AliBaBa: Running BaBar jobs on the grid using gsub

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Overview

- aims
- BaBar computing in the UK
- gsub interface
- technology behind gsub interface
- web interface
- technology behind web interface
- job and fabric monitoring
Aims

• to get BaBar Scientists to run code on grids today
  - bridge gap between Globus and BaBar

• must be simple to use
  - use what the scientist knows

• must be simple to install
  - client commands are all in AFS

• must be lightweight
  - all Software is either staged
  - ...or available via AFS
UK BaBar computing

- BaBarUK compute farms distributed throughout GB
  - Bham, Bristol, Edin, IC , Liv, Man, RAL, RHul, QMUL
- large datasets located only at specific farms
  - All data at RAL, replica of data at SLAC
  - (overlapping) subsets at other sites
- executables with client
  - Local BaBar Releases
  - Personal Code
- results wanted back on Scientist's PC
what it is:
- command line job submission to a Grid
- web based monitoring of those jobs and the grid
- stop-gap
- re-use of existing tested software
- a simple “input/output sandbox”

what it is not:
- web-based/portal job submission
- load balancer
- central resource broker
requirements

- client
  - bash, X509 cert, globusrun, grid-proxy-init, browser
  - optionally myproxy and/or voms-proxy-init

- BaBar farm
  - bash, Globus gatekeeper and functional job-manager
  - IP address (front and back end), AFS client software

- AFS server
  - gsiklogd / gssklogd

- AliBaBar server (>=1 per grid)
  - perl, Gridsite
  - optionally globus
Cartoon Architecture

- AFS spans, Globus spawns & gsub holds it together

GridPP
UK Computing for Particle Physics

Remote Site
- NFS Disks
- AFS Spans
- AFS cache
- Script sets up BFROOT; Job Runs on this node
- Farm Gatekeeper

Compute Farm

Tokens via GSI and SSL

AFS Executables, Libraries and Results are here

AFS cache

My Terminal
- AFS Client
- Globus Client

Data

GS-Klog Daemon

AFS Server

Tokens via Kerberos

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what gsub does

- sanity checks
- gets the current list of gatekeepers, on-line
- creates a script (to wrap the executable on farm PC)
  - sets up a normal environment
  - uploads state
  - gets (pag separated) AFS credentials using gsi klog
  - creates BFROOT - BaBar environment
  - changes to directory submitted from
  - starts a shepherd process
    - this will look after job's grid stuff and upload status changes
  - runs user's executable (script or binary)
  - unlogs

- Globus: execute the script, on a machine, on the grid
- uses curl to upload the status of the submission
Usage

gsub [options] command args

etc.

User interaction related:

[-h|-help] [-v|-usage] [-V|-version]
[-l|l-int [-l-err <errfile>]] [-l-out <outfile>]]

Remote machine related:

[-S|-site] <BABAR-SITE>
[-s|-source] <RemoteSourceFile1> [-s|-source] <File2> ...
[-rb|-rbfroot] <Path to Remote BFROOT on Remote Machine>
[-nb] [-t|-tmp]
[-CA|-capath] <path to CA's>
[-queue|-q] <queuename>
[-d|-display] <DISPLAY>
[-lproxy] <non-standard proxy location>
[-jobman] <jobmanager>
[-g|-gate] <gatekeeper>

AFS related:

[-a|-afs] user@cell [[{-a|-afs} <extra user@cell>]+]
[{-c|-cell} <cell>]
[{-pr|-principal} <principal>]
[+a|-adds <extra user@cell>]
[-e|-error] <errorfile>
[-o|-out] <outfile>
[-t|-tmp]
[-ca|-capath] <path to CA's>
[-queue|-q] <queuename>
[-verbose]
[-v|-version]
[-C|-cat]
[-d|-display]
[-lproxy] <non-standard proxy location>
[-l-proxy] <non-standard proxy location>
[-jobman] <jobmanager>
[-g|-gate] <gatekeeper>

Globus related:

If not specified by one method above, gsub will try to guess principal and realm.

[-p|-principal] <principal>
Web based monitoring

- is a CGI perl script
- is hosted by a Gridsite

- takes several variables in get method
  - Default returns a web page with overall status map
  - Links to specific sites' statuses
  - Methods for running jobs to upload their statuses securely
  - Methods for using the server to retrieve globus status and output

- records job statuses
- draws pretty pictures
Alibaba: UK BaBar Farm Grid at a glance

The map below shows the status of the Grid of BaBar Farms in the UK.
Version: 0.98

Site Status on Wed Mar 31 18:32:19 BST 2004

Summary for last 7 days
Average queue time
Weighted by time
- < 1 min
- < 5 mins
- < 20 mins
- < 1 hour
- < 12 hours
- > 12 hours

Status unknown
Number of jobs.

Further Information
Click here for further information about alibaba.pl, gsub and morgiana.pl

- site queue status
- jobs submitted
- jobs running
- jobs finished
- links
Querying job status

Job Details
- Basic details for all
- Times, URL

Advanced Details for Owner of job
- Times, URL, Locations, Proxy life
• gsub at the command line
  - https with local proxy send XML files to Gridsite CGI
    • job ready to submit
    • job successfully submitted

• gsub script on the remote machine
  - https with delegated limited proxy
    • send gsub script started
    • send real job started
    • send job finished/terminated
Status Map

- image updated on server every time state changes
- site blob colour
  - time jobs spend in queue
  - weighted by age of result
- extremely easy to add a new sites
  - add directory on server
  - create xml file with xy position of site!
Use of AFS

• is AFS slow? - not really
• BaBar jobs run (if they're proxy is good)
• what does AFS do?
  - cache and transfers files
  - list, read, write, create, delete, lock, dir admin
• time consuming components
  - token creation
  - actual transfer
  - obtaining locks
  - cache limits
• script to test AFS speed using gsub
  - read ~ 250-500KB/s small files  ~ 2-10MB/s large
  - write ~ 50-100 KB/s small files  ~ 1-3MB/s large
  - append ~ 1-3 KB/s small files    ~ 1-3MB/s large
• DESY, SLAC, RAL ... have AFS home directories
  - Current jobs fall over when AFS token expires

• A job submitted with gsub has its own shepherd
  - shepherd can catch a new proxy
    • Globus' refreshproxy
  - shepherd can ask for a new proxy
    • myproxy
  - shepherd can obtain new AFS token
    • gsiklog
Graphical UI

Janusz Martyniak - Ganga Interface

Welcome to Python Shell (PyCrust 0.9.2)
Welcome to Grid (Ganga) version 2.2.2 (1 Feb 2003)
Type "help", "copyright", "credits" or "license" for more information.
bfgits

- based on the UK eScience GITS
  - which are based on Teragrid's original tests
  - bash (or ksh) cf perl - for job control reasons
- index-centric
- contains extra test for gsub
- writes results in text, html and xml
- XML files are compatible with UK eScience GITS database
- Is wrapped in a script: bftests
- uses gatekeepers.xml rather than GIIS
- writes results directly to webserver
- Grid Fabric
- test results
- descriptions
Conclusions

• Easy to use
  - job submission similar to non-grid used today
  - job status and tracking in browser
• Easy to install
• Uses basic globus (can work along-side LCG…)
• Uses AFS fabric already required for non grid
• Uses whichever VO Management is deployed
Future

- gsiklog -> gssklog
- expand gssklogd take-up
- more automated data discovery
  - skimData (Index for raw data) web service interface
- Better resource discovery
  - static list of resources -> dynamic list
- Data movement
  - AFS stuff fine for small (<1GB) transactions
  - want to run at any grid enabled farm
  - Data must be present or moved