

Globus – GTK and Grid Services

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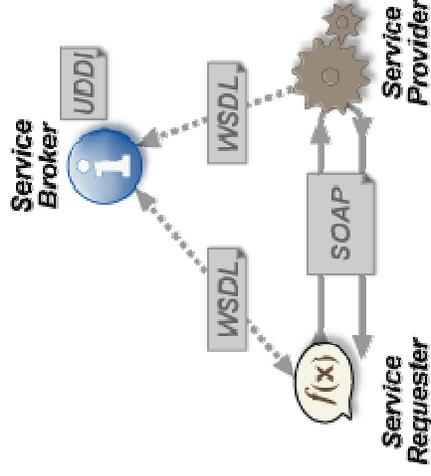
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OGSA – The Open Grid Services Architecture

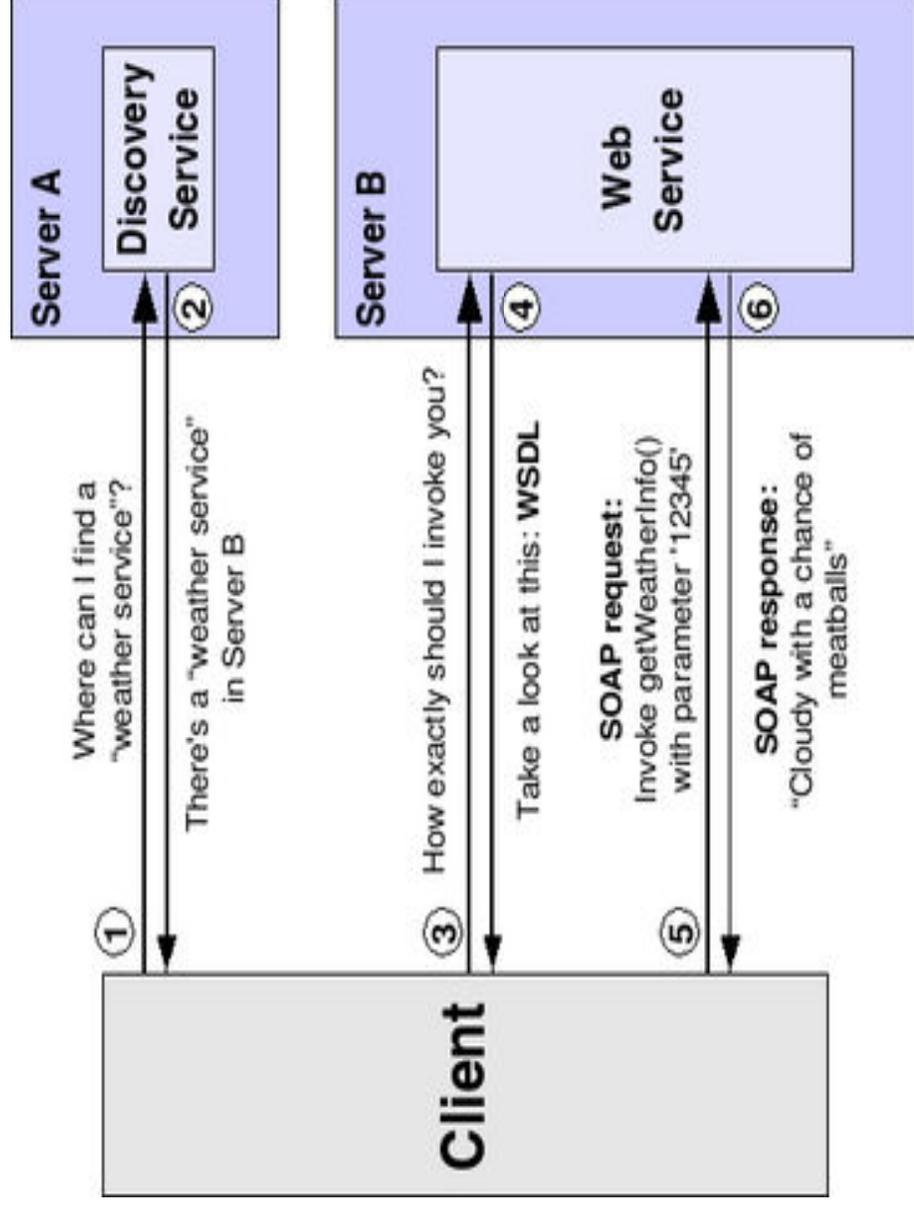
- What are some key requirements of Grid computing?
 - Interoperability: Critical due to nature of heterogeneous environments
 - Virtualization: virtual representation of organizations, resources, applications
- What is OGSA?
 - OGSA defines a Grid system architecture based on well defined standards and Web service technologies
 - Service Oriented Architecture based Grid services provide well-defined interfaces for clients
 - All grid resources (logical & physical) are modeled as services

Web Services Overview

- Web Services employ the client-server architecture and provide interoperable interfaces to applications
- Intended for use by other software, NOT directly by users.
- Request->Response/Producer->Consumer



