Open Science Grid

Operations Training: The OSG Software Stack

Alain Roy
OSG Software Coordinator

WHO NEEDS TRAINING TO KEEP UP WITH TECHNOLOGY TRENDS?
ME.
Dilbert.com DilbertCartoonist@gmail.com
YOU'RE FIRED. I ONLY WANT PEOPLE WHO ALREADY KNOW HOW TO DO THEIR JOBS.
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I DID NOT SEE THAT COMING.
THEY DON'T HAVE A CLASS TO FIX THAT.

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Crash course: What you need to know to support the OSG Software Stack

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Mistakes we made in creating OSG Software, and your life of pain in supporting it

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Goals

- Help you understand OSG Software 3.0
- Help you deal with incoming support tickets

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Rough Agenda

Time	Topic
9:00 – 10:00	Deep intro to OSG Software 3
10:00 – 11:15	Live demo and coffee break
11:15 – 12:00	Debugging common problems
12:00 – 1:00	Lunch
1:00 – 2:00	More debugging common problems
2:00 – 3:00	*Alain runs OSG Software Meeting*
3:00 – 3:15	Coffee break
3:15 – 5:00	Open discussion aka stump the expert
6:00	Dinner?

Part 1:
The Big Picture

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I’m assuming:

- You know all the basics about OSG 1.2
- You know how to use Pacman

- If you want lessons on how to use Pacman, we’ll have to do a separate training session.

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Differences from OSG Software 1.2

- No more Pacman: RPM & yum
- Install software into standard locations
  - /usr/bin/grid-proxy-init
  - /usr/sbin/globus-gridftp-server
  - /etc/osg/config.d/
  - /var/log/globus-gatekeeper.log
- No more $VDT_LOCATION
  - Nor $OSG_LOCATION, $GLOBUS_LOCATION…
- Life is easiest if you’re using standard tools & cluster management system

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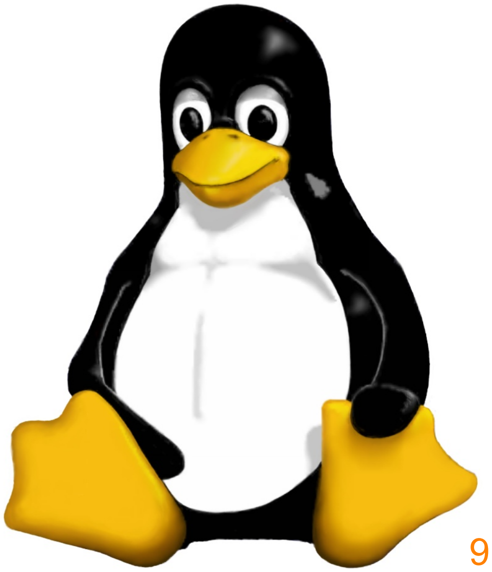
Requirements for using OSG Software 3.0

- RHEL, CentOS, or Scientific Linux
  - Version 5 right now
  - Version 6 on April 24th
- We rely on software from three sources:
  - OSG
  - OS
  - EPEL
- You install software with:
  - Yum
  - RPM



Software changes

Upgrades:

Software	New Version	Old Version
Globus	5.2	4.0
Bestman	2.2	2.0
VOMS	2.0	1.8
Condor	7.6	7.2
glexec	0.8	0.6
hdfs	0.2	---

Changes:

New	Old
lcmaps	PRIMA
configure-osg	osg-configure
---	vdt-control

Globus upgrade: Implications

- This is a really big upgrade!
  - From 4.0 to 5.2
  - And we shipped 5.2 *before* Globus did
- Big changes:
  - One jobmanager per user instead of per job
  - Globus gatekeeper is long-running daemon
- This all works pretty well…
  - But we've been fixing a steady stream of problems over the last few months
  - Expect more problems for a bit longer?

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VOMS Upgrade: Implications

- VOMS Admin is fancier:
  - Remove need for VOMRS
  - Let's users sign AUP, expire access…
- New command-line client (`voms-proxy-init`) is *not* compatible with oldest VOMS servers:
  - We pushed hard to upgrade all VOMS servers in OSG
  - Fermilab:
    - Was last to upgrade (complex setup)
    - Is having many problems (see GOC Ticket)
    - Dan threatened downgrading
    - We're trying hard to resolve their problems ASAP

PRIMA -> lcmaps: implications

- It all just works, so don’t worry…
  - …But the configuration is all different
  - …And the logging is all different
  - So it may end up generating some support
- Configuration for using gums is in:

```
/etc/lcmaps.db
```

No more vdt-control???

