

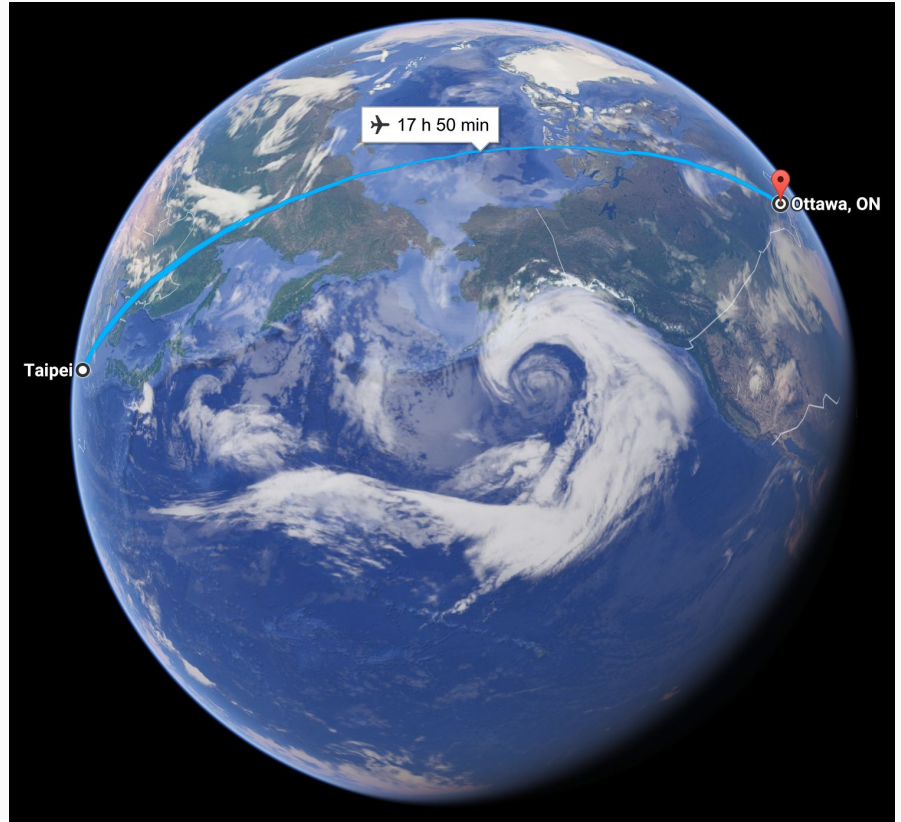
Continuous Integration of The FreeBSD Project

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<https://lwhsu.org>

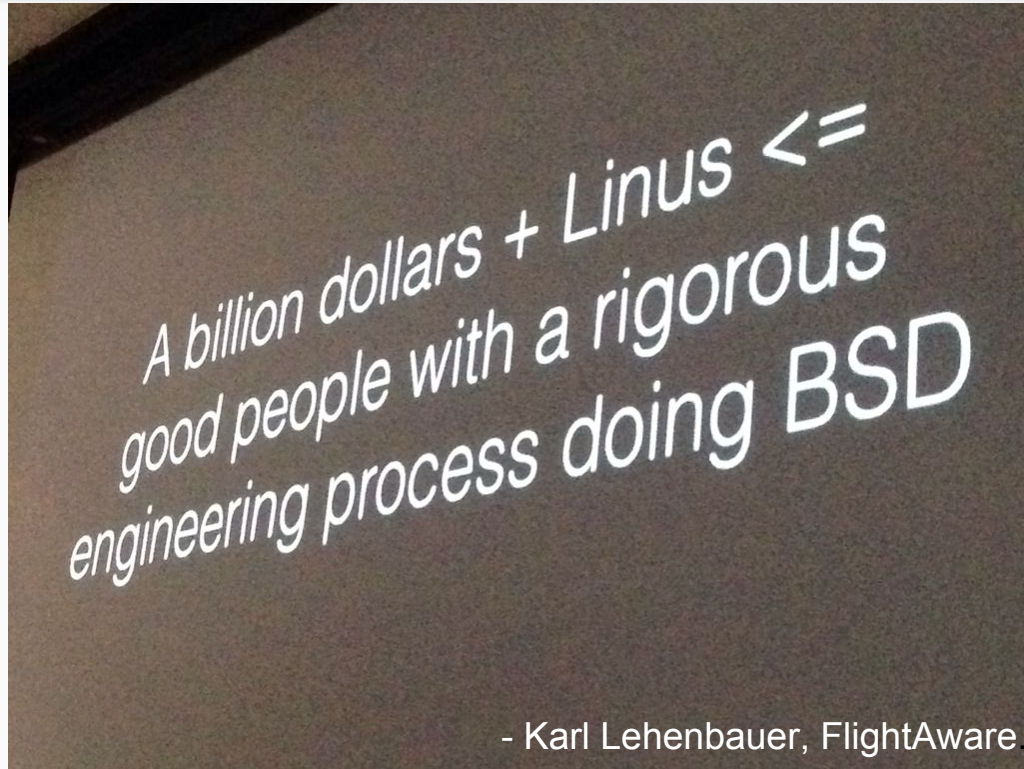


Something about Me

- 許立文
- From Taiwan, a.k.a. Formosa
- System Administrator
- Instructor
- Programmer
- Traveler
- Diver
- Snowborder
- Cyclist



BSDCan 2014 Keynote



We Need a (more) Higher Quality FreeBSD

- A higher quality Releasee
- Buildable -CURRENT branch
- Reliable -STABLE branch
- Faster development

Test Early, Test Often

Integration Test IS Important

We need to do it continuously.