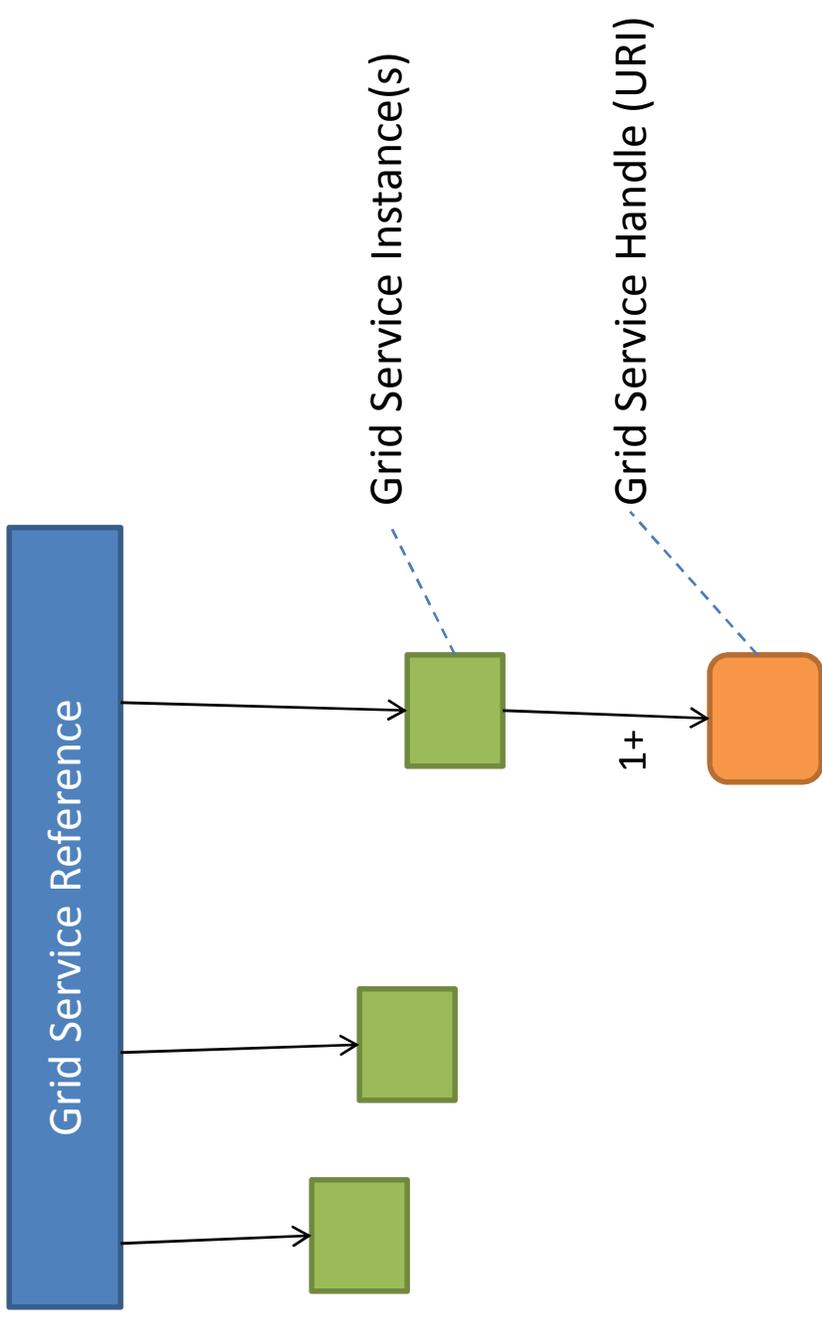
Web Services cont.



OGSI – Open Grid Services Infrastructure

- What is OGSI?
 - Formal specification of concepts described by OGSA
 - Specifies extensions to standard Web services needed for Grid services
 - Stateful Web services
 - Extended WSDL
 - Defined Grid service interfaces, lifecycle, concept of Grid service instances, references, and handles

OGSI Model



The Downfall of OGSi

- Problems found with OGSi
 - Too much stuff all in one specification
 - Doesn't work well with existing web service tools (too heavy on XSD, etc.)
 - Too object oriented (instances, handles, etc.)
- OGSi (base for GT3) replaced by WSRF (base for GT4)
 - WSRF separates the service and its state (resources)

WSRF – Web Service Resource Framework

OGSI	WSRF
Grid Service Reference	<i>WS-Addressing Endpoint Reference</i>
Grid Service Handle	<i>WS-Addressing Endpoint Reference</i>
HandleResolver portType	WS-RenewableReferences
Service data defn & access	WS-ResourceProperties
GridService lifetime mgmt	WS-ResourceLifeCycle
Notification portTypes	WS-Notification
Factory portType	Treated as a pattern
ServiceGroup portTypes	WS-ServiceGroup
Base fault type	WS-BaseFaults

