CI Made (Sort Of) Easy

How to build your projects without going insane

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The premises

- Own your data
- Run your own infrastructure

Contents

- Jenkins and Jenkins Job Builder
- Buildbot
- Gitlab CI

Basic CI concepts

- Version Control Systems (Git … and others)
  - Commits
  - Branches
  - Authors/Users
- Workers/Runners/Slaves
  - The machines
- Projects/Jobs/Builders
  - The job definitiion
- Schedulers/Triggers
  - When to run
- Publishers/Artifacts
  - The result of the build

Basic CI Workflow

- Receive trigger (Commit, Time event)
- On each build node:
  - Checkout source code
  - Prepare the environment
  - Run the build script
  - Archive the artifacts
  - Cleanup the environment
- Trigger the next job

Jenkins Job Builder

Jenkins

- Complex system written in Java
- Can be configured via
  - web interface
  - XML, JSON, Python API
- Okay(ish) for small number of different jobs

Jenkins Job Builder

- Build Jenkins jobs from Yaml/JSON description
- Adds job-templates, macros and projects
- Written in python (for OpenStack)

Jenkins Job Builder Installation

```
$ virtualenv --no-site-packages jjb
$ cd jjb/
$ ./bin/pip install jenkins-job-builder
$ ./bin/jenkins_jobs {update,test,delete,delete-all}
```

Jenkins Job Builder Configuration

```
[jenkins]
user=<jenkins_user>
password=<jenkins_password>
url=https://howl.labs.nic.cz/jenkins/
```

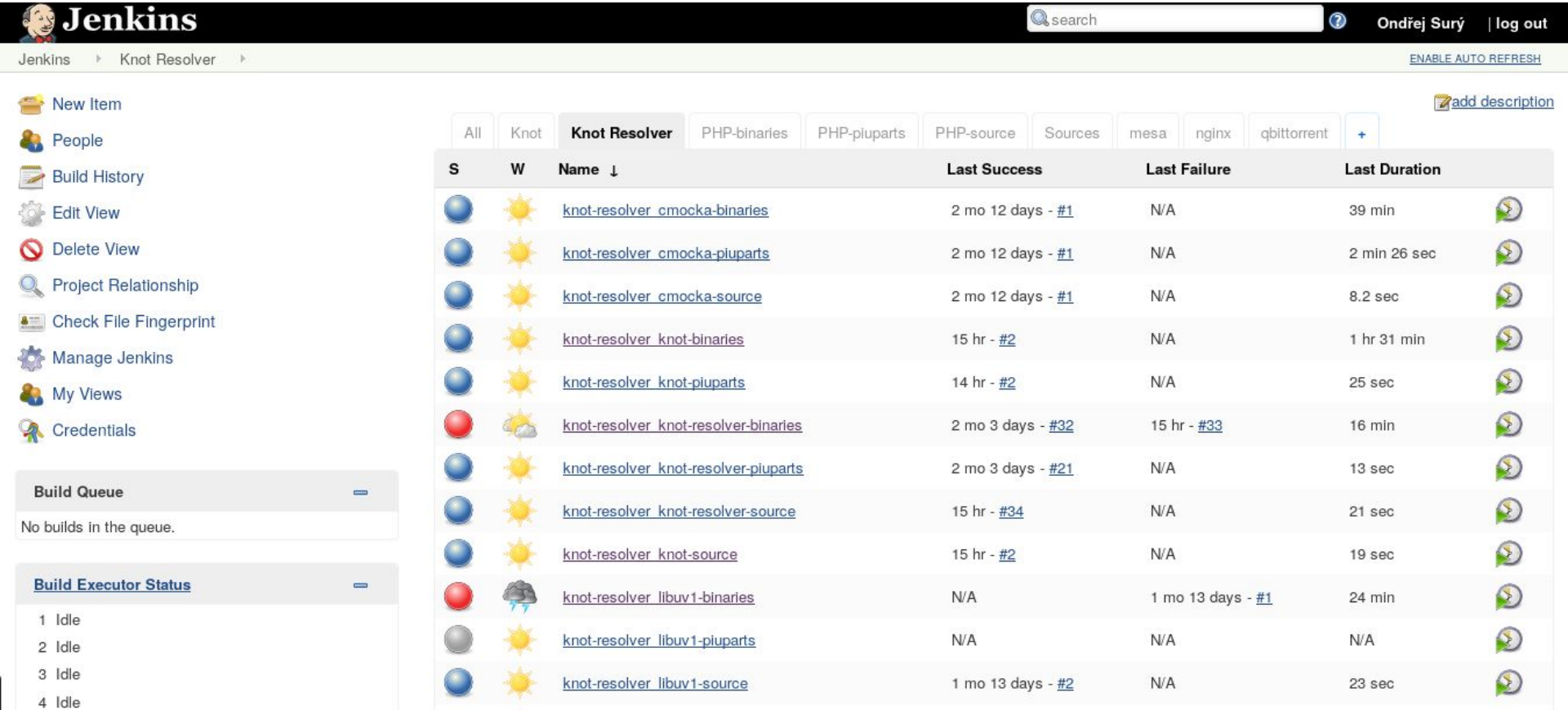
Job Configuration (Debian packaging)

```
- project: knot-resolver
    name: knot-resolver
    repo: knot-resolver
    distributions: !!python/tuple [jessie, stretch]
    architectures: !!python/tuple [amd64, i386, arm64, armhf]
    branches: !!python/tuple [master]
    sequential: false
    package:
        - knot-resolver:
            git-url: 'git://anonscm.debian.org/pkg-dns/knot-resolver.git'
    jobs:
        - '{repo}_{package}-source'
        - '{repo}_{package}-binaries'
        - '{repo}_{package}-piuparts'
```

