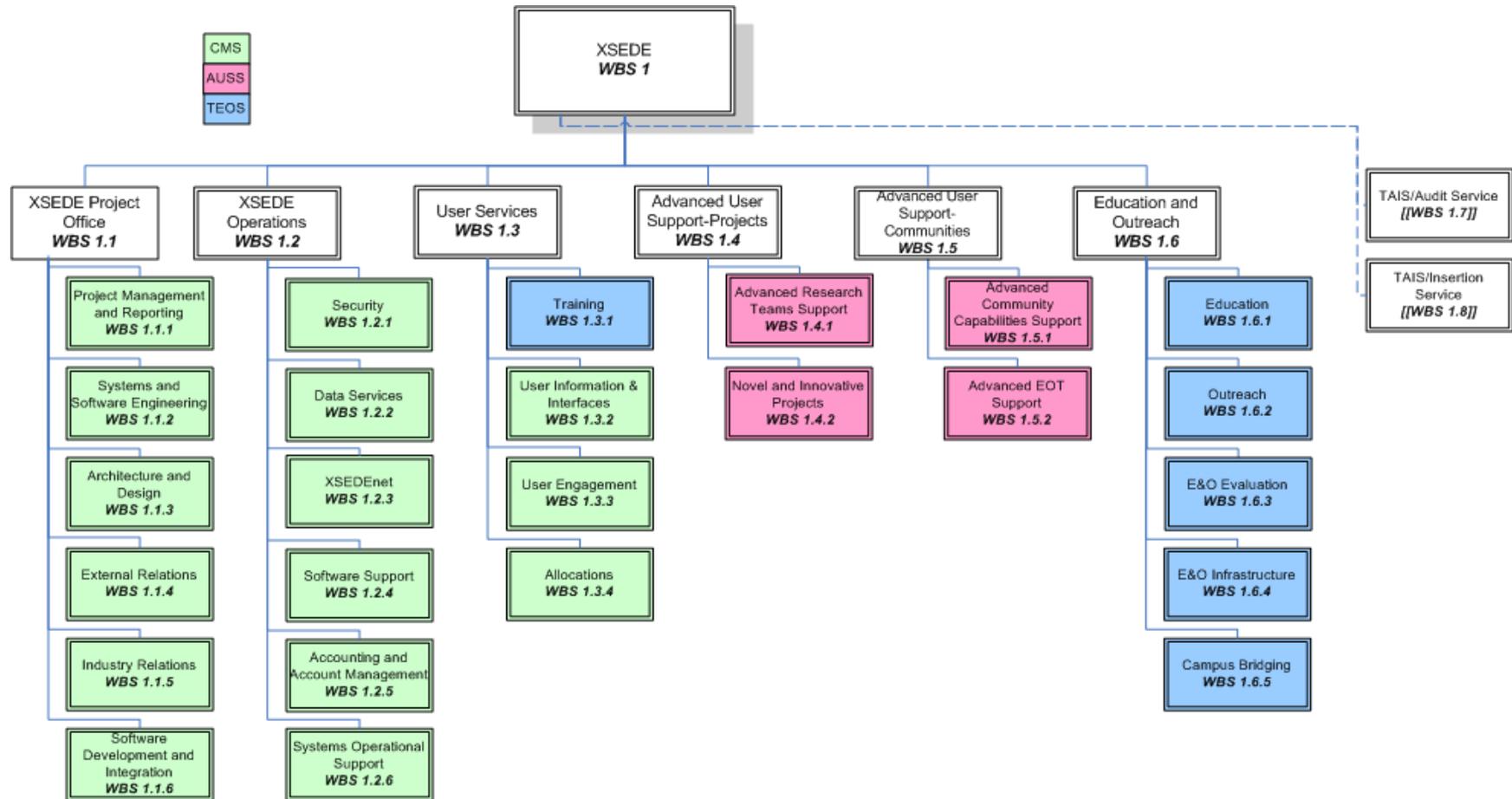


Enhancing UNICORE 6 to provide Execution Management Services in XSEDE

Bastian Demuth
Institute for Advanced Simulation (IAS)
Jülich Supercomputing Centre (JSC)

