

# Grid Tools

**Working Prototype of  
Distributed Computing  
Infrastructure for Physics  
Analysis (PHENIX)  
@ SUNY**

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Andrey Shevel@i2net.sunysb.edu

# Overview

- Ü **Conditions**
- Ü **Aims**
- Ü **Required features**
- Ü **Running projects**
- Ü **Working prototype**
- Ü **Conclusion**

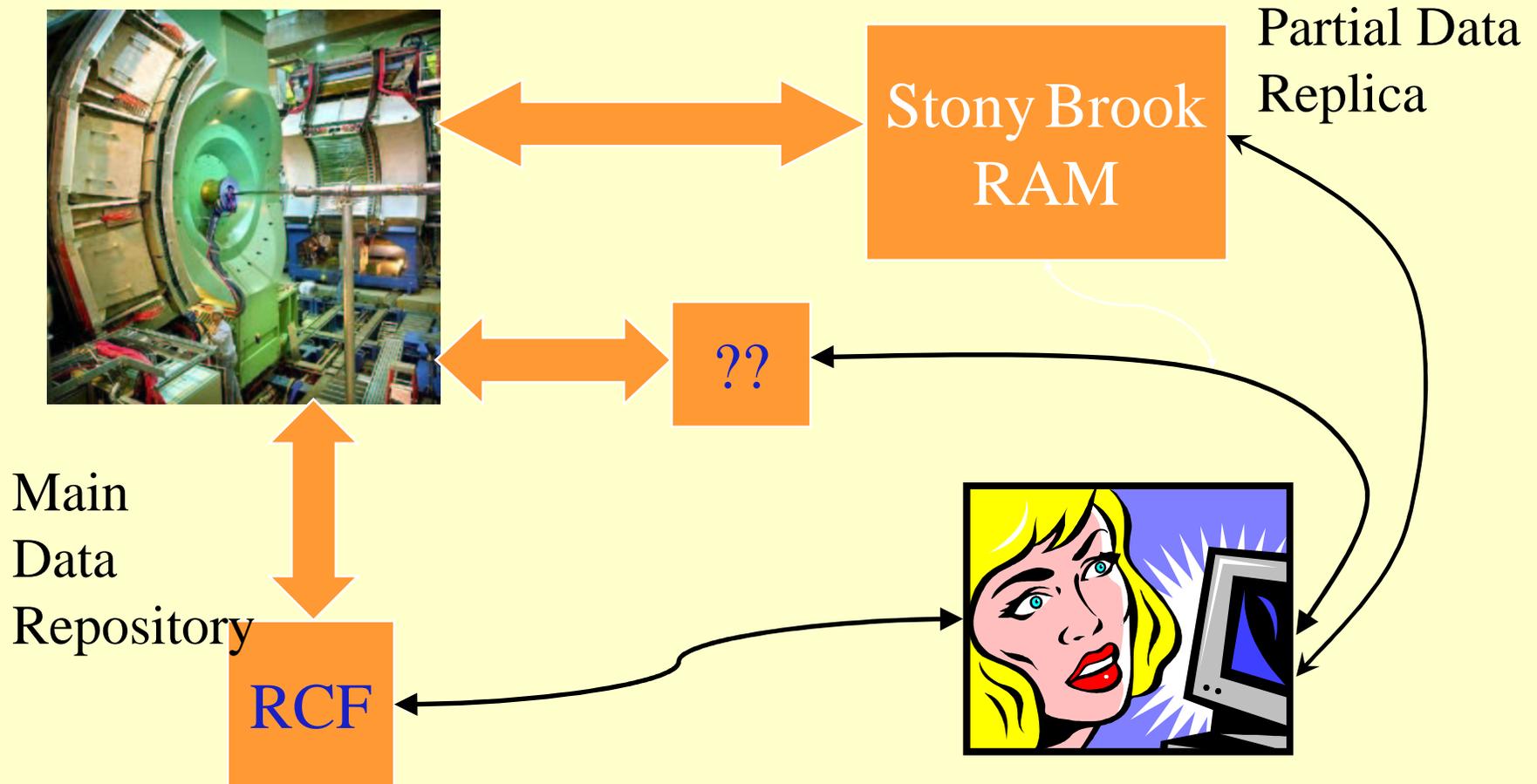
# Our Conditions

- Ü Relatively small physics team (about 10 persons) in chemistry + some 20 in physics department.
- Ü Most active part of team is involved into physics analysis.
- Ü Needs
  - Ü Replica/File catalog
  - Ü Resources status (lookup)
  - Ü Job submission+
  - Ü Data moving+
  - Ü Interfaces (Web, CLI)

# Main aims

- Ü To install and tune existing advanced GRID program tools to make robust and flexible distributed computing platform for physics analysis for remote physics teams (like SUNY). We need for distributed infrastructure because we wish to have access to as large as possible computing power. Our dream is to keep it with about zero maintenance efforts.
- Ü We consider SUNY as more or less typical example. That means our experience could be used at all other remote small teams.

