
CERN

# Implementation of Continuous Integration for Linux Images

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# Context

# Operating System Image Production

- Linux Support Team make images
- Built with Koji
- E.g. accessible from OpenStack:

```
% openstack image list
+------------------+------------------------------+
| ID               | Name                         |
+------------------+------------------------------+
| 29262d...3c8fc9 | CC7 - x86_64 [2017-04-06]     |
| d8c28e...a9015b | SLC6 - x86_64 [2017-04-06]    |
| f1c040...0c92c4 | SLC6 - i686 [2017-04-06]      |
| b2b7ba...e5c9c3 | CC7 TEST - x86_64 [2017-04-06] |
| ...              |                              |
```

# It's Critical That...

- We build images quickly
- We build images autonomously
- We make sure images work flawlessly

# Testing Out Images

Perform some manual checks:

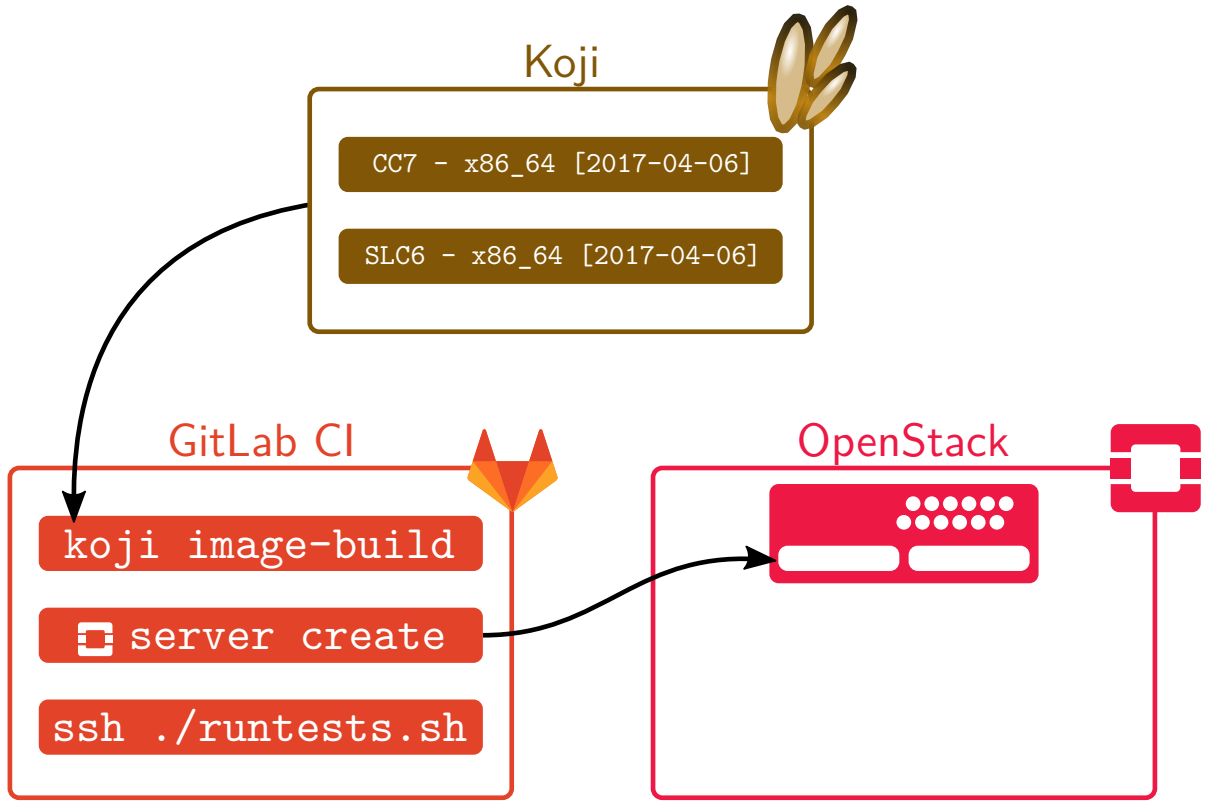
- Try starting a VM
- Try logging into it
- Check Puppet reports
- Check cloud-init logs
- A list of tests

# We Need To...

- Automate test execution
- Perform more thorough tests
- Be able to manage tests