Continuous Integration (CI)

Grady Booch, 1991

A software engineering practice of merging all developer working copies to a shared mainline several times a day

- To know conflicts earlier
- To know bugs earlier

CI Best Practices

- Maintain a code repository
- Automate the build
- Make the build self-testing
- Everyone commits to the baseline every day
- Every commit (to baseline) should be built
- Keep the build fast
- Test in a clone of the production environment
- Make it easy to get the latest deliverables
- Everyone can see the results of the latest build
- Automate deployment

We Do This from Beginning

- Maintain a code repository ✓ (svn.FreeBSD.org)
- Automate the build
- Make the build self-testing
- Everyone commits to the baseline every day
- Every commit (to baseline) should be built
- Keep the build fast
- Test in a clone of the production environment
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- Everyone can see the results of the latest build
- Automate deployment

We are an Open Source OS Project

- Maintain a code repository ✓ (svn.FreeBSD.org)
- Automate the build
- Make the build self-testing
- ~~Everyone commits to the baseline every day~~
- Every commit (to baseline) should be built
- Keep the build fast
- ~~Test in a clone of the production environment~~
- Make it easy to get the latest deliverables
- Everyone can see the results of the latest build
- ~~Automate deployment~~

What We Need

- Automate the build
- Make the build self-testing
- Every commit (to baseline) should be built
- Keep the build fast
- Make it easy to get the latest deliverables
- Everyone can see the results of the latest build

What We Do

A good CI system should provide:

- Automate the build
- Make the build self-testing
- Make it easy to get the latest deliverables
- Everyone can see the results of the latest build

Needs help from everyone:

- Every commit (to baseline) should be buildable
- Keep the build fast

Automatic Build & Some History

2002~2014, Tinderbox

- By Dag-Erling Smørgrav <des@FreeBSD.org>
- <http://tinderbox.freebsd.org>
 - Probably started in March 2002
 - Probably stopped in September 2014
- Open Sourced
 - <svn://svn.freebsd.org/base/user/des/tinderbox>
- Well Documented
 - <https://www.freebsd.org/doc/en/books/developers-handbook/testing-tinderbox.html>
 - <https://wiki.freebsd.org/Tinderbox>

tinderbox.FreeBSD.org

	amd64	arm	armv6 arm	i386	i386 pc98	ia64	mips	mips64 mips	powerpc	powerpc64 powerpc	sparc64
head	2014-09-17 12:53 UTC summary full log	2014-09-17 10:19 UTC summary full log	2014-09-17 13:46 UTC summary full log	2014-09-17 13:24 UTC summary full log	2014-09-17 09:13 UTC summary full log	n/a	2014-09-17 08:54 UTC summary full log	2014-09-17 07:04 UTC summary full log	2014-09-17 10:27 UTC summary full log	2014-09-17 10:23 UTC summary full log	2014-09-17 07:20 UTC summary full log
stable/10	2014-09-17 13:10 UTC summary full log	2014-09-17 11:04 UTC summary full log	2014-09-17 12:22 UTC summary full log	2014-09-17 13:33 UTC summary full log	2014-09-17 10:15 UTC summary full log	2014-09-17 09:43 UTC summary full log	2014-09-17 10:22 UTC summary full log	2014-09-17 08:39 UTC summary full log	2014-09-17 11:03 UTC summary full log	2014-09-17 10:58 UTC summary full log	2014-09-17 08:56 UTC summary full log
stable/9	2014-09-17 13:57 UTC summary full log	2014-09-17 07:47 UTC summary full log	n/a	2014-09-17 04:59 UTC summary full log	2014-09-17 08:27 UTC summary full log	2014-09-17 08:08 UTC summary full log	2014-09-17 06:14 UTC summary full log	n/a	2014-09-17 09:15 UTC summary full log	2014-09-17 09:25 UTC summary full log	2014-09-17 07:22 UTC summary full log
stable/8	2014-09-17 14:01 UTC summary full log	2014-09-17 14:01 UTC summary full log	n/a	2014-09-17 14:01 UTC summary full log	2014-09-17 14:01 UTC summary full log	2014-09-17 14:01 UTC summary full log	2014-09-17 14:01 UTC summary full log	n/a	2014-09-17 14:01 UTC summary full log	n/a	2014-09-17 14:01 UTC summary full log
stable/7	2014-09-17 14:00 UTC summary full log	n/a	n/a	2014-09-17 14:00 UTC summary full log	2014-09-17 14:00 UTC summary full log	2014-09-17 14:00 UTC summary full log	n/a	n/a	2014-09-17 14:00 UTC summary full log	n/a	2014-09-17 14:00 UTC summary full log

2013, jenkins-admin@FreeBSD.org

- Founded by Craig Rodrigues in late 2013
 - Current Members:
 - Baptiste Daroussin (bapt@), Brad Davis (brd@), Brooks Davis (brooks@), Craig Rodrigues (rodrigc@), Li-Wen Hsu (lw@), Steve Wills (swills@)
 - <https://www.freebsd.org/administration.html#t-jenkins-admin>
 - Alumni:
 - Julio Merino (jmmv@), Steven Kreuzer (skreuzer@), R. Tyler Croy, Ahmed Kamal
- First working group was in BSDCan 2014
- Discussions continued in following conferences
 - EuroBSDCon 2016, AsiaBSDCon 2017, BSDCan 2017 (yesterday!)
- More information: <https://wiki.FreeBSD.org/Jenkins>
 - TODO items: <https://wiki.FreeBSD.org/Jenkins/TODO>

Jenkins

- An open source automation server written in Java
- Created by Kohsuke Kawaguchi
- <https://jenkins.io>
- Helps automating the non-human part of the whole software development process
 - Continuous Integration
 - Continuous delivery
- Extended by various of plugins




Jenkins

2013, <https://Jenkins.FreeBSD.org>

- Created and operated by jenkins-admin@ since the group formed
- Independent successor of tinderbox.FreeBSD.org
- Periodically builds and tests FreeBSD src and doc trees
 - Branches: head, stable-11, stable-10, stable-9
 - Architectures: amd64, i386, sparc64
 - Others: build with GCC
 - Leverage the cross toolchain
 - amd64 cross build amd64 itself ;-)
- Repository: <https://github.com/freebsd/freebsd-ci>

https://Jenkins.FreeBSD.org

Jenkins [log in](#) [ENABLE AUTO REFRESH](#)

People


Build History

Build Queue

No builds in the queue.

