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
- Those images you see when you run:

```
% 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:

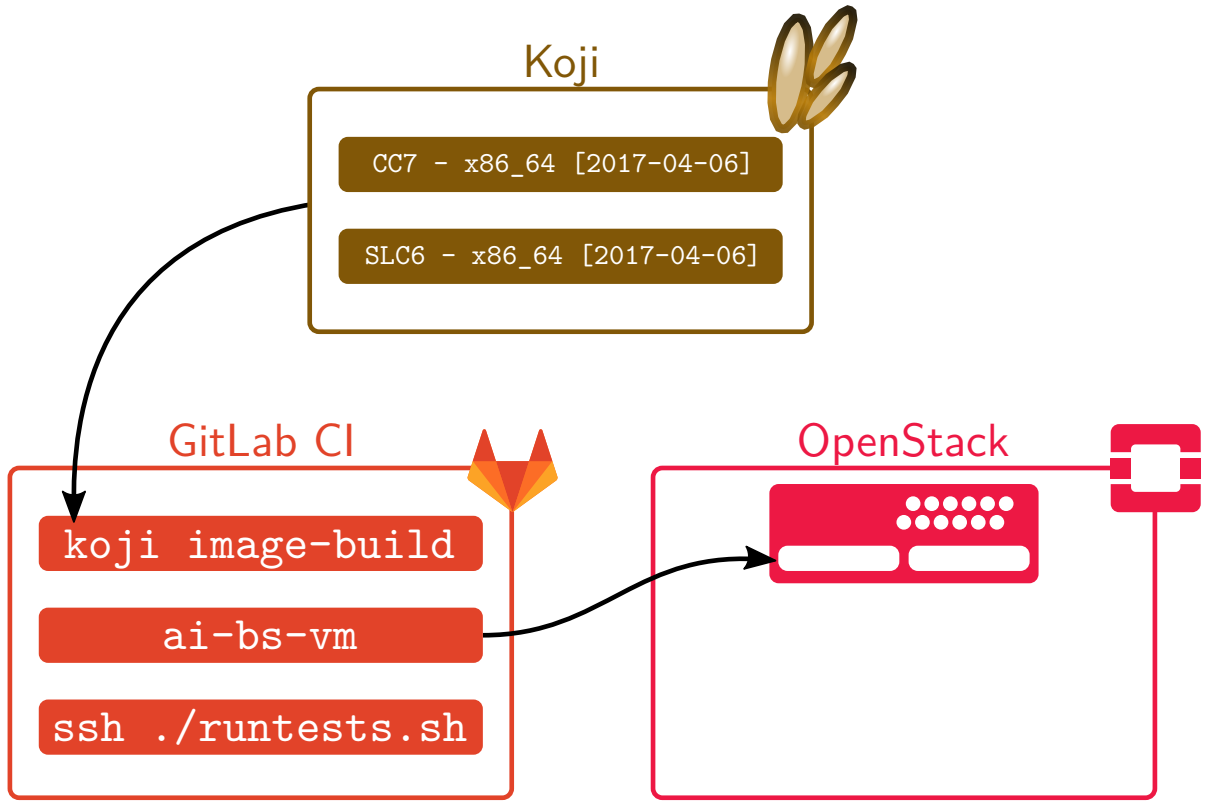
- Try starting a VM
- Try logging into it
- Check Puppet reports
- Check cloud-init logs
- A list of tests

We Need To...

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

