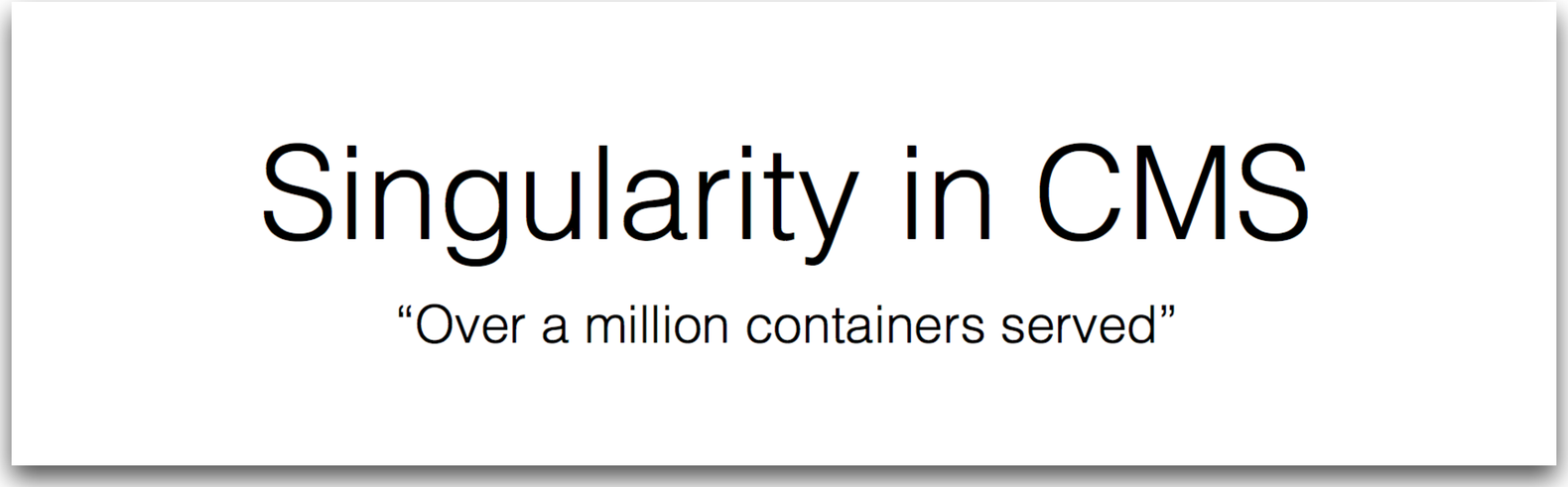
Singularity on the OSG

Derek Weitzel

Brian's talk yesterday

- Brian talked about CMS's use of Singularity
- CMS is concerned about **Isolation**, the OSG cares about **Environments**



The old days!

- The OSG manages many modules for software

```
$ module load python/3.3
```

- Leverages OSG team’s expertise installing and maintaining software

You know your software better than us!

- The module relies on our expertise to install and operate software
- Unfortunately, we are not experts in your software,
- You know how to run your software, and probably how to install it!

Introduction

- Again, not going to cover why Singularity other containers
- This time, we will talk about the user side of Singularity on the OSG

What is capable with Singularity

- Virtualize your local environment anywhere, create a docker image of your environment
- Some software comes with pre-made docker images!
- OSG integrated Singularity directly into their submit infrastructure to make it easy to use!

OSG is EL6 and EL7

- OSG provides an easy way to get only RHEL6

```
universe = vanilla
executable = job.sh
Requirements = HAS_SINGULARITY == TRUE

should_transfer_files = IF_NEEDED
when_to_transfer_output = ON_EXIT

output = out
error = err
log = log

queue
```

OSG is EL6 and EL7

- All OSG jobs that can be run in Singularity… are.

```
universe = vanilla
executable = job.sh
Requirements = HAS_SINGULARITY == TRUE

should_transfer_files = IF_NEEDED
when_to_transfer_output = ON_EXIT

output = out
error = err
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queue
```

Hosted Images

- The OSG hosts a few very common images
  - OS Images: Centos, Fedora, Ubuntu, Debian…
  - Programming Environments: Python, OpenJDK, R, Tensorflow
  - Experiment Specific: LIGO, CMS, and ATLAS WNs
- Images are hosted on CVMFS

Hosted Images

- You can add your own Docker images by adding it to a github repo: https://github.com/opensciencegrid/cvmfs-singularity-sync
- Automatically sync'd to CVMFS, even new Docker updates!

