Two GLUE2 use cases:
- EMI-ES job management interface
- ARC Middleware LDAP, XML, client libraries

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OGF36, GLUE2 Workshop, Chicago,
9th October 2012

Outline

- The EMI-ES information model
  - The Resource document
  - The Activity document
- ARC Middleware and GLUE2
  - ARC LDAP GLUE2 rendering
  - ARC XML GLUE2 documents
  - ARC client libraries

EMI-ES Information Model

- Five port-types:

  - **ActivityCreation**

    Only a URL to Access ResourceInfo

  - **ActivityManagement**

    Single Activity information

  - Delegation

  - **ActivityInfo**

  - **ResourceInfo**

    Information port types
    Need both for full info!

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    Information port types Need both for full info!

  - **ResourceInfo**

EMI-ES Info Model facts

- WS based

- Uses the GLUE2 jargon whenever possible

- Each **PortType** represented as a
  GLUE2 Endpoint

- **ResourceInfo → Resource Document**:
  Based on GLUE2 XML schema (hierarchical)

- **ActivityInfo → Activity Document**:
  A GLUE2-like document (mostly flat)

Resource Document Structure

```
<GetResourceInfoResponse>
 <Services>
  <ComputingService>
    ID, Type, HealthState, Capability, QualityLevel
      CreationTime, Validity, Name, OtherInfo, StatusInfo, Complexity, TotalJobs, RunningJobs, WaitingJobs, StagingJobs, SuspendedJobs,
      PreLRMSWaitingJobs, Associations
      <ComputingEndpoint>
        InterfaceName = org.ogf.glue.emies.activitycreation
        Capability, URL, ID, ImplementationName, ImplementationVersion, QualityLevel, HealthState,
        ServingState, Staging, JobDescription
        CreationTime, Validity, Name, OtherInfo, Technology,InterfaceVersion, InterfaceExtension, WSDL, SupportedProfile, Semantics,
        Implementor, HealthStateInfo, StartTime, IssuerCA, TrustedCA, DowntimeAnnounce, DowntimeStart, DowntimeEnd, DowntimeInfo,
        TotalJobs, RunningJobs,  WaitingJobs, StagingJobs, SuspendedJobs, PreLRMSWaitingJobs, Associations
      <AccessPolicy></AccessPolicy>
      </ComputingEndpoint>

      <ComputingEndpoint>
        InterfaceName = org.ogf.glue.emies.activitymanagement , Capability, ...
      </ComputingEndpoint>

      <ComputingEndpoint>
        InterfaceName = org.ogf.glue.emies.activityinfo , Capability, ...
      </ComputingEndpoint>

      <Endpoint>
        InterfaceName = org.ogf.glue.emies.resourceinfo , Capability, ...
      </Endpoint>

      <Endpoint>
        InterfaceName = org.ogf.glue.emies.activityinfo , Capability, ...
      </Endpoint>

      <ComputingManager></ComputingManager>
      <ComputingShare></ComputingShare>
      <Location></Location>
      <Contacts></Contacts>
      <!-- non EMI-ES endpoints -->
      <ComputingEndpoint>
        InterfaceName = org.nordugrid.gridftpjob , Capability, ...
      </ComputingEndpoint>

      <Endpoint>
        InterfaceName = org.nordugrid.ldapng ,Capability, ...
      </Endpoint>

      </ComputingService>
  <Services>
</GetResourceInfoResponse>
```

Resource Document Structure

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   ID, Type, HealthState, Capability, QualityLevel
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      Implementor, HealthStateInfo, StartTime, IssuerCA, TrustedCA, DowntimeAnnounce, DowntimeStart, DowntimeEnd, DowntimeInfo,
      TotalJobs, RunningJobs,  WaitingJobs, StagingJobs, SuspendedJobs, PreLRMSWaitingJobs, Associations
     <AccessPolicy></AccessPolicy>
    </ComputingEndpoint>

    <ComputingEndpoint>
     InterfaceName = org.ogf.glue.emies.activitymanagement , Capability, ...
    </ComputingEndpoint>

    <ComputingEndpoint>
     InterfaceName = org.ogf.glue.emies.activityinfo , Capability, ...
    </ComputingEndpoint>

    <Endpoint>
     InterfaceName = org.ogf.glue.emies.resourceinfo , Capability, ...
    </Endpoint>

    <Endpoint>
     InterfaceName = org.ogf.glue.emies.activityinfo , Capability, ...
    </Endpoint>

