



Jenkins and Bhyve: Continuous Integration for FreeBSD

Craig Rodrigues
rodrigc@FreeBSD.org

Presentation Overview

- Introduction to Jenkins and Continuous Integration (CI)
- Describe how Jenkins was set up in FreeBSD cluster

Jenkins

What is Jenkins?

- Continuous Integration tool implemented in Java
- written by Kohsuke Kawaguchi at Sun

What is Jenkins?

- Now an Open Source project:
<http://jenkins-ci.org>
- Hundreds of plugins available
- Hundreds of users
- Active developer community

Jenkins User Conference 2013

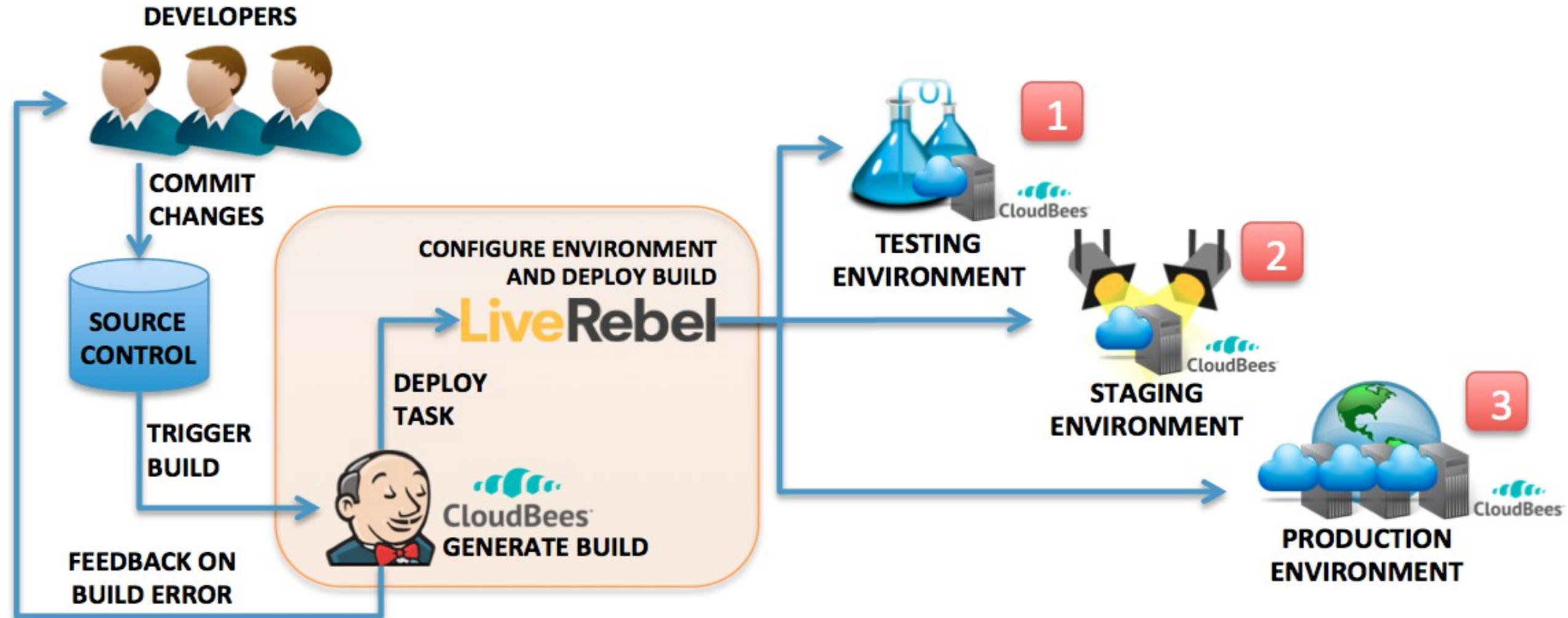


Continuous Integration

What is Continuous Integration?

- Developer commits code changes
- System verifies that code builds
- System verifies that code passes tests
- Code is deployed

Example Production CI Workflow



Jenkins in the FreeBSD cluster

Motivation

- Use more modern development tools in FreeBSD
- Help improve quality of FreeBSD
- Take advantage of large Jenkins ecosystem

Setting up Jenkins in the FreeBSD cluster

Task #1: Set up machine

- clusteradm@freebsd.org provided:
- vmhost.freebsd.org:
- 16G RAM, 1.8TB disks
- Intel E5620, 16 CPU cores
- FreeBSD 11

Task #2: Set up VM's

- Two 200GB disk images created
- Image 1: jenkins-9.freebsd.org (FBSD 9)
- Image 2: jenkins-10.freebsd.org (FBSD 10)
- Run VM's under BSD Hypervisor (BHyve)

Task #3: Create rc.d scripts

- rc.d scripts start VM's on boot of vmhost
- VM's send console output to /dev/nmdm
- Example to connect to VM console:
cu -l /dev/nmdm0B

