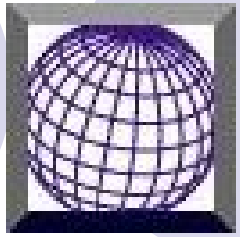
GridView - A Grid Monitoring and Visualization Tool



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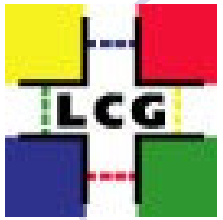


Project Goal

- 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

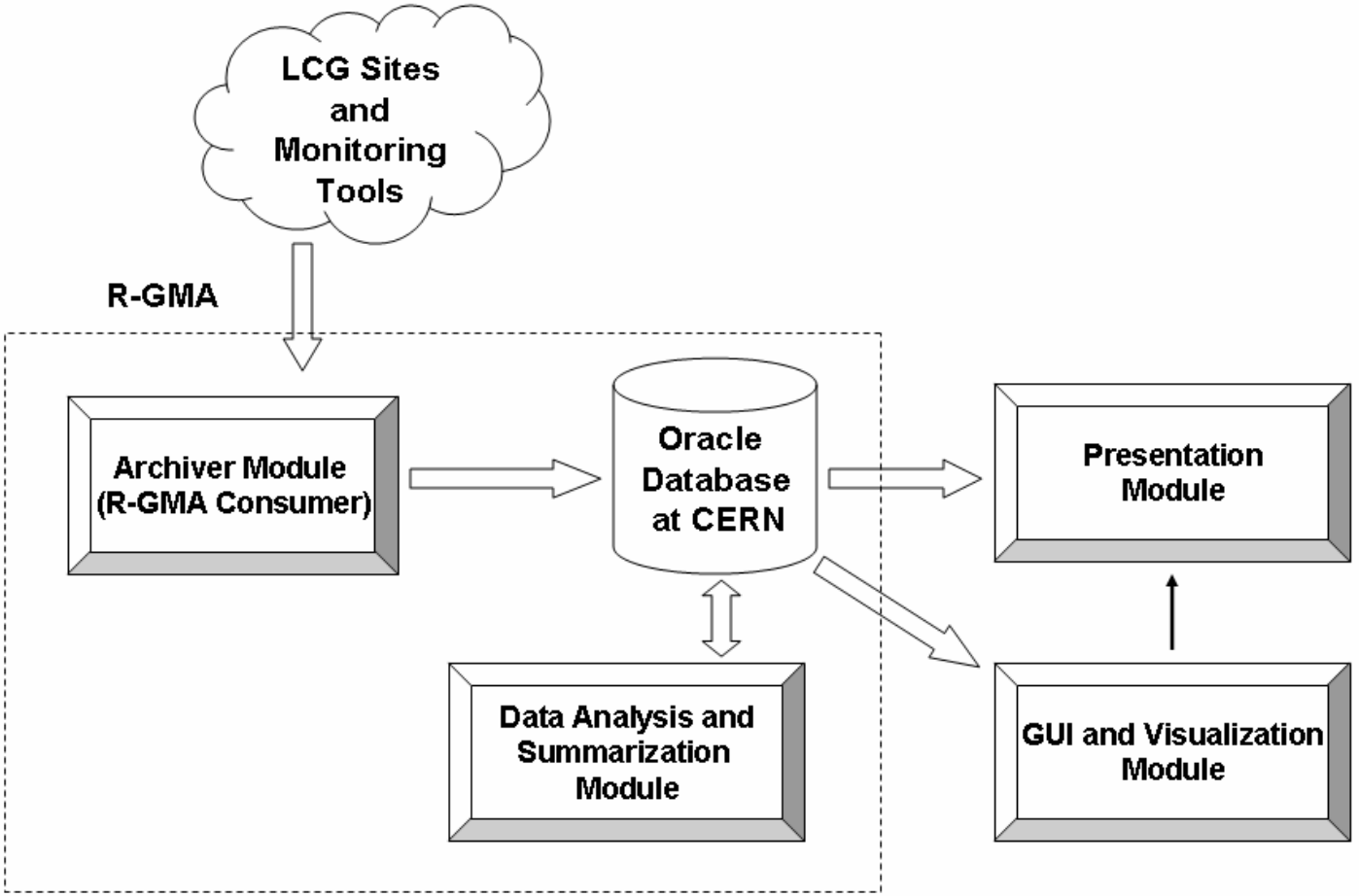
Data Sources (LCG Sites and Monitoring Tools)

- 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

R-GMA Transport

- 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

GridView Architecture



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

Current Implementation: File Transfer Monitoring

- 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

Grid View

Analysis of GridFTP Log for Service Challenge 3

LCG

What do you want?

