ARC CE Status and Plans

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Content

- Current state
- Adoption of new features
- Future plans

Current state

- Last production version 1.1.0
  - Mostly used with old GridFTP interface
  - Many features of prototype level
- Version 2.0 released as part of EMI 2
  - Replaces 1.1.0
  - New features moving to production level

New authorization capabilities

- Support for Argus authorization service
  - Use intermediate Argus PEPd and Argus PEP libraries
- Unified authorization configuration for easy switching to WS interfaces
  - Makes it easier to switch to new version

New data staging framework

- Greatly enhances productivity of data pre-staging and post-staging
  - More efficient use of gateway resources
  - Fair share and priorities
  - Better throughput of jobs
  - Distribution of data staging over multiple computers
- Already in use in ARC cloud of wLCG.
- Going to be production feature

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Adoption of EMI ES

- Both client and service sides are implemented
- EMI-ES interface is implemented as part of production A-REX service
  - Enabled simply by configuration option
- Most of features are implemented – 85-90%
- New interface provides all features used in ARC production setups

Adoption of EMI ES

- Some shortcomins of specs are identified
  - EMI ES group work is needed to address them
- *ARC is planning to deploy EMI-ES interface as one of the production interfaces on its Computing Element.*

Adoption of CAR

- External module called Jura available since December 22.
  - Collects information from internal state maintained by A-REX
  - Generates Compute Accounting Record (CAR) version 1.0
  - Sends generated messages to APEL accounting server via SSM protocol
- Changes of CAR specs being followed

Adoption of GLUE2

- GLUE2 schema gives the most complete overview of ARC CE services
- Information is rendered as LDIF and XML, and published both via LDAP and WS
  - ARC publishes ComputingActivities in LDIF
- UserDomain is missing : what to put / how to get data
- Policies: still very basic, new ones not yet profiled

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Adoption of GLUE2

- Need for profiling from each middleware
  - Different trees between LDIF and XML
  - Different trees on different middlewares
  - No common decision (yet) on how to publish EMI-ES

Future plans

- No radical changes are planned
- Enhancing scalability
  - Better handling of resources at gateway
  - Better distribution of load over multiple gateways
- Better support for batch systems – more features
- Better handling and reporting of errors

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Thank You

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Introduction

- Not so many efforts for standardizing computational job control interfaces can be identified
- The OGSA BES provides only very basic functionality and its extensions are tuned for different aims and overlap
  - *Interoperability tests show only basic compatibility between different implementations*
- Standards development from top to bottom is extrememly slow process
  - *Not consistent with quicker production life-cycle*

Introduction (cont.)

- The plethora of non-compatible interfaces
  - Disassociated Grid infrastructures
  - Client frameworks and gateways capable to communicate using multiple interfaces
- This situation raised effort backed by 3 EMI middlewares to develop common interface.

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Description of interface

- EMI-ES – common interface for EMI computing services
  - Non-strict super-set of functionalities from production versions
  - Quick development cycle tied to development of EMI components

Description of interface (cont.)

- Integrated support for for data pre-staging
  - Flexible control over destination of staged data
  - Arbitrary staging options
  - Support for delegation of client credentials for data staging
    - *X.509 defined, SAML reserved for future*

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Description of interface (cont.)

- Only basic job state cycle defined
  - Accomodates for various implementations
  - Specific functionalities are handled through state modifiers loosely coupled to states

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Implementation

- Both client and service sides are implemented
  - C++ libraries
  - Dynamically loadable plugins
    - *Job description processing*
    - *Communication to service*

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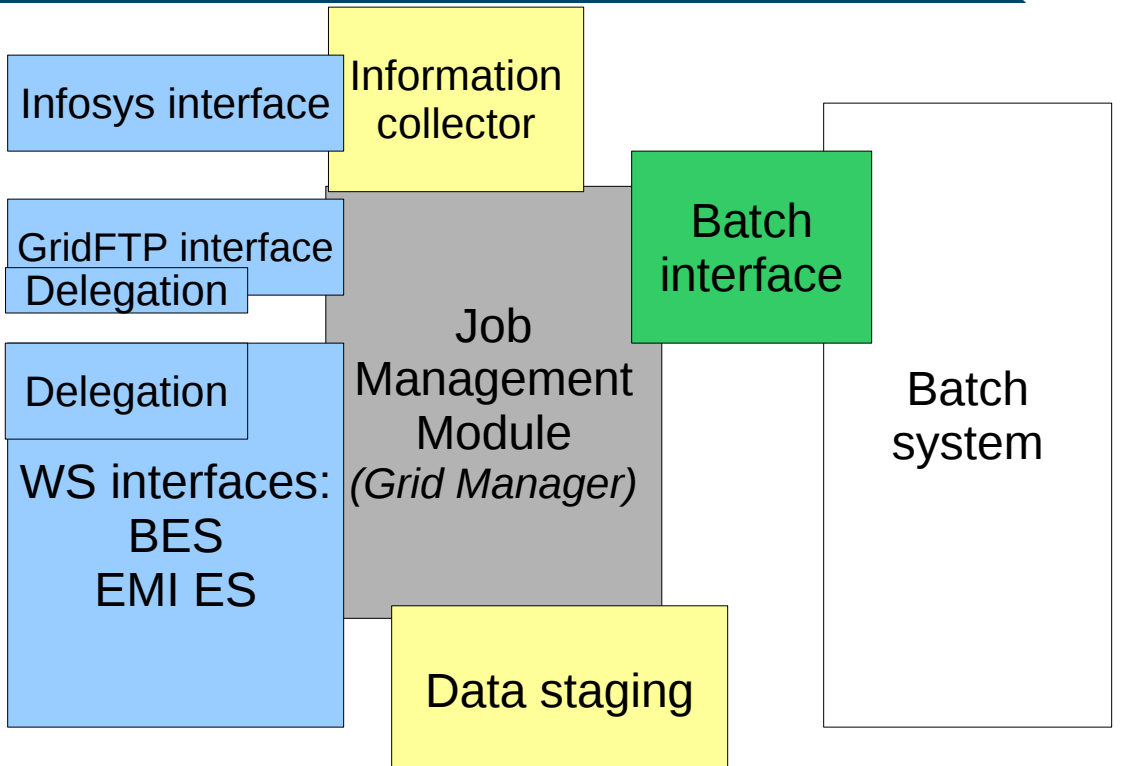
Implementation – server side

