

AUTOMATING IOS CI INFRASTRUCTURE AT REA GROUP

Donny Kurniawan @donny_k_
realestate.com.au



REA Group[®]

The screenshot shows the homepage of the realestate.com.au website. At the top, there is a navigation bar with links for Buy, Rent, Invest, Sold, Share, New homes, Retire, Find agents, Home ideas, News, and Commercial. There are also Sign in and Join buttons. The main header features the realestate.com.au logo with the tagline "Australia lives here". Below the header, there is a search bar with a dropdown menu set to "Buy", a search input field, and a red "Search" button. To the left of the search bar, there is a "Search properties for sale" button. Below the search bar are filters for "All property types", "Min beds", "Max beds", "Min price", "Max price", and a checked checkbox for "Surrounding suburbs". On the right side of the search bar, there are icons for a smartwatch, smartphone, and tablet, followed by the text "DOWNLOAD OUR APP" and links for iPhone & iPad and Android. The background of the page features a blurred image of a man sitting at a dining table with a woman, with a city skyline visible through a window in the background. At the bottom of the page, there are three sections: "Price Lookup" with a house and magnifying glass icon, "International" with a globe and building icon, and "Find an Agent" with a person and document icon. Each section has a brief description and a call-to-action button.

Buy Rent Invest Sold Share New homes Retire Find agents Home ideas News Commercial

Sign in Join

realestate.com.au®
Australia lives here

Search properties for sale

Buy

Search by state, suburb or postcode

Search

All property types

Min beds

Max beds

Min price

Max price

Surrounding suburbs

DOWNLOAD OUR APP

iPhone & iPad

Android

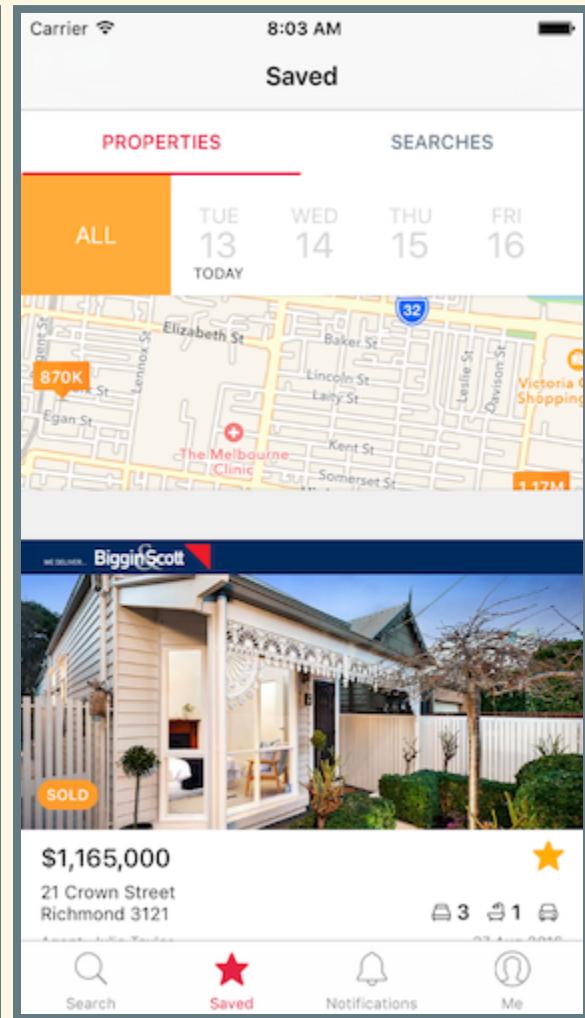
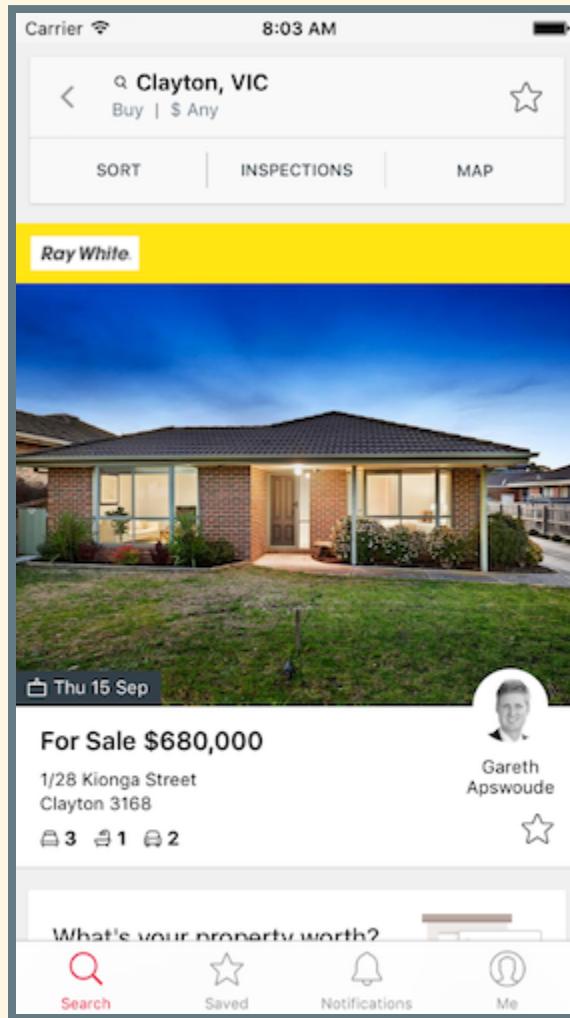
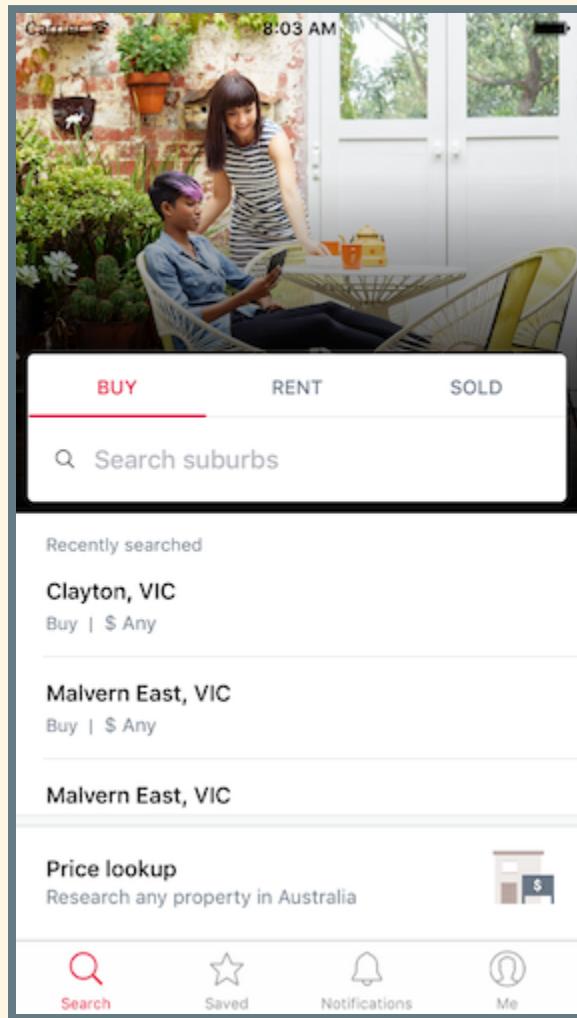
Price Lookup

International

Find an Agent

CHOOSE A COUNTRY

GET STARTED



AGENDA

- Continuous Integration
- Previous CI Infrastructure
- Problems & Issues
- Requirements & Workflow
- Current CI Infrastructure
- Summary

CONTINUOUS INTEGRATION

... a practice that requires developers
to integrate code into a shared repository.

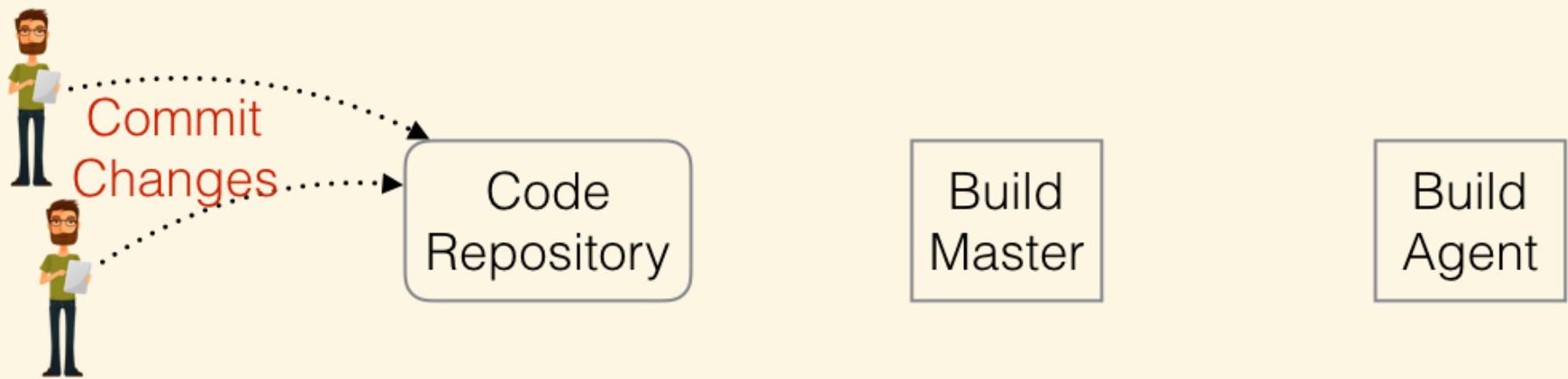
Each check-in is then verified by an automated build.

