
# Grid Standards

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# Why Standards Matter

- Ubiquitous adoption demands open, standard protocols
  - Standard protocols enable *interoperability*
  - Avoid product/vendor lock-in
  - Enables innovation/competition on end points
- Further aided by open, standard APIs
  - Standard APIs enable *portability*
  - Allow implementations to port to different vendor platforms
- Internet and Web as exemplars

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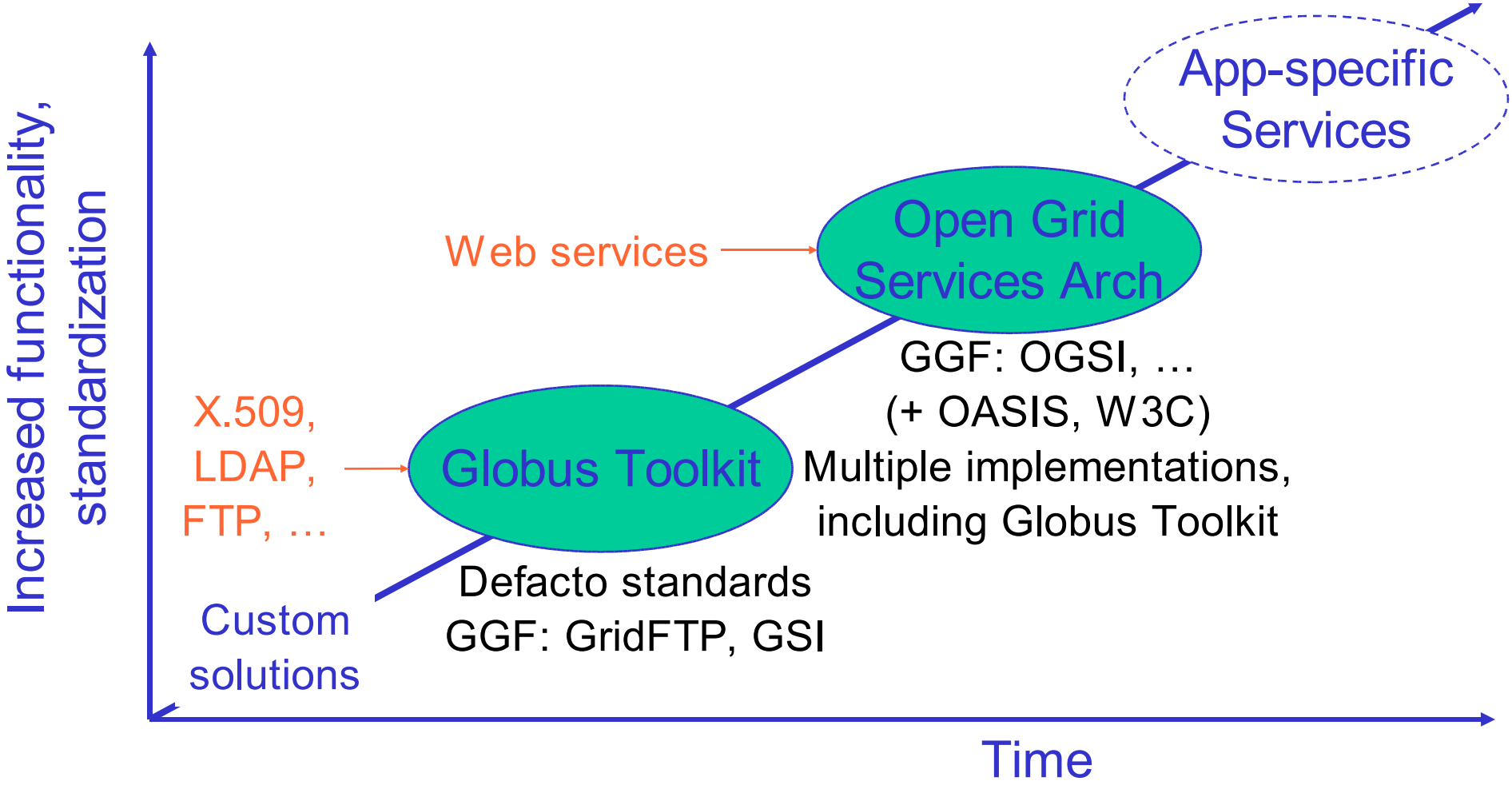
# Grids and Open Standards