# Towards a Variety of Tests

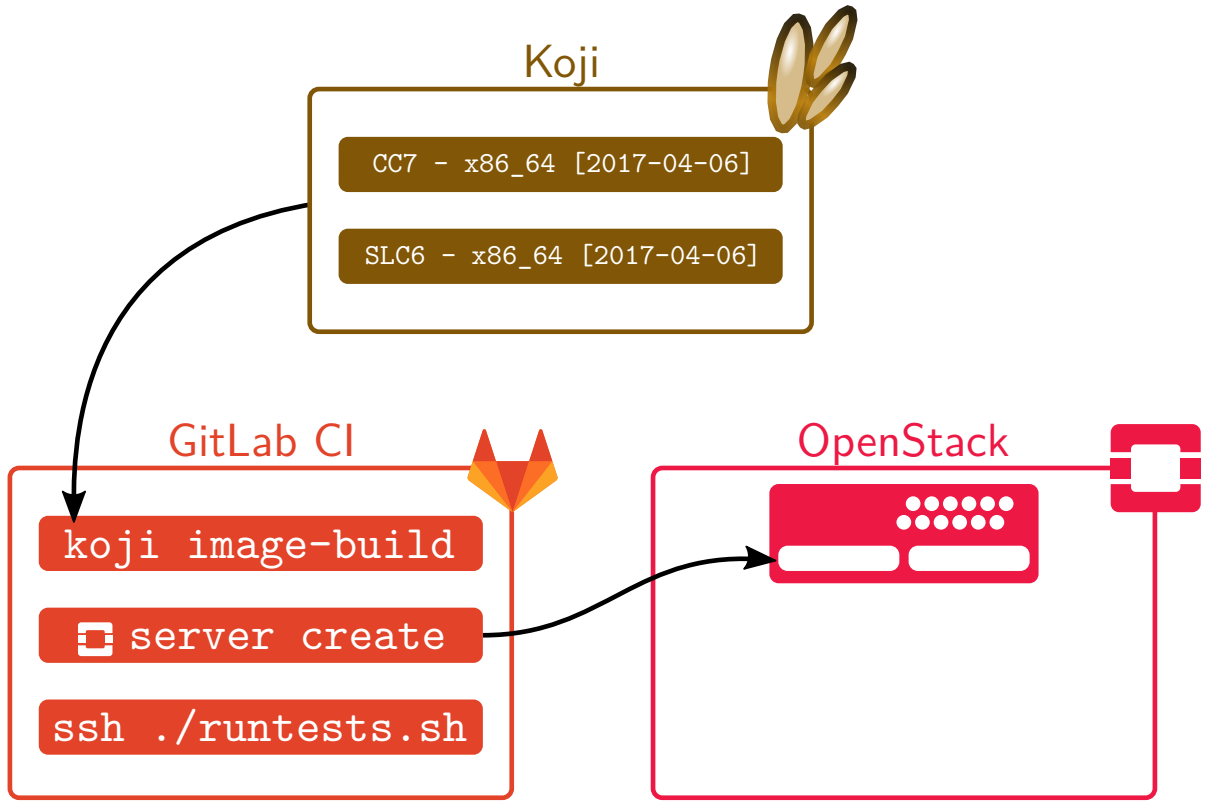
# So Far...


Koji
CC7 - x86_64 [2017-04-06]
SLC6 - x86_64 [2017-04-06]
GitLab CI
koji image-build
server create
ssh ./runtests.sh
OpenStack

# A Job to Build an Image

- Runs `koji image-build`
- Once a day – check if already built today
- Downloads the image from Koji
- Uploads the image into OpenStack

# A Job to Create a Test VM



# A Test VM

Purpose:

- A prerequisite
- A test in its own right

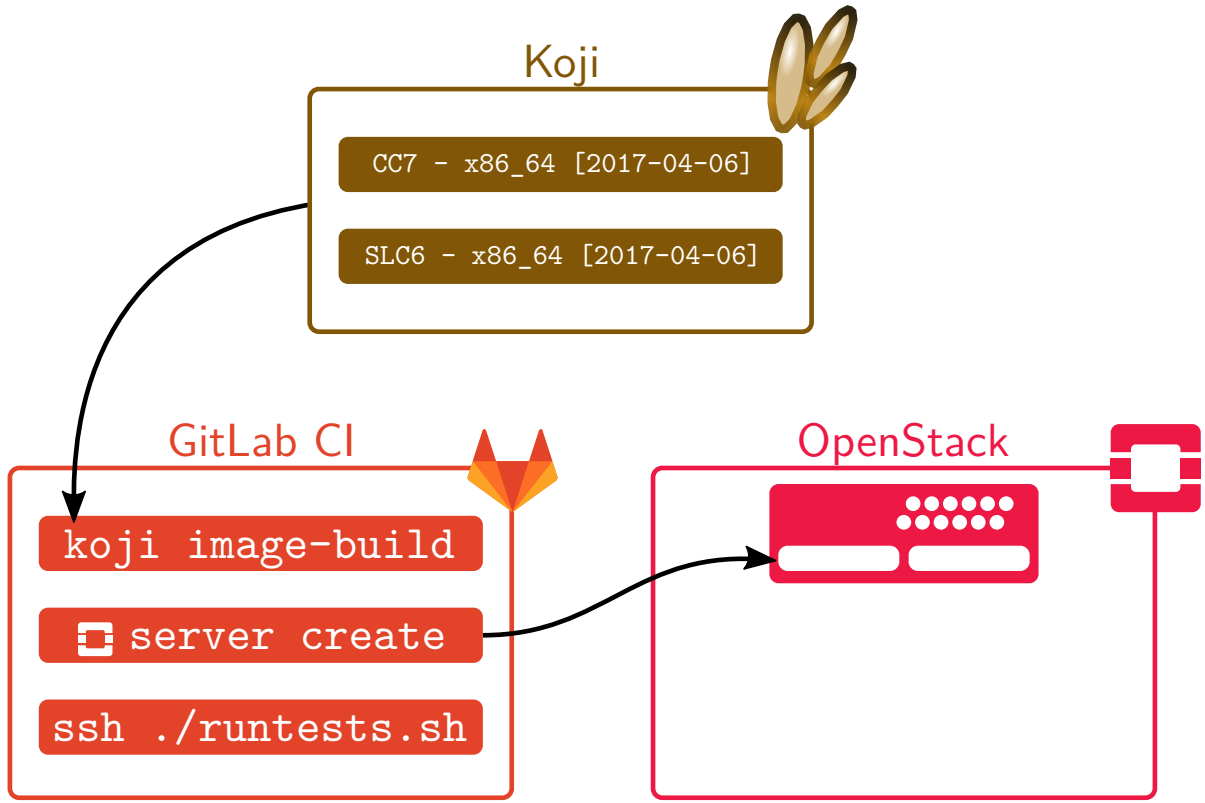
Not much in Docker image → `before_script`:

- Copy `.repo` files
- Install e.g. OpenStack RPMs

What it does:

- Run `openstack server create`

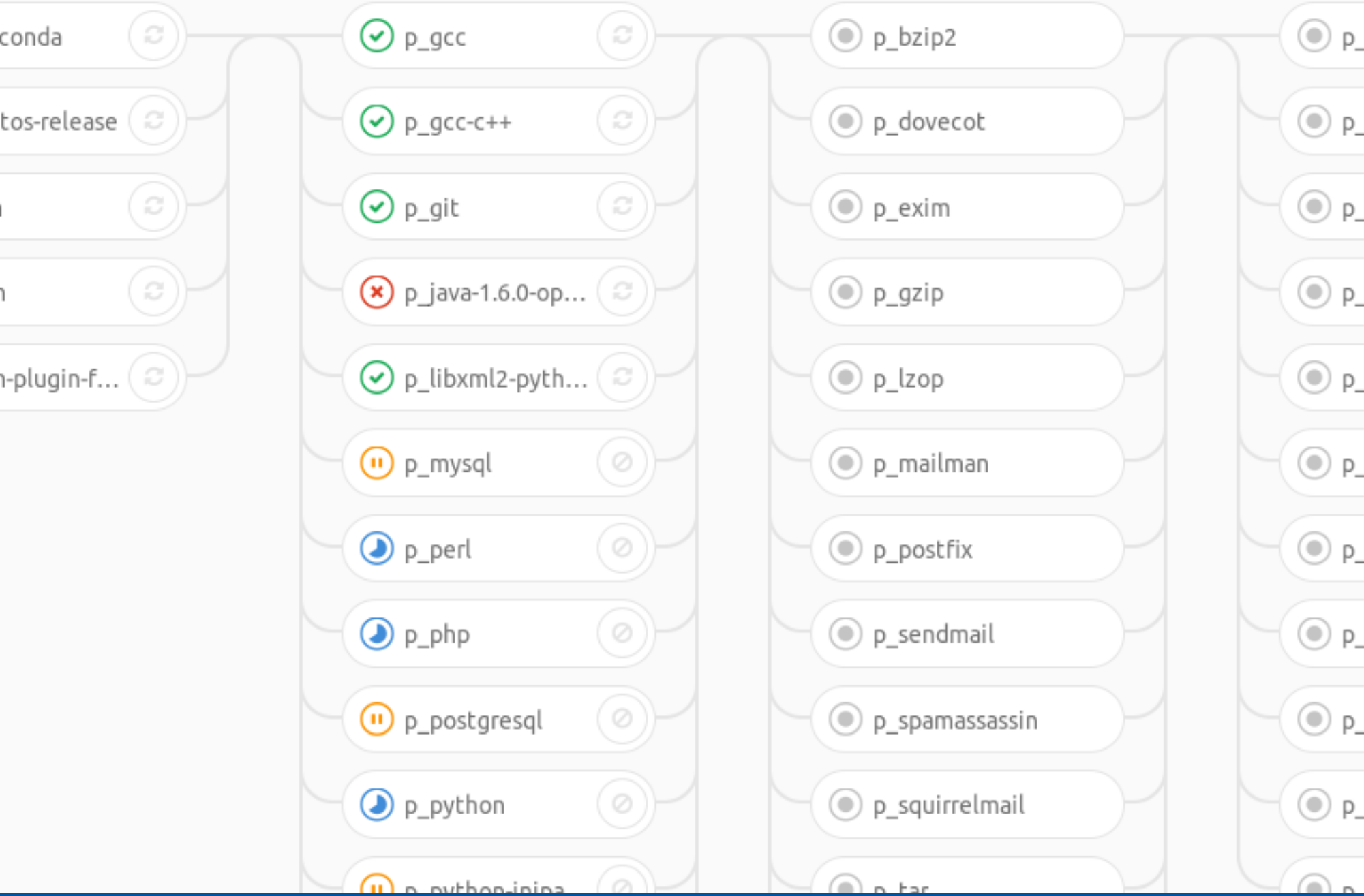
# A Job to Create a Test VM



# CentOS Functional Tests

https://github.com/CentOS/sig-core-t_functional

- Utilities (bzip2, curl, grep, ...)
- System bits (kernel, cron, iptables, ...)
- Services (MySQL, Apache, ...)
- Compilers (GCC, JDK, ...)
- File system (root files, ...)
- X Window
- ...


conda
tos-release