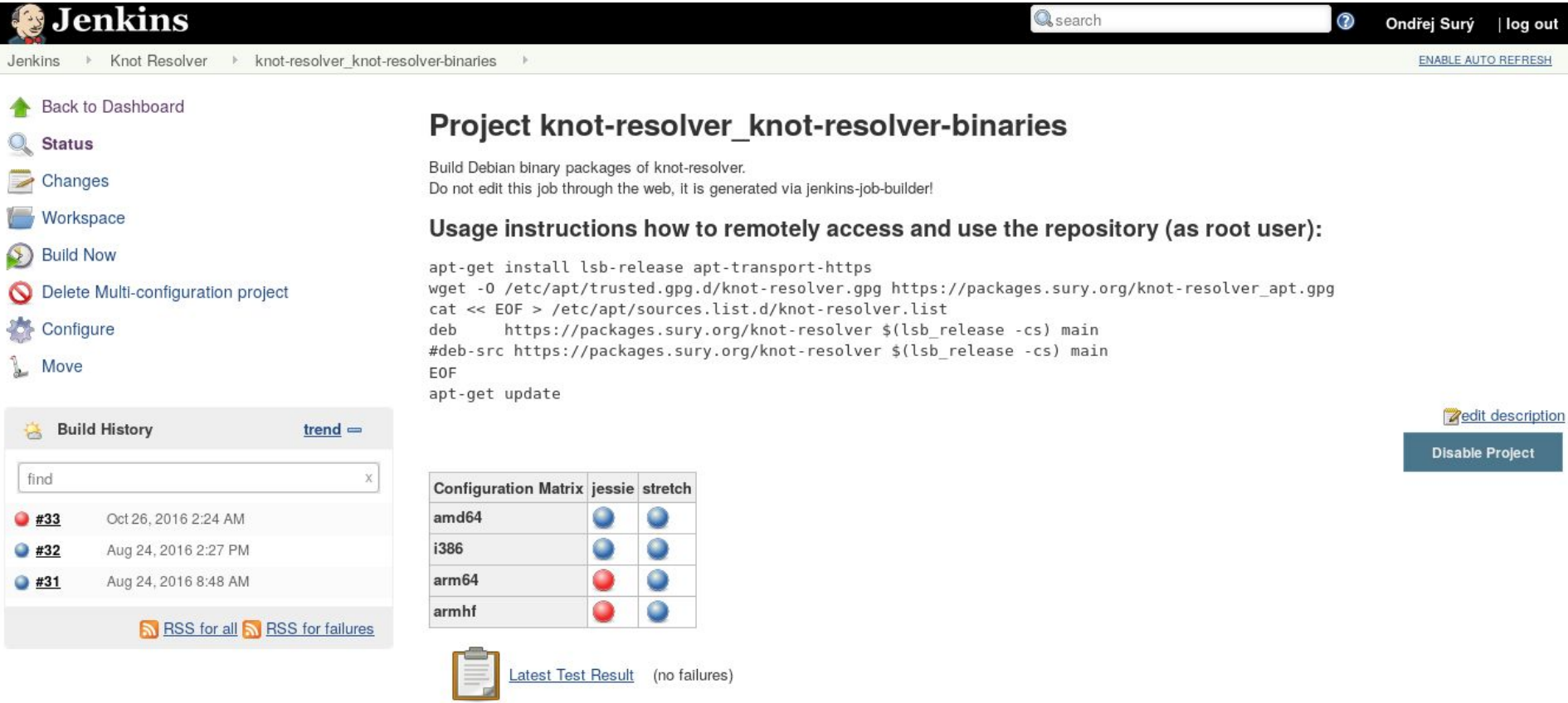
Job Configuration

```
- job-template:
    name: '{repo}_{package}-source
    scm:
        - git:
            url: '{git-url}'
                branches: '{obj:branches}'
    builders:
        - shell: |
            distribution=${{distribution}} /usr/bin/generate-git-snapshot
    Publishers:
        - archive:
                artifacts: '*.gz,*.xz,*.deb,*.dsc,*.git,*.changes'
        - trigger:
            project: '{repo}_{package}-binaries'
```