Towards a Variety of Tests

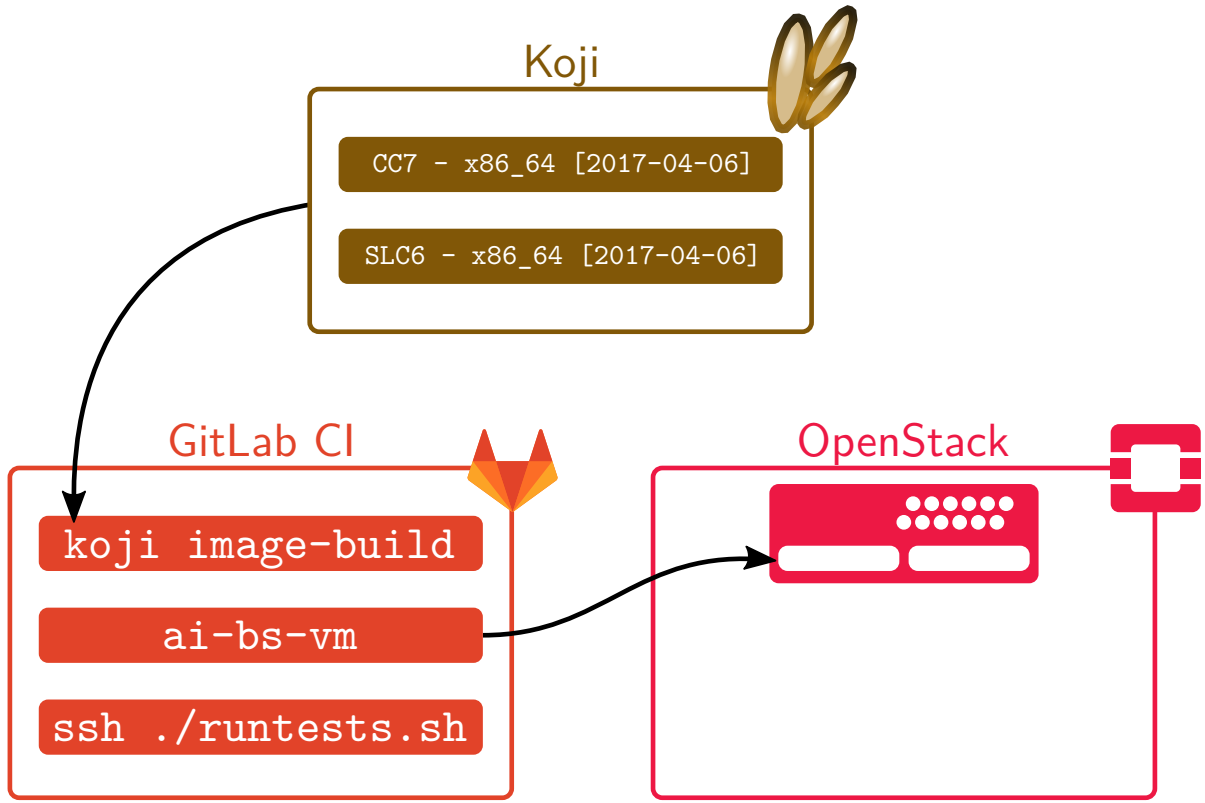
So Far...


Koji
CC7 - x86_64 [2017-04-06]
SLC6 - x86_64 [2017-04-06]
GitLab CI
koji image-build
ai-bs-vm
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 Puppet Test VM

Purpose:

- A prerequisite
- A test in its own right

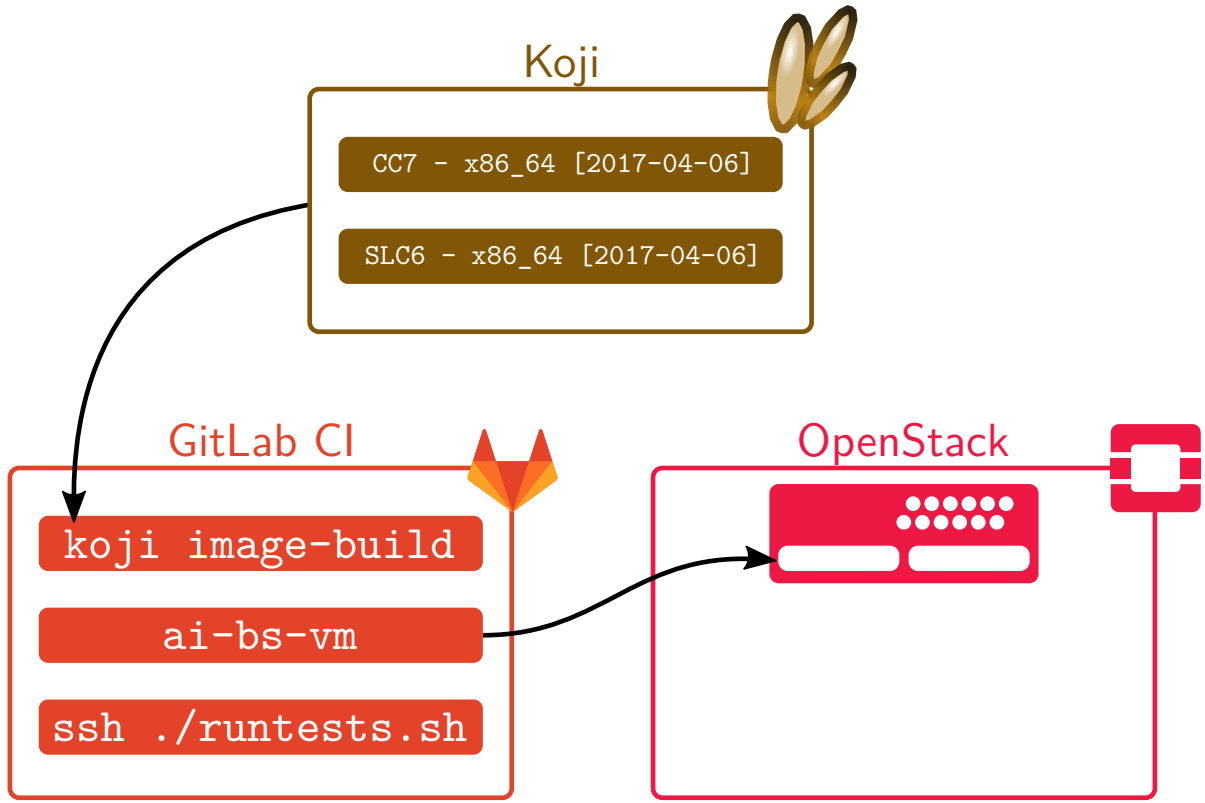
Not much in `cern/cc7-base` → `before_script`:

- Copy `.repo` files
- Install `ai-tools`

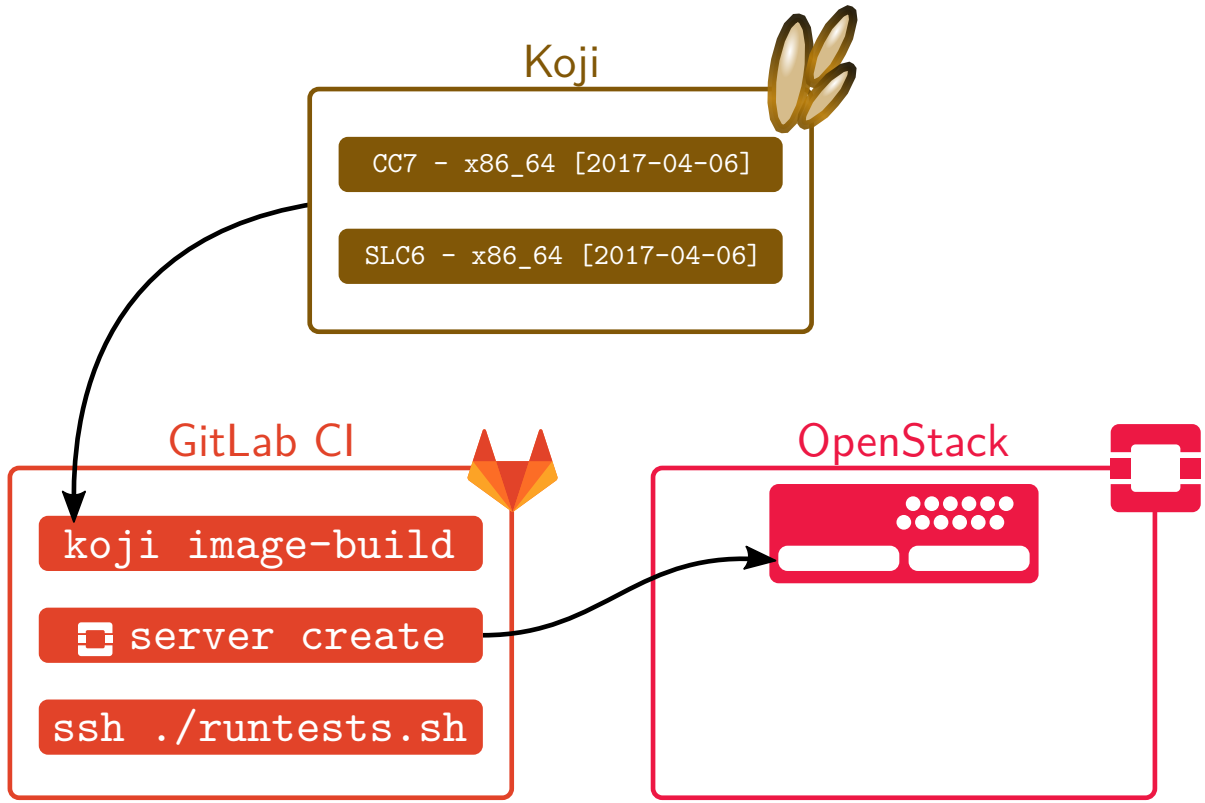
What it does:

- Run ai-bs-vm

A Job to Create a Test VM



A Job to Create a Test VM



A Bare OpenStack VM

Purpose:

- A prerequisite
- A test in its own right

Advantages:

- Faster build
- Faster start
- Faster config
- Extra shortcuts: skip LANDB, DNS, ...

