



IST-2001-3213
GridLab - A Grid Application Toolkit and Testbed

D9.4 "Report on the Prototype Integration with the GAT"

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Abstract: This document describes the first prototype of the GridLab Resource Management System called ScenarioBroker. The documentation covers the information about interfaces that can be used by Portal and GAT, GRMS Job Definition and XML schema which describes it. The document presents also Portal interactions with Resource Management System



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1. General Description

There are two types of clients for GridLab Resource Management System: application and portal. Application can communicate with GRMS using GAT API, and portal directly calls methods provided by GRMS. Generally, available GRMS interface provides mechanisms for job submission, job migration, getting information about running job, and some control functions. Besides that a lot of information about GRMS functionality is included in description of job which can be submitted by system.

2. GRMS Prototype (Scenario Broker) Interface

The Scenario Broker provides following interface that can be used by portal:

```
string submitJob(in string jobDescription);  
    Submits job according to jobDefinition; returns job id within Resource Management System  
  
JobIdList getMyJobsList(in string username);  
    Returns list of job ids that were submitted by given user  
  
void registerAppAccess(in string jobId, in string accessPoint, in long pid);  
    Registering callback access for running application (used to call application to checkpoint)  
  
void migrateJob(in string jobId, in string jobDescription);  
    Migration of job with given job id, according to provided job description  
  
string getHostName(in string jobId);  
    Returns name of host where job was executed  
  
JobInformation getJobInfo(in string jobId);  
    Returns more information about job (status, machine, start time, finish time)  
  
ResourcesList findResources(in string jobDescription);  
    Returns list of resources (resource manager contact strings) where described job can be  
    executed  
  
void jobCancel(in string jobId);  
    Cancel job with given id  
  
string getJobStatus(in string jobId);  
    Returns status of submitted job
```



3. GRMS Job Description (GJD)

Job Description for GridLab Resource Management System is a XML document which contains information about how the job should be executed, it specifies:

- job executable:
 - file location,
 - arguments,
 - file argument (files which have to be present in working directory of running executable)
 - environment variables
 - standard input
 - standard output
 - standard error
- resource requirements of executable
 - name of host for job execution (if provided no scheduling algorithm is used)
 - operating system
 - required local resource management system (lsf, pbs, condor, etc.)
 - minimum memory required
 - minimum number of cpus required
 - minimum speed of cpu
 - there is some other parameter passed directly to GRAM (maxtime, maxwalltime, maxcputime)
- Job Description for migration also can contain location of checkpoint files
- for files location it is possible to use gridFTP and GASS urls.

4. Informal Specification of GJD

Job description starts with `<grmsjob>` tag. It has attribute "appid" – identifier (assigned by user) of application which job is part of. Tag `<grmsjob>` has to contain one `<simplejob>` tag or one `<workflowjob>` tag. The first one is used for describing Simple Job, which generally is a executable with parameters (executable parameters, standard input, output and error streams, environment variables etc.) and resource requirements for execution.

Tag `<workflowjob>` denotes description of job, which contains flow of control among set of Simple Jobs (details are not designed yet).

Tag `<simplejob>` has to contain two elements:

- tag `<resource>` which describes resource requirements for job execution
- tag `<executable>`: description of executable

Resource description can (optional) contain following information:

- type of operating system `<ostype>` tag
- name of operating system `<osname>` tag
- version of operating system `<osversion>` tag



- release of operating system **<osrelease>** tag
- name of host where job should be executed **<hostname>** tag
- local resource management system on host **<localrmname>** tag; acceptable values: "fork" (default value), "lsf", "pbs", "sge" ...
- minimal amount of memory in MB **<memory>** tag
- minimal number of processors **<cpucount>** tag
- minimal speed of cpu(s) **<cpuspeed>** tag
- the maximum walltime or cputime for a single execution of the executable (in minutes). **<maxtime>** tag. (in minutes).
- the maximum walltime for a single execution of the executable (in minutes) **<maxwalltime>** tag
- the maximum cputime for a single execution of the executable (in minutes) **<maxcputime>** tag

But if the application is not "installed" on remote hosts resource description has to contain information about operation system for which executable was compiled or name of machine where job should be executed.

Description of executable (**<executable>** tag) must have one **<file>** tag which describes location of executable file; can have one **<arguments>** tag (command line arguments for executable) and one **<environment>** tag - environment variables, one **<checkpoint>** tag – checkpoint files used for migration.

It also can have one **<stdin>** tag, **<stdout>** tag, and **<stderr>** tag.

Tag **<file>** can contain **<url>** or **<collection>** tag. The first one denotes url location of file, the second tag is used to describe file from replica management system. It has "name" attribute – name of collection, and contains logical name of file in that collection.

Tag **<arguments>** which describes command line arguments of executable can include one or more tag **<value>** or **<file>** or **<directory>**.

Tag **<value>** contains command line argument as a character string.

Tag **<file>** can be used to describe command line argument, which is a file. It has to have attributes:

- "type" that can take values: "in" (for input file), "out" (for output file), "inout" (for input/output file),

- "name" tag, which denotes name the file, should have after copying from **<url>** location.

It contains **<url>** tag which contains file url – where to find that file (gass http, grid ftp), or **<collection>** tag (see **<executable>** tag description).

Tag **<directory>** can be used to describe directory, which is needed for job execution, or have to be transferred after job is done. It has to have "type" and "name" attribute (see **<file>** tag description). It contains **<url>** tag (directory url) or **<collection>** tag (it differs from collection described above – it does not contain value: collection is treated as directory).

Tag **<stdin>** denotes standard input for executable and contains **<url>** tag (the same meaning as for **<file>** tag), or **<collection>** tag (see **<executable>** tag description).

Tag **<stdout>** denotes standard output for executable and contains **<url>** tag (the same meaning as for **<file>** tag), or **<collection>** tag (see **<executable>** tag description).

Tag **<stderr>** denotes standard error for executable and contains **<url>** tag (the same meaning as for **<file>** tag), or **<collection>** tag (see **<executable>** tag description).



Tag **<environment>** can be used to describe environment variables for job execution. It has attribute "name" which denotes name of variable and contains variable value.

Tag **<checkpoint>** has to be used for job description for migration call. It describes application's checkpoint files. It has to contain one or more **<file>** tag (see description above) or **<directory>** tag (see description above).

5. Job Description – XML Schema

Formal way of describing how GJD should look like is following XML schema document – Appendix A and Appendix B.

6. Portal Side View.

Description of using GRMS via Portal will be added in final version of this document.



Appendix A. GJD XML schema document.

