Job Workflows with gLite

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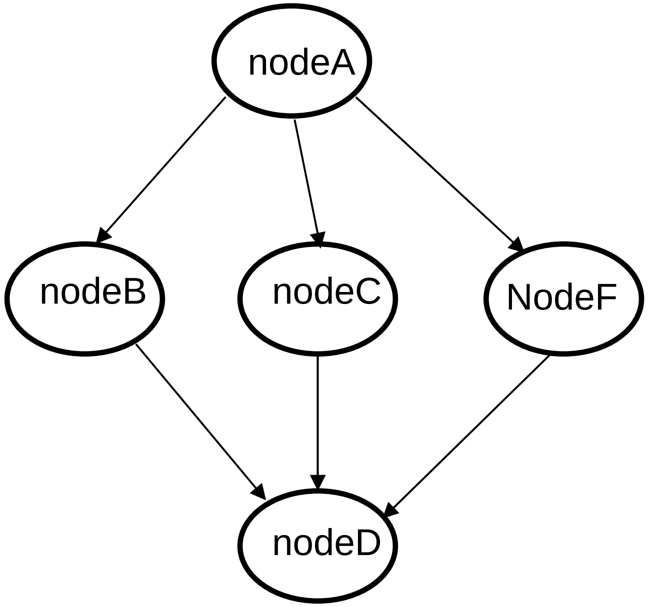
Outline

- **Job workflow overview**
- **Features available with WM proxy**
- **Examples**
  - DAG jobs
  - Job collections
  - Parametric jobs

DAG job

- DAG job is a set of jobs where the input, output, or execution of one or more jobs depends on one or more other ones
- Dependencies are represented through Directed Acyclic Graphs, where the nodes are graphs, and the edges identify the dependencies



DAG jdl

```
[
  type = "dag";
  max_nodes_running = 4;
  nodes = [
    nodeA = [
      file ="nodes/nodeA.jdl" ;
    ];
    nodeB = [
      file ="nodes/nodeB.jdl" ;
    ];
    nodeC = [
      file ="nodes/nodeC.jdl" ;
    ];
    nodeF = [
      file ="nodes/nodeF.jdl";
    ];
   dependencies = {
      {nodeA, nodeB},
      {nodeA, nodeC},{nodeA, nodeF},
      { {nodeB,nodeC,nodeF}, nodeD }
    }
  ];
;
]
```

Node description could be done also here, instead of using separate file

WMProxy : submission & monitoring

- In order to submit job with WMProxy, it’s mandatatory to use credentials delegation

```
glite-wms-job-delegate-proxy -d del_ID_01
```

- The submission/monitoring commands are slightly different, but most of “old” options are supported

```
glite-wms-job-submit -d del_ID_01 collection.jdl

glite-wms-job-status \
https://glite-rb.ct.infn.it:9000/LHIIGaCVdl7Olm
sz0jpI_g

glite-wms-job-output \
https://glite-rb.ct.infn.it:9000/LHIIGaCVdl7Olm
sz0jpI_g
```

Job Collection

- Job collection is a set of independent jobs that user can submit and monitor as it was a single job
- Jobs of a collection are submitted as DAG nodes, without dependencies
- The JDL is a list of ClassAds which describe the subjobs

```
[
        Type = "collection";
        VirtualOrganisation = “gilda";
        nodes = {
                  [  <job descr 1 >],
                  [  <job descr 2 >],
                   …
                 };
 ]
```

Job collection examples

```
[
 Type = "collection";
 InputSandbox = {"start_hostname.sh"};
 RetryCount = 0;
 nodes={ [
        Executable = "/bin/sh";
        StdOutput = "host.out";
        StdError = "host.err";
        InputSandbox = root.InputSandbox;
        OutputSandbox = {"host.err","host.out"};
  OutputSandboxURI={"gsiftp://glite-rb.ct.infn.it:2811/tmp/host.out", "host.err"};
        Arguments = "start_hostname.sh";
   ],[
        Executable = "/bin/sh";
        StdOutput = "test.out";
        StdError = "test.err";
 InputSandbox={"starter.sh","gsiftp://glite-rb.ct.infn.it:2811/tmp/t01.txt"};
        OutputSandbox = {"test.err","test.out"};
        Arguments = "starter.sh";
    ],[
      file = "hostname.jdl";
   ] };
]
```

Parametric Jobs (1/2)

