



# Web Services Interfaces and Open Standards Integration into the European UNICORE 6 Grid Middleware

Ahmed Shiraz Memon  
Juelich Supercomputing Center  
Research Centre Juelich (FZJ)



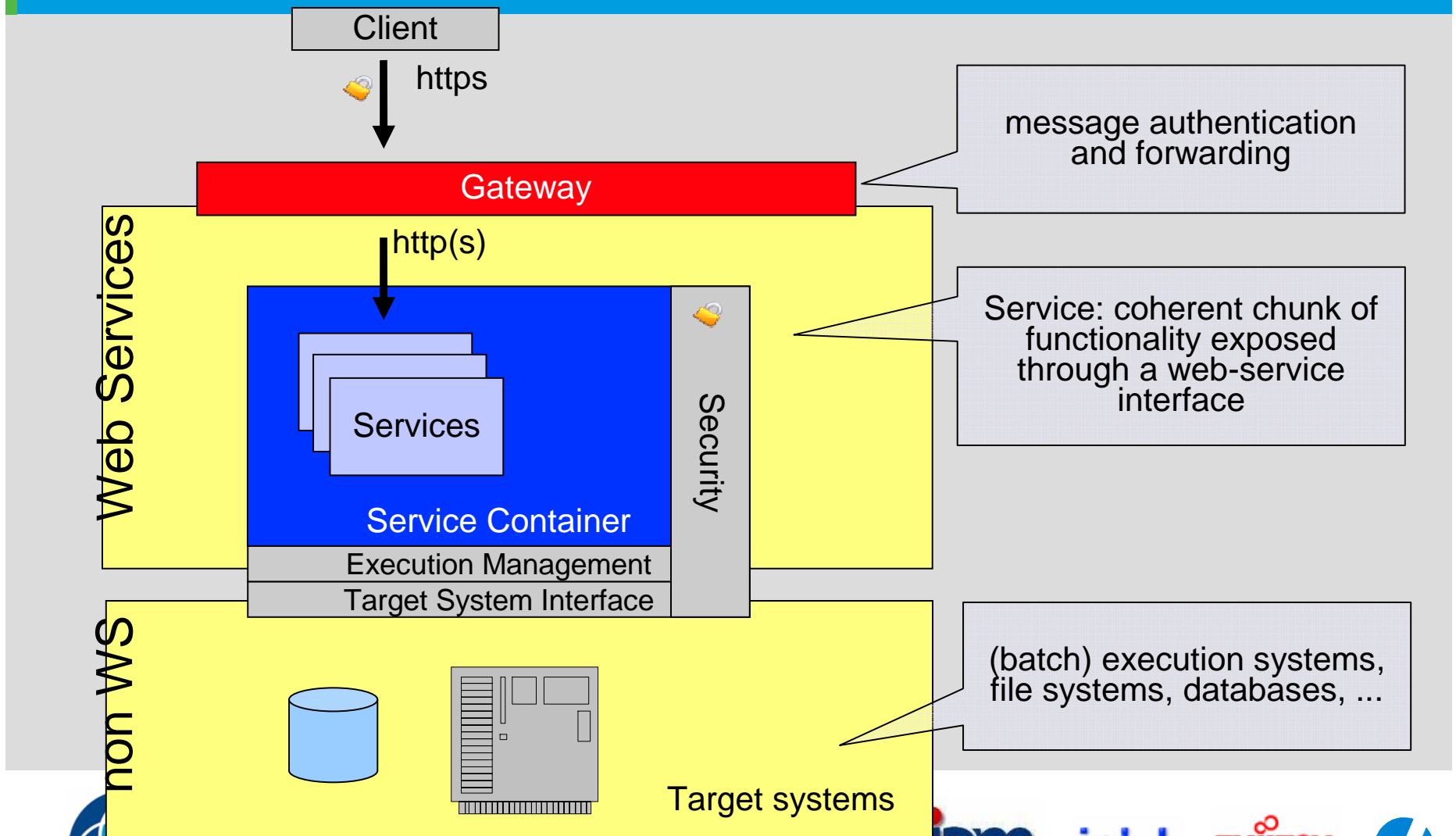
# Outline



- UNICORE Intro
- Architectural Overview
- Atomic (Core) Services
- Enhanced Network Job Supervisor
- Additional Services
- Feature Highlights

- **UNiform Interface to **COmputing REsources****
- Open Source (BSD) Grid Computing Solution
- Three tiered Architecture
- UNICORE5:
  - AJO
  - UPL
  - NON-WS
- UNICORE6
  - JSDL
  - HTTP over SOAP
  - WS/WS-RF1.2 Compliant

