

# Continuous Integration im Rechenzentrum

Michael Prokop

# % whoami

- Debian- und Grml-Entwickler
- Gründer von Grml-Forensic
- DevTools/Automation/Release Engineer
- Continuous Integration/Delivery in KMUs aber auch in Enterprise-Firmen begleitet + implementiert
- Mitgründer von LSS.io

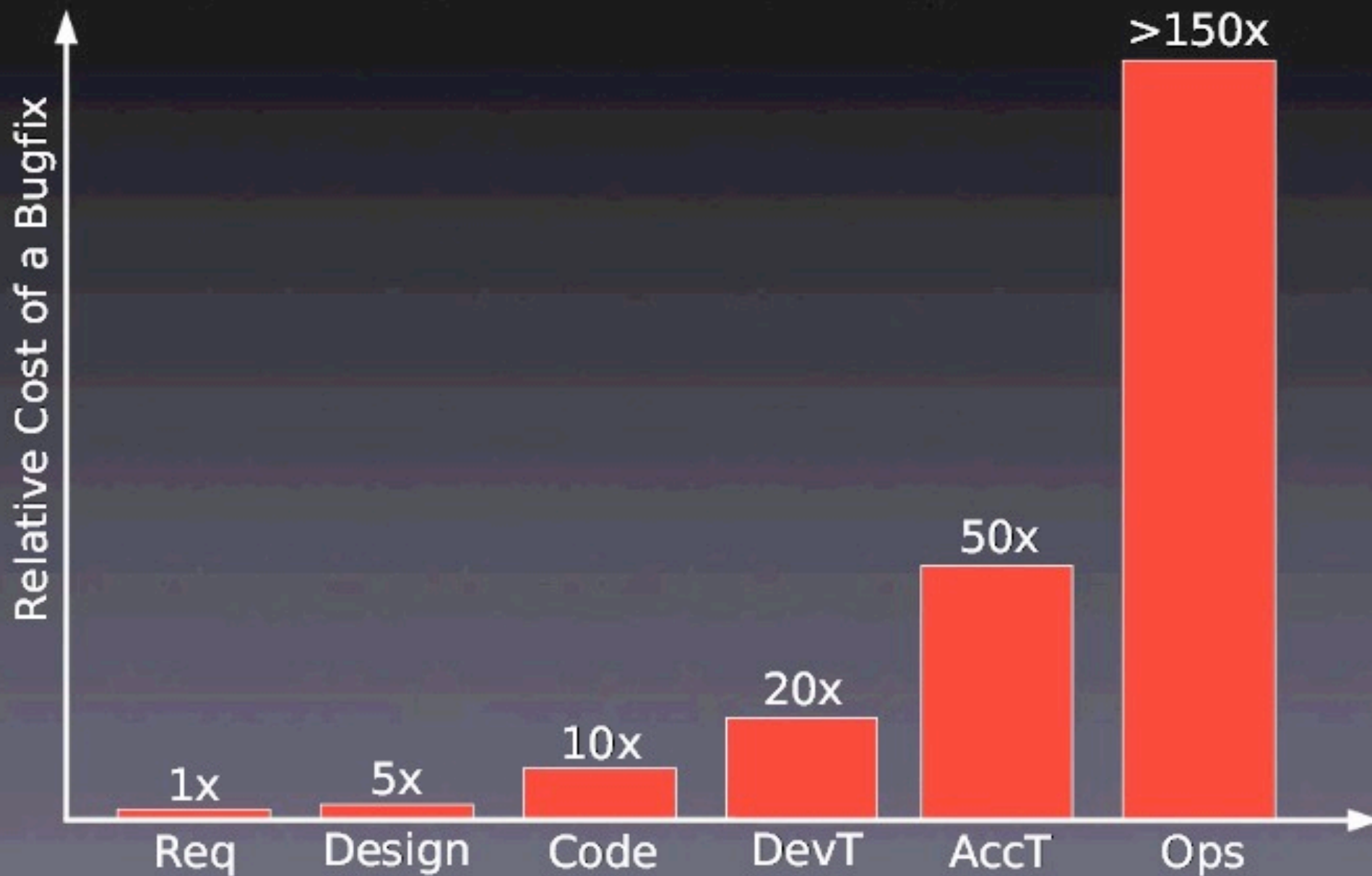
# Roadmap

- Begriffsklärung + Gründe für CI
- CI-Server Jenkins
- CI mit Debian-Paketen
- Weitere Beispiele für Einsatz von CI/CD im Rechenzentrum
- Best Practices