- It used to be:

```
# vdt-control --on
enabling init service apache... ok
enabling inetd service globus-gatekeeper... ok
...
```

- Now we use the standard interface:

```
# /sbin/service httpd start
Starting httpd:                     [  OK  ]

# /sbin/service globus-gatekeeper start
Started globus-gatekeeper           [  OK  ]
```

Migrating from OSG 1.2

- It’s best to do a fresh install
  - Don’t want libraries from old install messing with libraries from new install
- The old “config.ini” for osg-configure is now multiple files:

```
# ls /etc/osg/config.d
01-squid.ini        20-condor.ini  40-localsettings.ini
10-misc.ini         30-cemon.ini   40-network.ini
10-storage.ini      30-gip.ini     40-siteinfo.ini
15-managedfork.ini  30-gratia.ini
```

Migrating from OSG 1.2

- Option 1:
  - Install from RPMs
  - Edit relevant bits of all config.ini files
- Option 2:
  - Install from RPMs
  - Copy old config.ini to 99-config.ini
  - Edit 30-gip.ini to comment out GIP config

```
https://twiki.grid.iu.edu/bin/view/Documentation/
Release3/UpdateComputeElement
```

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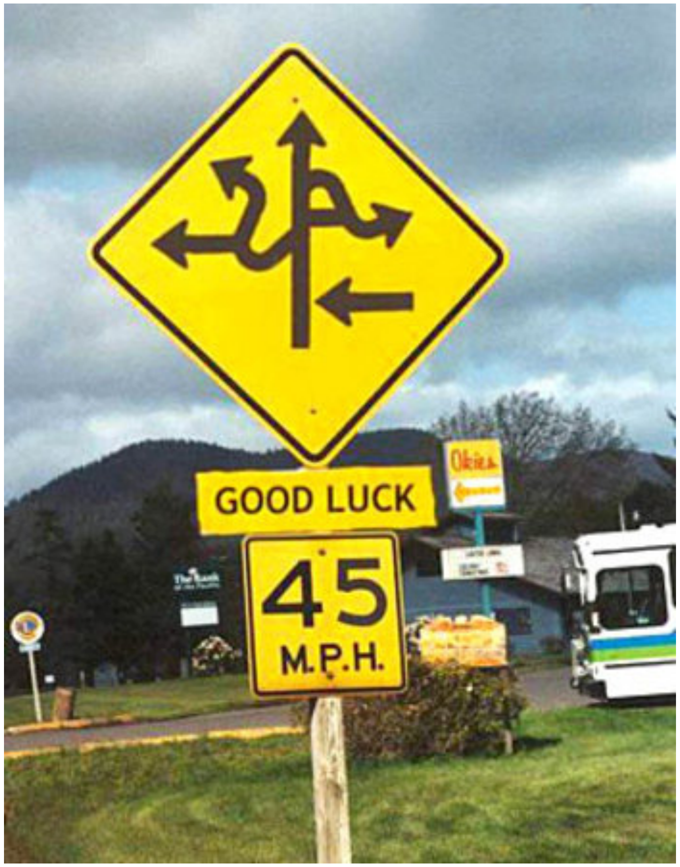
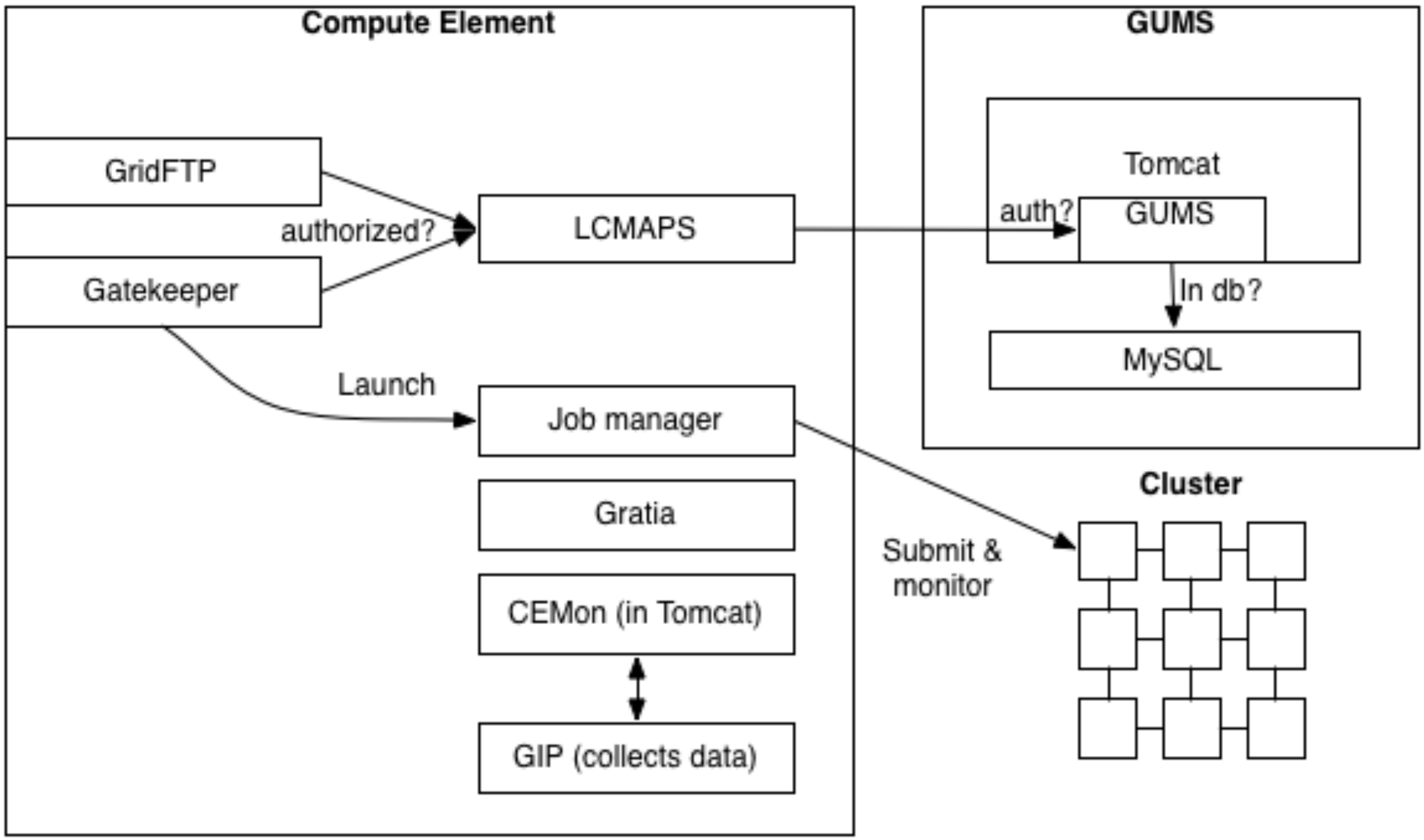
Part 2:
Let’s explore a CE