    <ComputingManager></ComputingManager>
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    </Endpoint>

   </ComputingService>
 <Services>
</GetResourceInfoResponse>
```

Might change wrt
official GLUE2
XML schema

EMI INFSO-RI-261611

Activity Document Structure

<!-- EMI EUROPEAN MIDDLEWARE INITIATIVE -->

```
<ActivityInfoDocument>
    <!-- Mandatory -->
    ID
    State
    IDFromEndpoint
    Owner
    <!-- Optional -->
    CreationTime, Validity, LocalIDFromManager JobDescription, RestartState, ExitCode,
    ComputingManagerExitCode, Error, WaitingPosition,
    UserDomain, LocalOwner, RequestedTotalWallTime, RequestedTotalCPUTime,
    RequestedSlots, RequestedApplicationEnvironment, Sdtin, Stdout, StdErr,
    LogDir, ExecutionNode, Queue, UsedTotalWallTime, UsedTotalCPUTime,
    UsedMainMemory, SubmissionTime, ComputingManagerSubmissionTime
    StartTime, ComputingManagerEndTime, EndTime,
    WorkingAreaEraseTime, ProxyExpirationTime, SubmissionHost,
    SubmissionClient, OtherMessages
    <!-- EMIES specific -->
    StageInDirectory
    StageOutDirectory
    SessionDirectory
    ComputingActivityHistory
</ActivityInfoDocument>
```

Activity Document Structure

```
<ActivityInfoDocument>
    <!-- Mandatory -->
    ID
    State
    IDFromEndpoint
    Owner
    <!-- Optional -->

    CreationTime,  Validity,  LocalIDFromManager  JobDescription,  RestartState,  ExitCode,
    ComputingManagerExitCode,  Error,  WaitingPosition,
    UserDomain, LocalOwner,  RequestedTotalWallTime, RequestedTotalCPUTime,
    RequestedSlots,      RequestedApplicationEnvironment, Sdtin, Stdout, StdErr,
    LogDir, ExecutionNode,  Queue,  UsedTotalWallTime,  UsedTotalCPUTime,
    UsedMainMemory, SubmissionTime,  ComputingManagerSubmissionTime
    StartTime, ComputingManagerEndTime,  EndTime,
    WorkingAreaEraseTime, ProxyExpirationTime,  SubmissionHost,
    SubmissionClient,  OtherMessages

    <!-- EMIES specific -->

    StageInDirectory
    StageOutDirectory
    SessionDirectory
    ComputingActivityHistory
</ActivityInfoDocument>
```
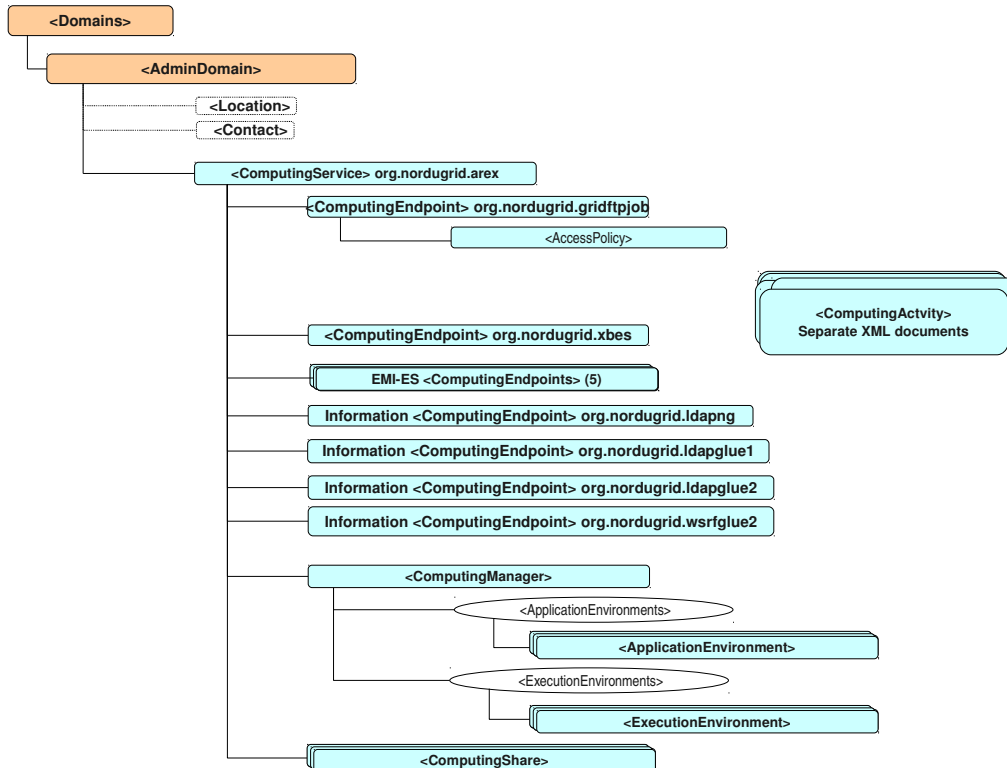
Use of substitution groups in the coming flat GLUE2 XML schema might make this document a GLUE2 document.

ARC XML GLUE2

<Domains>
- <AdminDomain>
  - <Location>
  - <Contact>
  - <ComputingService> org.nordugrid.arex
    - <ComputingEndpoint> org.nordugrid.gridftpjob
      - <AccessPolicy>
    - <ComputingEndpoint> org.nordugrid.xbes
    - EMI-ES <ComputingEndpoints> (5)
    - Information <ComputingEndpoint> org.nordugrid.ldapng
    - Information <ComputingEndpoint> org.nordugrid.ldapglue1
    - Information <ComputingEndpoint> org.nordugrid.ldapglue2
    - Information <ComputingEndpoint> org.nordugrid.wsrfglue2
    - <ComputingManager>
      - <ApplicationEnvironments>
        - <ApplicationEnvironment>
      - <ExecutionEnvironments>
        - <ExecutionEnvironment>
    - <ComputingShare>

<ComputingActvity>
Separate XML documents

ARC XML chunk