# Begriffsklärung

- Continuous Integration
- Continuous Deployment
- Continuous Delivery

# Warum CI?



Source: Barry Boehm: „EQUITY Keynote Address“, March 19th, 2007

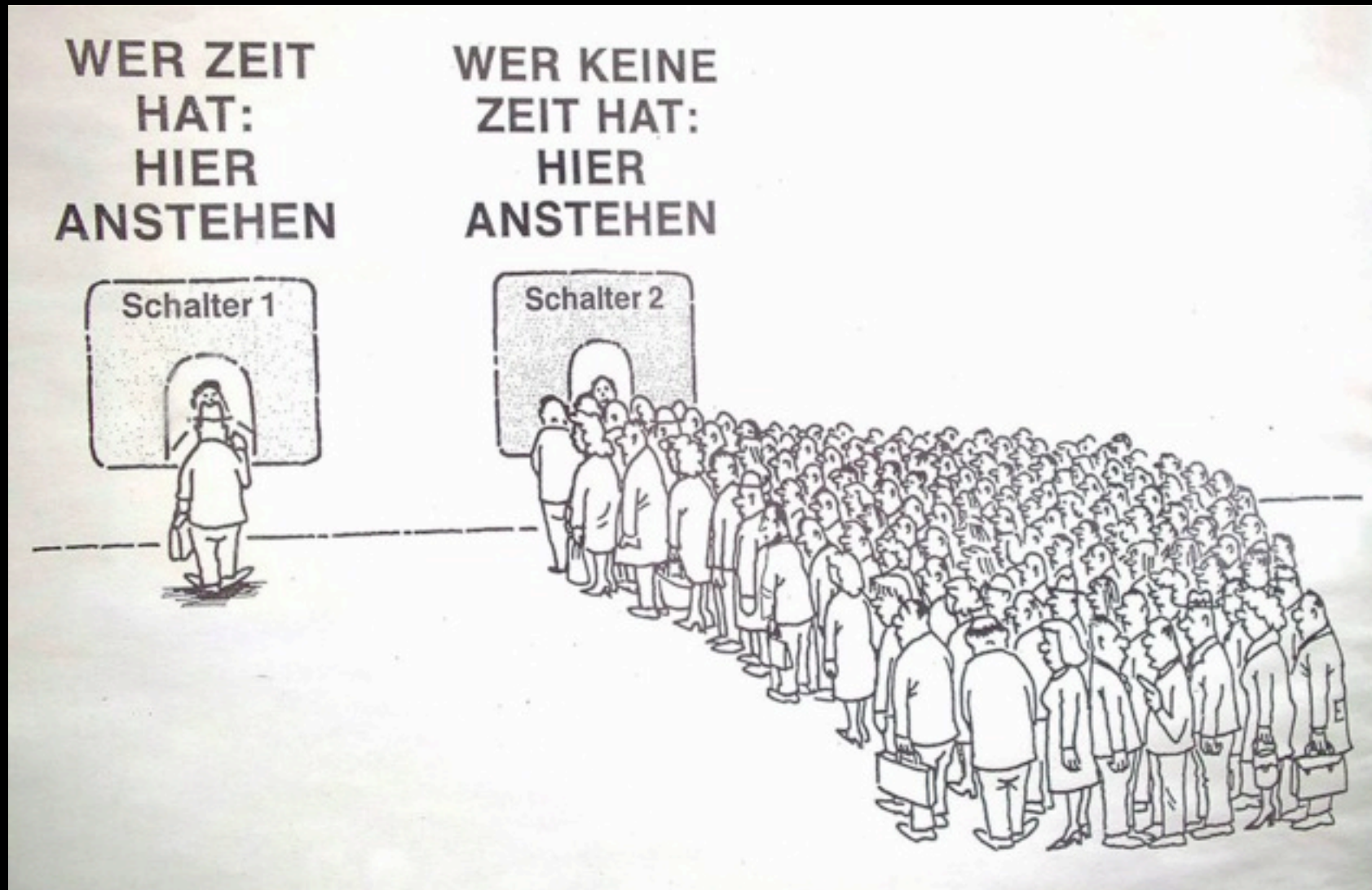
# Unabhängigkeit



Quelle: <http://decarabia.soup.io/post/241926962/Image>



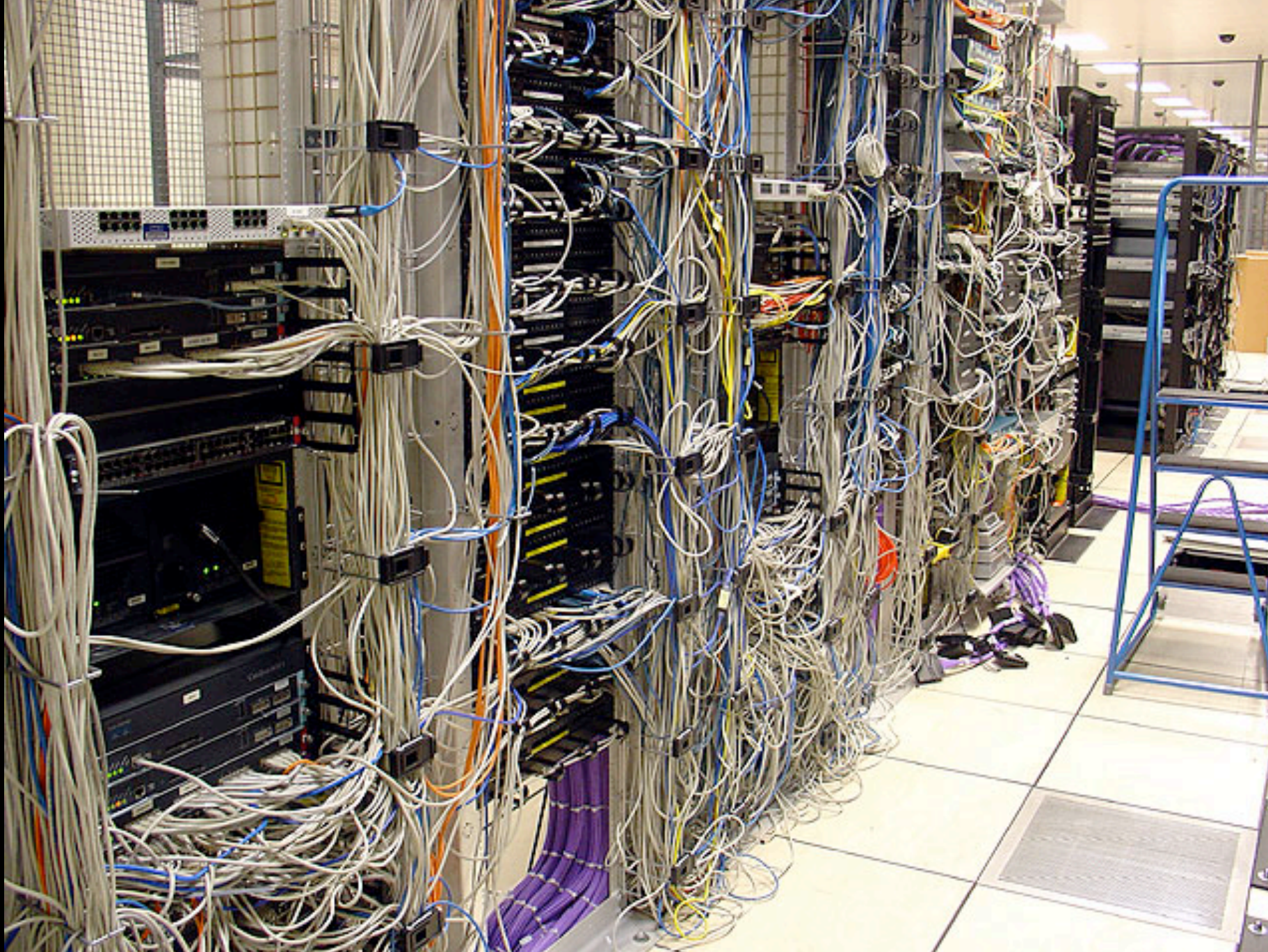
# Skalierbarkeit



Quelle: <http://up.arab-x.com/May12/M9b65492.jpg>



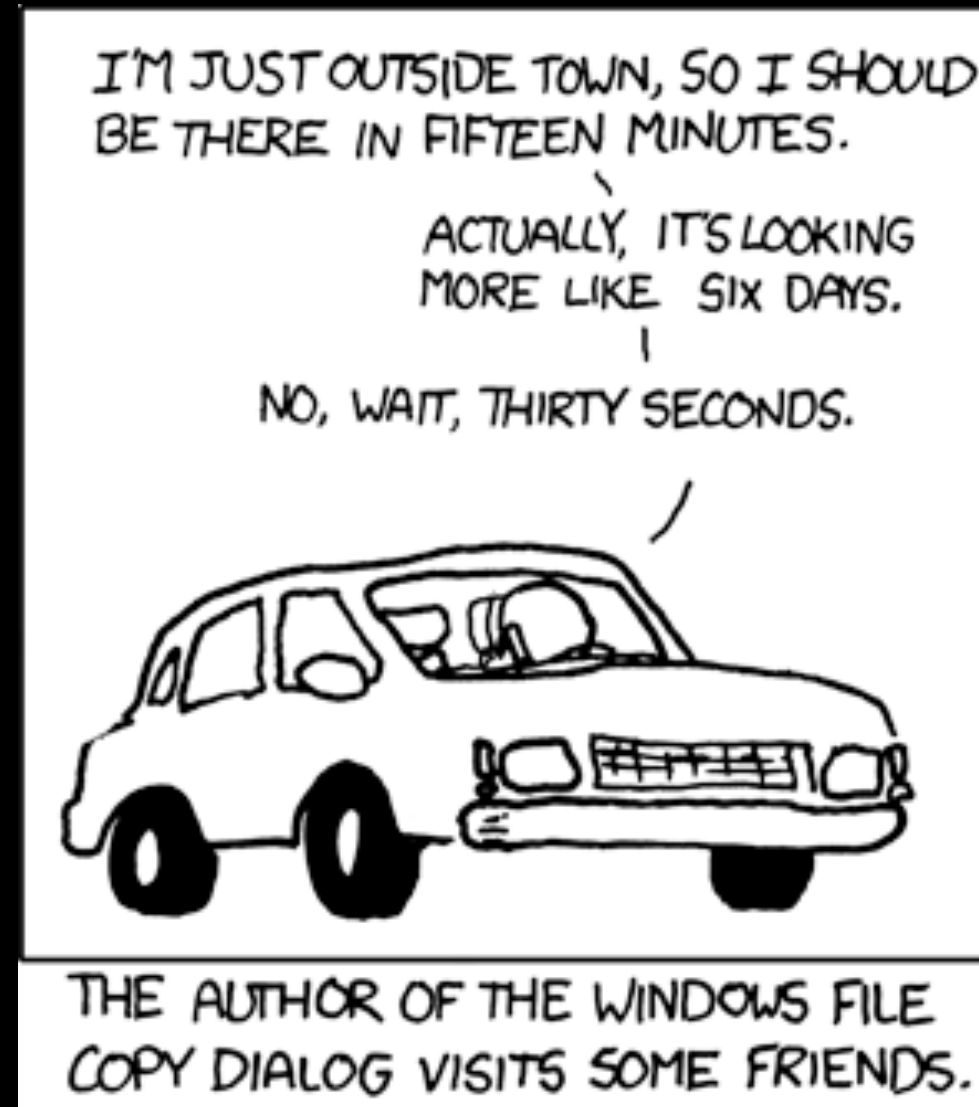
# Reproduzierbar



Quelle: <http://www.flickr.com/photos/route79/13120127/>



# Berechenbar



Quelle: <http://xkcd.com/612/>

# Versionskontrolle

- Nur was unter Versionskontrolle ist, zählt
- Distributed VCS ftw!



# % make

alleine ist **NICHT** genug



Quelle: <http://xkcd.com/303/>



# Jenkins

das “Wordpress der CI-Server”

# Jenkins

- Open Source (MIT Lizenz)
- wöchentliche && LTS-Releases
- >68k Installationen (Stand August 2013)
- >800 Plugins (Stand Oktober 2013)
- Community

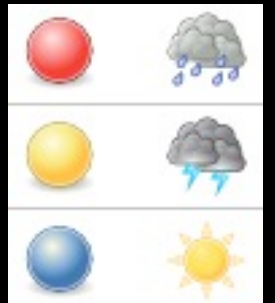
# FAQ #1 - Java?!

