



GitLab

Why We are Choosing Cloud
Native Build Packs at GitLab

Who am I?



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At the end of this talk, you'll learn...



- What is Buildpacks
- Heroku buildpacks
- Herokuish
- Why Cloud Native Buildpacks
- Buildpacks at GitLab
- Why switch to Cloud Native Buildpacks
- Demo using GitLab AutoDevOps





“Buildpacks are responsible for transforming deployed code into a slug, which can then be executed on a dyno. Buildpacks are composed of a set of scripts, and depending on the programming language, the scripts will retrieve dependencies, output generated assets or compiled code, and more.”

- Heroku



What is Buildpacks



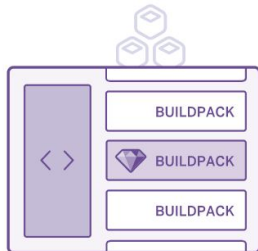
①

Deploy code to Heroku

```
> git push  
heroku master
```

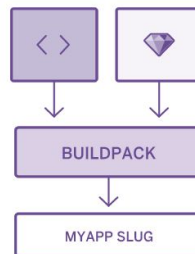
②

Heroku analyzes code and selects buildpack, or uses app-assigned buildpack

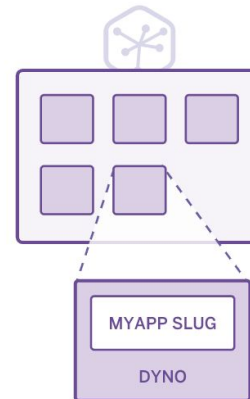


③

Buildpack retrieves assets, compiles code, and creates an app slug



④



Credit: Heroku



What is Buildpacks



```
$ ls
Gemfile Gemfile.lock
$ heroku create --buildpack https://github.com/heroku/heroku-buildpack-ruby.git
$ git push heroku master
...
-----> Heroku receiving push
-----> Fetching custom buildpack
-----> Ruby app detected
-----> Installing dependencies using Bundler version 1.1.rc
Running: bundle install --without development:test --path vendor/bundle --deployment
Fetching gem metadata from http://rubygems.org/..
Installing rack (1.3.5)
Using bundler (1.1.rc)
Your bundle is complete! It was installed into ./vendor/bundle
Cleaning up the bundler cache.
-----> Discovering process types
Procfile declares types -> (none)
Default types for Ruby -> console, rake
```



What is Buildpacks



```
if [ -f "$APP_DIR/Gemfile" ]; then  
  
    echo "Ruby"  
  
    exit 0  
  
else  
  
    echo "no"  
  
    exit 1  
  
fi
```

Source: <https://github.com/heroku/heroku-buildpack-ruby/blob/master/bin/detect#L14>





We have:

- Cloud Foundry Buildpacks
- Heroku Buildpacks



...and proprietary and are largely incompatible with each other.





...open source utility that emulates the **Heroku** build and runtime tasks in containers but largely depends on **Heroku** Supported buildpacks.

You can run it as a container against your app:

```
$ docker run --rm -v /abs/app/path:/tmp/app gliderlabs/herokuish /bin/herokuish build
```

<https://github.com/gliderlabs/herokuish>





Cloud Native Buildpacks (CNB) are pluggable, modular tools that translate source code into OCI images.

Initiated by Pivotal & Heroku in January 2018, its currently a [CNCF Sandbox project](#), which incorporates years of learning from both companies to unify the buildpacks ecosystem

<https://buildpacks.io/>





- Portable because it uses the OCI image format
- Unprivileged Containers
- Faster Builds
- Image Layer “Rebasing”

<https://buildpacks.io/>





- `pack` : CLI for building apps using CNB
- `builder` : is an image that bundles all the bits and information on how to build your apps.

```
pack build myapp --builder cnbs/sample-builder:bionic
```