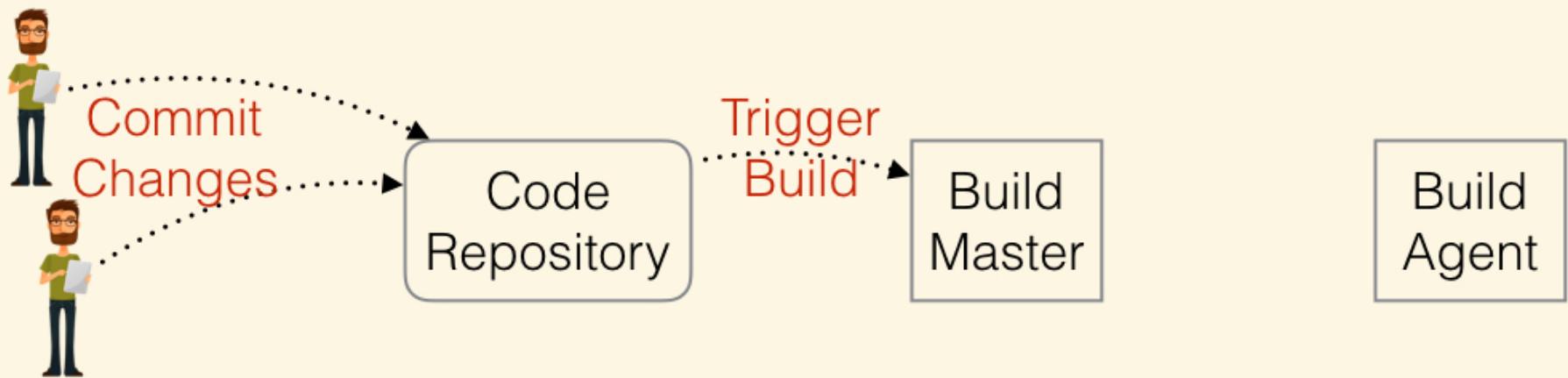


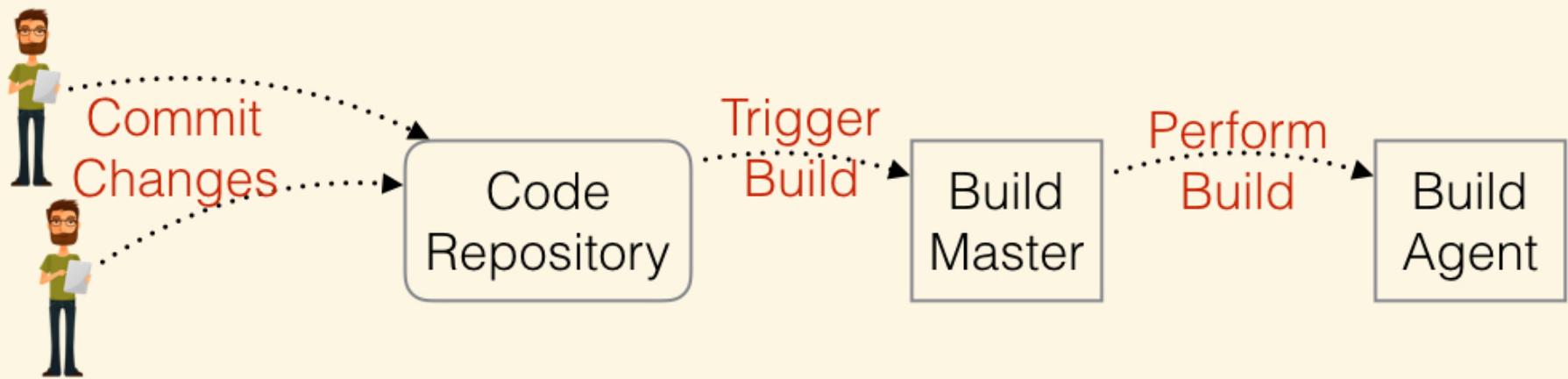
Code
Repository

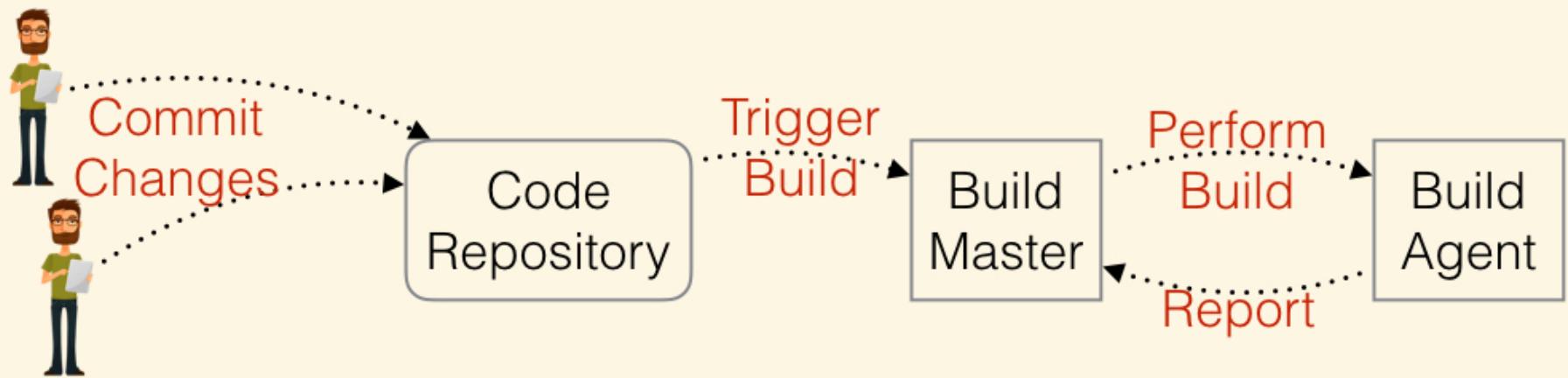
Build
Master

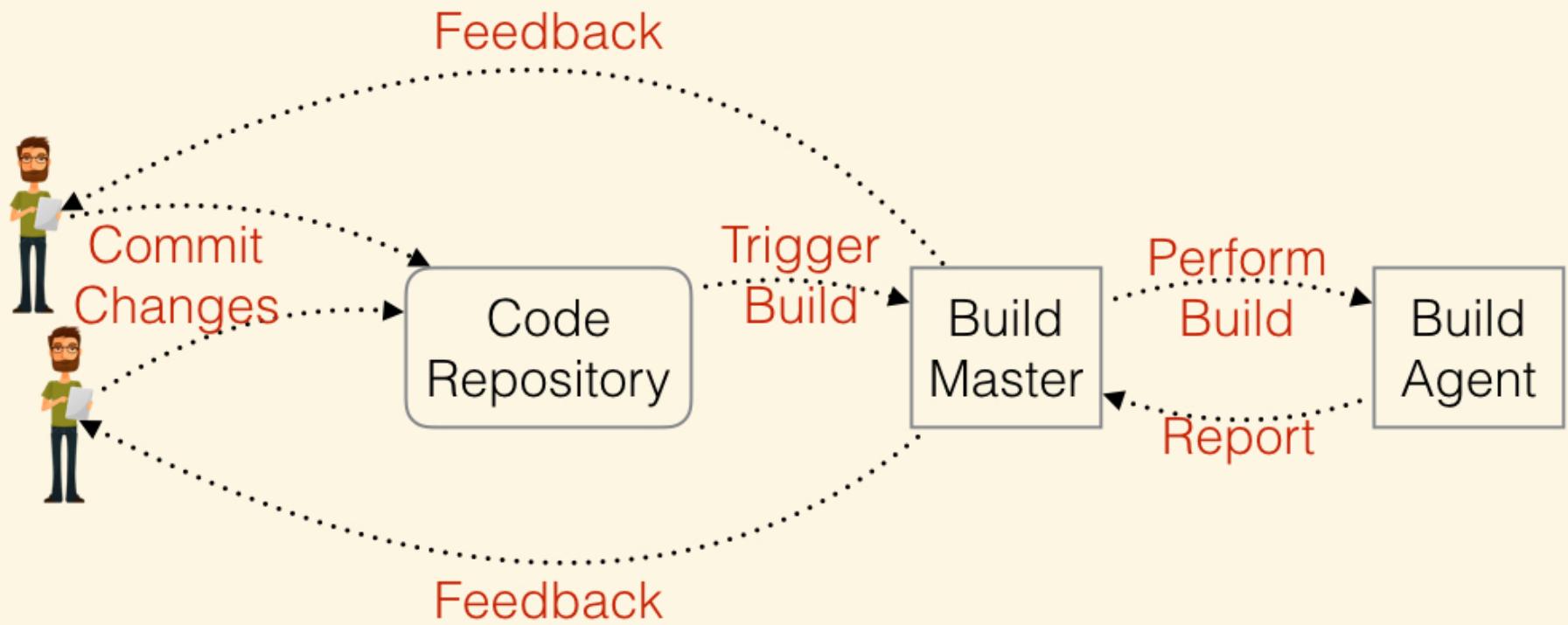
Build
Agent







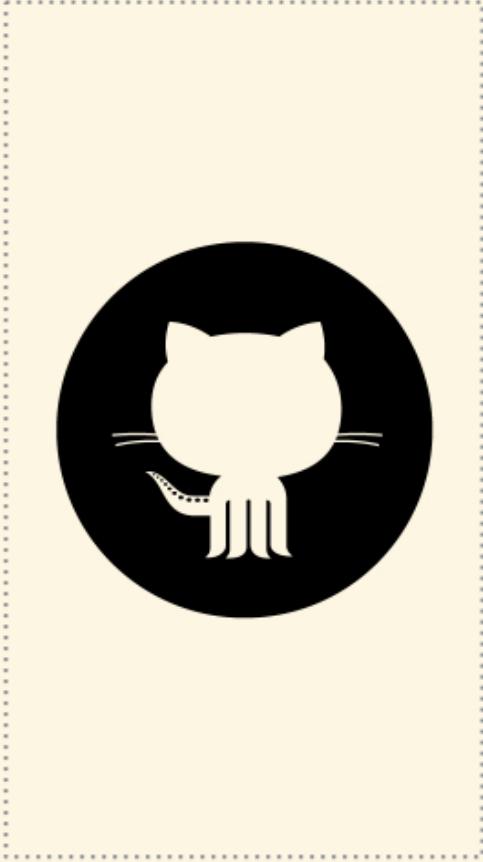


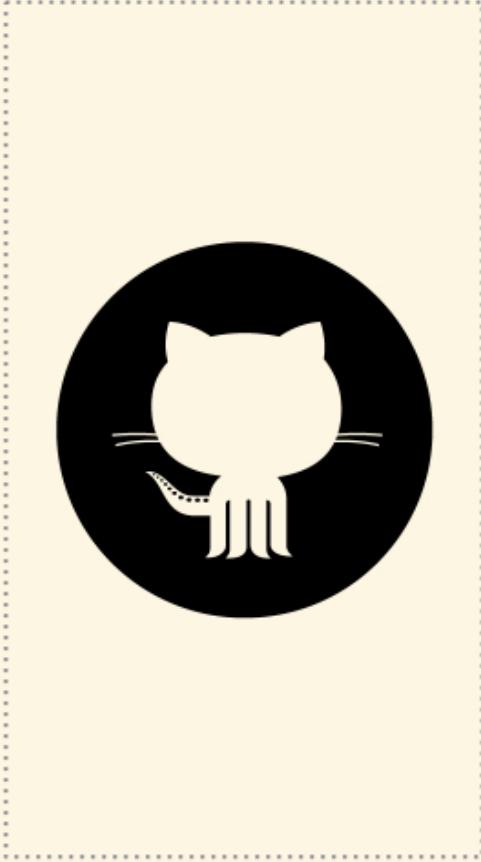


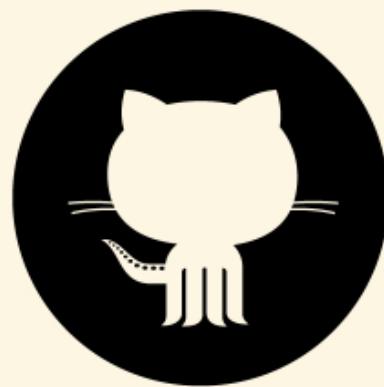
BENEFITS

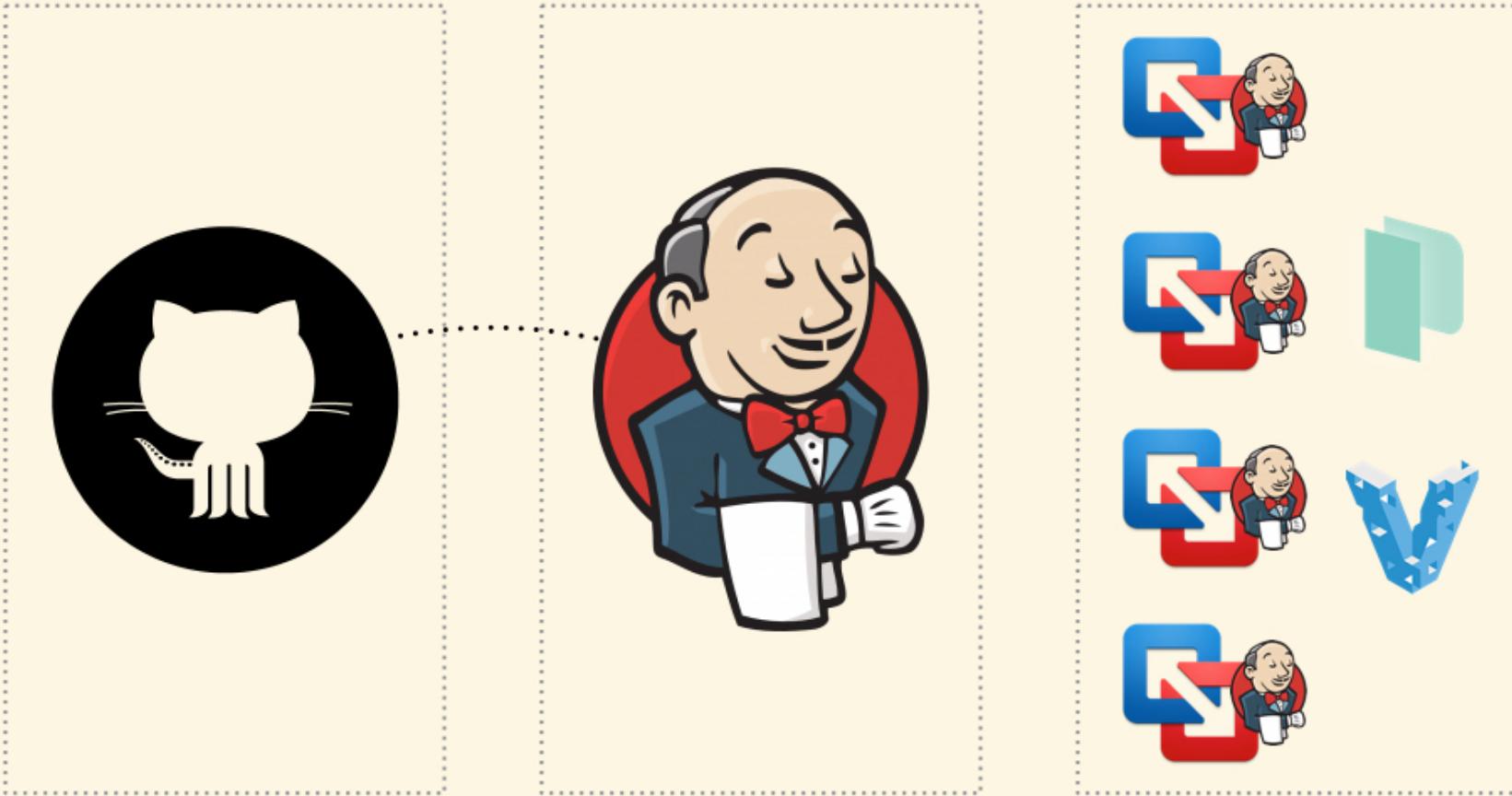
- Increase visibility
- Reduce integration risk
- Automate build and deployment