- ja, RAM und schnelle Disks helfen
- nein, man braucht keinen Javacode anzugreifen
- nein, unterstützt nicht nur Java-Projekte



# FAQ #2: Blau?! Gelb?!

- <http://jenkins-ci.org/content/why-does-jenkins-have-blue-balls>



# Getting Started

```
% curl -L -o jenkins.war \  
http://mirrors.jenkins-ci.org/war/latest/  
jenkins.war
```

```
% java -jar jenkins.war
```

```
% $BROWSER http://0.0.0.0:8080
```

*Disclaimer: bitte die (Upstream-)Software-  
Pakete nutzen*

[New Job](#)

Welcome to Jenkins! Please [create new jobs](#) to get started.

[People](#)

[Build History](#)

[Manage Jenkins](#)

## Build Queue

No builds in the queue.

## Build Executor Status

#	Status
1	Idle
2	Idle



[Back to Dashboard](#)[Status](#)[Changes](#)[Workspace](#)[Build Now](#)[Delete Project](#)[Configure](#)**Build History**[\(trend\)](#)[RSS for all](#)[RSS for failures](#)

Project name

grml2usb

Description

[Preview](#)

- ☐ Discard Old Builds ?
- ☐ This build is parameterized ?
- ☐ Disable Build (No new builds will be executed until the project is re-enabled.) ?
- ☐ Execute concurrent builds if necessary ?

### Advanced Project Options

[Advanced...](#)

### Source Code Management

☐ CVS☒ Git

Repositories

URL of repository

 ?[Advanced...](#)[Delete Repository](#)[Save](#)[Apply](#)

## Build

### Execute shell

Command `make prepare-release`

See [the list of available environment variables](#)

Delete

### Execute shell


Command `pep8 --repeat --ignore E501 grml2usb > pep8.txt || true`


See [the list of available environment variables](#)


Delete

Add build step ▼

## Post-build Actions

☐ Aggregate downstream test results 

☒ Archive the artifacts 

Files to archive `*.tgz, *.tgz.md5, pep8.txt` 

Save

Apply



[Back to Project](#)[Status](#)[Changes](#)[Console Output](#)[Edit Build Information](#)[Git Build Data](#)[Violations](#)[Previous Build](#)[Next Build](#)

## Console Output

[View as plain text](#)

```
01:20:37 Started by user anonymous
01:20:37 Building in workspace /var/lib/jenkins/jobs/grml2usb/workspace
01:20:37 Checkout:workspace / /var/lib/jenkins/jobs/grml2usb/workspace -
hudson.remoting.LocalChannel@65c0035b
01:20:37 Using strategy: Default
01:20:37 Last Built Revision: Revision
09149d774d47e757ca6df1e9363fa8cb75d41740 (origin/master)
01:20:37 Checkout:workspace / /var/lib/jenkins/jobs/grml2usb/workspace -
hudson.remoting.LocalChannel@65c0035b
01:20:38 Fetching changes from 1 remote Git repository
01:20:38 Fetching upstream changes from git://github.com/grml/grml2usb.git
01:20:38 Commencing build of Revision
09149d774d47e757ca6df1e9363fa8cb75d41740 (origin/master)
01:20:38 Checking out Revision 09149d774d47e757ca6df1e9363fa8cb75d41740
(origin/master)
01:20:38 [workspace] $ /bin/sh -xe /tmp/hudson3938467532622669835.sh
01:20:39 + make prepare-release
01:20:39 ./tarball.sh --no-gpg
01:20:39 make[1]: Entering directory `/var/lib/jenkins/jobs/grml2usb
/workspace'
01:20:39 make[1]: Nothing to be done for `build'.
01:20:39 make[1]: Leaving directory `/var/lib/jenkins/jobs/grml2usb
/workspace'
01:20:39 Not signing grml2usb.tgz.md5 as requested via --no-gpg.
01:20:39 Do not forget to run gpg --clearsign grml2usb.tgz.md5 before
uploading.
01:20:39 [workspace] $ /bin/sh -xe /tmp/hudson688358376671335888.sh
01:20:39 + pep8 --repeat --ignore E501 grml2usb
01:20:40 + true
01:20:40 Archiving artifacts
01:20:40 Finished: SUCCESS
```



[Back to Project](#)[Status](#)[Changes](#)[Console Output](#)[Edit Build Information](#)[Git Build Data](#)[Previous Build](#)

# Build #6 (Apr 26, 2012 5:59:27 PM)

[Delete this build](#)

Started 5 sec ago

Took [1.3 sec](#)[add description](#)

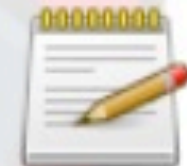
## Build Artifacts

[grml2usb.tgz](#)

203239

[grml2usb.tgz.md5](#)

47



No changes.

Started by anonymous user

**Revision:** 09149d774d47e757ca6df1e9363fa8cb75d41740

- origin/master

[Help us localize this page](#)

Page generated: Apr 26, 2012 5:59:32 PM

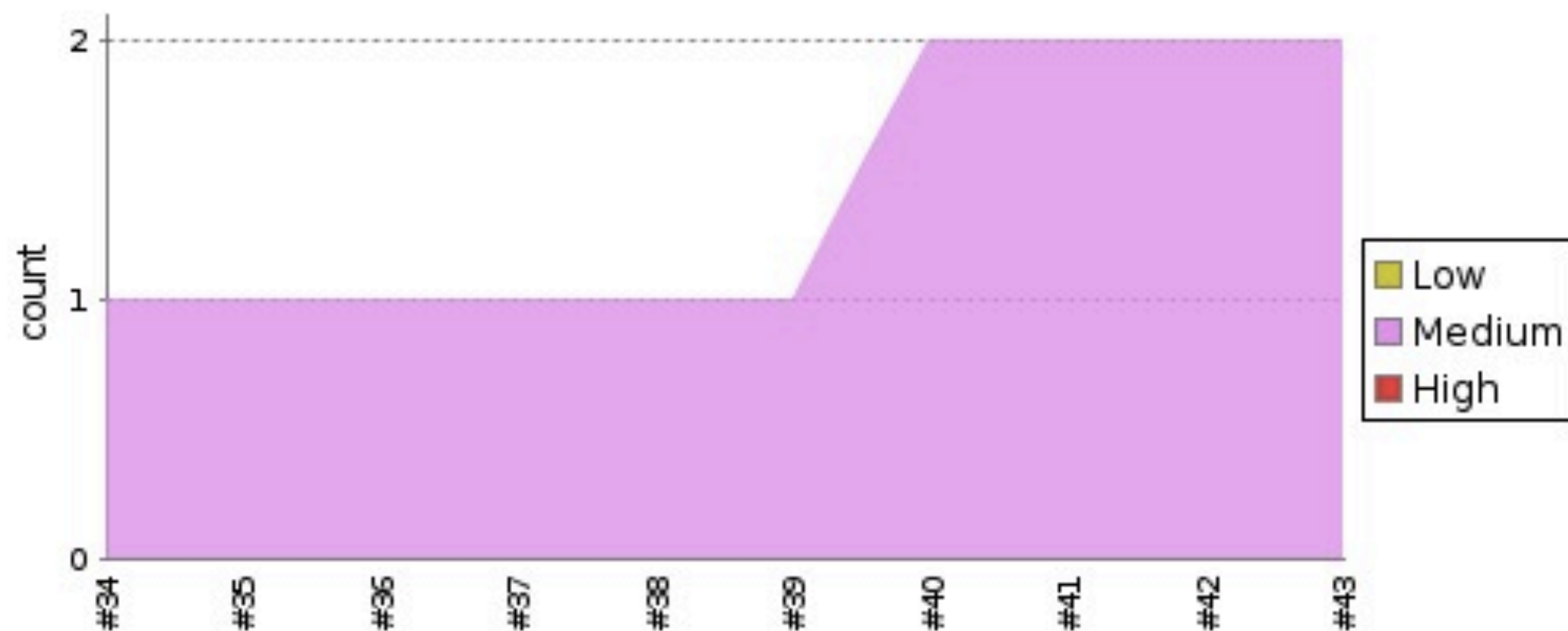
[Jenkins ver. 1.461](#)