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <xs:element name="grmsjob">
    <xs:annotation>
      <xs:documentation>Job Description for Gridlab Resource Management
System</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:choice>
        <xs:element name="simplejob" type="simplejobType">
          <xs:annotation>
            <xs:documentation>Description of Simple Job</xs:documentation>
          </xs:annotation>
        </xs:element>
        <xs:element name="workflowjob" type="workflowType">
          <xs:annotation>
            <xs:documentation>Description of Workflow Job (not implemented
yet)</xs:documentation>
          </xs:annotation>
        </xs:element>
      </xs:choice>
      <xs:attribute name="appid" type="xs:string" use="required"/>
    </xs:complexType>
  </xs:element>
  <xs:complexType name="simplejobType">
    <xs:annotation>
      <xs:documentation>Description of Simple Job</xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element name="resource" minOccurs="0">
        <xs:annotation>
          <xs:documentation>Resource requirement section</xs:documentation>
        </xs:annotation>
        <xs:complexType>
          <xs:all>
            <xs:element name="osname" type="xs:string" minOccurs="0">
              <xs:annotation>
                <xs:documentation>Operating system name</xs:documentation>
              </xs:annotation>
            </xs:element>
            <xs:element name="ostype" type="xs:string" minOccurs="0">
              <xs:annotation>
                <xs:documentation>Operating system type</xs:documentation>
              </xs:annotation>
            </xs:element>
            <xs:element name="osversion" type="xs:string" minOccurs="0">
              <xs:annotation>
                <xs:documentation>Operating system version</xs:documentation>
              </xs:annotation>
            </xs:element>
            <xs:element name="osrelease" type="xs:string" minOccurs="0">
              <xs:annotation>
                <xs:documentation>Operating system release</xs:documentation>
              </xs:annotation>
            </xs:element>
          </xs:all>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>

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```
<xs:element name="hostname" type="xs:string" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Host name</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="localrmname" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Local resource management system
name</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="fork"/>
      <xs:enumeration value="lsf"/>
      <xs:enumeration value="pbs"/>
      <xs:enumeration value="condor"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
<xs:element name="memory" type="xs:integer" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Amount of memory required</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="cpucount" type="xs:integer" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Number of cpus required</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="cpuspeed" type="xs:integer" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Required cpu performace</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="maxtime" type="xs:integer" minOccurs="0"/>
<xs:element name="maxwalltime" type="xs:integer" minOccurs="0"/>
<xs:element name="maxcputime" type="xs:integer" minOccurs="0"/>
</xs:all>
</xs:complexType>
</xs:element>
<xs:element name="executable">
  <xs:annotation>
    <xs:documentation>Application description section</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="file" type="fileType">
        <xs:annotation>
          <xs:documentation>Location of executable of
application</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="arguments" minOccurs="0">
        <xs:annotation>
          <xs:documentation>Arguments of execution</xs:documentation>
        </xs:annotation>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>
```



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```
<xs:element name="value" type="valueType" minOccurs="0"
maxOccurs="unbounded"/>
<xs:element name="file" type="fileType" minOccurs="0"
maxOccurs="unbounded"/>
<xs:element name="directory" type="directoryType" minOccurs="0"
maxOccurs="unbounded">
  <xs:annotation>
    <xs:documentation>Not implemented yet</xs:documentation>
  </xs:annotation>
</xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
<xs:element name="stdin" type="baseFile" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Standard input stream location</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="stdout" type="baseFile" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Standard output stream location</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="stderr" type="baseFile" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Standard error stream location</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="environment" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Environment variables</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="variable" maxOccurs="unbounded">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="xs:string">
              <xs:attribute name="name" type="xs:string" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="checkpoint" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Checkpoint files location</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:choice>
      <xs:element name="directory" type="directoryType">
        <xs:annotation>
          <xs:documentation>Checkpoint directory (not implemented
yet)</xs:documentation>
        </xs:annotation>
      </xs:element>
    </xs:choice>
  </xs:complexType>
</xs:element>
<xs:element name="file" type="fileType" maxOccurs="unbounded">
```



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```
<xs:annotation>
  <xs:documentation>Checkpoint files
description</xs:documentation>
</xs:annotation>
</xs:element>
</xs:choice>
</xs:complexType>
</xs:element>
</xs:sequence>
<xs:attribute name="type" use="required">
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="single"/>
      <xs:enumeration value="multiple"/>
      <xs:enumeration value="mpi"/>
    </xs:restriction>
  </xs:simpleType>
</xs:attribute>
<xs:attribute name="count" type="xs:int" use="optional" default="1"/>
</xs:complexType>
</xs:element>
<xs:element name="reservation" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Parameters for advnced scheduling</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:all>
      <xs:element name="deadline" type="xs:dateTime" minOccurs="0">
        <xs:annotation>
          <xs:documentation>Deadline for job execution</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="estime" type="xs:dateTime" minOccurs="0">
        <xs:annotation>
          <xs:documentation>Earliest possible time for job
execution.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="datasize" type="xs:double" minOccurs="0">
        <xs:annotation>
          <xs:documentation>Size of the data that need to be transfered to the
resource</xs:documentation>
        </xs:annotation>
      </xs:element>
    </xs:all>
  </xs:complexType>
</xs:element>
</xs:sequence>
</xs:complexType>
<xs:complexType name="fileType">
  <xs:annotation>
    <xs:documentation>Element that describes a file</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="baseFile">
      <xs:attribute name="name" type="xs:string" use="required"/>
      <xs:attribute name="type" use="required">
        <xs:simpleType>
          <xs:restriction base="xs:string">
```



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```
<xs:enumeration value="in"/>
<xs:enumeration value="out"/>
<xs:enumeration value="inout"/>
</xs:restriction>
</xs:simpleType>
</xs:attribute>
</xs:extension>
</xs:complexContent>
</xs:complexType>
<xs:complexType name="directoryType">
  <xs:annotation>
    <xs:documentation>Element that describes a directory</xs:documentation>
  </xs:annotation>
  <xs:choice>
    <xs:element name="url" type="xs:string">
      <xs:annotation>
        <xs:documentation>Url location of directory</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="collection">
      <xs:annotation>
        <xs:documentation>Collection from Replica Management System - not
implemented yet</xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:attribute name="name" type="xs:string" use="required"/>
      </xs:complexType>
    </xs:element>
  </xs:choice>
  <xs:attribute name="name" type="xs:string" use="required"/>
  <xs:attribute name="type" use="required">
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:enumeration value="in"/>
        <xs:enumeration value="out"/>
        <xs:enumeration value="inout"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:attribute>
</xs:complexType>
<xs:complexType name="valueType">
  <xs:annotation>
    <xs:documentation>Decription of value for arguments
definition</xs:documentation>
  </xs:annotation>
  <xs:simpleContent>
    <xs:extension base="xs:string"/>
  </xs:simpleContent>
</xs:complexType>
<xs:complexType name="baseFile">
  <xs:annotation>
    <xs:documentation>Base element for file description</xs:documentation>
  </xs:annotation>
  <xs:choice>
    <xs:element name="collectionfile">
      <xs:annotation>
        <xs:documentation>File from Replica Management system</xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:choice>
</xs:complexType>
```