Opportunities for More Shortcuts

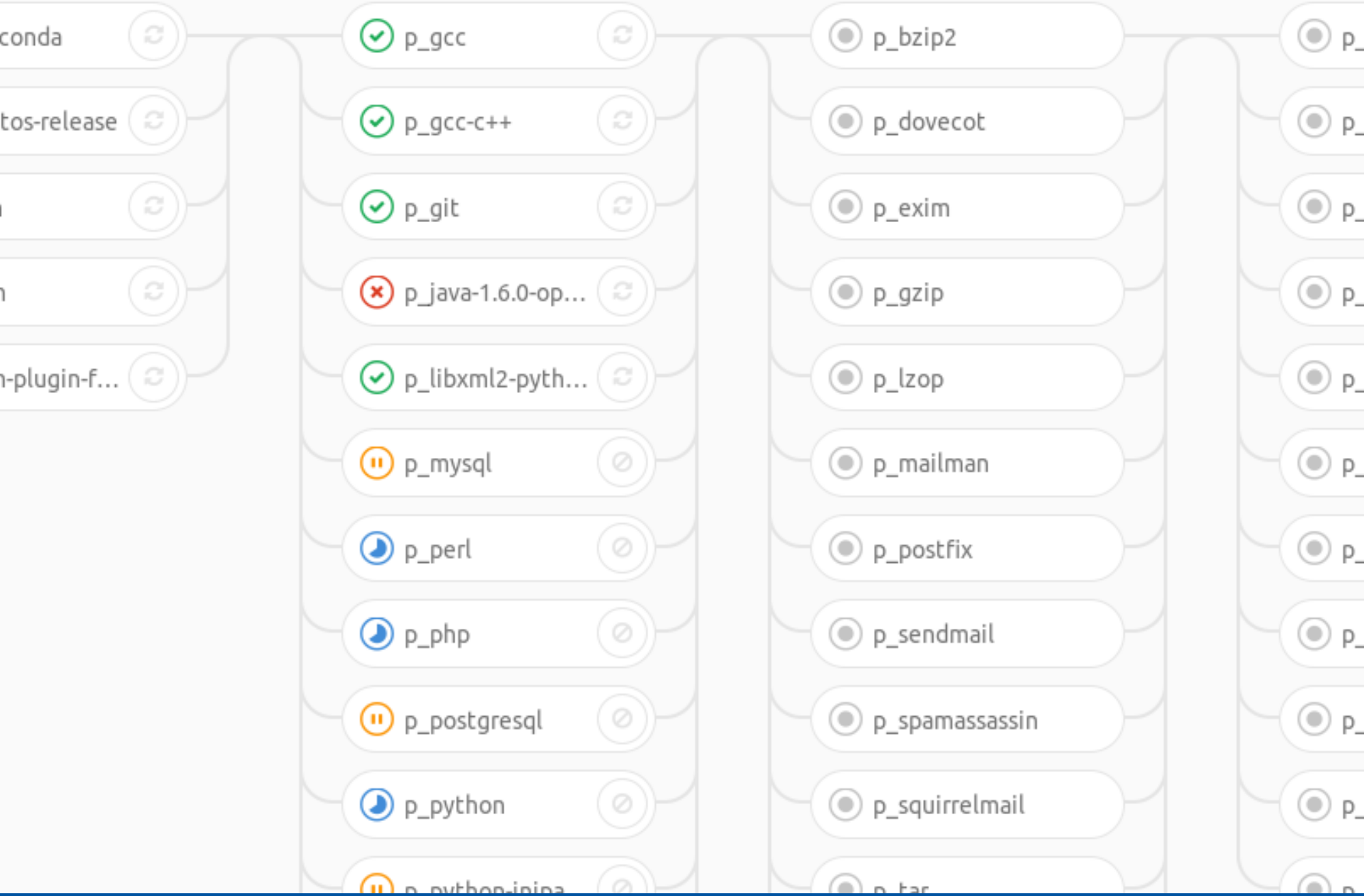
Using cloud-init...

- ... to install git
- ... to `git clone` tests
- ...

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