- (•) Average Throughput
- ( ) Aggregate Data X-fer

From Site: CERNCI

To Site(s): ALL

- ( ) Current Summary
- (•) Hourly Report
- ( ) Daily Report
- ( ) Weekly Report
- ( ) Full Report

From 22 1 2006

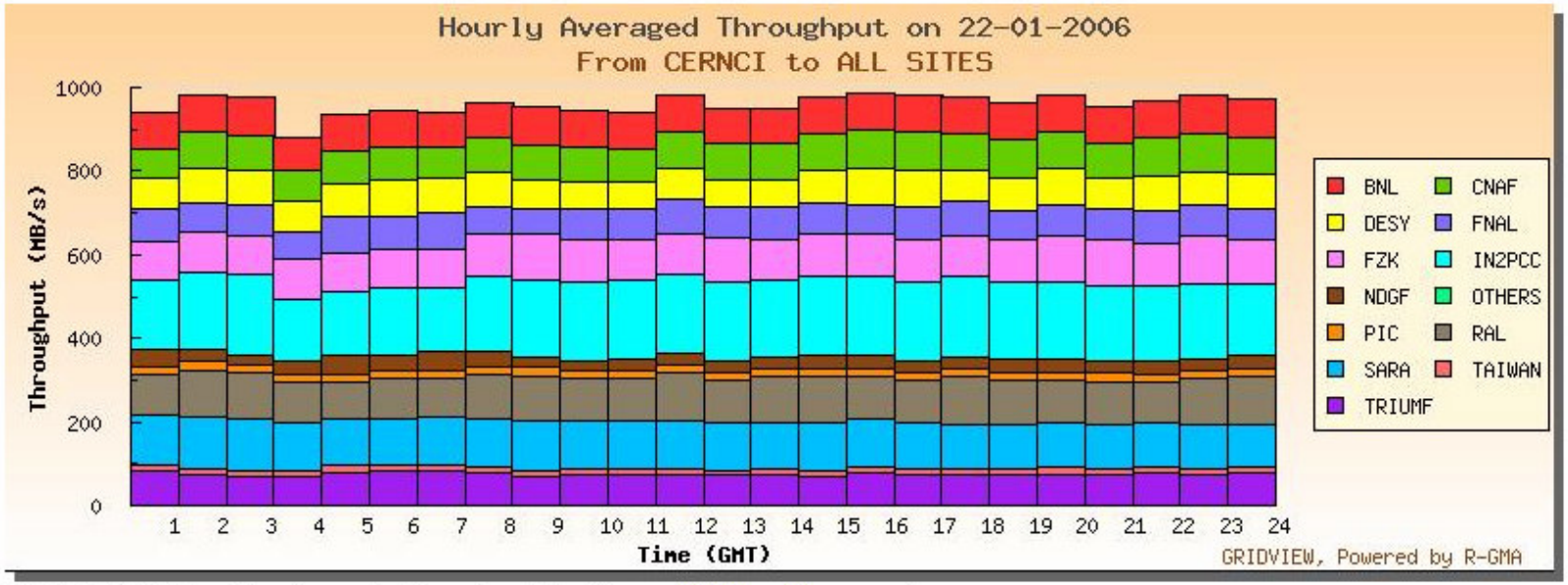
To 6 2 2006

Display Graphs

Sites Abbreviations

Latest Gridftp Records

Hourly Report



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

Show Site-wise Data X-fer | Show VO-wise Data X-fer | Go Back

Graphs for Individual Sites:-

BNL | CNAF | DESY | FNAL | FZK | IN2PCC | 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.