A map of the CE



The gatekeeper

- Long-running daemon
  - Used to be invoked per request
- Authorizes user to submit jobs
- Creates job manager per user/DN
- Configuration in:
  - /etc/sysconfig/globus-gatekeeper
- Log in:
  - /var/log/globus-gatekeeper.log

The job manager

- One long-lived job manager per user
  - Handles job submission, removal, etc
  - The user’s main point of contact
- Configuration:
  - /etc/globus/globus-gram-jobmanager.conf
  - /etc/globus/globus-fork.conf
  - /etc/globus/globus-condor.conf
  - /etc/globus/globus-pbs.conf
- Log: (not very useful)
  - /var/log/globus/gram_USER.log-date

GridFTP

- Long-lived daemon
- Configuration:
  - /etc/gridftp.conf
  - /etc/sysconfig/gridftp.conf.d
- Logs:
  - /var/log/gridftp-auth.log
  - /var/log/gridftp.log

lcmaps

- Lcmaps handles authorization
  - Can do gridmap (but we don't)
  - Used for GUMS
  - Used by Gatekeeper/GridFTP & glexec
- Configuration:
  - /etc/lcmaps.db
- Log:
  - /var/log/messages
  - Will be more useful with next update

CEMon & GIP

- Massive application in Tomcat
  - For our purposes, “fancy cron”
  - We could replace with “cron and a script”
    - We have, but it’s never been fully tested/supported
- CEMon invokes GIP
  - Every five minutes
  - GIP collects static & dynamic info
- CEMon pushes data to GOC
- Configuration:
  - /etc/osg/config.d/
- Log:
  - /var/log/glite-ce-monitor/glite-ce-monitor.log

