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.NET High Level API (NHiLA)

Bridging the Gap between .NET and UNICORE

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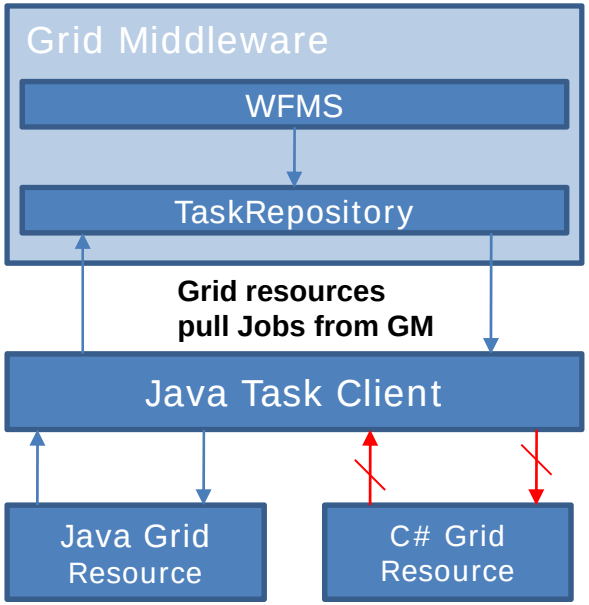
Overview

- Motivation
- UNICORE Clients
  - Architecture
- NHiLA
  - WSRF.NET
  - Clients
  - Experiences
- Summary & Outlook

Motivation

Motivation

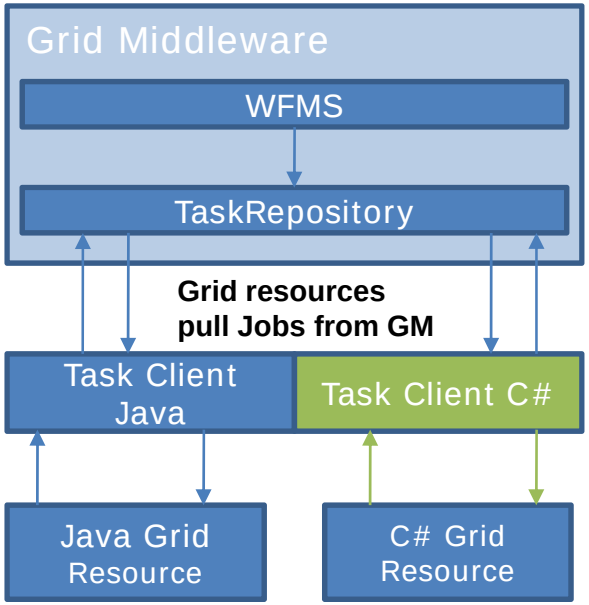
- Status today:
  - Hix4AGWS integrates a pull based approach for job distribution into UNICORE:



  - UNICORE provides a High Level API to develop Java clients
  - To connect .NET applications as actors we require .NET clients for UNICORE