n-plugin-f...
p_gcc
p_gcc-c++
p_git
p_java-1.6.0-op...
p_libxml2-pyth...
p_mysql
p_perl
p_php
p_postgresql
p_python
p_bzip2
p_dovecot
p_exim
p_gzip
p_lzop
p_mailman
p_postfix
p_sendmail
p_spamassassin
p_squirrelmail

# Jobs To Run Each Test

`before_script`:

- Install SSH
- Keytab/private key from secret variable
- Wait until we can SSH
- SSH and install git
- Clone CentOS functional tests

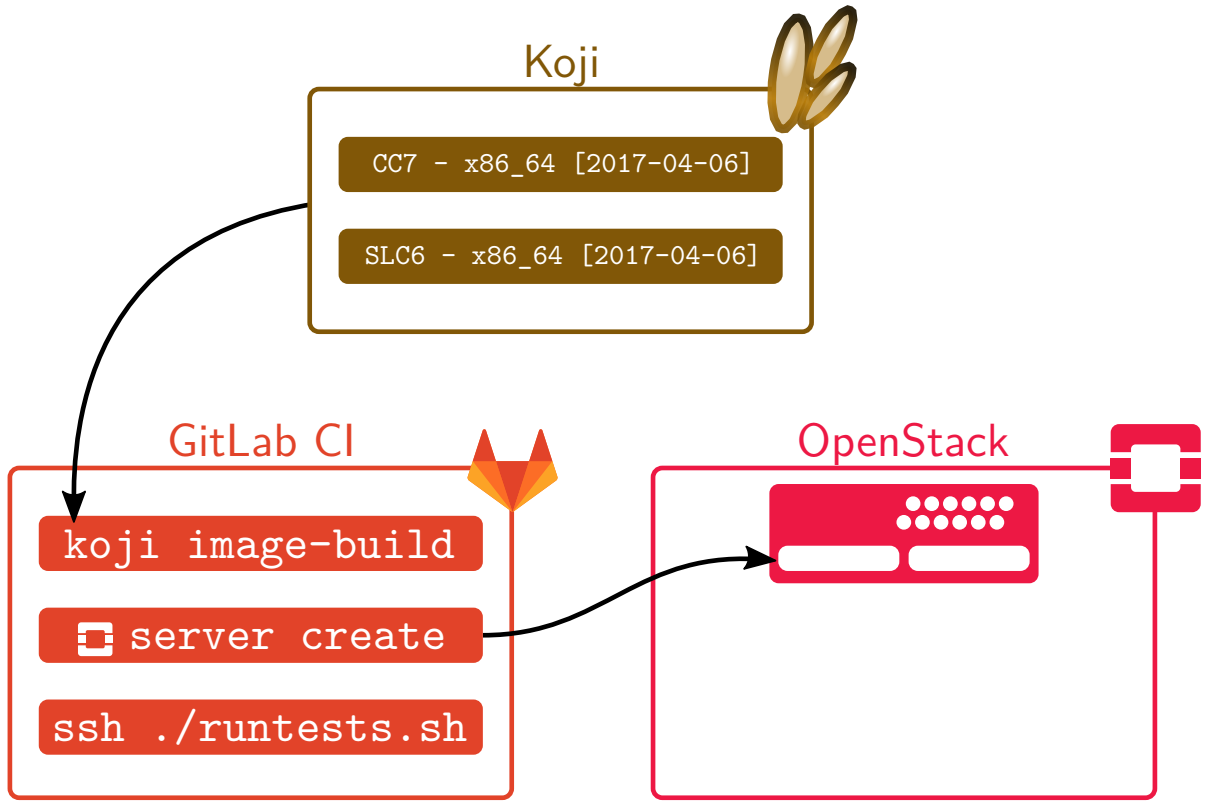
What they do:

- SSH and `./runtests.sh $TESTNAME`

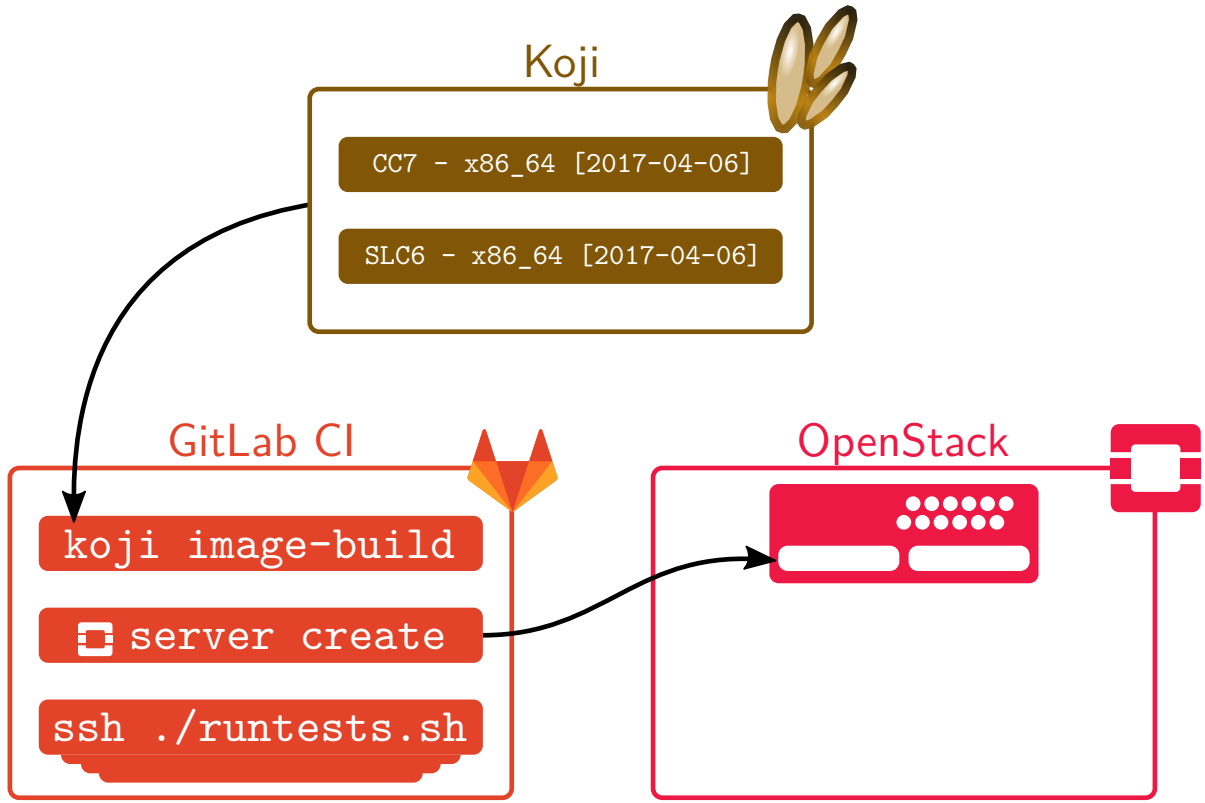
# .gitlab-ci.yml

```
job_template: &job_template
    script:
        - ssh root@$TESTNODE "./runtests.sh $CI_JOB_NAME"

p_gcc:
    <<: *job_template
    stage: development

p_git:
    <<: *job_template
    stage: development

p_java-1.6.0-openjdk:
    <<: *job_template
    stage: development
```