```
<InfoRoot>
  <Domains xmlns="http://schemas.ogf.org/glue/2009/03/spec_2.0_r1" xmlns:xsi="http://www.w3.org/2001/XMLSche
xsi:schemaLocation="https://raw.github.com/OGF-GLUE/XSD/master/schema/GLUE2.xsd">
    <AdminDomain BaseType="Domain" CreationTime="2012-08-24T09:52:18Z" Validity="60">
      <ID>urn:ogf:AdminDomain:ARCTESTDOMAIN</ID>
      <Name>ARCTESTDOMAIN</Name>
      <Distributed>undefined</Distributed>
      <Services>
        <ComputingService BaseType="Service" CreationTime="2012-08-24T09:52:18Z" Validity="60">
          <ID>urn:ogf:ComputingService:gridtest.hep.lu.se:arex</ID>
          <Name>gridtest</Name>
          <Capability>executionmanagement.jobmanager</Capability>
          <Type>org.nordugrid.execution.arex</Type>
          <QualityLevel>pre-production</QualityLevel>
          <Complexity>endpoint=11,share=1,resource=1</Complexity>
          <TotalJobs>0</TotalJobs>
          <RunningJobs>0</RunningJobs>
          <WaitingJobs>0</WaitingJobs>
          <StagingJobs>0</StagingJobs>
          <SuspendedJobs>0</SuspendedJobs>
          <PreLRMSWaitingJobs>0</PreLRMSWaitingJobs>
          <ComputingEndpoint BaseType="Endpoint" CreationTime="2012-08-24T09:52:18Z" Validity="60">
            <ID>urn:ogf:ComputingEndpoint:gridtest.hep.lu.se:emies:https://gridtest.hep.lu.se:50000/arex:ac</ID>
            <Name>ARC CE EMI-ES ActivityCreation Port Type</Name>
            <URL>https://gridtest.hep.lu.se:50000/arex</URL>
            <Capability>executionmanagement.jobcreation</Capability>
            <Technology>webservice</Technology>
            <InterfaceName>org.ogf.glue.emies.activitycreation</InterfaceName>
            <InterfaceVersion>1.14</InterfaceVersion>
            <WSDL>https://twiki.cern.ch/twiki/pub/EMI/EmiExecutionService/</WSDL>
            <Semantics>https://twiki.cern.ch/twiki/pub/EMI/EmiExecutionService/</Semantics>
```
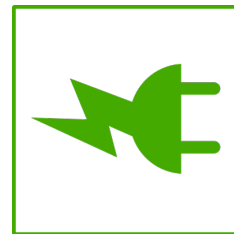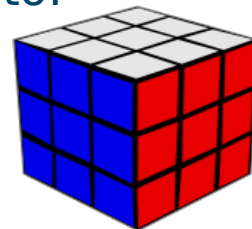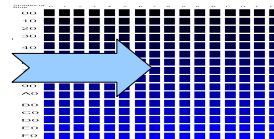
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ARC ComputingActivity XML chunk