# UNICORE6 Architecture

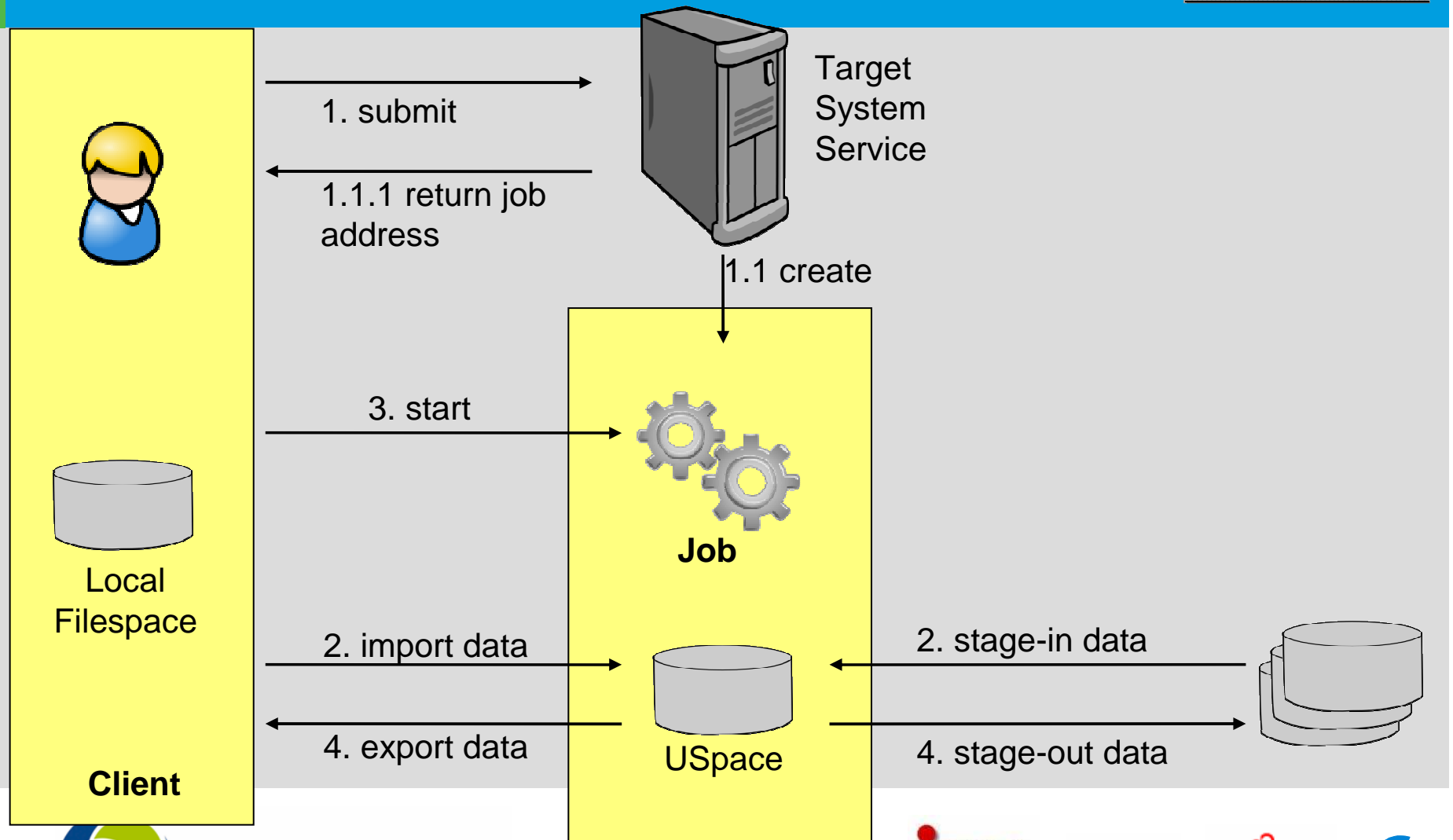


# Core Services



- UNICORE Atomic Services
  - Target system creation
  - Job submission and job management
  - File system access
  - File import/export control
- Registry
  - Publish services (address, service description)
  - Shareable between sites
  - Single point of entry for clients

# Jobs and Storages



# Enhanced Network Job Supervisor



- Execution management system (XNJS)
  - Submit and manage jobs
  - Control file transfers
- JSDL 1.0 support
  - extensions: POSIX, „HPC“, soon: SPMD
- Extensible
  - Logging, tracing, monitoring, notifications
  - Third-party system integration



# Additional Services I: OGSA-BES



- OGF driven OGSA Standard Web Services interface for creating and managing *computational jobs*
- Activity driven, specified by JSDL document
- Three port types
  - BES Management Service: management of BES itself
  - BES Factory Service: monitoring and managing set of activities
  - BES Activity(optional): represents individual activities
- Built on top of XNJS

# Additional Services II: OGSA-RUS



- OGF driven OGSA Standard Web Services interface for tracking resource usage
- Usage Record Format (URF)
- Two Port types:
  - RUS Factory Service: Creates instance of RUS Service
  - RUS Service: exposes resource usage information
- Endorses XNJS
- Application in the context of resource-level monitoring, accounting and billing

# Clients: GPE for UNICORE



- Application client
  - Single application, easy to use
- Expert client
  - Workflows
  - Replacement for UNICORE 5 client
- Web portal client
- Command line client



- Users and servers are identified by X.509 certificates
- Communication paths secured by client authenticated SSL/TLS
  - Clients – Gateway
  - Gateway – Server
  - Server – XUADB (optional)
  - Server – Gateway
- Messages contain additional security information in the SOAP header
- Messages are not encrypted
- Support for SAML/XACML
- Interoperability with VOMS in the form of role/group based authorization

# Feature highlights



- Fast WSRF 1.2 hosting environment
- Java management extensions (JMX) support
- JSR181 Annotations support (implicit)
- Uses Xfire WS SOAP Engine
- Lightweight servlet hosting with Jetty Web Server
- WS-Security
- Installer for Windows and Linux operating systems



# Conclusion



- UNICORE6 Grid Middleware
- Standard Job Submission
- Various clients (GUI and CLI's)
- Resource Usage
- Seamless access to supercomputers

# Acknowledgements



- OMII-Europe Project under EC grant RIO31844-OMIIEUROPE
- Chemomentum Project under EC grant IST-5-033437

# Questions?

