



<http://www.grid-support.ac.uk>



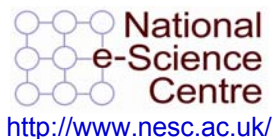
<http://www.ngs.ac.uk>

# Globus 4

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PPARC Summer School, NeSC  
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# Acknowledgement



- These slides are all taken from the keynote talk given by Carl Kesselman at Globus Week, NeSC, 4<sup>th</sup> April – 8<sup>th</sup> April 2005
  - <http://www.nesc.ac.uk/action/esi/contribution.cfm?Title=519>



# A Service-Oriented Infrastructure

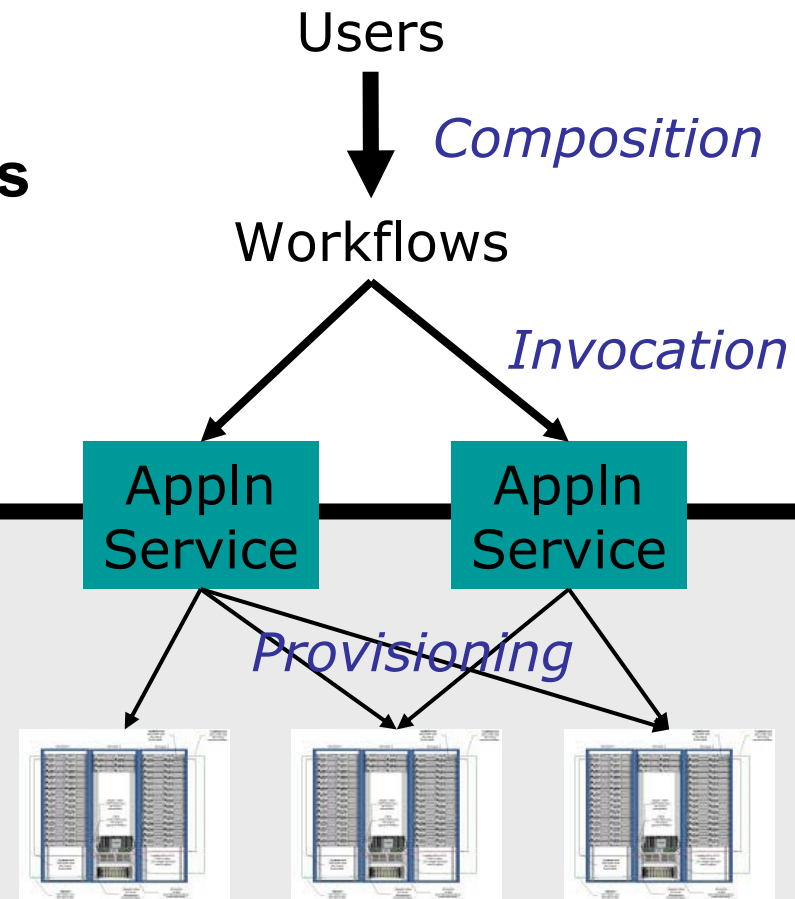


- Service-oriented **applications**

- Wrap applications as services
- Compose applications into workflows

- Service-oriented **infrastructure**

- Provision physical resources to support application workloads





# Globus is Service-Oriented Infrastructure Technology

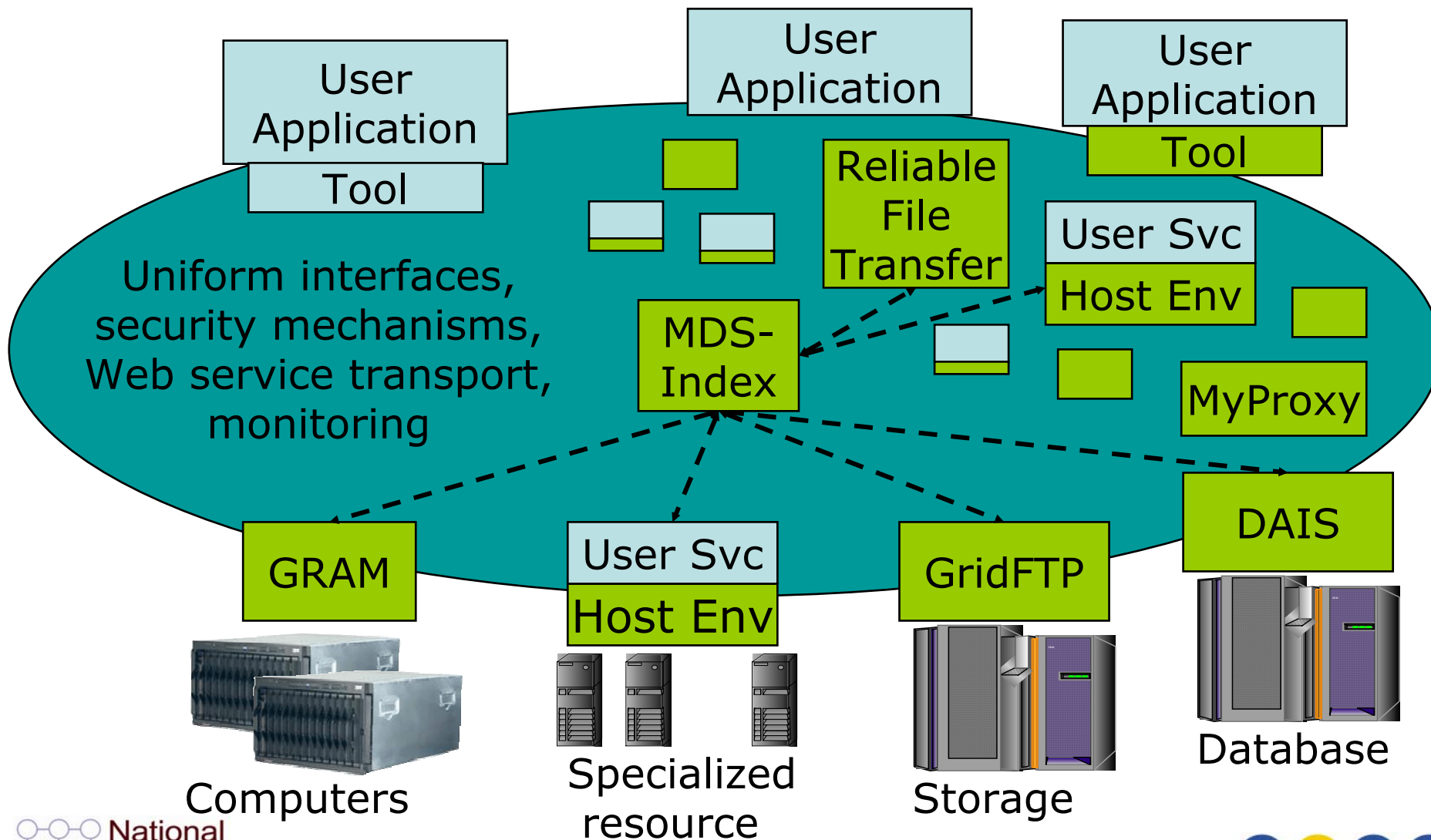


- Software for service-oriented infrastructure
  - Service enable new & existing resources
  - E.g., GRAM on computer, GridFTP on storage system, custom application service
  - Uniform abstractions & mechanisms
- Tools to build applications that exploit service-oriented infrastructure
  - Registries, security, data management, ...
- Open source & open standards
  - Each empowers the other
- Enabler of a rich tool & service ecosystem



# Globus as

# Service-Oriented Infrastructure



PPARC Summer School, NeSC, 13<sup>th</sup> May 2005





# Globus Toolkit V4.0



- Released April 29<sup>th</sup> 2005
- Fifteen months of design, development and testing
  - 1.8M lines of code
  - Major contributions from five institutions
  - Hundreds of millions of service calls executed over weeks of continuous operation
- Significant improvements over GT3 code base in all dimensions