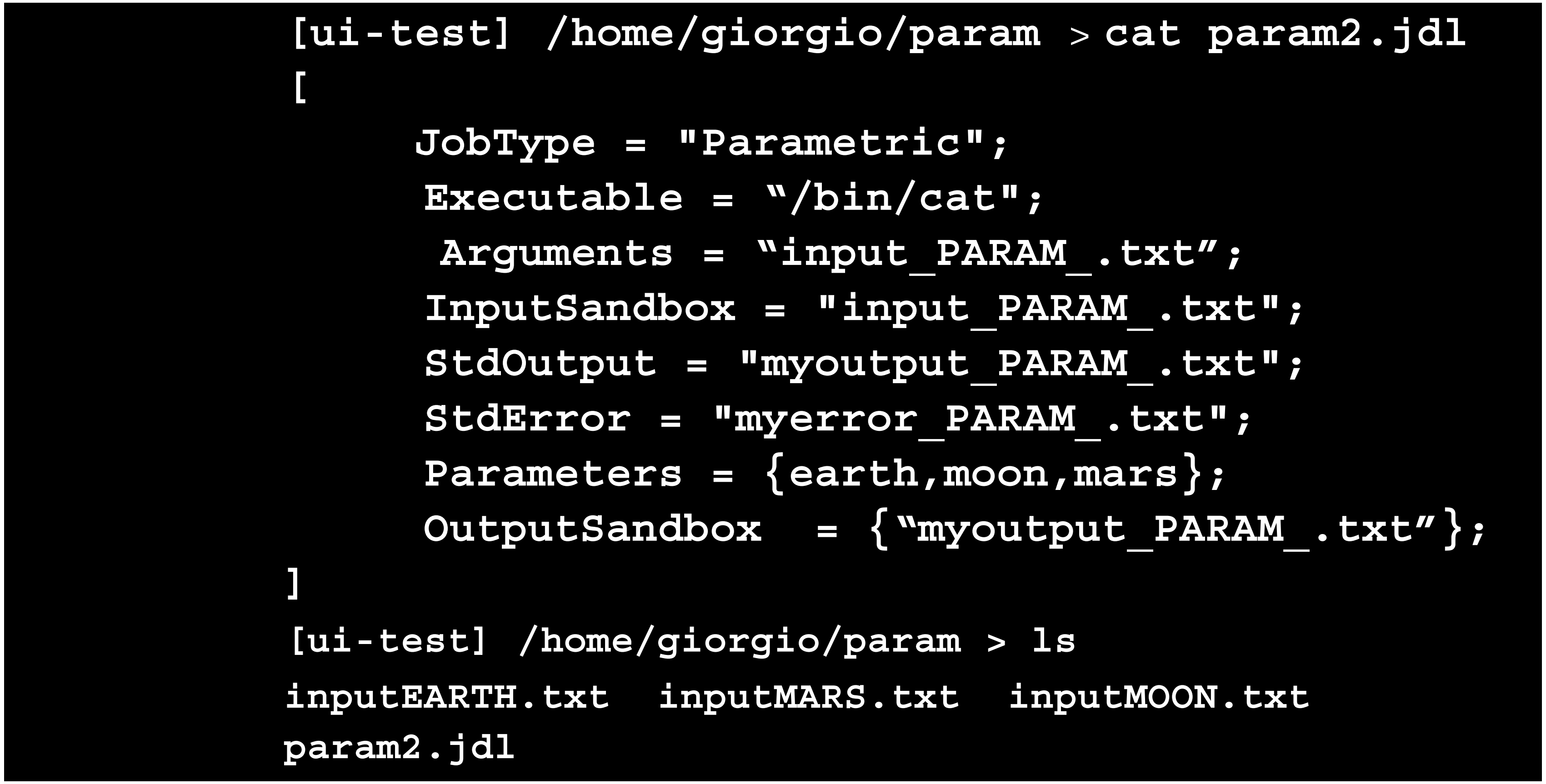
- A parametric job is a job where one or more of its attributes are parametrized
- Value of attributes varies according to parameter

```
[
      JobType = "Parametric";
      Executable = “/bin/echo";
         Arguments = “PARAM”;
      #InputSandbox = “input_PARAM_.txt";
      StdOutput = "myoutput_PARAM_.txt";
      StdError = "myerror_PARAM_.txt";
      Parameters = 2500;
      ParameterStep = 100;
      ParameterStart = 1000;
         OutputSandbox  =
{“myoutput_PARAM_.txt”};
]
```

- Job monitoring / managing is always done through an unique jobID, as if the job was single (see submission of collections)

Parametric jobs (2/2)

- Parameter can be also a list of string
- InputSandbox (if present) has to be coherent with parameters



```
[ui-test] /home/giorgio/param > cat param2.jdl
[
      JobType = "Parametric";
       Executable = “/bin/cat";
        Arguments = “input_PARAM_.txt”;
       InputSandbox = "input_PARAM_.txt";
       StdOutput = "myoutput_PARAM_.txt";
       StdError = "myerror_PARAM_.txt";
       Parameters = {earth,moon,mars};
       OutputSandbox  = {“myoutput_PARAM_.txt”};
]
[ui-test] /home/giorgio/param > ls
inputEARTH.txt  inputMARS.txt  inputMOON.txt
param2.jdl
```

References

- JDL attributes specification for WM proxy
  - https://edms.cern.ch/document/590869/1
- WMProxy quickstart
  - http://egee-jra1-wm.mi.infn.it/egee-jra1-wm/wmproxy_client_quickstart.shtml
- WMS user guides
  - https://edms.cern.ch/document/572489/1

Questions…