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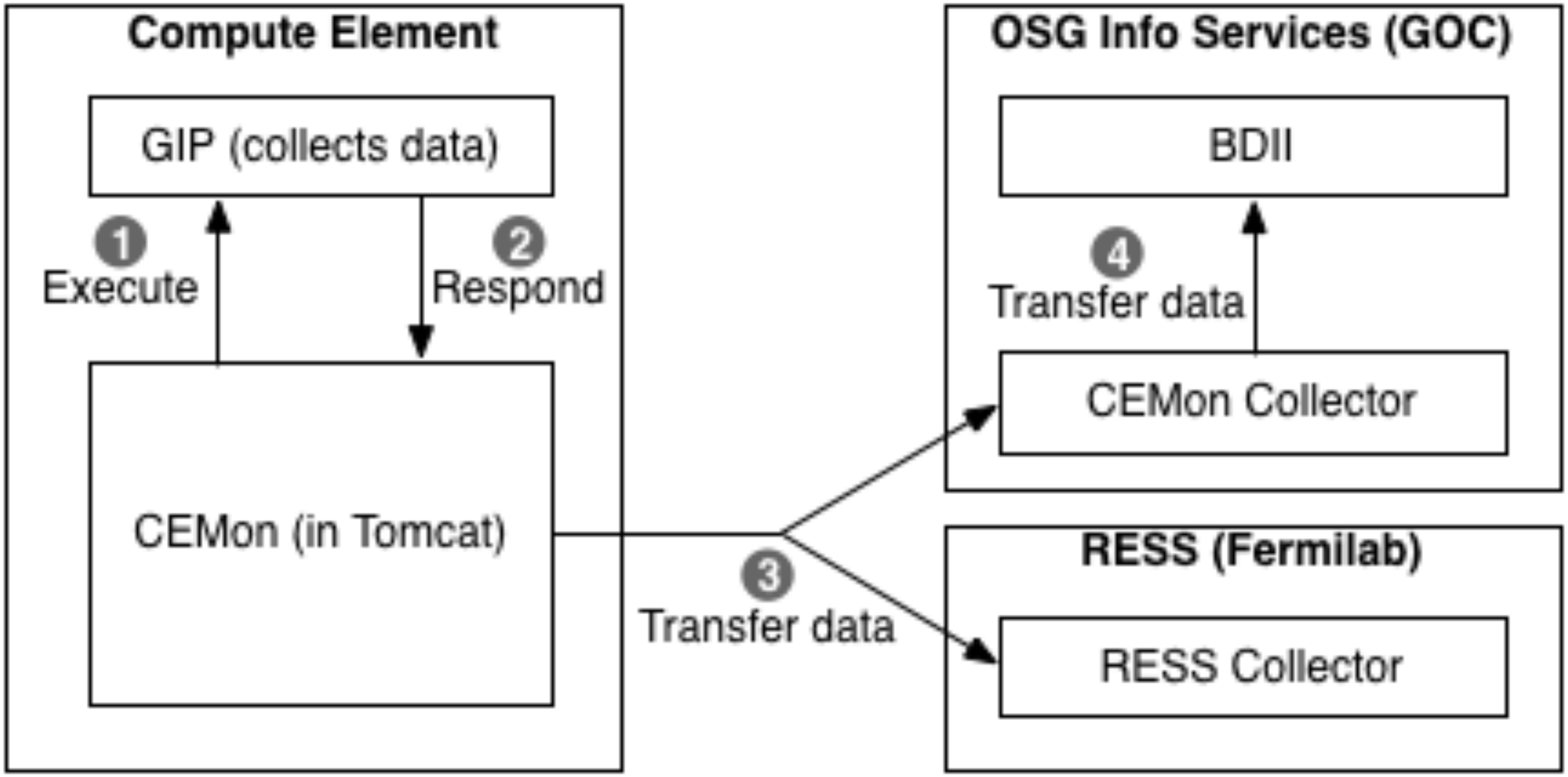
Information Services



Gratia

- Gratia runs as cron job
  - But controlled from init script

```
/sbin/service gratia-probes-cron start
```

- Periodically collects information from:
  - Batch system
  - GridFTP
  - …
- Configuration:
  - /etc/gratia/NAME/ProbeConfig
- Log:
  - /var/log/gratia/DATE.log

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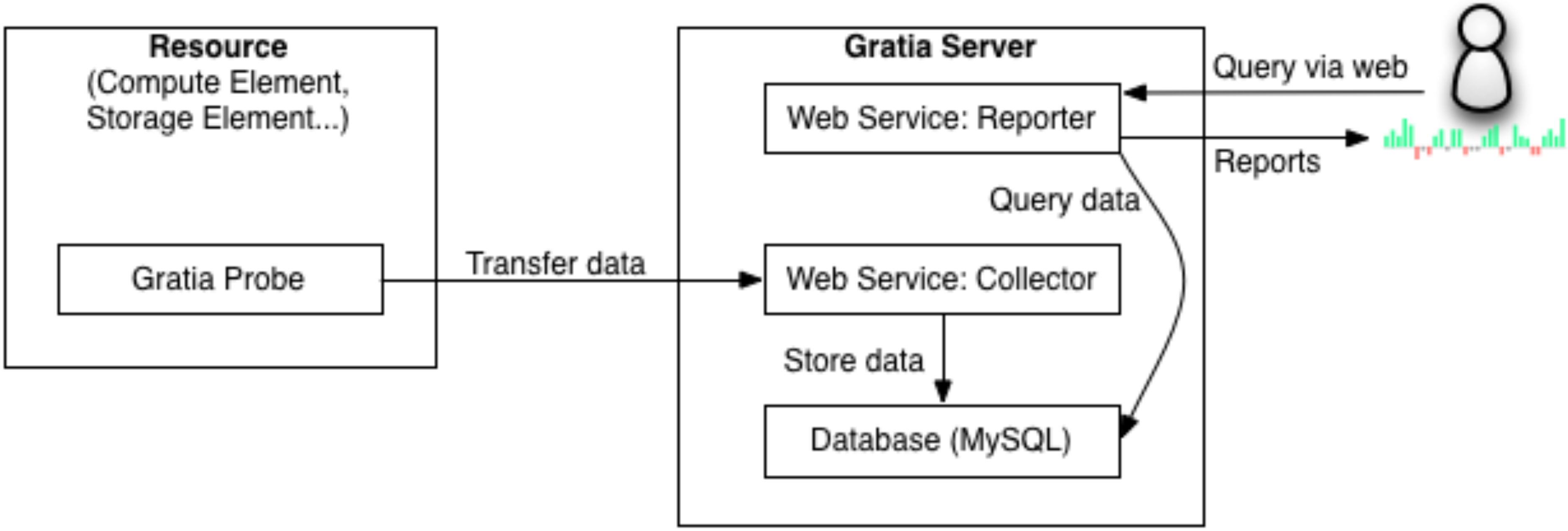
Gratia


Resource
(Compute Element,
Storage Element...)