# Relevant Standards Organizations

- GGF: Grid services—OGSI, OGSA
- W3C: Web services: WSDL, SOAP
- OASIS: Web services security
- IETF: Internet protocols and security
- Project Liberty Alliance: Identity federation
- DMTF: Common Information Model (CIM)

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# OGSI
# Open Grid Service *Infrastructure*

- Emerging standard that defines the *Grid service*
  - A Web service that conforms to standard behaviors and interfaces for distributed systems management
- GGF OGSI working group
- v1.0 specification has been released

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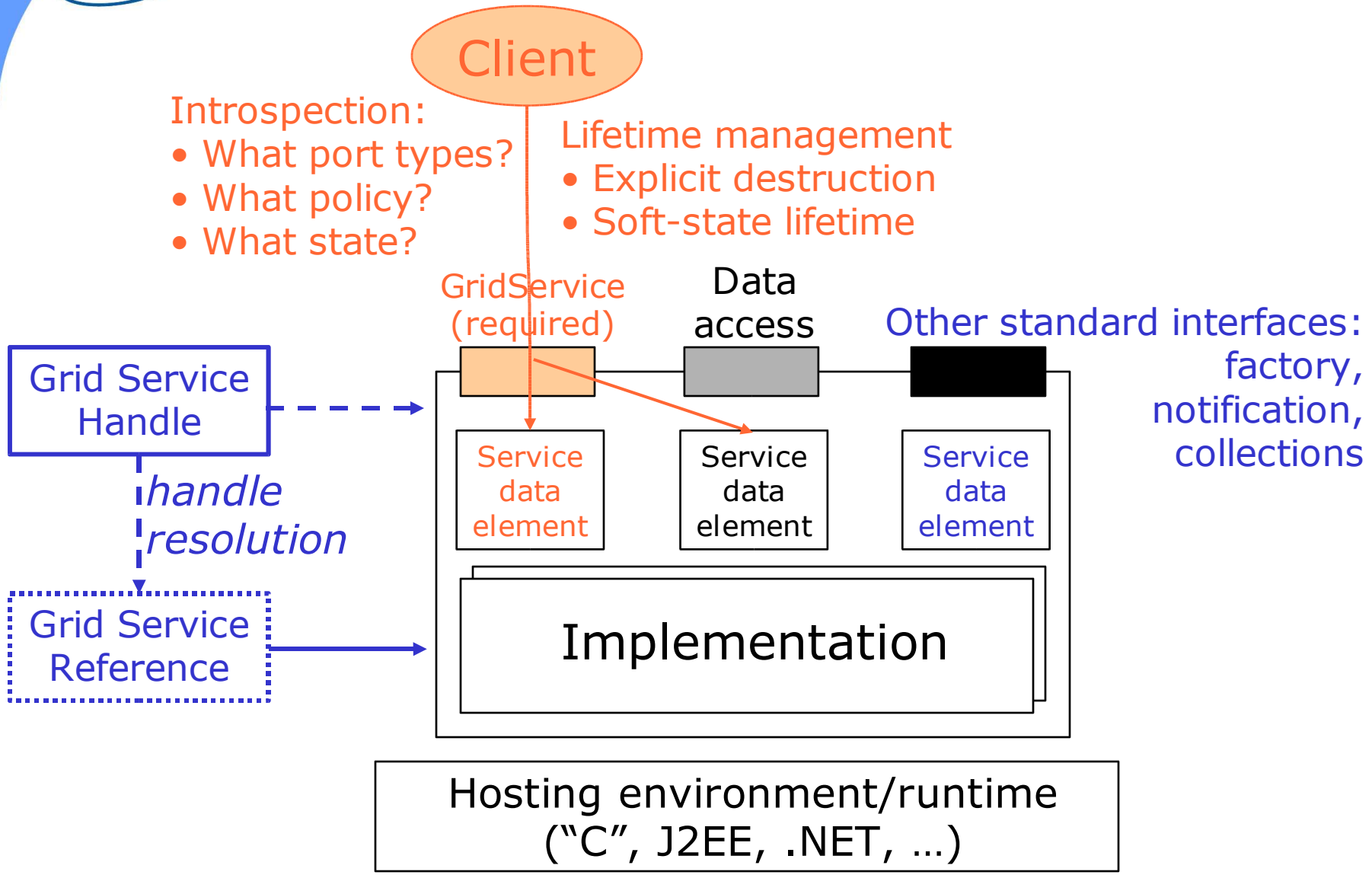
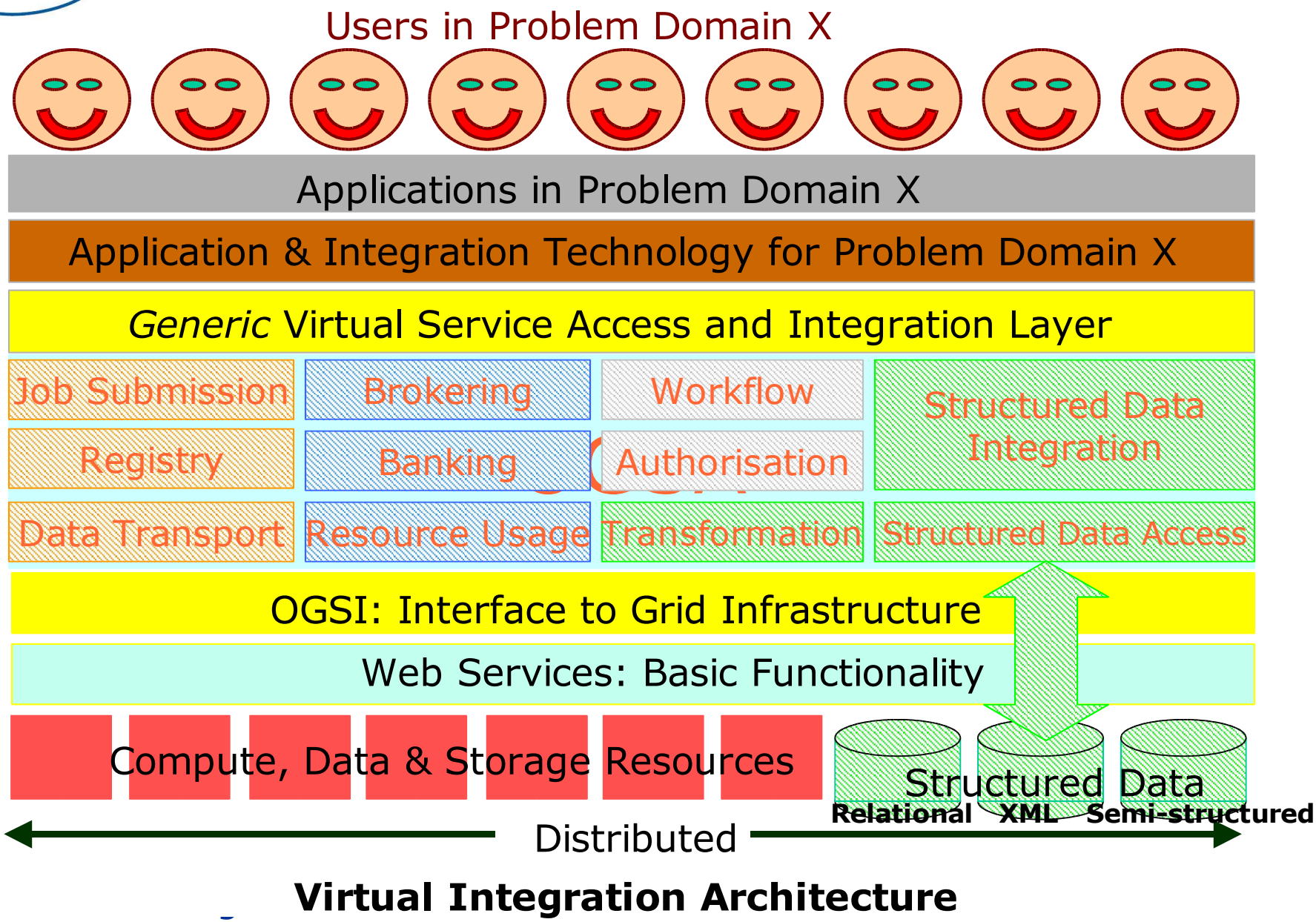
# Open Grid Services Infrastructure



