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GridLab - A Grid Application Toolkit and Testbed

D9.3 “Prototype working with Cactus and Triana on a GridLab testbed”

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Abstract: This document describes the first release of the GridLab Resource Management System called ScenarioBroker. The documentation covers the information about hosting environment, functionality and the WSDL document describing service.



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1 General Description

The Scenario Broker Service is running on the host `rage1.man.poznan.pl`, which is the front-end to the linux cluster and uses tomcat and axis as a hosting environment. Additionally to the standard axis services the Scenario Broker uses `http://` protocol and a standard model of GSI security taken from the forth version of the OGSA preview. The complete url to the service is:

`http://rage1.man.poznan.pl:8443/axis/services/gsiScenarioBroker`

It is possible to contact the service using any client implementing SOAP (Simple Object Access Protocol) and GSI (Grid Security Infrastructure) security with delegation of credentials. The description of service (interface, bindings and location) is available via a published WSDL (Web Services Definition Language) document, which was also used to generate stub and all auxiliary classes for our test java client. The WSDL document and the code of client is available on page:

`http://www.gridlab.org/WorkPackages/wp-9/` in section Resources/Our Software

The ScenarioBroker provides the following functionality as a set of operations defining `gsiScenarioBroker PortType`:

- `submitJob` - submits a new job,
- `migrateJob` - migrates the existing job,
- `getMyJobsList` - returns a list of jobs belonging to the user,
- `registerApplicationAccess` - registers application access,
- `getJobStatus` - returns the GRMS status of the job,
- `getHostName` - returns host name the job is/was running on,
- `getJobInfo` - returns a structure describing the job,
- `findResources` - returns resources matching user's requirements,
- `cancelJob` - cancels the job,
- `getServiceDescription` - returns the description of service.

All these operations have corresponding actions, which can be made using java client and will be described in more detail in the next part of this document.

The simplest way to compile and start the java client compatible with our service is to add all "jar" files coming from `<OGSA-tp4>/lib` directory to the CLASSPATH environment variable and run:

- `javac SBClient.java` for compiling,
- `java SBClient <action> [params]` for performing one of predefined action.

The aforementioned version of OGSA can be downloaded from globus site:

`http://www.globus.org/ogsa/releases/TechPreview/ogsa-tp4-src.tar.gz`

The complete list of actions and their parameters is:

- **submit** <jobDescriptionFile> - submits to the broker a new task according to the description from jobDescriptionFile file. If the submission finishes successfully the GRMS jobId is returned. The format of jobDescriptionFile can be found on page:

<http://www.gridlab.org/WorkPackages/wp-9/>

in section Resources/Documentation.

- **migrate** <jobId> <jobDescriptionFile> - migrates a job with a given GRMS jobId according to the requirements described in jobDescriptionFile
- **list** - prints out ids of all jobs belonging to the user,
- **register** <jobId> <service.location> <pid> - for a job with a given jobId registers location of service, which is responsible for preparing the job to the migration, additionally the process id of the job is registered,
- **status** <jobId> - returns the GRMS status of the job,
- **globus_status** <jobId> - returns the Globus GRAM status of the job with a given jobId
- **host** <jobId> - returns the host the job is or was running on,
- **info** <jobId> - returns the structure containing a set of information about the job

```
jobInformation
{
  String hostName - see "host" action,
  String jobStatus - see "status" action,
  long submissionTime - the time when the job was submitted to the GRMS,
  long startTime - the "epoch" time when the job was started,
  long finishTime - the "epoch" time when the job was finished,
}
```

- **resources** <resourceDescriptionFile> - prints out the list of resources, which the meet requirements described in the resourceDescriptionFile file,
- **description** - prints out the description of service.

Important: All of the actions listed above delegate the certificate to the service, so the globus-proxy has to be created and stored in a default place before the first run of the client.

