Monitoring TeraGrid Functionality and Performance with Inca

Kate Ericson
San Diego Supercomputer Center

TeraGrid '07, Madison, WI
June 4-8, 2007

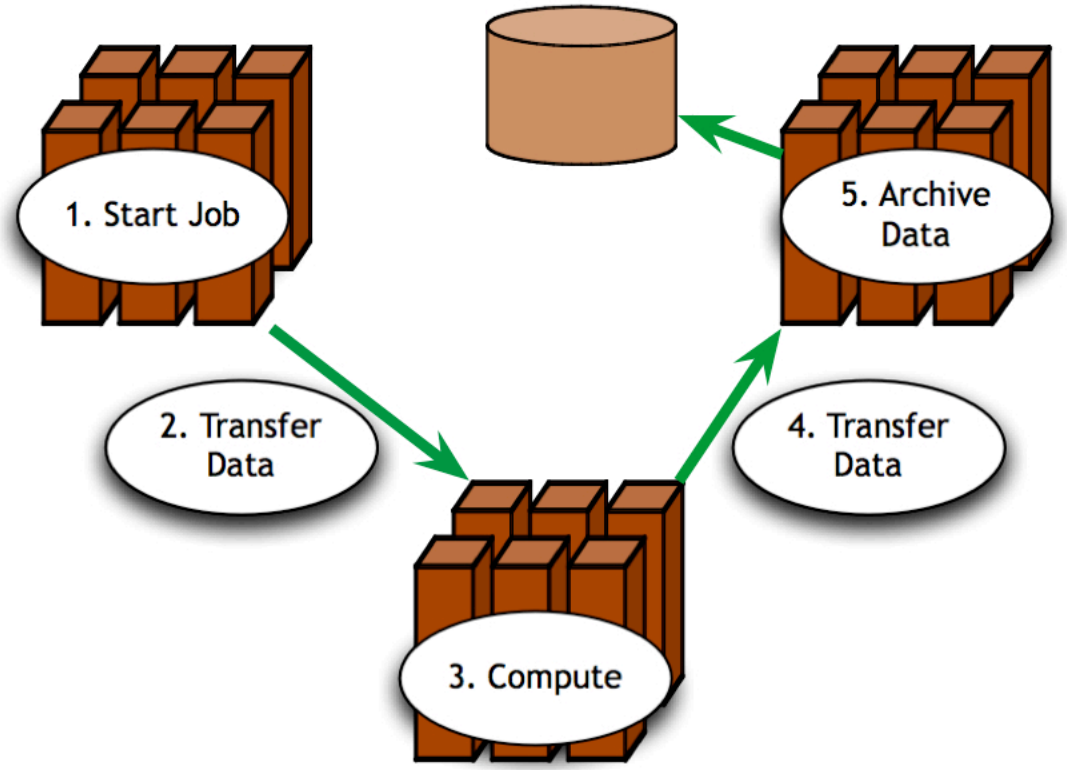
SDSC

TeraGrid™

Is TeraGrid working?

Can TeraGrid users run their applications? Can they access their datasets?

- Can user login?
- Are Grid services the application[s] use available? Compatible versions?
- Are dataset[s] N accessible to user X? Credentials?
- …



How can user requirements be tested?

User-level deployment testing

- Automated, continuous checking of Grid services, software, and environment
- Installed? Configured correctly? Running? Accessible to users? Acceptable performance?
- E.g., gatekeeper ping or scaled down application

Who is testing for?

TeraGrid management

- Responsible for designing & maintaining requirements
- Verify requirements are fulfilled by resource providers

System administrators

- Notified of problems
- Need enough information to understand context of problem

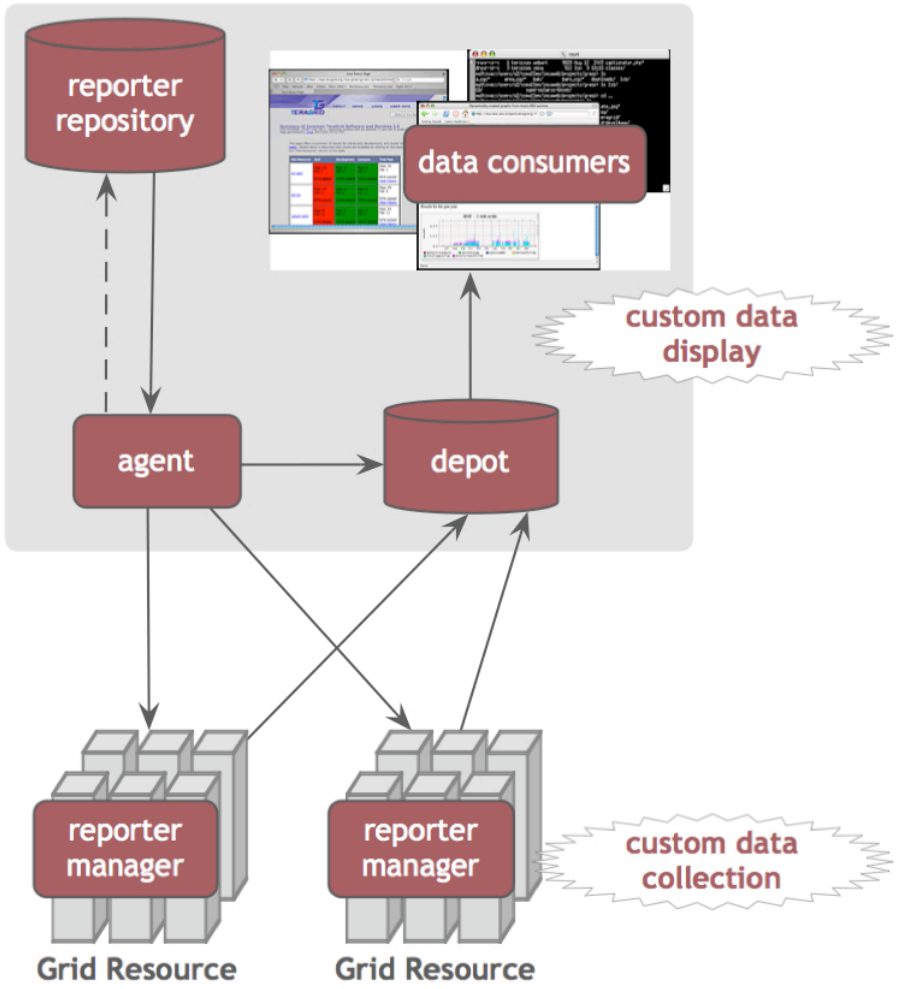
End users

- View results and compare to problems they are having
- Debug user account/environment issues
- Feedback to Grid

