

A Uniform Job Monitoring Service in Multiple Job Universes

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Logging and Bookkeeping

PBS and Condor support in L&B

Future work and interoperation

Job Monitoring Service

- keep track of Grid jobs
- capture job control flow
- provide job state information
- just in time or short-term post mortem analysis
- support user generated events
- support notifications
- part of LCG and EGEE gLite middleware stack

- L&B events as important points in the flow control of job
 - submission
 - transfer between components
 - match making and brokerage results
 - starting/finishing job execution
 - resolving failures (resubmission)
 - events generated directly by user
- multiple event sources, redundancy of information
- events delivered in non-blocking way but reliably
 - resilient w.r.t. both network outage and machine crash
- job state computed by fault tolerant state machine
- performance
 - tuned for more than 1M typical gLite jobs/day in a single instance

- implicit
 - submitting a job
- explicit
 - logging events during job execution
 - querying the bookkeeping server
- predefined set of common queries
 - directly available through the UI
- public API to access bookkeeping server
 - more general, for complex queries
 - user can register to receive a notification on job state change
- reject dangerous queries
- support for aggregated information about DAGs and collections

- provision of job state
 - including notification
 - feed into R-GMA
- provision of more detailed info about job flow
- debugging
 - transfer between components, failure trace
- statistics (EGEE JRA2 workpackage)
 - time of submission, execution start and end
 - matchmaking results, reasons for no match found
 - failures
- end user events
 - e.g. visualization of progress of job execution
- source of information for Job Provenance – long term permanent repository, contains info for job re-run, data-mining

Motivation - provide information about PBS/Condor jobs

- using the same client, the same API
- provide the same functionality (queries, notifications, JP)
- first step to providing coherent information about jobs submitted through gLite to PBS → future work

- job types within new universe in registration event
- events - definition, sources, ordering
 - defined declaratively, within new namespace
- job state machine
 - function called when new event arrives, specific to each universe
 - API defined, must be written for new universe
 - event ordering, including resubmits, must be defined

- event sources
 - gLite - modification of services
 - Condor/PBS - foreign log parser, no changes in PBS/Condor code
- grey jobs
 - in gLite, RegisterJob event is always first
 - for Condor/PBS cannot be guaranteed with log parsers
 - grey events don't define job state until RegisterJob comes
- authentication and authorization
 - gLite - X.509 (proxy)certificates
 - PBS - Kerberos (our local modification)
 - Condor - standard unix login
 - for authorization of queries, GSI with grid-mapfile mapping
 - ▶ mech-glue to support both GSI a Kerberos on top of GSI-API in future

- new events has to be defined
- new job status function, job status record
- event sources must be implemented
 - code instrumentation
 - new module to log analyzer
- event ordering may be problem
- non GSI/Kerberos AA support has to be added to L&B core

- improve Condor support
 - better understanding of Condor logs – more events, more sources
 - support for different Condor universes
- support for new universes
 - gLite CE and CREAM support from EGEE
 - data transfer
 - advance reservations
- Condor → gLite WMS → PBS
 - relatively easy when all info in one L&B
 - ▶ log event which connect two jobs
 - ▶ recursive job state query
 - more challenging in distributed environment
 - ▶ each system or EGEE VO has it's own L&B

Integration with service/host monitoring

- example events
 - WMS/PBS is down
 - cluster is down/rebooted
- monitor service/host life cycle? Done by monitoring services.
- accept events about hosts/services maintaining job?
 - Nagios/MonALISA/Ganglia can send such events
 - ▶ how to find which jobs are affected?
 - ▶ which L&B server?
 - ▶ is there some standard or do we need support then one by one?