Build Executor Status

- master
 - 1 Idle
- chaos.ysv.freebsd.org (offline)
- havoc.ysv.freebsd.org (offline)
- jenkins-10.freebsd.org
 - 1 part of [FreeBSD_HEAD](#) #699
- jenkins10a.freebsd.org
 - 1 [FreeBSD_HEAD_amd64_gcc](#) #1610
- jenkins9b.freebsd.org
 - 1 Idle
 - 2 Idle
- kyua1.nyi.freebsd.org ▾
 - 1 [FreeBSD_HEAD_arm64](#) #4003



This is build and test server for [The FreeBSD Project](#).

See the [Jenkins wiki page](#) for more information.

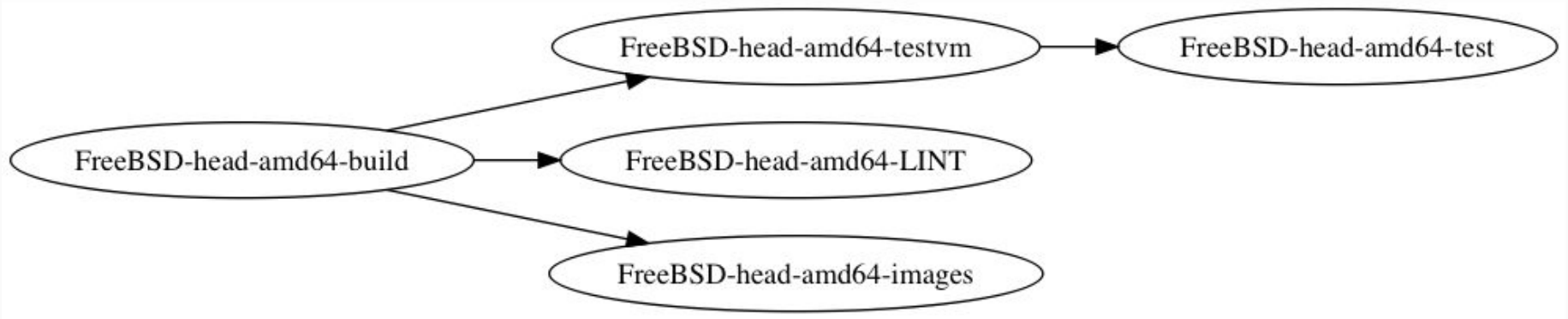
All [FreeBSD_doc](#) [FreeBSD_ports_ci](#) [FreeBSD_ports_ci_head](#) [FreeBSD_src_head](#) [FreeBSD_src_stable](#) [Tests](#)

S	W	Name ↓	Last Success	Last Failure	Last Duration	Number of builds
🔴	☁️	AlwaysPass	11 mo - #10	11 mo - #19	0.5 sec	🟢 1 🟡 0 🔴 9
🟢	☁️	FreeBSD_DOC	19 hr - #842	1 day 8 hr - #838	29 sec	🟢 804 🟡 0 🔴 17
🟢	☀️	FreeBSD_Doc-igor	19 hr - #2226	1 mo 24 days - #2146	39 sec	🟢 191 🟡 0 🔴 9
🔴	☁️	FreeBSD_DOC-phabric	N/A	20 days - #200	9.4 sec	🟢 0 🟡 0 🔴 200
🟢	☀️	FreeBSD_HEAD	4 hr 13 min - #698	1 day 13 hr - #688	2 hr 45 min	🟢 445 🟡 117 🔴 118
🔴	☁️	FreeBSD_HEAD-modules	2 yr 2 mo - #682	2 yr 2 mo - #686	2 hr 15 min	🟢 161 🟡 0 🔴 4
🔴	☀️	FreeBSD_HEAD-scan-build	9 mo 27 days - #162	12 mo - #151	3 min 56 sec	🟢 65 🟡 13 🔴 53
🟢	☀️	FreeBSD_HEAD_amd64_gcc	2 hr 25 min - #1609	1 day 1 hr - #1602	1 hr 25 min	🟢 192 🟡 0 🔴 8
🟢	☀️	FreeBSD_HEAD_arm64	1 hr 48 min - #4002	14 hr - #3997	1 hr 11 min	🟢 183 🟡 0 🔴 17
🟢	☀️	FreeBSD_HEAD_i386	2 hr 49 min - #3992	14 hr - #3987	1 hr 9 min	🟢 187 🟡 0 🔴 13

2016, <https://CI.FreeBSD.org>

- Started in last summer, right after BSDCan 2016
- Also based on Jenkins
- Experiment for some new ideas and features
- Artifact server introduced
 - Pass artifact between stages in a pipeline
 - Open to the public for doing more tests
- Job template
 - Make it easier to add new CI jobs without knowing jenkins configuration
- Codes have been merged back to freebsd/freebsd-ci repository
 - <https://github.com/freebsd/freebsd-ci>

head-amd64-* Jobs on CI.FreeBSD.org



Automatic Build on <https://CI.FreeBSD.org>

- *-build jobs
 - `scripts/build/build-world-kernel.sh`
 - Generalized for different versions and architectures
 - `make buildworld & buildkernel`
 - Build distribution files
- *-LINT jobs
 - `scripts/build/build-kernel-LINT.sh`
 - Build LINT kernel

Self Tests

Kyua

- Testing framework for infrastructure software
- By Julio Merino <jmmv@{NetBSD,FreeBSD}.org>
- Repository
 - <https://github.com/jmmv/kyua>
- Documentation
 - <https://github.com/jmmv/kyua/wiki/Quickstart>
 - Julio's talk & tutorial at AsiaBSDCon 2014
 - <https://drive.google.com/drive/folders/0B08g-X1kPkSYNmIEdTb5RjIFbkk>

bhyve - The BSD Hypervisor

- <http://bhyve.org/>
- Built in FreeBSD since 10.0
- On ci.FreeBSD.org
 - *-images jobs build virtual machine images installed by distribution files
 - *-testvm jobs build virtual machine with kyua installed
 - Basically the same with above job, but virtual disk size is smaller
- *-test jobs take testvm image from artifact server and run it
 - For RISC-V architecture we use QEMU