Inca

Inca automates user-level testing and benchmarking of TeraGrid's services, software and environment

- schedules execution of information gathering scripts (reporters)
- collects, archives, publishes data



Some Features of Inca

- Runs under a regular user account
- Archives full reports
- Easy to customize data collection and display
- Profiles and logs test resource use
- Secure (SSL, MyProxy)

Some Features of Inca

- Test schema is flexible
  (can monitor functionality and performance)
- Tests can be run from command line
- Captures test context
- Compares test results to a specification

Inca on TeraGrid

TeraGrid '07, Madison, WI
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TeraGrid's Inca Deployment

Currently monitoring all allocated TeraGrid resources at:

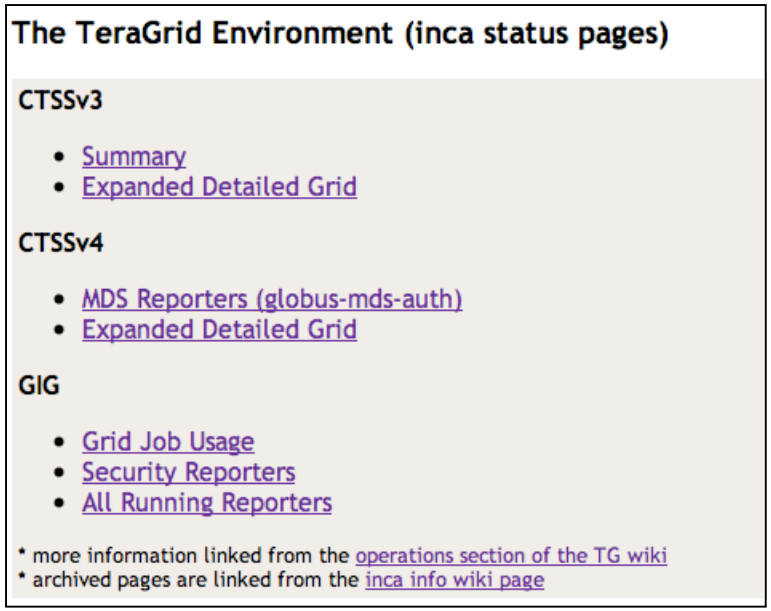
- ANL, Indiana, NCAR, NCSA, ORNL, PSC, Purdue, SDSC and TACC

Coordinated TeraGrid Software & Services (CTSS)

- Coordinated user environment across heterogeneous resources
- TeraGrid VO service agreement

Current Inca Data Display

- All pages linked from repo.teragrid.org (staff)
- CTSSv3 page linked from www.teragrid.org user guide (users)



The TeraGrid Environment (inca status pages)

CTSSv3

- Summary
- Expanded Detailed Grid

CTSSv4

- MDS Reporters (globus-mds-auth)
- Expanded Detailed Grid

GIG

- Grid Job Usage
- Security Reporters
- All Running Reporters

* more information linked from the operations section of the TG wiki
* archived pages are linked from the inca info wiki page

Current Inca Data Display: CTSSv4

Status of selected kit(s) on selected resource(s)

CTSSv4 Core Integration Kit

KIT: Core Integration | RESOURCE: TeraGrid | Submit

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n/a	does not apply to resource		test under development	tkt-#	TeraGrid ticket number
	missing (not yet executed)	pkgWait	waiting for package delivery	timeOut	reporter timed out
pass	passed	incaWait	waiting for inca test change	*	older than 24 hours
error	error	incaErr	inca framework error		

- condor
- ctss-core-registration
- globus-mds-info
- pacman
- tg-ca-config
- tg-policy
- tgresid

condor	anl-ia64	indiana-bigred	ncar-frost	ncsa-cobalt	ncsa-ia64	ornl-login	psc-bigben	purdue-lear	sdsc-datastar	sdsc-ia64	tacc-lonestar	tacc-viz
version: >=6.9.1	6.9.1	6.9.1	6.9.1	6.9.1	6.9.1	6.9.1	error	6.9.1	6.9.1	6.9.1	6.9.1	6.9.2
ctss-core-registration	anl-ia64	indiana-bigred	ncar-frost	ncsa-cobalt	ncsa-ia64	ornl-login	psc-bigben	purdue-lear	sdsc-datastar	sdsc-ia64	tacc-lonestar	tacc-viz
* need test *	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
globus-mds-info	anl-ia64	indiana-bigred	ncar-frost	ncsa-cobalt	ncsa-ia64	ornl-login	psc-bigben	purdue-lear	sdsc-datastar	sdsc-ia64	tacc-lonestar	tacc-viz
* need test *	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
pacman	anl-ia64	indiana-bigred	ncar-frost	ncsa-cobalt	ncsa-ia64	ornl-login	psc-bigben	purdue-lear	sdsc-datastar	sdsc-ia64	tacc-lonestar	tacc-viz
version: >= 3.14.1	3.20	3.20	3.20	3.15	3.15	error	error	error	3.15	3.14.1	3.20	3.20
pacman-unit	pass	pass	pass	pass	pass	error	error	error	pass	pass	pass	pass
tg-ca-config	anl-ia64	indiana-bigred	ncar-frost	ncsa-cobalt	ncsa-ia64	ornl-login	psc-bigben	purdue-lear	sdsc-datastar	sdsc-ia64	tacc-lonestar	tacc-viz
* need test *	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
tg-policy	anl-ia64	indiana-bigred	ncar-frost	ncsa-cobalt	ncsa-ia64	ornl-login	psc-bigben	purdue-lear	sdsc-datastar	sdsc-ia64	tacc-lonestar	tacc-viz
version: 0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
tgpolicy-unit	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
tgresid	anl-ia64	indiana-bigred	ncar-frost	ncsa-cobalt	ncsa-ia64	ornl-login	psc-bigben	purdue-lear	sdsc-datastar	sdsc-ia64	tacc-lonestar	tacc-viz
version: >= 2.0.0	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
tgresid-unit	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass

Current Inca Data Display: CTSSv4

Configured based on kit Integration Implementation wiki pages and MDS registered information

Success

```
Expecting: condor-g>=6.9.1
 Found: 6.9.2
```

Reporter details:

reporter name	grid.scheduling.condorg.version (click name for more info)
reporter version	2

Execution information:

ran at	05-30-2007 11:16 PM (PDT)
age	13 hours 22 minutes
cron	?=16 ?=1 * * *
ran on (hostname)	maverick.tacc.utexas.edu
memory usage (MB)	8.67188
cpu time (secs)	2.3
wall clock time (secs)	2.60918

Input parameters:

help	no
log	5
verbose	1
version	no

Command used to execute the reporter:

```
% bash --login -c 'set -a; cd
/home/utexas/staff/inca/inca2install; cp ~/.soft.v3
~/.soft.v3.$$ && soft-msc ~/.soft.v3.$$ && source
~/.soft.v3.$$.cache.sh && export
PERL5LIB=/home/utexas/staff/inca/inca2install/var/reporter-
packages/lib/perl:${HOME}/inca/install/lib/perl && eval
`soft-dec sh add +condor-6.9.2-r1 `"
&&/home/utexas/staff/inca/inca2install/var/reporter-
packages/bin/grid.scheduling.condorg.version-2 -help="no" -
log="5" -verbose="1" -version="no"; rm -f ~/.soft.v3.$$*';
```

System commands executed by the reporter:

Note that the reporter may execute other actions in between system commands (e.g., change directories).

```
% condor_version
```

Package name: condor
Package version: 6.9.1 (6.9.2 on Solaris)
Software components: Condor
Software pre-requisites: SoftEnv 1.6.2
Inca version check: >=6.9.1

Condor software is used to in the Build & Test system to manage the routing and e
software deployment. Note that this is a different Condor deployment than the one r

CTSSv4 Kit Registration

Site: tacc.teragrid.org

Resource: maverick.tacc.teragrid.org

Show/Hide Software and Services

Kit Name	Version	Support Goal	Support Level	Installed
core.teragrid.org	4.0.0	production	development	true

Software +/-

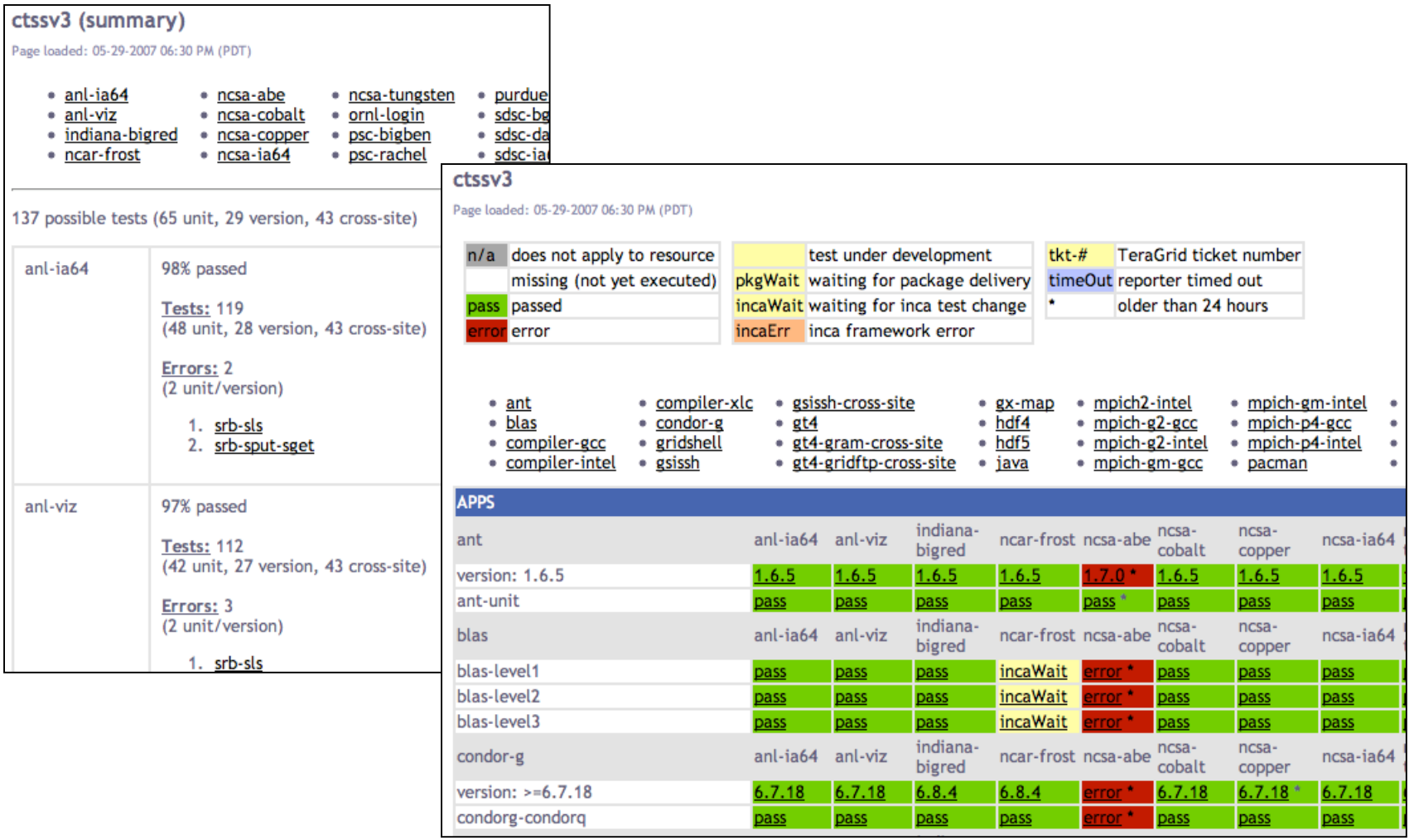
Name	Version	Default	HandleType	HandleKey
condor	6.9.2	no	softenv	+condor-6.9.2-r1
ctss-core-registration	4.0.0			
pacman	3.20	no	softenv	+pacman-3.20-r1
tg-ca-config	20070401			
tg-policy	0.2	yes	softenv	+tg-policy-0.2-r1
tgresid	4.0.0			