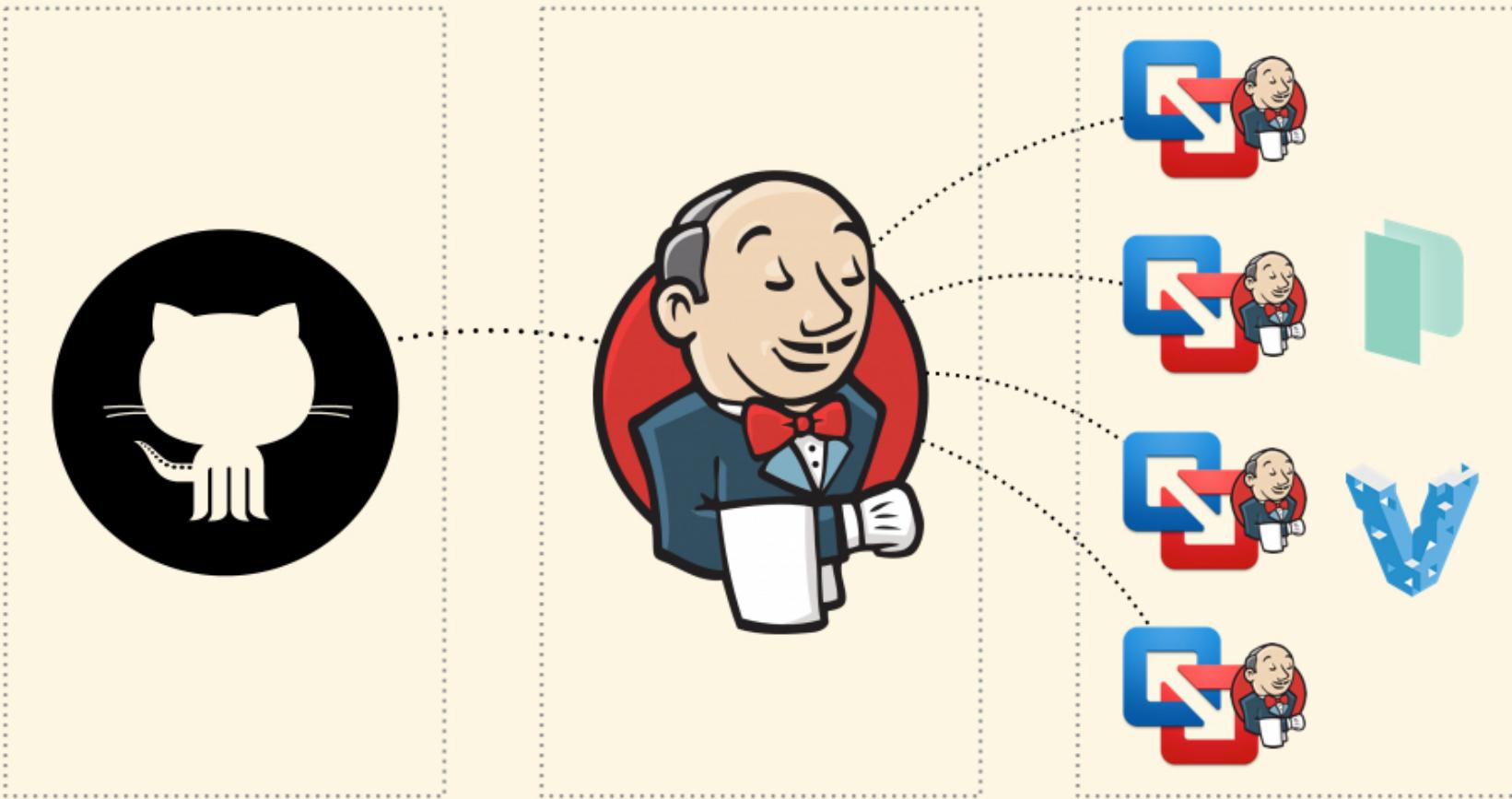
PREVIOUS CI INFRASTRUCTURE







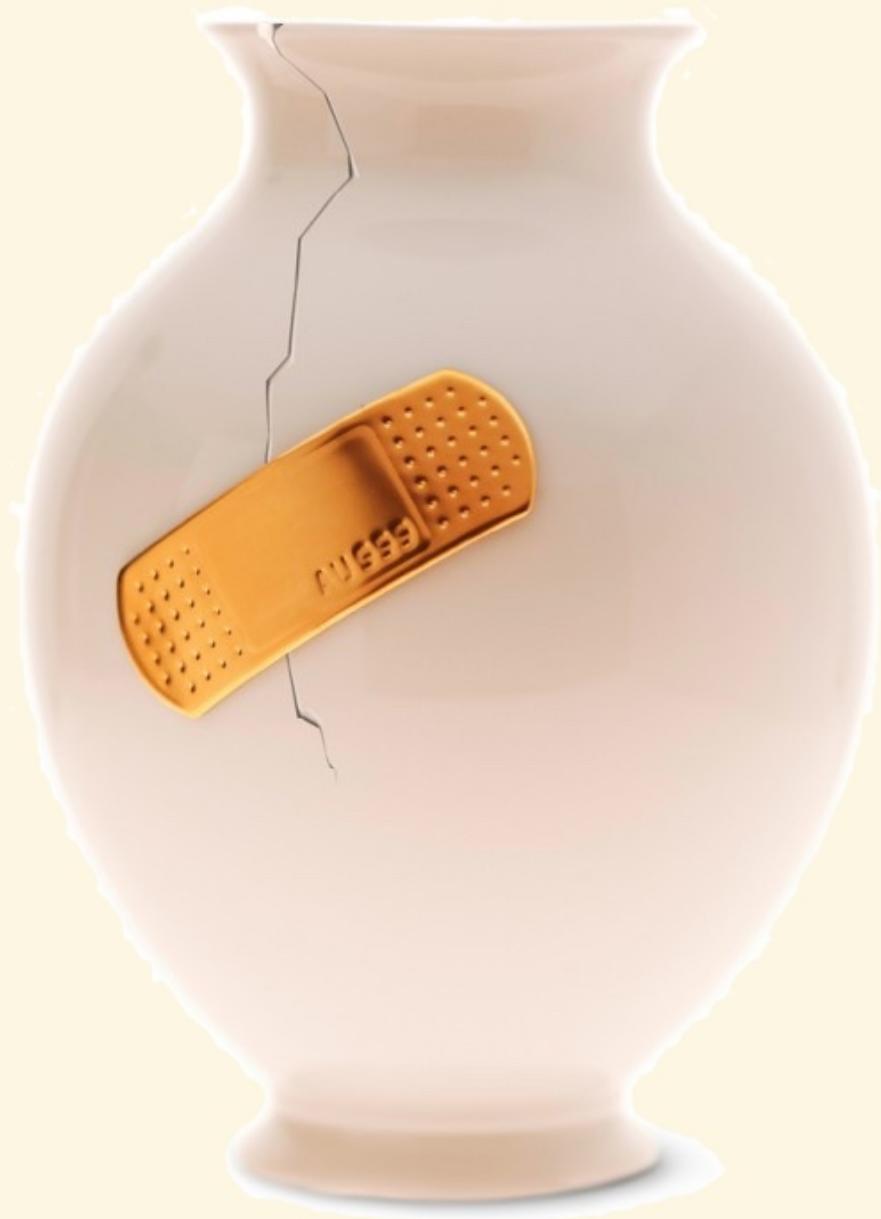




PROBLEMS & ISSUES

ISSUES

- Maintaining Jenkins
- Upgrading OS X and Xcode
- Web based configuration



REQUIREMENTS & WORKFLOW

A photograph of two men in a barbershop. On the left, a man with dark hair and a mustache, wearing a blue shirt, looks directly at the camera. On the right, a man with light brown hair and a slight smile, wearing a black shirt, also looks at the camera. In the background, there are shelves with various items and another person visible.

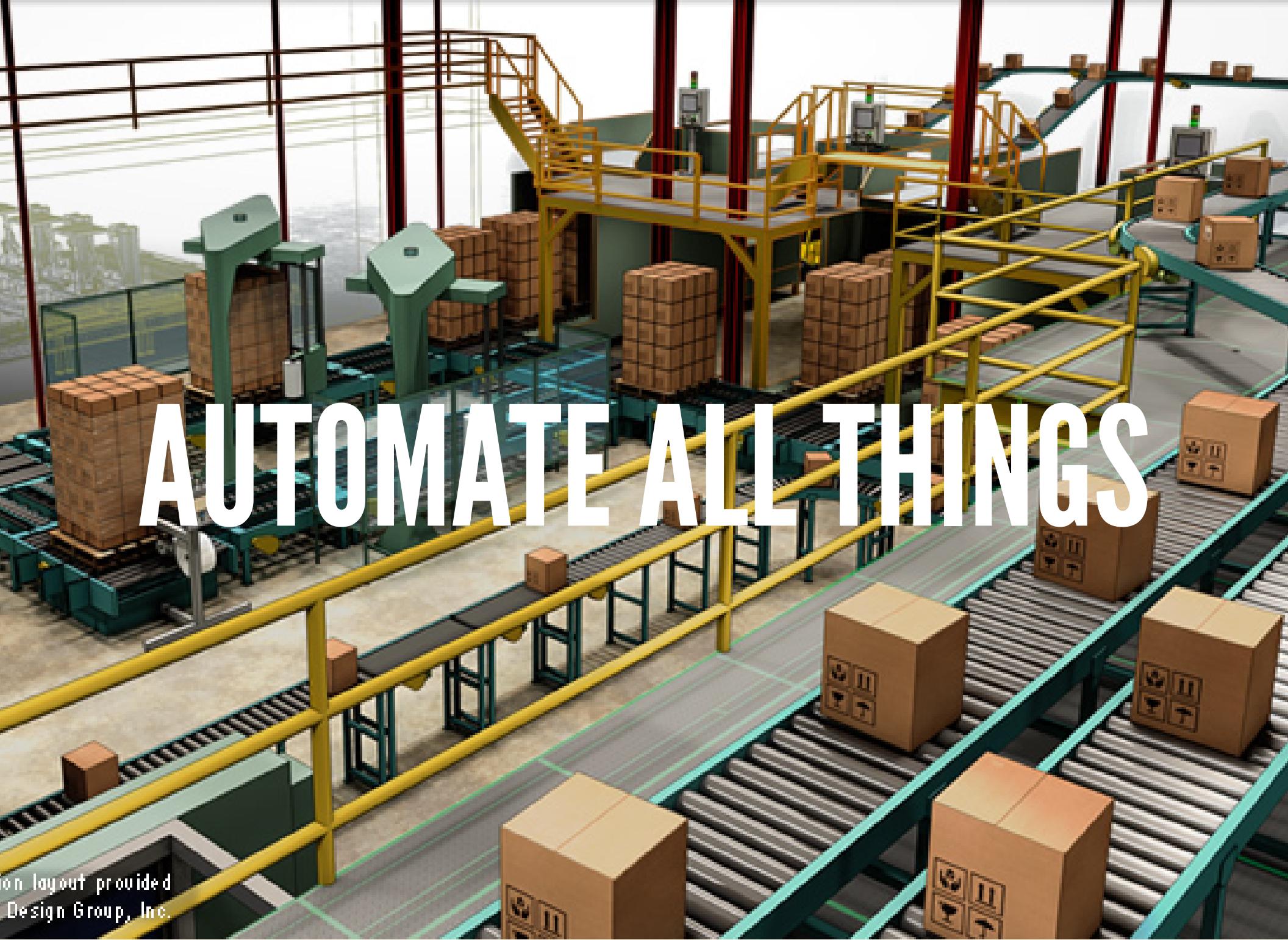
**THE REA IOS TEAM
IS EXPANDING**

A photograph of four men of diverse ages and ethnicities standing close together against a dark background. They are all looking directly at the camera with serious expressions. The man on the far left has short brown hair and is wearing a black t-shirt. Next to him is a man with a receding hairline and a mustache, wearing a red shirt. To his right is a man with dark hair and a blue shirt. On the far right, only the side profile of another man's head and shoulders are visible.

**THE REA IOS TEAM
IS EXPANDING**

A group of diverse men in Starfleet uniforms from the Star Trek franchise are standing together in a dark, futuristic setting. They are wearing various colored uniforms: black, red, blue, orange, and yellow. The man in the center is wearing a red uniform with a prominent Starfleet insignia on his chest. The man on the far left is wearing a black uniform. The man on the far right is wearing an orange uniform. All the men have serious expressions and are looking towards the camera. The background is dark and out of focus, suggesting a space station or a starship interior.

**THE REA IOS TEAM
IS EXPANDING**



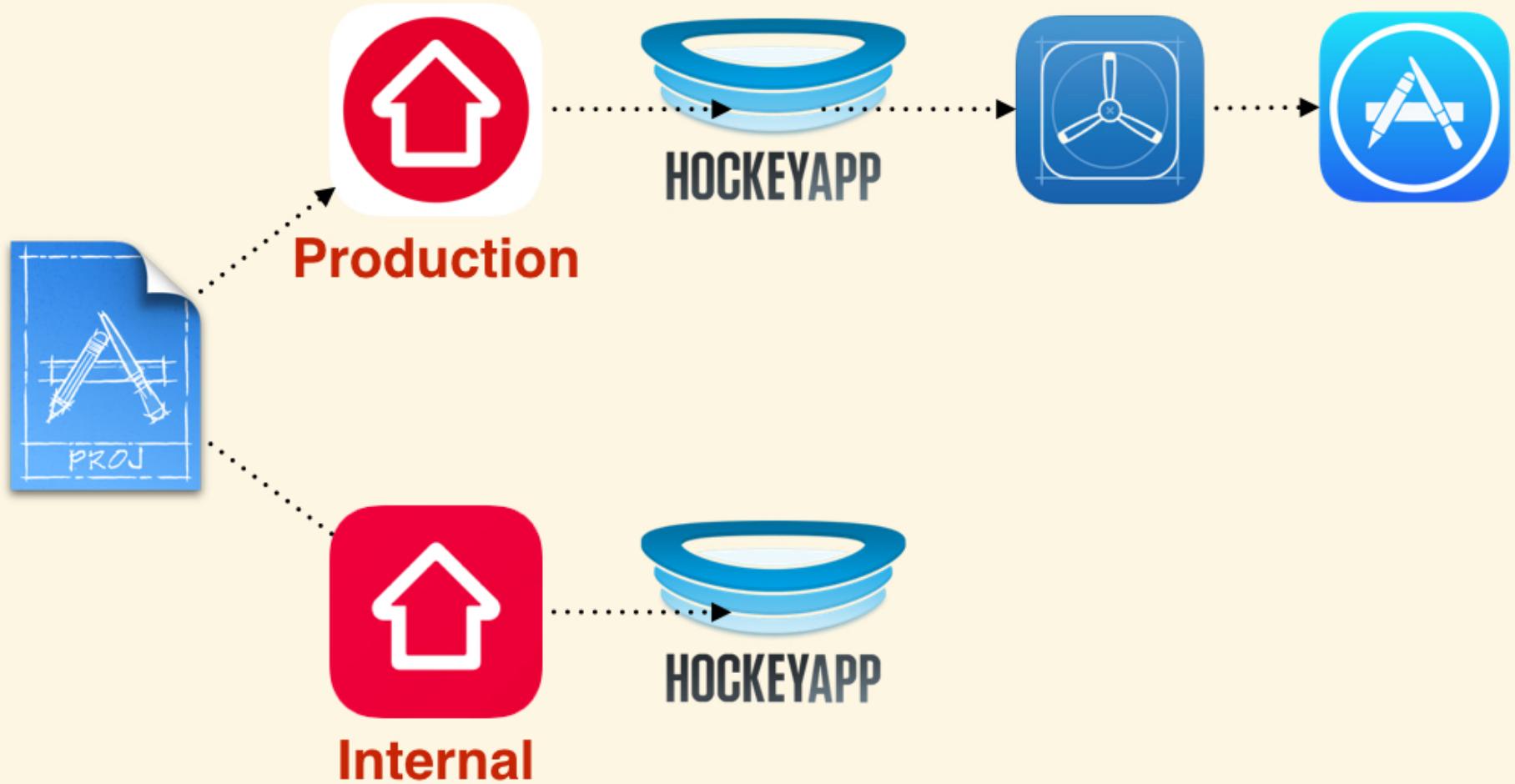
AUTOMATE ALL THINGS

**CODE TEMPLATES
RATHER THAN
WIKI PAGES**

**SCALABLE
AUTOMATED
TEMPLATED**

DEVELOPMENT WORKFLOW

- The `master` branch is always releasable
- No long running branches
- Branches merged into `master` with 2
- *Feature toggles* for controlling features
- Xcode targets: production & internal



CURRENT CI INFRASTRUCTURE



Buildkite

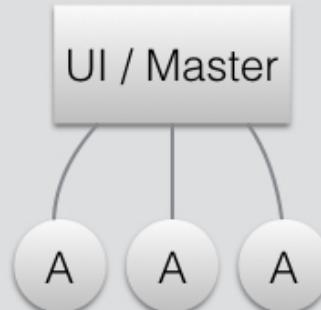
Managed Provider

- Closed System
- Multi Tenant
- “Cloud”
- CircleCI, Codeship, ...



Unmanaged Provider

- Open System
- Self Hosted
- “Data Center”
- Jenkins, Bamboo, ...



Managed Provider

- Closed System
- Multi Tenant
- “Cloud”

Unmanaged Provider

- Open System
- Self Hosted
- “Data Center”

Buildkite

UI / Master



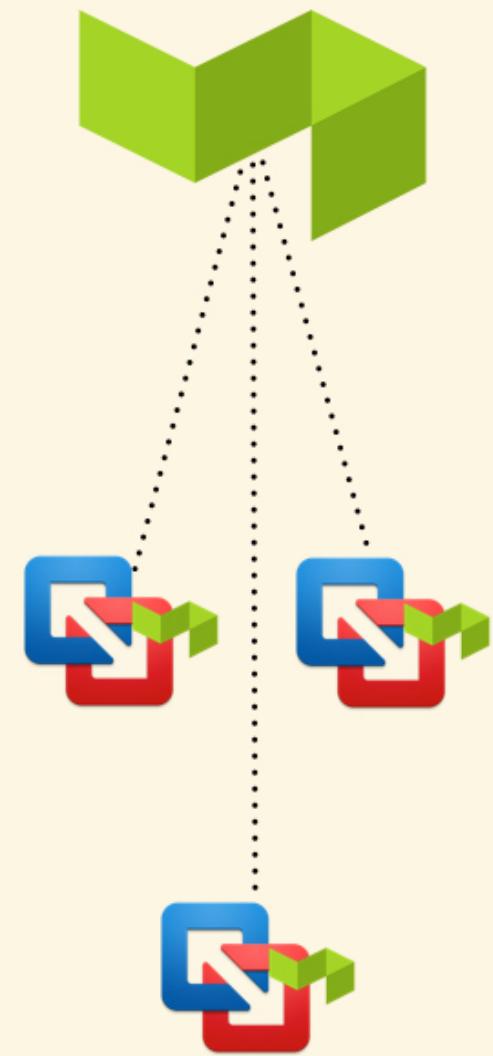
BUILDKITE

- Self hosted agents
- Managed jobs coordination & scheduling
- Managed web UI & integration
- Build steps and pipelines defined as code

All of the moving parts on one slide:









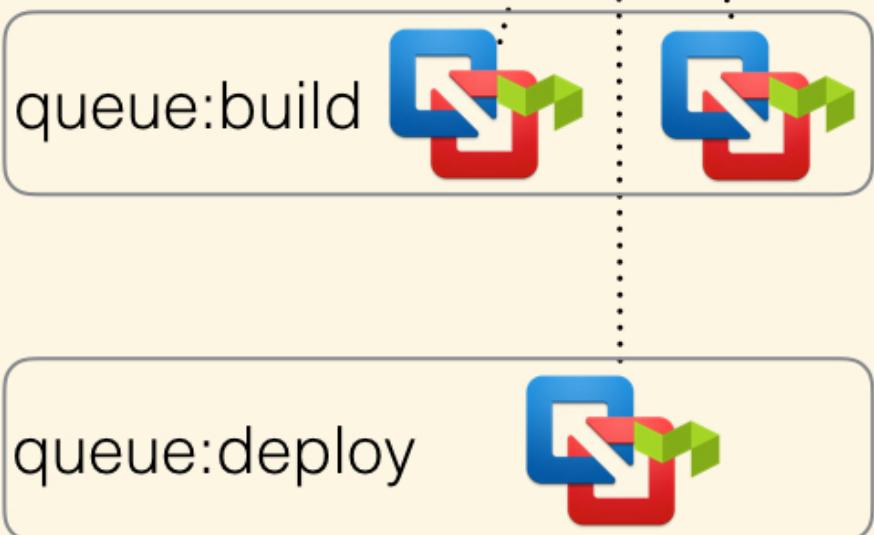
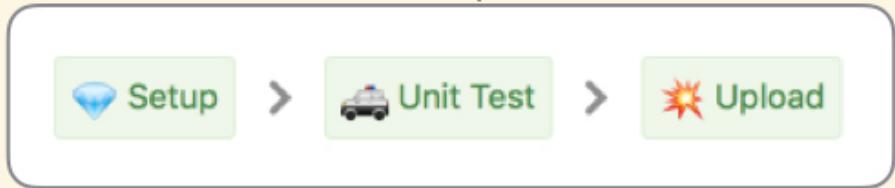
queue:build



queue:deploy



Build Pipeline



Build Pipeline

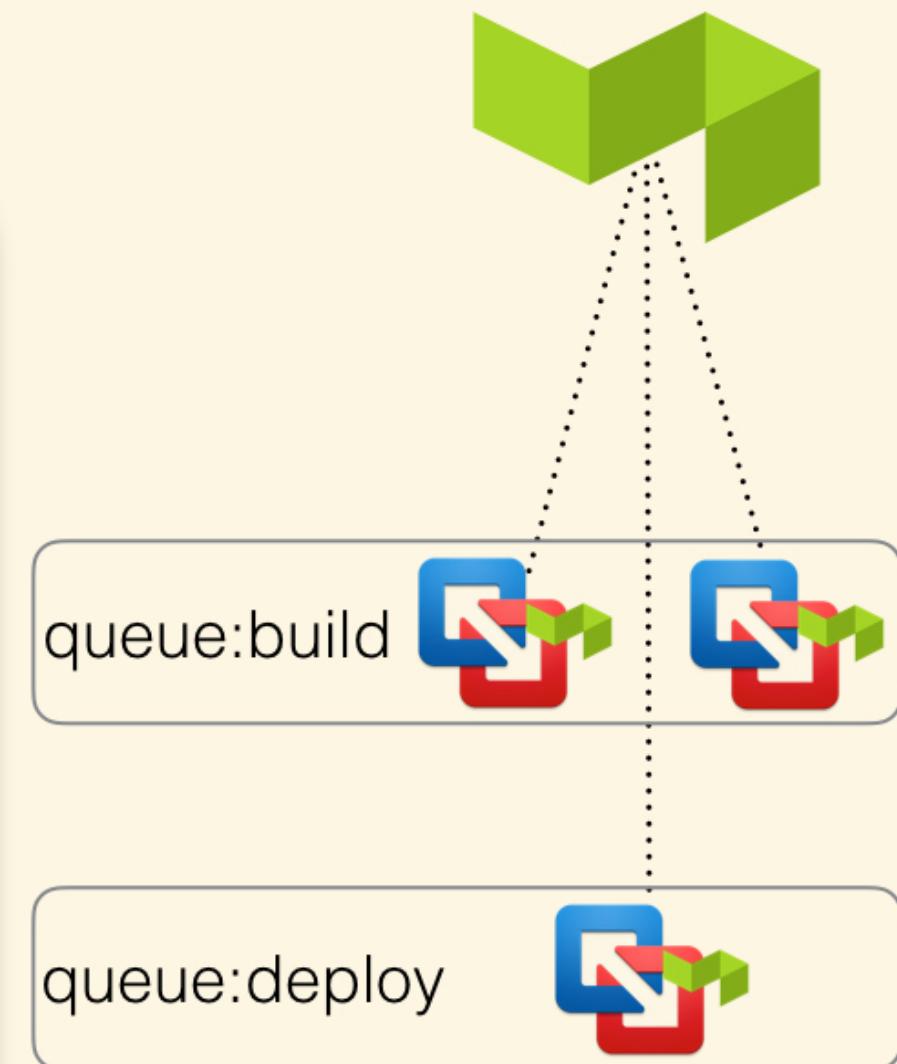
Setup > Unit Test > Upload

```
Terminal — vim ci/config.yml — 45x24
steps:
  - wait
  - name: ":gem: Setup"
    command: "ci/setup.sh"
    agents:
      queue: "aap-ios:resi-mobile-ios:build"

  - wait
  - name: ":police_car: Unit Test"
    command: "ci/unit_test.sh"
    agents:
      queue: "aap-ios:resi-mobile-ios:build"

  - wait
  - name: ":boom: Upload"
    command: "ci/upload.sh"
    branches: "master"
    agents:
      queue: "aap-ios:resi-mobile-ios:deploy"

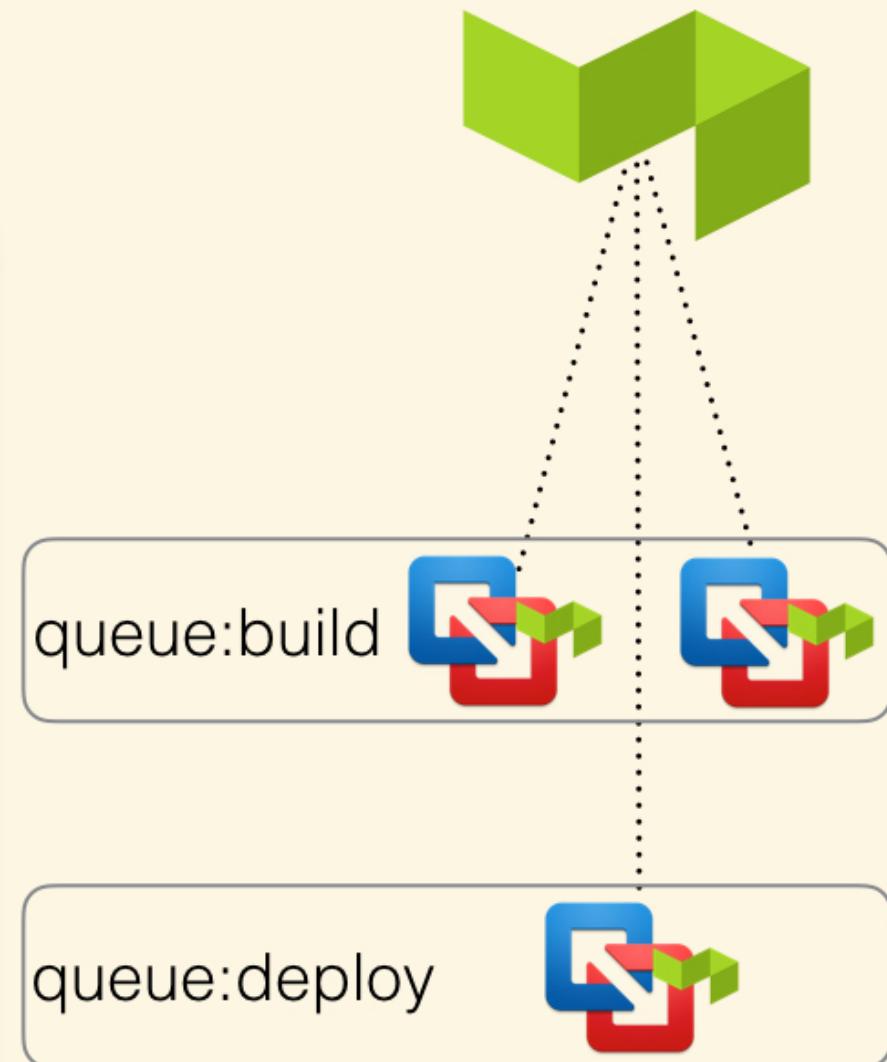
.<.yml | + unix | utf-8 | yaml | 55% | 21:1
```



Build Pipeline

```
Setup > Unit Test > Upload
```

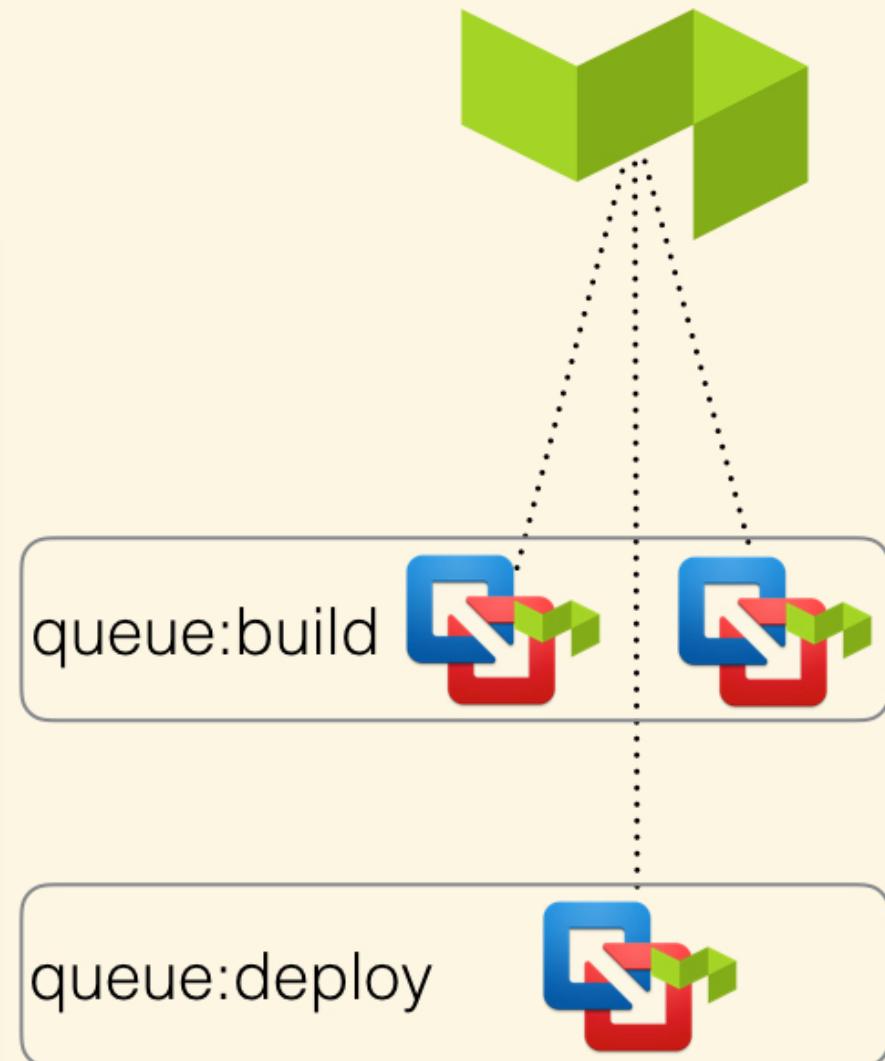
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        command: "ci/unit_test.sh"
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.yml | + unix | utf-8 | yaml | 55% | 21:1
```



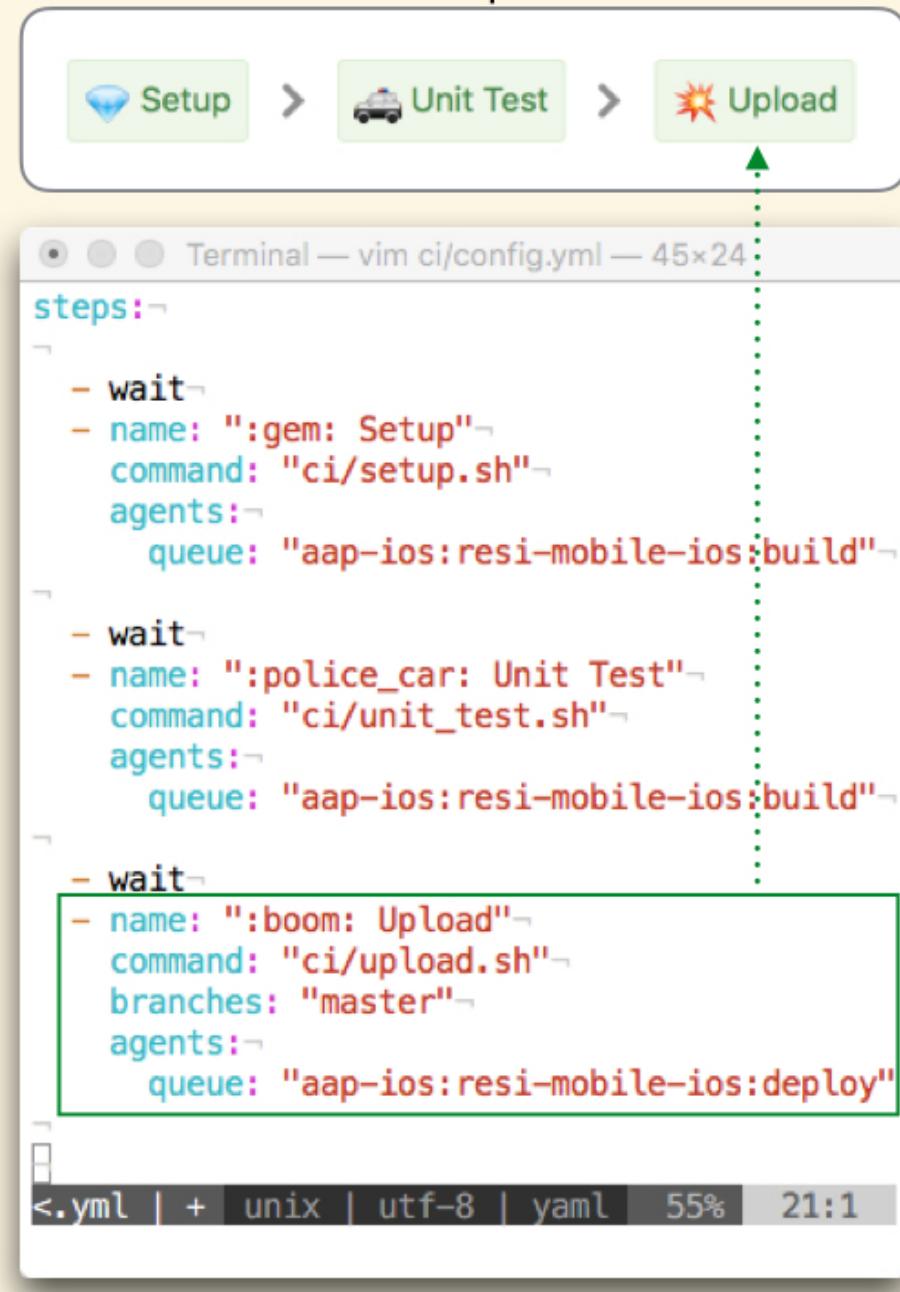
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    agents:
      queue: "aap-ios:resi-mobile-ios:build"
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    command: "ci/upload.sh"
    branches: "master"
    agents:
      queue: "aap-ios:resi-mobile-ios:deploy"
.yml | + unix | utf-8 | yaml | 55% | 21:1
```