Jenkins Interface (Example)



Jenkins Job (Example)

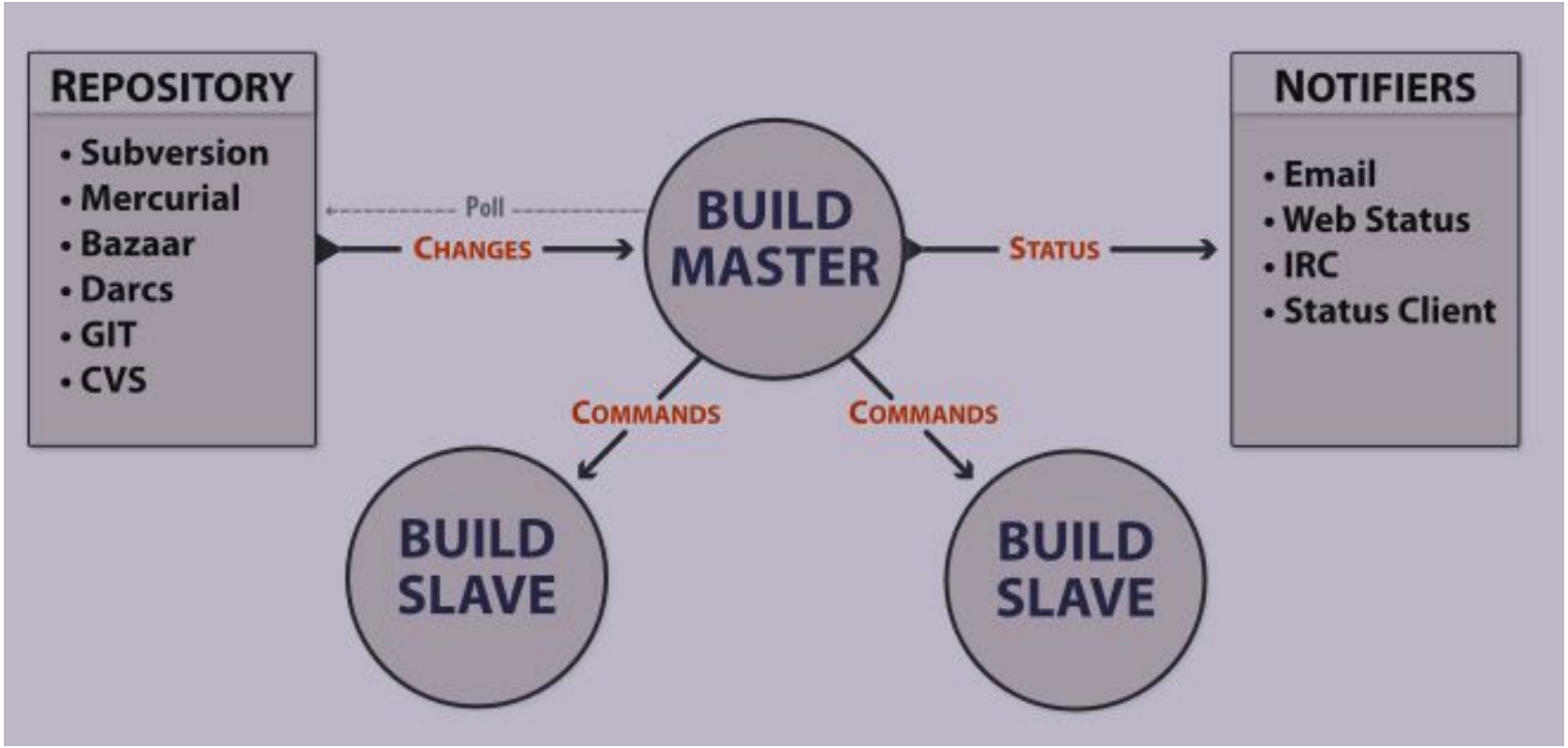


Buildbot

Buildbot

- Job Scheduling System
- Written in Python
- The configuration is a Python Script

Buildbot


REPOSITORY
• Subversion
• Mercurial
• Bazaar
• Darcs
• GIT
• CVS
Poll
CHANGES
BUILD MASTER
STATUS
NOTIFIERS
• Email
• Web Status
• IRC
• Status Client
COMMANDS
COMMANDS
BUILD SLAVE
BUILD SLAVE

Buildbot Master Installation

```
$ virtualenv --no-site-packages bb-master
$ cd bb-master
$ ./bin/pip install buildbot[bundle]
$ ./bin/buildbot create-master master