Services +/-

Name	Type	Version	Endpo
globus-mds-info	globus-mds4	4.0.3	https://maverick.tacc.utexas.edu:8446

TeraGrid™

Current Inca Data Display: CTSSv3



ctssv3 (summary)

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- anl-ia64
- anl-viz
- indiana-bigred
- ncar-frost
- ncsa-abe
- ncsa-cobalt
- ncsa-copper
- ncsa-ia64
- ncsa-tungsten
- ornl-login
- psc-bigben
- psc-rachel
- purdue
- sdsc-bg
- sdsc-da
- sdsc-ia

137 possible tests (65 unit, 29 version, 43 cross-site)

anl-ia64	98% passed Tests: 119 (48 unit, 28 version, 43 cross-site) Errors: 2 (2 unit/version) 1. srb-sls 2. srb-sput-sget
anl-viz	97% passed Tests: 112 (42 unit, 27 version, 43 cross-site) Errors: 3 (2 unit/version) 1. srb-sls

ctssv3

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n/a	does not apply to resource		test under development	tkt-#	TeraGrid ticket number
	missing (not yet executed)	pkgWait	waiting for package delivery	timeOut	reporter timed out
pass	passed	incaWait	waiting for inca test change	*	older than 24 hours
error	error	incaErr	inca framework error		

- ant
- blas
- compiler-gcc
- compiler-intel
- compiler-xlc
- condor-g
- gridshell
- gsissh
- gsissh-cross-site
- gt4
- gt4-gram-cross-site
- gt4-gridftp-cross-site
- gx-map
- hdf4
- hdf5
- java
- mpich2-intel
- mpich-g2-gcc
- mpich-g2-intel
- mpich-gm-gcc
- mpich-gm-intel
- mpich-p4-gcc
- mpich-p4-intel
- pacman

APPS

ant	anl-ia64	anl-viz	indiana-bigred	ncar-frost	ncsa-abe	ncsa-cobalt	ncsa-copper	ncsa-ia64
version: 1.6.5	1.6.5	1.6.5	1.6.5	1.6.5	1.7.0 *	1.6.5	1.6.5	1.6.5
ant-unit	pass	pass	pass	pass	pass *	pass	pass	pass
blas	anl-ia64	anl-viz	indiana-bigred	ncar-frost	ncsa-abe	ncsa-cobalt	ncsa-copper	ncsa-ia64
blas-level1	pass	pass	pass	incaWait	error *	pass	pass	pass
blas-level2	pass	pass	pass	incaWait	error *	pass	pass	pass
blas-level3	pass	pass	pass	incaWait	error *	pass	pass	pass
condor-g	anl-ia64	anl-viz	indiana-bigred	ncar-frost	ncsa-abe	ncsa-cobalt	ncsa-copper	ncsa-ia64
version: >=6.7.18	6.7.18	6.7.18	6.8.4	6.8.4	error *	6.7.18	6.7.18 *	6.7.18
condorg-condorq	pass	pass	pass	pass	error *	pass	pass	pass

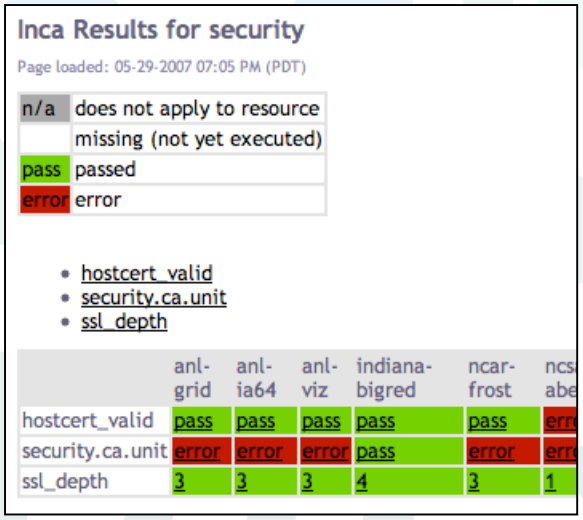
Current Inca Data Display: Cross-site Tests

CROSS-SITE									
gsissh-cross-site	anl-ia64	anl-viz	indiana-bigred	ncar-frost	ncsa-abe	ncsa-cobalt	ncsa-copper	ncsa-ia64	ncsa-tungsten
login.bigred.iu.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass
tg-login64.purdue.teragrid.org	pass	error	pass	error	error *	pass	error	pass	timeOut
tg-login.lonestar.tacc.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass
tg-viz-login.tacc.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass
tg-login.uc.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass
tg-viz-login.uc.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass
tg-login.ornl.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass
login-w.ncsa.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass
login-cu.ncsa.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass
login-co.ncsa.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass
login-hg.ncsa.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass
tg-login.bigben.psc.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass
tg-login.rachel.psc.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass
tg-login.sdsc.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass
bglogin.sdsc.edu	pass	pass	pass	pass	error *	pass	pass	pass	pass
dslogin.sdsc.edu	pass	pass	pass	pass	error *	pass	pass	pass	pass
gt4-gram-cross-site	anl-ia64	anl-viz	indiana-bigred	ncar-frost	ncsa-abe	ncsa-cobalt	ncsa-copper	ncsa-ia64	ncsa-tungsten
gatekeeper.bigred.iu.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass
grid-co.ncsa.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass
grid-hg.ncsa.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass
grid-cu.ncsa.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass
grid-w.ncsa.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass
tg-login.ornl.teragrid.org	pass	pass	pass	pass	error *	pass	pass	pass	pass