2 APPENDIX - Scenario Broker WSDL

```
<?xml version="1.0" encoding="UTF-8"?>
<wsdl:definitions targetNamespace="urn:resmgmt.gridlab.org"
  xmlns="http://schemas.xmlsoap.org/wsdl/"
  xmlns:apachesoap="http://xml.apache.org/xml-soap"
  xmlns:impl="urn:resmgmt.gridlab.org"
  xmlns:intf="urn:resmgmt.gridlab.org"
  xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
  xmlns:wSDL="http://schemas.xmlsoap.org/wsdl/"
  xmlns:wSDLsoap="http://schemas.xmlsoap.org/wsdl/soap/"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema">

  <wsdl:types>
    <schema targetNamespace="urn:resmgmt.gridlab.org"
      xmlns="http://www.w3.org/2001/XMLSchema">
      <import namespace="http://schemas.xmlsoap.org/soap/encoding/" />

      <complexType name="ArrayOf_xsd_string">
        <complexContent>
          <restriction base="soapenc:Array">
            <attribute ref="soapenc:arrayType" wsdl:arrayType="xsd:string[]" />
          </restriction>
        </complexContent>
      </complexType>
      <element name="ArrayOf_xsd_string" nillable="true"
        type="impl:ArrayOf_xsd_string" />

      <complexType name="jobInformation">
        <sequence>
          <element name="hostName" nillable="true" type="xsd:string" />
          <element name="jobStatus" nillable="true" type="xsd:string" />
          <element name="submissionTime" type="xsd:long" />
          <element name="startTime" type="xsd:long" />
          <element name="finishTime" type="xsd:long" />
        </sequence>
      </complexType>
      <element name="jobInformation" nillable="true" type="impl:jobInformation" />
    </schema>
  </wsdl:types>

  <wsdl:message name="submitJobRequest">
    <wsdl:part name="jobDefinition" type="xsd:string" />
  </wsdl:message>
```

```
<wsdl:message name="submitJobResponse">
  <wsdl:part name="submitJobReturn" type="xsd:int"/>
  <wsdl:part name="jobId" type="xsd:string"/>
</wsdl:message>

<wsdl:message name="migrateJobRequest">
  <wsdl:part name="jobId" type="xsd:string"/>
  <wsdl:part name="jobDefinition" type="xsd:string"/>
</wsdl:message>

<wsdl:message name="migrateJobResponse">
  <wsdl:part name="migrateJobReturn" type="xsd:int"/>
</wsdl:message>

<wsdl:message name="getMyJobsListRequest">
</wsdl:message>

<wsdl:message name="getMyJobsListResponse">
  <wsdl:part name="getMyJobsListReturn" type="xsd:int"/>
  <wsdl:part name="jobsList" type="intf:ArrayOf_xsd_string"/>
</wsdl:message>

<wsdl:message name="getJobInfoRequest">
  <wsdl:part name="jobId" type="xsd:string"/>
</wsdl:message>

<wsdl:message name="getJobInfoResponse">
  <wsdl:part name="getJobInfoReturn" type="xsd:int"/>
</wsdl:message>
```

```
<wsdl:part name="jobInfo" type="impl:jobInformation"/>
</wsdl:message>

<wsdl:message name="getHostNameRequest">
  <wsdl:part name="jobId" type="xsd:string"/>
</wsdl:message>

<wsdl:message name="getHostNameResponse">
  <wsdl:part name="getHostNameReturn" type="xsd:int"/>
  <wsdl:part name="hostName" type="xsd:string"/>
</wsdl:message>

<wsdl:message name="getJobStatusRequest">
  <wsdl:part name="jobId" type="xsd:string"/>
</wsdl:message>

<wsdl:message name="getJobStatusResponse">
  <wsdl:part name="getJobStatusReturn" type="xsd:int"/>
  <wsdl:part name="status" type="xsd:string"/>
</wsdl:message>

<wsdl:message name="registerApplicationAccessRequest">
  <wsdl:part name="jobId" type="xsd:string"/>
  <wsdl:part name="service_location" type="xsd:string"/>
  <wsdl:part name="pid" type="xsd:int"/>
</wsdl:message>
```

```
<wsdl:message name="registerApplicationAccessResponse">
  <wsdl:part name="registerApplicationAccessReturn" type="xsd:int"/>
</wsdl:message>
```

```
<wsdl:message name="findResourcesRequest">
  <wsdl:part name="resourceDefinition" type="xsd:string"/>