Putting Them Together

- Create virtual machine image
 - Pre-install kyua package and test files (under /usr/tests)
 - Customize /etc/rc.local to:
 - Run tests
 - Generate reports
 - Shutdown virtual machine
 - scripts/build/build-test_image.sh
- Run tests in virtual machine
 - Fetch the vm image, boot it
 - Wait for it completes running tests, or kill it when timeout
 - Extract test reports from the vm image
 - scripts/test/run-tests.sh

Access to Results

JUnit Format Output

```
<testcase classname="bin.cat.cat_test" name="align" time="0.018">
<system-out>Executing command [ /bin/sh -c cat -be /usr/tests/bin/cat/d_align.in ]
</system-out>
<system-err>Test case metadata
-----

allowed_architectures is empty
allowed_platforms is empty
description = Test that cat(1) aligns the output right with options &apos;-be&apos; (PR bin/4841)
has_cleanup = false
is_exclusive = false
required_configs is empty
required_disk_space = 0
required_files is empty
required_memory = 0
required_programs is empty
required_user is empty
timeout = 300

Timing information
-----

Start time: 2016-09-23T01:22:37.490230Z
End time:   2016-09-23T01:22:37.508471Z
Duration:   0.018s

Original stderr
-----

<&lt;EMPTY&&gt;
</system-err>
</testcase>
```

Parsed and Displayed by Jenkins

<https://<job url>/<build number>/testReport>

Test Result

0 failures (-3) , 64 skipped (-81)

6,023 tests (±0)

[Took 31 min.](#)

All Tests

Package	Duration	Fail	(diff) Skip	(diff) Pass	(diff) Total	(diff)
bin.cat	61 ms	0	0	3	3	
bin.date	0.89 sec	0	0	39	39	
bin.dd	0.16 sec	0	0	3	3	
bin.expr	0.25 sec	0	0	14	14	
bin.ls	6.8 sec	0	0	35	35	
bin.mv	0.36 sec	0	0	1	1	
bin.pax	95 ms	0	0	1	1	
bin.pkill	55 sec	0	0	28	28	
bin.sh.builtins	3.9 sec	0	0	163	163	

Failed Test Case Display

Failed

`sys.geom.class.gate.ggate_test.ggatel_file` (from (test-report.xml))

Failing for the past 3 builds (Since 🟡 [#1505](#))
[Took 60 ms.](#)

Error Message

```
work md5 checksum didn't match
```

Standard Output

```
Executing command [ ggatel create -u 0 work ]
```

Standard Error

```
Test case metadata
```

```
-----
```

Test Result Trend

Project FreeBSD-head-amd64-test



[Recent Changes](#)



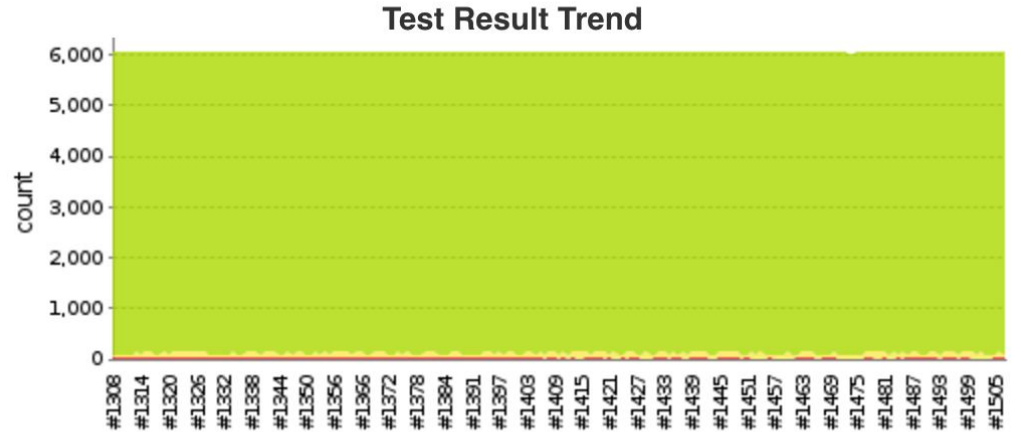
[Latest Test Result](#) (1 failure / -3)

Upstream Projects

 [FreeBSD-head-amd64-testvm](#)

Permalinks

- [Last build \(#1508\)](#), 34 min ago
- [Last stable build \(#1504\)](#), 8 hr 22 min ago
- [Last successful build \(#1507\)](#), 3 hr 14 min ago
- [Last failed build \(#1387\)](#), 7 days 7 hr ago
- [Last unstable build \(#1507\)](#), 3 hr 14 min ago
- [Last unsuccessful build \(#1507\)](#), 3 hr 14 min ago
- [Last completed build \(#1507\)](#), 3 hr 14 min ago



[\(just show failures\)](#) [enlarge](#)

Artifacts

- *.txz
 - From *-build jobs
 - Distribution files just like what on <https://download.FreeBSD.org>
- disk.img.xz
 - From *-images jobs
 - Virtual machine disk image file, installed from above *.txz files
- disk-test.img.xz
 - From *-testvm jobs
 - Virtual machine disk image file, with test script and test case

artifact.ci.FreeBSD.org

- <ftps://artifact.ci.FreeBSD.org>
 - Serves files upload from jobs
 - Through Jenkins "Publish Over FTP" Plugin
 - Add FTP over TLS support
- <https://artifact.ci.FreeBSD.org>
 - Serves files download for downstream jobs in pipeline or external users
 - snapshots/
 - `<branch>/<svn_revision>/<target>/<target_arch>`
 - `head/r123456/amd64/amd64`

Open Configurations

Make Creating New Job Easier

- Not everyone knows (and has to know) how to configure Jenkins
- Build jobs have most parts in common
- Create a "job template"
 - Environment setup
 - Check out latest source code
 - Setup needed version of FreeBSD
 - Install required packages
 - Execute specified build script for that job
 - Environment cleanup