Gratia Probe

Transfer data

Gratia Server

Web Service: Reporter

Query data

Web Service: Collector

Store data

Database (MySQL)

Query via web

Reports

Fetch-crl

- Cron job to periodically update CA Certificate Revocation Lists
- But controlled from init:

```
/sbin/service fetch-crl-boot start
/sbin/service fetch-crl-cron start
```

Part 3: Let's do an example install

Install EPEL

```
# rpm -Uvh http://dl.fedoraproject.org/pub/epel/5/i386/epel-release-5-4.noarch.rpm
Retrieving http://dl.fedoraproject.org/pub/epel/5/i386/epel-release-5-4.noarch.rpm
Preparing...        #################### [100%]
   1:epel-release   #################### [100%]
```

Install Yum priorities

```
# yum install yum-priorities
...
=======================================================
Package       Arch   Version         Repository  Size
=======================================================
Installing:
yum-priorities noarch 1.1.16-14.el5   sl-base  14 k
...
Is this ok [y/N]: y
...
Installed:
  yum-priorities.noarch 0:1.1.16-14.el5
```

Install OSG repo

```
# rpm -Uvh http://repo.grid.iu.edu/osg-el5-release-latest.rpm
Retrieving http://repo.grid.iu.edu/osg-el5-release-latest.rpm
warning: /var/tmp/rpm-xfer.2wCD1t: Header V3 DSA signature: NOKEY, key ID 824b8603
Preparing...   ########################## [100%]
 1:osg-release ########################## [100%]
```

Install the CA certificates

You get to choose the variety of CA certificates. Here’s the default:

```
# yum install osg-ca-certs
=======================================================
Package       Arch   Version         Repository  Size
=======================================================
Installing:
 osg-ca-certs noarch 1.26-3.osg.el5  osg         281 k
```

Install the Software (CE)

```
# yum install osg-ce-condor
=======================================================
Package       Arch   Version          Repository  Size
=======================================================
Installing:
osg-ce-condor x86_64 3.0.0-26         osg         4.5 k

Installing for dependencies:
 CGSI-gSOAP   x86_64 1.3.4.2-3.osg    osg         56 k
 I2util       x86_64 1.1-1            osg         67 k
...
```

Some configuration

```
# ls -1 /etc/osg/config.d/
01-squid.ini
10-misc.ini
10-storage.ini
15-managedfork.ini
20-condor.ini
30-cemon.ini
30-gip.ini
30-gratia.ini
40-localsettings.ini
40-network.ini
40-siteinfo.ini
```

```
# less /etc/lcmaps.db
gumsclient =
  "lcmaps_gums_client.mod"
  "-resourcetype ce"
  "-actiontype execute-now"
...
  "--endpoint https://foo.osg.edu:
8443/gums/services/
GUMSXACMLAuthorizationServicePort"
```

Run osg-configure & start services

```
# osg-configure –v
Configuration verified successfully

# osg-configure –c
Running /usr/sbin/fetch-crl, this process make take
some time to fetch all the crl updates
/usr/sbin/osg-configure completed

# service globus-gatekeeper start
Started globus-gatekeeper[  OK  ]

# service globus-gridftp-server start
Started GridFTP Server[  OK  ]
```

It’s ready to go!

```
% voms-proxy-init -voms Engage
Enter GRID pass phrase for this identity:
Your identity: /DC=org/DC=doegrids/OU=People/CN=Alain
Roy 424511
Creating temporary proxy .........................  Done
Contacting  osg-engage.renci.org:15001 [/DC=org/
DC=doegrids/OU=Services/CN=osg-engage.renci.org]
"Engage" Done
Creating proxy ................................. Done

Your proxy is valid until Mon Mar 19 03:07:41 2012

% globus-job-run fermicloud084.fnal.gov /bin/hostname
fermicloud084.fnal.gov
```

Q & A

Q: Can I use SL6?

A: For the worker node: yes

Everything else on April 24th (OSG 3.1)

Q: How do I update my system?

A: yum update

Can select specific packages if you wish

More Q & A

Q: Can I mix Pacman and RPM on one machine?

A: No

Q: Can I use Pacman on some machines and RPMs on others?

A: Yes

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Coming in OSG 3.1: Add back missing functionality

- GUMS
  - In testing/evaluation right now
  - Release at end of March, if it goes well
- Gratia Service
  - In development right now
  - Release in April?

