

# Green Grid Project

- Green Grid (PBS, Research Computing, Computer Science)
- Phase I: infrastructure
- Phase II: 300-500 nodes (from existing clusters)
- Phase II 1/2: 500-750 nodes (clusters + linux labs)
- Phase III: 1000+ nodes (clusters + linux labs + desktops)
- Projects: Biology, Chemistry, Computer Science, Earth Science, Engineering, Physics, and more

# Grid Security Basics

- PKI/X.509
  - Dartmouth CA -> hosts & users
  - Single sign-on
  - Forwarding of proxy cert
  - 12 hour expiration
- GSI
  - Standard for Grid (IETF - GSS-API)
  - Protocol support (FTP, SSH, AFS, CVS)
  - SSL on the wire
- PKINIT - generate TGT from cert
- K5Cert - generate proxy cert from k5 tgt

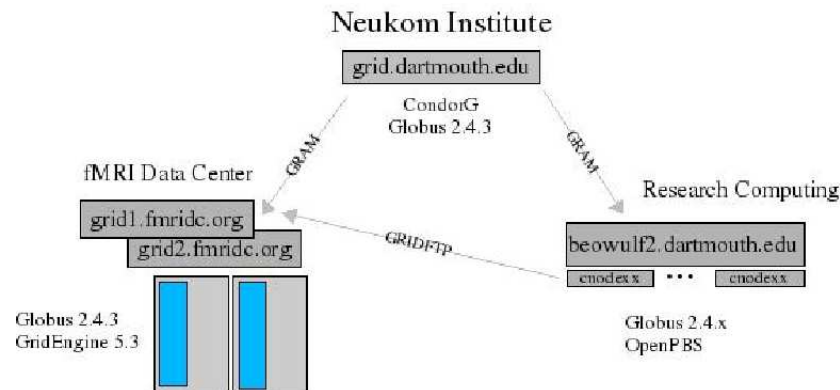
# Grid Accounts

- Green Grid is **not** another authentication source
- Dartmouth CA proves identity
- Local (/etc/grid-security/grid-mapfile) mapping
- Certification Revocation List support (client pull)
- Updates?
- Accounting might break...

```
[jed@purkinje] ~ > globus-job-run t2cms0.sdsc.edu /usr/bin/id  
uid=592(ivdgl) gid=592(ivdgl) groups=592(ivdgl),100(users),100(users)
```

# Data Transfer/Job Control

- AFS - obtain tokens via GSSKLOG
- GridFTP - copy data from servers (strong auth, ssl)
- globus-run & globus-job-run
- GridFTP works behind NAT



# Green Grid DRM

## Goal

- Campus-Wide Collaboration
- Physically/Geographically Distributed Environment
- Span Administrative Domains

## Challenge

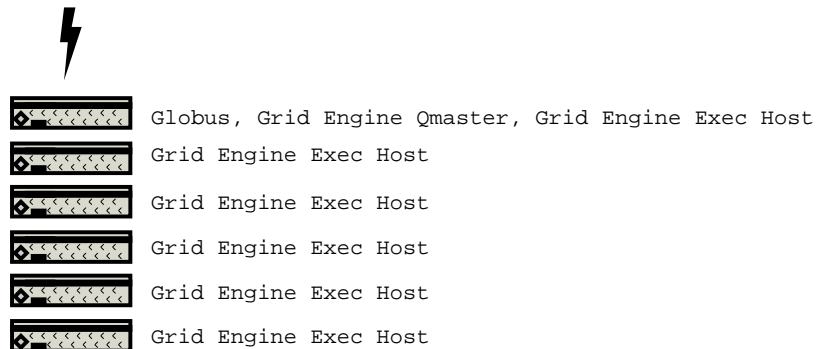
- Maintain “Local” Administrative Control
- Facilitate Prioritization of “Local” Resources
- Enable Scalability

# Reference Architecture

## Preconfigured “Local” Clusters

- Globus Head Node
- Distributed Resource Manager - DRM (Grid Engine or OpenPBS)
- Execution Queue on Each Node
- Globus-DRM Glue (Typically PERL)

## Globus Core Services



# User Contributed Resources

## Adding Local Resources

- Most DRMs allow a heterogeneous environment
- Install and Configure DRM on local resources
- Configure Execution Queues: Local and Globus
- Define Queue Policies
  - Allow only local users to submit jobs to the “local” queue
  - Local job queue can have a higher priority
  - Local job queue can preempt the Globus queue
  - DRMs allow local administrators many more options...

# Hardware

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<b>Vendor</b>	<b>System</b>	<b>CPU</b>	<b>Storage</b>	<b>Warranty</b>	<b>Mgt</b>
IBM	eServer 325	2.0GHz	1TB EXP400, JBOD	1 Year	IPMI
HP	DL145	2.2 GHz	Unknown	1 Year	None
Sun	V20z	1.8 GHz	1TB,JBOD	3 Year	IPMI
Dell*	PE1750	3.06GHz (Xeon)	1TB,PV220S	3 Year	None

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- 64 Servers

- 2G Memory, 2 Processors (AMD Operton)

- 1TB storage

\* Dell does not sell AMD. I2 Options available.