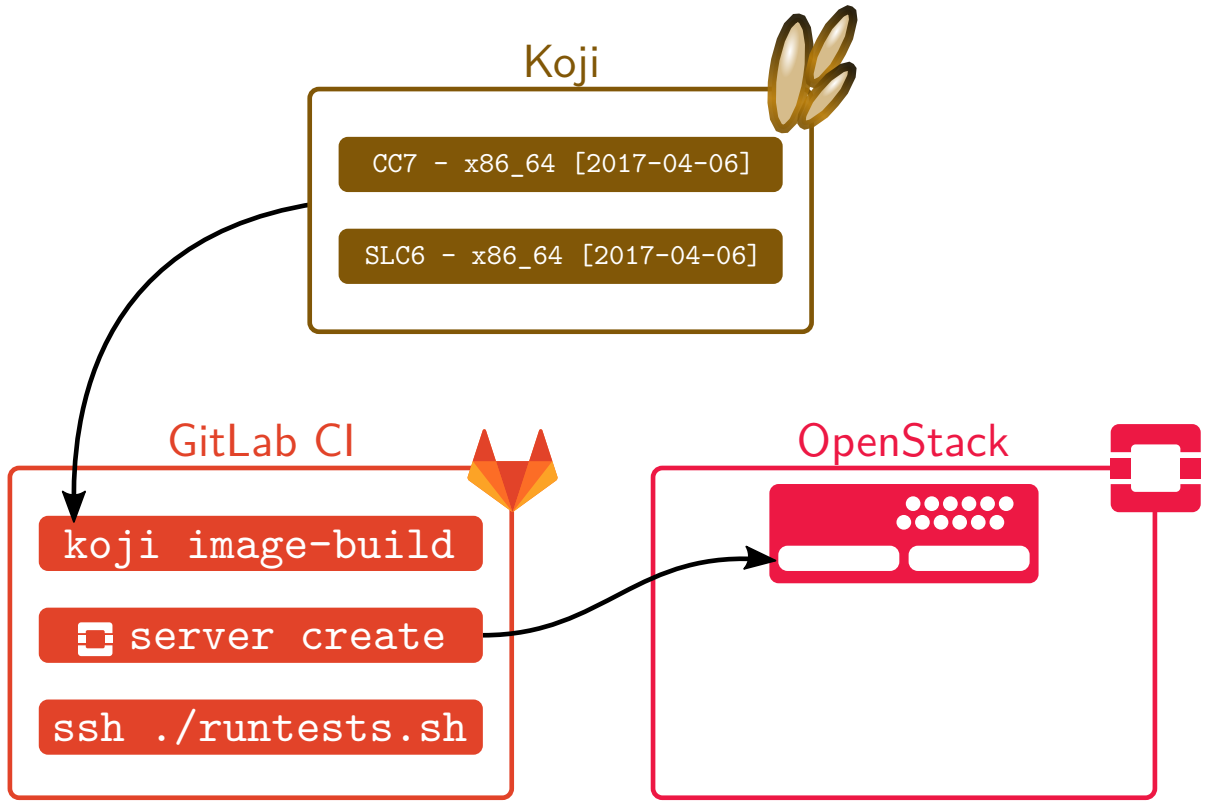
What they do:

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

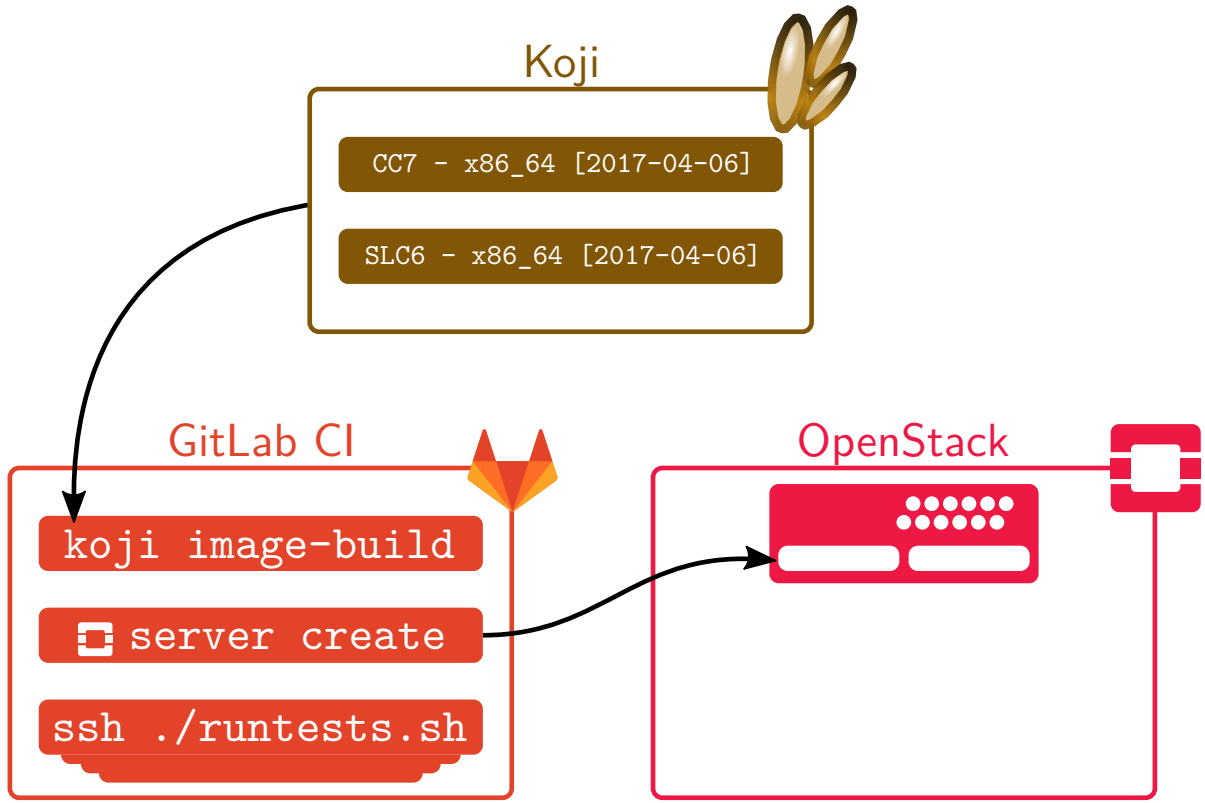
.gitlab-ci.yml

```
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
```

