



Continuous Integration mit Jenkins

Lessons Learnt & Best Practices

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Mika?

Debian Developer
Project lead of Grml.org
Founder of Grml-Forensic.org
Member in Debian Forensic Team
Involved in several OS projects
Author of Book „Open Source
Projektmanagement“
IT Consultant

Agenda

Warum überhaupt CI?

Warum Jenkins?

Erste Schritte

Hilfreiche Plugins

Anwendungsbeispiele

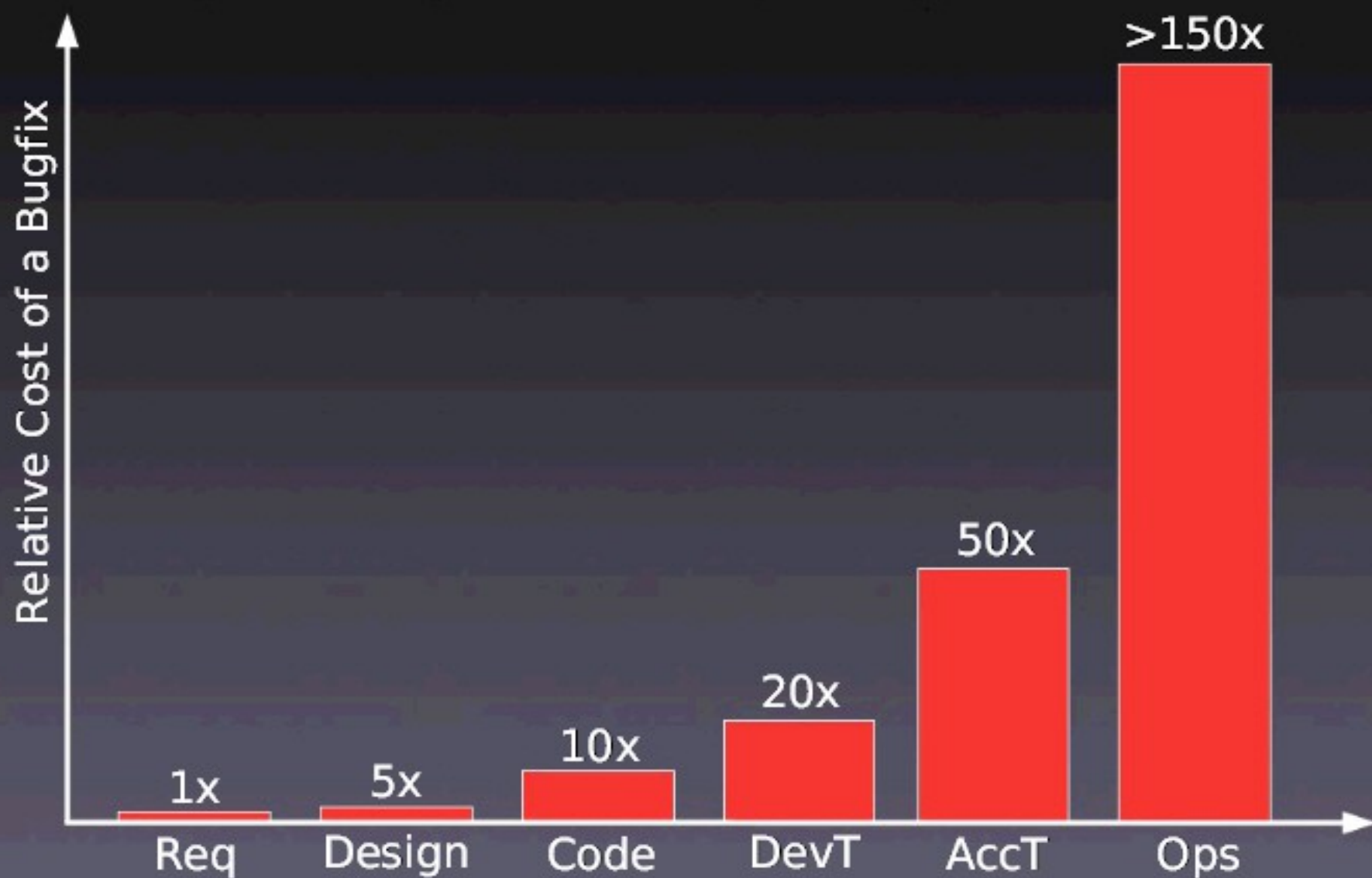
Best Practices

Stolpersteine && Wartungsschmerzen

Ist CI das Ende der Fahnenstange?