Task #4: Install Jenkins in VM's

- **pkg install devel/jenkins**
- OpenJDK pulled in as dependency
- configure some settings in `/etc/rc.conf`
- **service jenkins start**

Task #5: Set up nginx

- DNS CNAME: jenkins → jenkins-9
- d • Nginx reverse proxy set up:
<https://jenkins.freebsd.org> →
<http://jenkins-9.freebsd.org:8180/jenkins>
- nginx https configured with SSL certificate

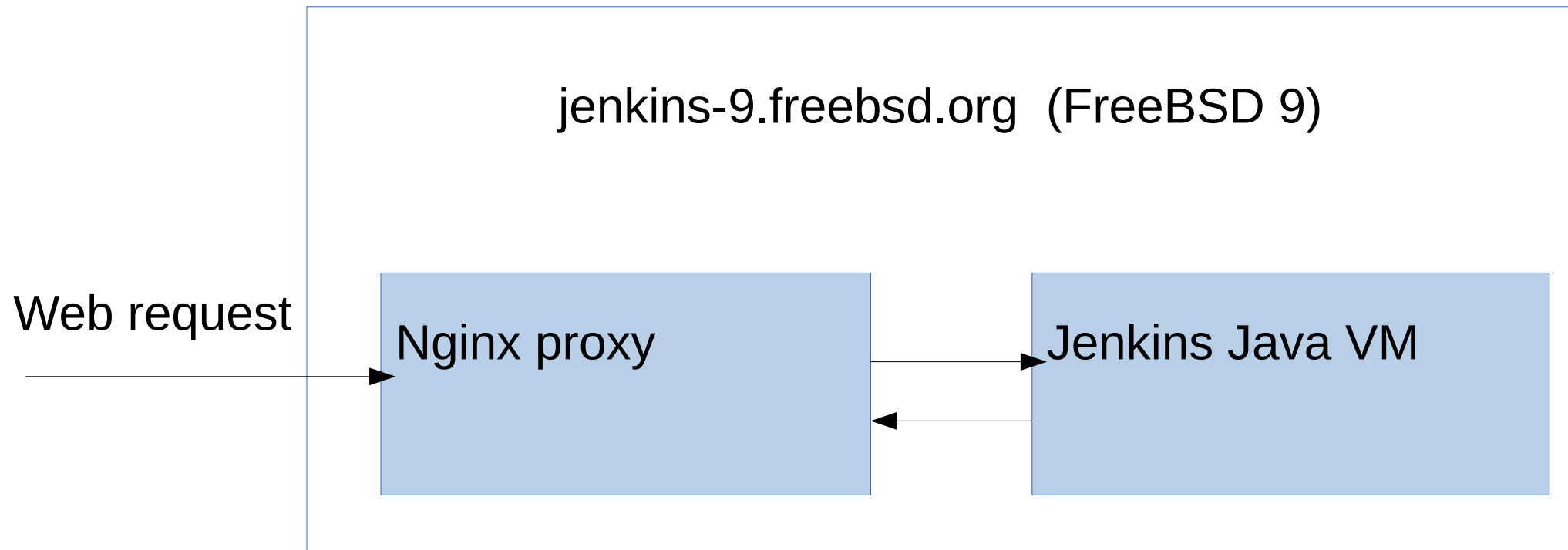
VM Host

vmhost.freebsd.org (FreeBSD 11)

jenkins-9.freebsd.org
(Bhyve VM)

jenkins-10.freebsd.org
(Bhyve VM)