</wsdl:message>
```

```
<wsdl:message name="findResourcesResponse">
  <wsdl:part name="findResourcesReturn" type="xsd:int"/>
  <wsdl:part name="resources" type="intf:ArrayOf_xsd_string"/>
</wsdl:message>
```

```
<wsdl:message name="getServiceDescriptionRequest">
</wsdl:message>
```

```
<wsdl:message name="getServiceDescriptionResponse">
  <wsdl:part name="getServiceDescriptionReturn" type="xsd:string"/>
</wsdl:message>
```

```
<wsdl:message name="cancelJobRequest">
  <wsdl:part name="jobId" type="xsd:string"/>
</wsdl:message>
```

```
<wsdl:message name="cancelJobResponse">
  <wsdl:part name="cancelJobReturn" type="xsd:int"/>
</wsdl:message>
```

```
<wsdl:message name="getGlobusJobStatusRequest">
  <wsdl:part name="jobId" type="xsd:string"/>
</wsdl:message>

<wsdl:message name="getGlobusJobStatusResponse">
  <wsdl:part name="getGlobusJobStatusReturn" type="xsd:int"/>
  <wsdl:part name="status" type="xsd:string"/>
</wsdl:message>

<wsdl:portType name="gsiScenarioBroker">
  <wsdl:operation name="submitJob" parameterOrder="jobDefinition jobId">
    <wsdl:documentation>
      Definition of WebService interface for job submitting

      int submitJob(String jobDefinition, String jobId)

      Input Parameters:
        - String jobDefinition - XML document describing job
          to be submitted
      Output Parameters:
        - String jobId -> unique Job ID
      Return Value:
        - int:
          0 - success
          >0 - error code
    </wsdl:documentation>
    <wsdl:input message="intf:submitJobRequest" name="submitJobRequest"/>
    <wsdl:output message="intf:submitJobResponse"
      name="submitJobResponse"/>
  </wsdl:operation>

  <wsdl:operation name="migrateJob" parameterOrder="jobId jobDefinition">
    <wsdl:documentation>
      Definition of WebService interface for job migration

      int migrateJob(String jobId, String jobDefinition)
    </wsdl:documentation>
  </wsdl:operation>
</wsdl:portType>
</wsdl:binding>
</wsdl:service>
```

```
    Input Parameters:
      - String jobId - id of job to be migrated
      - String jobDefinition - XML document describing migration
    Output Parameters:
      -
    Return Value:
      - int:
          0 - success
          >0 - error code
</wsdl:documentation>

<wsdl:input message="intf:migrateJobRequest" name="migrateJobRequest"/>

<wsdl:output message="intf:migrateJobResponse"
  name="migrateJobResponse"/>

</wsdl:operation>

<wsdl:operation name="getMyJobsList" parameterOrder="jobsList">

  <wsdl:documentation>
    Definition of WebService interface for obtaining list
    of jobs belonging to the user

    int getMyJobsList(String[] jobsList)

    Input Parameters:
      -
    Output Parameters:
      - String[] - array of job IDs belonging to the user
    Return Value:
      - int:
          0 - success
          >0 - error code
  </wsdl:documentation>

  <wsdl:input message="intf:getMyJobsListRequest"
    name="getMyJobsListRequest"/>

  <wsdl:output message="intf:getMyJobsListResponse"
    name="getMyJobsListResponse"/>

</wsdl:operation>

<wsdl:operation name="registerApplicationAccess"
  parameterOrder="jobId service_location pid">

  <wsdl:documentation>
    Definition of WebService interface for registering
```

```
application access

int registerApplicationAccess(String jobId,
                             String service_location, int pid)

Input Parameters:
  - String jobId - job identifier
  - String service_location - location of the application/service
- int pod - ProcessID
Output Parameters:
  -
Return Value:
  - int:
    0 - success
    >0 - error code
</wsdl:documentation>

<wsdl:input message="intf:registerApplicationAccessRequest"