Current Inca Data Display: Grid Jobs

Machine	Reporter Status	Start/End Time (GMT)	User's Distinguished Name (DN)	Num. Jobs
anl-grid	missing			
indiana-avidd	pass	2006071020:00:00 to 2006071120:00:00	/C=US/O=SDSC/OU=SDSC/CN=Sima Patel/UID=patelsk	140
			/C=US/O=SDSC/OU=SDSC/CN=Inca User Account/UID=inca	67
			/C=US/O=NPACI/OU=SDSC/CN=Jiahua He/UID=ux454809	1
indiana-ia32	pass			
ncsa-copper	pass			
ncsa-ia64	pass	2006071019:00:00 to 2006071119:00:00	/C=US/O=National Center for Supercomputing Applications/CN=LEAD Community User	58
			/C=US/O=SDSC/OU=SDSC/CN=Inca User Account/UID=inca	44
			/C=US/O=NPACI/OU=SDSC/CN=Jiahua He/UID=ux454809	1
			/C=US/O=National Center for Supercomputing Applications/CN=Doru I Marcusiu	1
ncsa-tungsten	pass	2006071019:00:00 to 2006071119:00:00	/C=US/O=SDSC/OU=SDSC/CN=Inca User Account/UID=inca	67
			/C=US/O=National Center for Supercomputing Applications/CN=Doru I Marcusiu	4
ornl-login	pass			
purdue-linux	pass			
sdsc-ia64	pass	2006071017:00:00 to 2006071117:00:00	/C=US/O=SDSC/OU=SDSC/CN=Inca User Account/UID=inca	67
			/C=US/O=SDSC/OU=SDSC/CN=Hunter Francoeur/UID=francoeu	58
			/C=US/O=NPACI/OU=SDSC/CN=Jiahua He/UID=ux454809	7
			/C=US/O=SDSC/OU=SDSC/CN=Sima Patel/UID=patelsk	7
			/C=UK/O=eScience/OU=Edinburgh/L=NeSC/CN=owain kenway	6
			/DC=org/DC=doegrids/OU=People/CN=Mei-Hui Su 508922	2

Current Inca Data Display: Other Requested Status Pages



Inca Results for security

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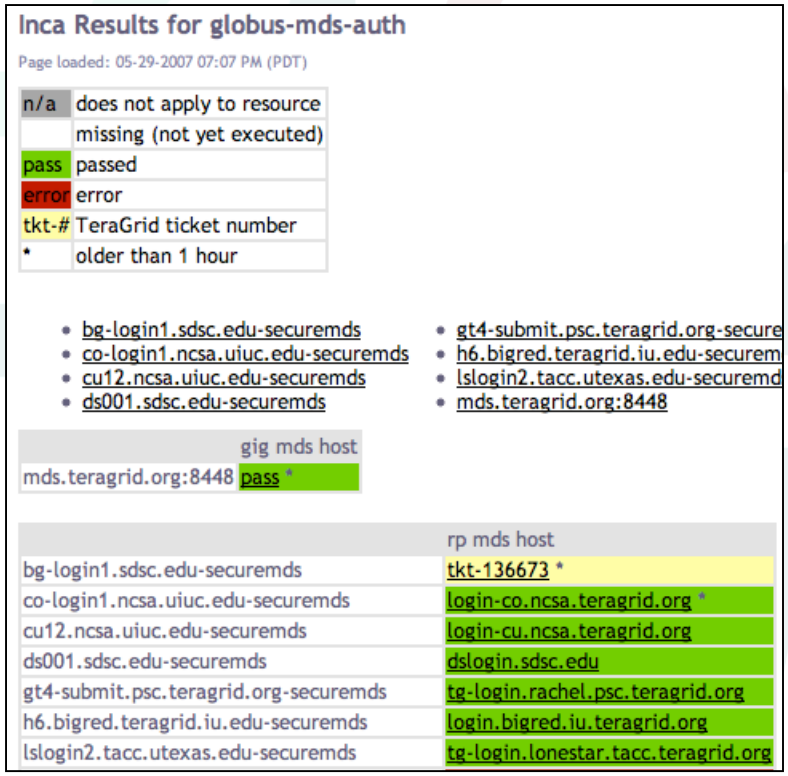
n/a	does not apply to resource
	missing (not yet executed)
pass	passed
error	error

- hostcert_valid
- security.ca.unit
- ssl_depth

	anl-grid	anl-ia64	anl-viz	indiana-bigred	ncar-frost	ncsa
hostcert_valid	pass	pass	pass	pass	pass	err
security.ca.unit	error	error	error	pass	error	err
ssl_depth	3	3	3	4	3	1



Inca Results for globus-mds-auth

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n/a	does not apply to resource
	missing (not yet executed)
pass	passed
error	error
tkt-#	TeraGrid ticket number
*	older than 1 hour

- bg-login1.sdsc.edu-securemds
- co-login1.ncsa.uiuc.edu-securemds
- cu12.ncsa.uiuc.edu-securemds
- ds001.sdsc.edu-securemds
- gt4-submit.psc.teragrid.org-secure
- h6.bigred.teragrid.iu.edu-securem
- lslogin2.tacc.utexas.edu-securemd
- mds.teragrid.org:8448

	gig mds host
mds.teragrid.org:8448	pass *

	rp mds host
bg-login1.sdsc.edu-securemds	tkt-136673 *
co-login1.ncsa.uiuc.edu-securemds	login-co.ncsa.teragrid.org *
cu12.ncsa.uiuc.edu-securemds	login-cu.ncsa.teragrid.org
ds001.sdsc.edu-securemds	dslogin.sdsc.edu
gt4-submit.psc.teragrid.org-securemds	tg-login.rachel.psc.teragrid.org
h6.bigred.teragrid.iu.edu-securemds	login.bigred.iu.teragrid.org
lslogin2.tacc.utexas.edu-securemds	tg-login.lonestar.tacc.teragrid.org