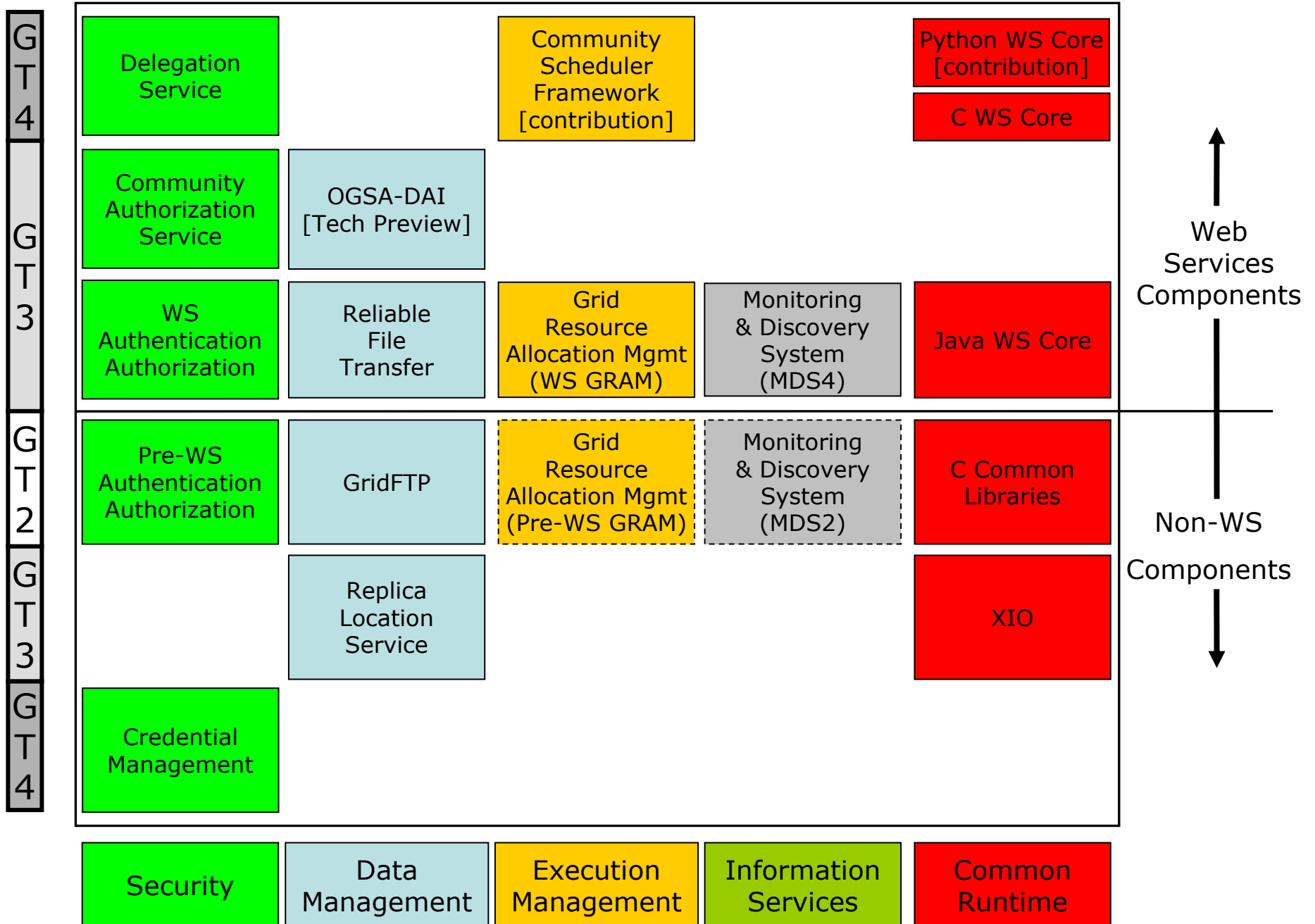


# The Goals of GT4



- Usability, reliability, scalability, ...
  - Web service components have quality equal or superior to pre-WS components
  - Documentation at acceptable quality level
- Consistency with latest standards (WS-\*, WSRF, WS-N, etc.) and Apache platform
  - WS-I Basic (Security) Profile compliant
- New components, platforms, languages
  - And links to larger Globus ecosystem