Gridview: SC3 Monitoring - Opera

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Rewind Back Forward Wand http://gvdev.cern.ch/GRIDVIEW/ Google search View

Find in page search Find next Voice Author mode Show images Fit to window width 100%

Grid View

Analysis of GridFTP and JobStatus Logs for Service Challenge 3

LCG

What do you want?

- Average Throughput
- Aggregate Data Xfer
- Jobs' Status

From Site CERNCI

To Site(s) ALL

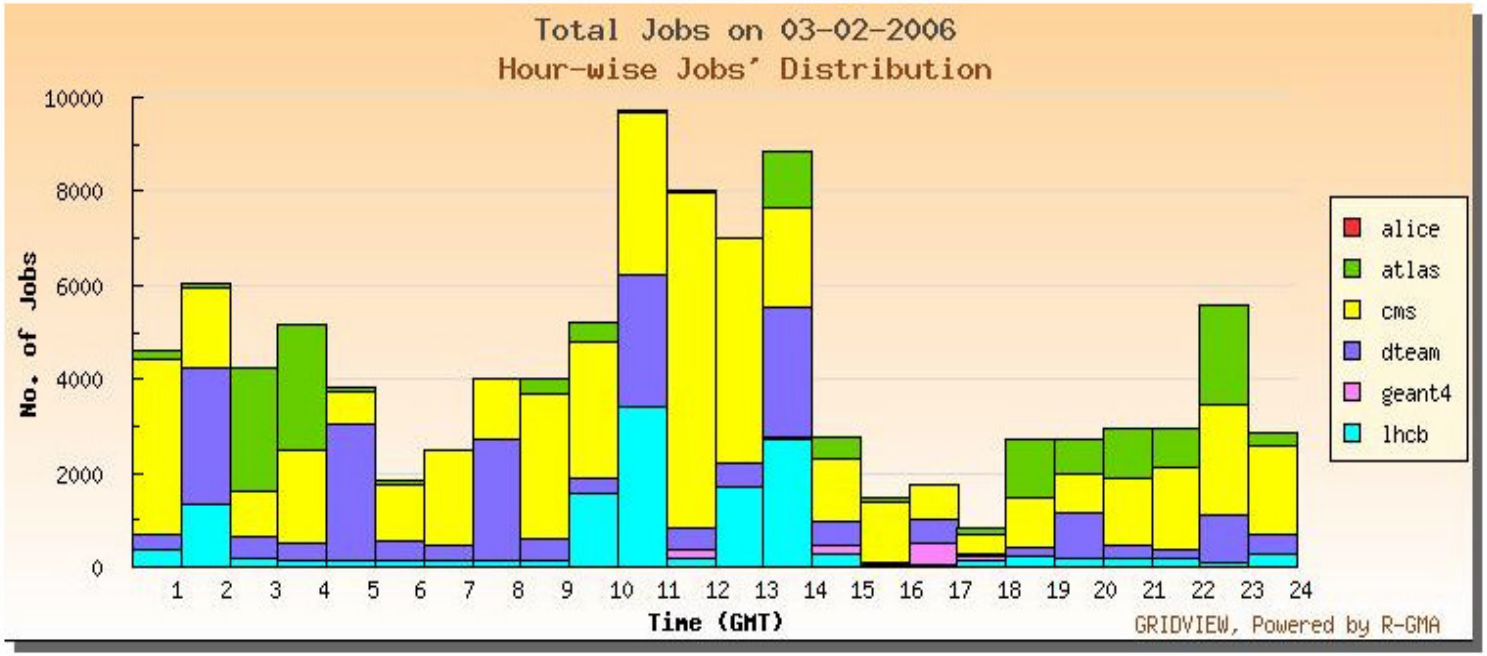
Jobs From

ALL JOBS

- Current Summary
- Hourly Report
- Daily Report
- Weekly Report
- Full Report

From 3 2 2006

Hourly Report of Jobs