# Violations Report for build 43

Type	Violations	Files in violation
<a href="#">pep8</a>	2	1

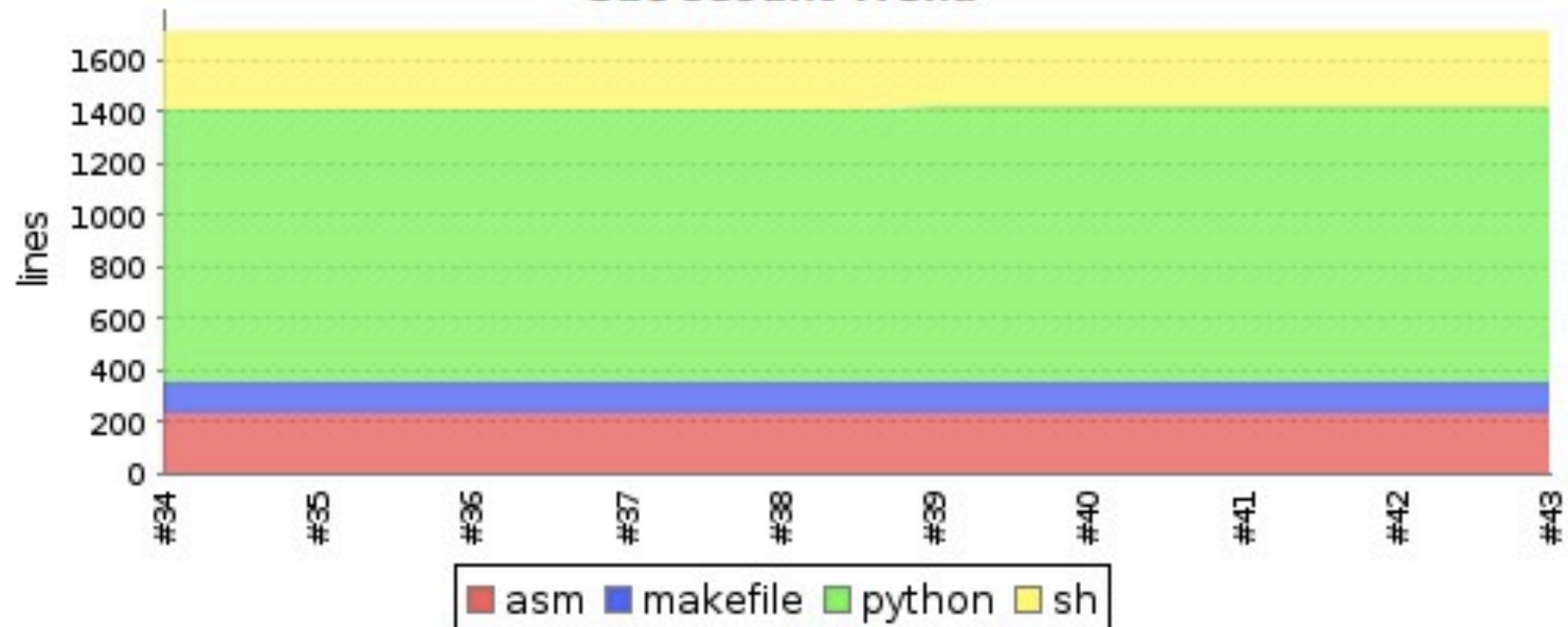
## pep8



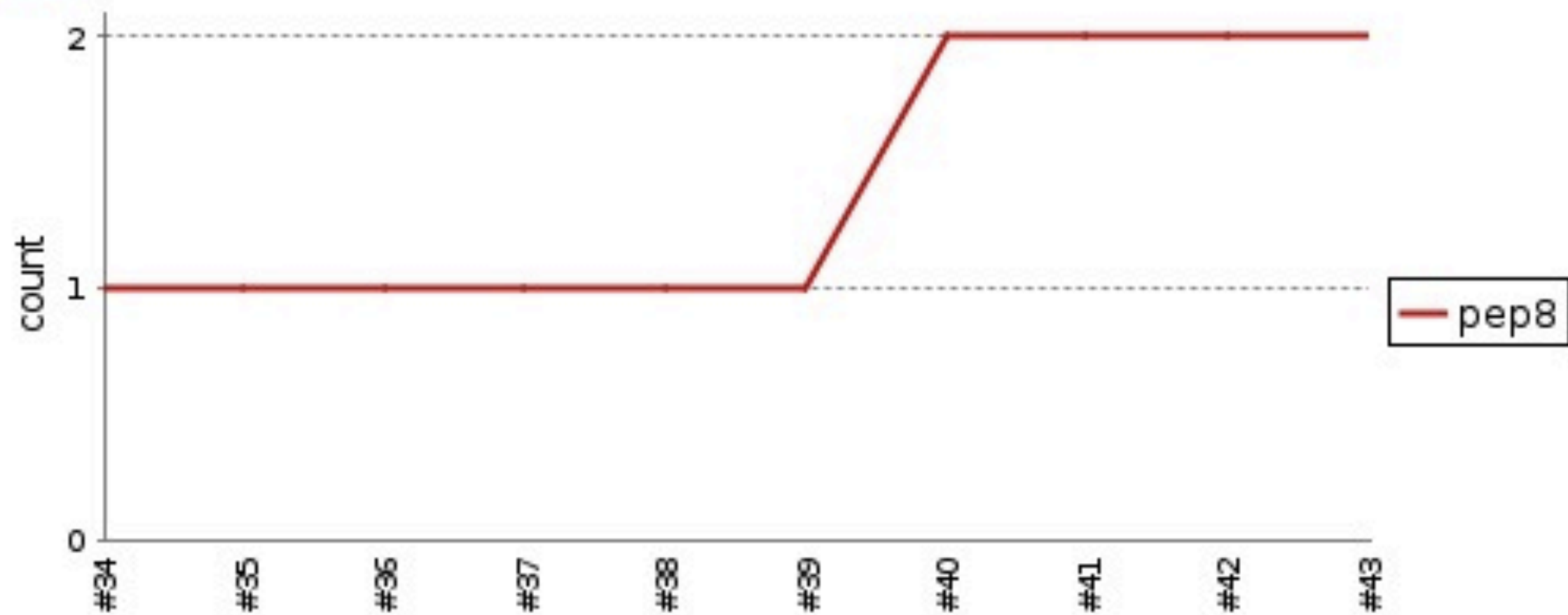
## filename

[source/qrml2usb](#)

## SLOCCount Trend

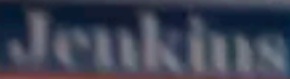


☀️ pep8 2



# Bestandteile einer Buildpipeline, u.a.

- Build Artifacts (\*.jar, \*.deb, \*.rpm,...)
- Stages (development, testing, production,...)
- Q/A-Tests (unit/component/system/...)
- Notifications



<https://www.youtube.com/watch?v=IEGk2rvZe8A>

# CI mit Debian-Paketen

jenkins-debian-glue



# Debian Packaging

- dpkg [v3] + debhelper [v8]
  - apt-get install packaging-tutorial
- dh-make, dh-make-perl, dh-make-php, dh-make-ruby/gem2deb
- fpm (<https://github.com/jordansissel/fpm>)
- {cvs,svn,git,...}-buildpackage
- cowbuilder/pbuilder/sbuild/...
- reprepro/dak/freight/...

# jenkins-debian-glue.org

- Open Source (MIT-Lizenz)
- 17 Contributors (Stand Oktober 2013)
- Ziel: Debian-/Ubuntu-Pakete bauen
- Auch für Nicht-Debian-Entwickler benutzbar
- Unterstützt Subversion + Git ootb
- Vorwiegend Shell, ein wenig Ruby/Python/Perl (je nach Einsatz) -> leicht adaptierbar

# j-d-g im Praxiseinsatz

- Grml (<http://jenkins.grml.org/>)
  - hostet u.a. dpkg, FAI, initramfs-tools
- PostgreSQL (<https://wiki.postgresql.org/wiki/Apt>)
- Icinga (<http://icingabuild.dus.dg-i.net>)
- LLVM Debian/Ubuntu (<http://llvm.org/apt/>)
- Scilab (<http://build.scilab.org/>)
- Interne System bei Sipwise, Ixolit,...