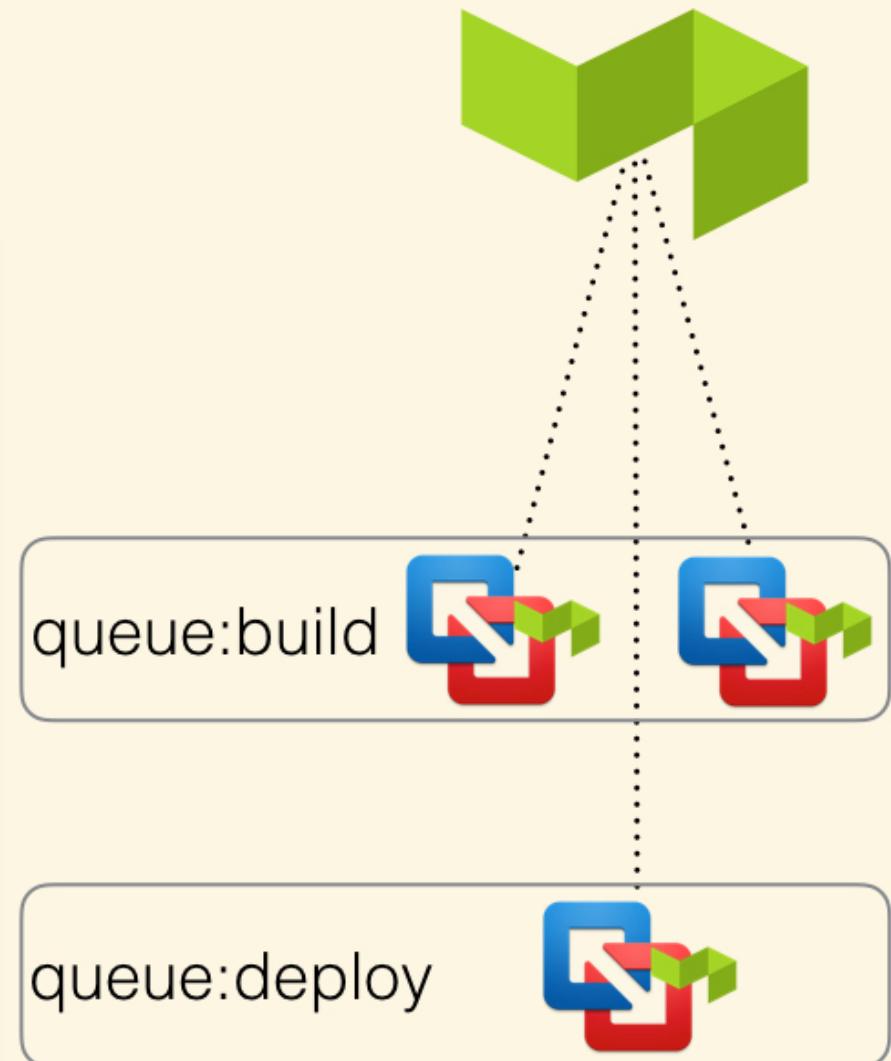
Build Pipeline



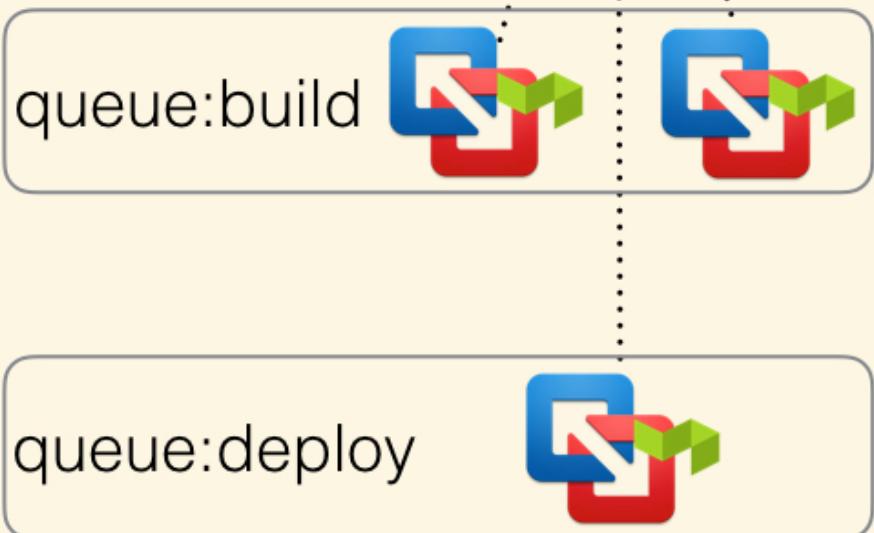
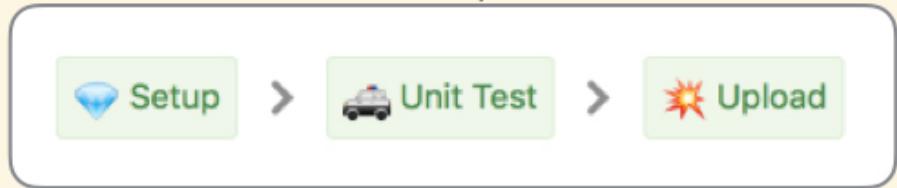
```
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```



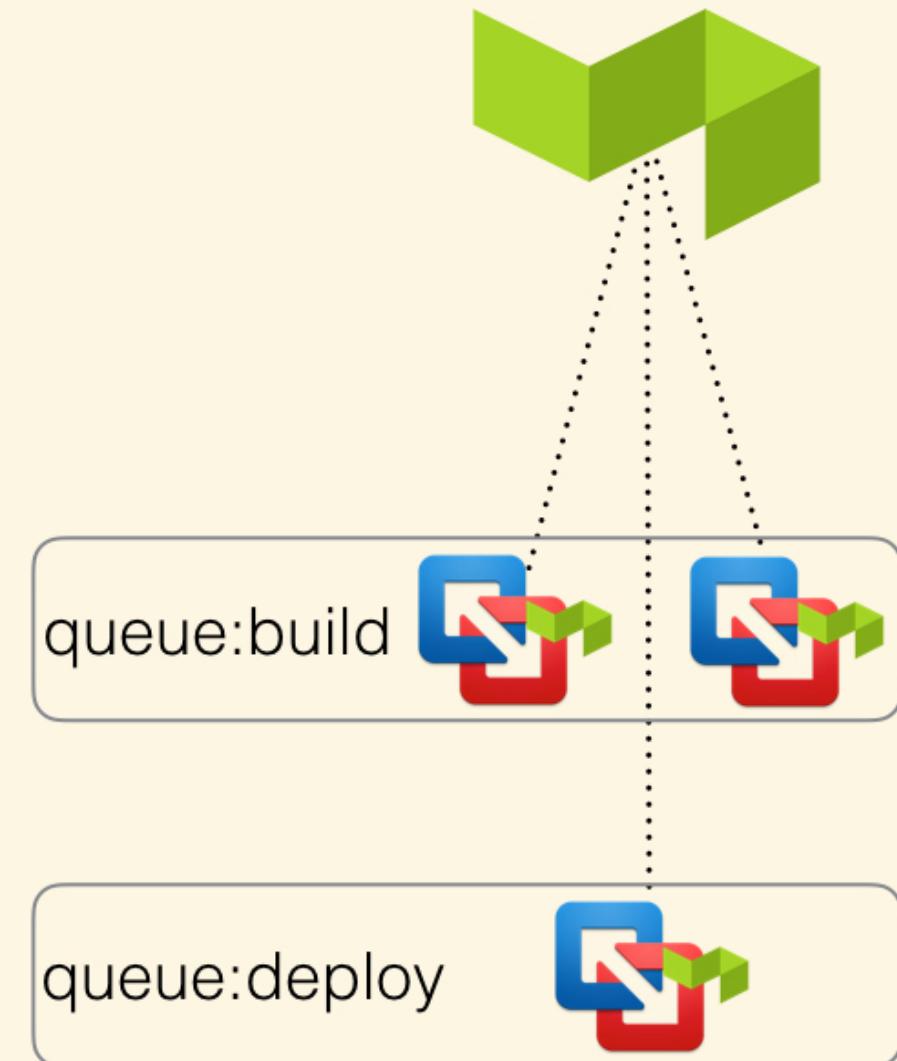
Build Pipeline



Build Pipeline

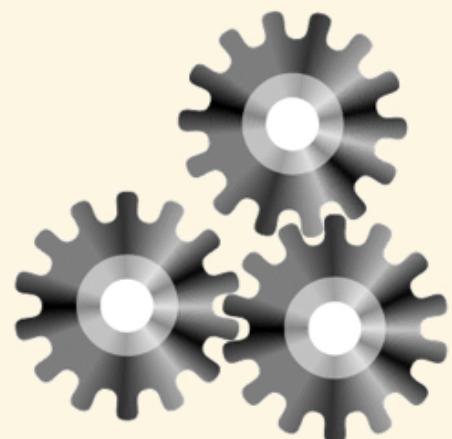
Setup > Unit Test > Upload

- Manual Invocation
- Scheduled Invocation
- Webhook Invocation



Build Pipeline

Setup > Unit Test > Upload



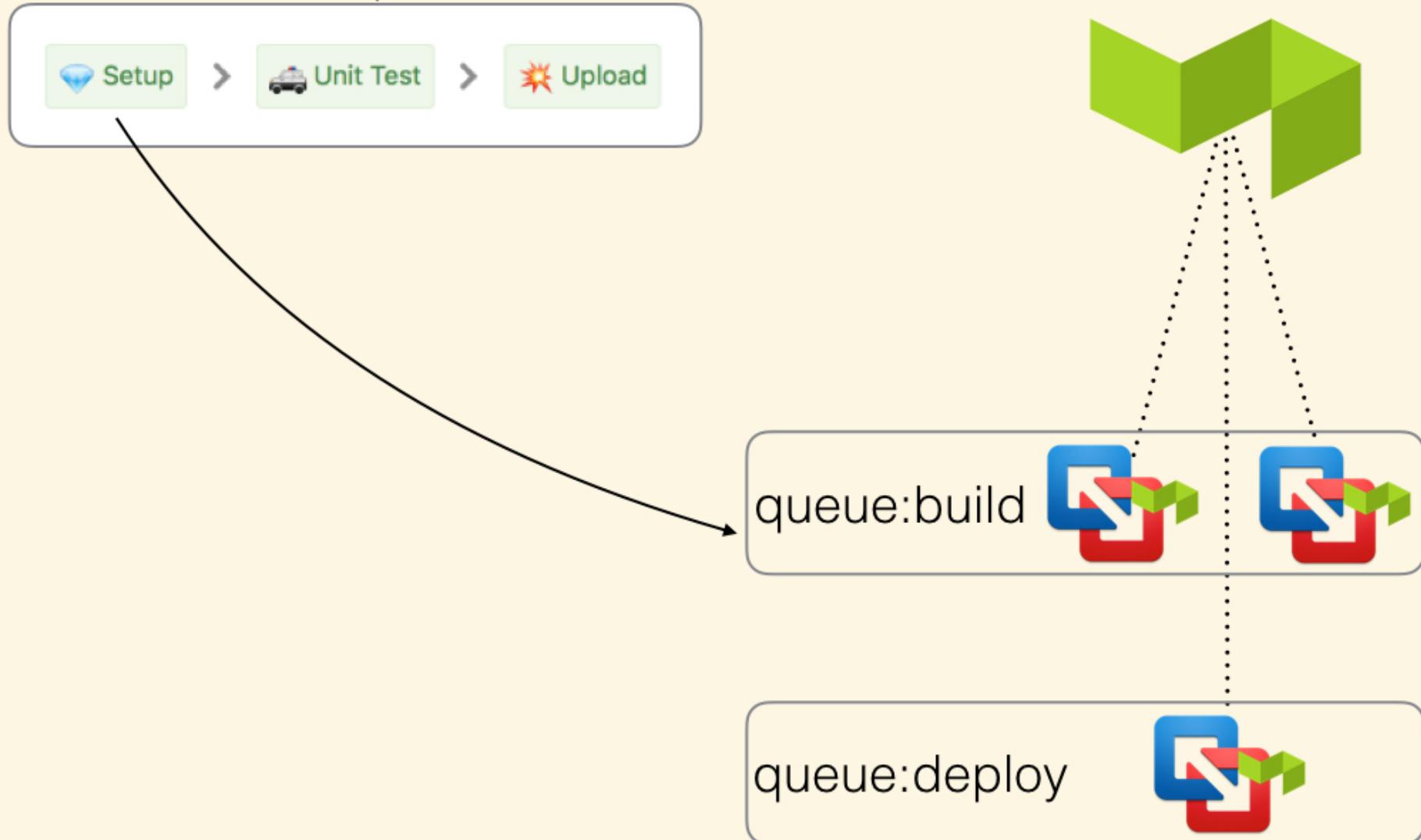
queue:build



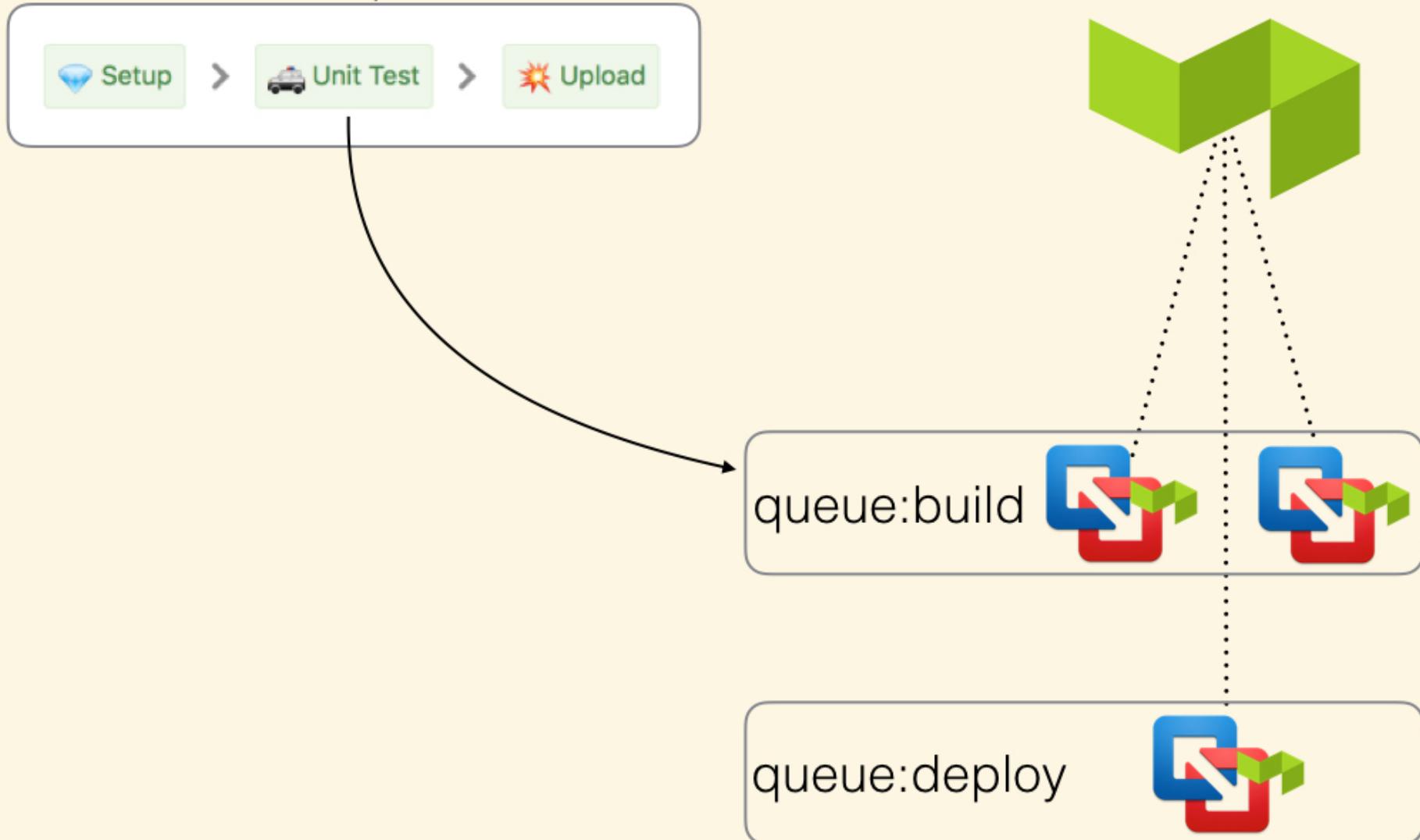
queue:deploy



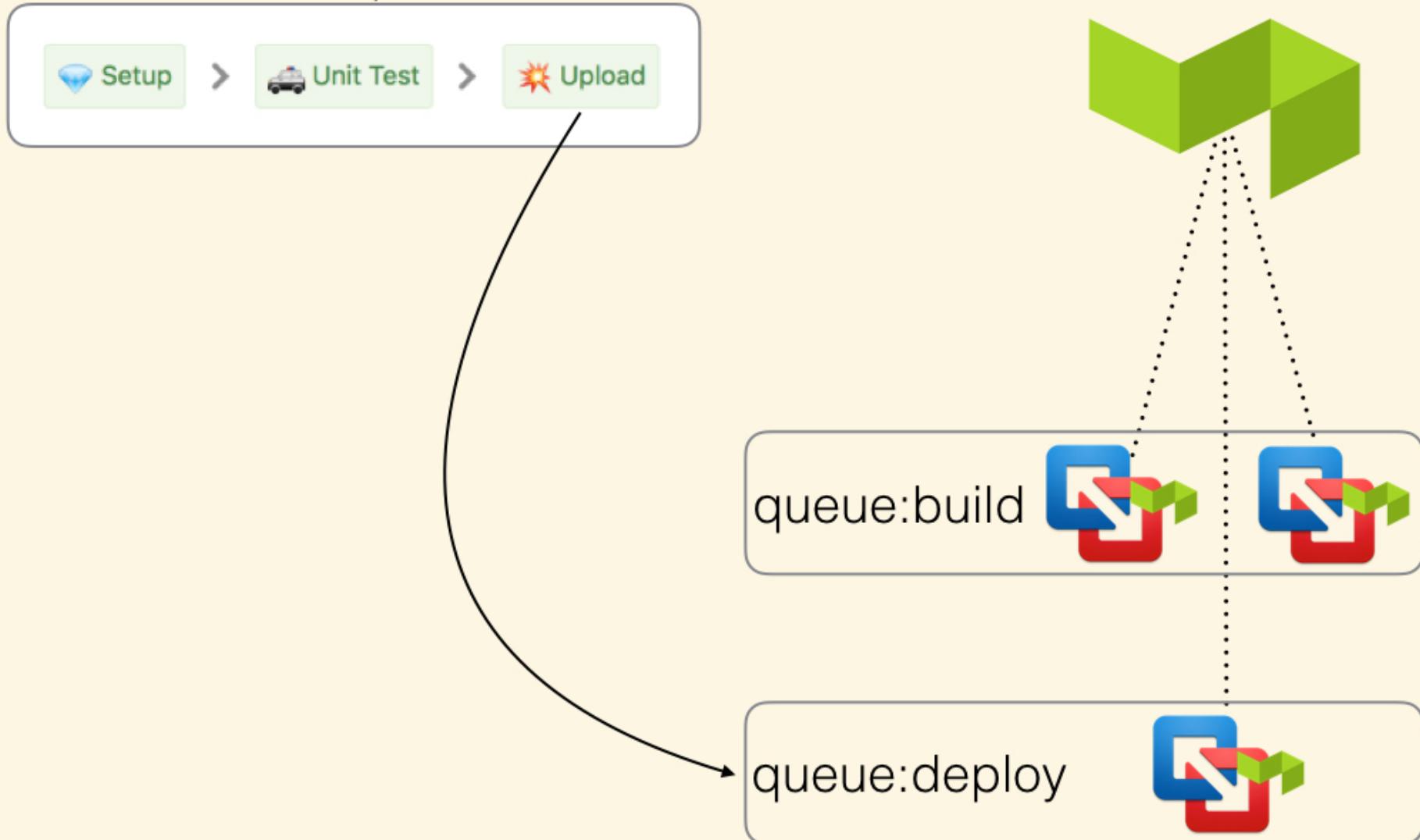
Build Pipeline



Build Pipeline



Build Pipeline



Build Pipeline

Setup > Unit Test > Upload



queue:build



queue:deploy



buildkite.com

RE Group ▾ Pipelines Agents 57 Settings Donny Kurniawan ▾

resi-mobile-ios
git@git.realestate.com.au: [REDACTED]

2152 Builds 0 Running 0 Scheduled + New Build Settings

master

Scheduled nightly build with extended unit test
Created today at 12:30 AM by Donny Kurniawan 1h 10m

Merge pull request #2039 from resi-mobile/bugfix/fullscreen-gallery-crash
Created yesterday at 3:50 PM by Satya Avasarala 53m 35s

Merge pull request #2036 from resi-mobile/bugfix/lifecycle
Created yesterday at 2:52 PM by Stephen Yao 55m 36s

Merge pull request #2036 from resi-mobile/bugfix/lifecycle
Created yesterday at 2:33 PM by Stephen Yao 17m 48s

Merge pull request #2036 from resi-mobile/bugfix/lifecycle
Created yesterday at 2:06 PM by Stephen Yao 14m 17s

feature/ios-10-[REDACTED]

The screenshot shows the Buildkite web interface with the following details:

- Pipeline:** resi-mobile-ios (highlighted by a red arrow)
- Git URL:** git@git.realestate.com.au: [REDACTED]
- Build Statistics:** 2152 Builds, 0 Running, 0 Scheduled, + New Build, Settings
- Master Branch Pipeline:**
 - Scheduled nightly build with extended unit test (Status: Success, Duration: 1h 10m)
 - Merge pull request #2039 from resi-mobile/bugfix/fullscreen-gallery-crash (Status: Success, Duration: 53m 35s)
 - Merge pull request #2036 from resi-mobile/bugfix/lifecycle (Status: Success, Duration: 55m 36s)
 - Merge pull request #2036 from resi-mobile/bugfix/lifecycle (Status: Failed, Duration: 17m 48s)
 - Merge pull request #2036 from resi-mobile/bugfix/lifecycle (Status: Failed, Duration: 14m 17s)
- feature/ios-10 Pipeline:** [REDACTED] (Status: Pending, Duration: 0m 0s)

buildkite.com

REA Group ▾ Pipelines Agents 57 Settings Donny Kurniawan ▾

resi-mobile-ios ← Pipeline Builds
git@git.realestate.com.au:

2152 Builds 0 Running 0 Scheduled + New Build Settings

master

- ✓ b4369ee Scheduled nightly build with extended unit test
Created today at 12:30 AM by Donny Kurniawan
- ✓ b4369ee Merge pull request #2039 from resi-mobile/bugfix/fullscreen-gallery-crash
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- ✓ 9b9424a Merge pull request #2036 from resi-mobile/bugfix/lifecycle
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Created yesterday at 2:06 PM by Stephen Yao

feature/ios-10- []

1h 10m 53m 35s 55m 36s 17m 48s 14m 17s

resi-mobile-ios
git@git.realestate.com.au:

2152 Builds | 0 Running | 0 Scheduled | + New Build | Settings

Merge pull request #1778 from resi-mobile/test -unit- ⌚ 56m 22s 

master | f6d4c4d

Plan Upload > Setup > Unit Test > Upload 

jzheng  Triggered from Webhook 

✓ Plan Upload buildkite-agent pipeline upload ci... ⌚ 15 seconds 📁 aap-ios-macpro-vagrant-n-4

✓ Setup ci/setup.sh ⌚ 4 minutes, 20 seconds 📁 aap-ios-macpro-vagrant-n-4

✓ Unit Test ci/unit_test.sh ⌚ 14 minutes, 3 seconds 📁 aap-ios-macpro-vagrant-n-4