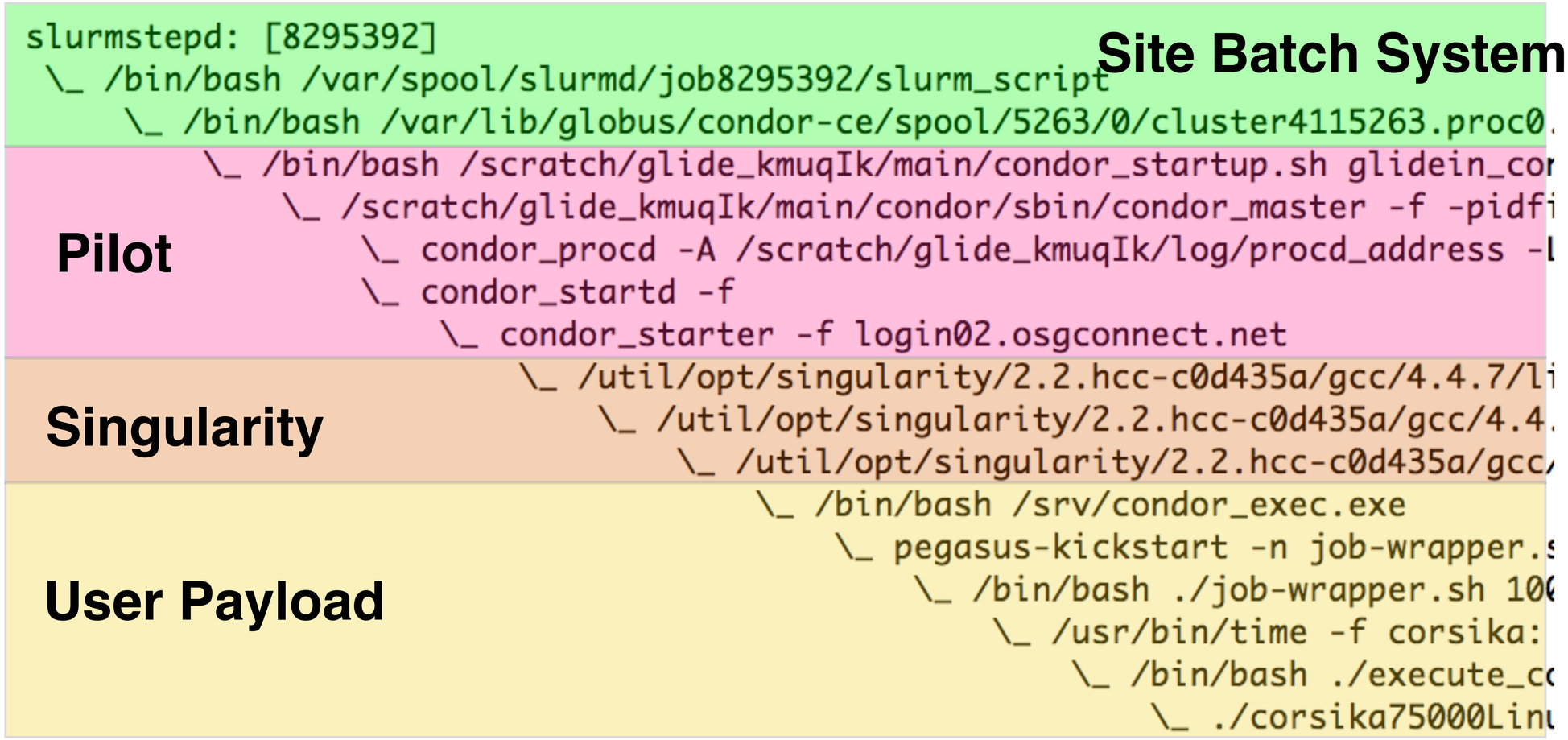
OSG is EL6 and EL7

- Singularity is the default

- RHEL7 is just a simple line change

```
universe = vanilla
executable = job.sh
Requirements = HAS_SINGULARITY == TRUE

+SingularityImage = "/cvmfs/singularity.opensciencegrid.org/rynge/osgvo:el7"
+SingularityBindCVMFS = True

should_transfer_files = IF_NEEDED
when_to_transfer_output = ON_EXIT

output = out
error = err
log = log

queue
```

View From the Worker Node



View from inside

- Only see your own usage! (well that's boring)

```
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
cuser1         1  0.1  0.0  11580   732 ?        S    18:03   0:00 /bin/sh /srv/condor_exec.exe
cuser1        64  0.0  0.0  47388  1656 ?        R    18:03   0:00 ps auxf
```

Conclusion

- The OSG can run a lot of different types of OS
- The OS on the site no longer matters, as long as Singularity is available
- I will talk more on Thursday morning

Some Stats

- 2,337,943 Singularity starts on the OSG
- 60.5% of opportunistic OSG were Singularity jobs for March