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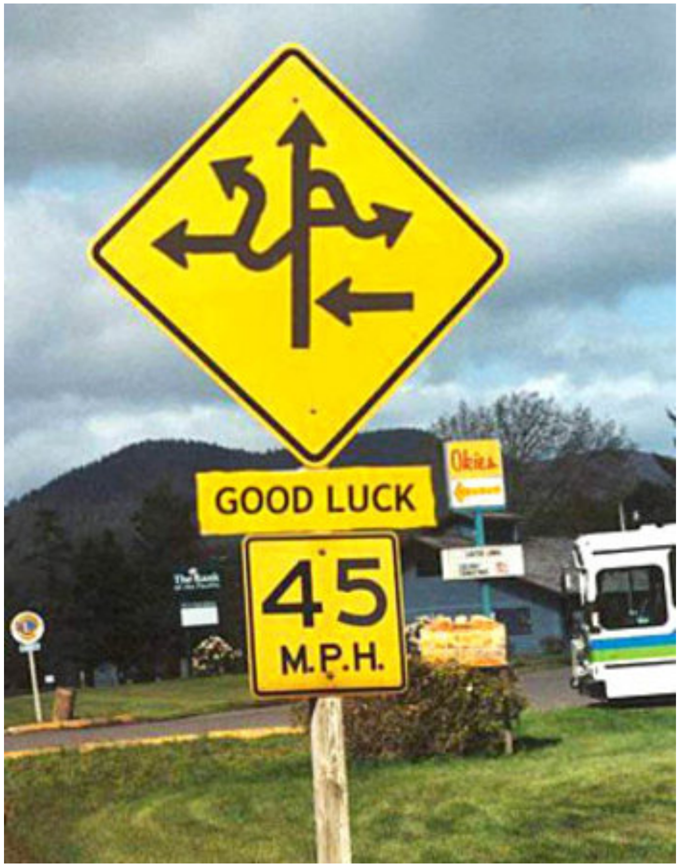
Part 4: Where does the software come from?



Principle of Community Packaging

The OSG Software Team should be a good community citizen when it comes to packaging: When possible, we should use packages from existing and/or broader communities; when that is not possible, we should make our own packaging but contribute them back to the broader communities.

Therefore, we should package software only when one of the following is true:

- The software is not already packaged; or
- The software is packaged but needs significant changes to be acceptable to our users. (Different version, extra patches, etc...)

Otherwise we should use the existing packaging provided by external developers or software repositories.

In short: leverage the community

Borrow

The VDT should borrow packages from the larger community whenever possible.

Contribute

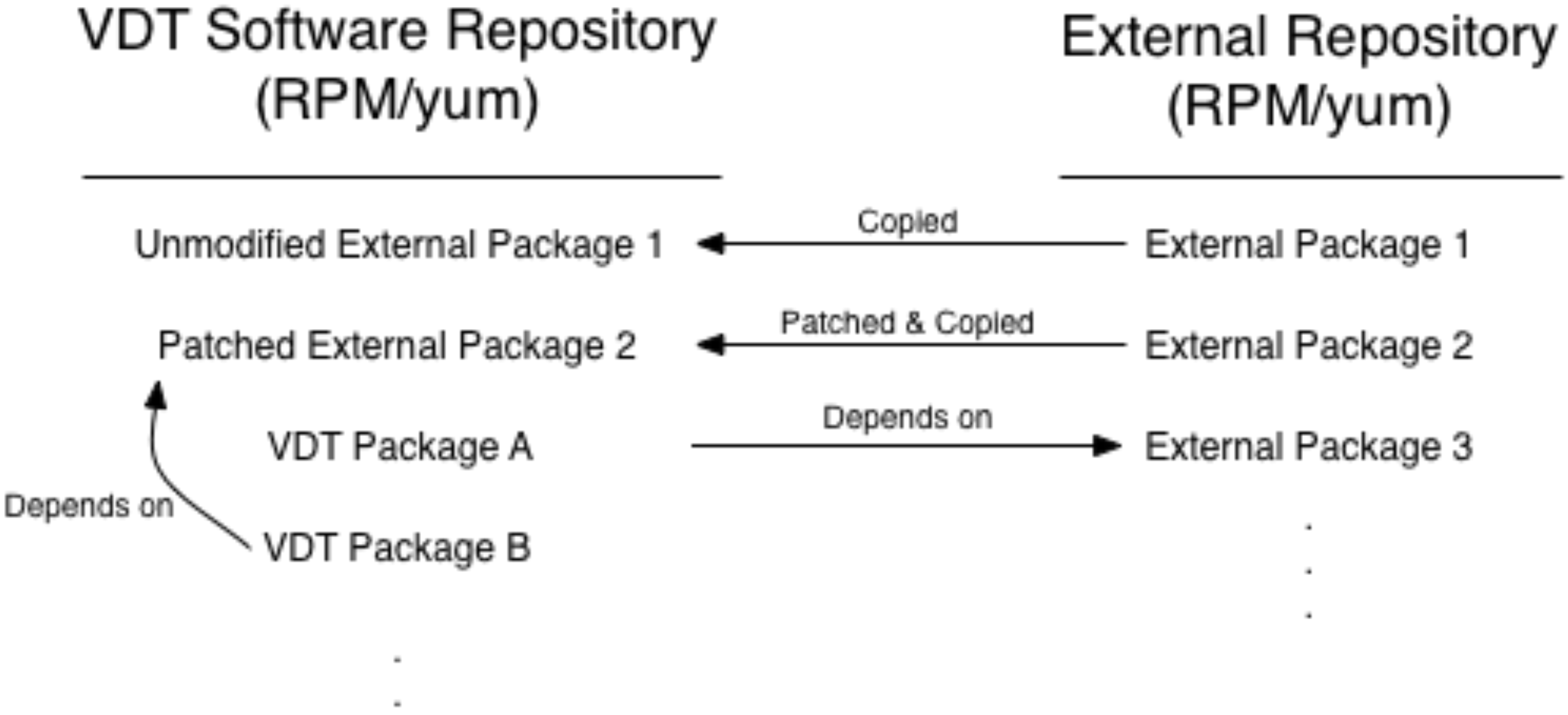
The VDT should contribute packages to the larger community whenever possible