✓ Upload ci/upload.sh ⌚ 37 minutes, 31 seconds 📁 aap-ios-macpro-vagrant-n-1

DYNAMIC PIPELINE

- Branches (e.g. master, production)
- Commit messages (e.g. XCODE8)

Scheduled nightly build with extended unit test

master 318b751 

① 47m 9s

Plan Upload > Setup > Lint Test > Extended Unit Test > Internal

Production (#2220) 

Donny Kurniawan
Finished Mon 26th Sep at 1:17 AM

Triggered from Pipeline Schedule



Rebuild

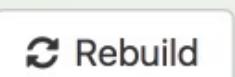
production/v3.04.0 27231e6 

① 51m 34s

Plan Upload > Setup > Lint Test > Unit Test > Production (#1766) 

Donny Kurniawan
Finished Fri 2nd Sep at 5:31 PM

Triggered from Webhook



BLOCK STEP

- A block step that pauses the pipeline
- Requires a team member to unblock it
- Useful for deployment

production/v3.04.0 | c4083c8

Plan Upload > Setup > Lint Test > Unit Test > Lock Production

Leon Xiang
Finished Thu 1st Sep at 2:37 PM Triggered from Webhook Rebuild

✓ Plan Upload ci/pipeline.sh | buildkite-agent pipeline upload ⏱ 15 seconds aap-ios-macpro-vagrant-n-2

✓ Setup ci/setup.sh ⏱ 4 minutes, 55 seconds aap-ios-macpro-vagrant-n-2

✓ Lint Test ci/lint.sh ⏱ 14 seconds aap-ios-macpro-vagrant-n-2

✓ Unit Test ci/unit_test.sh ⏱ 15 minutes, 35 seconds aap-ios-macpro-vagrant-n-2

Lock Production ci/build_production.sh

production/v3.04.0 | c4083c8

Plan Upload > Setup > Lint Test > Unit Test > Production

Leon Xiang
Finished Thu 1st Sep at 2:37 PM Triggered from Webhook Rebuild

✓ Plan Upload ci/pipeline.sh | buildkite-agent pipeline upload 15 seconds aap-ios-macpro-vagrant-n-2

✓ Setup ci/setup.sh Unblock this step? 15 seconds aap-ios-macpro-vagrant-n-2

✓ Lint Test ci/lint.sh Cancel OK 15 minutes, 35 seconds aap-ios-macpro-vagrant-n-2

✓ Unit Test ci/unit_test.sh 15 minutes, 35 seconds aap-ios-macpro-vagrant-n-2

Production ci/build_production.sh

Lock & Key icon

production/v3.04.0 | c4083c8

Plan Upload > Setup > Lint Test > Unit Test > Production

Leon Xiang
Created Thu 1st Sep at 2:15 PM Triggered from Webhook Cancel

✓ Plan Upload ci/pipeline.sh | buildkite-agent pipeline upload ⏱ 15 seconds aap-ios-macpro-vagrant-n-2

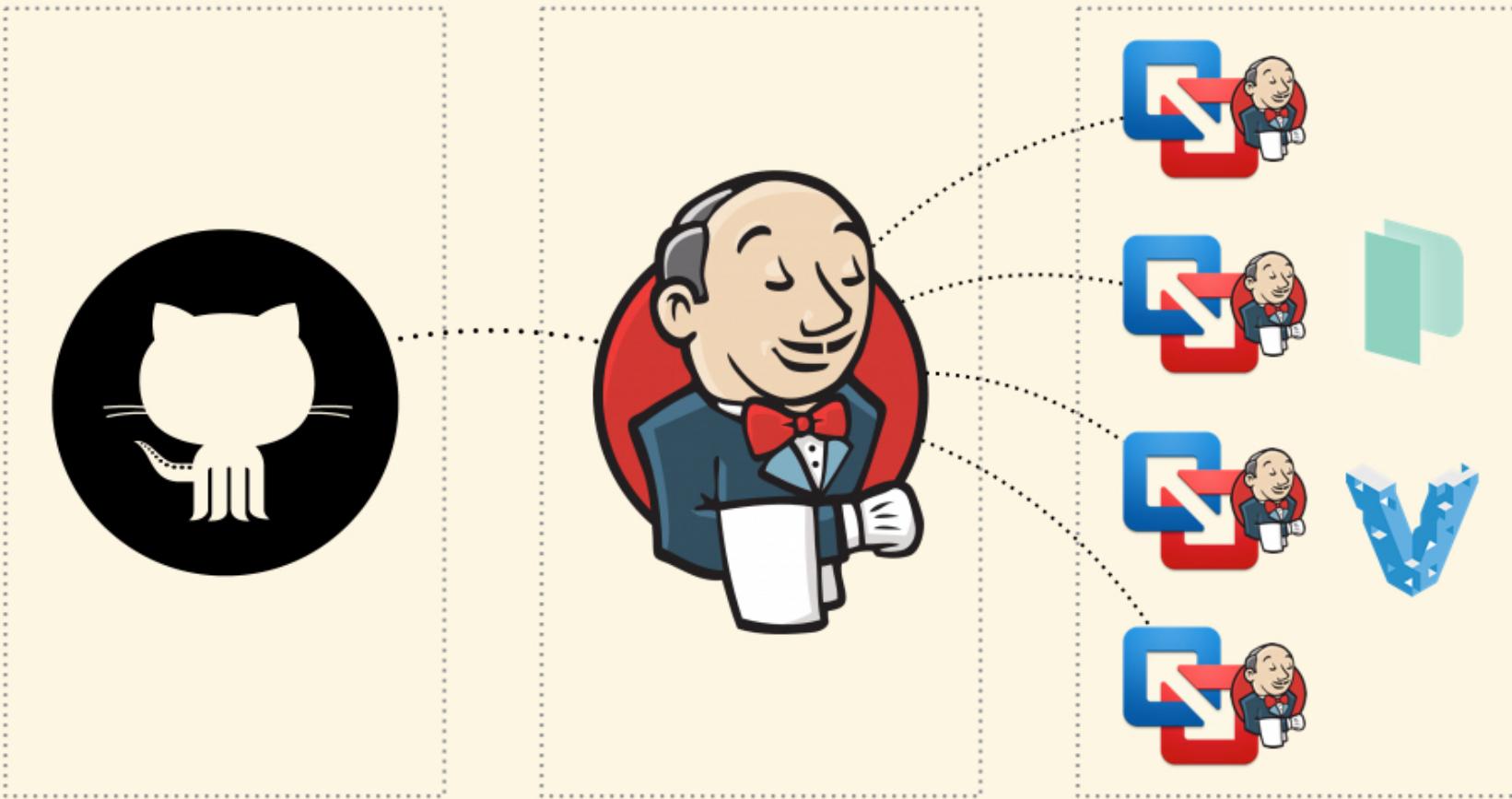
✓ Setup ci/setup.sh ⏱ 4 minutes, 55 seconds aap-ios-macpro-vagrant-n-2

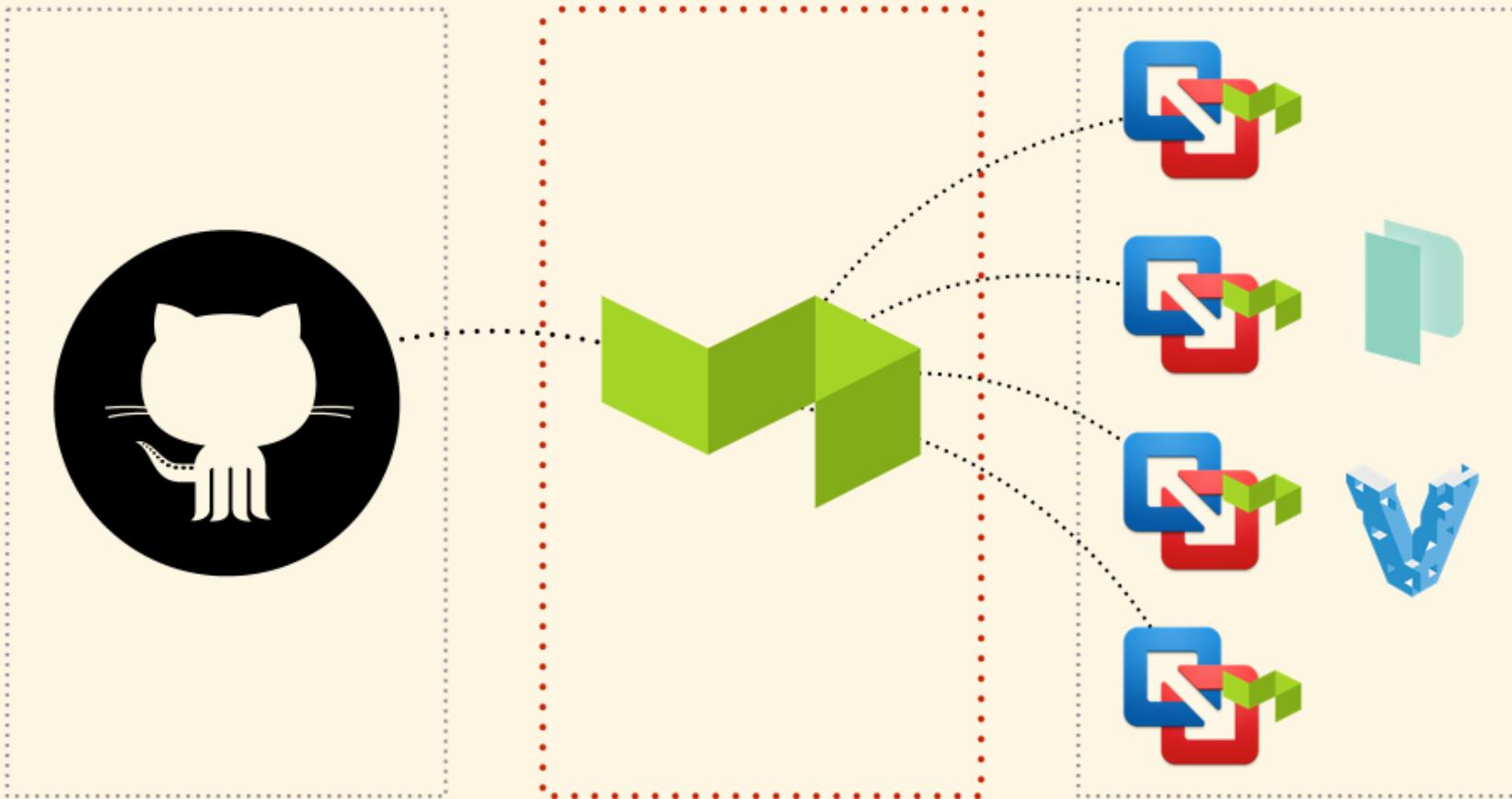
✓ Lint Test ci/lint.sh ⏱ 14 seconds aap-ios-macpro-vagrant-n-2

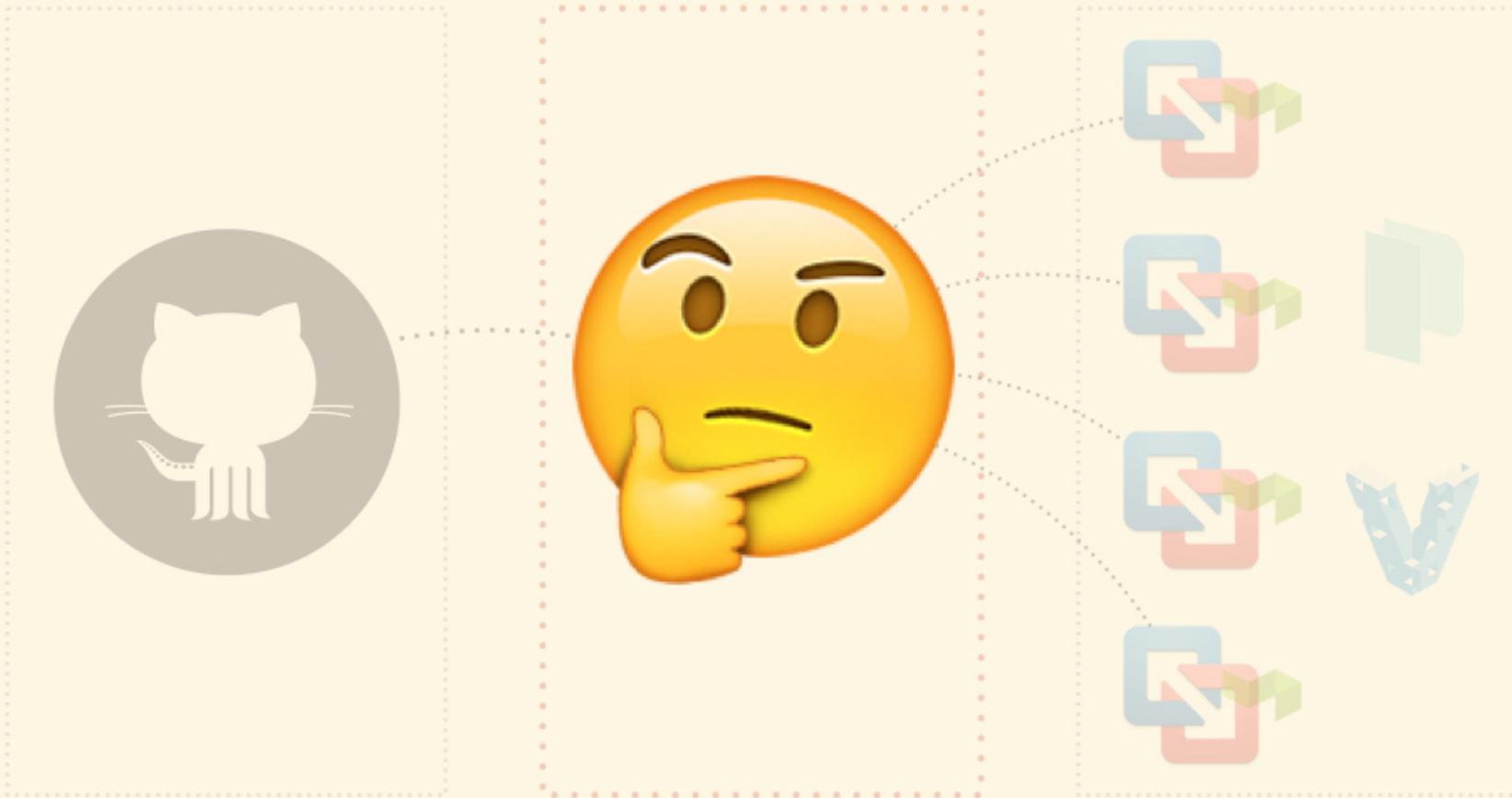
✓ Unit Test ci/unit_test.sh ⏱ 15 minutes, 35 seconds aap-ios-macpro-vagrant-n-2

Donny Kurniawan unblocked 🔑
Today at 2:08 PM

Production ci/build_production.sh ⏱ 3 seconds aap-ios-macpro-1







OSX-VM-FACTORY

git.realestate.com.au / osx-vm-factory PRIVATE

Unwatch 23 Star 0 Fork 0

Code Issues 0 Pull requests 0 Wiki Pulse Graphs Settings

Factory to create OS X VM — Edit

156 commits 2 branches 0 releases 3 contributors

Branch: master New pull request Create new file Upload files Find file Clone or download

Donny Kurniawan Add MacPro to the list Latest commit 4fe434a 10 days ago

ci	Check that the script exists	14 days ago
deploy	Add better error message	14 days ago
osx-vm	Install various tools	2 months ago
packer	Refactor preferences	17 days ago
prepare_iso	Initial commit	4 months ago
scripts	Support multiple iOS simulators	11 days ago
.gitignore	Add Bootstrap script	4 months ago
README.md	Add additional information	4 months ago
config.json	Add iOS 8.4 and 9.3 simulators	11 days ago
machines.json	Add MacPro to the list	10 days ago

README.md

OS X VM Factory

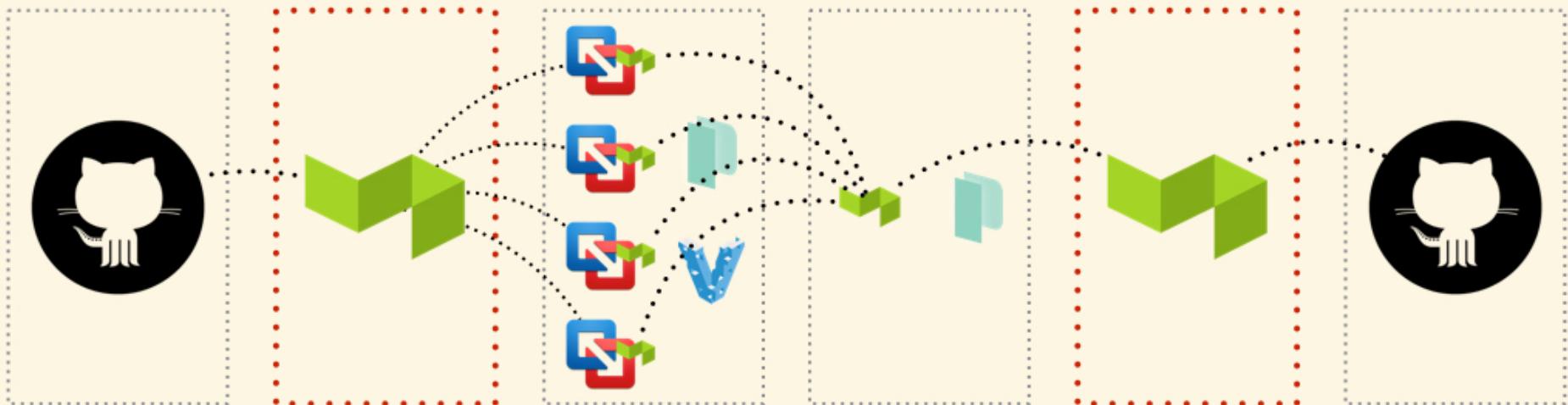
This is a set of scripts and Packer templates to create OS X VM for VirtualBox. It is largely based on osx-vm-templates. Be aware that the whole process can take more than 3 hours and require at least 30GB of disk space. We use mas and xcode-