Jenkins Job Builder

- By OpenStack project
 - <http://docs.openstack.org/infra/jenkins-job-builder/>
- Before that, Jenkins job can only be edited on web interface
- Jenkins Job Builder provides YAML -> Jenkins configurations
- Create / update job through Jenkins' web service
- Make jenkins configurations trackable and reproducible
- <https://github.com/freebsd/freebsd-ci/tree/master/jjb>

Job Definition

- job:
 - name: FreeBSD-head-scan_build
 - scm:
 - FreeBSD-src-head
 - builders:
 - checkout-scripts
 - setup-jail
 - **execute-in-jail**
 - publishers:
 - clean-jail
 - wrappers:
 - timestamps

Build-in-jail Script Sets

- <https://github.com/freebsd/freebsd-ci/tree/master/scripts/jail>
- Simplify clean environment setup and job execution
 - Three phase: setup.sh, execute.sh, clean.sh
 - sudo installed by default
- A typical job configuration
 - build.sh
 - Main build script, which is executed by execute.sh in the jail
 - jail.conf
 - Jail environment configuration: version, arch, etc.
 - pkg-list
 - Package needs to be installed (from pkg.FreeBSD.org)

Adding a New Job

- Submitters bring their own build scripts and configs:
 - jail.conf, pkg-list, build.sh
 - Other configurations (ex: src.conf, make.conf)
- Jenkins-admin merges scripts to freebsd-ci/jobs/<job name>/
- Jenkins-admin creates a new entry jenkins job builder, push it
- Done! Our restless Jenkins executes it around the clock

Example: FreeBSD-head-aarch64-build

- jail.conf

```
TARGET=amd64
TARGET_ARCH=amd64
WITH_32BIT=0
OSRELEASE=11.0-RELEASE
```

- pkg-list

```
aarch64-binutils
```

- build.sh

```
#!/bin/sh
env \
    JFLAG=${BUILDER_JFLAG} \
    TARGET=arm64 \
    TARGET_ARCH=aarch64 \
    sh -x freebsd-ci/scripts/build/build-world-kernel.sh
```


Quarantine Mode

- Used to build with patch from external
- `QUARANTINE=1` in `jail.conf`
- Config jail to be an isolated environment
 - Remove internet connection after required packages installed
- Limit job resource from job configuration
 - Limit execution time

wrappers:

```
- timeout:  
  timeout: 90  
  fail: true  
  type: absolute
```

Other Integrations

Notifications

- When to notify
 - Build failed
 - Build unstable (compile successfully, but some test cases failed)
 - Build back to stable
- How to notify
 - Email
 - IRC
- What to notify
 - Changes since last build (who & what)
 - Tail of the console output
 - What are the test cases failed

Email Notification

- Double-edged sword
- If nobody reads, it's totally no use
- Email-ext plugin

freebsd-current mailing list, July 2016

- [Jenkins build is still unstable: FreeBSD HEAD #500](#) *jenkins-admin at FreeBSD.org*
- [Jenkins build is still unstable: FreeBSD HEAD #501](#) *jenkins-admin at FreeBSD.org*
- [bhyve with lagg failover doesn't work on wifi](#) *Randy Westlund*
- [Jenkins build is still unstable: FreeBSD HEAD #502](#) *jenkins-admin at FreeBSD.org*
- [FreeBSD HEAD i386 - Build #3721 - Failure](#) *jenkins-admin at FreeBSD.org*
- [Build failed in Jenkins: FreeBSD HEAD #503](#) *jenkins-admin at FreeBSD.org*
- [AR8327 Etherswitch led control patch](#) *Dan Nelson*
- [FreeBSD HEAD i386 - Build #3722 - Still Failing](#) *jenkins-admin at FreeBSD.org*
- [EARLY AP STARTUP hangs during boot](#) *Gary Jennejohn*
- [FreeBSD HEAD i386 - Build #3723 - Fixed](#) *jenkins-admin at FreeBSD.org*
- [Jenkins build is unstable: FreeBSD HEAD #504](#) *jenkins-admin at FreeBSD.org*
- [Jenkins build is still unstable: FreeBSD HEAD #505](#) *jenkins-admin at FreeBSD.org*
- [Jenkins build is still unstable: FreeBSD HEAD #506](#) *jenkins-admin at FreeBSD.org*
- [AR8327 Etherswitch led control patch](#) *Dan Nelson*
- [EARLY AP STARTUP hangs during boot](#) *John Baldwin*
- [Jenkins build is still unstable: FreeBSD HEAD #507](#) *jenkins-admin at FreeBSD.org*
- [FreeBSD 11.0-BETA3 Now Available](#) *Glen Barber*
- [resolvconf needs @RESTARTCMD@ to be replaced after r303062](#) *Guy Yur*
- [Jenkins build is still unstable: FreeBSD HEAD #508](#) *jenkins-admin at FreeBSD.org*
- [resolvconf needs @RESTARTCMD@ to be replaced after r303062](#) *Pedro Giffuni*
- [resolvconf needs @RESTARTCMD@ to be replaced after r303062](#) *Glen Barber*
- [resolvconf needs @RESTARTCMD@ to be replaced after r303062](#) *Pedro Giffuni*
- [Jenkins build is still unstable: FreeBSD HEAD #509](#) *jenkins-admin at FreeBSD.org*
- [ACPI errors when booting laptop](#) *Ben Woods*
- [Jenkins build is still unstable: FreeBSD HEAD #510](#) *jenkins-admin at FreeBSD.org*
- [EFI boot: can we make loader.efi work as BOOT{x64, aa64, arm, ia32}.efi?](#) *Xin Li*
- [EFI boot: can we make loader.efi work as BOOT{x64, aa64, arm, ia32}.efi?](#) *Nathan Whitehorn*
- [Jenkins build is back to stable : FreeBSD HEAD #511](#) *jenkins-admin at FreeBSD.org*
- [EARLY AP STARTUP hangs during boot](#) *Gary Jennejohn*
- [\[PATCH\] randomized delay in locking primitives, take 2](#) *Mateusz Guzik*
- [\[PATCH\] randomized delay in locking primitives, take 2](#) *Konstantin Belousov*
- [Jenkins build is back to normal : FreeBSD HEAD sparc64 #185](#) *jenkins-admin at FreeBSD.org*