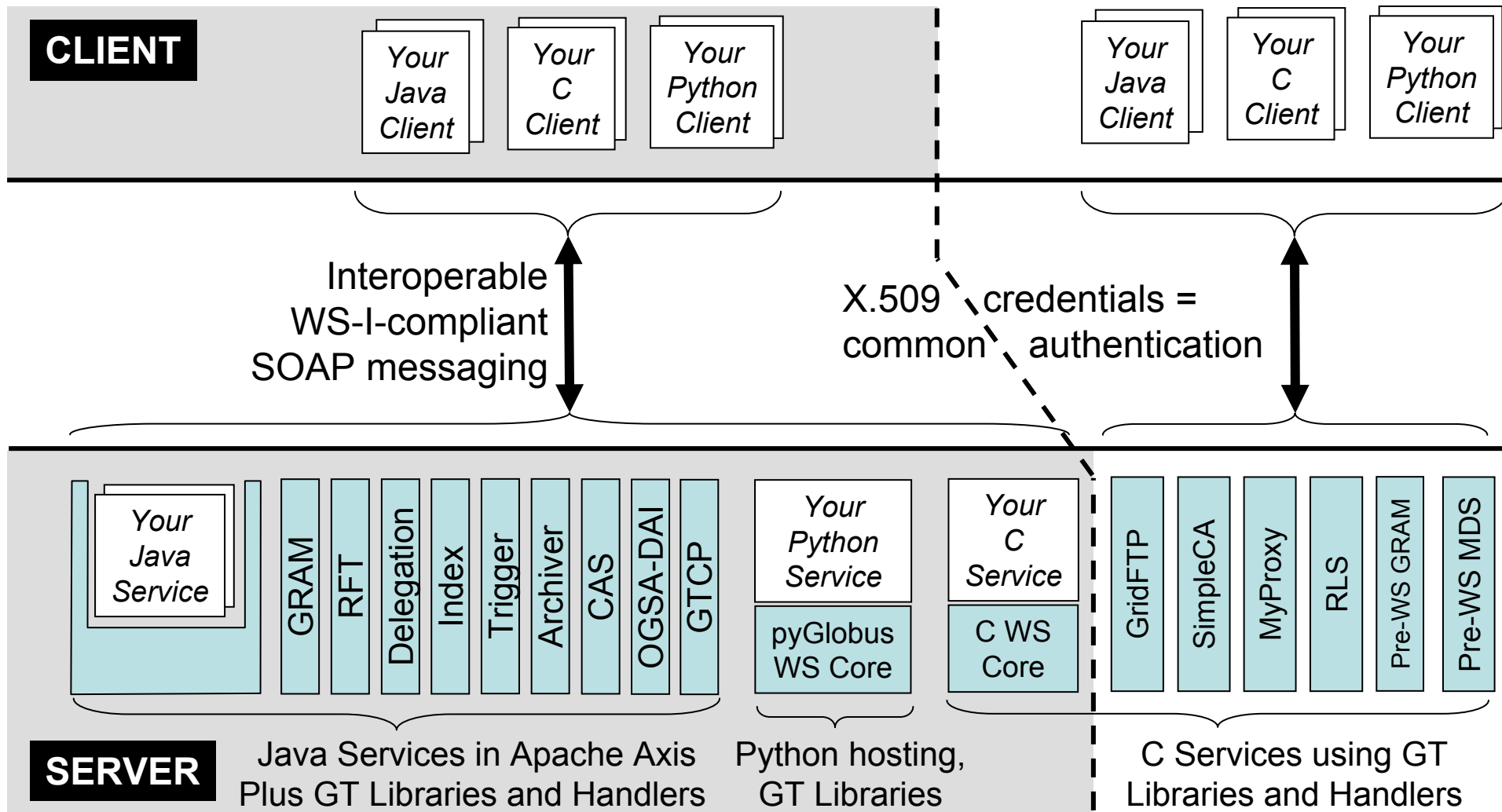
# Globus Open Source Grid Software







# GT4 Components





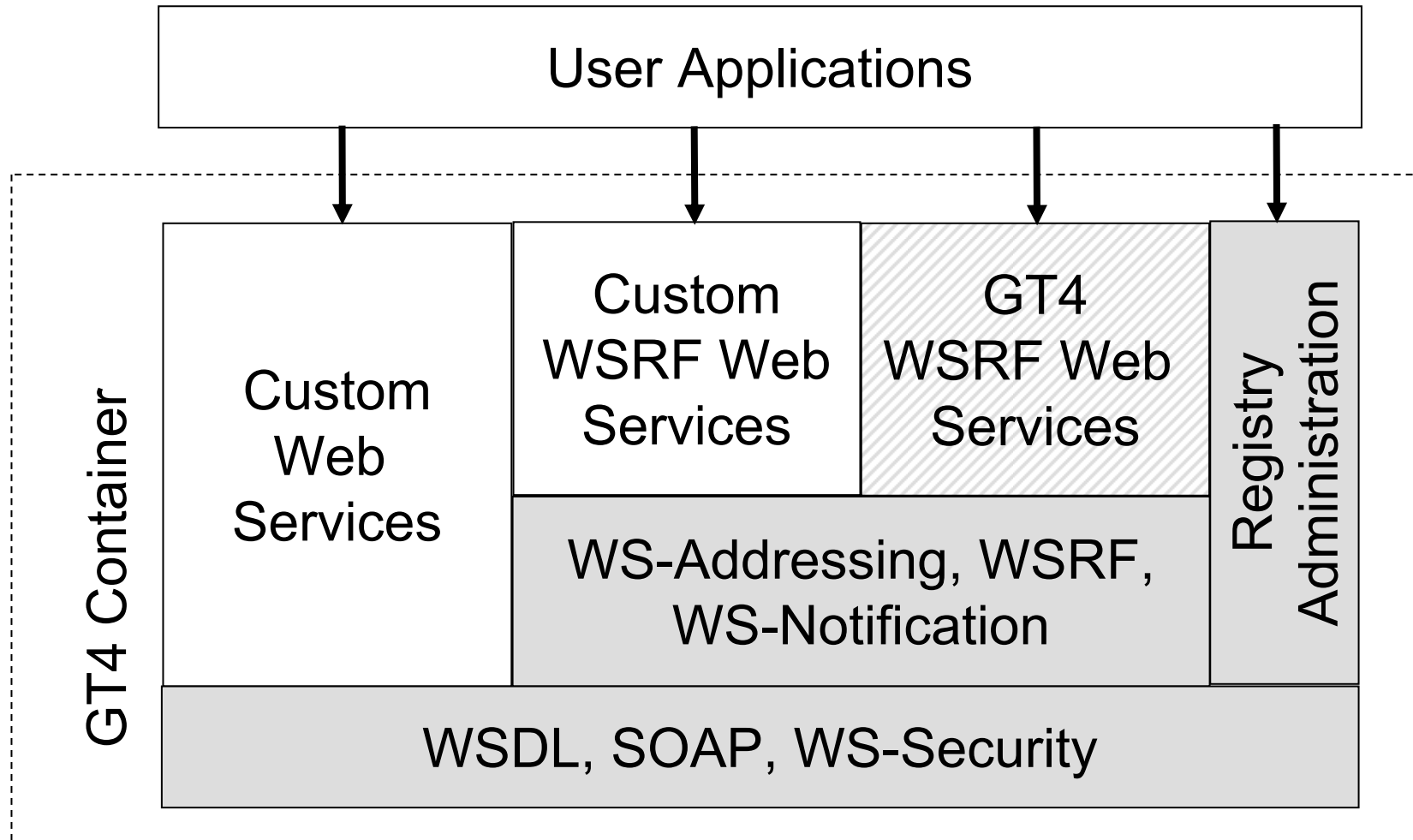
# GT4 Web Services Core



- Supports both Globus services (GRAM, RFT, Delegation, etc.) & user-developed services
- Redesign to enhance scalability, modularity, performance, usability
- Leverages existing WS standards
  - WS-I Basic Profile: WSDL, SOAP, etc.
  - WS-Security, WS-Addressing
- Adds support for emerging WS standards
  - WS-Resource Framework, WS-Notification
- Java, Python, & C hosting environments



# GT4 Web Services Core



# GOSC GT4 Security Highlights

- Standards based support for message level and transport level security
- Standards based authorization (SAML) via CAS or callout
- Stand-alone delegation service
- More authentication options
  - MyProxy, simpleCA, ...



