum.org/workflow/simple, h

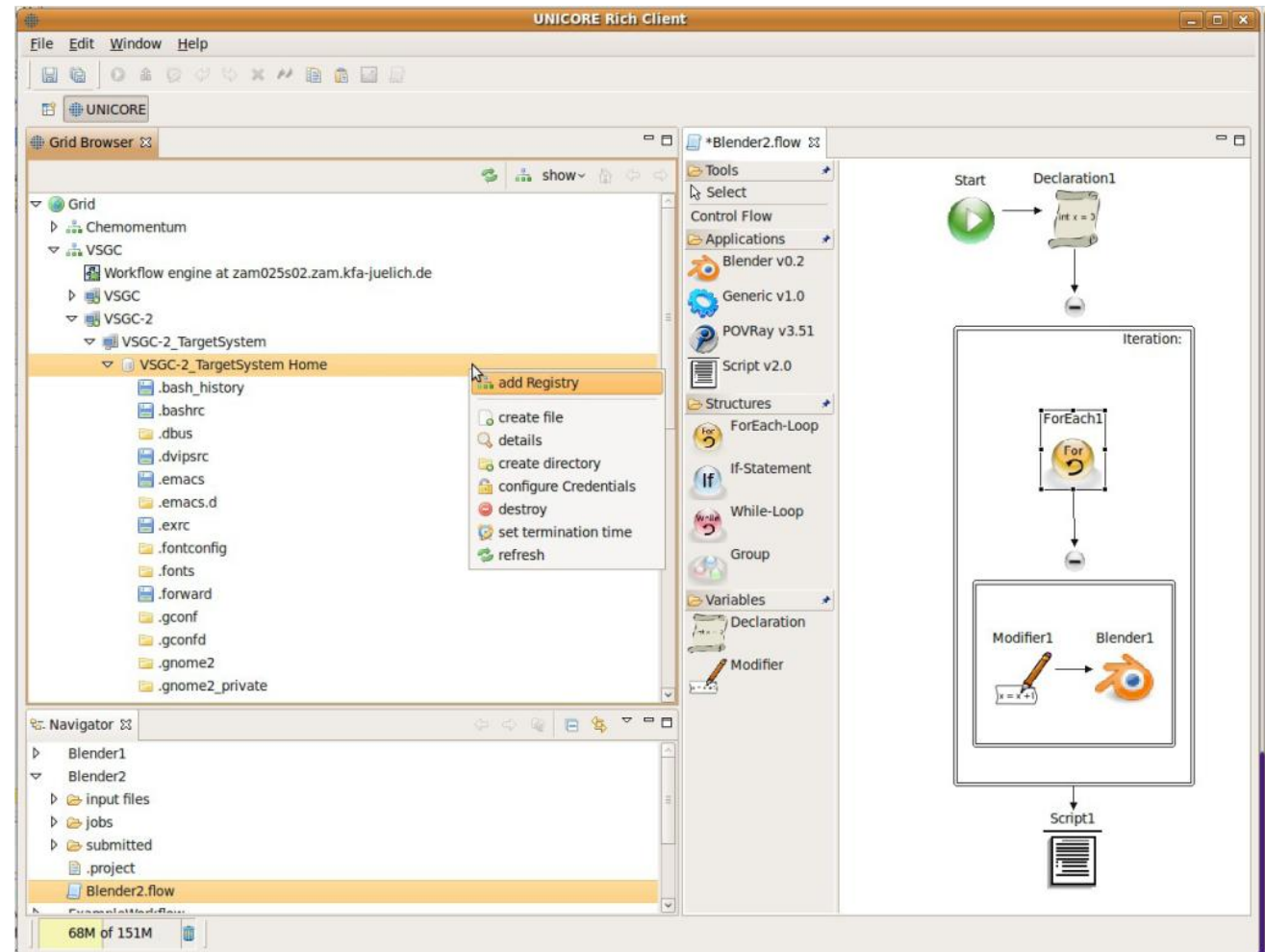
The screenshot displays the UNICORE Rich Client interface. The main window is titled "UNICORE Rich Client" and contains several panels:

- Grid Browser:** Shows a tree view of the grid environment. The "Registry" folder is expanded, showing "DEMO-SITE" (with sub-items "Global storage at localhost" and "VSGC") and "VSGC".
- Navigator:** Shows a file tree for the current workflow. "Blender2" is expanded, showing "input files", "jobs", "submitted", ".project", and "Blender2.flow" (which is selected).
- Tool Palette:** A central panel with categories: "Tools" (Select), "Control Flow" (ForEach-Loop, If-Statement, While-Loop, Group), "Applications" (Blender v0.2, Generic v1.0, POV-Ray v3.51, Script v2.0), "Structures" (ForEach-Loop, If-Statement, While-Loop, Group), and "Variables" (Declaration, Modifier).
- Workflow Editor:** The main workspace showing the workflow for "Blender2.flow". It starts with a "Start" node (green play button) leading to a "Declaration1" node (document icon with "ITE x = 2"). This leads into an "Iteration:" block containing a "ForEach1" node (yellow circle with a refresh icon). Below "ForEach1" is a "Modifier1" node (pencil icon with "x = x + 1") which points to a "Blender1" node (Blender logo). The iteration block ends with a "Script1" node (document icon).

At the bottom of the window, a status bar shows "44M of 155M" and a trash icon.

Integrated Storage Management

- Create files
- Drag and drop from/to desktop
- Copy and paste
- Remote file editing



- Grid Bean as additional plugins
- GridBean allows application-specific interfaces for the UNICORE Rich Client (URC)
- Input parameters available
- Output of application can be visualized
- Common for all GridBeans: file stage-in/-out, resource requirements, variables
- Easily implementable through a powerful API
- Available existing GridBeans for scientific applications: MOPAC, **NAMD**, Blender, Povray, and more life science Gridbeans at <http://unicore-life.sourceforge.net/>

11 Reasons to use UNICORE

- Mature Grid technology from Europe
- Made for Supercomputing / HPC Grids, Grids of Clusters and single PCs
- User support directly from the developers
- Easy to install and configure
- Graphical user interface
- Command line client
- Application integration
- Workflow support
- Interoperable
- Extensible
- General Purpose

Main references:

- UNICORE site: <http://www.unicore.eu/>
- Download Page: <http://www.unicore.eu/download/unicore6/>
- SourceForge: **UNICORE Rich Client for Linux/Windows/MacOs**
- Manuals: <http://www.unicore.eu/documentation/manuals/unicore6/>
- Plugin resources: <http://unicore-life.sourceforge.net/>
- Plugin Developer's Guide:
<http://www.unicore.eu/documentation/manuals/GridbeanDevelopersGuide.pdf>

What you need:

- Rich Client (last version 6.3.0)
- INFN CA certificate
- Your personal certificate
- Keystore, downloadable:
<http://winnetou.sara.nl/deisa/certs/keystore.jks>
- Configure CINECA-Registry with proper url:
https://grid.cineca.it:13303/CINECA-REGISTRY/services/Registry?res=default_registry