GridView - A Grid Monitoring and Visualization Tool

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Project Goal

- Provide a high level view of the various Grid resources and functional aspects of the LCG
- Central Archival, Analysis, Summarization Graphical Presentation and Pictorial Visualization of Data from various LCG sites and monitoring tools
- Useful in GOCs/ROCs and to site admins/VO admins
Gridview Architecture

- Loosely coupled components with independent sensors, transport, archival, analysis and visualization components.
- Sensors are the various LCG information providers and monitoring tools at sites.
- Transport used is R-GMA.
- Gridview provides Archival, Analysis and Visualization.
Data Sources (LCG Sites and Monitoring Tools)

- LCG-2 Information Providers
- Gridftp Logs (Service Challenge Throughput Tests)
- RB Job State
- WN Job State
- Site Functional Test (SFT)
- GIIS Monitor (GStat)
- LCG-2 Certificate Lifetime
- LCG-2 Job Submission Tests
Monitoring data generated at grid sites by different monitoring tools

Gridview collects this data for archival in a central Oracle database at CERN

R-GMA used as transport mechanism. Gridview a major consumer of R-GMA tuples

Many monitoring tools publish data to R-GMA
Archiver Module

- Collects R-GMA tuples containing monitoring information published by data sources
- Archives it into central Oracle database at CERN
- Implemented in Java
**Summarization Module**

- Performs analysis of monitoring data collected by archiver module and generates summary information
  - Usage, Performance figures
  - Detect Fault situations and user defined events
- Summary info stored back in database
- Filtering of duplicate R-GMA tuples
Presentation Module

- Presents current and history information (summaries created by Summarization module)
- Conventional bar graphs, histograms and pie charts
GUI and Visualization Module

- Dashboard showing all grid sites on a map
- Current site status information and fault notification displayed using 3D graphics
  - Information generated by summarization module read from database
- Hooks to invoke presentation module to view history information
Analysis of GridFTP logs

- Gridftp transfers are logged and published in R-GMA by lcg-mon-gridftp and archived by Gridview.
- After analysis, following summaries are created:
  - Hour-wise, day-wise average throughput per site
  - Hour-wise, day-wise aggregate data transfer per site
  - Hour-wise average throughput and aggregate data transfer per VO
  - Host wise data transfer details
- In production use during SC3
Analysis of GridFTP Log for Service Challenge 3

Hourly Report

Hourly Averaged Throughput on 22-01-2006
From CERNCI to ALL SITES

(OTHERS: Sites giving throughput less than 5% of max, click here for names)

Graphs for Individual Sites:
- BNL
- CNAF
- DESY
- FNAL
- FZK
- IN2P3
- NDGF
- OTHERS
- PIC
- RAL
- SARA
- TAIWAN
- TRIUMF
Current Implementation: Job Monitoring

- Job status logs published by LB (Logging and Bookkeeping) servers at various RBs
- Gridview generates following periodic (hourly/daily/weekly/monthly) summary info:
  - Total number of jobs in different states at different grid sites
  - VO-wise and RB-wise job distribution
  - Metrics such as site-wise Job success rate
  - Resource utilization by different VOs etc.
Analysis of GridFTP and JobStatus Logs for Service Challenge 3

Hourly Report of Jobs

Total Jobs on 03-02-2006
Hour-wise Jobs` Distribution

Other Job-Distribution Graphs:-
RB-wise / State-wise / Destination-wise jobs' distribution
Current Implementation: **GUI and Visualization**

- Java 3-D based application showing different grid sites, their status summaries and fault conditions
- Following are some status summaries to be shown
  - CPU Status – Total, Free, Busy
  - Storage Status – Total, Used, Free
  - Job Status – Total, Running, Queued-up
  - Service status – Ok, Stopped, Degraded
  - Network Traffic Status
    - Total Bandwidth
    - Long Term average bandwidth used
    - Currently (last hour) used bandwidth
Fault Notification (Fault and Alarm Types)

- CE, SE, WN down
- Site Functional Test (SFT) failure
- Sanity check failure (GIIS Monitor)
- SE storage space full
- Many jobs piled up in the queue
- Broken network link
- Host Certificate expiry
GRIDVIEW: A grid monitoring and visualization tool

TIFR, Mumbai, India, Feb 13-17, 2006

CPU Status
(Individual Sites)
On-Going work in Gridview

- Service Availability Monitoring
  - Being interfaced with SFT (Site Functional Tests) for monitoring availability of various services such as CE, SE, RB, BDII etc.
  - Rating of sites according to average resource availability and acceptable thresholds
  - Service availability metrics such as MTTR, uptime, failure rate to be computed and visualised

- gLite FTS
  - Gridview to be adapted to monitor file transfer statistics like successful transfers, failure rates etc for FTS channels across grid sites

- Enhancement of GUI & Visualisation module to function as full-fledged dashboard for LCG
In conclusion

- Gridview is a useful tool for high level visualization of grid status
- File Transfer Monitoring in production use during SC3 tests
- Job status monitoring to be released for production use
- Work on Service Availability Monitoring (integrating SFT etc.) in progress
Thank You