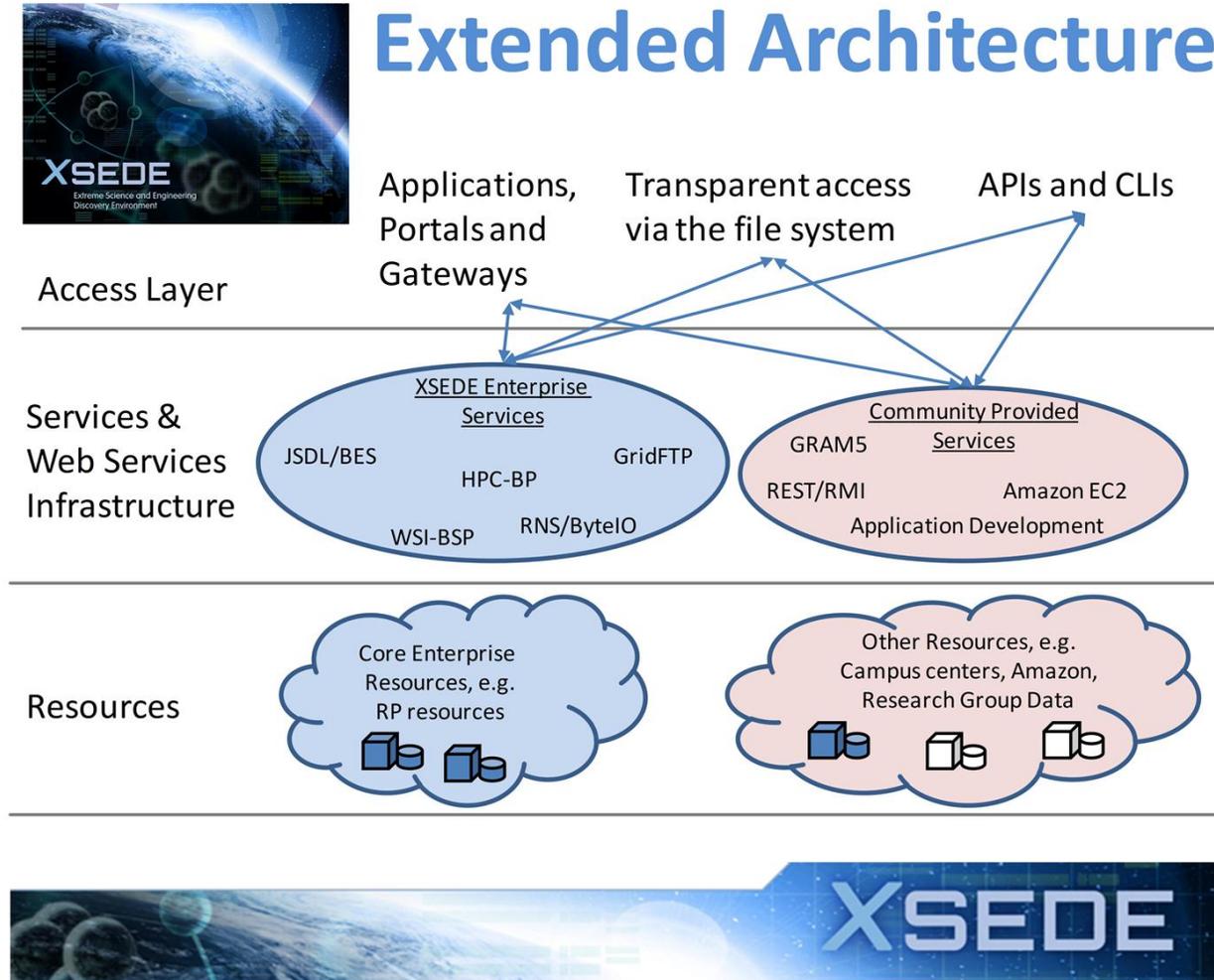
XSEDE Work Breakdown Structure



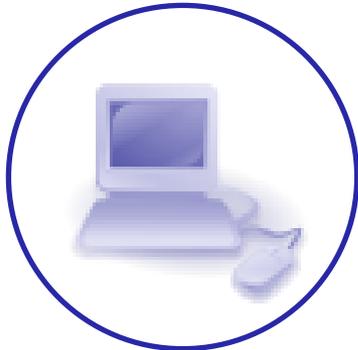
Architecture: The Big Picture



Extended Architecture

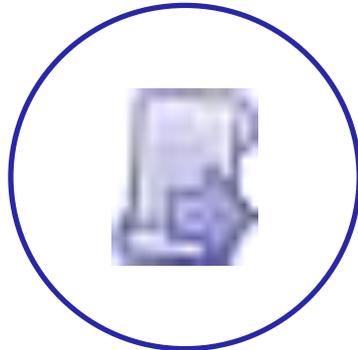


Important Standards in Service Layer



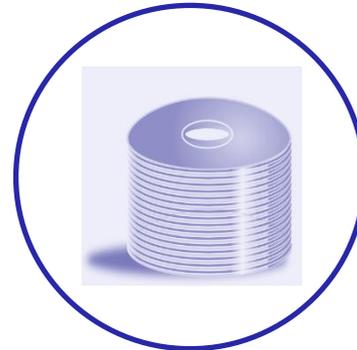
OGSA-BES

- Job execution interface
- Similar to TSS
- Provides job status
- Allows for bulk operations



JSDL

- Job Submission Description Language
- Abstract applications
- Supports arbitrary file staging protocols
- Extensible (e.g. parameter sweeps, SPMD, HPC File Staging Profile)



