



# Jenkins, Bhyve, and Webdriver: Continuous Integration testing on FreeNAS

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# What is Jenkins?

- System which provides tools for Continuous Integration, Testing
- Open source (MIT licensed)
- Written by Kohsuke Kawaguchi

# How do I install it?

## `pkg install devel/jenkins`

- Depends on OpenJDK
- Needs a few entries in `/etc/rc.conf`
- Additional installation notes:

<http://forums.freebsd.org>

# Jenkins

search

Jenkins ENABLE AUTO REFRESH

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-  [People](#)
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 [add description](#)

**Build Queue**

No builds in the queue.

**Build Executor Status**

| #             | Status                                       |
|---------------|--|
| <b>master</b> |  |
| 1             | Building <a href="#">FreeNAS #215</a>        |
| 2             | Building <a href="#">TrueNAS-master #129</a> |

| All + | S   | W   | Name ↓  | Last Success                       | Last Failure                        | Last Duration  |
|-------|---|---|---|------------------------------------|-------------------------------------|--|
|       |   |  | <a href="#">FreeNAS</a>                             | 2 hr 10 min - <a href="#">#214</a> | 1 day 2 hr - <a href="#">#209</a>   | 1 hr 4 min    |
|       |   |  | <a href="#">TrueNAS-master</a>                      | 2 hr 10 min - <a href="#">#128</a> | 2 days 21 hr - <a href="#">#111</a> | 44 min        |
|       |  |  | <a href="#">TrueNAS-stable-9.0</a>                  | 20 hr - <a href="#">#48</a>        | N/A                                 | 47 min        |
|       |  |  | <a href="#">TrueOS-feature-unified_freebsd</a>      | 4 days 22 hr - <a href="#">#10</a> | N/A                                 | 6 min 25 sec  |
|       |  |  | <a href="#">TrueOS-feature-unified_freebsd_i386</a> | 8 days 17 hr - <a href="#">#2</a>  | N/A                                 | 3 hr 13 min   |

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

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

**jenkins2**

|   |      |
|---|------|
| 1 | Idle |
| 2 | Idle |
| 3 | Idle |
| 4 | Idle |

# How do I configure it?

- Easy to use web interface for configuration
- Functionality extensible via 3<sup>rd</sup> party plugins (over 700)

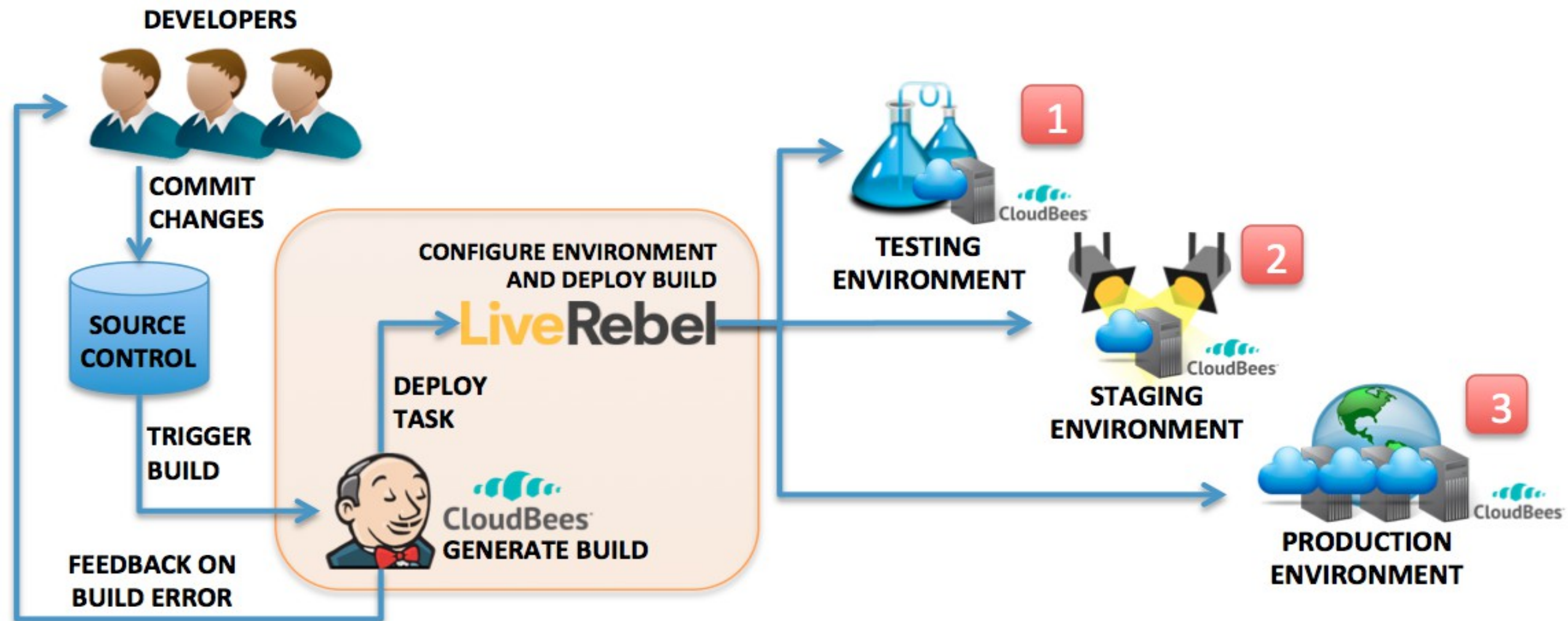
# Where do I get help?