Reduce False Alert

- Be more careful before sending
- Pre-send script
 - <https://github.com/freebsd/freebsd-ci/blob/master/scripts/email-ext/pre-send.groovy>
 - Filter out the internal errors of the jenkins cluster

Notification Contents

- Use email-ext plugin to customize mail body

Template for Failed/Unstable Build Jobs

`$PROJECT_NAME - Build #${BUILD_NUMBER} - ${BUILD_STATUS}:`

`Build information: ${BUILD_URL}`
`Full change log: ${BUILD_URL}changes`
`Full build log: ${BUILD_URL}console`

`Change summaries:`

`${CHANGES, format="%r by %a:\\n%m\\n"}`

`The end of the build log:`

`${BUILD_LOG}`

Example: Build Failed Mail

FreeBSD_HEAD_i386 - Build #3987 - Failure:

Build information: https://jenkins.FreeBSD.org/job/FreeBSD_HEAD_i386/3987/
Full change log: https://jenkins.FreeBSD.org/job/FreeBSD_HEAD_i386/3987/changes
Full build log: https://jenkins.FreeBSD.org/job/FreeBSD_HEAD_i386/3987/console

Change summaries:

306148 by jpaetzel:
Update oce driver to 11.0.50.0

Submitted by: Venkat Duvvuru <venkatkumar.duvvuru@broadcom.com>

The end of the build log:

[...truncated 190386 lines...]

```
--- oce_if.o ---
/usr/src/sys/modules/oce/../../dev/oce/oce_if.c:45:10: fatal error: 'oce_user.h' file not found
#include "oce_user.h"
      ^
1 error generated.
*** [oce_if.o] Error code 1

bmake[4]: stopped in /usr/src/sys/modules/oce
```


Template for Failed/Unstable Test Jobs

`$PROJECT_NAME - Build #${BUILD_NUMBER} - ${BUILD_STATUS}:`

`Build information: ${BUILD_URL}`
`Full change log: ${BUILD_URL}changes`
`Full build log: ${BUILD_URL}console`

`Change summaries:`

`${CHANGES, format="%r by %a:\\n%m\\n"}`

`The failed test cases:`

`${FAILED_TESTS, showStack="false", showMessage="true", maxTests=100}`

Example: Test Failed Mail

FreeBSD_HEAD-tests - Build #1746 - Still Unstable:

Build information: https://jenkins.FreeBSD.org/job/FreeBSD_HEAD-tests/1746/
Full change log: https://jenkins.FreeBSD.org/job/FreeBSD_HEAD-tests/1746/changes
Full build log: https://jenkins.FreeBSD.org/job/FreeBSD_HEAD-tests/1746/console

Change summaries:

No changes

The failed test cases:

2 tests failed.

FAILED: sys.mqueue.mqueue_test.mqtest3

Error Message:

atf-check failed; see the output of the test for details

FAILED: sys.mqueue.mqueue_test.mqtest4

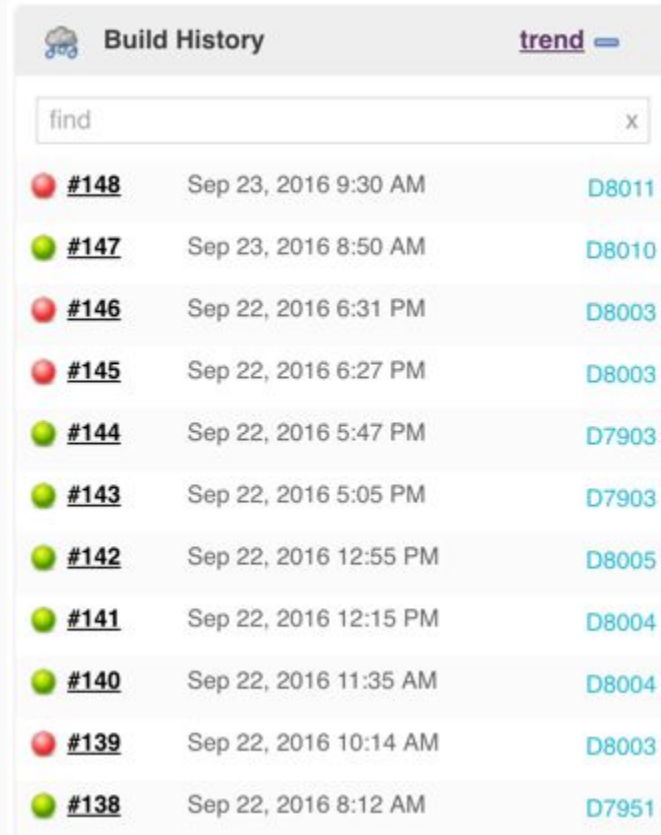
Error Message:

atf-check failed; see the output of the test for details

Integration with Code Review System

- <https://ci.freebsd.org/job/phabric-FreeBSD-head-amd64-build>
- Phabricator Differential Plugin
 - From Uber
 - <https://github.com/uber/phabricator-jenkins-plugin>
 - Good readme.md
 - We patched it to support Subversion
 - <https://github.com/uber/phabricator-jenkins-plugin/pull/214>
 - Basically provide option to select the main SCM
 - Conditionally issue SCM-specified options to arc

Patch Number Attached to each Build



The screenshot shows a 'Build History' table with a search bar at the top. The table lists 11 builds, each with a status indicator (red or green circle), a build number, a timestamp, and a patch number. The patch numbers are consistently attached to the build numbers.

Status	Build Number	Timestamp	Patch Number
Red	#148	Sep 23, 2016 9:30 AM	D8011
Green	#147	Sep 23, 2016 8:50 AM	D8010
Red	#146	Sep 22, 2016 6:31 PM	D8003
Red	#145	Sep 22, 2016 6:27 PM	D8003
Green	#144	Sep 22, 2016 5:47 PM	D7903
Green	#143	Sep 22, 2016 5:05 PM	D7903
Green	#142	Sep 22, 2016 12:55 PM	D8005
Green	#141	Sep 22, 2016 12:15 PM	D8004
Green	#140	Sep 22, 2016 11:35 AM	D8004
Red	#139	Sep 22, 2016 10:14 AM	D8003
Green	#138	Sep 22, 2016 8:12 AM	D7951

Patch Information in Build Page

Build #17 (Sep 3, 2016 2:24:56 PM)



Revision: 49365
No changes.