# Open Grid Services Architecture




**Virtual Integration Architecture**

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# OGSA
# Open Grid Services *Architecture*

- OGSA refers to the collection of specifications that together define a complete architecture
- GGF OGSA WG is defining OGSA
  - Services must be OGSI-compliant
  - Coordination group: Specifications for the services will come from other working group
  - Will define requirements, scope activities, …
  - This effort is just ramping up

GWD-R (draft-ggf-ogsa-platform-3)
Open Grid Services Architecture Platform

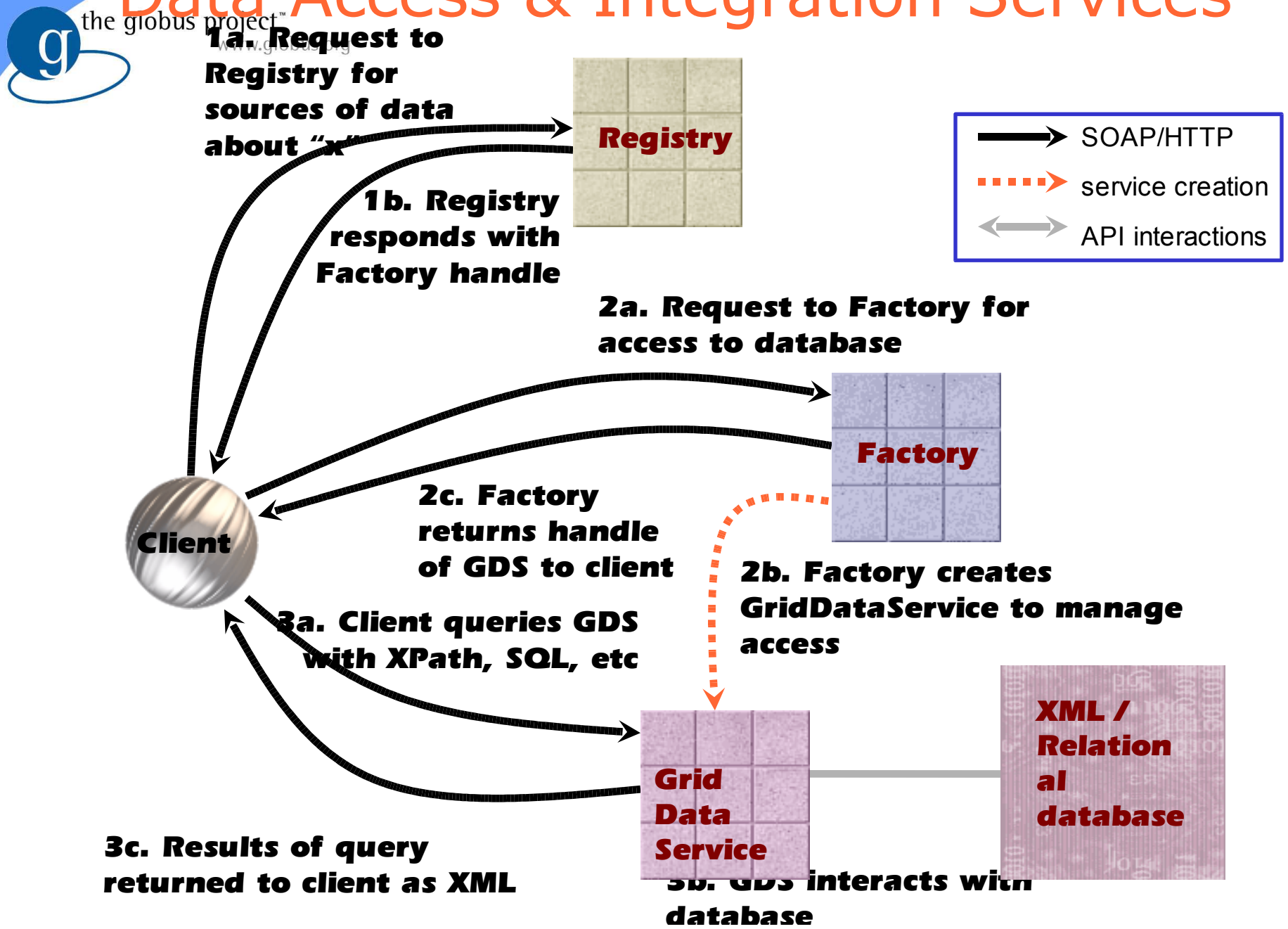
**Editors:**
I. Foster, Argonne & U.Chicago