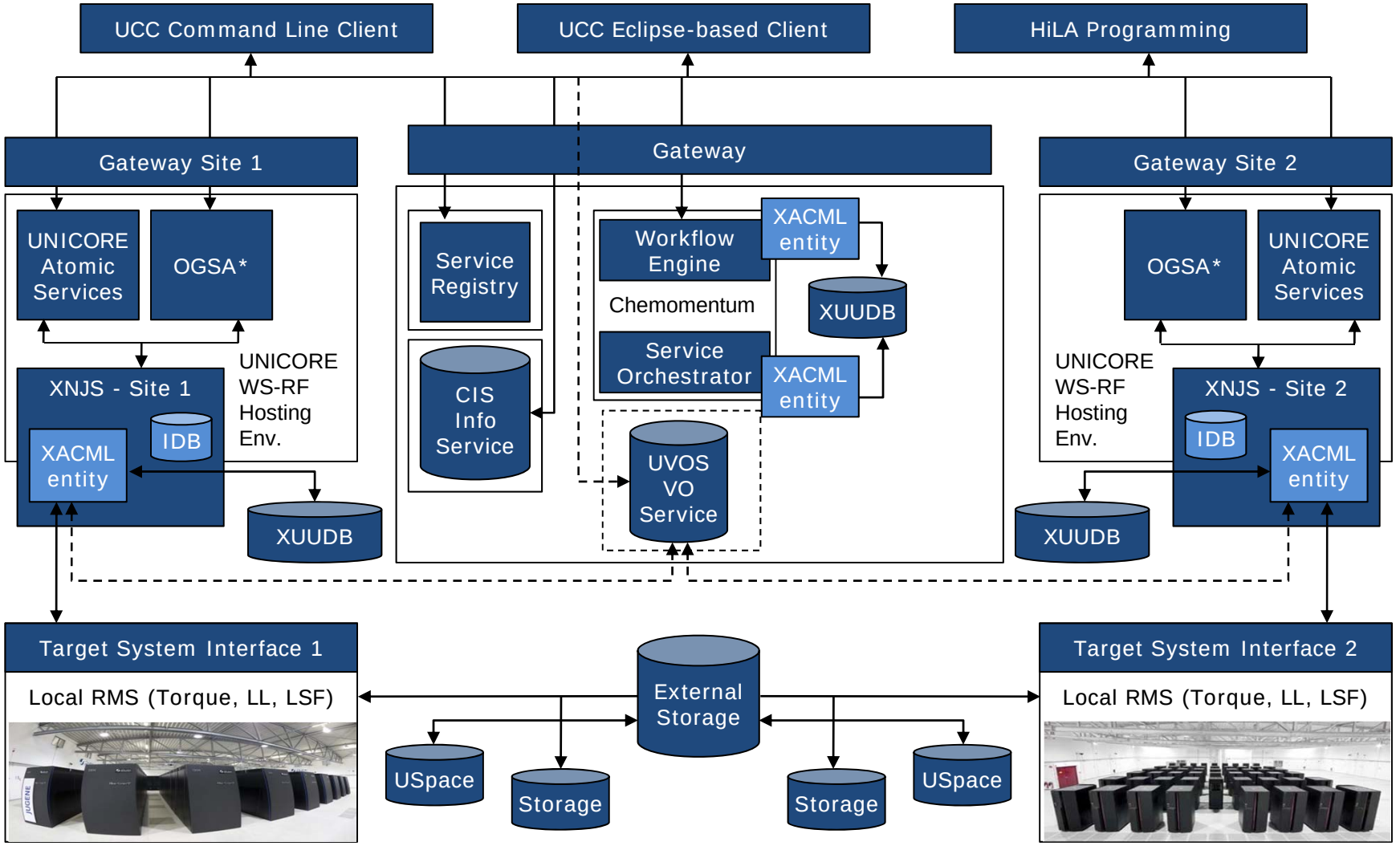
Motivation

- Aim:
  - Development of user interfaces with C# to use the UNICORE middleware with the pull based approach
  - Use the rich set of .NET capabilities
    - DataGridViews
    - LINQ
    - Integrated reporting tools
    - ...