<https://buildpacks.io/>





CNB Lifecycle

- Detection
- Analysis
- Build
- Export

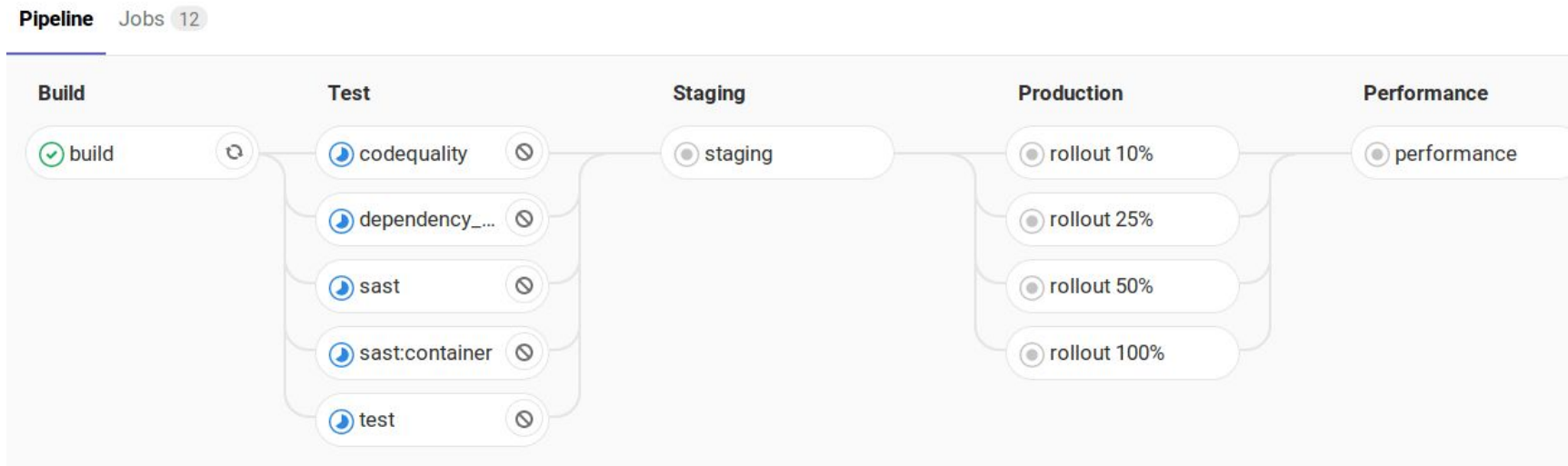
<https://buildpacks.io/>



Buildpacks at GitLab



With GitLab AutoDevOps, you commit and GitLab does the rest from build to performance monitoring with the help of buildpacks using Herokuish.



<https://about.gitlab.com/stages-devops-lifecycle/auto-devops/>





- Reduced Image size due to image rebase
- Faster Builds
- [Unsure future](#) of Herokuish, might be archived soon.
- CNCF Project

<https://about.gitlab.com/stages-devops-lifecycle/auto-devops/>





CNB is currently opt-in for the Auto-Build jobs in AutoDevOps and requires a CI variable:

Custom `.gitlab-ci.yml` file:

```
include:
  - template: Auto-DevOps.gitlab-ci.yml
build:
  variables:
    AUTO_DEVOPS_BUILD_IMAGE_CNB_ENABLED: 1
  image: registry.gitlab.com/gitlab-org/cluster-integration/auto-build-image:v0.2.0
```

Links:

<https://about.gitlab.com/stages-devops-lifecycle/auto-devops/>

<https://docs.gitlab.com/ee/topics/autodevops/#auto-build>

<https://gitlab.com/gitlab-org/cluster-integration/auto-build-image/compare/v0.1.0...v0.2.0>





Drawback:

No CNB equivalent for:

herokuish buildpack test

We are sticking to herokuish for [AutoTest Job template](#), we are looking forward to collaborate on adding such feature.

Links:

<https://about.gitlab.com/stages-devops-lifecycle/auto-devops/>

<https://docs.gitlab.com/ee/topics/autodevops/#auto-build>

<https://gitlab.com/gitlab-org/cluster-integration/auto-build-image/compare/v0.1.0...v0.2.0>

<https://gitlab.com/gitlab-org/gitlab/-/issues/222814>





Demo



Sample Ruby Project



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Search or jump to...

cnb-demo

TE Demos > cnb-demo > Details

cnb-demo Project ID: 17802082

17 Commits 2 Branches 0 Tags 727 KB Files 815 KB Storage

master cnb-demo / +

History Find file Web IDE Clone

Enable CNB
Abubakar Siddiq Ango authored 3 months ago 1a3fe4c7

CI/CD configuration Add README Add LICENSE Add CHANGELOG Add CONTRIBUTING Auto DevOps enabled Add Kubernetes cluster