# Other GGF Working Groups

- Numerous other GGF working groups related to OGSA
  - OGSA security
  - CIM based data models
  - Resource usage records and protocols
  - Agreement negotiation
  - Common management model
  - Data access and integration
  - Many more, and more to come…

# Data Access & Integration Services





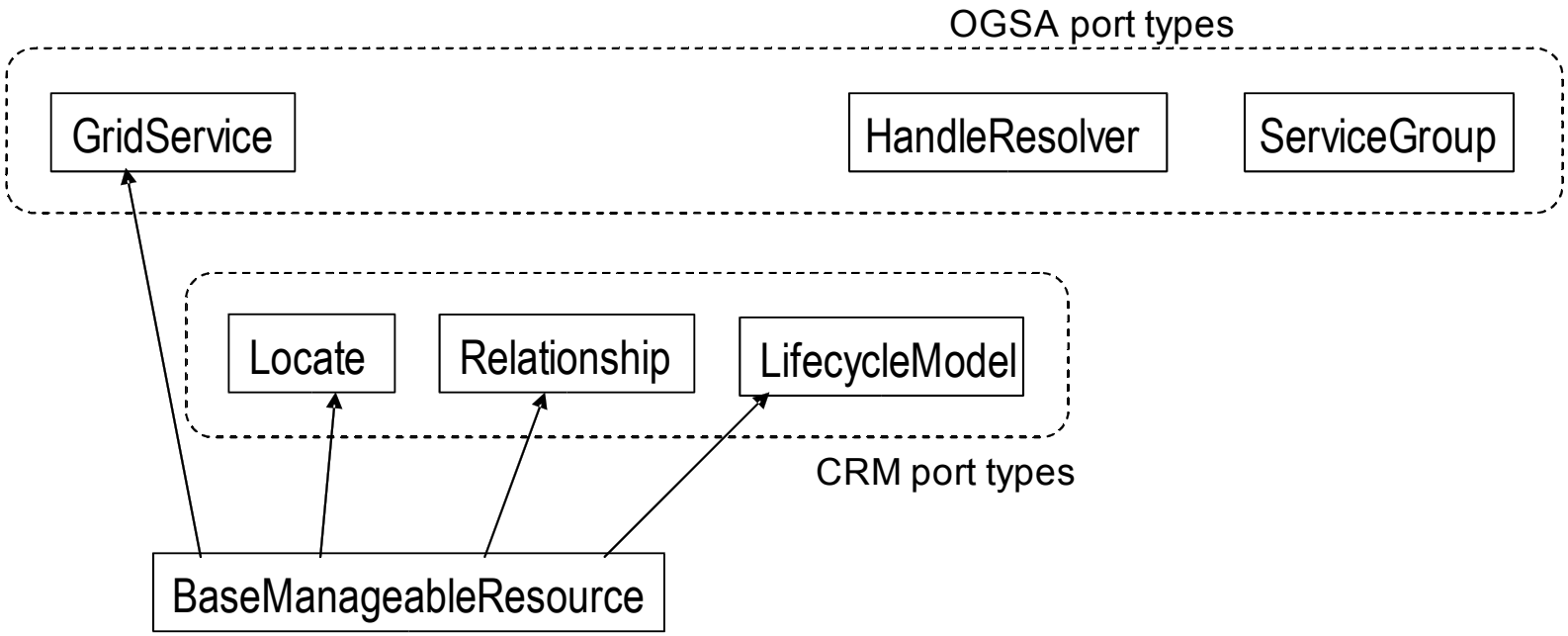

Slide Courtesy Malcolm Atkinson, UK eScience Center


# Common Management Model

- A manageable resource is a Grid service, thus
  - Global resource names: Grid service handles
  - State data modeling + access: SDEs
  - Lifetime management
  - Service Group for grouping resources
  - Interface definition language: WSDL
- Plus additional schema & operations
  - Standard manageable resource SDE schema
  - Interfaces for extensible lifecycle and relationship management