# jenkins-debian-glue

- \*-source -> Source-Paket
- \*-binaries -> Binary-Paket(e)
- \*-repos -> Repository-Handling (optional)
- \*-piuparts -> Install/Deinstall/Upgrade-Testing (optional)

# Source-Pakete

- (Upstream-)Source (orig.tar.gz)
- Debian-Änderungen (debian.tar.gz) [opt.]
- Control-Datei (.dsc)

Wichtig: nur einmal pro Paket erstellen

# Binary-Pakete

- \*\_all.deb/\*\_amd64.deb/\*\_i386.deb
- \*.changes, \*.dsc, \*.tar.gz

Wichtig: pro Architektur einmal bauen  
(Ausnahme für “Architecture: all”, dort generell  
nur ein einziges Mal unabhängig von der  
Architektur)



# Repository

- reprepro- + freight-Support ootb
  - <http://mirrorer.alioth.debian.org/>
  - <https://github.com/rcrowley/freight/>
- standardmässig ein Repository pro Projekt
- sog. Release-Repository + trunk-release-Repository einfach aktivierbar
- > kein manuelles Setup/Management notwendig

# Q/A-Tests

- lintian: Paketqualität (\*-source, \*-binaries)
- autopkgtest: Paket-Tests in definierter Umgebung (\*-binaries)
- piuparts: Install/Deinstall/Upgrade-Tests (\*-piuparts)
- perlcritics/checkbashism/...: Code-Policies

Resultat als TAP/JUnit/...-Report in Jenkins

# lintian Report

## Failed

lintian.libgps20

### Error Message

```
shlib-missing-in-control-file libgpsd 20 for usr/lib/x86_64-linux-gnu/libgpsd.so.20.0.0
```

### Stacktrace

```
libgps20: shlib-missing-in-control-file libgpsd 20 for usr/lib/x86_64-linux-gnu/libgpsd.so.20.0.0
```

### Standard Output

```
W: gpsd source: changelog-should-mention-nmu
```

```
N:
```

```
N: When you NMU a package, that fact should be mentioned on the first line
```

```
N: in the changelog entry. Use the words "NMU" or "Non-maintainer upload"
```

```
N: (case insensitive).
```

```
N:
```

```
N: Maybe you didn't intend this upload to be a NMU, in that case, please
```

```
N: doublecheck that the most recent entry in the changelog is byte-for-byte
```

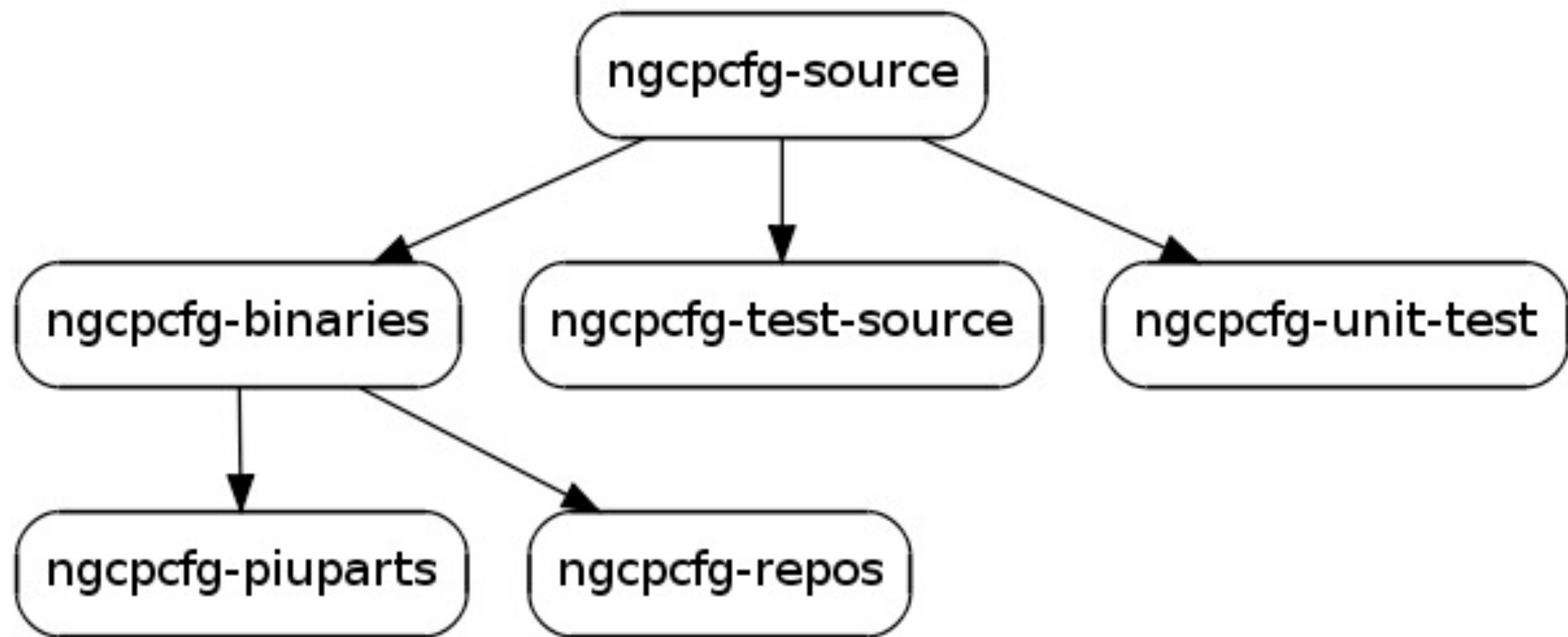
```
N: identical to the maintainer or one of the uploaders. If this is a local
```

```
N: package (not intended for Debian), you can suppress this warning by
```

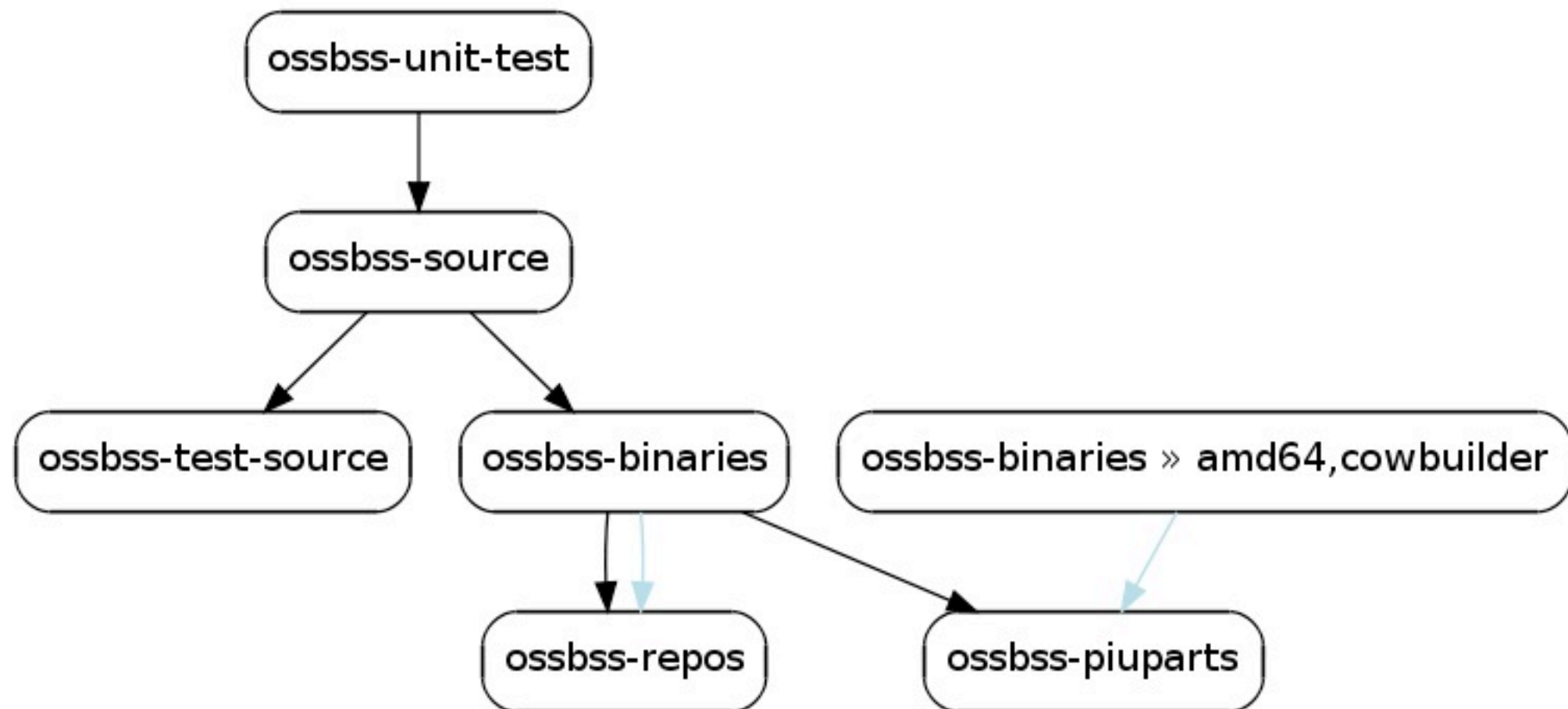
```
N: putting "local" in the version number or "local package" on the first
```

```
N: line of the changelog entry.
```

# Bsp. für Dependencies



# Bsp. für Dependencies



# Deployment von j-d-g


If you want to get all the work done for you automatically then please choose the automatic approach.