Accept Donations

The VDT should make it easy for people to donate packages to the VDT

OSG Software is an amalgamation of repos

- **Refer** to packages in OS/EPEL
- **Copy/patch** packages as needed
- **Create** packages as neede



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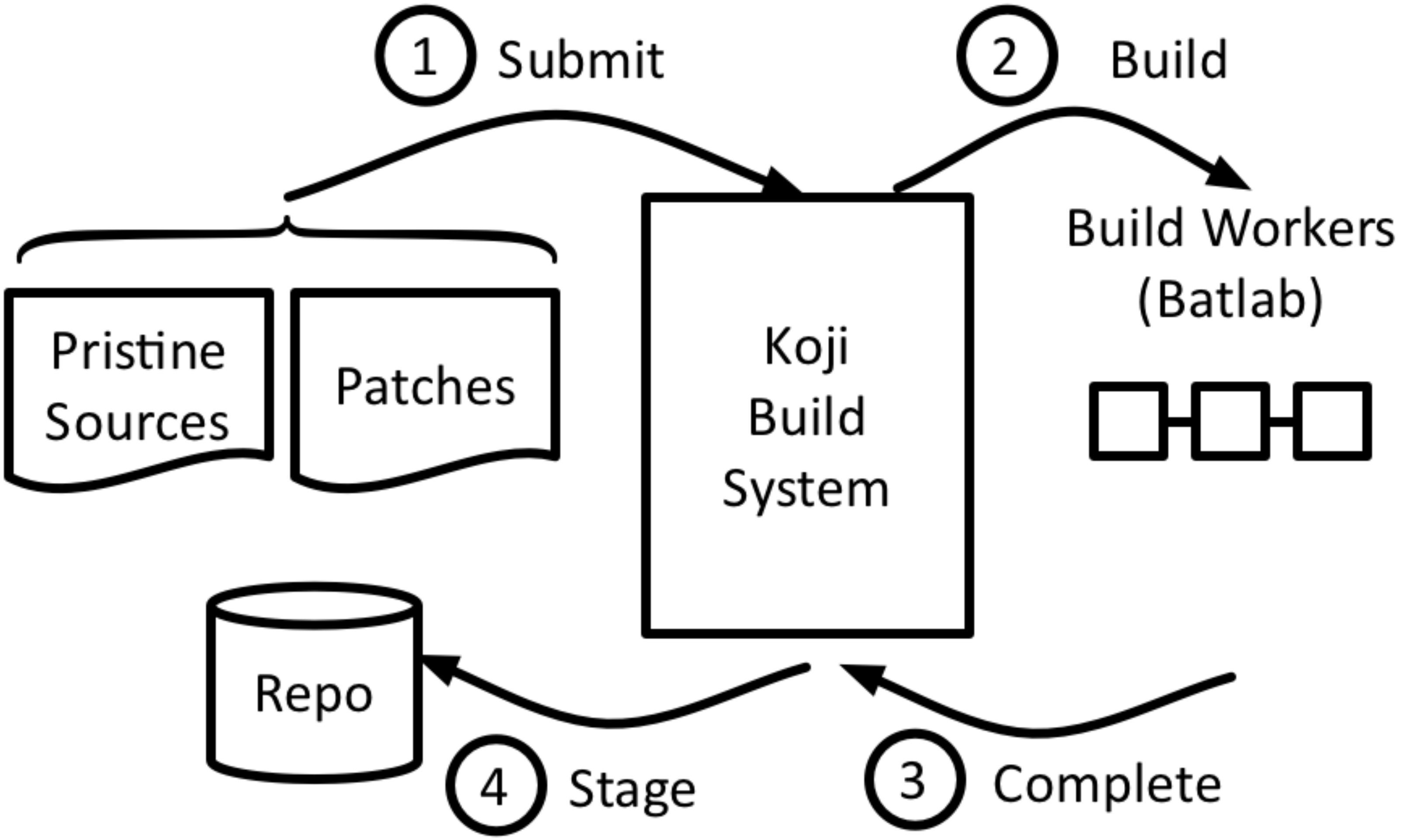
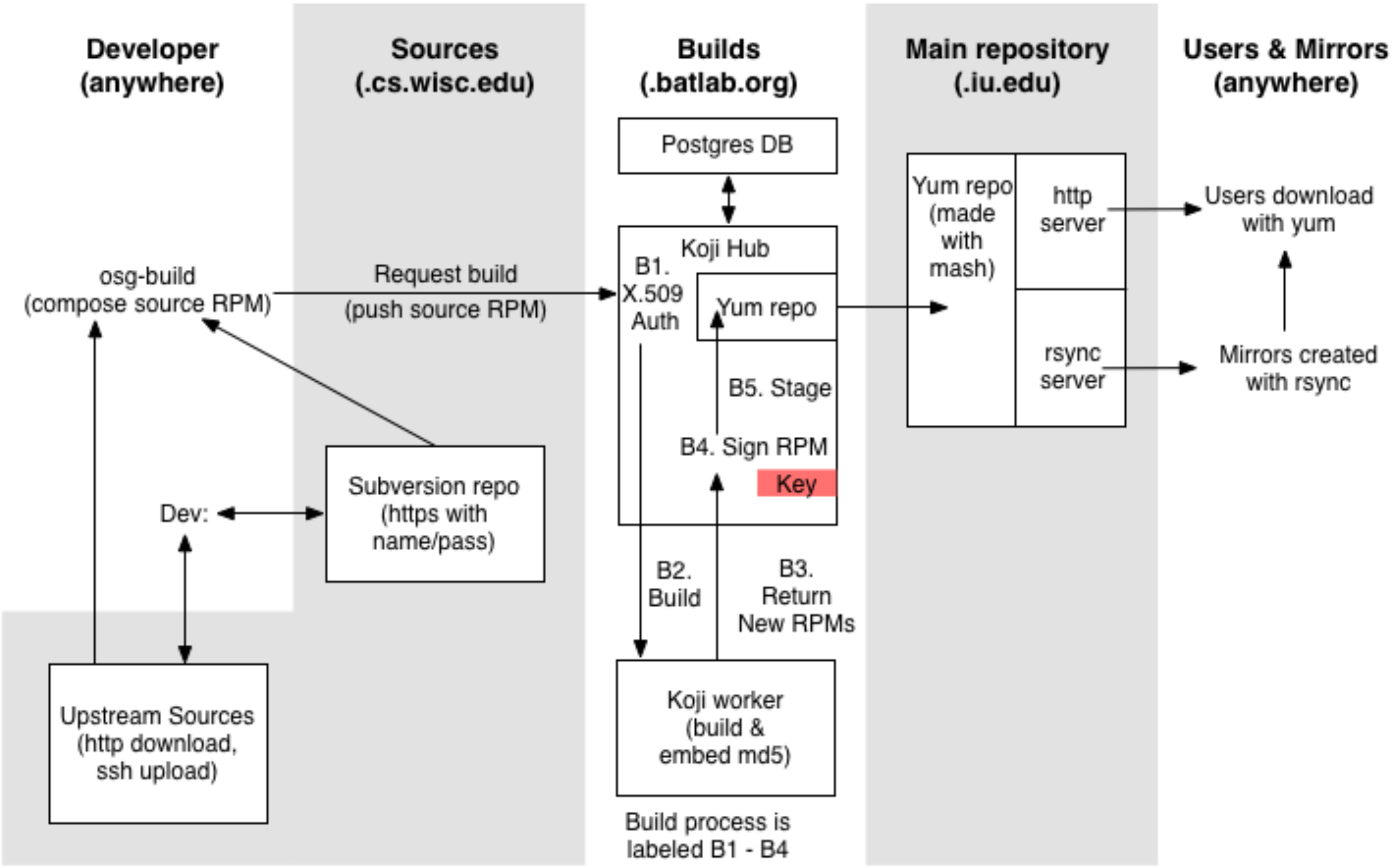
How we build software





Developer (anywhere)

Sources (.cs.wisc.edu)

Builds (.batlab.org)

Main repository (.iu.edu)

Users & Mirrors (anywhere)

osg-build (compose source RPM)

Request build (push source RPM)

Dev:

Subversion repo (https with name/pass)

Upstream Sources (http download, ssh upload)

Postgres DB

Koji Hub

B1. X.509 Auth

Yum repo

B5. Stage

B4. Sign RPM

Key

B2. Build

B3. Return New RPMs

Koji worker (build & embed md5)

Build process is labeled B1 - B4

Yum repo (made with mash)

http server

rsync server

Users download with yum

Mirrors created with rsync

To do:

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Questions? Feedback?