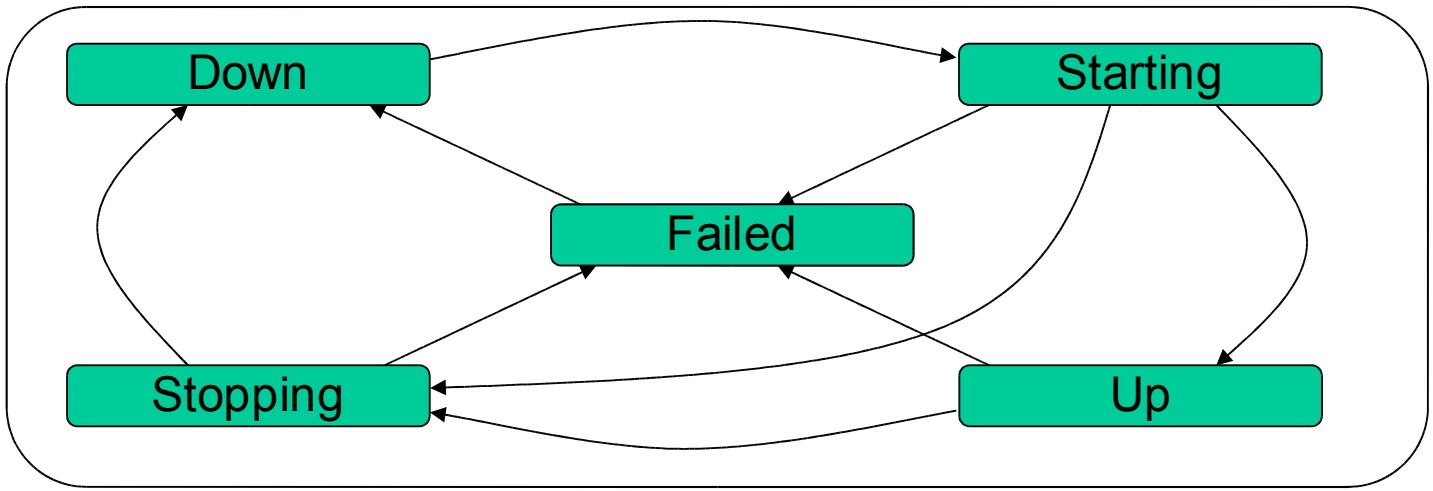
⇒ BaseManageableResource interface

# Base Manageable Port Types



# lifecycleModel Port Type: A Container for Lifecycle States

- There may be multiple models, but only one for a given resource's port type
- Example: Get/set resource's lifecycle state
  - down, starting, up, stopping, failed
  - Each state has additional info, e.g.,
    - up state: idle, busy, degraded



# W3C WSDL & SOAP

- WSDL: Web Services Description Language
- SOAP: Simple Object Access Protocol

- Foundation under OGSI
- Both are "W3C Notes", with standardization in progress
- OGSI authors are on the WSDL working group, to ensure that OGSI requirements are met in WSDL v1.2

# Security Standards

- Many core security standards are from IETF
  - PKI, Kerberos, etc.
- X.509 Proxy Certificates
  - Used by Globus Toolkit GSI
  - IETF PKIX RFC

# Web Services Security

- A whole raft of Web services security specification are in play
  - Need to evaluate & perhaps extend for OGSA; still many holes to be filled
- GGF OGSA Security WG is coordinating security standards for OGSA applicability
  - Binding level & service definitions
  - E.g., standard authorization interfaces