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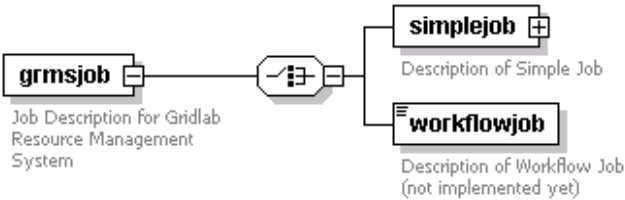
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```
<xs:simpleContent>
  <xs:extension base="xs:string">
    <xs:attribute name="name" type="xs:string" use="required"/>
  </xs:extension>
</xs:simpleContent>
</xs:complexType>
</xs:element>
<xs:element name="url" type="xs:string">
  <xs:annotation>
    <xs:documentation>Url location of file</xs:documentation>
  </xs:annotation>
</xs:element>
</xs:choice>
</xs:complexType>
<xs:complexType name="workflowType">
  <xs:annotation>
    <xs:documentation>Description of Workflow Job</xs:documentation>
  </xs:annotation>
  <xs:simpleContent>
    <xs:extension base="xs:string"/>
  </xs:simpleContent>
</xs:complexType>
</xs:schema>
```

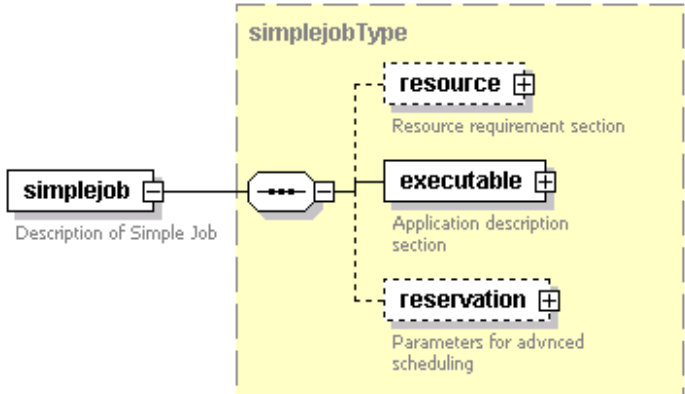
Appendix B. GJD XML Schema Documentation.

- Elements
- [grmsjob](#)
- Complex types
- [baseFile](#)
 - [directoryType](#)
 - [fileType](#)
 - [simplejobType](#)
 - [valueType](#)
 - [workflowType](#)


element **grmsjob**

diagram						
children	simplejob workflowjob					
attributes	Name	Type	Use	Default	Fixed	Annotation
	appid	xs:string	required			
annotation	documentation	Job Description for Gridlab Resource Management System				
source	<pre> <xs:element name="grmsjob"> <xs:annotation> <xs:documentation> Job Description for GridLab Resource Management System </xs:documentation> </xs:annotation> <xs:complexType> <xs:choice> <xs:element name="simplejob" type="simplejobType"> <xs:annotation> <xs:documentation>Description of Simple Job</xs:documentation> </xs:annotation> </xs:element> <xs:element name="workflowjob" type="workflowType"> <xs:annotation> <xs:documentation>Description of Workflow Job (not implemented yet)</xs:documentation> </xs:annotation> </xs:element> </xs:choice> <xs:attribute name="appid" type="xs:string" use="required"/> </xs:complexType> </xs:element> </pre>					

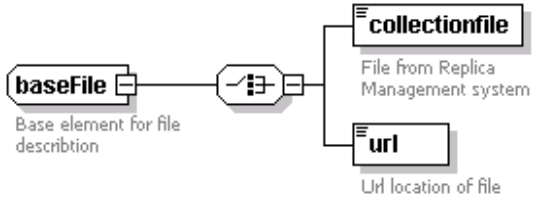
element **grmsjob/simplejob**

<p>diagram</p> 
<p>type simplejobType</p>
<p>children resource executable reservation</p>
<p>annotation documentation Description of Simple Job</p>
<p>source <pre><xs:element name="simplejob" type="simplejobType"> <xs:annotation> <xs:documentation> Description of Simple Job</xs:documentation> </xs:annotation> </xs:element></pre></p>

element **grmsjob/workflowjob**

<p>diagram</p> 
<p>type workflowType</p>
<p>annotation documentation Description of Workflow Job (not implemented yet)</p>
<p>source <pre><xs:element name="workflowjob" type="workflowType"> <xs:annotation> <xs:documentation> Description of Workflow Job (not implemented yet)</xs:documentation> </xs:annotation> </xs:element></pre></p>

complexType **baseFile**


diagram	
children	collectionfile url
used by	elements simplejobType/executable/stderr simplejobType/executable/stdin simplejobType/executable/stdout complexType fileType
annotation	documentation Base element for file description
source	<pre> <xs:complexType name="baseFile"> <xs:annotation> <xs:documentation>Base element for file description</xs:documentation> </xs:annotation> <xs:choice> <xs:element name="collectionfile"> <xs:annotation> <xs:documentation>File from Replica Management system</xs:documentation> </xs:annotation> <xs:complexType> <xs:simpleContent> <xs:extension base="xs:string"> <xs:attribute name="name" type="xs:string" use="required"/> </xs:extension> </xs:simpleContent> </xs:complexType> </xs:element> <xs:element name="url" type="xs:string"> <xs:annotation> <xs:documentation>Url location of file</xs:documentation> </xs:annotation> </xs:element> </xs:choice> </xs:complexType> </pre>

element **baseFile/collectionfile**

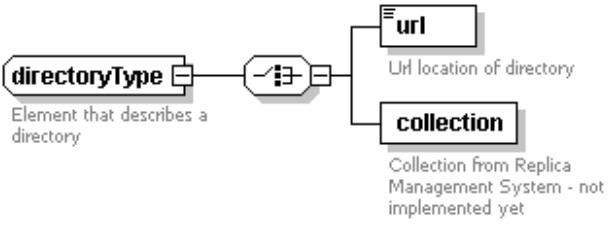
diagram													
type	extension of xs:string												
attributes	<table border="1"> <thead> <tr> <th>Name</th> <th>Type</th> <th>Use</th> <th>Default</th> <th>Fixed</th> <th>Annotation</th> </tr> </thead> <tbody> <tr> <td>name</td> <td>xs:string</td> <td>required</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Name	Type	Use	Default	Fixed	Annotation	name	xs:string	required			
Name	Type	Use	Default	Fixed	Annotation								
name	xs:string	required											

annotation	documentation	File from Replica Management system
<pre> source <xs:element name="collectionfile"> <xs:annotation> <xs:documentation>File from Replica Management system </xs:documentation> </xs:annotation> <xs:complexType> <xs:simpleContent> <xs:extension base="xs:string"> <xs:attribute name="name" type="xs:string" use="required"/> </xs:extension> </xs:simpleContent> </xs:complexType> </xs:element> </pre>		

element **baseFile/url**

diagram		
type	xs:string	
annotation	documentation	Url location of file
<pre> source <xs:element name="url" type="xs:string"> <xs:annotation> <xs:documentation>Url location of file</xs:documentation> </xs:annotation> </xs:element> </pre>		

complexType **directoryType**

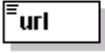
diagram						
children	url collection					
used by	elements	simplejobType/executable/arguments/directory simplejobType/executable/checkpoint/directory				
attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xs:string	required			
	type	xs:string	required			
annotation	documentation	Element that describes a directory				
<pre> source <xs:complexType name="directoryType"> <xs:annotation> <xs:documentation>Element that describes a directory</xs:documentation> </pre>						