**Notice:** recommended if you are starting with a plain Debian/Ubuntu system from scratch.

 Choose Automatic








If you want to manually set up the system on your own please follow the documentation.

**Notice:** recommended if you already have a running Jenkins system on Debian/Ubuntu.

 Choose Manual

- siehe <http://jenkins-debian-glue.org/>
- in <15 Minuten (auch auf EC2) mit minimalem Aufwand testbar





-  [New Job](#)
-  [People](#)
-  [Build History](#)
-  [Project Relationship](#)
-  [Check File Fingerprint](#)
-  [Manage Jenkins](#)
-  [My Views](#)

## jenkins-debian-glue Continuous Integration labs

[edit description](#)

All +

S	W	Name ↓	Last Success	Last Failure	Last Duration	
		<a href="#">jenkins-debian-glue-binaries</a>	8 min 6 sec ( <a href="#">#1</a> )	N/A	2 min 49 sec	
		<a href="#">jenkins-debian-glue-piuparts</a>	5 min 12 sec ( <a href="#">#1</a> )	N/A	3 min 59 sec	
		<a href="#">jenkins-debian-glue-source</a>	8 min 21 sec ( <a href="#">#1</a> )	N/A	9.9 sec	

Icon: [S](#) [M](#) [L](#)[Legend](#)  [RSS for all](#)  [RSS for failures](#)  [RSS for just latest builds](#)

Build Queue	
No builds in the queue.	
Build Executor Status	
#	Status
1	Idle
2	Idle

[Help us localize this page](#)

Page generated: Feb 5, 2013 3:19:16 PM

[REST API](#)[Jenkins ver. 1.480.2](#)

# Default Deployment von jenkins-debian-glue

# Weitere Einsatzbeispiele im Rechenzentrum

Puppet, Custom ISOs, Dokumentation,...

# Konfigurations- Management

- Puppet
- Chef
- Ansible
- SaltStack
- CFEngine
- ....

# Puppet

- Facter (sysinfo), Hiera (hierarchische DB), augeas (handle config files as trees of values)
- PuppetDB (inventory service + exported resources)
- ENC (External Nodes Classifier)
- Dashboards (Puppet Dashboard, Razor, Foreman,...)

## Background Tasks

✓ All systems go

## Nodes

0 Unresponsive

0 Failed

0 Pending

0 Changed

**20 Unchanged**

0 Unreported

**20 All**

Add node

Radiator View

## Group

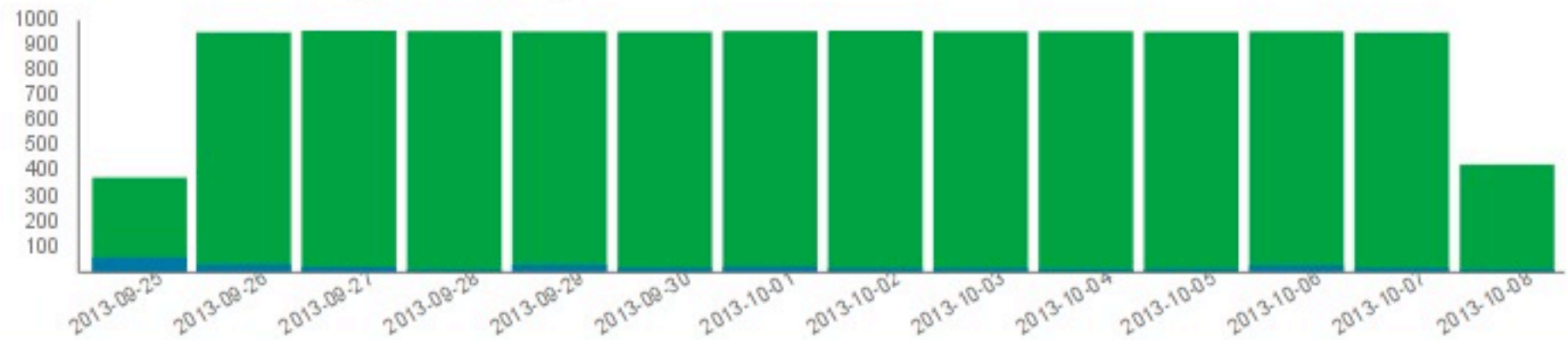
Add group

## Class

Add class

## Daily run status

Number and status of runs during the **last 30 days**:



All

Unresponsive

Failed

Pending

Changed

Unchanged

Export nodes as CSV

Resources

	Node	↓ Latest report	Total	Failed	Pending	Changed	Unchanged
Total			2125	0	0	0	2125
✓	provisioning	2013-10-08 10:45 UTC	71	0	0	0	71
✓	jenkins-slave1	2013-10-08 10:44 UTC	135	0	0	0	135
✓	paste	2013-10-08 10:42 UTC	71	0	0	0	71
✓	builder	2013-10-08 10:41 UTC	50	0	0	0	50
✓		2013-10-08 10:37 UTC	151	0	0	0	151
✓	git	2013-10-08 10:35 UTC	95	0	0	0	95
✓	jenkins-slave3	2013-10-08 10:34 UTC	135	0	0	0	135
✓	mcollective	2013-10-08 10:34 UTC	74	0	0	0	74
✓	selenium-client1	2013-10-08 10:33 UTC	148	0	0	0	148
✓	jenkins-slave7	2013-10-08 10:32 UTC	135	0	0	0	135

# Puppet mit mcollective

```
# mco rpc package apt_update \  
-W /jenkins-slave/  
# mco package update \  
jenkins-debian-glue\* \  
-W /jenkins-slave/
```



```
# mco rpc rpcutil get_fact fact=lsbdistcodename
Discovering hosts using the mc method for 2 second(s) ... 18
```

```
* [ =====> ] 18 / 18
```

```
[...]
```

```
puppet
```

```
  Fact: lsbdistcodename
```

```
  Value: wheezy
```

```
Summary of Value:
```

```
  wheezy = 17
```

```
  squeeze = 1
```

```
Finished processing 18 / 18 hosts in 315.28 ms
```

# mco inventory puppet  
Inventory for puppet:

Server Statistics:

[...]

Agents:

[...]

Data Plugins:

[...]

Configuration Management Classes:

acpi                      apt                      [...]

Facts:

architecture => amd64

[...]

virtual => kvm

# Hilfreiche Ressourcen

- <http://puppetlabs.com/>
- <http://www.puppetbestpractices.com/>
- <https://github.com/puppetlabs/puppetlabs-mcollective/>
- [http://docs.puppetlabs.com/mcollective/reference/basic/basic\\_cli\\_usage.html](http://docs.puppetlabs.com/mcollective/reference/basic/basic_cli_usage.html)

# Scaling Puppet

- WEBrick vs mod\_passenger vs Mongrel
- Separate CA + Master
- Single Master vs Multi Master vs No Master
  - jeweils mit Vor- und Nachteilen verbunden

# puppet-lint

- <https://github.com/rodjek/puppet-lint>
- Integration in VCS pre-commit-Hook (z.B. auch gemeinsam mit Syntax-Check)
- <https://gitorious.org/puppet-helpers/puppet-helpers>

# Puppet Environments

- z.B.:
  - development / staging / production
  - <https://puppetlabs.com/blog/git-workflow-and-puppet-environments/>
- r10k
  - <http://somethingsinistral.net/blog/rethinking-puppet-deployment/>



# Puppet Testing

- RSpec-Puppet (<http://rspec-puppet.com/>)
- <https://puppetlabs.com/blog/the-next-generation-of-puppet-module-testing/>
- <https://github.com/camptocamp/puppet-spec>
- <http://www.slideshare.net/PuppetLabs/carlos-sanchez-25547313>

# Verifizieren vom System

- RSpec tests
  - <http://serverspec.org/>
- mspectator
  - <https://github.com/raphink/mspectator>
- Tests::Server
  - <http://search.cpan.org/dist/Test-Server/>

# Custom Grml ISOs

- <http://grml.org/>
- `netscript=http://example.org/deployment.sh`
  - kann natürlich Beliebiges nachladen
  - `facter`, RAID-Management,...

## Grml - Live Linux for system administrators

**grml64-full Standard (2013.02, amd64)**

Additional boot entries for grml64-full:

Boot options for grml64-full >

Further boot options:

Addons >

Isolinux prompt

Boot from next boot device.



