



Open Science Grid

Testing OSG Software

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Overview

Automated Testing

osg-test

Automated test runs

Manual Testing

Developer

Acceptance

Integration Test Bed (ITB)

Testing and Releases

Future



osg-test



- Software that tests OSG software stack
- Tries to mimic what admins do
 - Install RPMs · configure (commands, files)
 - Run services · use client tools
 - Clean up · remove RPMs
- Works best on virtual machine (VM)
 - Needs administrator privileges (root)
 - Avoid conflicts with existing software
- One run tests all installed components



Test Coverage

HTCondor

GUMS

GRAM

BeStMan

GridFTP

XRootD

Gratia probes

Fetch CRL

VOMS

RSV

VOMS Admin

gLExec



Test Run Output

FAIL: test_03_myproxy_init (osgtest.tests.test_48_myproxy.TestMyProxy)

Traceback (most recent call last):

...

EXIT STATUS: 1

STANDARD OUTPUT:

MyProxy v5.9 Jul 2012 PAM SASL KRB5 LDAP VOMS OCSP

...

STANDARD ERROR: [none]

BAD SKIPS:

test_04_my_proxy_retrieval

(osgtest.tests.test_48_myproxy.TestMyProxy) MyProxy creation failed

Ran 271 tests in 2367.078s

FAILED (failures=2, badSkips=1, okSkips=15)



Automated Tests



Automation Goals

One run tests one environment

Want *many* runs, varying:

Operating system

Installed package(s)