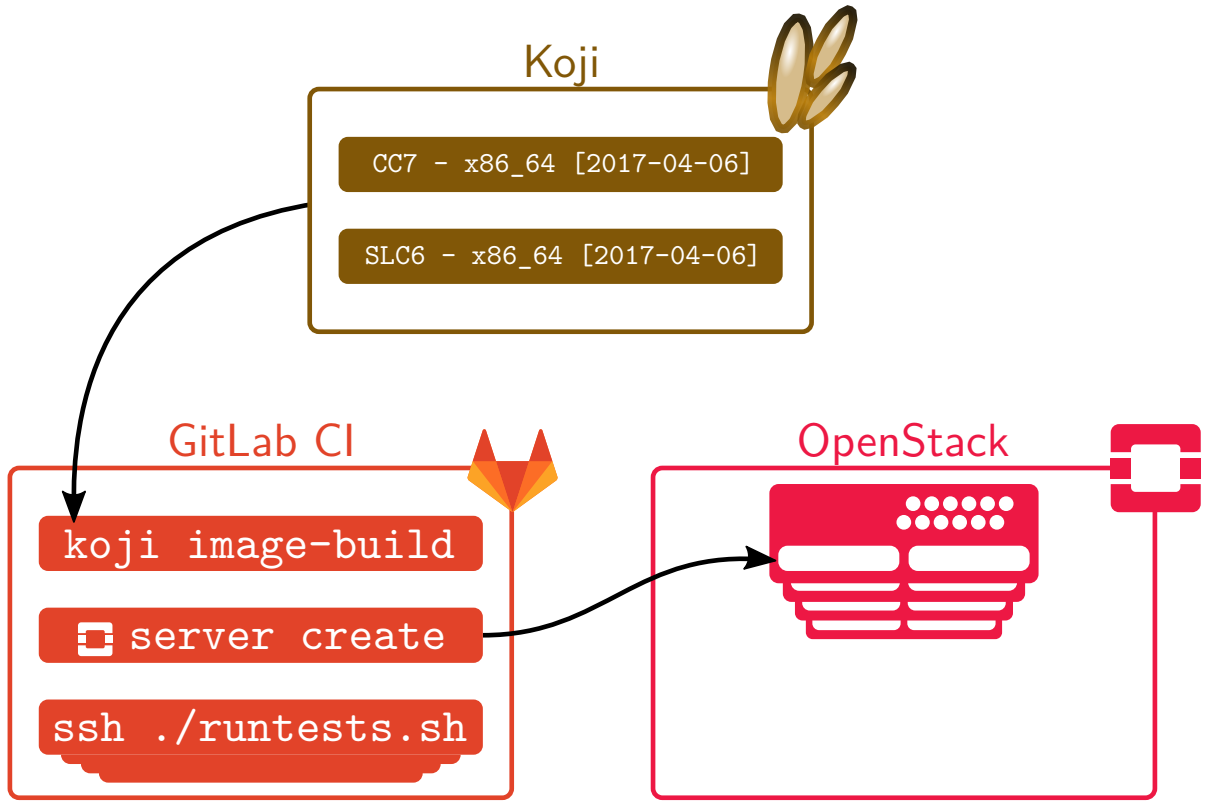
# Scaling with Tests



# Scaling with Tests



# Scaling with Tests



# Which Granularity?

- A fresh VM for each CI job
- Problem of destructive tests
- A fresh VM for each test? Really?

# Test VM Pool

Workflows...

- ... to schedule test VMs in OpenStack project
- ... to manage VM life cycle
- CI Runner VM instead? But special privileges.

# Interesting Tests

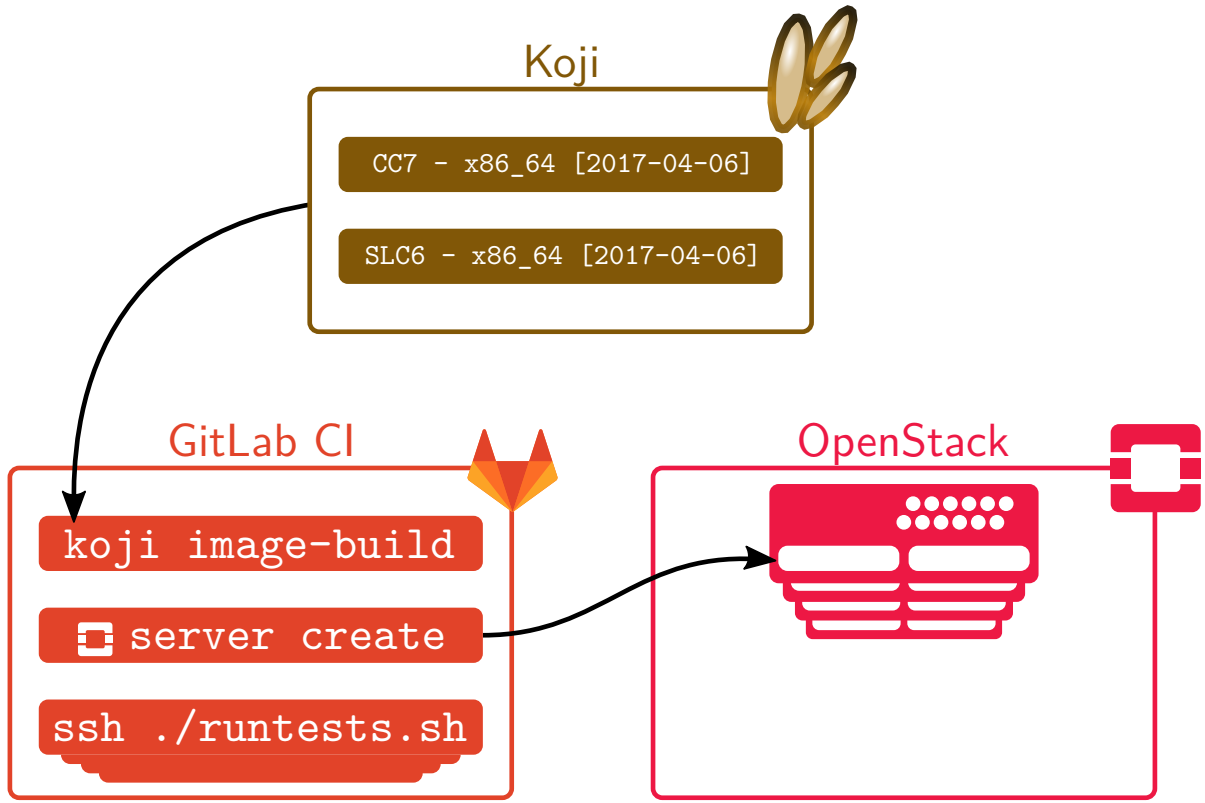
- Access to AFS, EOS, CVMFS, ...
- RPM health
- `collectd`
- Attaching Cinder volumes
- Performance