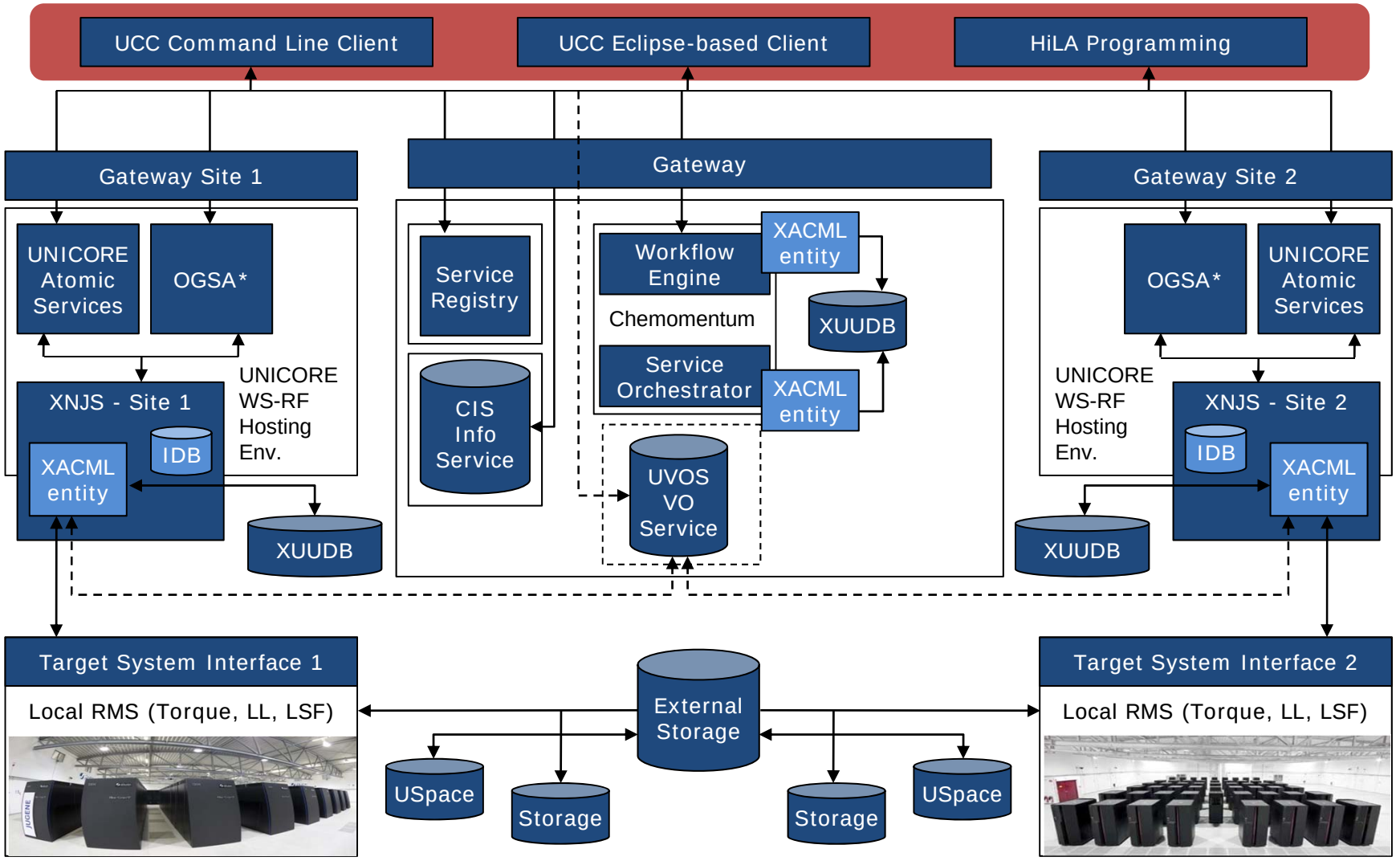


UNICORE Clients

UNICORE Clients
General UNICORE Architecture



UNICORE Clients
General UNCORE Architecture

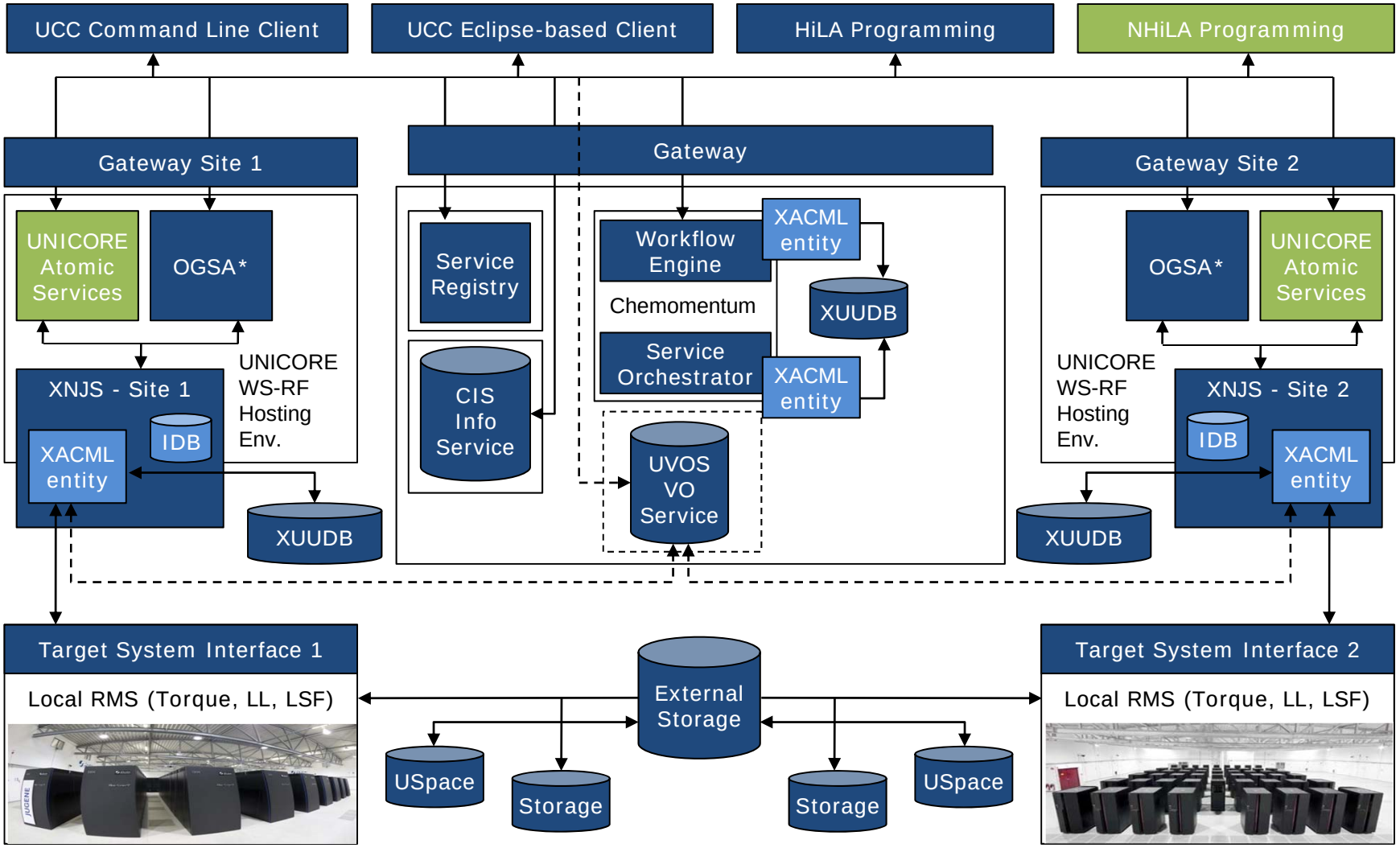


UNICORE Clients

- UNICORE Commandline Client (UCC)
  - Toolbox that allows users to access all features of the UNICORE service layer in a scripting environment
- UNICORE Rich Client (URC)
  - Eclipse based
  - Provides graphical view of the Grid to the users
  - Offers modeling tools to design complex scientific workflows
- High Level API (HiLA)
  - Develop specific user interfaces in Java