$ mv master/master.cfg.sample master/master.cfg
$ $EDITOR master/master.cfg
$ ./bin/buildbot start master
Following twistd.log until startup finished..
The buildmaster appears to have (re)started correctly.
```

Buildbot Worker Installation

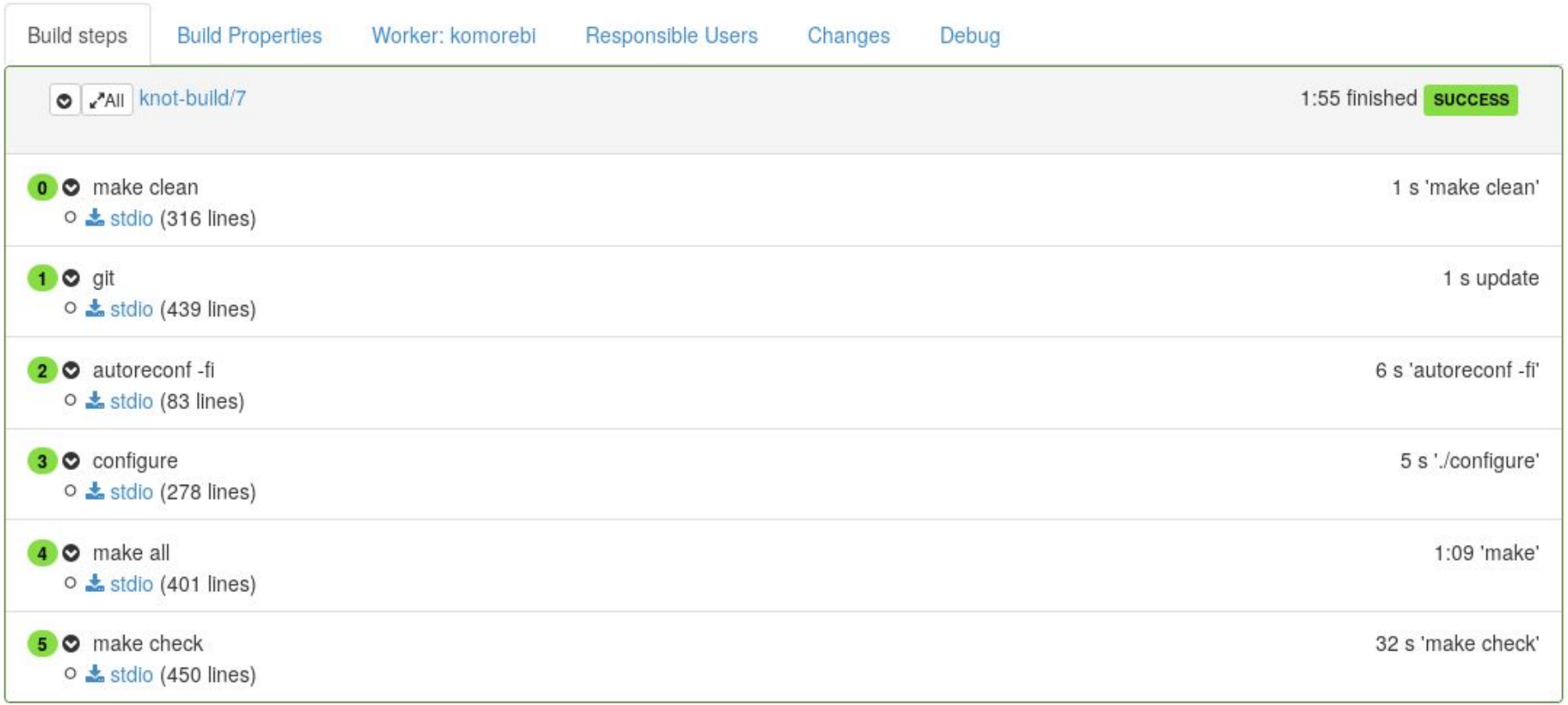
```
$ virtualenv --no-site-packages bb-worker
$ cd bb-worker
$ ./bin/pip install buildbot-worker
$ ./bin/buildbot-worker create-worker worker <hostname> <user> <pass>
$ ./bin/buildbot-worker start worker # ← just a directory
Following twistd.log until startup finished..
The buildbot-worker appears to have (re)started correctly.
```