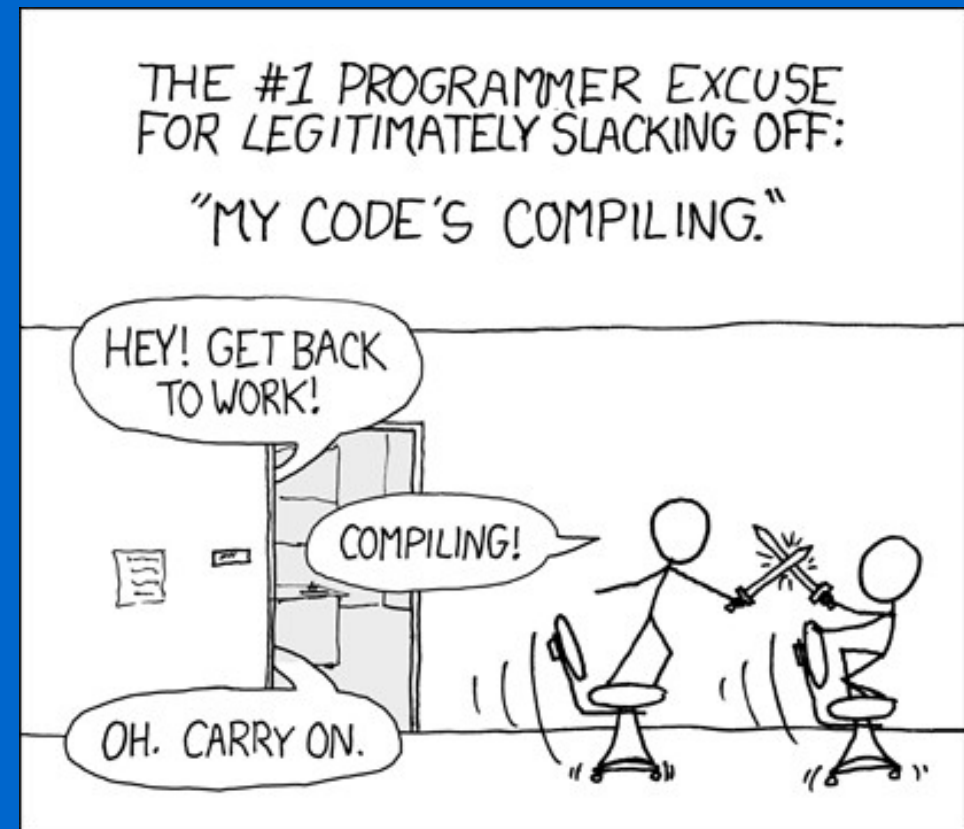
Warum CI?





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

Einfach nur
% make
ist **NICHT**
genug!



A dark, abandoned room with a broken television set and graffiti on the wall. The room is in a state of decay, with debris on the floor and peeling paint on the walls. Two windows with multiple panes are visible on the left wall. A doorway on the right leads to another room. A large, old television set with a shattered screen sits on the floor in the foreground. Graffiti is visible on the wall to the right of the doorway.