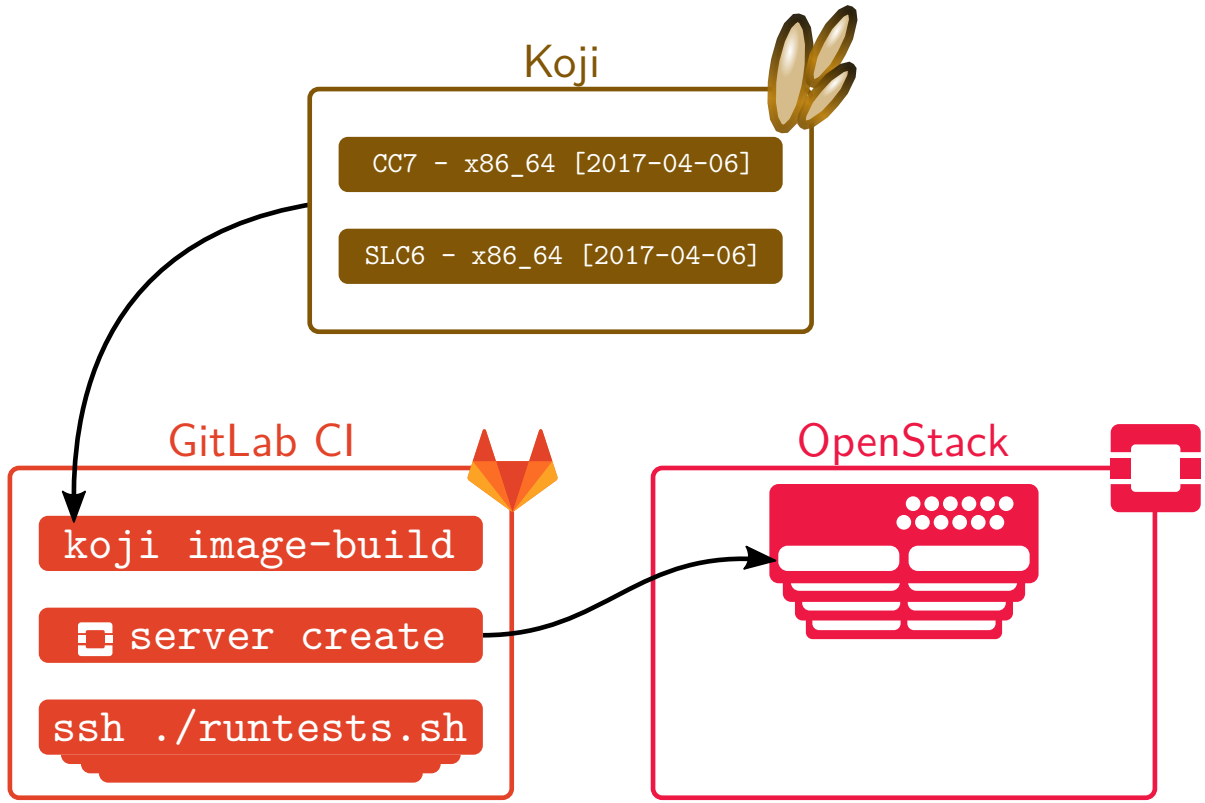
Scaling with Tests



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

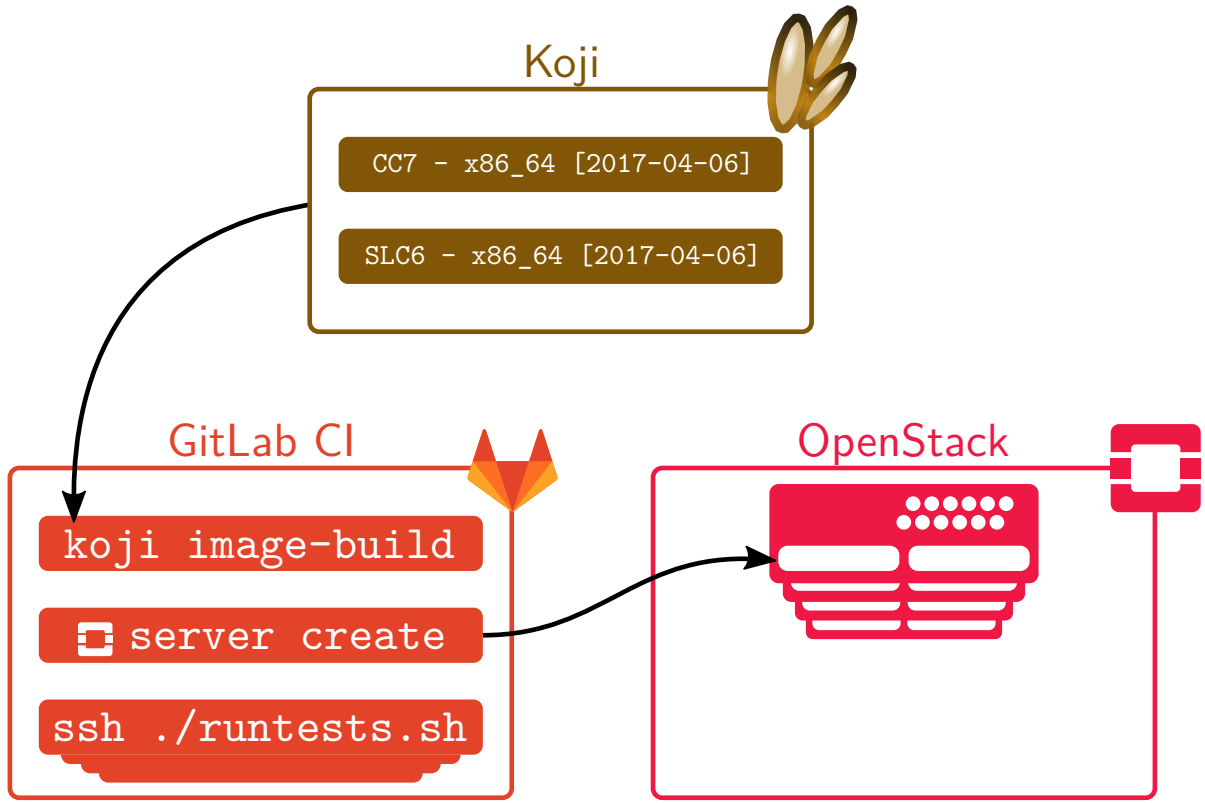
- Testing setups based on BagPlus
- Access to AFS, EOS, CVMFS, ...