            name="registerApplicationAccessRequest"/>

<wsdl:output message="intf:registerApplicationAccessResponse"
              name="registerApplicationAccessResponse"/>

</wsdl:operation>

<wsdl:operation name="getJobStatus" parameterOrder="jobId status">

  <wsdl:documentation>
    Definition of WebService interface for getting the status of job

    int getJobStatus( String jobId, String status)

    Input Parameters:
      - String jobId - job identifier
    Output Parameters:
      - String status - status of the job
    Return Value:
      - int:
        0 - success
        >0 - error code
  </wsdl:documentation>

  <wsdl:input message="intf:getJobStatusRequest"
              name="getJobStatusRequest"/>

  <wsdl:output message="intf:getJobStatusResponse"
               name="getJobStatusResponse"/>

</wsdl:operation>
```

```
<wsdl:operation name="getHostName" parameterOrder="jobId hostName">

  <wsdl:documentation>
    Definition of WebService interface for getting the name
    of the host, which the job is running on

    int getHostName( String jobId, String hostName)

    Input Parameters:
      - String jobId - job identifier
    Output Parameters:
      - String hostName - name of the host
    Return Value:
      - int:
          0 - success
          >0 - error code
  </wsdl:documentation>

  <wsdl:input message="intf:getHostNameRequest"
    name="getHostNameRequest"/>

  <wsdl:output message="intf:getHostNameResponse"
    name="getHostNameResponse"/>

</wsdl:operation>

<wsdl:operation name="getJobInfo" parameterOrder="jobId jobInfo">

  <wsdl:documentation>
    Definition of WebService interface for getting
    the information of job

    int getJobInfo(String jobId, jobInformation jobInfo)

    Input Parameters:
      - String jobId - job identifier
    Output Parameters:
      - jobInformation jobInfo - information about the job

    jobInformation
    {
      string hostName
      string jobStatus
      long submissionTime
      long startTime
      long finishTime
    }
  </wsdl:documentation>
</wsdl:operation>
```

```
Return Value:
  - int:
    0 - success
    >0 - error code
</wsdl:documentation>

<wsdl:input message="intf:getJobInfoRequest"
  name="getJobInfoRequest"/>

<wsdl:output message="intf:getJobInfoResponse"
  name="getJobInfoResponse"/>

</wsdl:operation>

<wsdl:operation name="findResources"
  parameterOrder="resourceDefinition resources">

  <wsdl:documentation>
    Definition of WebService interface for finding resources

    int findResources( String resourceDefinition, String[] resources)

    Input Parameters:
      - String resourceDefinition - XML document describing
        resource preferences
    Output Parameters:
      - String[] resources -> array of resources
        (resourceManagerContact) that match user preferences
    Return Value:
      - int:
        0 - success
        >0 - error code
  </wsdl:documentation>

  <wsdl:input message="intf:findResourcesRequest"
    name="findResourcesRequest"/>

  <wsdl:output message="intf:findResourcesResponse"
    name="findResourcesResponse"/>

</wsdl:operation>

<wsdl:operation name="cancelJob" parameterOrder="jobId">

  <wsdl:documentation>
    Definition of WebService interface for canceling a job

    int cancelJob( String jobId)
```

```
    Input Parameters:
      - String jobId - job identifier
    Output Parameters:
      -
    Return Value:
      - int:
          0 - success
          >0 - error code
</wsdl:documentation>

<wsdl:input message="intf:cancelJobRequest" name="cancelJobRequest"/>

<wsdl:output message="intf:cancelJobResponse"
  name="cancelJobResponse"/>

</wsdl:operation>

<wsdl:operation name="getServiceDescription">