Unabhängig von Entwickler-Laptop

Nur, was in **VCS** ist, zählt

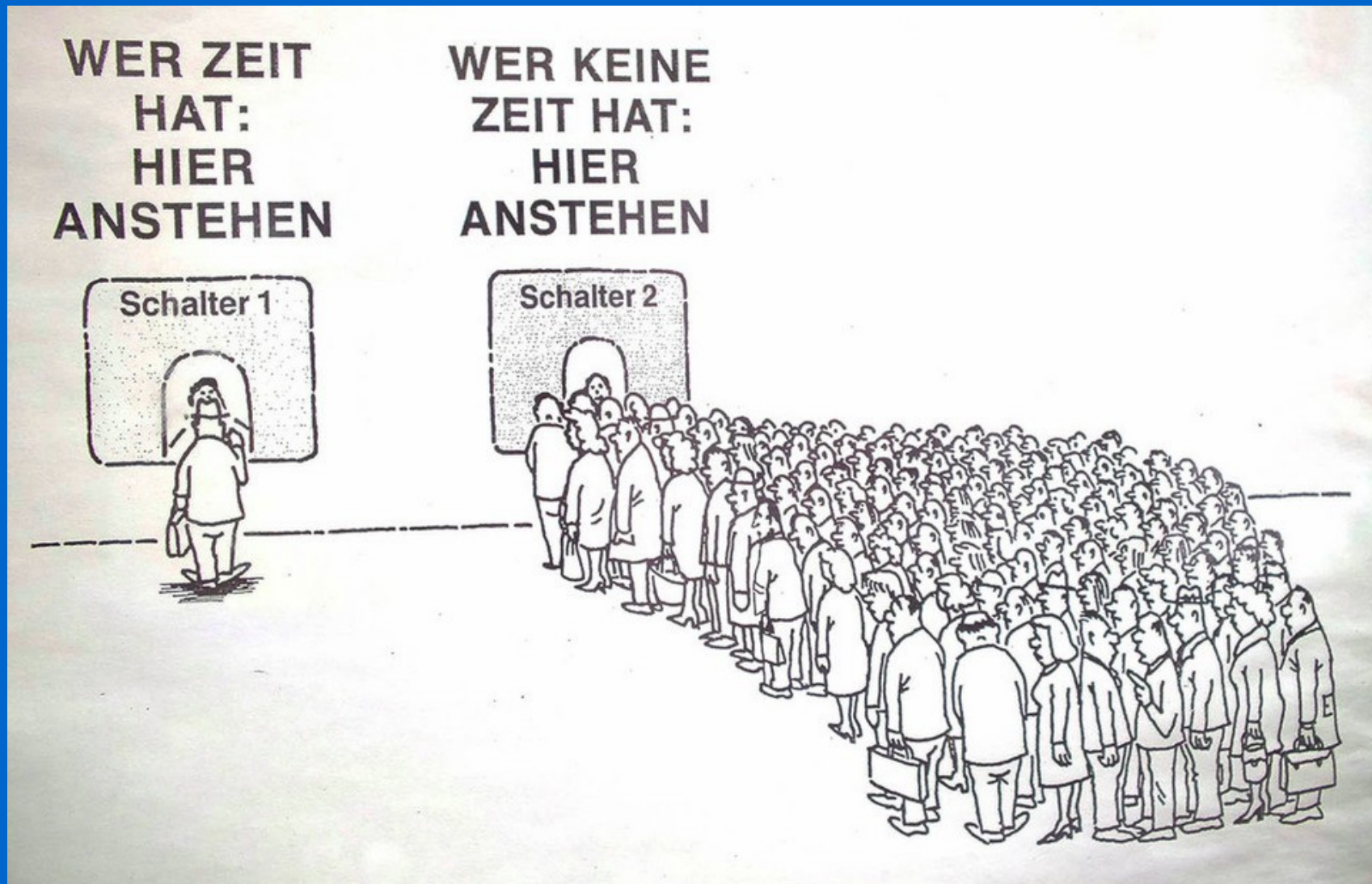




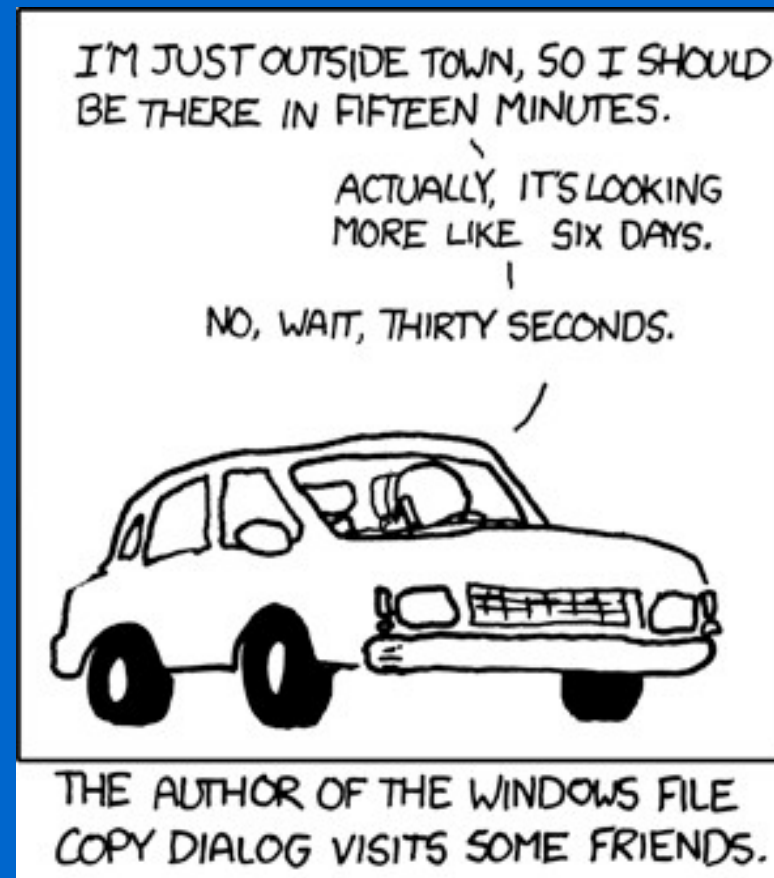
**Reproduzierbar
... ohne Workarounds**

Skalierbar

Leute & Maschinen

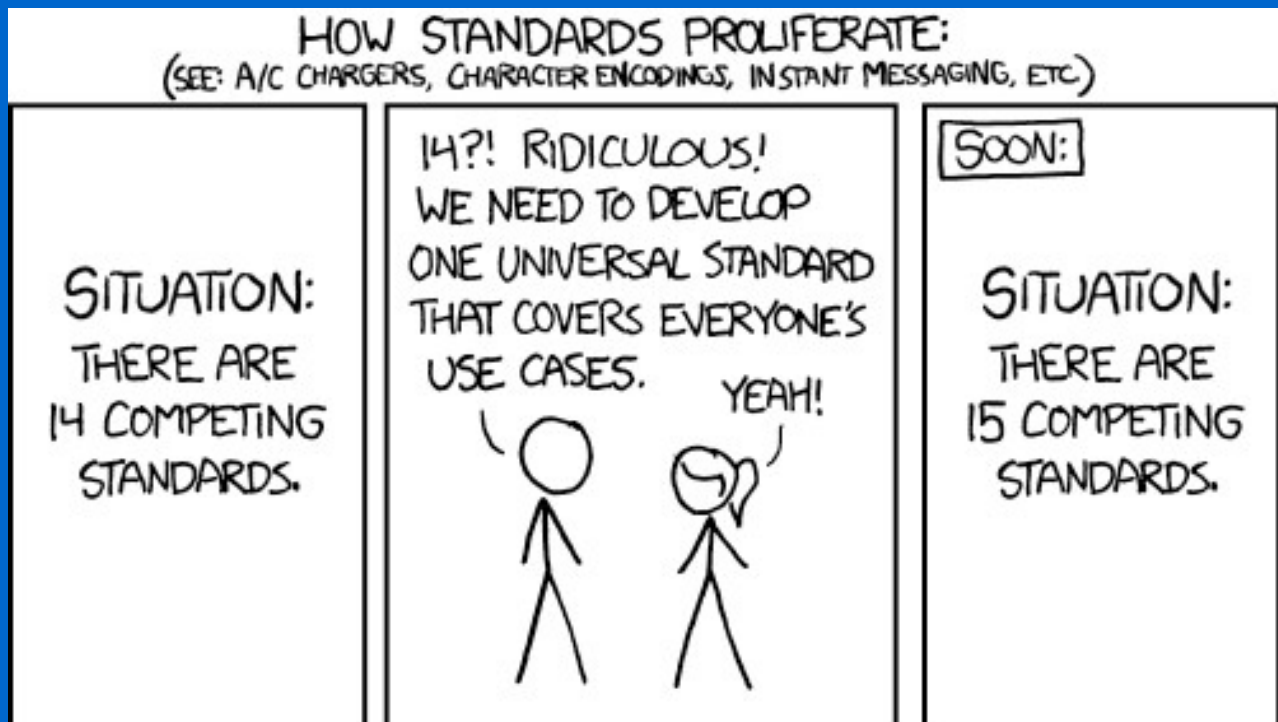


Berechenbar



Standards

etablieren & nutzen



Tests!

Auto.

Matisch.



Warum Jenkins?

QuickBuild

Buildbot

Bamboo

Bitten

CDash

pony-build

Apoycot

CruiseControl

cijoe

Integrity

Team City

Jenkins

Continuum



Jenkins

AKA

“The Wordpress of CI”™

Hudson: 2004

Jenkins: 2011

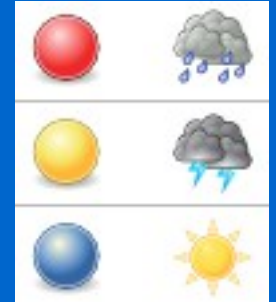
~wöchentliche Releases && LTS-Version

MIT Lizenz

>500 Plugins

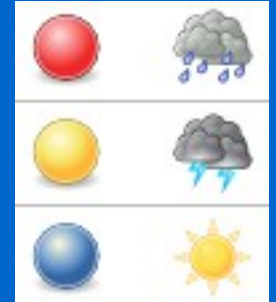
Community

>40k Installationen (03/12)



FAQ #1: Blau?!

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



FAQ #2: Gelb?!

FAQ #42: Java?!

Erste Schritte

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

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

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

Disclaimer: SW-Pakete für Produktionsbetrieb!

[New Job](#)

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

[People](#)[Build History](#)[Project Relationship](#)[Check File Fingerprint](#)[Manage Jenkins](#)

Build Queue

No builds in the queue.

[Build Executor Status](#)

#	Status
1	Idle
2	Idle

[Help us localize this page](#)

[New Job](#)

[People](#)

[Build History](#)

[Project Relationship](#)

[Check File Fingerprint](#)

[Manage Jenkins](#)

Build Queue

No builds in the queue.

[Build Executor Status](#)

#	Status	
1	Idle	
2	Idle	

Job name

☒ **Build a free-style software project**

This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.

☐ **Build a maven2/3 project**

Build a maven2 project. Jenkins takes advantage of your POM files and drastically reduces the configuration.

☐ **Build multi-configuration project**

Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.

☐ **Monitor an external job**

This type of job allows you to record the execution of a process run outside Jenkins, even on a remote machine. This is designed so that you can use Jenkins as a dashboard of your existing automation system. See [the documentation for more details](#).

