Logging & Bookkeeping
User Interaction Interfaces

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Agenda

- Introduction to L&B Concepts
- Interfaces
  - Standard L&B Interface
  - Lightweight HTTP Interface
- L&B Notifications
- Conclusions and References
L&B Concepts

• **States**
  - Current status of the job
  - Generated from known events

• **Events**
  - Generated by grid components
  - Passed (pushed) to the L&B Server on a store-and-forward basis
  - Asynchronous delivery
    ▪ The only exception being job registration – the first step in the chain

• **Grid components generate L&B events as the job passes through the grid**

• **L&B Server stores the events on delivery, and uses the information to compute job states**
L&B Concepts

- **gLite State diagram**
- **Interpretation of even a single event may not be straightforward**
  - Resubmission
  - Skewed time
  - Events delivered out of sequence
  - etc.
- **There are related tasks**
  - Keeping low-cost track of purged jobs
• The actual State Diagram is even more complex
  - e. g. state may still be “running” despite receiving a “done” event
    ▪ “done” event from CE is not enough to trigger state change, L&B needs to receive confirmation from Log Monitor.
    ▪ Job may still be resubmitted.
L&B Concepts

- **Two types of user interfaces**
  - Query – Response (consumer API)
  - Register – Push/Receive (notification API)
Standard L&B Interface

- Command line interface available on the UI
- Features available in the UI are a subset of all features available through the L&B API
- Getting the current status of a job
  - glite-wms-job-status
- Getting the history of events logged for a job
  - glite-wms-job-logging-info
- Outputs with various levels of detail
- Logging your own information concerning the job
  - glite-lb-logevent
- Other commands you may find useful are installed among examples on the UI.
**glite-wms-job-status Example**

```bash
glite-wms-job-status
https://skurut68-2.cesnet.cz:9000/BjVXwjWlpVLvFZn96VjpIQ
```

**BOOKKEEPING INFORMATION:**

Status info for the Job:
https://skurut68-2.cesnet.cz:9000/BjVXwjWlpVLvFZn96VjpIQ

Current Status: Done (Success)
Exit code: 0
Status Reason: Job terminated successfully
Destination: ce.grid.tuke.sk:2119/jobmanager-pbs-voce
Submitted: Wed Apr 22 10:47:11 2009 CEST

*******************************************

### Diagram

```
SUBMITTED

WAITING

READY

SCHEDULED

CANCELLED

RUNNING

DONE(failed)

DONE(ok)

CLEARED

ABORTED
```

EGEE-III INFSO-RI-222667
• `glite-wms-job-status` Example (``--verbosity 2``)

```bash
ui1.egee.cesnet.cz$ glite-wms-job-status --verbosity 2
https://skurut68­2.cesnet.cz:9000/BjVXwjWlpVLvFZn96VjpIQ

******************************************************************************
BOOKKEEPING INFORMATION:

Status info for the Job:
https://skurut68­2.cesnet.cz:9000/BjVXwjWlpVLvFZn96VjpIQ
Current Status: Done (Success)
Exit code: 0
Status Reason: Job terminated successfully
Destination: ce.grid.tuke.sk:2119/jobmanager-pbs-voce
Submitted: Wed Apr 22 10:47:11 2009 CEST

---
- Cancelling = 0
- Ce node = gt2 ce.grid.tuke.sk:2119/jobmanager-pbs
- Children num = 0
- Condorid = 287435
- Condor job exit status = 0
- Condor job pid = 0
- Condor shadow exit status = 0
- Condor shadow pid = 0
- Condor starter exit status = 0
- Condor starter pid = 0
- Cputime = 0
- Destination = ce.grid.tuke.sk:2119/jobmanager-pbs-voce
- Done code = 0
- Expectupdate = 0
- Jobtype = 0
- Lastupdatetime = Wed Apr 22 10:50:45 2009 CEST
- Location = none
- Network server = wms2.egee.cesnet.cz
- Owner Bohemia/CN=Jiri Sitera
- Payload running = 0
- Pbs exit status = 0
- Pbs pid = 0
- Possible ce nodes = gt2 ce.grid.tuke.sk:2119/jobmanager-pbs
- Possible destinations = ce.grid.tuke.sk:2119/jobmanager-pbs-voce
- Resubmitted = 0
- Stateentertime = Wed Apr 22 10:50:45 2009 CEST
- Subjob failed = 0
- Suspended = 0

******************************************************************************
```
STATEMENT TIMES
MATCHED JDL
SUSPENDED

STATEMENT TIMES
RESUBMITTED
PBS PID
NETWORK SERVER
LAST UPDATING TIME
JOB TYPE
DONE CODE
DESTINATION
CONDOR STARTER PID
CONDOR STARTER EXIT STATUS
CONDOR JOB PID
CONDOR JOB EXIT STATUS
CONDOR ID
CE NODE
CANCELING

SUBMITTED: Wed Apr 22 10:47:11 2009 CEST
DESTINATION: ce.grid.tuke.sk:2119/jobmanager-pbs-voce
STATUS REASON: Job terminated successfully
CURRENT STATUS: Done (Success)