.NET High Level API

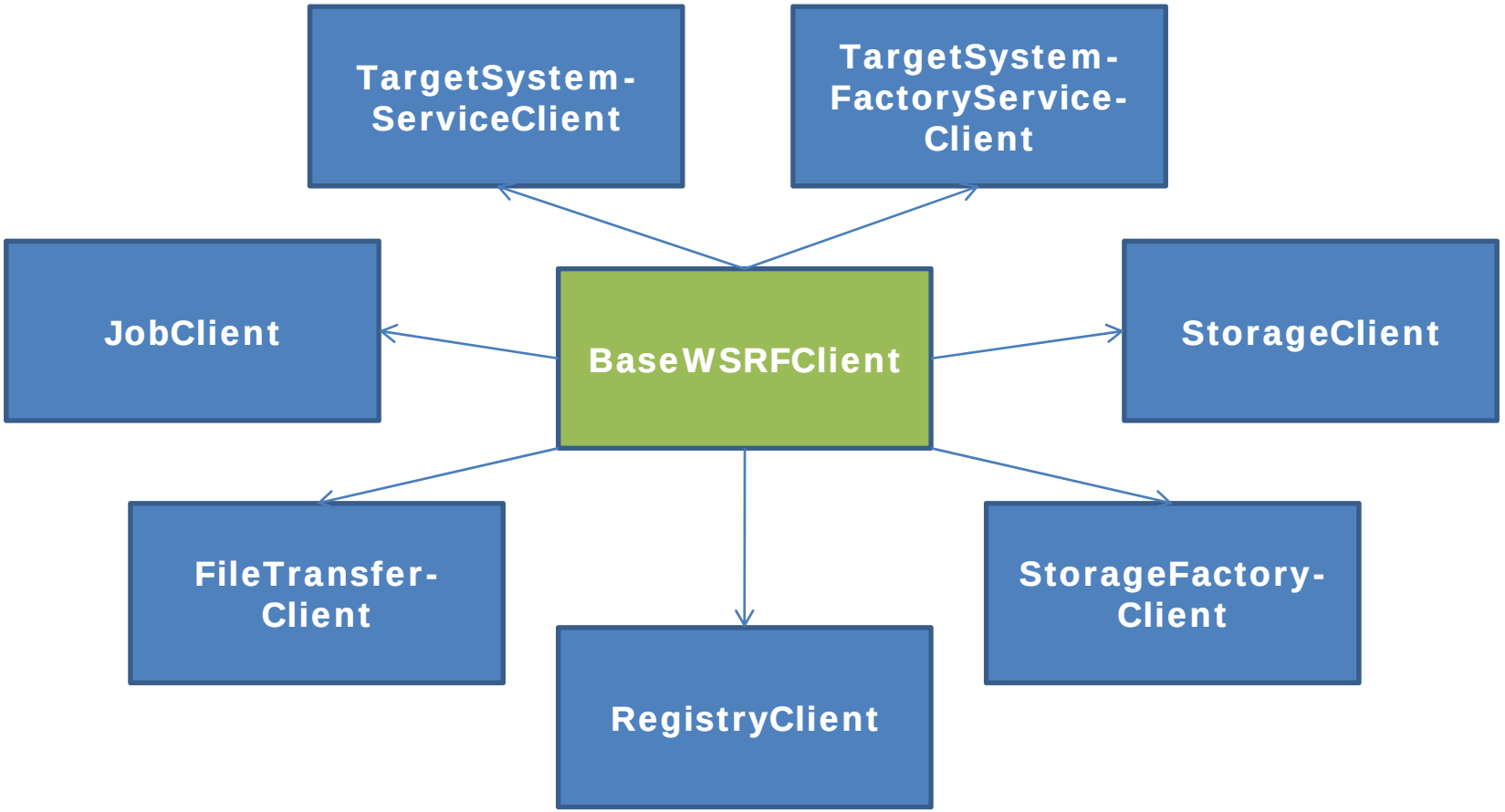
NHiLA, .NET High Level API
Status Quo



NHiLA, .NET High Level API
WSRF.NET

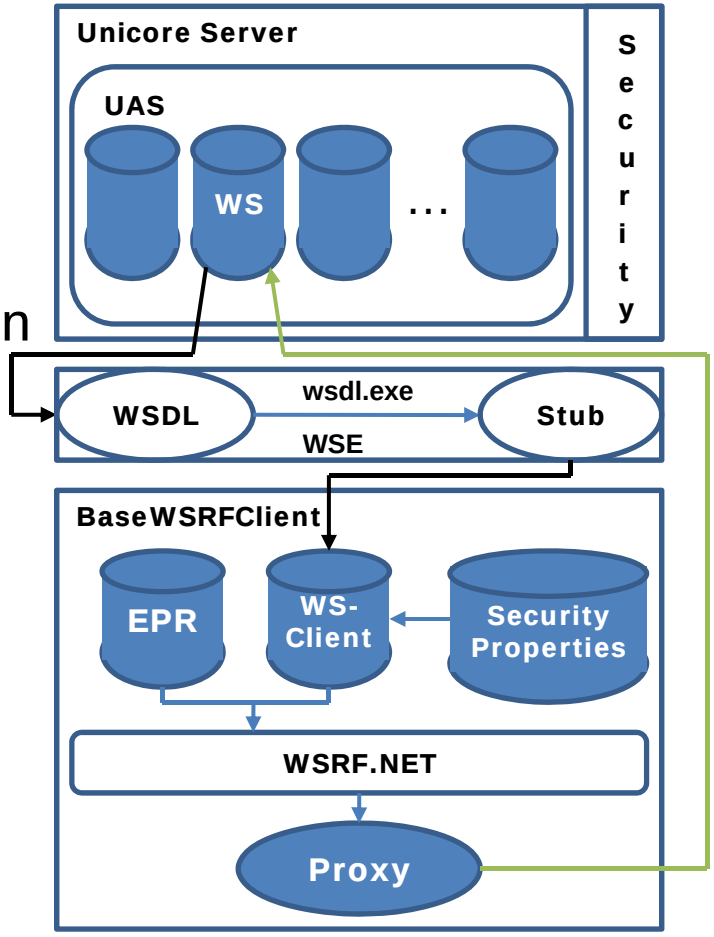
- Evolved by the University of Virginia
- A set of software libraries, tools, and applications which implements WSRF and WS-Notification for .NET
- Build easily WSRF-compliant web services
- A platform for Grid-Computing on .NET
- Integrates Microsoft technologies, such as Web Service Enhancements
- SOAP engine for .NET, that is compliant to WSRF
- Starting point to develop the .NET High Level API (NHiLA)

