Current Status and Future Direction of UNICORE and OGSA

NAREGI Symposium
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Fujitsu Labs Europe
UniGrids Objectives

- **Develop:**
  - An OGSA compliant Unicore Implementation
  - A framework and technology for Grid interoperability
  - A framework for Grid economics

- **Create Generic Services for**
  - Visualisation and steering of simulations
  - Device monitoring and control
  - Access to distributed data and databases
  - Application instrumentation

- **Influence selected Grid standards and promote European research results**
# What Does my Title Mean?

**Current Status and Future Direction of Unicore and OGSA**

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OGSA: The Future

**OGSA Architecture V2.0 Document**
- Same scope, more refined than V1.0
- Possibly only a V1.5, due to effort on OGSA Profiles

**OGSA Profiles**
- Basic Profile
  - WSRF, WSN (Base Notification only), & WS-Addressing
- Security Profile
  - Transport Security, WS-Security, ???
- Basic Execution Profile
  - JSDL, Basic Execution Service, WS-Agreement?, WSDM?
- Naming Profile
- Candidate Execution and Data Profiles
Introducing Profiles to OGSA

Profiles
- Refine and clarify referenced specifications
- Goals: Interoperability, Interoperability, Interoperability
- Reference point for “claims” of OGSA compliance
  - No compliance suites planned

Profile Types
- Full Profiles: GGF Recommendations Track
  - Based on stable standards
- Candidate Profiles: GGF Informational Track
  - Based on proposed and evolving specifications
Full Profile

- **Required for “Proposed Recommendation” Status**
  - Contains specifications that are at least on a standards track
    - *E.g. GGF Proposed Recommendation, OASIS Committee Draft, etc.*
  - Commitments from multiple implementers to continue development of evolving specifications.

- **Required for “Recommendation” Status**
  - Contains completed standard specifications only.
    - *De facto standards permitted, e.g. WSDL 1.1.*
  - Two or more independently developed, interoperable implementations
  - Experience document must published
Candidate Profiles

Informational Document in GGF Process

“Candidate” Status is

- A function of status of any referenced specifications
  - E.g. with respect to the standardization process
  - Not a function of the importance of the profile to OGSA.

Restrictions on Referenced Specifications

- Only references specifications are in standards development.
- At least one reference prototype of each specification exists.
- Specifications may be evolving.
- Commitments for multiple implementations of the final specification.
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**Unicore Principles**

- Seamless Computing
- High Security
- Portable Server
- Complex Workflows
- File Management
- Advanced Client Interface
- Extensibility

Retain These Ideals
Unicore: The Future

OGSA Profiles
- Basic Profile
- Security Profile
- Basic Execution Profile
- Naming Profile

Unicore Grid Programming Environment
- Virtual Resource Factory
- Job and File Management
- WS Based File Transfer

Globus Interoperability
- Issues: WSRF Version and GSI Interfaces
Unicore: The Future Continued

- **Virtual Organizations**
  - Dynamic Trust Management
    - SAML and XACML Based
  - Distributed Trust Base

- **New Gateway Design**
  - Tentative ideas only, Please feedback
  - Https as core protocol, not Java only UPL
  - WS-Addressing enabled
  - Gateway “Plug-in” support improved
Unicore: GPE Architecture

Unicore Atomic Services

Web Service Resource Framework (WSRF)

WSRF-enabled Servers
WSRF-enabled Storage
WSRF-enabled Network

Open Grid Services Architecture

Grid Programming Library

Grid SDK  Grid Beans  Client Framework

High-level Grid API
- Descriptions
  - Resources (CIM)
  - Jobs (JSDL)
  - Workflows (BPEL)
- Operations
  - Job management
  - File transfers
  - Brokering
  - Steering, etc.

Applications

U-GPE
Unicore Atomic Services

U-GPE (or other) Clients

Grid Programming Library
- TSS Client
- JMS Client
- SMS Client
- FIS Client
- FES Client

Atomic Services
- Target System Service (TSS) Implementation
- Job Management Service (JMS) Implementation
- Storage Management Service (SMS) Implementation
- File Import Service (FIS) Implementation
- File Export Service (FES) Implementation

Manage jobs on target system
Manage files on storage
Manage imports to storage
Manage exports from storage

Manage target system
Unicore GPE Grid Services

- **Target System Factory**
  - Create a virtual compute resource for a VO.

- **Target System Service**
  - Job Submit (JSDL and AJO)
  - Resource Description Properties

- **Job Management Service**
  - Basic control and status properties

- **File Management Service**
  - Copy, Delete, List Directory, ...