Name	Last commit	Last update
test	Add required files to allow herokuish buildpack detection	2 years ago
.gitlab-ci.yml	Enable CNB	3 months ago
Gemfile	Add required files to allow herokuish buildpack detection	2 years ago
Gemfile.lock	Add required files to allow herokuish buildpack detection	2 years ago
rakefile.rb	Add required files to allow herokuish buildpack detection	2 years ago
server.rb	Update server.rb	1 year ago

AutoDevOps CI Pipeline



The screenshot displays the GitLab web interface for a CI pipeline. The browser address bar shows the URL `gitlab.com/abubakar-te-demos/cnb-demo/-/pipelines/130957943`. The left sidebar contains navigation options: Project overview, Repository, Issues (0), Merge Requests (0), CI / CD, Pipelines, Jobs, Schedules, Operations, Packages & Registries, Analytics, Wiki, Snippets, and Collapse sidebar.

The main content area shows the pipeline details for `#130957943`, which was triggered 3 months ago by `Abubakar Siddiq Ango` and is currently in a `canceled` state. A `Remove Dockerfile` section indicates that 5 jobs for `master` were completed in 6 minutes and 29 seconds. The pipeline is associated with commit `7343be71`. Below this, a DAG (Directed Acyclic Graph) diagram illustrates the pipeline stages: `Build`, `Test`, `Production`, and `Performance`. The `Build` stage includes a `build` job (completed). The `Test` stage includes `code_quality` and `test` jobs (both canceled). The `Production` stage includes a `production` job (canceled). The `Performance` stage includes a `performance` job (canceled). Each job in the DAG has a refresh icon.

Autobuild using Herokuish



build (#490461824) · Jobs · TE x +

gitlab.com/abubakar-te-demos/cnb-demo/-/jobs/490461824

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```
181 24e36c71a47a: Pull complete
182 28d0a5a5ff8b: Pull complete
183 Digest: sha256:4704ccc5106bce50603be74e4217212ce657b6ad3de1e519071d7be170f237e0
184 Status: Downloaded newer image for gliderlabs/herokuish:latest
185 ----> 70021f8552e6
186 Step 2/11 : COPY . /tmp/app
187 ----> 763958e305b0
188 Step 3/11 : ARG BUILDPACK_URL
189 ----> Running in 824f8331f567
190 Removing intermediate container 824f8331f567
191 ----> 296d8465367e
192 Step 4/11 : ENV USER=herokuishuser
193 ----> Running in ca768331351a
194 Removing intermediate container ca768331351a
195 ----> 715b4bb04d2c
196 Step 5/11 : RUN /bin/herokuish buildpack build
197 ----> Running in a700e85eb1be
198 ---->>> Ruby app detected
199 ---->>>> Installing bundler 1.17.3
200 ---->>>>> Removing BUNDLED WITH version in the Gemfile.lock
201 ---->>>>> Compiling Ruby
202 ---->>>>> Using Ruby version: ruby-2.4.1
203 ---->>>>> Installing dependencies using bundler 1.17.3
204 ---->>>>>> Running: bundle install --without development:test --path vendor/bundle --binstubs vend
or/bundle/bin -j4 --deployment
205 ---->>>>>>> Fetching gem metadata from https://rubygems.org/.
206 ---->>>>>>> Fetching rake 12.0.0
207 ---->>>>>>> Installing rake 12.0.0
208 ---->>>>>>>> Using bundler 1.17.3
```

build Retry

Duration: 3 minutes 57 seconds
Timeout: 1h (from project)
Runner: shared-runners-manager-5.gitlab.com (#380986)

Commit 7343be71 🔗
Remove Dockerfile

● Pipeline #130957943 for master

build ▼

→ build

Create custom CI file to enable CNB



GitLab Projects Groups More

cnb-demo

- Project overview
- Repository
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- Commits
- Branches
- Tags
- Contributors
- Graph
- Compare
- Issues 0
- Merge Requests 0
- CI / CD

TE Demos > cnb-demo > Repository

master cnb-demo / .gitlab-ci.yml

Enable CNB
Abubakar Siddiq Ango authored 3 months ago

✓ This GitLab CI configuration is valid. [Learn more](#)

.gitlab-ci.yml 196 Bytes