Current Inca Data Display: List of Running Tests

configured inca reporters

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core.teragrid.org-4.0.0	(7 reporter series described)
condor-version	Reports the version of Condor-G
pacman-unit	Sample pacman install and verify
pacman-version	Reports the version of pacman
tgpolicy-unit	Search result of supplied command for regular expressions
tgpolicy-version	Reports the version of tg-policy in the user's path.
tgresid-unit	Verifies tgresid "tgwhatami" and "tgwhereami" commands
tgresid-version	Reports the version of tgresid
ctss-v3	**(77 reporter series described)**
all2all:gram_to_@gatekeepers@	Checks that the gatekeeper at a host is accessible from the local machine
all2all:gridftp_to_@gridftpHosts@	Verifies the globus-url-copy service
all2all:gsissh_to_@sshHosts@	This test verifies that you can login and run commands via the SSH service on the remote machine
ant-unit	ant hello world test
ant-version	Reports the version of Apache Ant
blas-level1	This test runs the level1 tests on blas

Current Inca Data Display: List of Running Tests (cont)

```
#!/usr/bin/env perl

use strict;
use warnings;
use Inca::Reporter::SimpleUnit;

my $reporter = new Inca::Reporter::SimpleUnit(
  name => 'grid.middleware.globus.unit.gatekeeper',
  version => 2,
  description =>
    'Checks that the gatekeeper at a host is accessible from the local machine',
  url => 'http://www.ncsa.uiuc.edu/People/jb
  unit_name => 'remoteLogin'
);
$reporter->addArg('host', 'gatekeeper host')
$reporter->processArgv(@ARGV);
my $host = $reporter->argValue('host');

my $output = $reporter->loggedCommand("globu
if(!$output) {
  $reporter->unitFailure("globusrun failed:
} elsif($output !~ /GRAM Authentication test
  $reporter->unitFailure("globusrun failed:
} else {
  $reporter->unitSuccess();
}
$reporter->print();
```

Click here to see help information for the grid.middleware.g

```
NAME:
  grid.middleware.globus.unit.gatekeeper
VERSION:
  2
DESCRIPTION:
  Checks that the gatekeeper at a host is accessible from the local machine
URL:
  http://www.ncsa.uiuc.edu/People/jbasney/teragrid-setup-test.html
SYNOPSIS:
  grid.middleware.globus.unit.gatekeeper -help=no -host -log=0 -verbose=1 -version=no
  -help
        display usage information (no|yes)
  -host
        gatekeeper host
  -log
        log message types included in report
  -verbose
        verbosity level (0|1|2)
  -version
        show reporter version (no|yes)
```

Click here to view the grid.middleware.globus.unit.gatekeeper reporter.

Development Plans

SDSC

TeraGrid™

Development Plans

Run now capability for system admins:

- ability to execute configured reporters on demand and send reports to depot immediately
- wiki instructions: Inca_Information_for_System_Administrators
- password same as repo.teragrid.org

Comments form (near completion):

- staff will be able to view reporter execution details and add their own comments

Development Plans

Downtime handling:

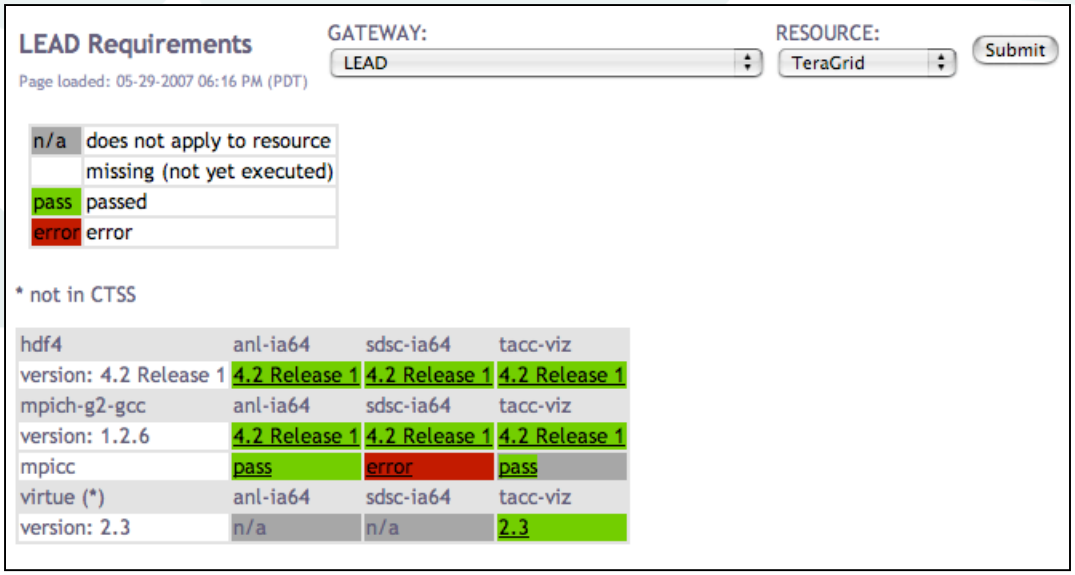
- tests will not execute during planned downtime and status pages will display news with downtime information

State change reports (weekly ops call):

- report a summary of test status changes for a selected time period

Custom Science Gateway Status

- Customize views of existing data, in future add new tests for gateway application
- Allow users to test and confirm that their Grid applications' requirements are being met