- **File Import/Export Services**
  - WS Based File Transfer Capability
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OGSA-WG: Current Status

- **OGSA Version 1.0 and Glossary Published**
- **OGSA WG Focus on Profiles**
  - Base and Security Profiles - Drafts on GridForge
    - *Contribute NOW!*
  - Base Execution Profile Draft after GGF13
- **OGSA Spawned WGs**
  - ByteIO, Basic Execution Services, and Naming
    - *Attend BoFs at GGF13*
- **OGSA Candidate Profiles Starting Work Now**
  - Advanced Execution Services (SuperScheduler, Broker, ...)
  - Base and Advanced Data Services Profiles

UniGrids
**WSRF/ WSN/ WSDM: Status**

- **WSRF**
  - Resource Properties and Lifetime ready for Committee Draft
  - Service Group in process
  - Renewable References moved out of scope

- **WSN**
  - Base Notification stable & seeking synergy with WS-Eventing
  - Includes “pull” based Notification
    - *Important to NAREGI and UniGrids because of Unicore model*

- **WSDM**
  - Committee Draft
    - (Based of a different version of WSRF than the CD)

- **HP/Globus/Apache Incubator Announcement**
  - Apollo, Hermes, Muse incubators
  - [http://wiki.apache.org/incubator/<name>Proposal](http://wiki.apache.org/incubator/<name>)
**JSDL: Status**

- **Job Submission Description Language**
  - Pre-stage, Execute, Post-stage.
  - Uniformity across batch subsystems.
  - Support for multiple file transfer protocols.

- **Not a Job Management Interface!**
  - A job description document with a processing semantics

- **Capabilities**
  - Optional data sources/sinks, with different credentials possible
  - Seamless or restricted resource description
  - Suitable for resource brokers and schedulers
    - *Act as JSDL to JSDL processors*

- **Restrictions**
  - No support for “Multi-Jobs” or work-flow.
<JobDefinition>
  <JobDescriptionSection>
    <JobIdentification ... />?
    <User id="xsd:uri" ... /> ?
    <Application id="xsd:uri" ... /> ?
    <Resource id="xsd:uri" ... />*
    <DataStaging id="xsd:uri" ... />*
    <Limits id="xsd:uri" ... />?
  </JobDescriptionSection>
  <Profile>
    <Description ... />?
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    <Application id="xsd:uri" ... />?
    <Resource id="xsd:uri" ... />*
    <DataStaging id="xsd:uri" ... />*
    <Limits id="xsd:uri" ... />?
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      <CPUCount "8"/>
    </Resource>
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    </Resource>
  </Profile>
</JobDefinition>
GRID Computing, Distributed Computing and Utility Computing are different views of the same important problem domain.
**Status Legend**

- **Standard**
  - Existing, adopted specification from a recognized Standards Development Organization.

- **Evolving**
  - Emerging specifications with reference implementations and standardization in process

- **Gap**
  - Identified architectural component with no existing specifications complete, but work is in progress somewhere.

- **Hole**
  - Identified architectural component without apparent activity.
OGSA Architecture: Status

Use Cases & Applications
- Collaboration
- Persistent Archive
- ASP
- Data Centre
- Multi Media

Core Services
- OGSA Self Mgmt
- OGSA-EMS
- WS-DAI
- Information
- WSDM
- Discovery
- GGF-UR
- WS-BaseNotification
- Naming
- Privacy
- Trust
- GFD-C.16
- WSRF-RP
- WSRF-RL
- Data Model
- WSRF-RAP
- WS-Security
- SAML/XACML
- X.509
- WS-Addressing
- HTTP(S)/SOAP
- WSDL
- CIM/JSIM
- Data Transport

Infrastructure Specifications
- Distributed query processing
- VO Management
- Grid Computing
- Evolving
- Gap
- Hole
- Standard

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### Unicore Status

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Unicore: Current Status

Security Infrastructure
- Explicit Trust Delegation Framework - Done

WS Infrastructure
- Prototype WSRF Plus job and file management interfaces
  - Shipped in November
- V1.0 WSRF by end March 2005
- V1.0 Unicore Atomic Services by end March 2005
  - Includes JSDL based job description

WS Based File Transfer
- V1.0 by mid April
- V2.0 next year
Conclusions

Progress is Good
- OGSA is moving aggressively, backed by GGF.
- WSRF is approaching completion
- NAREGI/UniGrids WSRF Infrastructure ready soon
- JSDL’s progress is due to NAREGI/UniGrids Team
  - *Aim for a repeat performance on Basic Execution Service*

New Tools Too
- Basic execution services for NAREGI requirements
- WS Based File Transfer and New Gateway Design
- VO support coming (Tell us your requirements)

High Degree of Collaboration
- NAREGI, UniGrids, Globus, EGEE, Condor, ...