Repositories used

Fully automated

Harness power of HTC

Clear reporting

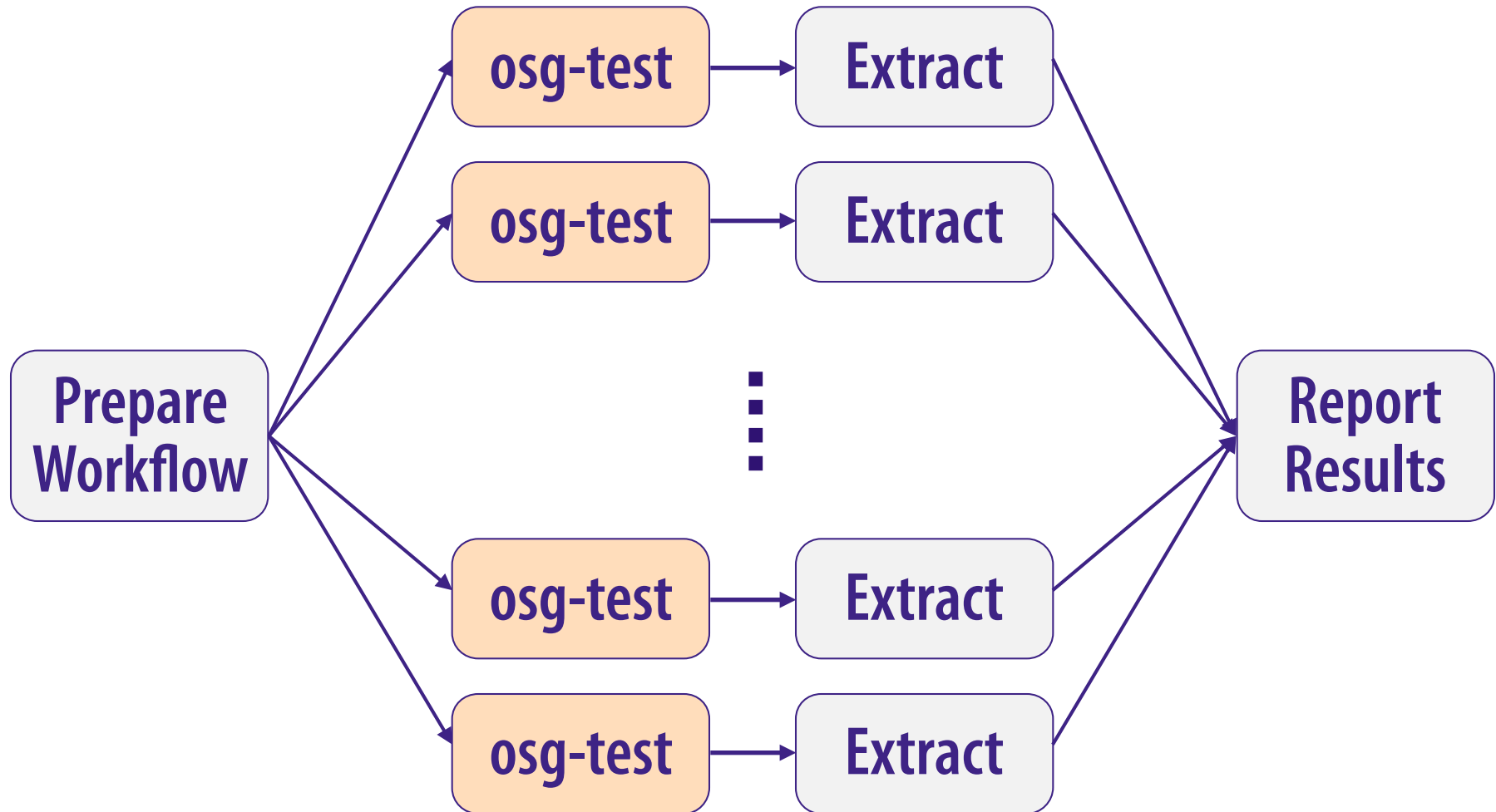


Testing in CHTC

- Use *VM universe* feature of HTCondor to run osg-test as opportunistic VM jobs
- Supported by developers and admins at Center for High Throughput Computing
- Workflow adjusts to input parameters:
 - All 6 OSG operating systems (EL5 & EL6)
 - 6 package sets (e.g., CE, BeStMan SE, GUMS)
 - 9 repository combos (e.g., release, 3.1 \Rightarrow 3.2)
- Automated nightly runs or on demand



Test Workflow





Benefits of VM Tests

- “Nightlies”: 324 test runs in 2–4 hours
- Customized run: 1–4 hours
- Has found real issues
 - OpenJDK 7 dependency changes
 - OpenSSL changes to minimum proxy lengths
 - OpenSSL packaging changes
 - jGlobus / BeStMan problems with certificates



Report Sample

3.1 Production ⇒ 3.1 Testing

[1/9]

	Cent 5	RH 5	SL 5	Cent 6	RH 6	SL 6
Everything	241 14 1	241 14 1	241 14 1	242 14 0	241 14 1	242 14 0
HTCondor	86 169 1	86 169 1	86 169 1	88 168 0	88 168 0	88 168 0
GridFTP	70 186 0	70 186 0	70 186 0	71 185 0	71 185 0	71 185 0
BeStMan	79 177 0	78 177 1	79 177 0	80 176 0	80 176 0	80 176 0
VOMS	93 163 0	93 163 0	93 163 0	94 162 0	94 162 0	94 162 0
GUMS	79 177 0	78 177 1	79 177 0	80 176 0	80 176 0	80 176 0

<http://vdt.cs.wisc.edu/tests/latest.html>



Manual Testing

Why Test by Hand?

Lack coverage in osg-test yet

We keep adding tests ...

If test cases are hard to code

Client and server on separate machines

Simulating user input to web pages

If test covers a one-time change

Exploratory testing

Unexpected output

Unusual messages in log files

Check for basic errors

Packaging mistakes

Software does not work at all

Usually install isolated software

E.g., not a whole Compute Element

Generally very lightweight



Sample Dev Test

Carl, testing new GridFTP UDT feature:

```
# yum install osg-gridftp
Loaded plugins: priorities, ...
osg-development                | 1.9 kB      00:00
...
Complete!
# service globus-gridftp-server start
Starting globus-gridftp-server: [ OK ]
```

```
$ echo hi > /tmp/test.in
$ globus-url-copy -udt file:///tmp/test.in \
  gsiftp://$HOSTNAME/tmp/test.out
$ cat /tmp/test.out
hi
```


Must pass before release

Install software on bare VM

FermiCloud is awesome – thanks, guys!

Some integration, but not a site

Kinds of testing

Check specific features or changes

Check for regressions

Look around for new issues

Maybe do multi-machine testing



Sample Defect #1

Brian L., testing an unrelated change:

```
# osg-koji setup
```

```
Koji configuration file '...' already exists.  
Recreate it?
```

```
[y/n] ? n
```

```
Error downloading DOEGrids certs tarball (from  
https://pki1.doe grids.org/Other/doe grids.tar  
to /.../doe grids.tar): <urlopen error [Errno  
110] Connection timed out>
```

```
# echo $?
```

```
1
```

```
#
```

Neha, testing other changes to fetch-crl:

```
# grep dir /etc/fetch-crl.conf
fodir = /etc/grid-security/certificates
# service fetch-crl-boot start
Running fetch-crl on boot:           [ OK ]
# echo $?
0
```

We emailed the fetch-crl developer about the failure to warn about an unused config option; still trying to convince them that this is a bug ...



ITB Testing

Install software on a test site

Same architecture as real site

Relatively few worker/data nodes

Takes some real production jobs

Lets us test in real environment

Very few ITB sites today ...

E.g.: UChicago (Suchandra), OU (Horst)

Soon: Madison (OSG Software/Release)



Horst, testing Globus 5.2.5 updates:

```
# osg-control list
Configured services:
-
c
condor-cron
e
edg-mkgridmap
f
fetch-crl-boot
fetch-crl-cron
g
globus-gatekeeper
globus-gridftp-server
...
```



Testing is a Process



Testing and Releases

1. Build \Rightarrow Development
2. **Developer testing**
3. Development \Rightarrow Testing
4. **Acceptance and ITB testing**
5. Testing \Rightarrow Pre-Release
6. **One final run of osg-test**
7. Pre-Release \Rightarrow Production



Future Work

osg-test

- Expand coverage and expressiveness
- Add different modes: e.g., all vs. fast
- Better support runs on existing installs

Automated Runs

- Update for OS, package, & repo changes
- Reports: "EL5 HTCondor jobs are broken"

Test Cases

- Continue adding manual testing recipes
- Better tie tests to documentation



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