NHiLA, .NET High Level API
Client Architecture



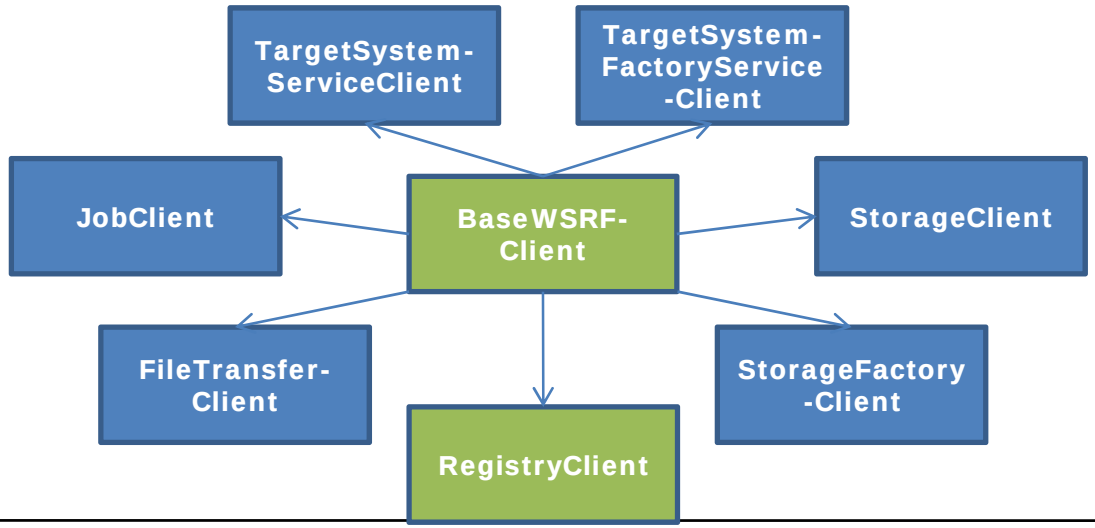
NHiLA, .NET High Level API (1/5)
Clients

- BaseWSRFClient
  - Implements only the core communication functionality
  - Generic skeleton
  - Authentication handling with X509 certificates
  - Generated Stub integrates the whole logic for the communication and security
  - Certificate gets easily included in the WS-Client Stub



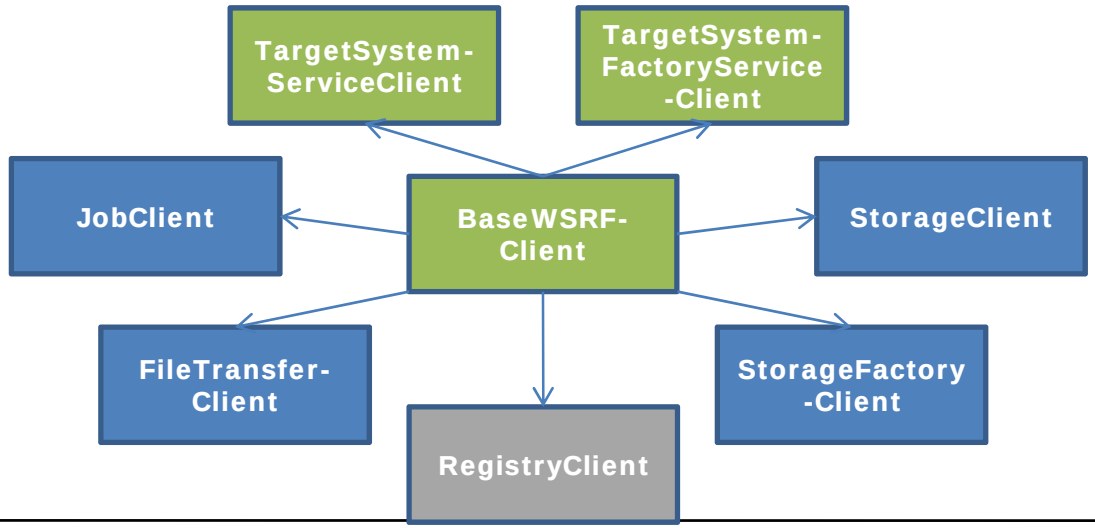
NHiLA, .NET High Level API (1/5)
Clients