Started by remote host 2001:1900:2254:206a::16:75



This was a build of [D7749](#) by unknown (unknown)

Igor fix

Reviewers: bcr, wblock

Reviewed By: bcr, wblock

Subscribers: wblock, bcr

Differential Revision: <https://reviews.freebsd.org/D7749>



Checkstyle: [66,114 warnings](#) from one analysis.

- [1 fixed warning](#)

Patch Build Status


On Phabricator:


Diff Detail

Repository rS FreeBSD src repository


Lint ★ Lint OK



Unit ★ No Unit Test Coverage

Build Status  **Buildable 5112**

-  Build 5205: CI src build Jenkins
-  Build 5204: arc lint + arc unit



Build Status  **Buildable 5112**

-  Build 5205: CI src build Jenkins
-  Build 5204: arc lint + arc unit



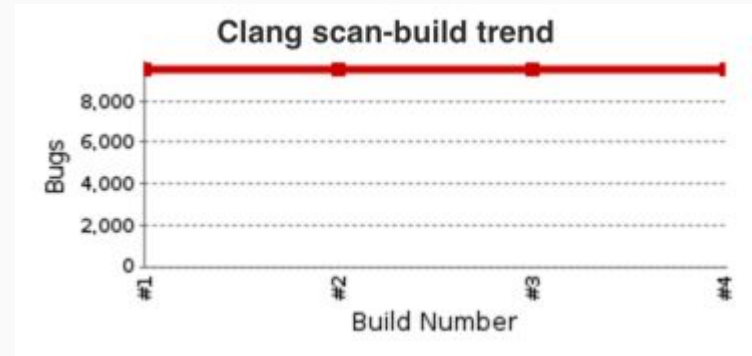
Build Status  **Buildable 5172**

-  Build 5294: CI src build Jenkins

Clang scan-build

- https://ci.freebsd.org/job/FreeBSD-head-scan_build/
- Static analysis tool provided by clang
 - <http://clang-analyzer.llvm.org/scan-build.html>
- Clang Scan-Build Plugin
- `bsd.clang-analyze.mk`
 - Imported from NetBSD

```
make analyze \  
CLANG_ANALYZE_OUTPUT_DIR=clangScanBuildReports \  
CLANG_ANALYZE_OUTPUT=html
```



Clang scan-build Bug Report

Jenkins > FreeBSD-head-scan_build > #4 > Clang scan-build bugs

[ENABLE AUTO REFRESH](#)

Clang scan-build bug report for build #4

Group	Type	File	Path Length	Description	
Security	Potential insecure memory buffer bounds restriction in call 'strcpy'	/workspace/src/usr.sbin/ctm/ctm_rmail/ctm_rmail.c	1	Call to function 'strcpy' is insecure as it does not provide bounding of the memory buffer. Replace unbounded copy functions with analogous functions that support length arguments such as 'strncpy'. CWE-119	Details
Dead store	Dead assignment	/workspace/src/sys/modules/sym/././dev/sym/sym_hipd.c	1	Value stored to 'f1' is never read	Details
Dead store	Dead assignment	/workspace/src/sys/modules/sound/sound/././dev/sound/pcm/mixer.c	1	Value stored to 'ret' is never read	Details
Security	Potential insecure memory buffer bounds restriction in call 'strcpy'	/workspace/src/usr.bin/less/././contrib/less/filename.c	1	Call to function 'strcpy' is insecure as it does not provide bounding of the memory buffer. Replace unbounded copy functions with analogous functions that support length arguments such as 'strncpy'. CWE-119	Details
Logic error	Dereference of null pointer	/workspace/src/lib/ncurses/panelw/./././contrib/ncurses/panel/p_bottom.c	4	Access to field '_begy' results in a dereference of a null pointer (loaded from field 'win')	Details
Dead store	Dead assignment	/workspace/src/sys/modules/drm/radeon/./././dev/drm/r600_cp.c	1	Value stored to 'num_backends' is never read	Details

Detailed HTML Output

```
697      /*
698      * Recheck that "." entry in the vdp directory points
699      * to the inode we looked up before vdp lock was
700      * dropped.
701      */
702      error = ufs_lookup_ino(pdp, NULL, cnp, &ino1);
703      if (error) {
704          43 ← Assuming 'error' is 0 →
705          44 ← Taking false branch →
706              vput(tdp);
707              return (error);
708          }
709          if (ino1 != ino) {
710              45 ← Taking false branch →
711              vput(tdp);
712              goto restart;
713          }
714          *vpp = tdp;
715          46 ← Dereference of null pointer (loaded from variable 'vpp')
```

Igor + Checkstyle

- `textproc/igor`
 - By Warren Block <wblock@FreeBSD.org>
 - Automated proofreader for text files, man pages, and DocBook SGML source files



- Checkstyle
 - A tool to help programmers write Java code that adheres to a coding standard
 - Output an XML can be parsed by Jenkins Checkstyle Plugin

We added a new option (-X) to igor to output checkstyle XML

Checkstyle Result

Jenkins > FreeBSD-doc-head-igor > #18 > Checkstyle Warnings

- Back to Project
- Status
- Changes
- Console Output
- View Build Information
- Environment Variables
- Checkstyle Warnings**
- Embeddable Build Status
- Previous Build