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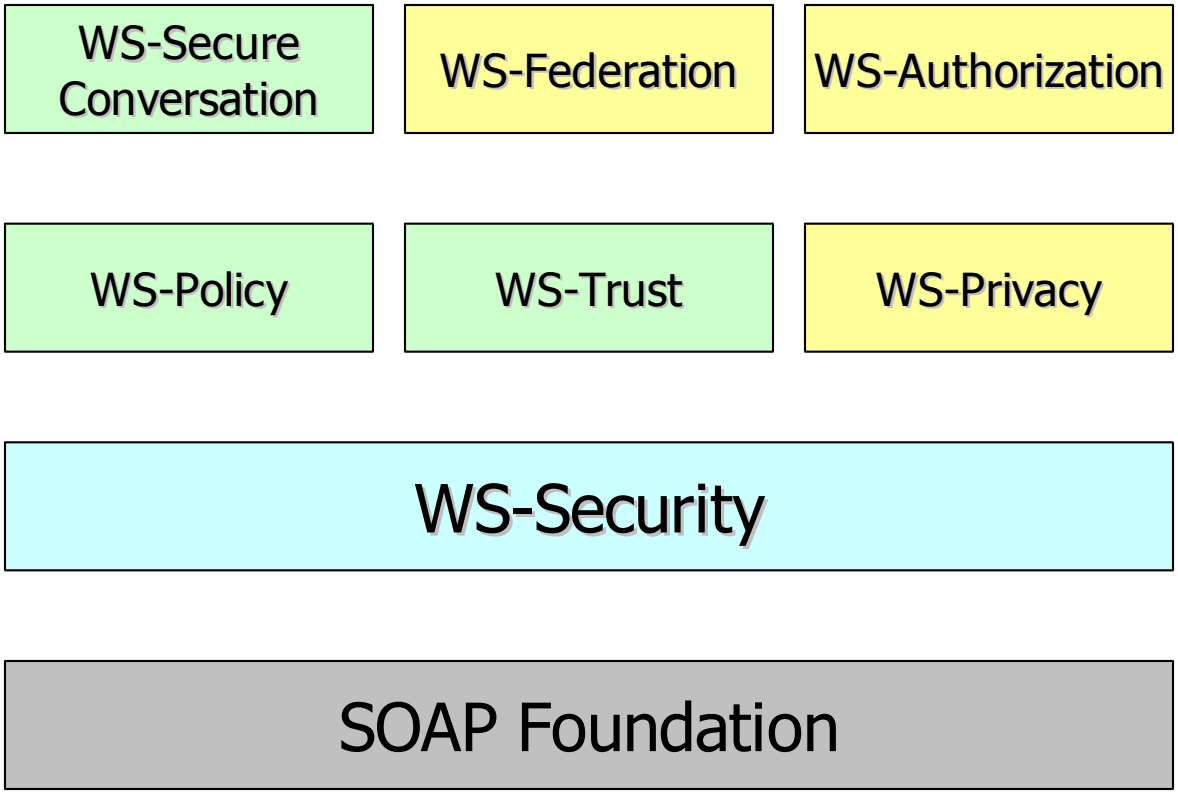
# IBM/Microsoft WS Security Architecture

- Large set of specifications for doing Web services security, most of which should be appropriate for OGSA
- Announced April 2002
- Initial spec in July 2002 (WS-Security)
  - Submitted to OASIS
- New crop of specs arrived in December 2002
  - Not yet in any standards organzation

# WS Security
# Current/Proposed WSS-specs



# OASIS SAML & XACML

- SAML: Security Assertion Markup Language
  - Good for asserting properties such as group membership, etc
- XACML: eXtensible Access Control Markup Language
  - For defining access control policies

# Project Liberty Alliance

- V1.0 specifications for identity federation
- Based on SAML

# Intellectual Property issues

- Ubiquitous adoption is likely only to happen if IP is licensed royalty free (RF)
  - Core specifications must be RF
  - Higher level service specifications may be RAND (Reasonable and Non-Discriminatory) or even proprietary
- OGSI authors have made RF commitment
  - Many of the key IBM/Microsoft WS-* specs are not (currently) RF
  - But WS-Security is RF, so hopefully…

# Globus Toolkit and Standards

- GT continues to implement open standards as they emerge
- GT2
  - X.509 Certs and Proxy Certs, GridFTP, LDAP, GSS-API, GSS-API extensions
- GT3
  - GT2 + WSDL, SOAP, X.509, OGSI, WS-Security, etc.

# Summary

- Standards are critical to Grid success
- A complex space, with much to be done and many stakeholders
- GGF is defining key Grid standards: OGSI, data, manageability, agreements, etc.
- Close coordination with W3C
- Uncertain status of security standards continues to be a source of concern
- Open source software as a secret weapon