# A Wider Outreach

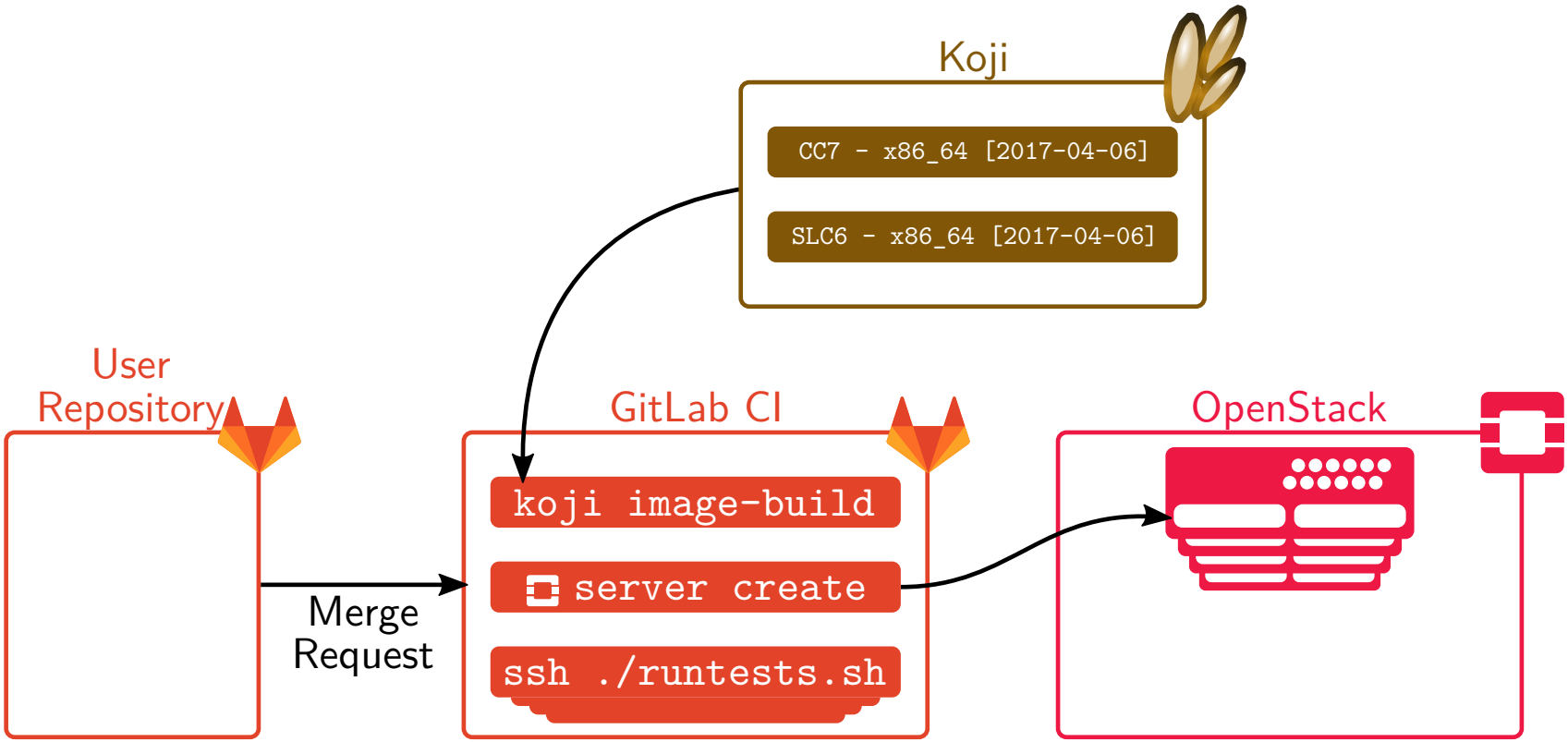
# Allow End-Users to. . .