Other Job-Distribution Graphs:-

RB-wise / State-wise / Destination-wise jobs' distribution

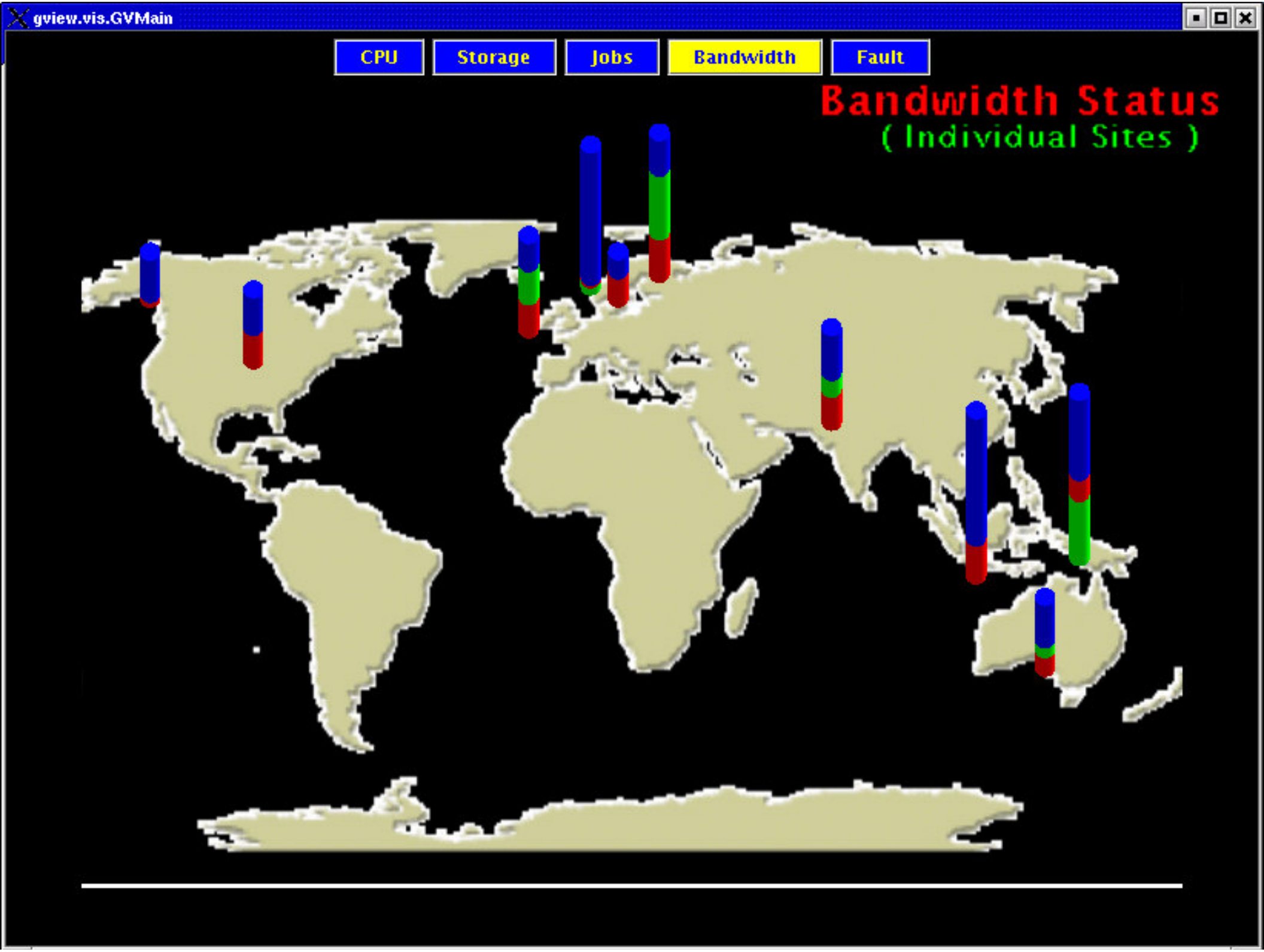
New page Gridview: SC3 Monitoring

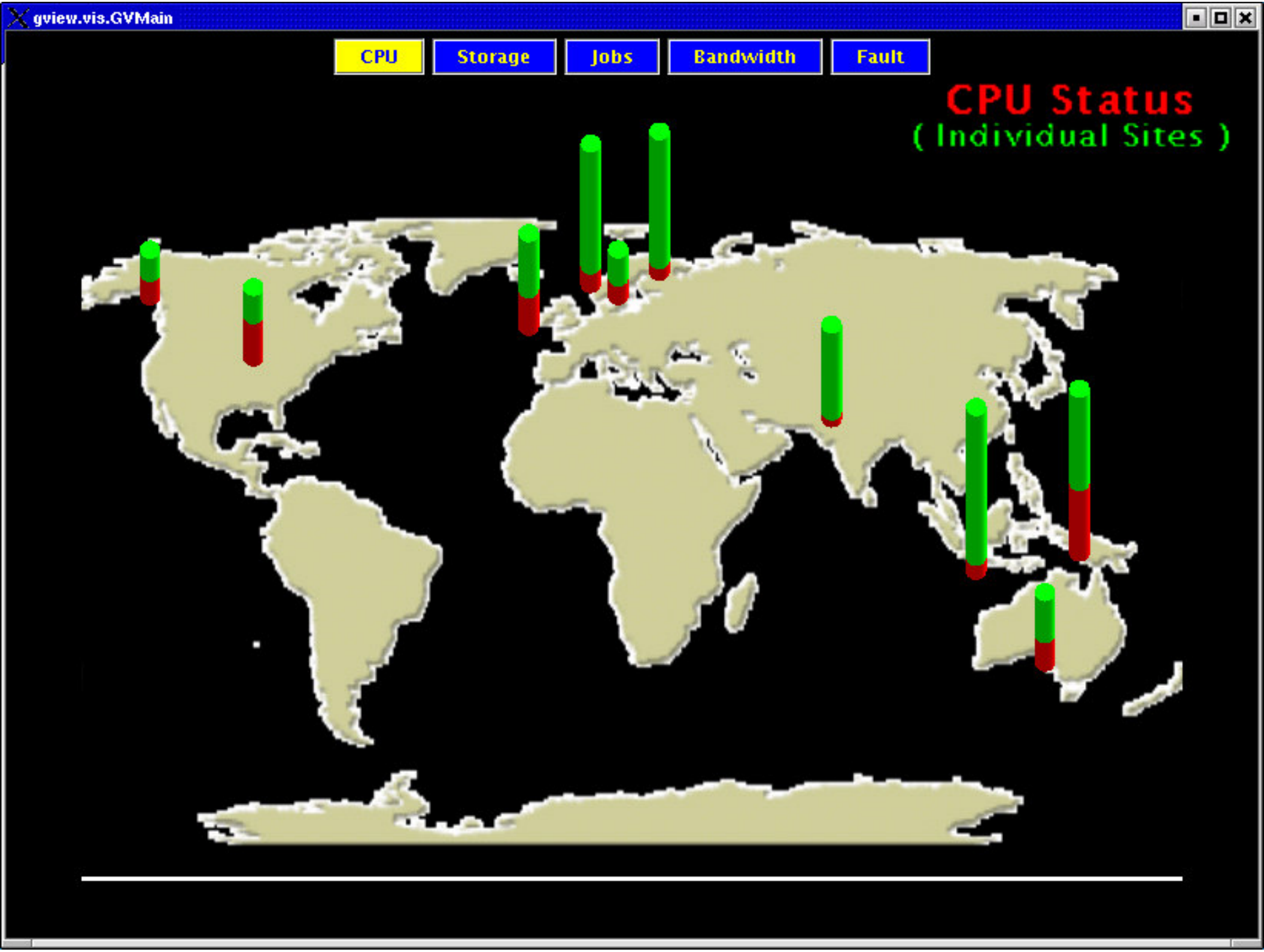
Current Implementation: GUI and Visualization

- 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)