PURGED = 0
CANCELLED = 0
ABORTED = 0
CLEARED = 0
DONE = 0
RUNNING = 0
READY = 0
WAITING = 0
UNDEFINED = 0

COMMAND = Submit;
ARGUMENTS

INPUT SANDBOX
{ gsiftp://wms2.egee.cesnet.cz:2811/var/glite/SandboxDir/Bj/https_3a_2f_2fskurut68-2.cesnet.cz_3a9000_2fBjVXwjWlpVLvFZn96VjpIQ/input/test.sh }
WMP INPUT SANDBOX BASE URI
gsiftp://wms2.egee.cesnet.cz:2811/var/glite/SandboxDir/Bj/https_3a_2f_2fskurut68-2.cesnet.cz_3a9000_2fBjVXwjWlpVLvFZn96VjpIQ
SHALLOW RETRY COUNT
5
TYPE
job
VIRTUAL ORGANISATION
voce
INPUT SANDBOX PATH
/var/glite/SandboxDir/Bj/https_3a_2f_2fskurut68-2.cesnet.cz_3a9000_2fBjVXwjWlpVLvFZn96VjpIQ/input
OUTPUT SANDBOX
test.out
VOMS FQAN
/voce/Role=NULL/Capability=NULL
STD OUTPUT
test.out
X509 USER PROXY
/var/glite/SandboxDir/Bj/https_3a_2f_2fskurut68-2.cesnet.cz_3a9000_2fBjVXwjWlpVLvFZn96VjpIQ/user.proxy
CERTIFICATE SUBJECT
/DC=cz/DC=cesnet-ca/O=University of West Bohemia/CN=Jiri Sitera
OUTPUT SANDBOX DEST FILE NAME
{ gsiftp://wms2.egee.cesnet.cz:2811/var/glite/SandboxDir/Bj/https_3a_2f_2fskurut68-2.cesnet.cz_3a9000_2fBjVXwjWlpVLvFZn96VjpIQ/output/test.out }
SIGNIFICANT ATTRIBUTES
{ "Requirements","Rank","FuzzyRank" }
INPUT SANDBOX DEST FILE NAME
{ test.sh }
JOB TYPE
normal
MY PROXY SERVER
myproxy1.egee.cesnet.cz
OUTPUT SANDBOX PATH
/var/glite/SandboxDir/Bj/https_3a_2f_2fskurut68-2.cesnet.cz_3a9000_2fBjVXwjWlpVLvFZn96VjpIQ/output
EDG JOB ID
https://skurut68-2.cesnet.cz:9000/BjVXwjWlpVLvFZn96VjpIQ
REQUIREMENTS
other.GlueCEStateStatus == "Production"
glite-wms-job-logging-info Example

```plaintext
glite-wms-job-logging-info
https://skurut68-2.cesnet.cz:9000/BjVXwjWlpVLvFZn96VjpIQ

********************************************************************************
LOGGING INFORMATION:


---
Event: RegJob
- Source         = NetworkServer
- Timestamp      = Wed Apr 22 10:47:11 2009 CEST
---
Event: RegJob
- Source         = NetworkServer
- Timestamp      = Wed Apr 22 10:47:11 2009 CEST
---
Event: Accepted
- Source         = NetworkServer
- Timestamp      = Wed Apr 22 10:47:12 2009 CEST
---
Event: EnQueued
- Result         = START
- Source         = NetworkServer
- Timestamp      = Wed Apr 22 10:47:12 2009 CEST
---
Event: EnQueued
- Result         = OK
- Source         = NetworkServer
- Timestamp      = Wed Apr 22 10:47:12 2009 CEST
```
Changing Job ACL

- Record ("upload") information regarding your job
  - `glite-lb-logevent`

- Record an User Tag for your job
  `glite-lb-logevent -s Application -e UserTag -j <job_id> -c <seq_code>
  --name <tag_name> --value <tag_value>`

- Adding a user specified by a DN to the ACL
  `glite-lb-logevent -e ChangeACL -s UserInterface -p --permission 1
  -j <job_id> --user_id <DN> --user_id_type 0 --permission_type 0
  --operation 0`

- Adding a VOMS group to the ACL
  `glite-lb-logevent -e ChangeACL -s UserInterface -p --permission 1
  -j <job_id> --user_id 'VOCE:/VOCE' --user_id_type 1
  --permission_type 0 --operation 0`
Lightweight L&B Interface

- Credentials loaded in a Web browser
- Use ID as URL
  - Note the following ID structure example:

```
Job ID:
https://scientific65.zcu.cz:9010/JIZWsxd1dcrBi5kpsXW9Zw
```

- protocol
- Server address
- Port
- Unique Job Identifier
Lightweight L&B Interface