OK

[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](#)[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](#)

[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
```

Hilfreiche Plugins

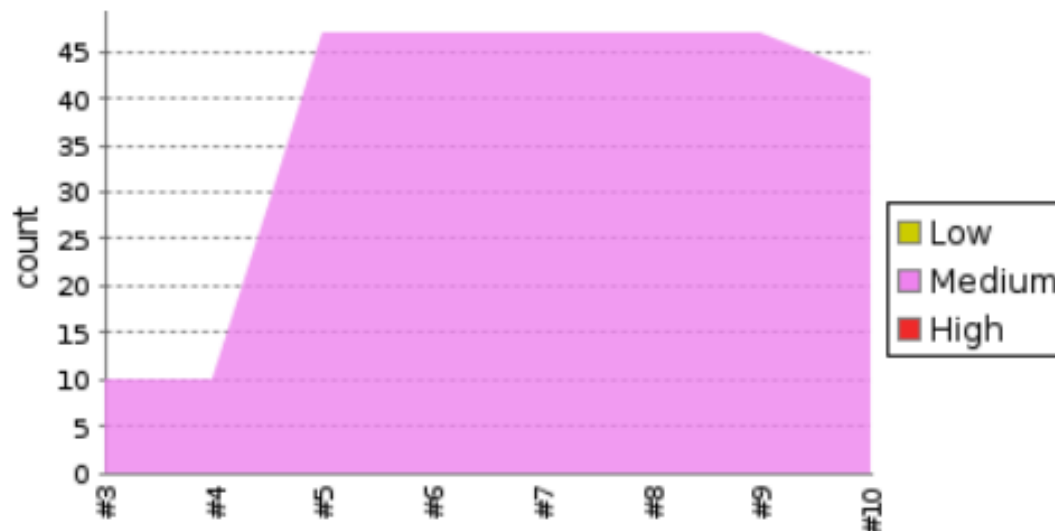
Violations Plugin



Violations Report for build 10

Type	Violations	Files in violation
pep8	42 (-5)	1

pep8



filename	l	m	h	number ↑
source/grml2usb	0	42	0	42 (-5)

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 22238432167d60b8cle781be26095995eb5d
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 22238432167d60b8cle781be26095995eb5de
18:09:55 Checking out Revision 22238432167d60b8cle781be26095995eb5de52a (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

für bash, erlang, perl, python, ruby,...

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)	

Gerrit Trigger [Plugin]

Bruce Schneier [Plugin]

... knows Alice and Bob's shared secret.

Chuck Norris [Plugin]

... can instantiate an abstract class



Persona Plugin



Weitere Anwendungsbeispiele

Grml.org

Daily Builds & Releases
(>80 Jobs)

grml-live

Product Name

Defaults to "autobuild".

Release Codename

Defaults to "autobuild-VERSION".

Debian Suite

Architecture

Classes

Build Directory

Build Directory defaults to `workspace` if unset.

Version

If you want to use an autogenerated version string enable the setting "Use date as version".

Extract previous ISO

If you want to update or build from an existing ISO, specify its name here.

Use date as version (YYYYMMDD) ☒

Do not update chroot ☐

(build-only mode)

Delete

grml-live: generate changelist

Output filename

Defaults to "changelog.txt".

dpkg.list.old name

dpkg.list to compare against. Defaults to "dpkg.list.old".

Save

Apply

[Back to Dashboard](#)
[Status](#)
[Changes](#)

Project dpkg-binaries

The Debian package management system.

<http://anonscm.debian.org/gitweb/?p=dpkg/dpkg.git;a=summary>

APT instructions:

```
deb http://jenkins.grml.org/debian dpkg main
```

```
deb-src http://jenkins.grml.org/debian dpkg main
```

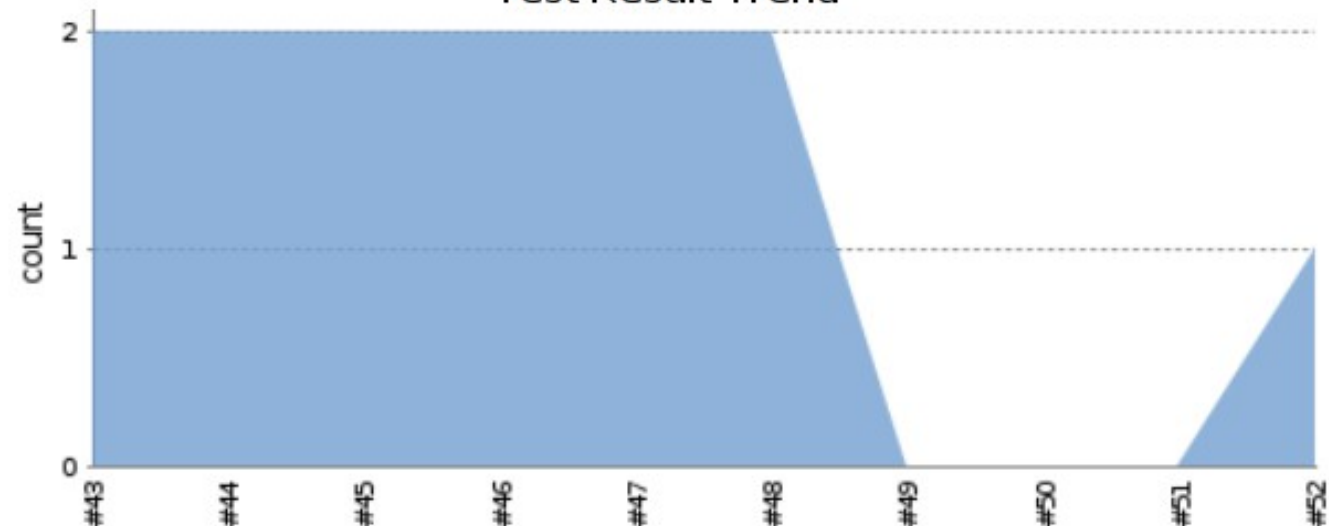
```
wget -O - http://jenkins.grml.org/debian/C525F56752D4A654.asc | sudo apt-key  
add -
```

Configurations

[amd64](#) [i386](#)

Disk Usage: Workspace 12MB, Builds 132MB

Test Result Trend



Build History (trend)	
#53	Apr 27, 2012 2:04:38 AM
#52	Apr 24, 2012 7:01:58 PM 13MB
#51	Apr 24, 2012 7:00:11 PM 8MB
#50	Apr 24, 2012 3:05:32 PM 8MB
#49	Apr 24, 2012 7:21:25 AM 8MB
#48	Apr 18, 2012 8:14:42 PM 16MB
#47	Apr 18, 2012 11:00:34 AM 16MB
#46	Apr 15, 2012 10:43:27 PM 16MB
#45	Apr 15, 2012 10:50:41 AM 16MB
#44	Apr 14, 2012 9:19:03 AM 16MB
#43	Apr 13, 2012 9:51:29 PM 16MB

[RSS for all](#) [RSS for failures](#)

Sipwise.com

**Komplettes Release Management
(>190 Jobs)**

Automatische Erstellung von VM-Images

Project **vmbuilder-ce**

This build requires parameters:

release

sip:providerCE release that should be built

vmbuilder ☒

build VMware/Virtualbox images?

vmversion

If set to something other than "release" the selected string will be used as VM version. So you can use e.g. the 2.4 version in the release setting and specify 2.4.1 in this setting to get according 2.4.1 VM images. If "vmversion" should be the same as "release" then just take the default ("release").

Build

Selenium

This build requires parameters:

url

URL of Sipwise sip:provider webpanel

Build

**Aufwendige Tests einfach und
reproduzierbar machen**

~~Checklisten~~

Project release-update

This build requires parameters:

release

Release to be synchronized.

fake ☐

Enable to fake execution to see what's pending. Output available at <http://deb.sipwise.com/autobuild/pending/>

Build

Manuelle Schritte vermeiden!

Best Practices

Schnellste verfügbare **Hardware**
besorgen, **Entwicklerzeit** ist teurer
als gute + schnelle Hardware

Ausssschließlich aus VCS
heraus bauen



**Homogenität &&
Build-Skripte**



„discard old builds“

Builds triggern
... und **NICHT** pollen

Viele ähnliche Jobs?

config-Builder einsetzen

um Jobs zu managen

**Bauen in dezidierten
Buildumgebung**

Master als
Kontrollinstanz,
Bauen auf Slaves

Slaves & Distributed Builds

S	Name ↓	Architecture
	<u>master</u>	Linux (amd64)
	<u>doc-builder</u>	Linux (amd64)
	<u>jenkins-slave1</u>	Linux (amd64)
	<u>jenkins-slave2</u>	Linux (amd64)
	<u>jenkins-slave3</u>	Linux (amd64)
	<u>jenkins-slave4</u>	Linux (amd64)
	<u>jenkins-slave5</u>	Linux (amd64)
	<u>jenkins-slave6</u>	Linux (amd64)
		

Automatisieren

... was auch immer weh tut



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

**Externe Abhängigkeiten
beseitigen**



Downstream + Upstream Jobs

Upstream Projects

 [db-schema-source](#)

Downstream Projects

 [db-schema-repos](#)

Artifacts + Fingerprints



Workspace



Last Successful Artifacts

 lintian.txt	3025 
 ngcp-db-schema 0.1.3+0~1335458649.svn8554.89.dsc	621 
 ngcp-db-schema 0.1.3+0~1335458649.svn8554.89.tar.gz	91012 
 ngcp-db-schema 0.1.3+0~1335458649.svn8554.89 all.deb	76448 
 ngcp-db-schema 0.1.3+0~1335458649.svn8554.89 amd64.changes	4270 



Recent Changes



Latest Test Result (no failures)

Notifications

via Mail, Jabber, IRC, RSS,...



Quelle: www.youtube.com/watch?v=1EGk2rvZe8A

Stolpersteine && Wartungsschmerzen

Fehler nicht maskieren