- CEs, SEs, WNs 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


gview.vis.GVMain
CPU
Storage
Jobs
Bandwidth
Fault
Bandwidth Status
(Individual Sites)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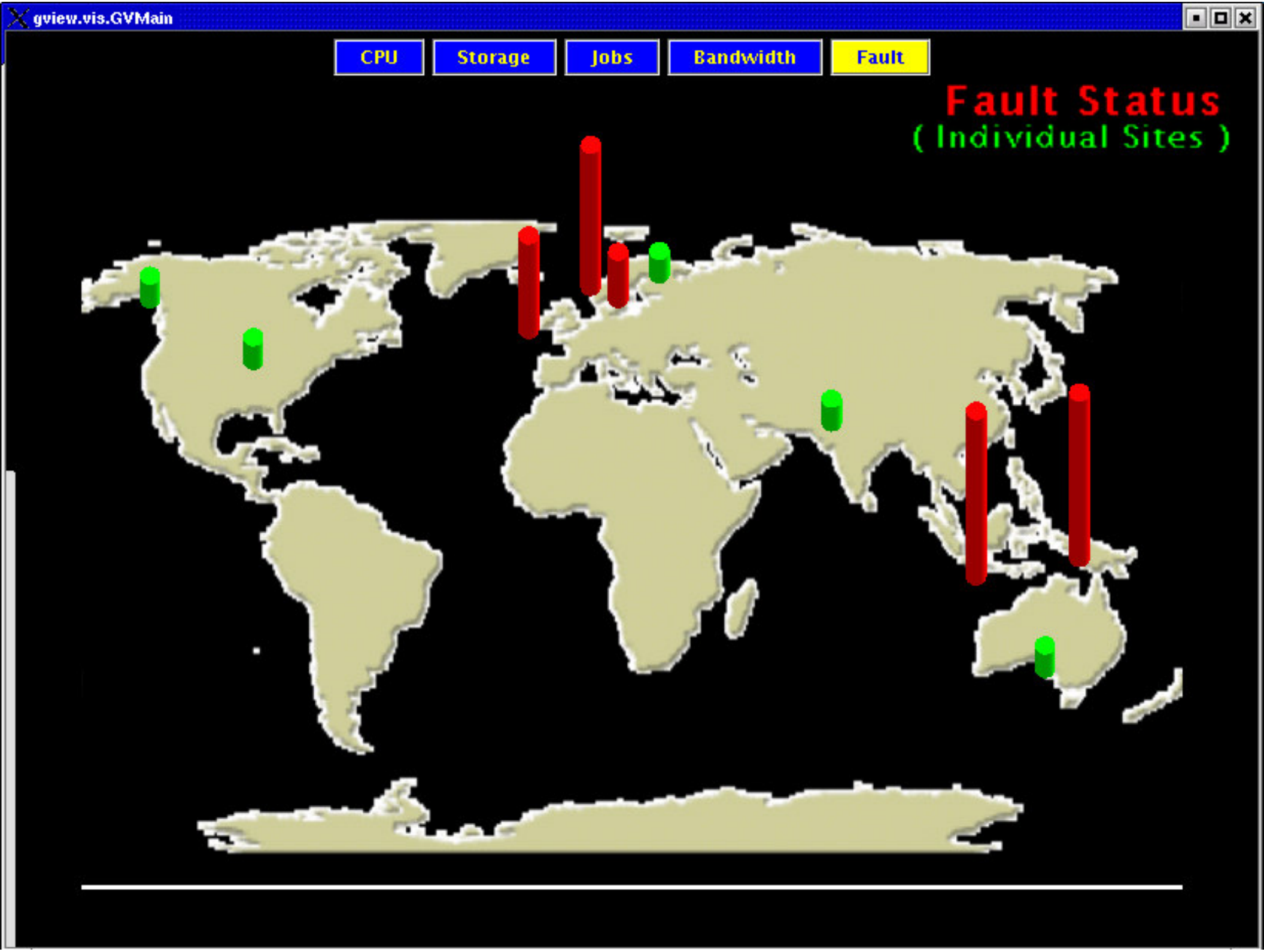
CPU
Storage
Jobs
Bandwidth
Fault
CPU Status
(Individual Sites)


gview.vis.GVMain
CPU
Storage
Jobs
Bandwidth
Fault
Fault 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 visuailsed
- 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