```

</xs:annotation>
<xs:choice>
  <xs:element name="url" type="xs:string">
    <xs:annotation>
      <xs:documentation>Url location of directory</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="collection">
    <xs:annotation>
      <xs:documentation>Collection from Replica Management System - not implemented
yet</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:attribute name="name" type="xs:string" use="required"/>
    </xs:complexType>
  </xs:element>
</xs:choice>
<xs:attribute name="name" type="xs:string" use="required"/>
<xs:attribute name="type" use="required">
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="in"/>
      <xs:enumeration value="out"/>
      <xs:enumeration value="inout"/>
    </xs:restriction>
  </xs:simpleType>
</xs:attribute>
</xs:complexType>

```

element **directoryType/url**

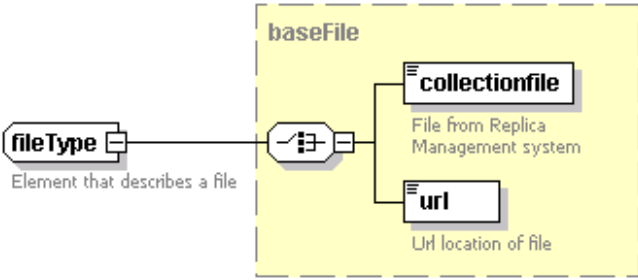
diagram	 <p>Url location of directory</p>
type	xs:string
annotation	documentation Url location of directory
source	<pre> <xs:element name="url" type="xs:string"> <xs:annotation> <xs:documentation>Url location of directory</xs:documentation> </xs:annotation> </xs:element> </pre>

element **directoryType/collection**

diagram	 <p>Collection from Replica Management System - not implemented yet</p>
---------	--

attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xs:string	required			
annotation	documentation	Collection from Replica Management System - not implemented yet				
source	<pre> <xs:element name="collection"> <xs:annotation> <xs:documentation>Collection from Replica Management System - not implemented yet</xs:documentation> </xs:annotation> <xs:complexType> <xs:attribute name="name" type="xs:string" use="required"/> </xs:complexType> </xs:element> </pre>					

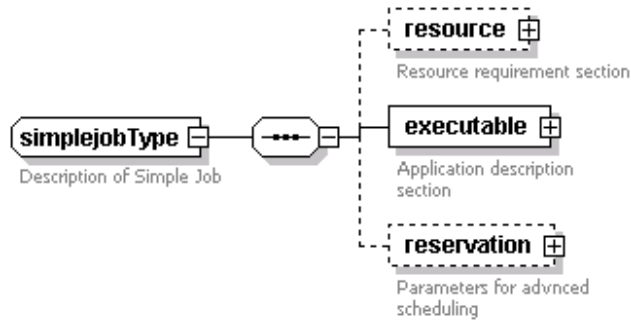
complexType **fileType**

diagram						
type	extension of baseFile					
children	collectionfile url					
used by	elements	simplejobType/executable/file simplejobType/executable/arguments/file simplejobType/executable/checkpoint/file				
attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xs:string	required			
	type	xs:string	required			
annotation	documentation	Element that describes a file				
source	<pre> <xs:complexType name="fileType"> <xs:annotation> <xs:documentation>Element that describes a file</xs:documentation> </xs:annotation> <xs:complexContent> <xs:extension base="baseFile"> <xs:attribute name="name" type="xs:string" use="required"/> <xs:attribute name="type" use="required"> <xs:simpleType> <xs:restriction base="xs:string"> <xs:enumeration value="in"/> <xs:enumeration value="out"/> <xs:enumeration value="inout"/> </xs:restriction> </xs:simpleType> </xs:attribute> </xs:extension> </xs:complexContent> </xs:complexType> </pre>					

```
</xs:complexContent>
</xs:complexType>
```

complexType **simplejobType**

diagram



children [resource](#) [executable](#) [reservation](#)

used by element [grmsjob/simplejob](#)

annotation documentation Description of Simple Job

```
source <xs:complexType name="simplejobType">
  <xs:annotation>
    <xs:documentation>Description of Simple Job</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="resource" minOccurs="0">
      <xs:annotation>
        <xs:documentation>Resource requirement section</xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:all>
          <xs:element name="osname" type="xs:string" minOccurs="0">
            <xs:annotation>
              <xs:documentation>Operating system name</xs:documentation>
            </xs:annotation>
          </xs:element>
          <xs:element name="ostype" type="xs:string" minOccurs="0">
            <xs:annotation>
              <xs:documentation>Operating system type</xs:documentation>
            </xs:annotation>
          </xs:element>
          <xs:element name="osversion" type="xs:string" minOccurs="0">
            <xs:annotation>
              <xs:documentation>Operating system version</xs:documentation>
            </xs:annotation>
          </xs:element>
          <xs:element name="osrelease" type="xs:string" minOccurs="0">
            <xs:annotation>
              <xs:documentation>Operating system release</xs:documentation>
            </xs:annotation>
          </xs:element>
        </xs:all>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
```

```

</xs:element>
<xs:element name="hostname" type="xs:string" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Host name</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="localrmname" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Local resource management system name</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="fork"/>
      <xs:enumeration value="lsf"/>
      <xs:enumeration value="pbs"/>
      <xs:enumeration value="condor"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
<xs:element name="memory" type="xs:integer" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Amount of memory required</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="cpucount" type="xs:integer" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Number of cpus required</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="cpuspeed" type="xs:integer" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Required cpu performance</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="maxtime" type="xs:integer" minOccurs="0"/>
<xs:element name="maxwalltime" type="xs:integer" minOccurs="0"/>
<xs:element name="maxcputime" type="xs:integer" minOccurs="0"/>
</xs:all>
</xs:complexType>
</xs:element>
<xs:element name="executable">
  <xs:annotation>
    <xs:documentation>Application description section</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="file" type="fileType">
        <xs:annotation>
          <xs:documentation>Location of executable of application</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="arguments" minOccurs="0">

```

```

<xs:annotation>
  <xs:documentation>Arguments of execution</xs:documentation>
</xs:annotation>
<xs:complexType>
  <xs:sequence>
    <xs:element name="value" type="valueType" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element name="file" type="fileType" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element name="directory" type="directoryType" minOccurs="0"
maxOccurs="unbounded">
      <xs:annotation>
        <xs:documentation>Not implemented yet</xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence>
</xs:complexType>
</xs:element>
<xs:element name="stdin" type="baseFile" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Standard input stream location</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="stdout" type="baseFile" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Standard output stream location</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="stderr" type="baseFile" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Standard error stream location</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="environment" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Environment variables</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="variable" maxOccurs="unbounded">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="xs:string">
              <xs:attribute name="name" type="xs:string" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="checkpoint" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Checkpoint files location</xs:documentation>
  </xs:annotation>

```

```

</xs:annotation>
<xs:complexType>
  <xs:choice>
    <xs:element name="directory" type="directoryType">
      <xs:annotation>
        <xs:documentation>Checkpoint directory (not implemented yet)</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="file" type="fileType" maxOccurs="unbounded">
      <xs:annotation>
        <xs:documentation>Checkpoint files description</xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:choice>
</xs:complexType>
</xs:element>
</xs:sequence>
<xs:attribute name="type" use="required">
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="single"/>
      <xs:enumeration value="multiple"/>
      <xs:enumeration value="mpi"/>
    </xs:restriction>
  </xs:simpleType>
</xs:attribute>
<xs:attribute name="count" type="xs:int" use="optional" default="1"/>
</xs:complexType>
</xs:element>
<xs:element name="reservation" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Parameters for advnced scheduling</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:all>
      <xs:element name="deadline" type="xs:dateTime" minOccurs="0">
        <xs:annotation>
          <xs:documentation>Deadline for job execution</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="estime" type="xs:dateTime" minOccurs="0">
        <xs:annotation>
          <xs:documentation>Earliest possible time for job execution.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="datasize" type="xs:double" minOccurs="0">
        <xs:annotation>
          <xs:documentation>Size of the data that need to be transfered to the
resource</xs:documentation>
        </xs:annotation>
      </xs:element>
    </xs:all>
  </xs:complexType>
</xs:element>
</xs:all>