  <wsdl:documentation>
    Definition of WebService interface for getting the description
    of the service

    String getServiceDescription()

    Input Parameters:
      -
    Output Parameters:
      -
    Return Value:
      - String - containing the description of the service
  </wsdl:documentation>

  <wsdl:input message="intf:getServiceDescriptionRequest"
    name="getServiceDescriptionRequest"/>

  <wsdl:output message="intf:getServiceDescriptionResponse"
    name="getServiceDescriptionResponse"/>

</wsdl:operation>

<wsdl:operation name="getGlobusJobStatus" parameterOrder="jobId status">

  <wsdl:documentation>
    Definition of WebService interface for getting the status
    of job obtained from Globus

    int getGlobusJobStatus( String jobId, String status)
```

```
Input Parameters:
  - String jobId - job identifier
Output Parameters:
  - String status - status of the job
Return Value:
  - int:
    0 - success
    >0 - error code
</wsdl:documentation>

<wsdl:input message="intf:getGlobusJobStatusRequest"
  name="getGlobusJobStatusRequest"/>

<wsdl:output message="intf:getGlobusJobStatusResponse"
  name="getGlobusJobStatusResponse"/>

</wsdl:operation>

</wsdl:portType>

<wsdl:binding name="gsiScenarioBrokerSoapBinding"
  type="intf:gsiScenarioBroker">

  <wsdlsoap:binding style="rpc"
    transport="http://schemas.xmlsoap.org/soap/http"/>

  <wsdl:operation name="findResources">

    <wsdlsoap:operation soapAction=""/>

    <wsdl:input name="findResourcesRequest">

      <wsdlsoap:body
        encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
        namespace="urn:resgmt.gridlab.org" use="encoded"/>

    </wsdl:input>

    <wsdl:output name="findResourcesResponse">

      <wsdlsoap:body
        encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
        namespace="urn:resgmt.gridlab.org" use="encoded"/>

    </wsdl:output>

  </wsdl:operation>
```

```
<wsdl:operation name="submitJob">

  <wsdlsoap:operation soapAction=""/>

  <wsdl:input name="submitJobRequest">

    <wsdlsoap:body
      encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
      namespace="urn:resmgmt.gridlab.org" use="encoded"/>

  </wsdl:input>

  <wsdl:output name="submitJobResponse">

    <wsdlsoap:body
      encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
      namespace="urn:resmgmt.gridlab.org" use="encoded"/>

  </wsdl:output>

</wsdl:operation>

<wsdl:operation name="migrateJob">

  <wsdlsoap:operation soapAction=""/>

  <wsdl:input name="migrateJobRequest">

    <wsdlsoap:body
      encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
      namespace="urn:resmgmt.gridlab.org" use="encoded"/>

  </wsdl:input>

  <wsdl:output name="migrateJobResponse">

    <wsdlsoap:body
      encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
      namespace="urn:resmgmt.gridlab.org" use="encoded"/>

  </wsdl:output>

</wsdl:operation>

<wsdl:operation name="getMyJobsList">

  <wsdlsoap:operation soapAction=""/>

  <wsdl:input name="getMyJobsListRequest">
```

```
<wsdlsoap:body
  encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
  namespace="urn:resmgmt.gridlab.org" use="encoded"/>

</wsdl:input>

<wsdl:output name="getMyJobsListResponse">

  <wsdlsoap:body
    encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
    namespace="urn:resmgmt.gridlab.org" use="encoded"/>

</wsdl:output>

</wsdl:operation>

<wsdl:operation name="registerApplicationAccess">

  <wsdlsoap:operation soapAction=""/>

  <wsdl:input name="registerApplicationAccessRequest">

    <wsdlsoap:body
      encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
      namespace="urn:resmgmt.gridlab.org" use="encoded"/>

  </wsdl:input>