Press ENTER to boot or TAB to edit a menu entry

Grml is a Debian based Linux live system for system administrators and users of text tools.

<http://grml.org/>

Grml-Sipwise - The VoIP experts



### Rescue system boot (2013.01-rc1)

Install sip:providerCE - DHCP  
Install sip:providerCE - static NW config  
Install sip:providerPRO - sp1  
Install sip:providerPRO - sp2  
Install Debian/squeeze 64bit - DHCP  
Install Debian/squeeze 64bit - static NW  
Install Debian/squeeze 64bit - Puppet

### Install specific versions of CE/PRO

Specific sip:providerCE releases ... >  
Specific sip:providerPRO releases ... >

Press ENTER to boot or TAB to edit a menu entry

Automatic deployment system for the  
Sipwise Next Generation Communication  
Platform. <http://sipwise.com/>

Based on <http://grml.org/>



+++ Grml-Sipwise Deployment +++

grml64 2011.12 Release Codename Knecht Rootrecht [2011-12-23]

Host IP(s): 192.168.1.80 | Deployment version: 12483

16 CPU(s) | 12323648kB RAM | Running in blade chassis Slot2

Install ngcp: true | Install pro: true [sp2] | Install ce: false

Installing 2.4 platform using installer version 0.6.3

Install IP: 192.168.1.80 | Started deployment at Tue Jan 22 01:35:31 CET 2013

I: Retrieving dash

I: Validating dash

I: Retrieving libdb4.8

I: Validating libdb4.8

I: Retrieving debconf-i18n

I: Validating debconf-i18n

I: Retrieving debconf

I: Validating debconf

I: Retrieving debian-archive-keyring

I: Validating debian-archive-keyring

I: Retrieving debianutils

I: Validating debianutils

I: Retrieving diffutils

I: Validating diffutils

I: Retrieving dmidecode

I: Validating dmidecode

I: Retrieving dpkg

I: Validating dpkg

I: Retrieving e2fslibs

I: Validating e2fslibs

I: Retrieving e2fsprogs

I: Validating e2fsprogs

I: Retrieving libcomerr2

I: Validating libcomerr2

I: Retrieving libss2

I: Validating libss2



# ISO anpassen

- grml-live.git (<http://grml.org/grml-live/>): templates/  
boot/isolinux/\* anpassen
  - Bootoptionen (z.B. netscript=<http://example.org/path/to/deployment.sh>)
  - Bootsplash Layout (z.B. Firmenlogo)
- % sudo grml2iso -c templates -o custom.iso grml.iso
  - Teil von grml2usb (<http://grml.org/grml2usb/>)

# Admin-Doku

- z.B. mit Sphinx (reStructured TeXt, Such-Feature in HTML-Ausgabe inkludiert!)
- automatisch via Jenkins-Job bauen aus VCS
  - immer aktuelle Dokumentation für alle zugänglich (HTML, PDF,...)

23 UP

377 OK

0 / 0 / 0 DOWN

0 / 0 / 0 UNREACHABLE

0 PENDING

0 / 23 TOTAL

0 / 0 / 0 WARNING

0 / 0 / 0 CRITICAL

0 / 0 / 0 UNKNOWN

0 PENDING

0 / 377 TOTAL

23 / 0 / 0

0.00 / 0.02 / 0.018 s

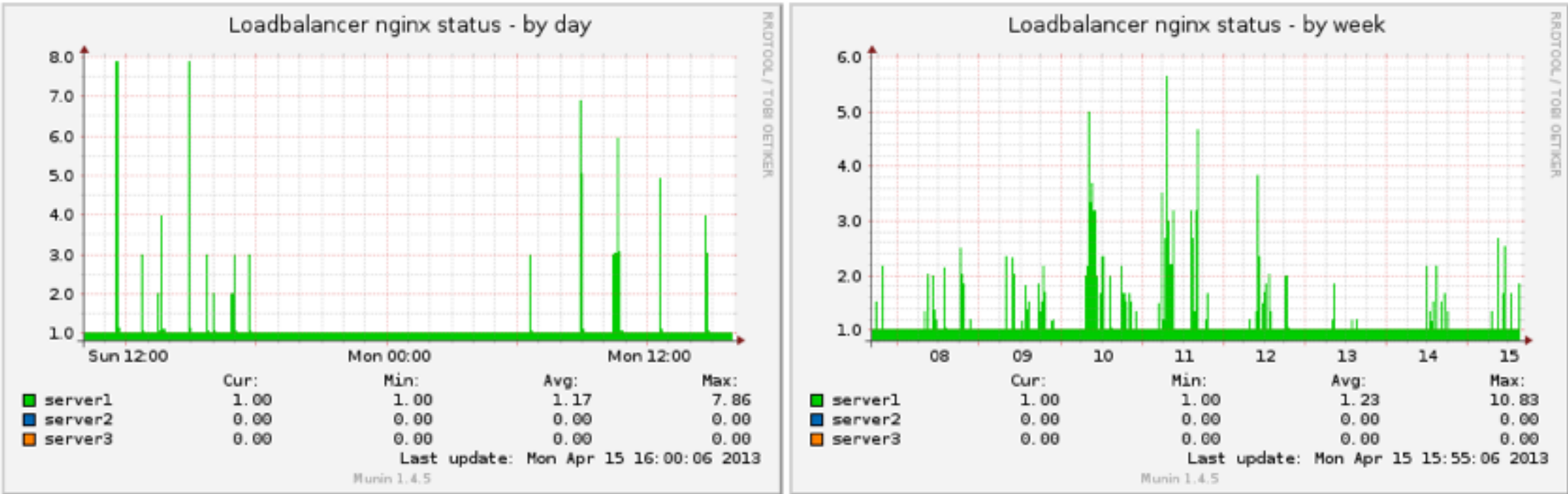
0.10 / 0.22 / 0.174 s

27 / 350 / 0

0.01 / 2.62 / 0.642 s

0.04 / 0.25 / 0.112 s

Production nginx LoadBalancer



Production nginx Backends



## The Xeer Admin Handbook

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- [Base installation](#)
  - [Base system](#)
  - [Network configuration](#)
  - [Put /etc under version control](#)
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  - [proxmox-utils](#)
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### Quick search

