Grid Services and the Globus Toolkit®

Lisa Childers
childers@mcs.anl.gov
The Globus Alliance
Overview

- Architectural context
- Grid Services in the Globus Toolkit: current and future
The “Grid Problem”
In One Slide

Enable flexible, secure, coordinated resource sharing among dynamic collections of individuals, institutions, and resources
Globus Toolkit: A Story of Evolution

- Definition of the Grid Problem has been stable since the original Globus Project proposal in 1995
- But our approach to its solution has evolved:
  - From APIs
  - To proprietary protocols
  - To standard protocols
The Building Blocks of the Grid:
Grid Services

- A Grid service is a network-enabled entity that exposes a set of capabilities to the grid
  - Services are composed to provide higher-level and increasingly complex capabilities
- From a user’s perspective, a Grid service is defined by its public interface
  - Public interfaces of Grid services are comprised of the protocol it supports and the set of behaviors that are triggered in response to message exchanges
Why a Protocol-Based Architecture?

- We start from the view that effective VO operation requires the ability to interact with any service on the Grid without needing to grok implementation details
  - Example interaction: ask the service if it supports a desired capability
  - Hence the need for interoperability
- In a network environment, interoperability implies adoption of common protocols
- Earlier work in GT development focused on proprietary protocols
- Recent work reflects a movement toward WS-based protocols
  - to facilitate wide-spread adoption of grid technology
(APIs are Important Too)

- While protocols specify how services interact with clients, APIs define the programming model
- GT includes APIs to provide developers with useful (hopefully!) abstractions for building their own services
Grid Services in the Globus Toolkit: current and future
GT3
Currently supported stable release
The 3.2 distribution includes:

- Components supporting Pre-Web Service protocols
  > Carried on through GT2
- Components supporting Web Service protocols based on OGSI
- Deployment environments for OGSI-based Grid services (Java)
- A framework for creating OGSI-based Grid services
OGSI

- The Open Grid Services Infrastructure Draft from GGF
- The spec defines approaches for
  - Creating, naming and managing the lifetime of services
  - Declaring and inspecting service state
  - Asynchronous notification of state changes
  - Managing collections of service instances
GT4

- Alpha-quality release due 30 July 2004
- The first feature-complete release planned for mid-October 2004
- Beta-quality release early December 2004
- Final release due end of January 2005
GT4

The 4.0 distribution will include:

- Components supporting Pre-Web Service protocols
  > Carried on through GT2
- New components supporting Web Service protocols based on WSRF
- Deployment environments for WSRF-based Grid services (Java, C, Python)
- A framework for creating WSRF-based Grid services
WSRF

- The WS-Resource Framework is a suite of 6 specifications under development in OASIS
- The specs represent a refactoring of OGSI that is designed to make it more acceptable to the traditional Web services community
  - Partitions OGSI functionality into a family of composable specs
  - Uses standard XML Schema mechanisms that are supported by existing tooling
  - Makes an explicit distinction between the “service” and the stateful entities acted upon by the service
Further Reading

- For information regarding the Globus Alliance: http://www.globus.org

- For information regarding the Globus Toolkit: http://www.globus.org/toolkit/

- For information regarding the move from OGSI to WSRF: http://www-106.ibm.com/developerworks/library/ws-resource/ogsi_to_wsrfsf_1.0.pdf