- RegistryClient
  - Accessing a Registry or ServiceGroup service
  - Add registry entries and list available services



NHiLA, .NET High Level API (2/5)
Clients

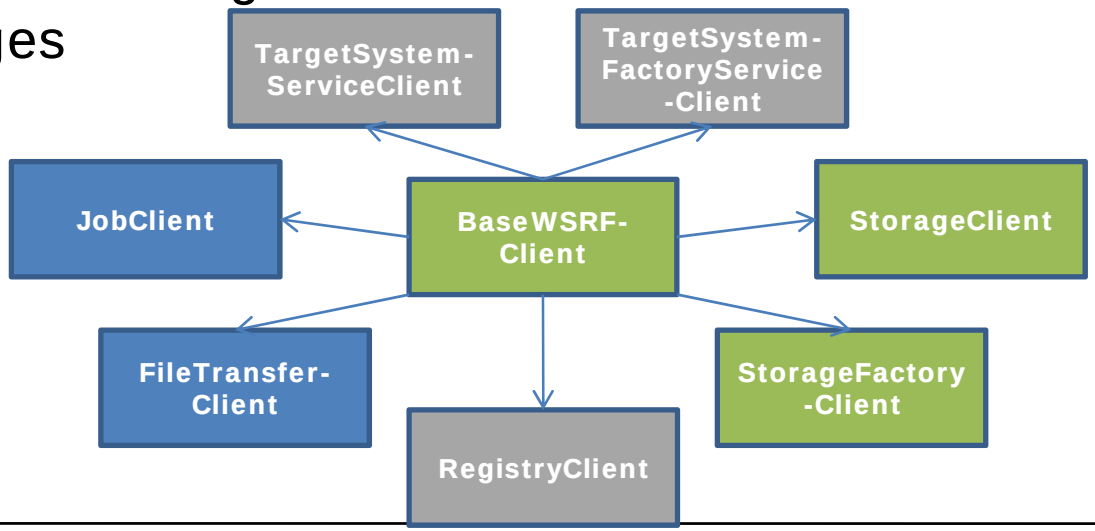
- TargetSystemFactoryServiceClient
  - Create a TargetSystemService client or list the target systems, which are available for the client
- TargetSystemServiceClient
  - Submit a job or get the current list of jobs on the target system



NHiLA, .NET High Level API (3/5)
Clients

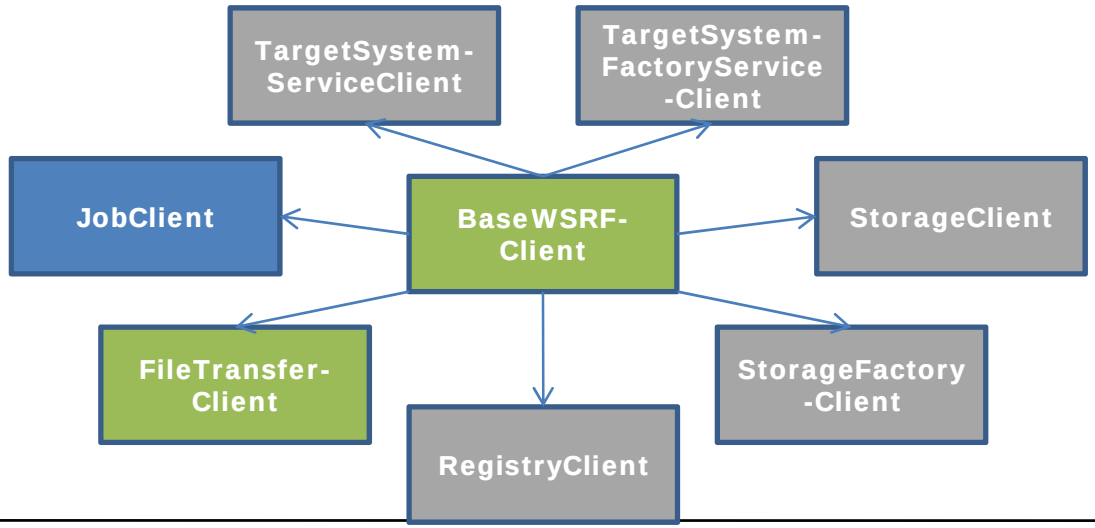
- StorageClient
  - Access the StorageManagement service
  - Writing or Reading data from or to a given remote file
  - Copy, rename, send or search a file
  - Create a new directory