# GT4's Use of Security Standards



	Message-level Security w/X.509 Credentials	Message-level Security w/Username and Passwords	Transport-level Security w/X.509 Credentials
Authorization	SAML and grid-mapfile	grid-mapfile	SAML and grid-mapfile
Delegation	X.509 Proxy Certificates/ WS-Trust		X.509 Proxy Certificates/ WS-Trust
Authentication	X.509 End Entity CertificateS	Username/ Password	X.509 End Entity CertificateS
Message Protection	WS-Security WS-SecureConversation	WS-Security	TLS
Message format	SOAP	SOAP	SOAP



# Execution Management (GRAM)



- Common WS interface to schedulers
  - Unix, Condor, LSF, PBS, SGE, ...
- More generally: interface for process execution management
  - Lay down execution environment
  - Stage data
  - Monitor & manage lifecycle
  - Kill it, clean up
- A basis for application-driven provisioning



# GT4 GRAM



- 2nd-generation WS implementation
  - optimized for performance, stability, scalability
- Streamlined critical path
  - Use only what you need
- Flexible credential management
  - Credential cache & delegation service
- GridFTP & RFT used for data operations
  - Data staging & streaming output
  - Eliminates redundant GASS code
- Single and multi-job support

# GT4 Documentation is Much Improved!

## GT 4.0 General

- [Release Notes](#)
- [Key Concepts](#)
- [Installing GT 4.0 \(System Administrator's Guide\)](#)
- [Site/VO Planning](#)
- [Platform Notes](#)
- [Best Practices for Developing with GT 4.0](#)
- [Guide to APIs](#)
- [Coding Guidelines](#)
- [Migration Guide](#)
  - [From GT2 to GT4](#)
  - [From GT3 to GT4](#)
- [Samples](#)
- [Command Line Clients Guide](#)
- [GUI Guide](#)
- [Resource Properties Guide](#)
- [Overview and Status of Current GT Performance Studies](#)
- [Release Version Scheme](#)

## GT 4.0 Common Runtime Components

- [Common Runtime Components: Key Concepts](#)
- [Java WS Core](#)
- [C WS Core](#)
- [XIO](#)
- [C Common Libraries](#)

## GT 4.0 Security (GSI)

- [Security: Glossary](#)
- [Security: Key Concepts](#)
- [WS A&A](#)
  - [Community Authorization Service \(CAS\)](#)
  - [Delegation Service](#)
  - [Authorization Framework](#)
  - [Message/Transport-level Security](#)
- [Credential Management](#)
  - [MyProxy](#)
  - [SimpleCA](#)
- [Utilities](#)
  - [GSI-OpenSSH](#)
- [Pre-WS Authentication & Authorization](#)

## GT 4.0 Data Management

- [Data Management: Key Concepts](#)
- [RFT](#)
- [GridFTP](#)
- [RLS](#)

## GT 4.0 Information Services

- [Information Services: Key Concepts](#)
- [WS MDS \(MDS4\)](#)
  - [Aggregator Framework](#)
  - [Index Service](#)
  - [Trigger Service](#)
  - [WebMDS \(Tech Preview\)](#)
- [Pre-WS MDS \(MDS2\)](#)

## GT 4.0 Execution Management

- [Execution Management: Key Concepts](#)
- [WS GRAM \(GRAM4\)](#)
- [WS Rendezvous](#)
- [Pre-WS GRAM \(GRAM2\)](#)





# The Globus Ecosystem



- **Globus components** address core issues relating to resource access, monitoring, discovery, security, data movement, etc.
  - GT4 being the latest version
- A larger **Globus ecosystem** of open source and proprietary components provide complementary components
  - A growing list of components
- These components can be combined to produce **solutions** to Grid problems
  - A list of such solutions is being built



# 2005 and Beyond



- We have a solid Web services base now exists
- Next is to build, on that base, a open source service-oriented infrastructure
  - Virtualization
  - New services for provisioning, data management, security, VO management
  - End-user tools for application development
  - Etc., etc.