```xml
<ComputingActivity xmlns="http://schemas.ogf.org/glue/2009/03/spec_2.0_r1" BaseType="Activity" CreationTime="20
  <ID>urn:caid:mowgli.hep.lu.se:org.nordugrid.gridftpjob:1mWMDm3XNWgnq2TvIpCwoSEmABFKDmABFKDmv7GKDmA
  <Name>longjob</Name>
  <OtherInfo>SubmittedVia=org.nordugrid.gridftpjob</OtherInfo>
  <Type>single</Type>
  <IDFromEndpoint>urn:idfe:1mWMDm3XNWgnq2TvIpCwoSEmABFKDmABFKDmv7GKDmABFKDmXVoc9n</IDFromEndp
  <LocalIDFromManager>4.gridtest.hep.lu.se</LocalIDFromManager>
  <JobDescription>nordugrid:xrsl</JobDescription>
  <State>nordugrid:INLRMS:EXECUTED</State>
  <State>bes:Running</State>
  <State>emies:processing-running</State>
  <Owner>/DC=org/DC=terena/DC=tcs/C=SE/O=Lunds Universitet/CN=Florido Paganelli hep-frp@lu.se</Owner>
  <LocalOwner>florido</LocalOwner>
  <RequestedSlots>1</RequestedSlots>
  <StdIn>/dev/null</StdIn>
  <StdOut>stdout</StdOut>
  <StdErr>stderr</StdErr>
  <LogDir>gmlog</LogDir>
  <ExecutionNode>mowgli</ExecutionNode>
  <Queue>fork</Queue>
  <SubmissionTime>2012-09-13T12:18:03Z</SubmissionTime>
  <ProxyExpirationTime>2012-09-13T20:08:03Z</ProxyExpirationTime>
  <SubmissionHost>130.235.185.148</SubmissionHost>
  <Associations>
   <ComputingShareID>urn:ogf:ComputingShare:mowgli.hep.lu.se:fork</ComputingShareID>
  </Associations>
</ComputingActivity>
```

- A client library for accessing grid resources.

- Provides a simple but powerful API to:
    - **discover services**
    - **create and manage jobs**
    - handle data transfers
    - handle user credentials

- Features a modular architecture: it uses **plugins** to be able to talk to different services.

Arclib GLUE2 Retrievers

- **ServiceEndpointRetriever**
  queries information system for GLUE2 Endpoints
  index-levels/registry services

- **TargetInformationRetriever**
  queries information system **local-levels (Ces)**
  for GLUE2 Endpoints

- **JobRetrievers**
  retrieves list of jobs, obtains information on
  specific jobs represented as
  ComputingActivities.

Currently Developed

These are the retrievers that support GLUE2 information.

ServiceInformationRetriever

- EMIR (EMI Registry)

TargetInformationRetriever

- GLUE2 LDAP
- ARC GLUE2 WSRF
- EMI-ES ResourceInfo

JobRetrievers

- LDAP GLUE2
- EMI-ES ActivityInfo/ActivityManager

Thanks!

References

- ## EMI-ES Specification v1.14-1
  https://twiki.cern.ch/twiki/pub/EMI/EmiExecutionService/EMI-ES-Specification_v1.14-1.odt

- ## GLUE2 Model
  http://www.ogf.org/gf/docs/gfd.php?gfd=147

Backup Slides

ARC LDAP GLUE2

Local level

GLUE2DomainID=<ARCAdminDomainURI>

objectClass: GLUE2Location   GLUE2LocationID=<LocationURI>

objectClass: GLUE2Contact   GLUE2ContactID=<ContactURI>

GLUE2GroupID=local

ComputingService org.nordugrid.arex

ComputingEndpoint org.nordugrid.gridftpjob

AccessPolicy

GLUE2GroupID=ComputingActivities

ComputingActivities

ComputingEndpoint org.nordugrid.xbes

EMI-ES endpoints (5)

Information Endpoint org.nordugrid.ldapng

Information Endpoint org.nordugrid.ldapglue1

Information Endpoint org.nordugrid.ldapglue2

Information Endpoint org.nordugrid.wsrfglue2

ComputingManager

GLUE2GroupID=ApplicationEnvironments

ApplicationEnvironments

GLUE2GroupID=ExecutionEnvironments

ExecutionEnvironments

ComputingShares