L&B Service – beyond *glite-wms-job-status*

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Teaching L&B to Know about Sandbox Transfers

Sandbox transfer problems are a major cause for delayed or failed jobs in gLite. It is essential to know more about failures and their possible causes.

gLite's L&B service [1] is used to track computing jobs managed by the WMS [2]. Additionally, L&B was extended to support other types of computing jobs such as Condor, PBS, native CREAM jobs, etc. Users can access information on their jobs in several ways.

L&B receives events from various grid components and computes the states jobs at any given time. This is a general principle that can be applied not only to computing tasks but to other processes as well.

In this case, we are employing the same principle to track the transfer of sandboxes. Events are generated by the Job Wrapper, which is where the transfers themselves are initiated. Each transfer (input sandbox and output sandbox) is registered as a unique job with its own JobID, and cross-links are added to the status structure of the relevant computing job.

Thanks to the fact that the tracking of sandbox transfers is fully separated from the traditional gLite WMS job state diagram, the existing implementation can also be used to support file transfer tracking in other applications or other computing job types.

Extended Info on Running WMS Jobs

Besides the usual job state information L&B now also follows the status of sandbox transfers, giving users a more detailed overview of the status of their jobs. Sandbox transfer status information can be accessed by standard tools (API, command line utilities, HTTPs, notifications...) in the same manner as traditional computing jobs. Examples shown bellow use `glite-lb-job_status` to query the L&B server.

Traditional WMS Job Life-Cycle

State of the Computing Job interpreted, as usual, by L&B. More detail can be achieved by logging and processing events regarding the status of sandbox transfers.

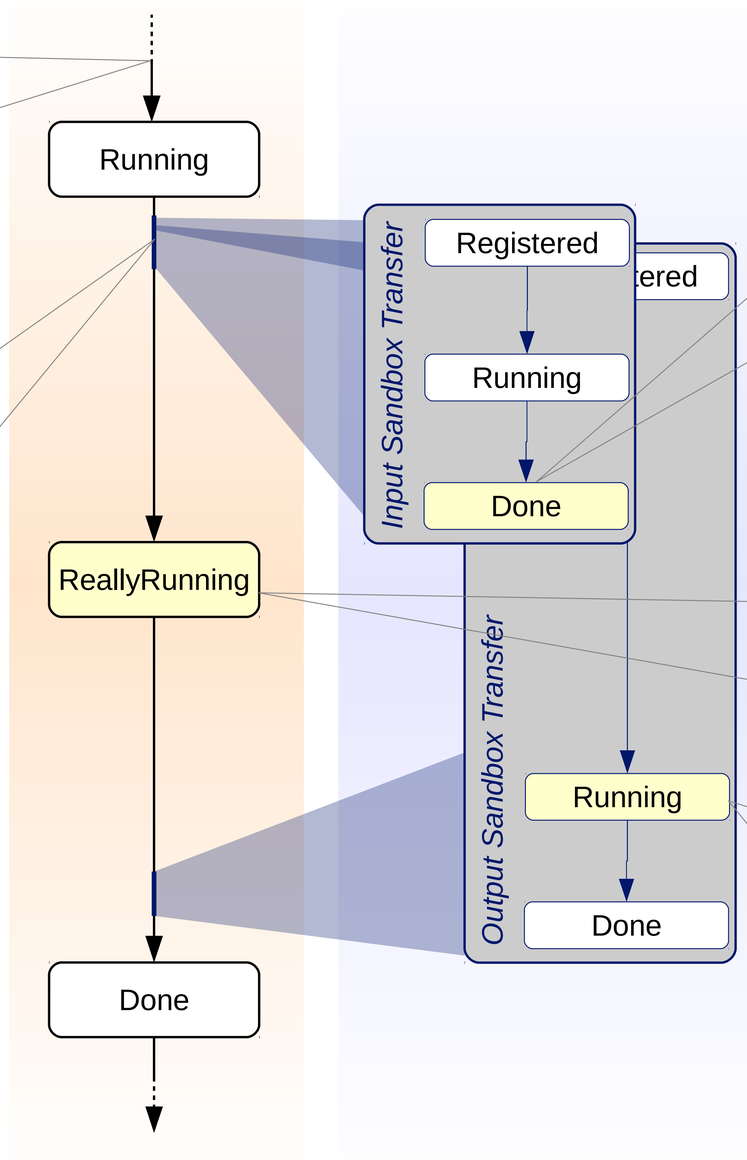
File Transfer Events sent by Job Wrapper

Events that affect the state of the Sandbox Transfer jobs originate from the Job Wrapper, running on the Computing Element.

Both sandbox transfers are registered at the beginning and subsequent events (*start*, *success* or *failure*) are logged accordingly.

Job State Example

Our example shows a running computing job. The Input Sandbox has already been retrieved, the computation is done and the Computing Elements currently finds itself in the process of uploading the Output Sandbox.
Status information obtained by calling *glite-lb-job_status*.



Input Sandbox Transfer Status

```
state : Done
jobId : https://harad.ics.muni.cz:9158/FT:DHXaS98mTXnKHAPTIGIjmQ
owner : /DC=cz/DC=cesnet-ca/O=Masaryk University/CN=Ales Krenek
jobtype : FILE_TRANSFER
...
ft_compute_job : https://harad.ics.muni.cz:9158/KlDYyXPUAWwHXvCqALwQag
ft_sandbox_type : INPUT
ft_src : gsiftp://pelargir1.ics.muni.cz:2811/var/glite/SandboxDir/Kl/https_3a_...
ft_dest : file:///scratch/5728608.batch.grid.cyf-kr.edu.pl/https_3a_2f_2fharad...
```

State and Details of the Computing Job

```
state : Running
jobId : https://harad.ics.muni.cz:9158/KlDYyXPUAWwHXvCqALwQag
owner : /DC=cz/DC=cesnet-ca/O=Masaryk University/CN=Ales Krenek
jobtype : SIMPLE
...
sandbox_retrieved : 0
jw_status : Wrapper_running
isb_transfer :  https://harad.ics.muni.cz:9158/FT:DHXaS98mTXnKHAPTIGIjmQ
osb_transfer : https://harad.ics.muni.cz:9158/FT:JdVGHFd8pLsRjVQy3-m8mg
```

Output Sandbox Transfer Status

```
state : Running
jobId : https://harad.ics.muni.cz:9158/FT:JdVGHFd8pLsRjVQy3-m8mg
owner : /DC=cz/DC=cesnet-ca/O=Masaryk University/CN=Ales Krenek
jobtype : FILE_TRANSFER
...
ft_compute_job : https://harad.ics.muni.cz:9158/KlDYyXPUAWwHXvCqALwQag
ft_sandbox_type : OUTPUT
ft_src : file:///scratch/5728608.batch.grid.cyf-kr.edu.pl/https_3a_2f_2fharad...
ft_dest : gsiftp://pelargir1.ics.muni.cz:2811/var/glite/SandboxDir/Kl/https_3a_...
```

References

[1] *The Logging and Bookkeeping Subsystem*, `http://egee.cesnet.cz/cs/JRA1/LB/`

[2] *The gLite Workload Management System*, Cecchi M. et al., Lecture Notes in Computer Science, 2009, Volume 5529

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