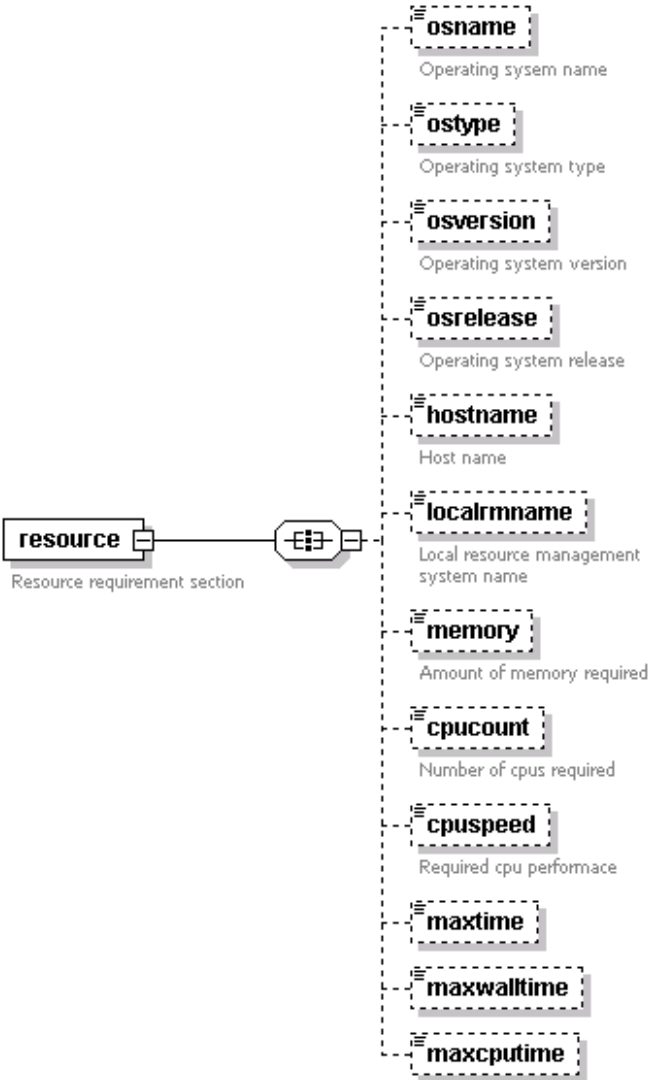
```

```

</xs:complexType>
</xs:element>
</xs:sequence>
</xs:complexType>

```

element **simplejobType/resource**

<p>diagram</p> 	<p>osname Operating system name</p> <p>ostype Operating system type</p> <p>osversion Operating system version</p> <p>osrelease Operating system release</p> <p>hostname Host name</p> <p>localrmname Local resource management system name</p> <p>memory Amount of memory required</p> <p>cpucount Number of cpus required</p> <p>cpuspeed Required cpu performance</p> <p>maxtime</p> <p>maxwalltime</p> <p>maxcputime</p>
<p>children</p>	<p>osname ostype osversion osrelease hostname localrmname memory cpucount cpuspeed maxtime maxwalltime maxcputime</p>
<p>annotation</p>	<p>documentation Resource requirement section</p>
<p>source</p>	<pre> <xs:element name="resource" minOccurs="0"> <xs:annotation> <xs:documentation> Resource requirement section</xs:documentation> </pre>

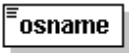
```
</xs:annotation>
<xs:complexType>
  <xs:all>
    <xs:element name="osname" type="xs:string" minOccurs="0">
      <xs:annotation>
        <xs:documentation>Operating system name</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="ostype" type="xs:string" minOccurs="0">
      <xs:annotation>
        <xs:documentation>Operating system type</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="osversion" type="xs:string" minOccurs="0">
      <xs:annotation>
        <xs:documentation>Operating system version</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="osrelease" type="xs:string" minOccurs="0">
      <xs:annotation>
        <xs:documentation>Operating system release</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="hostname" type="xs:string" minOccurs="0">
      <xs:annotation>
        <xs:documentation>Host name</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="localrname" minOccurs="0">
      <xs:annotation>
        <xs:documentation>Local resource management system name</xs:documentation>
      </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="fork"/>
          <xs:enumeration value="lsf"/>
          <xs:enumeration value="pbs"/>
          <xs:enumeration value="condor"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:element>
    <xs:element name="memory" type="xs:integer" minOccurs="0">
      <xs:annotation>
        <xs:documentation>Amount of memory required</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="cpucount" type="xs:integer" minOccurs="0">
      <xs:annotation>
        <xs:documentation>Number of cpus required</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="cpuspeed" type="xs:integer" minOccurs="0">
```

```

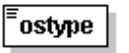
<xs:annotation>
  <xs:documentation>Required cpu performance</xs:documentation>
</xs:annotation>
</xs:element>
<xs:element name="maxtime" type="xs:integer" minOccurs="0"/>
<xs:element name="maxwalltime" type="xs:integer" minOccurs="0"/>
<xs:element name="maxcputime" type="xs:integer" minOccurs="0"/>
</xs:all>
</xs:complexType>
</xs:element>

```


element **simplejobType/resource/osname**

diagram	 <p>Operating system name</p>
type	xs:string
annotation	documentation Operating system name
source	<pre> <xs:element name="osname" type="xs:string" minOccurs="0"> <xs:annotation> <xs:documentation>Operating system name</xs:documentation> </xs:annotation> </xs:element> </pre>

element **simplejobType/resource/ostype**

diagram	 <p>Operating system type</p>
type	xs:string
annotation	documentation Operating system type
source	<pre> <xs:element name="ostype" type="xs:string" minOccurs="0"> <xs:annotation> <xs:documentation>Operating system type</xs:documentation> </xs:annotation> </xs:element> </pre>

element **simplejobType/resource/osversion**

diagram	 <p>Operating system version</p>
type	xs:string
annotation	documentation Operating system version



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```
source <xs:element name="osversion" type="xs:string" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Operating system version</xs:documentation>
  </xs:annotation>
</xs:element>
```

element simplejobType/resource/osrelease

diagram 

type **xs:string**

annotation documentation Operating system release

```
source <xs:element name="osrelease" type="xs:string" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Operating system release</xs:documentation>
  </xs:annotation>
</xs:element>
```

element simplejobType/resource/hostname

diagram 

type **xs:string**

annotation documentation Host name

```
source <xs:element name="hostname" type="xs:string" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Host name</xs:documentation>
  </xs:annotation>
</xs:element>
```

element simplejobType/resource/localrmname

diagram 

type restriction of **xs:string**

facets enumeration fork
enumeration lsf
enumeration pbs
enumeration condor

annotation documentation Local resource management system name


```
source <xs:element name="localrmname" minOccurs="0">
```

```


<xs:annotation>
  <xs:documentation>Local resource management system name</xs:documentation>
</xs:annotation>
<xs:simpleType>
  <xs:restriction base="xs:string">
    <xs:enumeration value="fork"/>
    <xs:enumeration value="lsf"/>
    <xs:enumeration value="pbs"/>
    <xs:enumeration value="condor"/>
  </xs:restriction>
</xs:simpleType>
</xs:element>