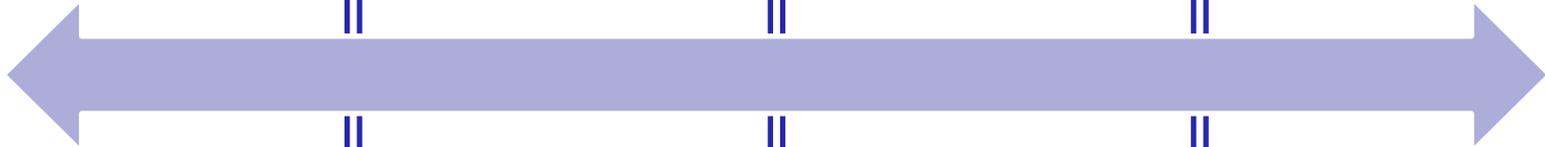
RNS/Bytelo

- Models directories and files
- Human readable names
- Based on EPRs
- Supports links
- Serial and random access



Glue 2

- Information model
- Describes Grid entities
- Can be used for matchmaking
- Adopted in EMI and XSEDE



Overview: Achievements So Far

- Interop with Genesis II
 - Support for GAML based trust delegation
 - Staging from and to the GFFS
- Support for Globus Grid-map-files
- XSEDE-specific installation package
- Simplified core service installation procedure
- Documentation
- Systematic and comprehensive testing