```
if ! $skript ; then rm -f $buildplace/* ; fi
```

**Lang laufende Jobs mit
kurzen Jobs vorschalten
die ASAP fehlschlagen**

Achtung vor Catch-22

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

Matrix Jobs sind speziell™

Ist **CI** das Ende der
Fahnenstange?

Continuous Deployment

UAT == OK? An Kunden ausliefern!

Continuous **Delivery**

jederzeit potentiell releasefähig

Weiterführende Literatur

**Jez Humble & David Farley:
Continuous Delivery,
Addison-Wesley, 2010**

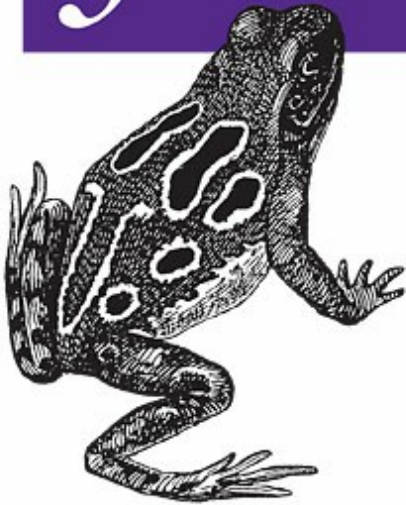
Continuous Integration for the Masses

**Also Covers
Hudson**



Jenkins

The Definitive Guide



O'REILLY®

John Ferguson Smart

*Foreword by Kobsuke Kawaguchi,
creator of Jenkins/Hudson*

Jenkins The Definitive Guide

wakaleo.com/books/jenkins-the-definitive-guide

Fragen || Wünsche?

@mikagrml
mika @ github
michael-prokop.at/blog/
grml-solutions.com

Quellenangaben

<http://www.flickr.com/photos/27017674@N06/5557802327/lightbox/>

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

<http://www.flickr.com/photos/josephrobertson/4429285449/>

<http://www.flickr.com/photos/trevi55/575665048/>

<http://www.flickr.com/photos/helico/1568566210/>

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

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

<http://www.flickr.com/photos/k0re/4081617381/>

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

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

...