```

element **simplejobType/resource/memory**

diagram	
type	xs:integer
annotation	documentation Amount of memory required
source	<pre> <xs:element name="memory" type="xs:integer" minOccurs="0"> <xs:annotation> <xs:documentation>Amount of memory required</xs:documentation> </xs:annotation> </xs:element> </pre>

element **simplejobType/resource/cpucount**

diagram	
type	xs:integer
annotation	documentation Number of cpus required
source	<pre> <xs:element name="cpucount" type="xs:integer" minOccurs="0"> <xs:annotation> <xs:documentation>Number of cpus required</xs:documentation> </xs:annotation> </xs:element> </pre>

element **simplejobType/resource/cpuspeed**

diagram	
type	xs:integer



D9.4 "REPORT ON THE PROTOTYPE INTEGRATION WITH THE GAT"

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annotation	documentation	Required cpu performace
source	<pre><xs:element name="cpuspeed" type="xs:integer" minOccurs="0"> <xs:annotation> <xs:documentation> Required cpu performace</xs:documentation> </xs:annotation> </xs:element></pre>	

element simplejobType/resource/maxtime

diagram	
type	xs:integer
source	<pre><xs:element name="maxtime" type="xs:integer" minOccurs="0"/></pre>

element simplejobType/resource/maxwalltime

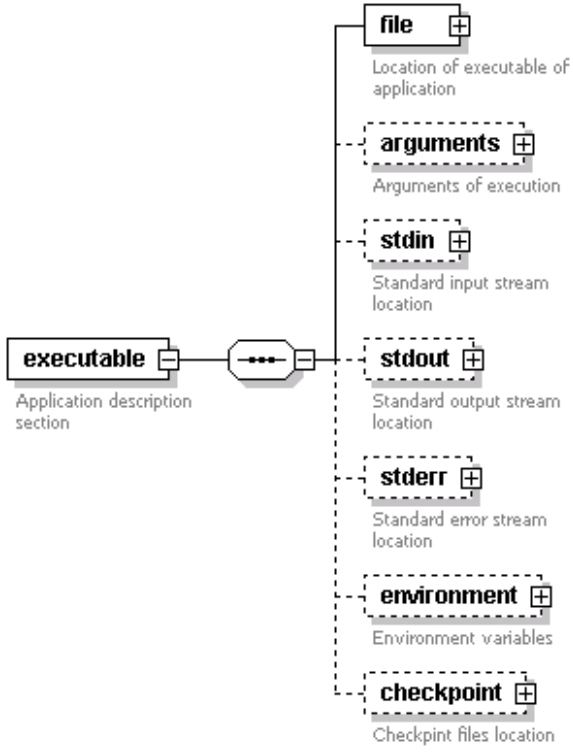
diagram	
type	xs:integer
source	<pre><xs:element name="maxwalltime" type="xs:integer" minOccurs="0"/></pre>

element simplejobType/resource/maxcputime

diagram	
type	xs:integer
source	<pre><xs:element name="maxcputime" type="xs:integer" minOccurs="0"/></pre>

element **simplejobType/executable**

diagram



children [file](#) [arguments](#) [stdin](#) [stdout](#) [stderr](#) [environment](#) [checkpoint](#)

attributes	Name	Type	Use	Default	Fixed	Annotation
type		xs:string	required			
count		xs:int	optional	1		

annotation documentation Application description section

```

source <xs:element name="executable">
  <xs:annotation>
    <xs:documentation>Application description section</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="file" type="fileType">
        <xs:annotation>
          <xs:documentation>Location of executable of application</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="arguments" minOccurs="0">
        <xs:annotation>
          <xs:documentation>Arguments of execution</xs:documentation>
        </xs:annotation>
      </xs:complexType>
    </xs:sequence>
  </xs:complexType>
</xs:element>

```

```

<xs:element name="value" type="valueType" minOccurs="0" maxOccurs="unbounded"/>
<xs:element name="file" type="fileType" minOccurs="0" maxOccurs="unbounded"/>
<xs:element name="directory" type="directoryType" minOccurs="0"
maxOccurs="unbounded">
  <xs:annotation>
    <xs:documentation>Not implemented yet</xs:documentation>
  </xs:annotation>
</xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
<xs:element name="stdin" type="baseFile" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Standard input stream location</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="stdout" type="baseFile" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Standard output stream location</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="stderr" type="baseFile" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Standard error stream location</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="environment" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Environment variables</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="variable" maxOccurs="unbounded">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="xs:string">
              <xs:attribute name="name" type="xs:string" use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="checkpoint" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Checkpoint files location</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:choice>
      <xs:element name="directory" type="directoryType">
        <xs:annotation>

```

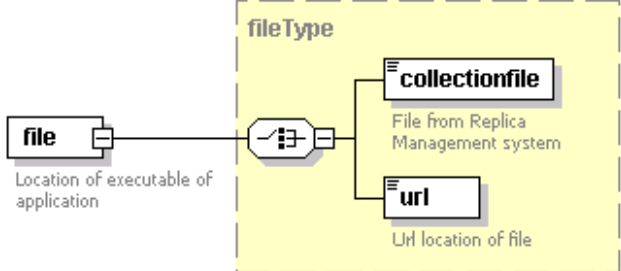
```

        <xs:documentation>Checkpoint directory (not implemented yet)</xs:documentation>
    </xs:annotation>
</xs:element>
<xs:element name="file" type="fileType" maxOccurs="unbounded">
    <xs:annotation>
        <xs:documentation>Checkpoint files description</xs:documentation>
    </xs:annotation>
</xs:element>
</xs:choice>
</xs:complexType>
</xs:element >
</xs:sequence>
<xs:attribute name="type" use="required">
    <xs:simpleType>
        <xs:restriction base="xs:string">
            <xs:enumeration value="single"/>
            <xs:enumeration value="multiple"/>
            <xs:enumeration value="mpi"/>
        </xs:restriction>
    </xs:simpleType>
</xs:attribute>
<xs:attribute name="count" type="xs:int" use="optional" default="1"/>
</xs:complexType>
</xs:element>

```

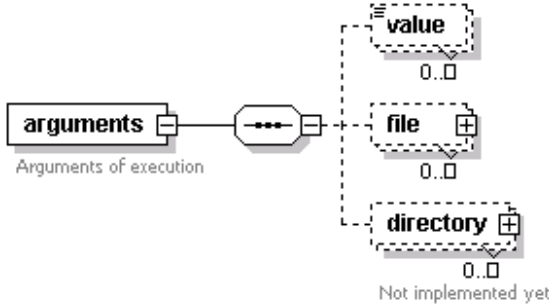
element **simplejobType/executable/file**

diagram

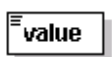


type	fileType					
children	collectionfile url					
attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xs:string	required			
	type	xs:string	required			
annotation	documentation	Location of executable of application				
source	<pre> <xs:element name="file" type="fileType"> <xs:annotation> <xs:documentation>Location of executable of application</xs:documentation> </xs:annotation> </xs:element> </pre>					