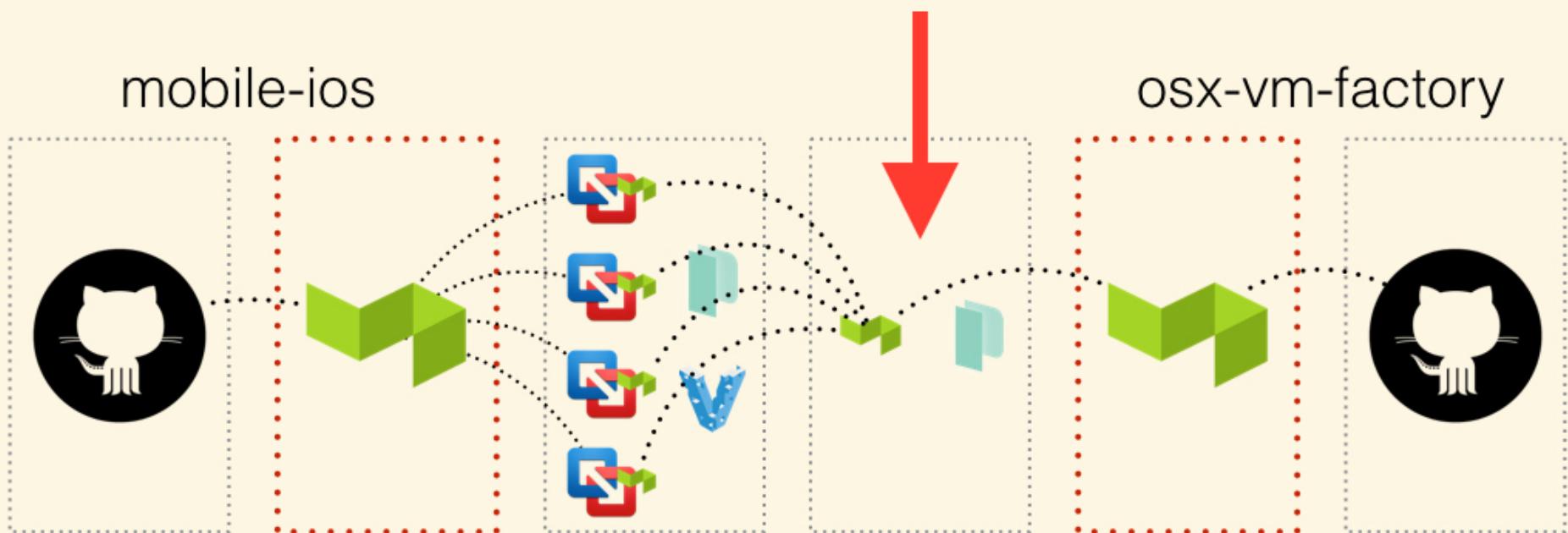
OSX-VM-FACTORY

- Automates VM creation
- Mac App Store ready-to-run VM image
- Copies VM image to specified machines
- Provisions the VMs on those machines
- Driven by config.json & machines.json

mobile-ios

osx-vm-factory





[Add iOS 8.4 and 9.3 simulators](#)

master | 84ed371

⌚ 22m 52s 

 Pipeline Upload >  VMware Setup >  OS X >  Xcode >  Tools >  VM Transfer >  VM Deploy

 **donny-kurniawan**
Triggered from Webhook 

✓  Pipeline Upload ci/pipeline.sh | buildkite-agent pipeline upload ⌚ 11 seconds aap-ios-macmini-vm-factory

✓  VMware Setup ci/vmware/setup.sh ⌚ 9 seconds aap-ios-macmini-vm-factory

✓  OS X ci/vmware/osx.sh ⌚ 3 seconds aap-ios-macmini-vm-factory

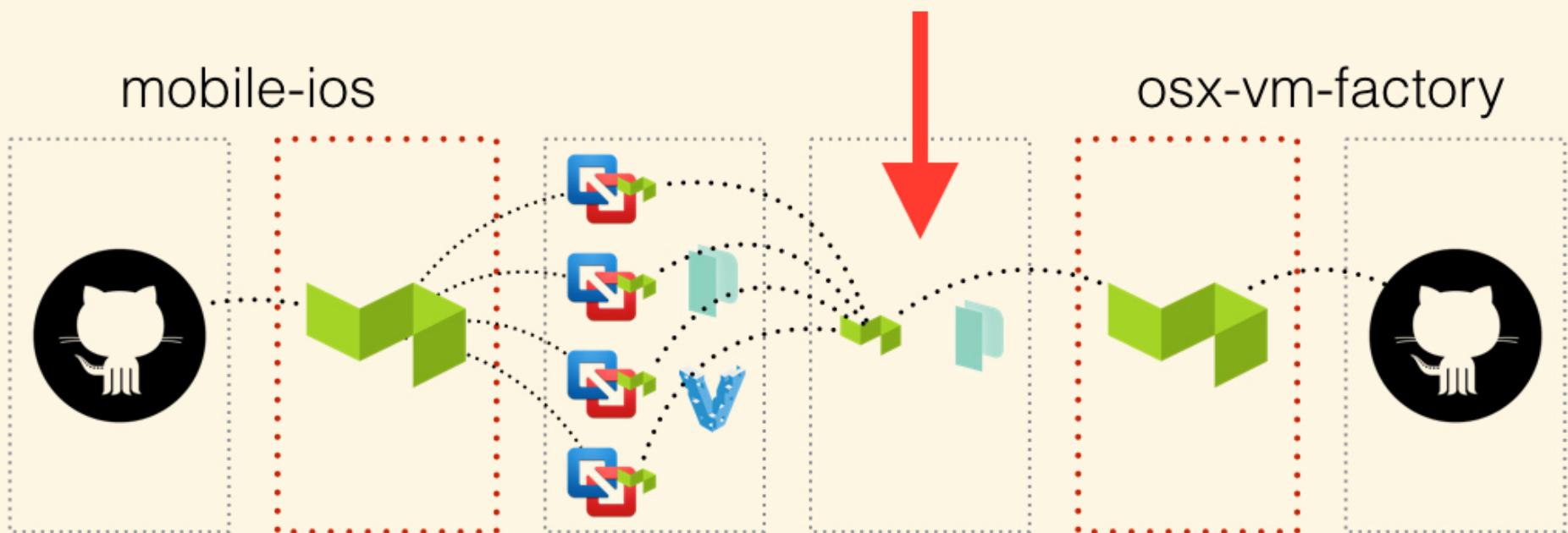
✓  Xcode ci/vmware/xcode.sh ⌚ 3 seconds aap-ios-macmini-vm-factory

✓  Tools ci/vmware/tools.sh ⌚ 3 seconds aap-ios-macmini-vm-factory

✓  VM Transfer ci/vmware/transfer.sh ⌚ 10 minutes, 13 seconds aap-ios-macmini-vm-factory

 **Donny Kurniawan unblocked** 
Thu 15th Sep at 2:00 PM

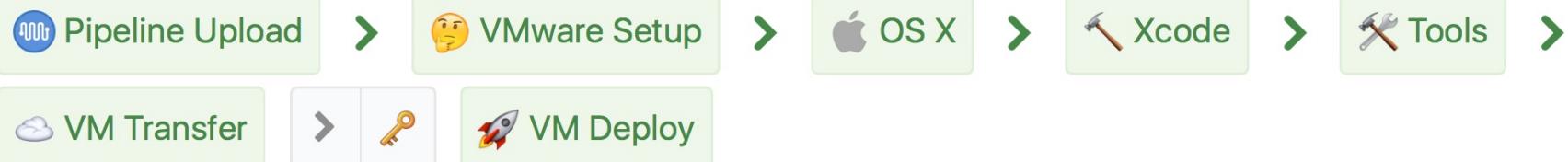
✓  VM Deploy ci/vmware/deploy.sh ⌚ 11 minutes, 53 seconds aap-ios-macmini-vm-factory



Add iOS 8.4 and 9.3 simulators

master | 84ed371

⌚ 22m 52s



donny-kurniawan

Finished Thu 15th Sep at 2:12 PM

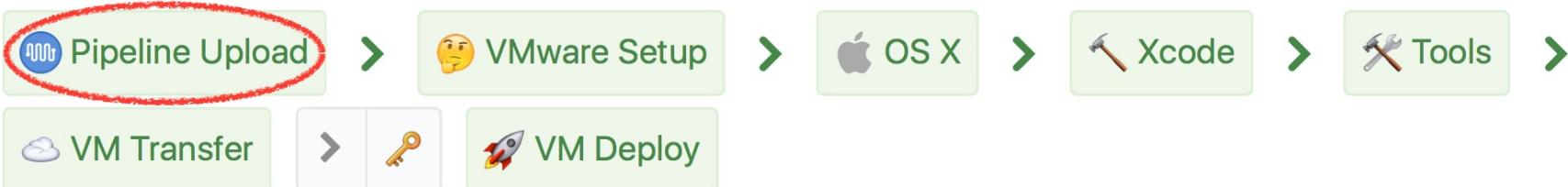
Triggered from Webhook

↻ Rebuild

Add iOS 8.4 and 9.3 simulators

master | 84ed371

⌚ 22m 52s



donny-kurniawan

Finished Thu 15th Sep at 2:12 PM

Triggered from Webhook

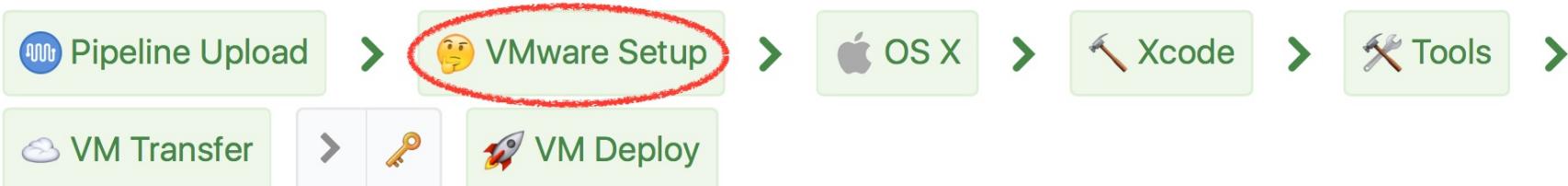
⟳ Rebuild

- Upload build steps file
- Setup Buildkite CI steps
- ~10 seconds

Add iOS 8.4 and 9.3 simulators

master | 84ed371

⌚ 22m 52s



? donny-kurniawan

Finished Thu 15th Sep at 2:12 PM

Triggered from Webhook

⟳ Rebuild

- Set necessary variables
- Ensure software is installed
- Ensure folders are created
- ~10 seconds

Add iOS 8.4 and 9.3 simulators

master | 84ed371

⌚ 22m 52s



donny-kurniawan

Finished Thu 15th Sep at 2:12 PM

Triggered from Webhook

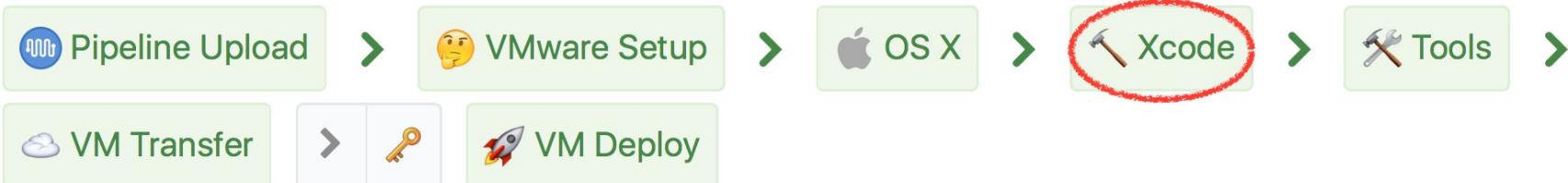
⟳ Rebuild

- Get OS X from App Store
- Build OS X disk image
- Pack base OS X image and save
- ~1 hour or ~5 seconds

Add iOS 8.4 and 9.3 simulators

master | 84ed371

⌚ 22m 52s



? donny-kurniawan

Finished Thu 15th Sep at 2:12 PM

Triggered from Webhook

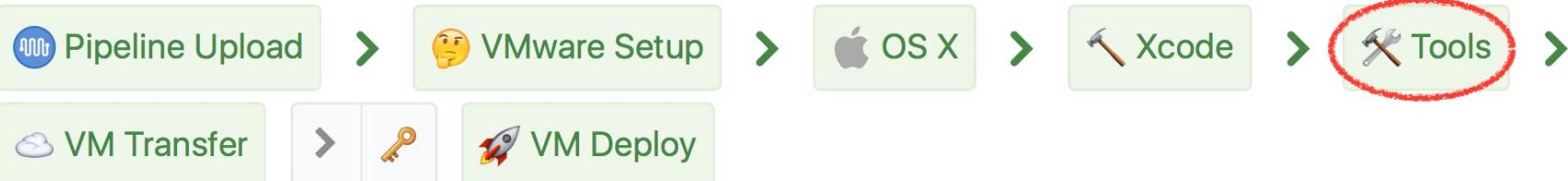
⟳ Rebuild

- Get base OS X image
- Build OS X + Xcode disk image
- Pack OS X + Xcode image and save
- ~1-2 hours or ~5 seconds

Add iOS 8.4 and 9.3 simulators

master | 84ed371

⌚ 22m 52s



donny-kurniawan

Finished Thu 15th Sep at 2:12 PM

Triggered from Webhook

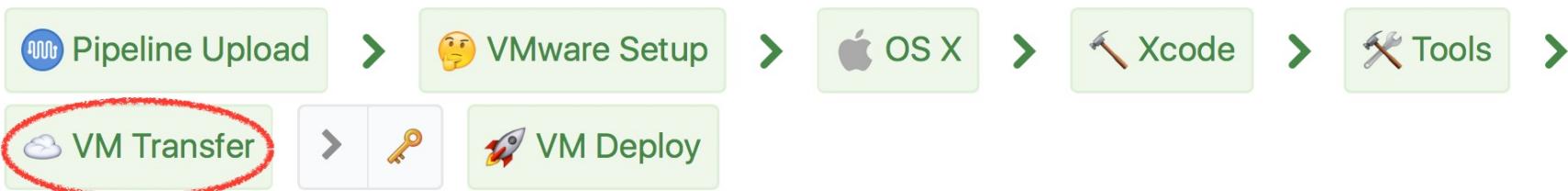
⟳ Rebuild

- Get OS X + Xcode image
- Build OS X + Xcode + Tools disk image
- Pack OS X + Xcode + Tools and save
- ~1-2 hours or ~5 seconds

Add iOS 8.4 and 9.3 simulators

master | 84ed371

⌚ 22m 52s



donny-kurniawan

Finished Thu 15th Sep at 2:12 PM

Triggered from Webhook

⟳ Rebuild

- Copy the final disk image to machines
- Based on `machines.json` file
- Machines are in the same private subnet
- 30GB file & 5 minutes to transfer

Add iOS 8.4 and 9.3 simulators

master | 84ed371

⌚ 22m 52s 

Pipeline Upload > 🤖 VMware Setup > OS X > Xcode > Tools >

VM Transfer >  VM Deploy

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Finished Thu 15th Sep at 2:12 PM

Triggered from Webhook





- Login to machines and setup necessary files
- Destroy previous VMs and clean up
- Restart VMs with new disk image
- ~5 minutes per machine

CONFIG.JSON