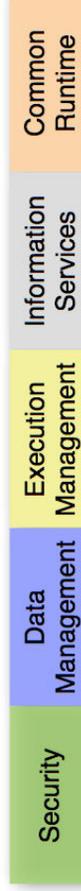
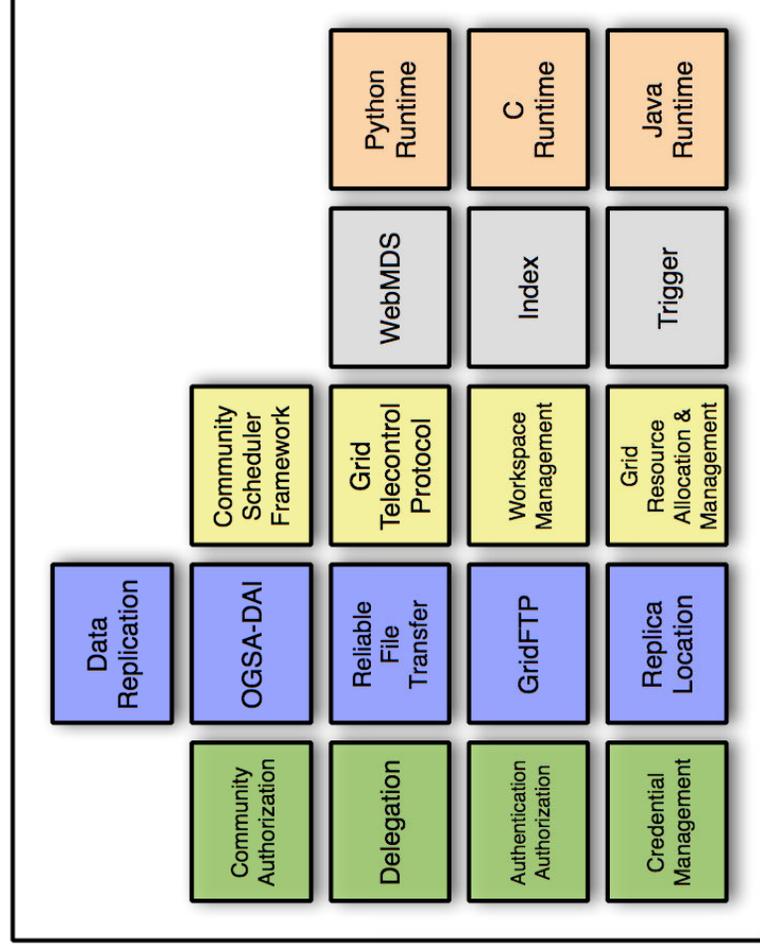
Globus Toolkit

- What is the GTK?
 - Framework for developing OGSA Grid services
- What's included?
 - Basic infrastructure services
 - Job submission/management
 - File transfer
 - Data management
 - Monitoring
 - Grid development environment
 - Programmatic APIs
 - Security mechanisms
 - Tools and examples

Infrastructure Services

- “Connectivity Layer” Solutions
 - Service Management (WS Core)
 - Monitoring/Discovery (WS Core)
 - Security (GSI and WS-Security)
 - Communication (XIO)
- “Resource Layer” Solutions
 - Computing / Processing Power (GRAM)
 - Data Access/Movement (GridFTP, OGSA-DAI)
 - In development: Telecontrol (GTCP)
- “Collective Layer” Solutions
 - Data Management (RLS, DRS, RFT, OGSA-DAI)
 - Monitoring/Discovery (Index, Trigger, Archiver services)
 - Security (CAS, MyProxy)

GT4 Components



Security Mechanisms

- Features:
 - Grid-wide identities implemented as PKI certificates
 - Transport-level and message-level authentication
 - Ability to delegate credentials to agents
 - Ability to map between Grid & local identities
 - Local security administration & enforcement
 - Single sign-on support implemented as “proxies”
 - A “plug in” framework for authorization decisions

Overview of Components - Security

- SimpleCA
 - Tool used for small test grid setups, typically not used in production environments as certificates must be signed by well known CA to ensure authenticity
- MyProxy
 - Remote service used to store user credentials
 - Can use CA, Kerberos, etc.
 - Simplifies certificate management

Information Services

- **Index Service**
 - Provides registry capability, caching
- **Trigger Service**
 - Used for monitoring, e-mails alerts when pre-defined conditions are met
- **Archive Service**
 - Logs values of resource property info over time, useful for auditing
- **WebMDS**
 - Web browser interfaces to resource properties and index services
 - Collects monitoring info from pluggable sources
 - Applies XSLT to XML to produce human-friendly HTML (uses Tomcat)

Execution Management

- GRAM: Grid Resource Allocation & Management
 - Provides basic job submission and control
 - Uniform service interface for remote submission and management of jobs
 - NOT a scheduler (fork, Condor-G, PBS, etc. are used for this)
 - Often used as a front end to schedulers and to simplify metaschedulers & brokers

Data Tools

- **GridFTP**
 - FTP enhanced for security and high performance
 - Multiple data channels for parallel transfer
 - Partial file transfer
- **RFT: Reliable File Transfer**
 - Provides mechanism for file transfer queuing
- **OGSA-DAI: OGSA Data Access & Integration**
 - Interface for accessing relational/XML data stores
 - Registry
 - Grid Data Service Factory
- **MCS: Metadata Catalog Service (integrated in OGSA-DAI)**
 - Stores system or user defined attributes
 - Supports manipulation and query

References

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