Interop with Genesis II

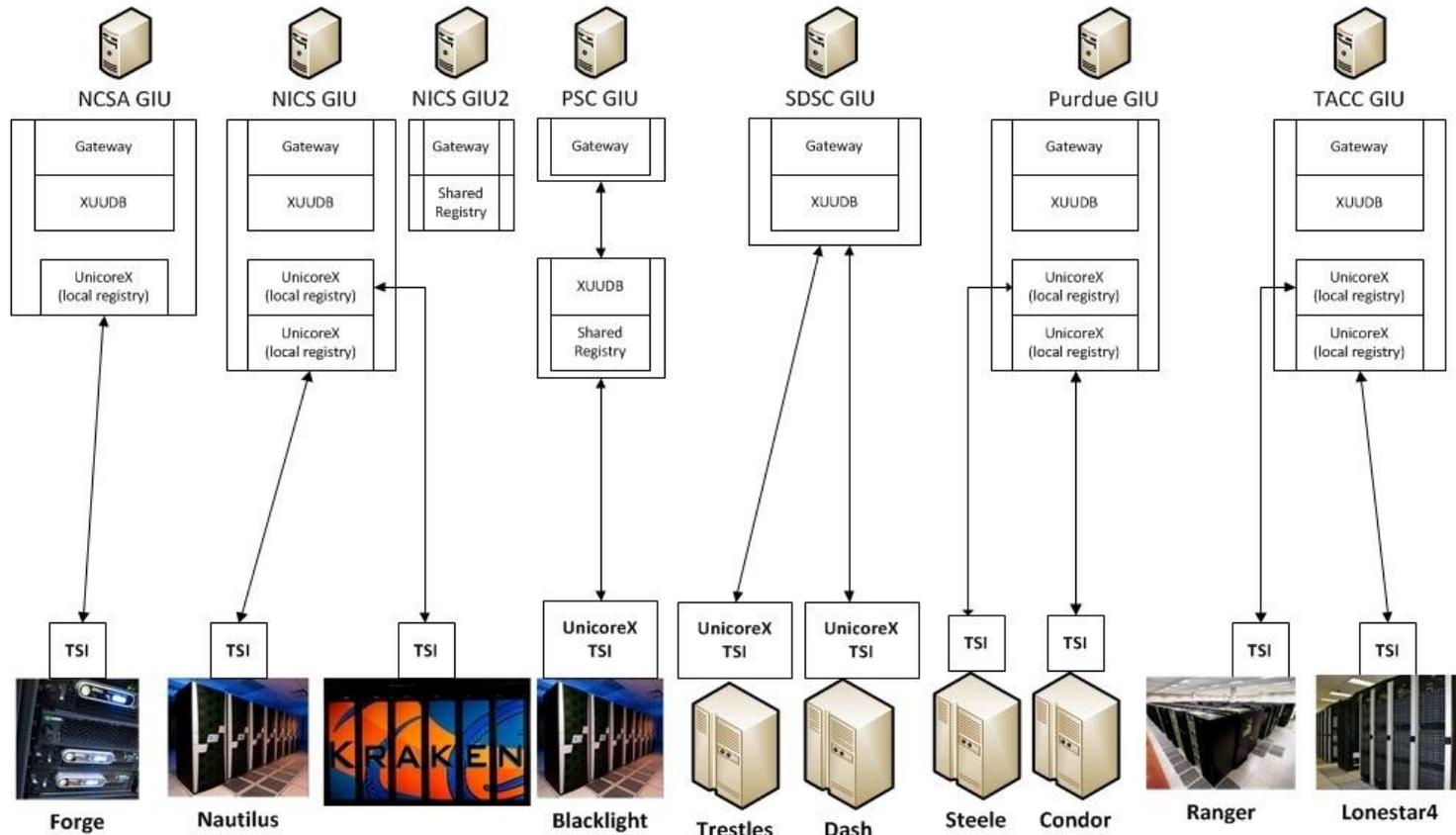
- GAML based trust delegation:
 - Easy to extend UNICORE to adopt
 - XFire In-Handler
 - Genesis security library for full chain validation
 - Does not interfere with traditional delegation
- GFFS support:
 - Global namespace
 - Based on RNS and ByteIO
 - Similar to UNIX file system
 - „Everything is a file“
 - Staging via GII client
 - Requires GII delegation chain

Benefits from interop with Genesis II

- Login at STS via username/password
 - Supports MyProxy and Kerberos
 - Certificates hidden from user
- GFFS support:
 - User home
 - Resource sharing with full ACLs
 - BESes and Jobs modeled as directories
 - Status and execution log via files
 - Submission and monitoring with FUSE driver
 - Allows for controlling and steering (/proc)
- Genesis Grid queue (meta-scheduler)
 - Supports JSDL parameter sweeps

UNICORE Beta Deployment in XSEDE (1)

GIU – Grid Interface Unit
 XUADB – Unicore Grid Map File
 TSI – Target System Interface



UNICORE Beta Deployment in XSEDE (2)

- Services can be accessed via unmodified U6 clients
- Interop with PRACE => global HPC Grid
- Workflow system under evaluation now
- URC under evaluation soon
- Science gateways expected to switch to BES instead of GRAM to prevent vendor lock-in

Current development and Outlook

RNS Support in U6

- Submission and monitoring
- Improved ACLs in U6
- Control/Steering/Remote Debugging

Standardization

- Activity Endpoint profile (work dir, status, history, notifications)
- Common SAML profile (with Genesis II and Globus)
- JSDL updates and extensions

Improved GridFTP support

- Once current SAML profile is in place

Workflows via BES

- U6 workflow engine easily extensible

Re-Activate Condor TSI

- Deployed on some XSEDE clusters
- Collaboration with Open Science Grid

Parameter sweeps in U6

- Collaboration with UVA