Live demo #1
L&B user jobs and job status – https interface

- list of jobs
- job overview
- pure text output
User jobs

- https://scientific.civ.zcu.cz:9010/wO4vRplRQTmjNzGyIfQiLA
- https://scientific.civ.zcu.cz:9010/wR1FSxg05gM0NkbIvKJWuQ
- https://scientific.civ.zcu.cz:9010/weOFEEghqZvu9qYlg77UQ
- https://scientific.civ.zcu.cz:9010/wi2E1voQcoRd6UWfHuYT5g
- https://scientific.civ.zcu.cz:9010/wu2axp-6y6hxG_VvDxx2Eg
- https://scientific.civ.zcu.cz:9010/wuZHR0b435bt_QQCALJnKQ
- https://scientific.civ.zcu.cz:9010/xAfIP86rp58dLUTtCq7AFQ
- https://scientific.civ.zcu.cz:9010/xTj0OEbAr3y0QzqS8jUyvw
- https://scientific.civ.zcu.cz:9010/xVNHyWglz8wcTJSbNhWnA-A
- https://scientific.civ.zcu.cz:9010/xsSR91kX5Qi8yT_sWx4]Hg
- https://scientific.civ.zcu.cz:9010/y8RQDF0sXQlcdGCs8clwQ
- https://scientific.civ.zcu.cz:9010/yBIE_KXwgrVnCKz05W16Zq
- https://scientific.civ.zcu.cz:9010/yn2QFiWiFP1BKPlG-wuM3Q
- https://scientific.civ.zcu.cz:9010/ypvsqQGiKMM-442LsKrcw
- https://scientific.civ.zcu.cz:9010/yrZFl8m78w02v85nTugT6cq
- https://scientific.civ.zcu.cz:9010/zQjGd-Vm5b7mjMZYtFmtMw
- https://scientific.civ.zcu.cz:9010/zKmGLesWbM9_aF_0QG9bg
- https://scientific.civ.zcu.cz:9010/zac6qa7a21iQLPVe2TcT3Q
- https://scientific.civ.zcu.cz:9010/zlADzSjMMPNis5iDFoFP-A

User subject: /DC=cz/DC=cesnet-ca/O=CESNET/CN=Zdenek Sustr
https://scientific.civ.zcu.cz:9010/-caUWWSrKPNRPt2inRLcuQ

Status: Submitted
owner: /DC=cz/DC=cesnet-ca/O=CESNET/CN=Zdenek Sustr
Expect update: NO
Canceling: NO

Job description

[
Executable = "/bin/echo";
Arguments = "Hello World";
StdOutput = "message.txt";
StdError = "stderr";
OutputSandbox = {"message.txt","stderr"};
VirtualOrganisation = "voce";
]
enabling grids for e-sciencE

EGEE-III INFSO-RI-222667
L&B Notifications

- **Publish/subscribe streaming model**
  - Preventing periodic L&B Server queries
- **Delivery through a dedicated component**
  - notification interlogger
Typical Notification Workflow

- **Registration**
  - Specify criteria
  - Get unique Notification ID
  - Information on events matching the criteria stored in queue

- **Receiving data**
  - Receive notifications on events matching criteria
  - Once started, all queued notifications are delivered
  - Go on listening to keep receiving notifications as the events occur
  - Client may stop listening temporarily
    - Can resume from another location

- **Refreshing registration validity**
  - Registrations need to be refreshed periodically
  - Expired registrations are dropped and event notifications removed from the queue.
Typical Notification Use Cases

- Register notifications on state changes for all “My” jobs
  - `glite-lb-notify new -c -O`

- Register notifications on everything regarding a specific job
  - `glite-lb-notify new -j <Job ID>`

- Register notifications as jobs enter particular states
  - `glite-lb-notify new -c --state <state1,state2,...>`

- Start receiving notifications
  - `glite-lb-notify receive <notif_id>`
Live demo #2
L&B notifications in command line
Lightweight L&B Interface

- Credentials loaded in a Web browser
- Use ID as URL
  - Note the following ID structure example:

**Notification ID:**

```
https://scientific65.zcu.cz:9010/NOTIF:B9TgSJD2pBonV1sZMSjobw
```

- protocol
- Server address
- Port
- Prefix
- Unique Notification Identifier
Live demo #3
L&B notifications – https interface
RSS interface
Notification _iLoiPUucmTUGxs-LurbAw

Conditions

owner = /DC=cz/DC=cesnet-ca/O=CESNET/CN=Zdenek Sustr

Destination: scientific65.zcu.cz:54537
Valid until: 2009-04-28 17:59:27
Flags:
LB feed

List of jobs.

1. https://harad.ics.muni.cz:9010/HBtipdRPOUhLPjSi2j0XvQ

2. https://harad.ics.muni.cz:9010/_pFBrlfVPR-Sn4tjPzd00A


4. https://harad.ics.muni.cz:9010/sGh80yUmn4y1kQ8ixs7q10

5. https://harad.ics.muni.cz:9010/wTt30LGqJ-brUCfRJeM01g
### Conclusion

- **Multiple ways to access L&B information**
  - *Full-featured vs. Lightweight*
  - *Query/response vs. Publish/subscribe/receive*

- **Choose whichever suits your purpose**

- **Availability**

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<th>Feature</th>
<th>gLite 3.1</th>
<th>gLite 3.2</th>
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<tr>
<td>UI</td>
<td>Full</td>
<td>Full</td>
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<td>Notifications</td>
<td>Core</td>
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</table>
References

  – General information
  – Guides
  – Contacts
Thank You

for your attention!