Direction and Trends in Grid Computing Standards

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Outline

• Grid Computing Landscape
• Standards Impact on that Landscape
• Standards Trends
• “Top Ten” Grid Standards
• Managing Convergence of Standards
• Unicore and Standards
• Next Steps?
The Grid Computing Landscape

• Orchestrator: Collaboration Grids
  • Multiple institutions, secure, widely distributed, VOs
  • Service level agreements & commercial partnerships
  • Overall Aim: New modes of business and research
• Service Provider: Enterprise Grids
  • Virtualization of enterprise resources and applications
  • Aggregation and centralization of management
  • Overall Aim: Reduce total cost of ownership
• Systems Manager: Clusters
  • Networks of Workstations, Blades, etc.
  • Cycle scavenging, Homogeneous workload
  • Overall Aim: More efficient use of assets
Standards Impact on Grid Computing

Cluster Grids
Enterprise Grids
Collaboration Grids

Increasing Importance to Industry
Decreasing Impact of Standards

Grim thought, but …
… The Trend is Better

- Cluster Grids
- Enterprise Grids
- Collaboration Grids

Decreasing Impact of Standards

Increasing Importance to Industry
High Impact “Grid-Like” Standards

• WS-Addressing
  • Meets addressing requirements missed in basic WSs
  • Uses structured identifiers and protocol rules
  • Is (at least theoretically) binding independent.
• OGSI, WSRF, WS-Transfer, WS-Resource Transfer
  • Acknowledges patterns in management and discovery
  • Broad applicability
  • Clearly includes various approaches
• WS-Notification, WS-Eventing, WS-Event Notification
  • Highlights a fundamental pattern in distributed systems
  • Critical space for standards
Grid Computing’s Top Ten Standards

• Stable
  • JSDL
  • OGSA-BES
  • GridFTP
  • OGSA Security Profile Core
  • OGSA Security Profile Secure Channel

• Evolving with a Clear Direction
  • OGSA Base Profile (Next Revision)
    • WS-Addressing, WS-Resource Transfer, WS-Event Notification
  • OGSA-AuthZ-SAML
    • Including WS-Security

• Under Development
  • DMI
  • OGSA-RSS
  • OGSA Information Model
Evolution of Standards

Pre Standards Cloud

JMS/TSS

GRAM

ESI

RMT

SMS

Standards Cloud

BES α

BES 1.0

DMI

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Unicore Summit

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Convergence Toward WS-Resource Transfer

• All Specifications Cover the same Use Cases
  • Stateful Services/Resources
  • Access to properties of these
  • Support for lifetime management
  • Mechanisms for subscription
• Observation
  • Most functional operation of a service is orthogonal to these “management” related capabilities
• Strategies
  • Use stable API for both client and service
  • Model service state with properties
    • Don’t use state modifying operations, e.g. SetResourceProperties
  • Include an abstract notion of lifetime in all services
  • Expect that notifications of property changes will be possible
A Peek at the OGSA Information Model

<Resource>

<Capabilities>

<Capability Name="Processor.Type" Value="Power4"/>
<Capability Name="Processor.Speed" Value="10"/>

</Capabilities>

<Requirements>

{ User.VO="EGEE" or User.VO="NAREGI" }  

</Requirements>

</Resource>

<Job>

<Capabilities>

<Capability Name="User.VO" Value="EGEE"/>

</Capabilities>

<Requirements>

{ Processor.Type = "Power4" and Processor.Speed > 7 }  

</Requirements>

</Job>
Unicore and Standards

- JSDL
- OGSA-BES*
- OGSA Base profile
- OGSA Sec. Profile
- DMI*
- OGSA-RSS*
- OGSA-AuthZ-SAML*

* Future plans or in process
What Next for Unicore and Standards?

- Unicore has lost a lot in the recent quest for standards
  - Workflow
  - Integrated file transfer protocol
  - Incarnation and seamless computing
  - Client integration
  - Extensibility
  - Integrated job/task management
  - Seamless file access
  - Portfolio support
- Starting points
  - Grid Beans integration with SAGA standard?
  - REST based Grids?
  - Service side developer APIs?
  - ????
What is the impact of water on a lava field?