- . . . run their own tests. . .
- . . . against their own images

# Allow End-Users to Run Their Tests



# Allow End-Users to Run Their Tests



# User Interface

Merge requests either way

- From a CLI?

```
imageci run 'CC7 - x86_64 [2017-09-20]' mysql
```

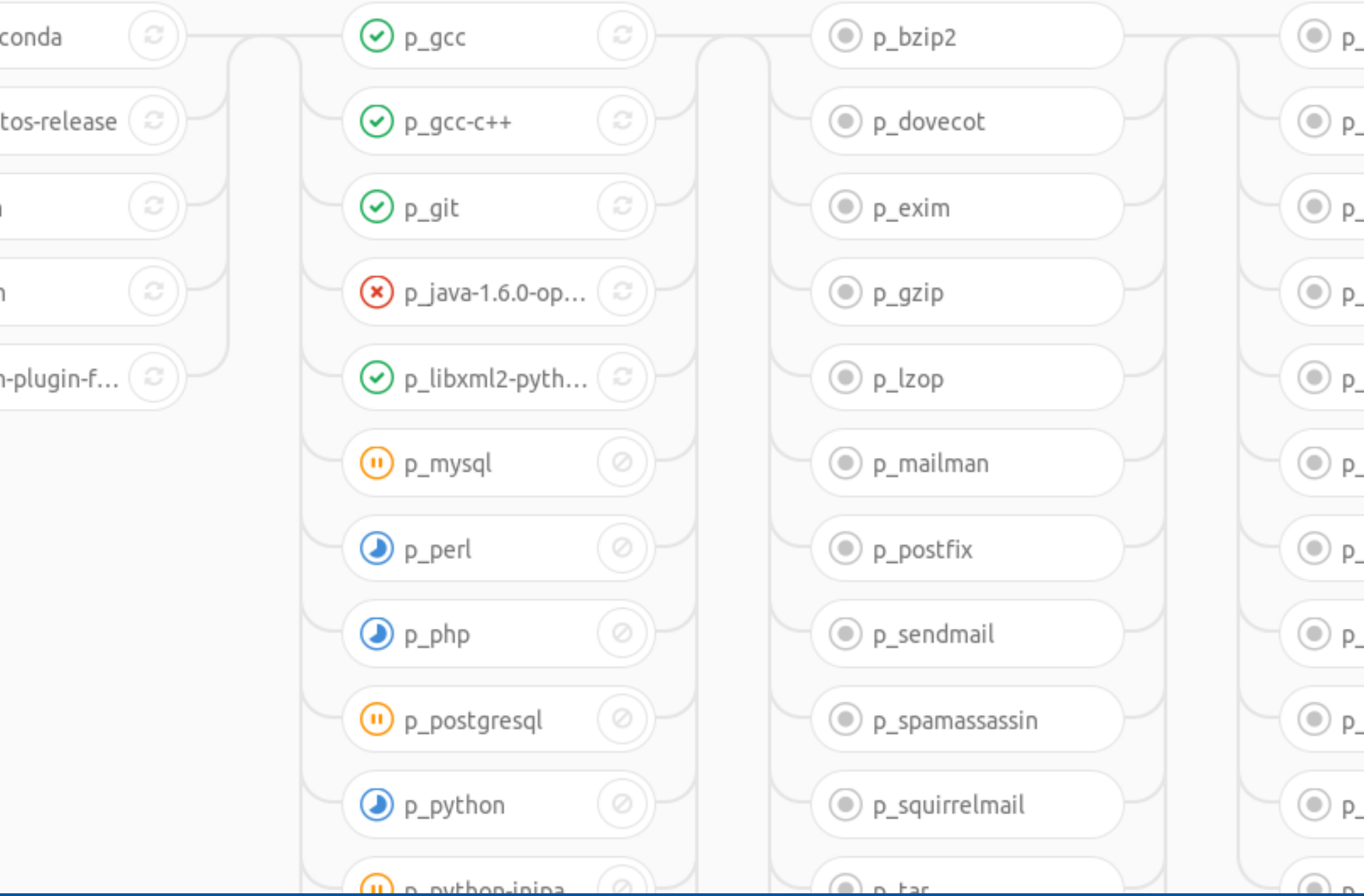
- Directly from their git repository?

# Querying Results

- GitLab API
- Clear views
- From CLI?

```
imageci results 'CC7 - x86_64 [2017-09-20]' mysql
```

Or simply. . .


conda
tos-release
n-plugin-f...
p_gcc
p_gcc-c++
p_git
p_java-1.6.0-op...
p_libxml2-pyth...
p_mysql
p_perl
p_php
p_postgresql
p_python
p_bzip2
p_dovecot
p_exim
p_gzip
p_lzop
p_mailman
p_postfix
p_sendmail
p_spamassassin
p_squirrelmail

# Concerns and Opportunities

- Jobs running for too long
- How many jobs can we run?
- Work to adapt CentOS functional tests
- Testing Docker images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