LEAD Requirements

GATEWAY: LEAD RESOURCE: TeraGrid Submit

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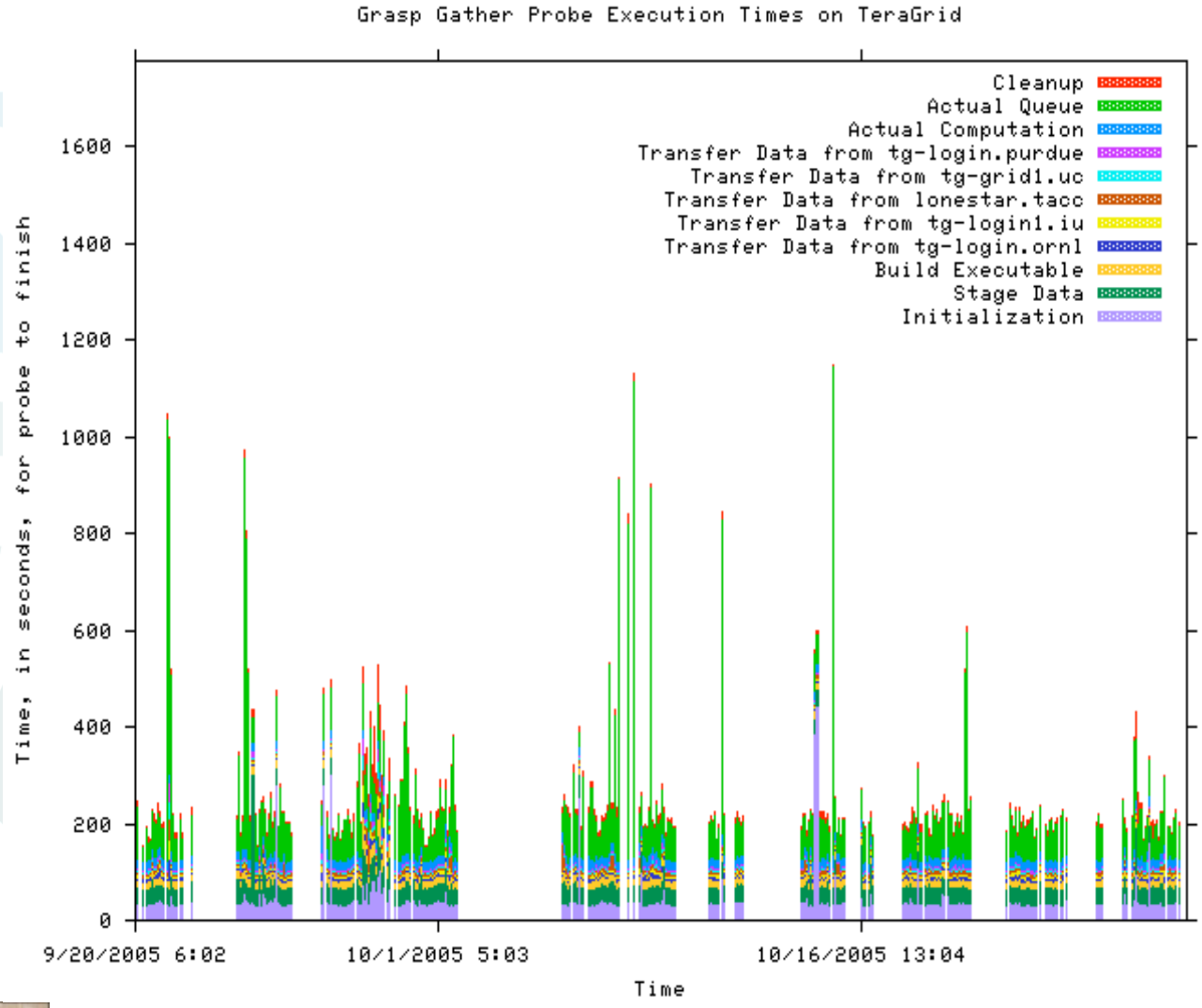
n/a	does not apply to resource
	missing (not yet executed)
pass	passed
error	error