- Locmap
- RPM health
- `lemon-host-check`
- `collectd`
- Attaching Cinder volumes
- Performance

A Wider Outreach

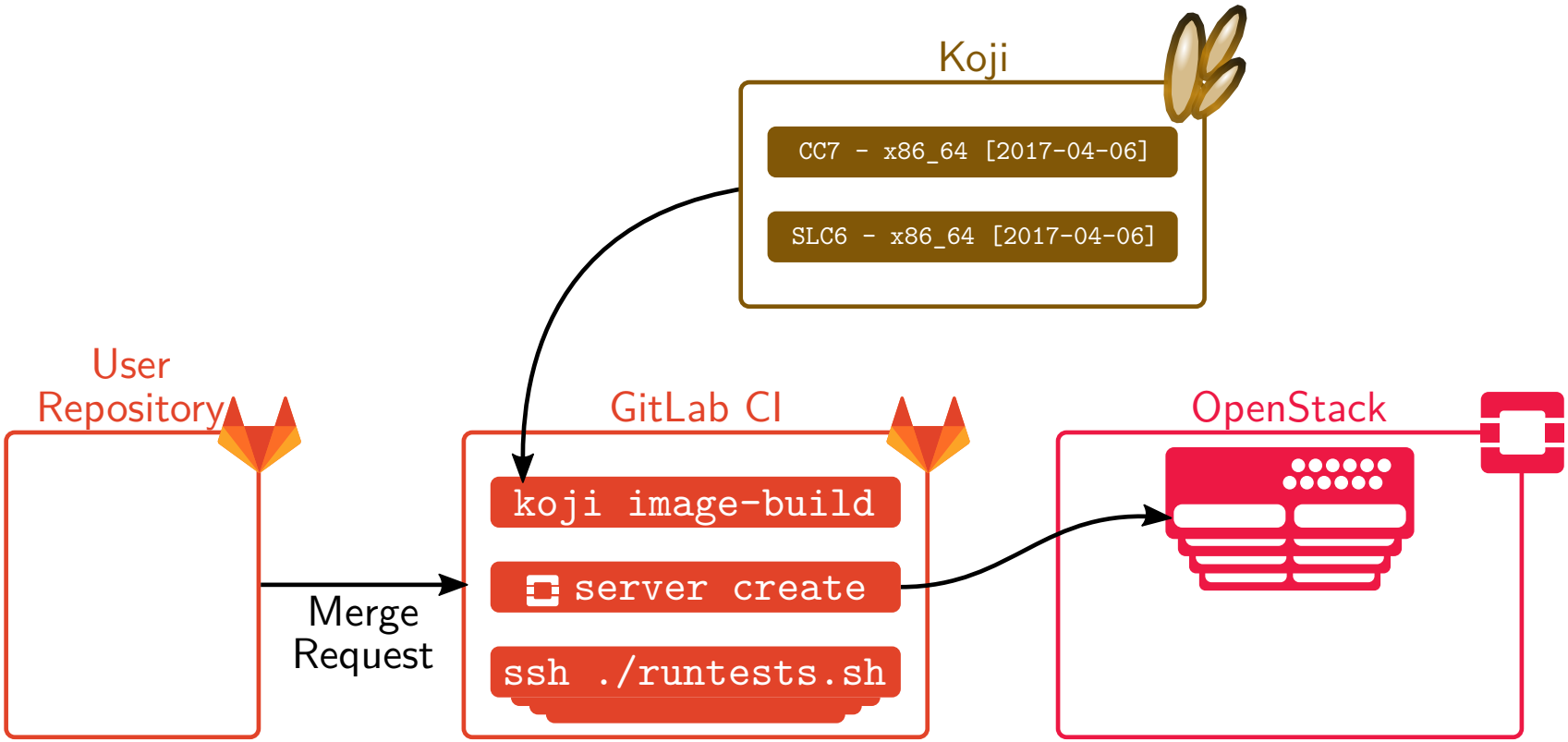
Allow End-Users to. . .