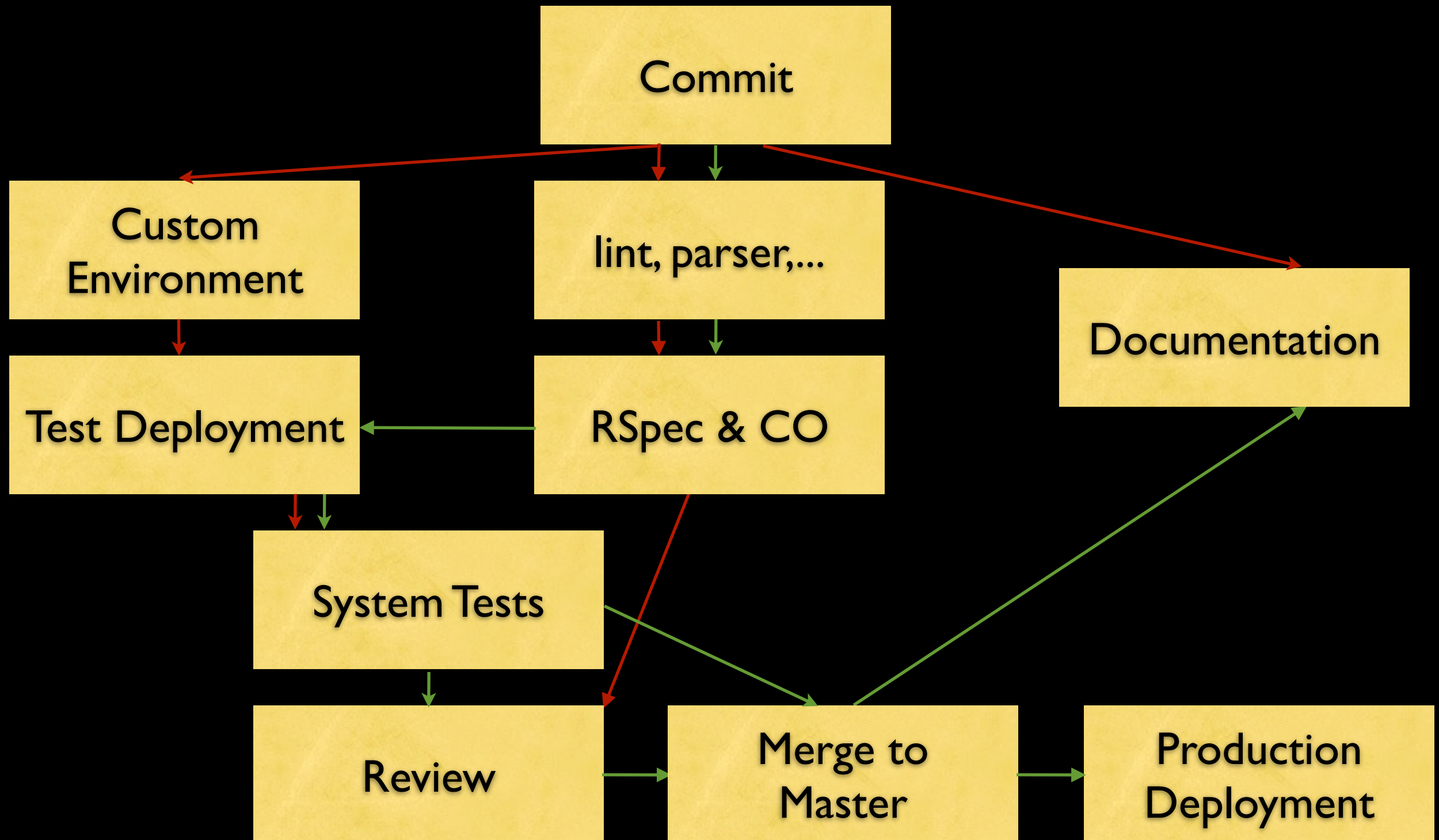
 

Enter search terms or a module,  
class or function name.

# Vagrant

- Vagrant base boxes + VMs bauen
  - <http://www.packer.io/>
  - <https://github.com/jedi4ever/veewee>
- Testen/Entwicklung mit Vagrant
  - <http://www.vagrantup.com/>
  - Entwickler können Puppet/Chef/...-Rezepte schreiben und testen!

# ein(!) Bsp. für mögliche Pipeline



# Best Practices

... oder nicht jeder muss die  
gleichen Schmerzen erleben



# Automatisieren was weh tut

Quelle: <http://www.flickr.com/photos/ctrl-l/3579073698/>



# Timestamper Plugin

```
18:09:54 Started by user Michael Prokop
18:09:54 Building in workspace /var/lib/jenkins/jobs/grml2usb-source-tests/
18:09:54 Checkout:workspace / /var/lib/jenkins/jobs/grml2usb-source-tests/w
18:09:54 Using strategy: Default
18:09:54 Last Built Revision: Revision 22238432167d60b8c1e781be26095995eb5d
18:09:54 Checkout:source / /var/lib/jenkins/jobs/grml2usb-source-tests/work
18:09:54 Fetching changes from 1 remote Git repository
18:09:54 Fetching upstream changes from git://github.com/grml/grml2usb.git
18:09:54 Seen branch in repository origin/HEAD
18:09:54 Seen branch in repository origin/master
18:09:54 Seen branch in repository origin/mika/grml2iso-templates
18:09:54 Seen branch in repository origin/mika/media_path
18:09:54 Seen branch in repository origin/mru/grml2iso-templates
18:09:55 Commencing build of Revision 22238432167d60b8c1e781be26095995eb5de
18:09:55 Checking out Revision 22238432167d60b8c1e781be26095995eb5de52a (or
18:09:55 Warning : There are multiple branch changesets here
18:09:55 [workspace] $ /bin/sh -xe /tmp/hudson8119103293049157429.sh
18:09:55 + rm -rf reports
18:09:55 [workspace] $ /bin/sh -xe /tmp/hudson3986771262421641804.sh
18:09:55 + mkdir -p reports
18:09:55 + /usr/bin/sloccount --duplicates --wide --details source
18:09:55 [workspace] $ /bin/sh -xe /tmp/hudson9165592941863928227.sh
18:09:55 + mkdir -p reports
18:09:55 + pep8 --repeat --ignore E501 source/grml2usb
18:09:55 [workspace] $ python /tmp/hudson6260668113947609498.py
18:09:55 huhu
18:09:55 Finished: SUCCESS
```

# Test Anything Protocol + Plugin

File: /var/lib/jenkins/jobs/ossbss-test-source/workspace/reports  
/perl/source lib SOAP WSDL SOAP Typelib Fault.pm

	Number	Description	Directive
	1	source/lib/SOAP/WSDL/SOAP/Typelib/Fault.pm source OK	

File: /var/lib/jenkins/jobs/ossbss-test-source/workspace/reports  
/perl/source lib SOAP WSDL SOAP Typelib Fault11.pm

	Number	Description	Directive
	1	Code before strictures are enabled at line 2, column 1. See page 429 of PBP. (Severity: 5)	



“discard old builds”



Quelle: <http://www.flickr.com/photos/epsos/5575089139/>



schnelle

Hardware nutzen

Entwicklerzeit ist

teuer



# Homogenität



Quelle: <http://www.flickr.com/photos/baggis/226567107/>



Builds **triggern**  
und *nicht* **pollen**



# Jenkins Jobs Handling

- Erstellen von Jobs automatisieren
- Configs in VCS speichern
  - <https://wiki.jenkins-ci.org/display/JENKINS/SCM+Sync+configuration+plugin>
- jenkins-job-builder & CO
  - <https://github.com/openstack-infra/jenkins-job-builder>
  - ... viele weitere Tools: <https://gist.github.com/mika/5237127>

# Externe Abhängigkeiten beseitigen

Beispiele, was schiefgehen kann (BTDT):

- Github
- PyPI
- RubyGems
- Percona Repository
- ....

There are only two hard  
problems in Computer Science:  
cache invalidation, naming things  
and off-by-one errors.

Jenkins Master als  
Controlinstanz  
+ Jenkins Slaves fürs  
Bauen

# Dashboards

- View auf Repository
- View auf Build-Status
- Frontend für Bauen von Releases
- z.B. Sinatra, Flask, PerlDancer,...

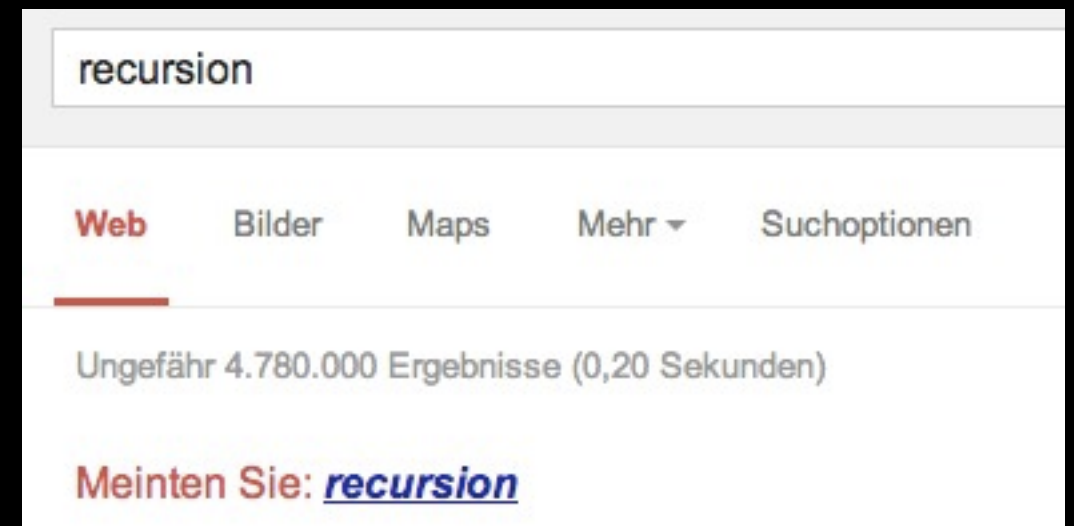
# Low-Hanging Fruits für Speedup

- tmpfs
- eatmydata
- lokaler Package-Mirror

# Achtung vor Catch-22

1) CI-Upgrade geht nicht wegen Bug,  
Bugfix von Plugin hängt aber von neuer  
CI-Version ab

2) Buildskripte die unter  
dem CI-System stecken  
kommen vom CI-System  
selbst





Wartungsfenster auch  
für CI-Umgebung  
schaffen

...Testumgebung!

# Recap

- Keine Angst vor Jenkins
- Verfügbare Jenkins-Plugins anschauen
- Automatisierung (Paketmanagement, Configuration Management,...)
- Kein manuelles SSH (fabric, mcollective,...)
- Tests schreiben
- Dashboards

# Fragen || Wünsche?

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