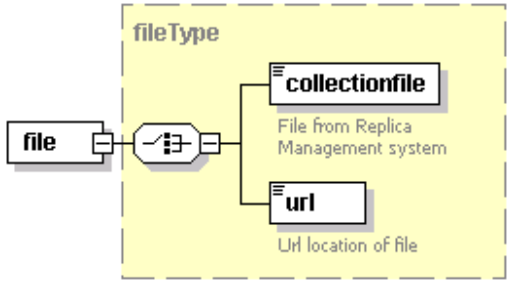
element **simplejobType/executable/arguments**

<p>diagram</p> 
<p>children value file directory</p>
<p>annotation documentation Arguments of execution</p>
<p>source</p> <pre> <xs:element name="arguments" minOccurs="0"> <xs:annotation> <xs:documentation>Arguments of execution</xs:documentation> </xs:annotation> <xs:complexType> <xs:sequence> <xs:element name="value" type="valueType" minOccurs="0" maxOccurs="unbounded"/> <xs:element name="file" type="fileType" minOccurs="0" maxOccurs="unbounded"/> <xs:element name="directory" type="directoryType" minOccurs="0" maxOccurs="unbounded"> <xs:annotation> <xs:documentation>Not implemented yet</xs:documentation> </xs:annotation> </xs:element> </xs:sequence> </xs:complexType> </xs:element> </pre>

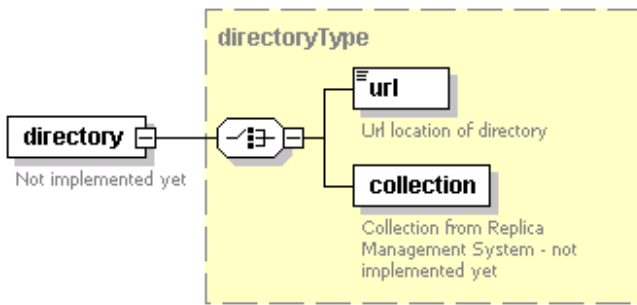
element **simplejobType/executable/arguments/value**

<p>diagram</p> 
<p>type valueType</p>
<p>source</p> <pre> <xs:element name="value" type="valueType" minOccurs="0" maxOccurs="unbounded"/> </pre>

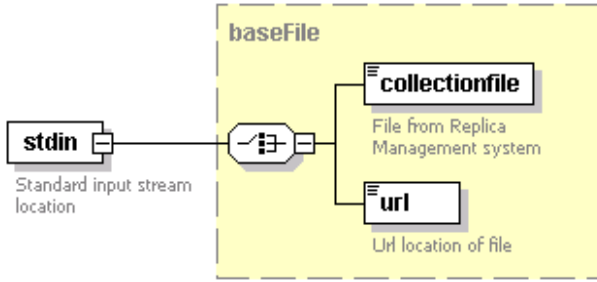
element **simplejobType/executable/arguments/file**

diagram	 <p>The diagram shows a 'file' element connected to a choice element. This choice element has two options: 'collectionfile' (File from Replica Management system) and 'url' (Url location of file). The choice element is enclosed in a dashed box labeled 'fileType'.</p>					
type	fileType					
children	collectionfile url					
attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xs:string	required			
	type	xs:string	required			
source	<code><xs:element name="file" type="fileType" minOccurs="0" maxOccurs="unbounded"/></code>					

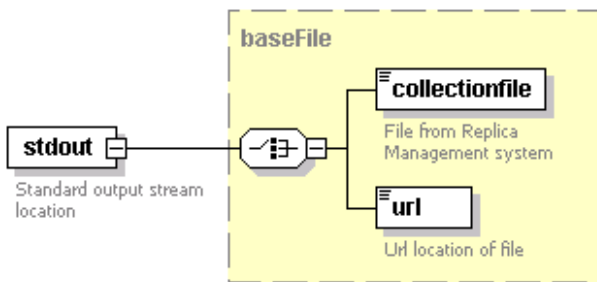
element **simplejobType/executable/arguments/directory**

diagram	 <p>The diagram shows a 'directory' element (labeled 'Not implemented yet') connected to a choice element. This choice element has two options: 'url' (Url location of directory) and 'collection' (Collection from Replica Management System - not implemented yet). The choice element is enclosed in a dashed box labeled 'directoryType'.</p>					
type	directoryType					
children	url collection					
attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xs:string	required			
	type	xs:string	required			
annotation	documentation	Not implemented yet				
source	<pre> <xs:element name="directory" type="directoryType" minOccurs="0" maxOccurs="unbounded"> <xs:annotation> <xs:documentation> Not implemented yet </xs:documentation> </xs:annotation> </xs:element> </pre>					

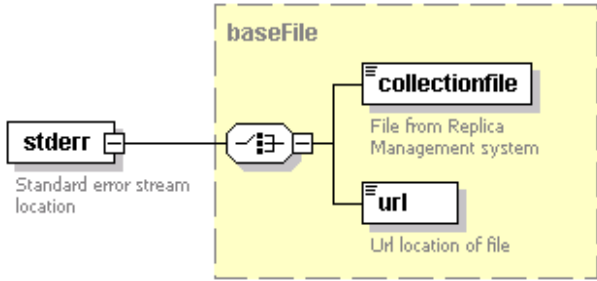
element **simplejobType/executable/stdin**

<p>diagram</p> 
<p>type baseFile</p>
<p>children collectionfile url</p>
<p>annotation documentation Standard input stream location</p>
<p>source <code><xs:element name="stdin" type="baseFile" minOccurs="0"> <xs:annotation> <xs:documentation>Standard input stream location</xs:documentation> </xs:annotation> </xs:element></code></p>

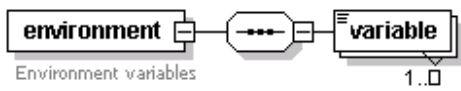
element **simplejobType/executable/stdout**

<p>diagram</p> 
<p>type baseFile</p>
<p>children collectionfile url</p>
<p>annotation documentation Standard output stream location</p>
<p>source <code><xs:element name="stdout" type="baseFile" minOccurs="0"> <xs:annotation> <xs:documentation>Standard output stream location</xs:documentation> </xs:annotation> </xs:element></code></p>


element **simplejobType/executable/stderr**

<p>diagram</p> 
<p>type baseFile</p>
<p>children collectionfile url</p>
<p>annotation documentation Standard error stream location</p>
<p>source <pre><xs:element name="stderr" type="baseFile" minOccurs="0"> <xs:annotation> <xs:documentation>Standard error stream location</xs:documentation> </xs:annotation> </xs:element></pre></p>

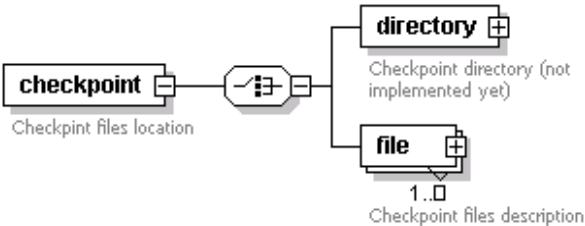
element **simplejobType/executable/environment**