- . . . 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 in aiadm?

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

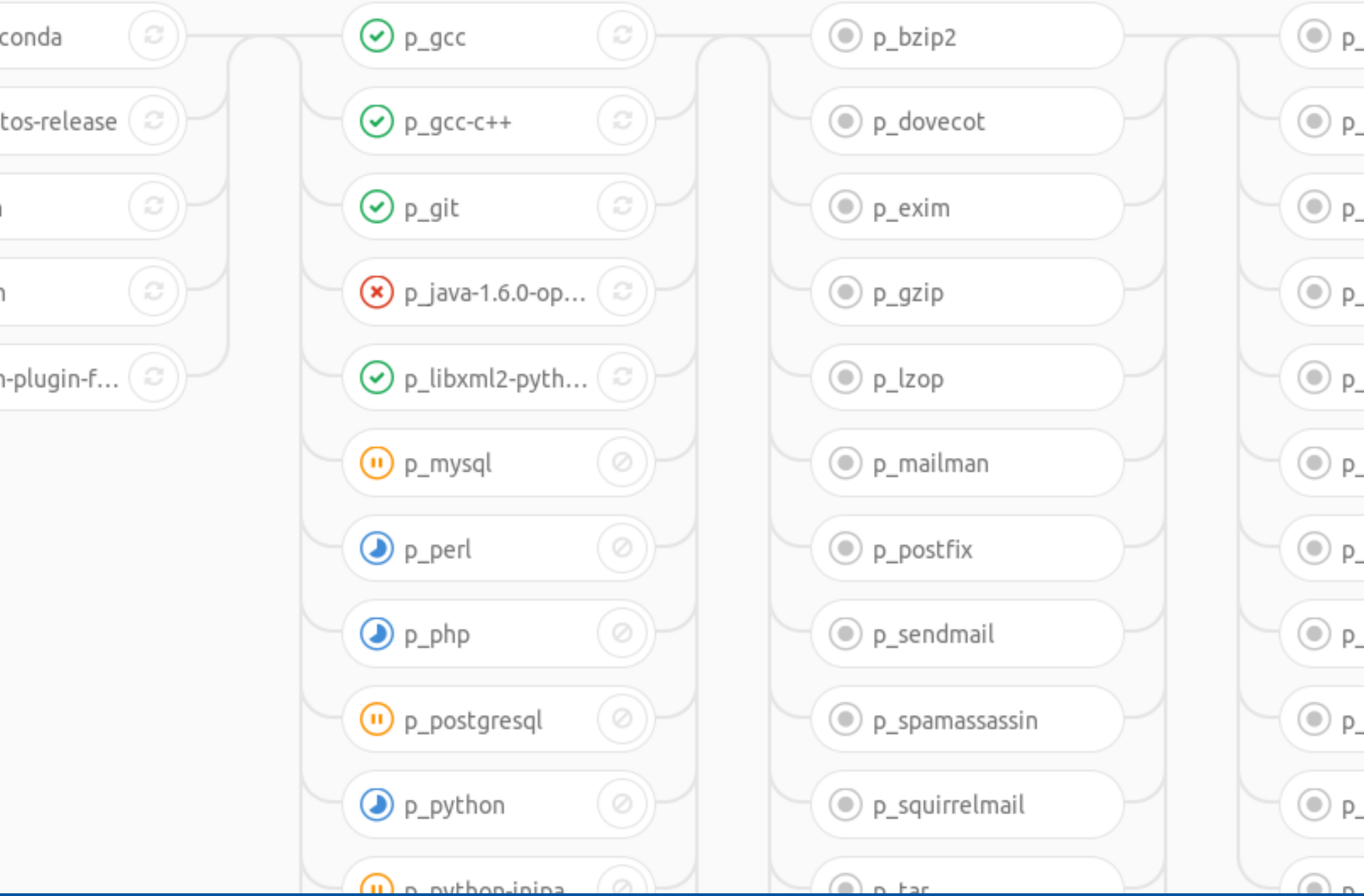
- Directly from their git repository?

Querying Results

- GitLab API
- Clear views
- From CLI in aiadm?

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

Or simply. . .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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

Thanks...

... for the useful chats and suggestions:

Dan van der Ster, Jan Iven, Jan van Eldik, Nacho Barrientos, Raul Garcia, Thomas Oulevey, Vincent Brillault, the ASDF audience, the LCS Section.

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