

Highlights of GlobusWorld 2004

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Outline of Today's Talk

- OGSI -> WS-RF
- Grid/Globus Security
- Meta-scheduling - CSF

OGSI -> WSRF

OGSI -> WSRF

Most of this section of the talk was taken from the paper,

“From Open Grid Services Infrastructure to WS-Resource Framework: Refactoring and Evolution” 2/12/2004

by Karl Czajkowski (Globus Alliance/USC Information Sciences Institute), Don Ferguson (IBM), Ian Foster (Globus Alliance/Argonne National Laboratory), Jeff Frey (IBM), Steve Graham (IBM), Tom Maguire (IBM), David Snelling (Fujitsu Laboratories of Europe), Steve Tuecke (Globus Alliance, Argonne National Laboratory).

OGSI -> WS-RF

- OGSI – The Inspiration
- OGSI – The Flaws
- WS-RF – The Future

Open Grid Services Infrastructure

The **Open Grid Services Infrastructure** defines a set of conventions and extensions on the use of Web Service Definition Language (WSDL) and XML Schema to enable stateful web services.

Open Grid Services Infrastructure

The OGSI specification defines

- A set of Web Service Definition Language (WSDL) extensions
- WSDL constructs and standard operations for querying and updating service data associated with a service
- The Grid Service Handle and Grid Service Reference constructs used to address Grid services

OGSI

- A definition of common fault information from operations that defines a base XML Schema and associated semantics for WSDL fault messages to support a common interpretation.
- A set of operations for creating and destroying Grid services that provides for both explicit destruction of services and implicit garbage collection of expired services without the need for explicit destruction.

OGSI

- A set of operations for creating and using heterogeneous reference collections of Web services
- Mechanisms for requesting asynchronous notifications of changes in the value of service data elements.

Critiques of OGSi

- Too much stuff in one specification
- Does not work well with existing Web Services and XML tooling
- Too object oriented
- WSDL 2.0 would not fully support WSDL 1.1

Web Services Resource Framework

WSRF = OGSF +

- The introduction of the WS-Resource Concept
- Better separation of function and exploitation of other web services specifications
- A broader view of notification, which is a general Web service requirement upon which state change notification can be built

WS-Resource Framework

The refactoring of OGSI yields five normative WSRF specifications plus WS-Notification

- WS-ResourceProperties
- WS-ResourceLifetime
- WS-RenewableReferences
- WS-ServiceGroup
- WS-BaseFault
- WS-Notification

WS-RF's take on the Critiques of OGSi

- Too much stuff in one specification
 - WSRF partitions OGSi 1.0 functionality into a family of six specifications that allow for flexible composition.
- Does not work well with existing Web Services and XML tooling
 - WSRF uses standard XML schema mechanisms that are familiar to developers and are supported by existing tooling.

WS-RF vs. OGSi

- Too object oriented
 - WSRF re-articulates the underlying OGSi architecture to make an explicit distinction between the “service” and the stateful entities acted upon that service.
- WSDL 2.0 would not fully support WSDL 1.1
 - WSRF expresses the capabilities of OGSi using the WSDL 1.1 definition to avoid the requirement for extended tooling.

Grid/Globus Security

Grid/Globus Security: Firewalls

Solution: Open Ports.

Grid/Globus Security

Most of this section of the talk was inspired by the a round table discussion on,

“Firewalls in Grid Computing”

Katarzyna (Kate) Keahey - Globus Alliance, Argonne National Laboratory; Participants: David Schissel - General Atomics; Lew Randerson - PPPL; James Rome - Oak Ridge National Laboratory; Stephen Chan - NERSC; Tom Goodale - Max Planck Institute for Gravitational Physics; Von Welch - NCSA, UIUC; Bill Allcock - Globus Alliance, Argonne National Laboratory; Scott Campbell - NERSC

Grid/Globus Security

- Globus Solutions
- Site Solutions

Globus Solutions

■ GRAM firewall requirements

- Server Side:
 - In Globus Toolkit 3, it is sufficient to open a well-known static port 8080.
- Client Side:
 - Open a range of ports to traffic:
GLOBUS_TCP_PORT_RANGE

(I'm just the messenger)

Globus Solutions (cont.)

■ GridFTP firewall requirements

- Server Side:

- In Globus Toolkit 3, it is sufficient to open a well-known static port 8080.
- A range of ports for data channel

- Client Side:

- A range of port

US Magnetic Fusion Energy Research Solution

Current Firewall: Cisco IOS Firewall Feature Set

■ Rule Set

- Default is to deny all
- Opened on a case by case basis
- Changes done only during off-peak times and on limited basis
- Service/port availability tailored per user profile

Fusion Energy Research (cont.)

- Specific firewall ports opened from specific host to specific host
- SecureIDs sometimes used to open firewall ports
- Grant access for certain group members

Princeton Plasma Physics Laboratory

- Incoming under firewall control
- Outgoing allowed
- Tailored firewalls for specific services
- Incoming sites opened upon request
- Filtering based on target IP port and source IP address including Globus traffic
- Access allowed through opening ports for specific machines at known sites.

Oak Ridge National Laboratory

- Created what they call “enclaves” and “collaborative domains” with certain rights.
- An enclave is specific to one site and is a collection of resources that are governed by a common site security policy.
- A collaborative domain is the fabric that instantiates the collection and connects the enclaves.

ORNL (cont)

- Implemented one-time-password tokens.

NERSC Grid Security Technologies

- Centralized Authorization
 - LDAP Based solution
- NERSC PKI Infrastructure
 - Integration with NIM database
 - Certificate management
- Grid Firewall Work
 - Mitigation Policies and Recommendations
 - Bro Network Intrusion Detection
 - Real-time analysis of Grid traffic
 - Certificate identification

Metascheduling - CSF

Metascheduling/Community Scheduler Framework

- Lunch with Ian Lumb
- CSF and Globus

Lunch with Ian Lumb

- The big question: What is the difference between Condor and CSF?
- The small answer: Not much. Condor is a scheduler; CSF is designed to be a meta-scheduler. CSF can work on top of other schedulers like Condor.

Metascheduling/CSF

Most of this section of the talk was inspired by the talk,

“The Community Scheduler Framework:
Comprehensive and Standards Based
Metascheduling Services for the Grid”

By Chris Smith

CSF Grid Services

■ Job Service

- Creates, monitors and controls compute jobs

■ Reservation Service

- Guarantees resources are available for running a job

CSF

■ Queueing Service

- Provides a service where administrators can customize and define scheduling policies at the VO level and/or at the different resource manager level
- Defines and APT for plug in schedulers

■ RM Adapter Service

- Provides a Grid service interface that bridges the Grid service protocol and resource managers (LSF, PBS, SGE, Condor and other RMs)