# General scheme: jobs are going where data are and to less loaded clusters



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# Replica/File catalog

- Ü Needs to maintain some information about our files in different locations (in our computers, at BNL, etc.). Expected total number of files is about  $10^{**5} - 10^{**7}$  (now is about  $2*10^{**4}$ )
- Ü Needs to keep the catalog more or less up to date.
  - Ü We use adopted version of MAGDA (our catalog is available at <http://ram3.chem.sunysb.edu/magda/dyShowMain.pl>) and try to adopt ARGO <http://replicator.phenix.bnl.gov/~replicator/fileCatalog.html> (Phenix).

# Computing Resource Status and job submission

- Ü We need for simple and reliable tool to see current status of available computing resources (graphics and CLI).
- Ü After some testing of different Globus versions I have prepared set of simple scripts to use Globus toolkit in our concrete environment.
- Ü We are still looking for reliable and flexible graphics interface.

# Known systems under development

- Ü **GRid Access Portal for Physics Applications (GRAPPA)** = “a method (portal) for physicists to easily submit requests to run high throughput computing jobs on remote machines.”  
<http://iuatlas.physics.indiana.edu/grappa/> also it is interesting <http://gate.hep.anl.gov/gfg/grappa/athena/>
- Ü **Clarens:** “The Clarens Remote Dataserver is a wide-area network system for remote analysis of data generated by the Compact Muon Solenoid (CMS) detector at the European Organization for Nuclear Research, CERN” <http://clarens.sourceforge.net/>

# Known Systems (cont.)

Ü **AliEn <http://alien.cern.ch/>**

Ü AliEn is a GRID prototype created by the Alice Offline Group for Alice Environment

Ü AliEn consists of: Distributed Catalogue, Authentication Server, Queue Server, Computing Elements, Storage Elements, Information Server

Ü **All systems are not trivial, they include many components.**

Ü **Apparently it is not bad to be sure for base structure first.**

# Initial Configuration

- Ü In our case we used two computing clusters which are available for us
  - Ü At SUNY (ram); Globus gateway is `rserver1.i2net.sunysb.edu`
  - Ü At BNL PHENIX (RCF); Globus gateway is `stargrid01.rcf.bnl.gov` (thanks to Jerome and Dantong).

# Submission Commands

Ü **gsub-s *job-script***

Ü Submit the job to SUNY.

Ü **gsub-p *job-script***

Ü Submit the job to Phenix.

Ü **gsub *job-script***

Ü Submit the job to less loaded cluster.

Ü **gsub *job-script filename***

Ü Submit the job to the cluster where file with name *filename* is located.

# Job Retrieval

## Ü **gstat** [*jobID*]

Ü To show the status of job *jobID*.

## Ü **gjobs-s** [*qstat parameters*]

Ü To get the info about job queue status at SUNY.

## Ü **gjobs-p** [*qstat parameters*]

Ü To get the job queue status at PHENIX.

## Ü **gget** [*jobID*]

Ü To get the output from the job output.

# Data moving

## Ü Our Conditions

- Ü From time to time we need to transfer a group of files (from about  $10^{**2}$  to  $10^{**4}$  files) in between different locations (in between SUNY and BNL). Apparently we need to keep newly copied files in Replica/File Catalog. Some trace of all our data transfers is required as well.
- Ü Now it is realized in two ways (home made set of scripts with using 'bbftp') and with our MAGDA
- Ü To show SUNY data catalog based on our MAGDA distribution please use  
“<http://ram3.chem.sunysb.edu/magda/dyShowMain.pl>”

# Minimum Requirements to deploy the Prototype

- To deploy the prototype of computing infrastructure for physics analysis somebody needs:
  - PC, Linux 7.2/7.3 (it was tested);
  - Globus Tools 2.2.3;
  - To get two tarballs with scripts (including SUNY distribution for MAGDA): `magda-client.tar.gz` and `gsuny.tar.gz`. It is not bad to see <http://nucwww.chem.sunysb.edu/ramdata/docs/globus.html>
  - MySql (server if required) + MySql++(client) + perl interface;
  - To get Globus certificates (through <http://www.ppdg.net>).

# CONCLUSION

- Ü Transition to GRID architecture could only follow the understanding in GRID computing model of all involved people .
- Ü Special training sessions for end users are required.
- Ü Of course GRID tools have to be publicly available and supported on centralized computing resources (now it is available at RCF).