<p>diagram</p> 
<p>children variable</p>
<p>annotation documentation Environment variables</p>
<p>source <pre><xs:element name="environment" minOccurs="0"> <xs:annotation> <xs:documentation>Environment variables</xs:documentation> </xs:annotation> <xs:complexType> <xs:sequence> <xs:element name="variable" maxOccurs="unbounded"> <xs:complexType> <xs:simpleContent> <xs:extension base="xs:string"> <xs:attribute name="name" type="xs:string" use="required"/> </xs:extension> </xs:simpleContent> </xs:complexType> </xs:element> </xs:sequence> </xs:complexType> </xs:element></pre></p>

element **simplejobType/executable/environment/variable**

diagram						
type	extension of xs:string					
attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xs:string	required			
source	<pre><xs:element name="variable" maxOccurs="unbounded"> <xs:complexType> <xs:simpleContent> <xs:extension base="xs:string"> <xs:attribute name="name" type="xs:string" use="required"/> </xs:extension> </xs:simpleContent> </xs:complexType> </xs:element></pre>					

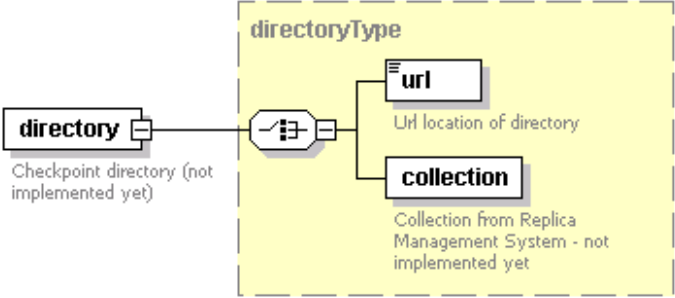
element **simplejobType/executable/checkpoint**

diagram						
children	directory file					
annotation	documentation	Checkpoint files location				
source	<pre><xs:element name="checkpoint" minOccurs="0"> <xs:annotation> <xs:documentation>Checkpoint files location</xs:documentation> </xs:annotation> <xs:complexType> <xs:choice> <xs:element name="directory" type="directoryType"> <xs:annotation> <xs:documentation>Checkpoint directory (not implemented yet)</xs:documentation> </xs:annotation> </xs:element> <xs:element name="file" type="fileType" maxOccurs="unbounded"> <xs:annotation> <xs:documentation>Checkpoint files description</xs:documentation> </xs:annotation> </xs:element> </xs:choice> </xs:complexType></pre>					

`</xs:element>`

element `simplejobType/executable/checkpoint/directory`

diagram



type [directoryType](#)

children [url](#) [collection](#)

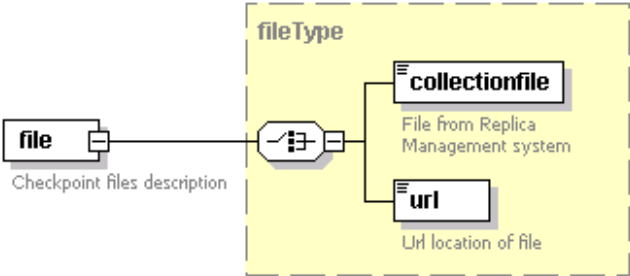
attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xs:string	required			
	type	xs:string	required			

annotation documentation Checkpoint directory (not implemented yet)

source `<xs:element name="directory" type="directoryType">`
`<xs:annotation>`
`<xs:documentation>Checkpoint directory (not implemented yet)</xs:documentation>`
`</xs:annotation>`
`</xs:element>`

element `simplejobType/executable/checkpoint/file`

diagram



type [fileType](#)

children [collectionfile](#) [url](#)

attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xs:string	required			
	type	xs:string	required			

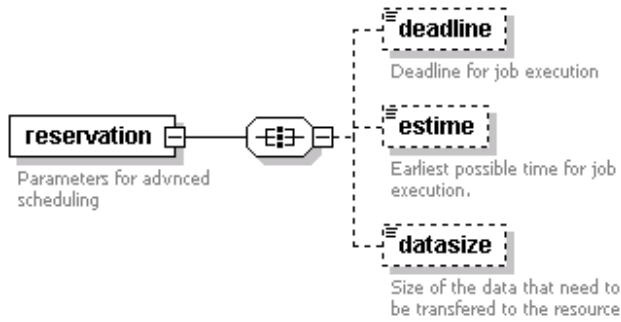
annotation documentation Checkpoint files description

source `<xs:element name="file" type="fileType" maxOccurs="unbounded">`
`<xs:annotation>`
`<xs:documentation>Checkpoint files description</xs:documentation>`

```
</xs:annotation>
</xs:element>
```

element `simplejobType/reservation`

diagram




children [deadline](#) [estimate](#) [datasize](#)


annotation documentation Parameters for advnced scheduling

```
source <xs:element name="reservation" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Parameters for advnced scheduling</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:all>
      <xs:element name="deadline" type="xs:dateTime" minOccurs="0">
        <xs:annotation>
          <xs:documentation>Deadline for job execution</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="estimate" type="xs:dateTime" minOccurs="0">
        <xs:annotation>
          <xs:documentation>Earliest possible time for job execution. </xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="datasize" type="xs:double" minOccurs="0">
        <xs:annotation>
          <xs:documentation>Size of the data that need to be transferred to the
resource</xs:documentation>
        </xs:annotation>
      </xs:element>
    </xs:all>
  </xs:complexType>
</xs:element>
```


element **simplejobType/reservation/deadline**

diagram 
type xs:dateTime
annotation documentation Deadline for job execution
source <pre><xs:element name="deadline" type="xs:dateTime" minOccurs="0"> <xs:annotation> <xs:documentation>Deadline for job execution</xs:documentation> </xs:annotation> </xs:element></pre>

element **simplejobType/reservation/estimate**

diagram 
type xs:dateTime
annotation documentation Earliest possible time for job execution.
source <pre><xs:element name="estimate" type="xs:dateTime" minOccurs="0"> <xs:annotation> <xs:documentation>Earliest possible time for job execution.</xs:documentation> </xs:annotation> </xs:element></pre>

element **simplejobType/reservation/datasize**

diagram 
type xs:double
annotation documentation Size of the data that need to be transferred to the resource
source <pre><xs:element name="datasize" type="xs:double" minOccurs="0"> <xs:annotation> <xs:documentation>Size of the data that need to be transferred to the resource</xs:documentation> </xs:annotation> </xs:element></pre>



complexType valueType

diagram	
type	extension of xs:string
used by	element simplejobType/executable/arguments/value
annotation	documentation Description of value for arguments definition
source	<pre><xs:complexType name="valueType"> <xs:annotation> <xs:documentation> Description of value for arguments definition</xs:documentation> </xs:annotation> <xs:simpleContent> <xs:extension base="xs:string"/> </xs:simpleContent> </xs:complexType></pre>

complexType workflowType

diagram	
type	extension of xs:string
used by	element grmsjob/workflowjob
annotation	documentation Description of Workflow Job
source	<pre><xs:complexType name="workflowType"> <xs:annotation> <xs:documentation> Description of Workflow Job</xs:documentation> </xs:annotation> <xs:simpleContent> <xs:extension base="xs:string"/> </xs:simpleContent> </xs:complexType></pre>