Buildbot Configuration

```
from buildbot.plugins import *
c = BuildmasterConfig = {}
knot_git = 'https://gitlab.labs.nic.cz/labs/knot.git'
c['workers'] = [worker.Worker("<user>", "<pass>")]
c['change_source'].append(changes.GitPoller(knot_git,
    workdir='knot-wd', branch='master', project='knot', pollinterval=300))
f_knot = util.BuildFactory()
f_knot.addStep(steps.Git(repourl=knot_git,mode='incremental')
f_knot.addStep(steps.ShellCommand(name="configure", command=["./configure"])
f_knot.addStep(steps.ShellCommand(name="make all", command=["make", "all"])
f_knot.addStep(steps.ShellCommand(name="make check", command=["make", "check"])
c['builders'] = [util.BuilderConfig(name="knot-build", workernames=["komorebi"],
factory=f_knot)]
[...]
```

Buildbot Master Interface

Buildbot Build (Example)



Gitlab CI

Gitlab CI

- Part of Gitlab
- Written in Ruby (on Rails)
  - With GitLab Runner written in Go (apparently RoR is not cool enough now :))
- Uses .gitlab-ci.yml

Gitlab CI Runner Installation

- Run couple of random `curl https:// | sudo bash` scripts from all over the web
  - Now we are COOL!
  - Because adding one apt gpg key and extra repository is too hard
- Or carefully analyze those scripts and add the repository by hand
  - And be the old, grumpy, bearded guy…

```
# curl https://packages.gitlab.com/gpg.key | gpg --import
# gpg --export E15E78F4 > /etc/apt/trusted.gpg.d/gitlab-ci.gpg
# curl https://packages.gitlab.com/.. > /etc/apt/sources.list.d/gitlab-ci.list
# apt-get install gitlab-ci-multi-runner package
# gitlab-ci-multi-runner register
    ## Enter your gitlab-uri, registration token, tags and run method (shell,
ssh, docker, …)
# gitlab-ci-multi-runner start
```

Gitlab CI Configuration (.gitlab-ci.yml)

```
before_script:
  - apt-get update -qq && apt-get build-dep -y knot-resolver

job_build:
  script:
        - make -j2 all V=1

job_check:
  script:
        - make check V=1
```

Questions?
Comments?
Tomato Throwing?

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