```
1 include:
2   - template: Auto-DevOps.gitlab-ci.yml
3 build:
4   variables:
5     AUTO_DEVOPS_BUILD_IMAGE_CNB_ENABLED: 1
6   image: registry.gitlab.com/gitlab-org/cluster-integration/auto-build-image:v0.2.0
```

Autobuild using Cloud Native Build Packs



build (#490468659) · Jobs · TI x +

gitlab.com/abubakar-te-demos/cnb-demo/-/jobs/490468659

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```
94 Initialized empty Git repository in /builds/abubakar-te-demos/cnb-demo/.git/
95 Created fresh repository.
96 From https://gitlab.com/abubakar-te-demos/cnb-demo
97 * [new ref]          refs/pipelines/130959670 -> refs/pipelines/130959670
98 * [new branch]      master          -> origin/master
99 Checking out 1a3fe4c7 as master...
100 Skipping Git submodules setup
102 Restoring cache
104 Downloading artifacts
106 Running before_script and script
107 Authenticating with credentials from job payload (GitLab Registry)
108 $ if [[ -z "$CI_COMMIT_TAG" ]]; then # collapsed multi-line command
109 $ /build/build.sh
110 Logging to GitLab Container Registry with CI credentials...
111 WARNING! Using --password via the CLI is insecure. Use --password-stdin.
112 WARNING! Your password will be stored unencrypted in /root/.docker/config.json.
113 Configure a credential helper to remove this warning. See
114 https://docs.docker.com/engine/reference/commandline/login/#credentials-store
115 Login Succeeded
116 Building Cloud Native Buildpack-based application with builder heroku/buildpacks:18...
117 18: Pulling from heroku/buildpacks
118 5c939e3a4d10: Pulling fs layer
119 c63719cdbe7a: Pulling fs layer
120 19a861ea6baf: Pulling fs layer
121 651c9d2d6c4f: Pulling fs layer
122 d1a6ba7d1cf5: Pulling fs layer
123 7aba82131c28: Pulling fs layer
124 fa5ef0d366ec: Pulling fs layer
```

build Retry

Duration: 2 minutes 29 seconds
Timeout: 1h (from project)
Runner: shared-runners-manager-5.gitlab.com (#380986)

Commit 1a3fe4c7

Enable CNB

Pipeline #130959670 for master

build

→ build

Autobuild using Cloud Native Build Packs



The screenshot shows the GitLab CI/CD interface for a project named 'cnb-demo'. The main area displays a terminal log for a build job. The log shows the process of pulling a new image for 'heroku/buildpacks:18' and then detecting and analyzing the buildpacks. A red box highlights the output of the detector and analyzer, which shows a warning that the image 'index.docker.io/library/tmp-cnb-image:latest' was not found. The summary panel on the right indicates the build duration is 2 minutes 29 seconds, the timeout is 1h, and the runner is 'shared-runners-manager-5.gitlab.com (#380986)'. The commit ID is '1a3fe4c7'.

```
249 4f4fb700ef54: Pull complete
250 Digest: sha256:aa81d6285a5338440a09bde9a47754540de32b8d04a6e58d562ef5b822c12ccc
251 Status: Downloaded newer image for heroku/buildpacks:18
252 18: Pulling from heroku/pack
253 5c939e3a4d10: Already exists
254 c63719cdbe7a: Already exists
255 19a861ea6baf: Already exists
256 651c9d2d6c4f: Already exists
257 d1a6ba7d1cf5: Already exists
258 7aba82131c28: Already exists
259 f078ba6b8793: Pulling fs layer
260 e0453f5fcc37: Pulling fs layer
261 f078ba6b8793: Verifying Checksum
262 f078ba6b8793: Download complete
263 e0453f5fcc37: Verifying Checksum
264 e0453f5fcc37: Download complete
265 f078ba6b8793: Pull complete
266 e0453f5fcc37: Pull complete
267 Digest: sha256:91d99e25639023ad5be483eed51a293f6b5305698037a46c0eb6c4a45f6fdcd3
268 Status: Downloaded newer image for heroku/pack:18
269 ==> DETECTING
270 [detector] heroku/ruby      0.0.1
271 [detector] heroku/procfile 0.5
272 ==> ANALYZING
273 [analyzer] Warning: Image "index.docker.io/library/tmp-cnb-image:latest" not found
274 ==> RESTORING
275 ==> BUILDING
276 [builder] -----> Compiling Ruby
```

build Retry

Duration: 2 minutes 29 seconds
Timeout: 1h (from project) ⓘ
Runner: shared-runners-manager-5.gitlab.com (#380986)

Commit 1a3fe4c7 ⓘ
Enable CNB

● Pipeline #130959670 for master

build ▼

→ build



Thank you!

