Middleware for Production Grids

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Basic Grid Services

- Interactive login

- Job submission and monitoring

- File transfer

- Resource information

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NCSA General-Purpose Grids

A production grid is…

- Usable

- Dependable

- Secure

- Interoperable

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- Integrate, test, document, and support grid software
  - Latest release includes
    Globus Toolkit, Condor-G, NWS, KX.509/KCA, GSISSH, MyProxy, MPICH-G2, GPT, Gridconfig, GridSolve, PyGlobus, UberFTP
- 8 site testbed evaluates releases
- NMI also funds grid software development

http://www.nsf-middleware.org/

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Grid Packaging Tools (GPT)

- Portable package management
- Toolkit approach
- Source and binary packages
- Dependency tracking
- Package updates
- Relocatable packages

Grid Packaging Toolkit

http://www.gridpackagingtools.org/

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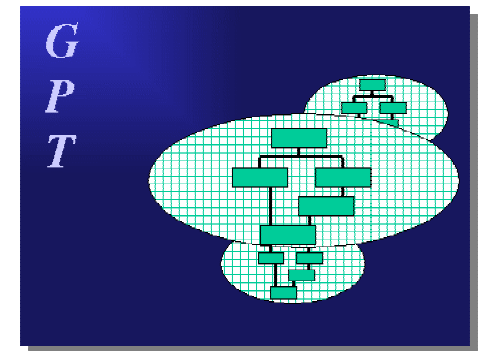
GSI-enabled OpenSSH

- GSI-authenticated login service with credential delegation

- Packaged with GPT

- Maintains compatibility with OpenSSH and Globus Toolkit

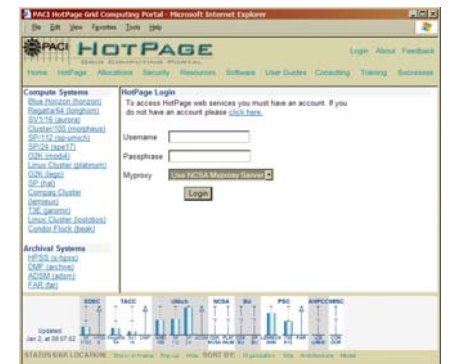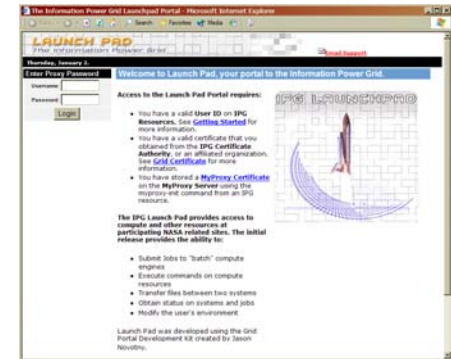http://grid.ncsa.uiuc.edu/ssh/

Online Certificate Authorities

- Globus Certificate Service
  http://gcs.globus.org:8080/

- Cacl
  http://www.npaci.edu/CA/

- KX.509/KCA
  http://citi.umich.edu/projects/kerb_pki/

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MyProxy Credential Repository

- Secure credential storage

- Improved usability

- Flexible credential management


http://myproxy.ncsa.uiuc.edu/

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Account Management Information Exchange (AMIE)

- Account management and usage reporting

- Used in NCSA production grids

- Development funded by NMI

- Joint project with Boston University

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GX-Map

- A Globus grid-mapfile management tool
- Allows users to add distinguished names to the grid-mapfile
  - mapped only to that user's account
- Similar to adding SSH Authorized Keys
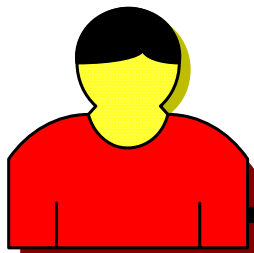
"/C=US/O=NCSA/CN=Jim Basney" jbasney
"/C=US/O=NPACI/OU=SDSC/CN=Keith Thompson" kst
"/C=US/O=PSC/CN=dsimmel" dsimmel
"/DC=org/DC=doegrids/CN=Sandra Bittner " bittner
…
"/C=UK/O=eScience/CN=Joe User" juser

http://www.sdsc.edu/~kst/gx-map

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File   Edit   View   Favorites   Tools   Help   Address http://grid.ncsa.uiuc.edu/test/grid-status-test/output_sample.html

Sample Grid Status Test Output (Mon Nov 24 18:54:14 GMT 2003)

Site	Authenticate to Gatekeeper	GRIS	GSIFTP Server	GSISSH Server	mpicc compilation	Grid Programs in PATH	Condor-G	Simple Test of jobmanager	MPI Job Test of jobmanager	GSIFTP Job Test of jobmanager
tg-login1.ncsa.teragrid.org	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Fail		
tg-master.uc.teragrid.org	Pass	No Server	No Server	Fail				Pass		
tg-login1.sdsc.teragrid.org	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Fail	Pass
tg-login1.caltech.teragrid.org	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Grid Status Test Output

```
Verifying proxy...succeeded

Testing tg-login1.ncsa.teragrid.org:
Authenticating to gatekeeper at tg-login1.ncsa.teragrid.org...succeeded
Querying GRIS at tg-login1.ncsa.teragrid.org...succeeded
Testing GridFTP at tg-login1.ncsa.teragrid.org...succeeded
Testing GSISSH at tg-login1.ncsa.teragrid.org...succeeded
Testing mpicc on tg-login1.ncsa.teragrid.org...succeeded
Checking for Grid programs in PATH at tg-login1.ncsa.teragrid.org...found
Testing Condor-G at tg-login1.ncsa.teragrid.org...Condor-G found
2 Condor-G jobs queued; 1 Condor-G jobs running.
Now running Condor-G test job at tg-login1.ncsa.teragrid.org...failed
Running simple test job on tg-login1.ncsa.teragrid.org/jobmanager...failed

Testing tg-master.uc.teragrid.org:
Authenticating to gatekeeper at tg-master.uc.teragrid.org...succeeded
Querying GRIS at tg-master.uc.teragrid.org...no server
Testing GridFTP at tg-master.uc.teragrid.org...no server
Testing GSISSH at tg-master.uc.teragrid.org...failed
Running simple test job on tg-master.uc.teragrid.org/jobmanager...succeeded
```

Local intranet

http://grid.ncsa.uiuc.edu/test/

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Common Grid Problems

- Service not running

- Service misconfigured

- Permission denied

- Protocol incompatibility

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Building a Grid

"A Grid is a system that coordinates resources that are not subject to centralized control using standard, open, general-purpose protocols and interfaces to deliver nontrivial qualities of service." -- Ian Foster, GRIDToday, July 20, 2002.

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