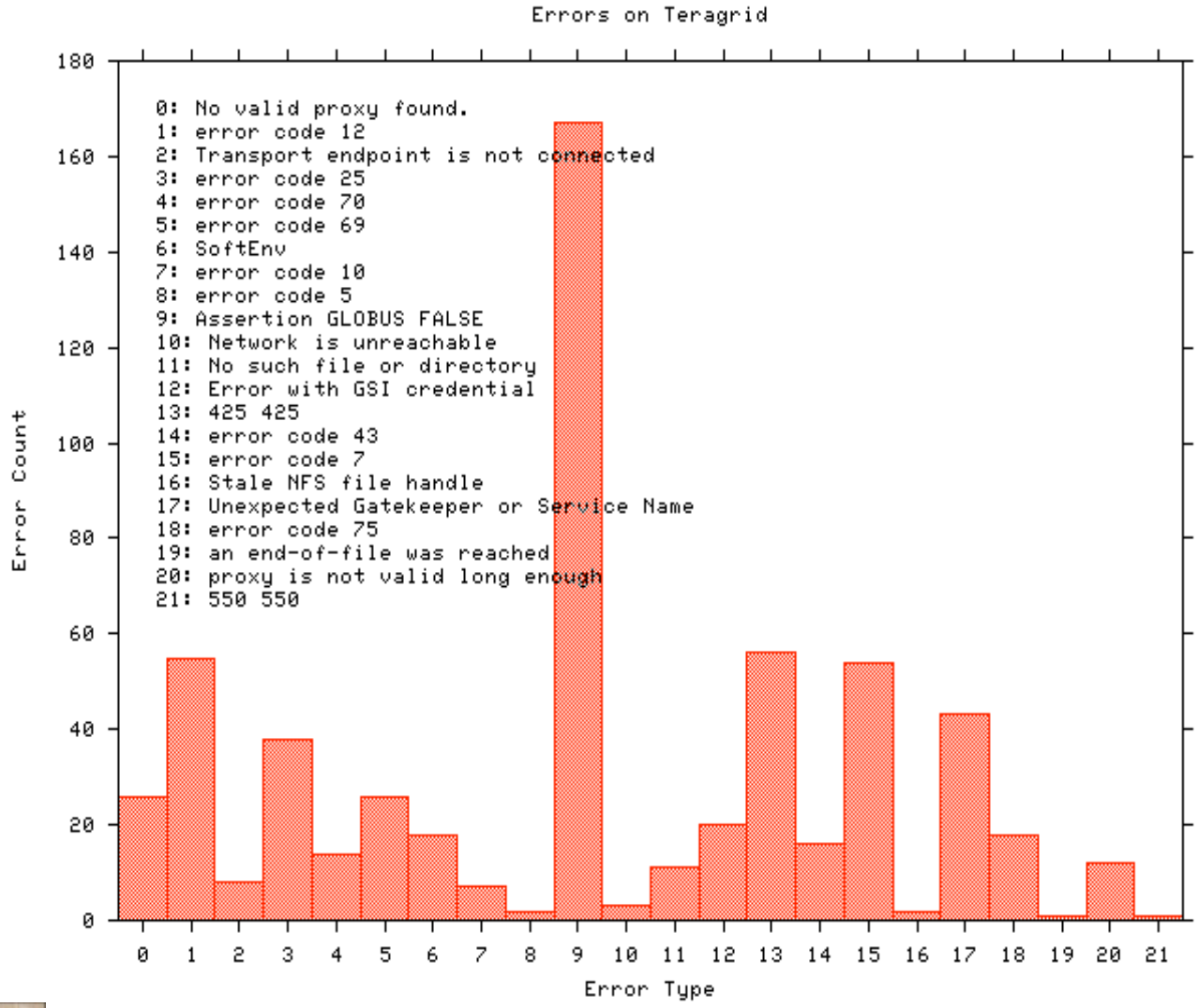
* not in CTSS

hdf4	anl-ia64	sdsc-ia64	tacc-viz
version: 4.2 Release 1	4.2 Release 1	4.2 Release 1	4.2 Release 1
mpich-g2-gcc	anl-ia64	sdsc-ia64	tacc-viz
version: 1.2.6	4.2 Release 1	4.2 Release 1	4.2 Release 1
mpicc	pass	error	pass
virtue (*)	anl-ia64	sdsc-ia64	tacc-viz
version: 2.3	n/a	n/a	2.3

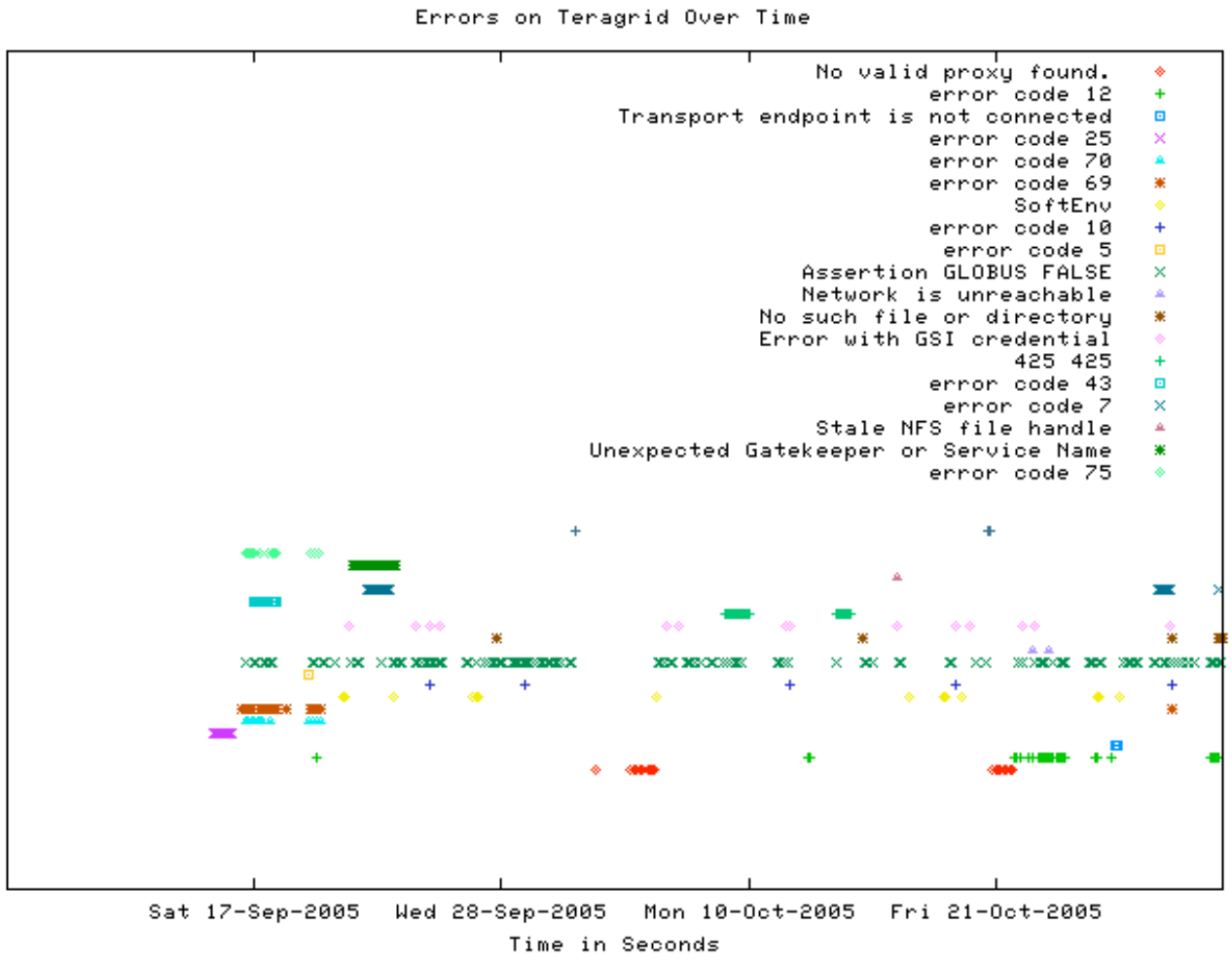
Historical Graphs



Historical Graphs



Displaying errors over time



More information

Inca Web Page:

http://inca.sdsc.edu

TeraGrid Inca Status Pages:

Staff: https://repo.teragrid.org/

Users: http://www.teragrid.org/userinfo/monitor.php

Email:

inca@sdsc.edu

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