- <http://jenkins-ci.org>, active community
- Books
- Conferences
- Consulting companies, <http://cloudbees.com>

# Jenkins User Conference 2013

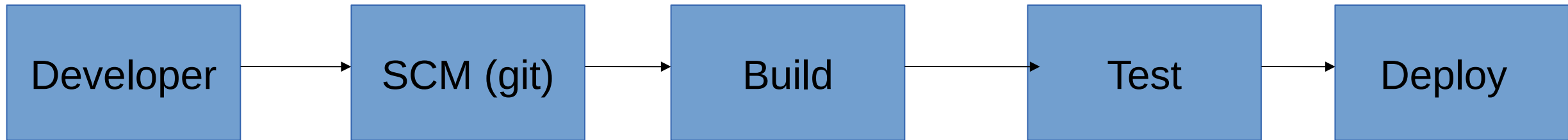


# How do I use it?





# How am I trying to use Jenkins



# BHyve

- BSD Hypervisor, in FreeBSD 10
- works great for booting/testing images
- Python pexpect over serial interface to drive installer
- thanks to Neel, Peter

# Webdriver

- Framework for automated web app testing
- Built into Firefox
- I'm using Python Splinter library to interface with Webdriver:

<http://splinter.cobrateam.info>

# Webdriver example using Python splinter library

```
from splinter import Browser
```

```
browser = Browser()
```

```
browser.visit("http://www.yahoo.com")
```

```
browser.find_by_id("p_13838465-p").fill("BSDCAn 2014")
```

```
browser.find_by_id("search-submit").click()
```

# Special Thanks

- FreeBSD ports team
- BHyve team

# FreeNAS and TrueNAS

- #1 Open-Source NAS software
- Take a look and try it out!

<http://www.freenas.org>

<http://www.ixsystems.com/freenas>





# Jenkins and Bhyve: Continuous Integration for FreeBSD

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# 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

# Continuous Integration

# What is Continuous Integration?

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

# 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](mailto:clusteradm@freebsd.org) provided:
- [vmhost.freebsd.org](http://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](http://jenkins-9.freebsd.org) (FBSD 9)
- Image 2: [jenkins-10.freebsd.org](http://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

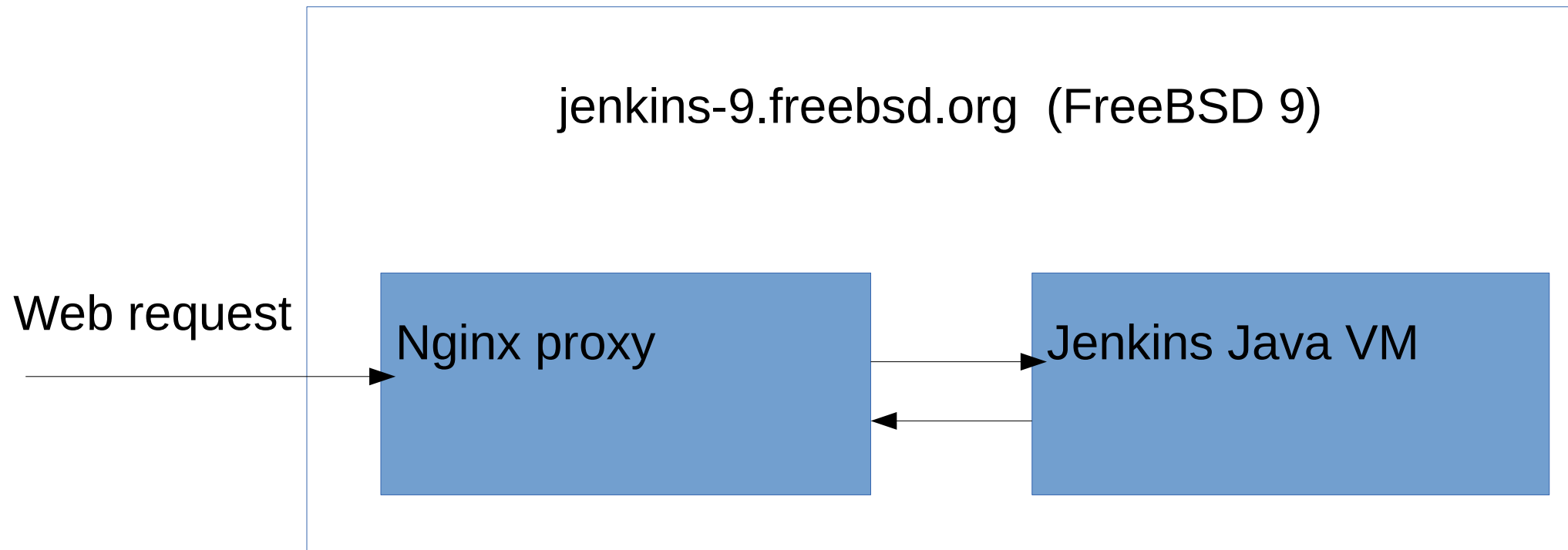
# VM Host

vmhost.freebsd.org (FreeBSD 11)

jenkins-9.freebsd.org  
(Bhyve VM)

jenkins-10.freebsd.org  
(Bhyve VM)