  <wsdl:output name="registerApplicationAccessResponse">

    <wsdlsoap:body
      encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
      namespace="urn:resmgmt.gridlab.org" use="encoded"/>

  </wsdl:output>

</wsdl:operation>

<wsdl:operation name="getJobStatus">

  <wsdlsoap:operation soapAction=""/>

  <wsdl:input name="getJobStatusRequest">

    <wsdlsoap:body
      encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
      namespace="urn:resmgmt.gridlab.org" use="encoded"/>
```

```
</wsdl:input>

<wsdl:output name="getJobStatusResponse">

  <wsdlsoap:body
    encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
    namespace="urn:resmgmt.gridlab.org" use="encoded"/>

</wsdl:output>

</wsdl:operation>

<wsdl:operation name="getHostName">

  <wsdlsoap:operation soapAction=""/>

  <wsdl:input name="getHostNameRequest">

    <wsdlsoap:body
      encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
      namespace="urn:resmgmt.gridlab.org" use="encoded"/>

  </wsdl:input>

  <wsdl:output name="getHostNameResponse">

    <wsdlsoap:body
      encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
      namespace="urn:resmgmt.gridlab.org" use="encoded"/>

  </wsdl:output>

</wsdl:operation>

<wsdl:operation name="getJobInfo">

  <wsdlsoap:operation soapAction=""/>

  <wsdl:input name="getJobInfoRequest">

    <wsdlsoap:body
      encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
      namespace="urn:resmgmt.gridlab.org" use="encoded"/>

  </wsdl:input>

  <wsdl:output name="getJobInfoResponse">

    <wsdlsoap:body
```

```
        encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
        namespace="urn:resgmt.gridlab.org" use="encoded"/>

    </wsdl:output>

</wsdl:operation>

<wsdl:operation name="cancelJob">

    <wsdlsoap:operation soapAction=""/>

    <wsdl:input name="cancelJobRequest">

        <wsdlsoap:body
            encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
            namespace="urn:resgmt.gridlab.org" use="encoded"/>

    </wsdl:input>

    <wsdl:output name="cancelJobResponse">

        <wsdlsoap:body
            encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
            namespace="urn:resgmt.gridlab.org" use="encoded"/>

    </wsdl:output>

</wsdl:operation>

<wsdl:operation name="getServiceDescription">

    <wsdlsoap:operation soapAction=""/>

    <wsdl:input name="getServiceDescriptionRequest">

        <wsdlsoap:body
            encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
            namespace="urn:resgmt.gridlab.org" use="encoded"/>

    </wsdl:input>

    <wsdl:output name="getServiceDescriptionResponse">

        <wsdlsoap:body
            encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
            namespace="urn:resgmt.gridlab.org" use="encoded"/>

    </wsdl:output>
```

```
</wsdl:operation>

    <wsdl:operation name="getGlobusJobStatus">

<wsdlsoap:operation soapAction=""/>

<wsdl:input name="getGlobusJobStatusRequest">

    <wsdlsoap:body
        encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
        namespace="urn:resgmt.gridlab.org" use="encoded"/>

</wsdl:input>

<wsdl:output name="getGlobusJobStatusResponse">

    <wsdlsoap:body
        encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
        namespace="urn:resgmt.gridlab.org" use="encoded"/>

</wsdl:output>

</wsdl:operation>

</wsdl:binding>

<wsdl:service name="gsiScenarioBrokerService">

    <wsdl:port binding="intf:gsiScenarioBrokerSoapBinding"
        name="gsiScenarioBroker">

        <wsdlsoap:address location=
            "http://rage1.man.poznan.pl:8443/axis/services/gsiScenarioBroker"/>

    </wsdl:port>

</wsdl:service>

</wsdl:definitions>
```