- EMI-ES interface is implemented as part of production A-REX service
- Service is split into modules by functionality
  - *Interface*
  - *Job management*
  - *Data staging*
  - *Credentials delegation*
  - *Batch system communication*

Implementation – server side



Implementation – server side

- Modular design allows to have multiple interfaces simultaenously
- EMI ES interface can be enabled even on production cluster
  - Makes it possible to test experimental interfaces on production systems

Implementation – client side

- C++ library with a set of dynamically loadable plugins
  - for indexing services
  - for computing services' information
    - *based on GLUE2 model*
  - for job control
  - for job description languages
    - *based on JSDL and EMI ADL*
- Almost seamless addition of new interfaces
  - *Within limitations of internal models*

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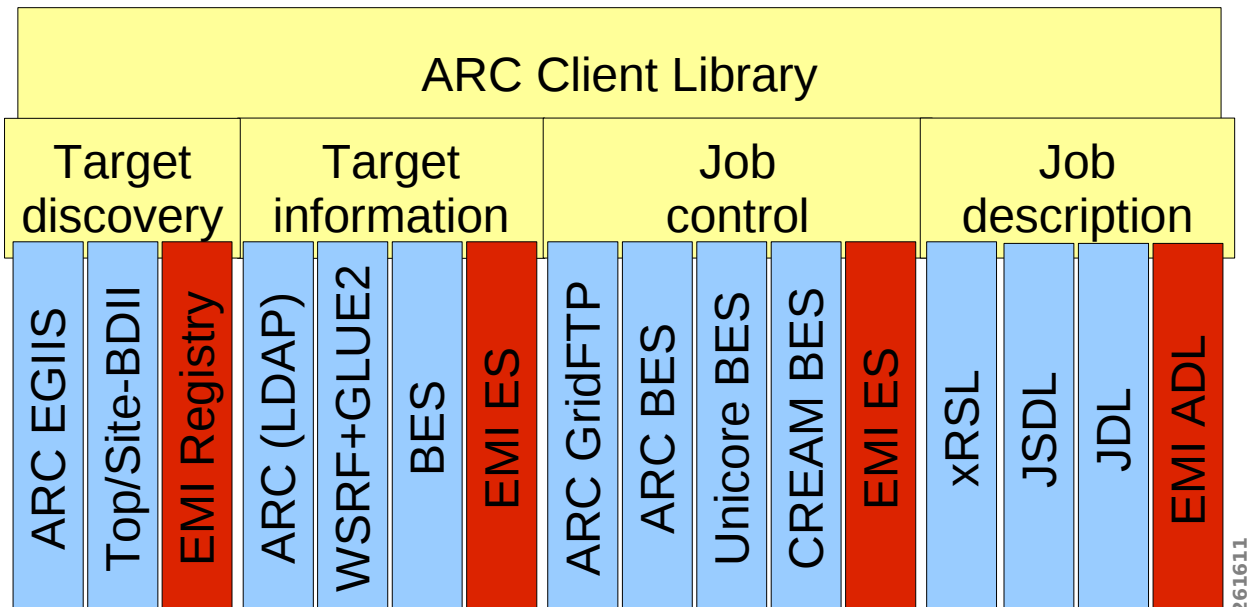
Implementation – client side



Future work

- Work on interoperability
  - Establish “freedom” in specs
    - *First interoperabilty tests show that “nothing works”™ so far*
  - Participate in enahncing and tightening of specs
  - Implement changes of specs
- Extend functionality of client part to cover not only ARC needs

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Status and conclusion

- The implementation is almost complete
  - Estimated 85-90% features implemented
    - *Job create, cancel, wipe, restart, get status, get info, list*
    - *Job pause/resume not supported*
    - *Service info query*
    - *Delegation (besides EMI ES also Gridsite and ARC interfaces are supported)*
  - Provides all features used in production ARC Computing Element

Status and conclusion (cont.)

- In some fields covers broader functionality than original interface
  - For final conclusions production testing is needed
- *ARC is planning to deploy EMI-ES interface as one of the production interfaces on its Computing Element.*