# jenkins-9.freebsd.org VM

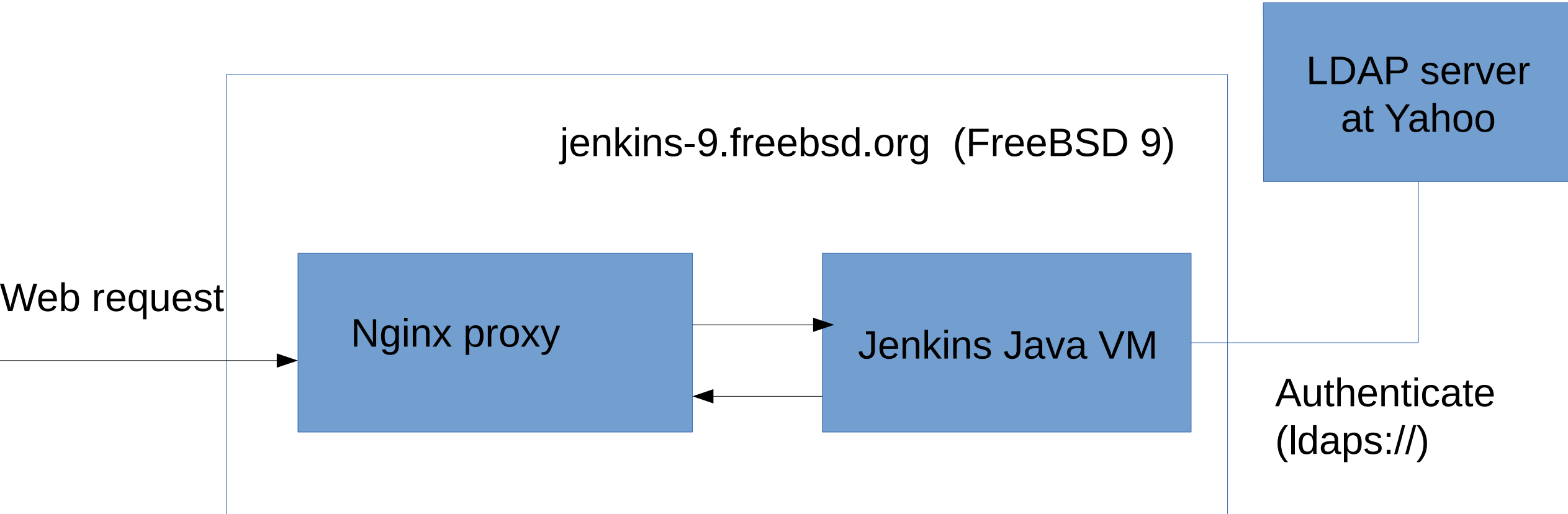


# Task #6: Set up authentication

- 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  |
|-------------------------------|---|
| <b>master</b>                 |   |
| 1                             | Building <a href="#">FreeBSD_stable_8 #24</a> |
| 2                             | Idle  |
| 3                             | Idle  |
| 4                             | Idle  |
| <b>jenkins-10.freebsd.org</b> |   |
| 1                             | Idle  |
| 2                             | Idle  |
| 3                             | Idle  |
| 4                             | Idle  |
| 5                             | Building <a href="#">FreeBSD_HEAD #264</a>    |
| 6                             | Idle  |

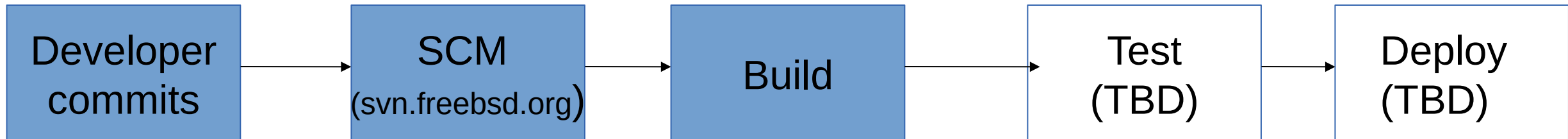
| All |   |   |                                    |                                    |               |  |
|-----|---|---|------------------------------------|------------------------------------|---------------|--|
| S   | W | Name ↓                                  | Last Success                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

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

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**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](mailto:freebsd-testing@FreeBSD.org)
- Join in, and help out!

# Special Thanks

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

# Special Thanks

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- Sean Bruno, [sbruno@freebsd.org](mailto:sbruno@freebsd.org)
- Peter Wemm, [peter@freebsd.org](mailto:peter@freebsd.org)
- Glen Barber, [gjb@freebsd.org](mailto:gjb@freebsd.org)