```
{  
  "provider": "vmware",  
  "secret_file": "/Users/macmini/Documents/REA/secret.json",  
  "box_folder": "/Users/macmini/Documents/REA/Box",  
  "xcode_version": "8",  
  "xcode_simulators": "iOS 8.4_iOS 9.3",  
  "xcode_folder": "/Users/macmini/Downloads/Xcode/",  
}
```

MACHINES.JSON

```
{  
  "machines": [  
    {  
      "user_host": "macpro@127.0.0.1",  
      "box_folder": "Documents/REA/Box/",  
      "deploy_folder": "Documents/REA/VM/",  
      "nodes": [  
        {  
          "hostname": "macpro-1", "cpus": "4", "memory": "8192",  
          "buildkite_name": "aap-ios-%hostname",  
          "buildkite_metadata": "queue=aap-ios:resi-mobile-ios:build,xcode=11.3,  
        },  
        {  
          "hostname": "macpro-2", "cpus": "4", "memory": "8192",  
          "buildkite_name": "aap-ios-%hostname",  
          "buildkite_metadata": "queue=aap-ios:resi-mobile-ios:build,xcode=11.3,  
        }  
      ]  
    }  
  ]  
}
```

Slack

REA Group ▾
Donny Kurniawan

ALL UNREADS

CHANNELS (690)

aap-ios-build

#aap-ios-build

Yesterday

Buildkite BOT 12:22 PM

thumb up resi-mobile-ios (feature/testflight) #2229
Add TestFlight submission step - Donny Kurniawan (a3742cd)
[View Build](#)

thumb up resi-mobile-ios (master) #2228
Merge pull request #2025 from resi-mobile/feature/today-view-ios10 - Stephen Yao (edfaf67)
[View Build](#)

Buildkite BOT 12:38 PM ☆

thumb down resi-mobile-ios (feature/fix-plist-for-app-stroe) #2222
Put default values to the plist entitlements. - Jake Lin (5565594)
[View Build](#)

Buildkite BOT 12:46 PM

▶ Satya Avasarala unblocked resi-mobile-ios "🔑" (master) build #2230
Merge pull request #2048 from resi-mobile/bugfix/ipad-photogallery-crash - Satya Avasarala (9cdd81f)
[View Build](#)

github enterprise BOT 1:04 PM

[resi-mobile/resi-mobile-ios] Pull request closed: #2050 Add TestFlight submission step by [donny-kurniawan](#)

Buildkite BOT 1:27 PM

thumb up resi-mobile-ios (master) #2230
Merge pull request #2048 from resi-mobile/bugfix/ipad-photogallery-crash - Satya Avasarala (9cdd81f)
[View Build](#)

github enterprise BOT 2:06 PM

+ Message #aap-ios-build

MORE UNREADS ▾

ALL GOOD

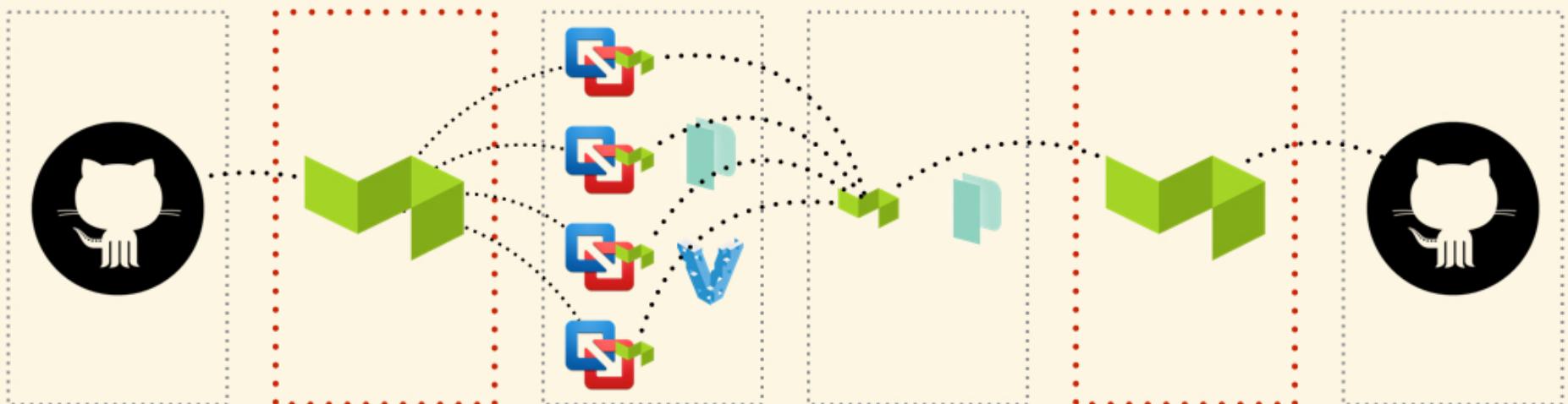
NO! LESSONS LEARNT

- Network to GitHub
- Network to Apple
- GHE and CI colocation

SUMMARY

mobile-ios

osx-vm-factory



- Really happy with Buildkite
- Automate the CI infrastructure
- Capture process as code
- Build agents as &

@donny_k_
realestate.com.au