CheckStyle Result

Warnings Trend

All Warnings	New Warnings	Fixed Warnings
66116	45	45

Summary

Total	High Priority	Normal Priority	Low Priority
66116	0	66116	0

Details

- Folders**
- Files
- Warnings
- Details
- New
- Fixed

Source Folder	Total	Distribution
doc/en_US.ISO8859-1/articles/bsd-gpl	113	■
doc/en_US.ISO8859-1/articles/building-products	641	■
doc/en_US.ISO8859-1/articles/committers-guide	7	■
doc/en_US.ISO8859-1/articles/contributing	144	■
doc/en_US.ISO8859-1/articles/contributors	2	■
doc/en_US.ISO8859-1/articles/cups	39	■
doc/en_US.ISO8859-1/articles/explaining-bsd	225	■
doc/en_US.ISO8859-1/articles/filtering-bridges	215	■
doc/en_US.ISO8859-1/articles/fonts	91	■
doc/en_US.ISO8859-1/articles/freebsd-questions	236	■

Checkstyle Result Trend

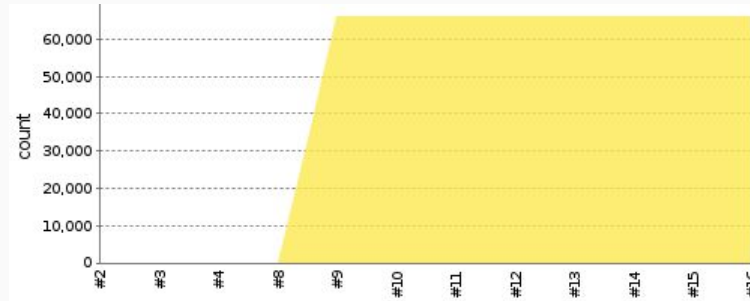
- Compare with previous build



Checkstyle: [66,117 warnings](#) from one analysis.

- [7 new warnings](#)
- [16 fixed warnings](#)

- Overall Trend



Compiler Warnings

Jenkins > FreeBSD-stable-11-amd64-build > #31 > LLVM/Clang Warnings

- [Back to Project](#)
- [Status](#)
- [Changes](#)
- [Console Output](#)
- [View as plain text](#)
- [View Build Information](#)
- [Environment Variables](#)
- [LLVM/Clang Warnings](#)**
- [Embeddable Build Status](#)
- [Previous Build](#)

LLVM/Clang Warnings

Warnings Trend

All Warnings	New Warnings	Fixed Warnings
853	<u>4</u>	<u>4</u>

Summary

Total	High Priority	Normal Priority	Low Priority
853	<u>2</u>	<u>851</u>	0

Details

- Folders**
- Files
- Categories
- Warnings
- Details
- New
- Fixed
- High
- Normal

Source Folder	Total	Distribution
-	116	
usr/obj/usr/src/lib32/usr/include/netinet	1	
usr/obj/usr/src/lib32/usr/include/sys	1	
usr/obj/usr/src/tmp/usr/include/netinet	1	
usr/obj/usr/src/tmp/usr/include/sys	1	
usr/src/cddl/lib/libzfs/./././cddl/contrib/opensolaris/lib/libzfs/common	30	
usr/src/cddl/sbin/zfs/./././cddl/contrib/opensolaris/cmd/zfs	25	
usr/src/cddl/sbin/zpool/./././cddl/contrib/opensolaris/cmd/zpool	17	
usr/src/cddl/usr.bin/zstreamdump/./././contrib/opensolaris/cmd/zstreamdump	14	
usr/src/cddl/usr.bin/ztest/./././contrib/opensolaris/cmd/ztest	17	

Compiler Warnings Trend



Build Status Badge

- [https://wiki.freebsd.org/arm64:](https://wiki.freebsd.org/arm64)



- <https://riscv.org/software-tools/freebsd/>

FreeBSD/RISC-V

This is a port of **FreeBSD Operating System** to RISC-V instruction set architecture.



- <https://<job url>/badge/icon>
- <https://<job url>/lastCompletedBuild/badge/icon>

Other Jenkins Plugins Used

- **SCM Sync configuration**
 - Use post-commit hook to notify administrators
- **SafeRestart**
 - Schedule restart jenkins when all current jobs complete
 - Save and resume the build queue
- **Green balls**
 - People like green
 - Everything is fine

Jenkins REST API

Most Jenkins URLs can be append `"/api"` to get REST API document

- Append `"/api/json"` for JSON
- Append `"/api/json?pretty=true"` for human readable
- Get the latest good-to-build revision: (jq package needed)
 - `curl -s https://ci.freebsd.org/job/FreeBSD-head-amd64-build/lastStableBuild/api/json | jq '.changeSet.revisions[0].revision'`

Tinderbox view

- <https://ci.freebsd.org/tinderbox/>
- By foundation intern, Siva Mahadevan

	head	stable/11	stable/10
aarch64	2017-06-09 17:28 UTC <i>r319756</i> details	2017-06-09 01:20 UTC <i>r319728</i> details	N/A
amd64	2017-06-09 16:40 UTC <i>r319755</i> details	2017-06-09 00:33 UTC <i>r319728</i> details	2017-06-08 17:09 UTC <i>r319701</i> details
i386	2017-06-09 17:26 UTC <i>r319756</i> <i>(failing since r319660)</i> last successful build details	2017-06-09 00:46 UTC <i>r319728</i> details	2017-06-08 17:31 UTC <i>r319701</i> details
riscv64	2017-06-09 17:41 UTC <i>r319756</i> details	N/A	N/A
sparc64	2017-06-09 17:27 UTC <i>r319756</i> details	2017-06-09 00:33 UTC <i>r319728</i> details	2017-06-08 17:40 UTC <i>r319701</i> details

Last updated: Fri Jun 09 2017 14:15:13 GMT-0400 (EDT)

Epilogue

Summary

- Continuous Integration does help development of the FreeBSD project
- Hope these experience and codes can also help other projects

Future Work

- Have you to work on testing FreeBSD!
 - freebsd-testing@
 - EFNet/#freebsd-ci
- Check for reproducible build
- More tests, even some are not enabled by default
 - Dtrace
- Build for project branches
 - Make testing feature branches easier
- CI for ports
 - Collaboration with "redports"
 - Automatically "exp-run"
- Performance tests
- Work with other projects

Acknowledgement

- jenkins-admin@FreeBSD.org
- The FreeBSD Foundation
- clusteradmin@FreeBSD.org
- phabic-admin@FreeBSD.org
- People on -testing, -current, -stable mailing lists