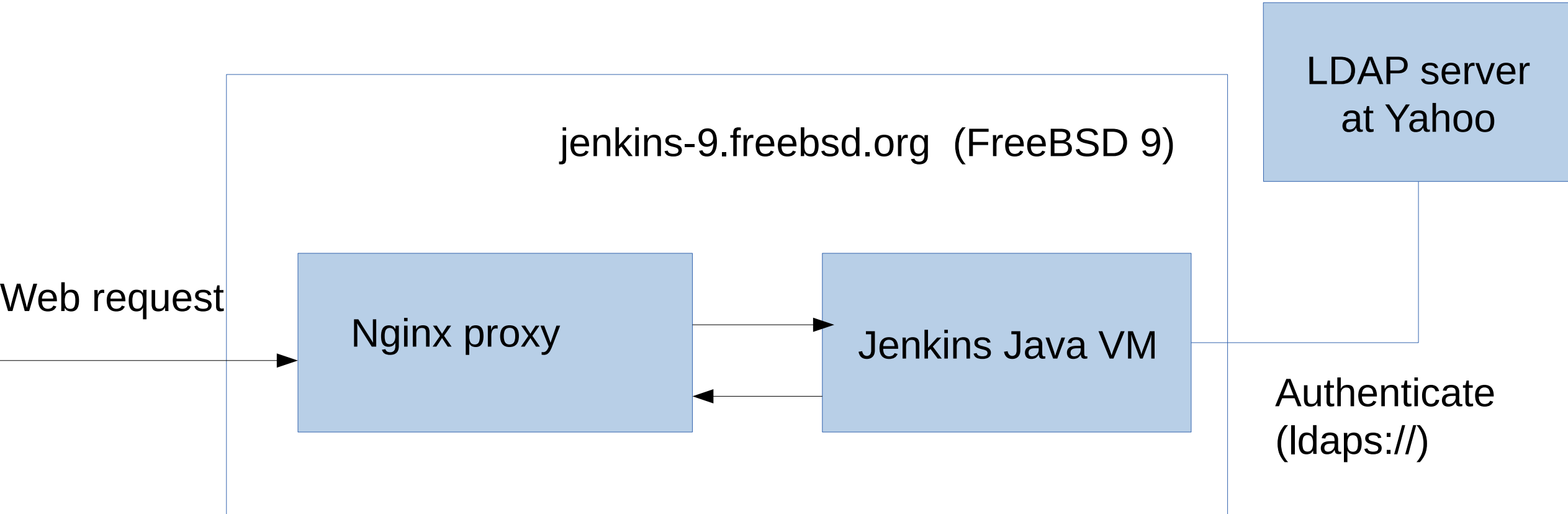
jenkins-9.freebsd.org VM



Task #6: Set up authentication

- Jenkins authentication via LDAP used
- Configured via Jenkins web UI
- FreeBSD LDAP servers at Yahoo used

LDAP authentication



Task #7: Set up builds

- Set up “free-form builds” via Jenkins web UI
- On Unix, “free-form” builds executed via “/bin/sh -xe”, if first line lacks “#!” (shebang)



Jenkins

Jenkins DISABLE AUTO REFRESH

- [People](#)
- [Build History](#)

Build Queue (1)

FreeBSD_HEAD

Build Executor Status

#	Status
master	
1	Building FreeBSD_stable_8 #24
2	Idle
3	Idle
4	Idle
jenkins-10.freebsd.org	
1	Idle
2	Idle
3	Idle
4	Idle
5	Building FreeBSD_HEAD #264
6	Idle

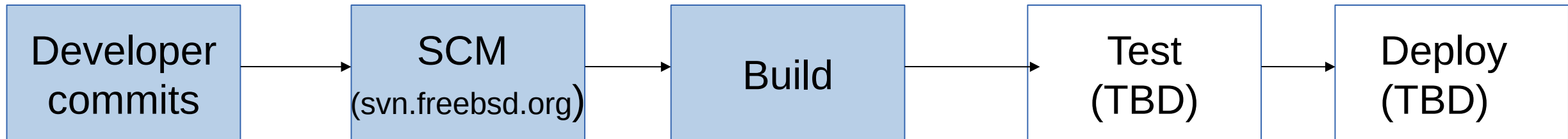
S	W	Name ↓	Last Success	Last Failure	Last Duration
		FreeBSD_DOC	6 hr 27 min - #83	3 days 15 hr - #73	56 min
		FreeBSD_HEAD	9 hr 23 min - #263	12 hr - #262	1 hr 24 min
		FreeBSD_HEAD-modules	7 hr 59 min - #30	N/A	9 min 25 sec
		FreeBSD_HEAD-scan-build	N/A	3 days 20 hr - #1	1 hr 37 min
		FreeBSD_stable_10	6 hr 40 min - #71	N/A	5 hr 52 min
		FreeBSD_stable_8	2 days 12 hr - #23	N/A	8 hr 16 min
		FreeBSD_stable_9	3 hr 3 min - #53	N/A	18 min

Icon: [S](#) [M](#) [L](#)

[Legend](#)
[RSS for all](#)
[RSS for failures](#)
[RSS for just latest builds](#)

What do we have so far?

Implementation status of CI



- Latest project status:
<http://wiki.freebsd.org/Jenkins>

What's next?

Next steps

- Integrate with Julio Merino's Kyua framework at BSDCan
- Set up more builds
- Boot results of builds in VM's
- Coverity integration

Where do I find out more?

Further information

- Project page:
<http://wiki.freebsd.org/Jenkins>
- Contact us:
freebsd-testing@FreeBSD.org
- Join in, and help out!

Special Thanks

- jenkins-admin@freebsd.org:
- Craig Rodrigues, rodrigc@ (project lead)
- Li-Wen Hsu, lwhsu@, (port maintainer)
- Steve Kreuzer, skreuzer@ (devops ninja)
- Steve Wills, swills@, (port maintainer)
- R. Tyler Croy, tyler@, (Jenkins guru)

Special Thanks

- clusteradm@freebsd.org:
- Sean Bruno, sbruno@freebsd.org
- Peter Wemm, peter@freebsd.org
- Glen Barber, gjb@freebsd.org