EMI Execution Service Status

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Outline

• Some background
• EMI Execution Service
  – Port types
  – Delegation
  – Processing model and state model
  – Data staging
  – Job description
Background: EMI

- EMI is a “joint venture” of European middleware providers
  - ARC, UNICORE, gLite, dCache, ...

- Goals
  - Support existing gLite, ARC, UNICORE, dCache
  - Harmonisation, evolution, integration
    - Less maintenance effort, reduced duplication, ...
  - New developments: clouds, virtualisation, messaging, ...
Background: EMI ES

• Common specification by key people from ARC, UNICORE, gLite

• Based on
  – PGI and “AGU” spec (v0.42)

• Status and plans:
  – First version (EMI Milestone) due Nov. 2010, consists of document and xsd/wsdl
  – Prototype implementations in 2011 by all the providers
  – Second version will be done → feedback loop

• https://twiki.cern.ch/twiki/bin/view/EMI/WebHome
Basic assumptions and scope

- Service of the “compute element” type
  - ARC CE, Cream CE, UNICORE atomic services
- Accepts and manages single jobs that run on some backend
  - Cluster managed by an LRMS
  - “Standalone” compute node
- Out of scope (at least for now)
  - Brokering / forwarding of jobs
  - Multi-jobs (e.g. JSDL parameter sweep)
“Modules” and port types

- Activity Factory module
  - Create: create activities
  - ResourceInfo: GLUE2 service info
  - Delegation: manage credentials

- Activity Management module
  - ActivityManagement
  - ActivityInfo: GLUE2 activity info
  - Delegation
Basic ideas

• Where possible, operations support sets of requests ("vector operations")

• Operations are asynchronous
  – Avoid slow replies

• Example:
  – Submission of many jobs
    • Service immediately replies with vector of IDs
    • Validation stage processed async.
Delegation

• Allow to delegate trust to the service, avoiding GSI
  – Currently *limited* to proxies
  – SAML assertions as a future option

• InitDelegation
  – Client asks for a X509 CSR from the server
  – Server responds with CSR + delegation ID

• PutDelegation
  – Client puts the signed CSR + delegation ID to the server, allowing the server to create a proxy certificate
Data staging

• Three dirs, available at various stages in the processing
  – stage in / session dir / stage out

• Modes
  – Server pull/push
  – Client push/pull
State model

• Primary states + state attributes
  – Accepted
  – Preprocessing
  – Processing-accepting
  – Processing-queued
  – Processing-running
  – Postprocessing
  – Terminal
State attributes

• Indicate some transient condition, or convey additional information about the primary state

• Examples in “Preprocessing”
  – Client-stagein-possible
  – Provisioning
  – Client-paused
  – Server-stagein
Job description

- Model + XML rendering
- Elements
  - Job metadata (job name and such)
  - Resources
  - Executable + its attributes
  - Runtime environments
  - Data staging specification
Resources

• Similar to JSDL, but improved (?!)
  – Operating system
  – Value ranges

• VERY similar to JSDL: resource specification:
  – Nodes, processors, memory

• Under discussion
  – Scalable runtime request (i.e. linked to a benchmark value)
Executable + its attributes

- Executable
- Input/output/error redirect
- Arguments
- Environment

- Executable can be provided by a Runtime environment ("abstract" application)
Runtime environments

• Provide the job's "ecosystem"
• Used by the ES to generate "concrete" job
• Provides environment variables, path settings, etc.
  – e.g. "module load deisa"
• May provide predefined executable
  – e.g. "Gromacs" → /opt/gromacs/bin/gromacs
Summary

- EMI ES effort will provide a joint web service interface to ARC, gLite, UNICORE compute services
- Understood and agreed (sort of)
  - Basic modules and port types
  - Processing model
  - Data staging
- Work in progress
  - Job description and its XML rendering
- Agreement needed within EMI
  - Delegation
EMI ES team

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- Martin Skou Andersen, Aleksander Konstantinov, Balazs Konya, Oxana Smirnova (ARC)
- Shahbaz Memon, Shiraz Memon, Bernd Schuller (UNICORE)

- https://twiki.cern.ch/twiki/bin/view/EMI/WebHome
Thank you!

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