- StorageFactoryClient
  - Create a StorageClient or list the for the client available storages



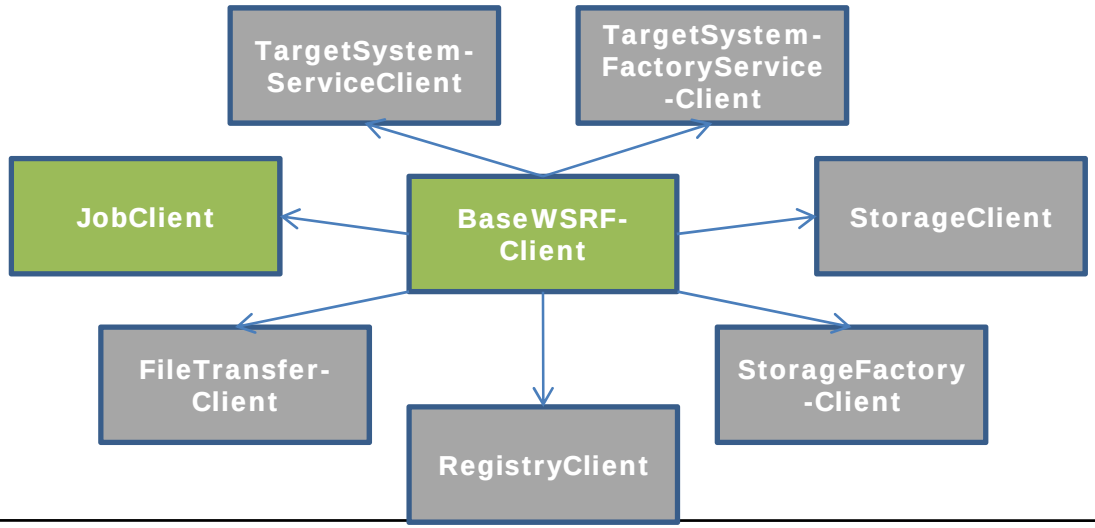
NHiLA, .NET High Level API (4/5)
Clients

- FileTransferClient
  - Base Client for managing the File-Transfer
  - Two capabilities to transfer files
    - Random byte IO and streamable byte IO
    - Own clients for those two capabilities



NHiLA, .NET High Level API (5/5)
Clients

- JobClient
  - Manage a job resource and access the job working directory
  - Start, abort, resume or hold a job
  - Wait until a job is finished



NHiLA, .NET High Level API Experiences

- Installation of UNICORE Servers was easy
- API Development with the delivered WSDLs and XML-Schemes was difficult
  - WSDLs had to be changed
  - A lot of any-Tags instead of specific Value-Types, when automatically generating stubs from WSDLs via wsdl.exe
  - Installation problem from WSRF.NET
    - Actual version (3.0.1) of WSRF.NET is not compatible with a higher versioned Framework than .NET 2.0
- C# has nearly the same capabilities like Java
  - The source-code is close to that from the Java UNICORE Atomic Services Clients

Summary & Outlook

Summary & Outlook

Summary:

- Extension to the UNICORE Client-Layer
- Development of C# Clients to use UNICORE middleware
- Hix4AGWS pull based approach with .NET possible

Outlook:

- Upgrade of WSRF.NET
  - Compatible to higher versioned Frameworks, LINQ can be used
- Graphical User Interface with C#
- Adaption to UNICORE Java HiLA

Any questions?

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