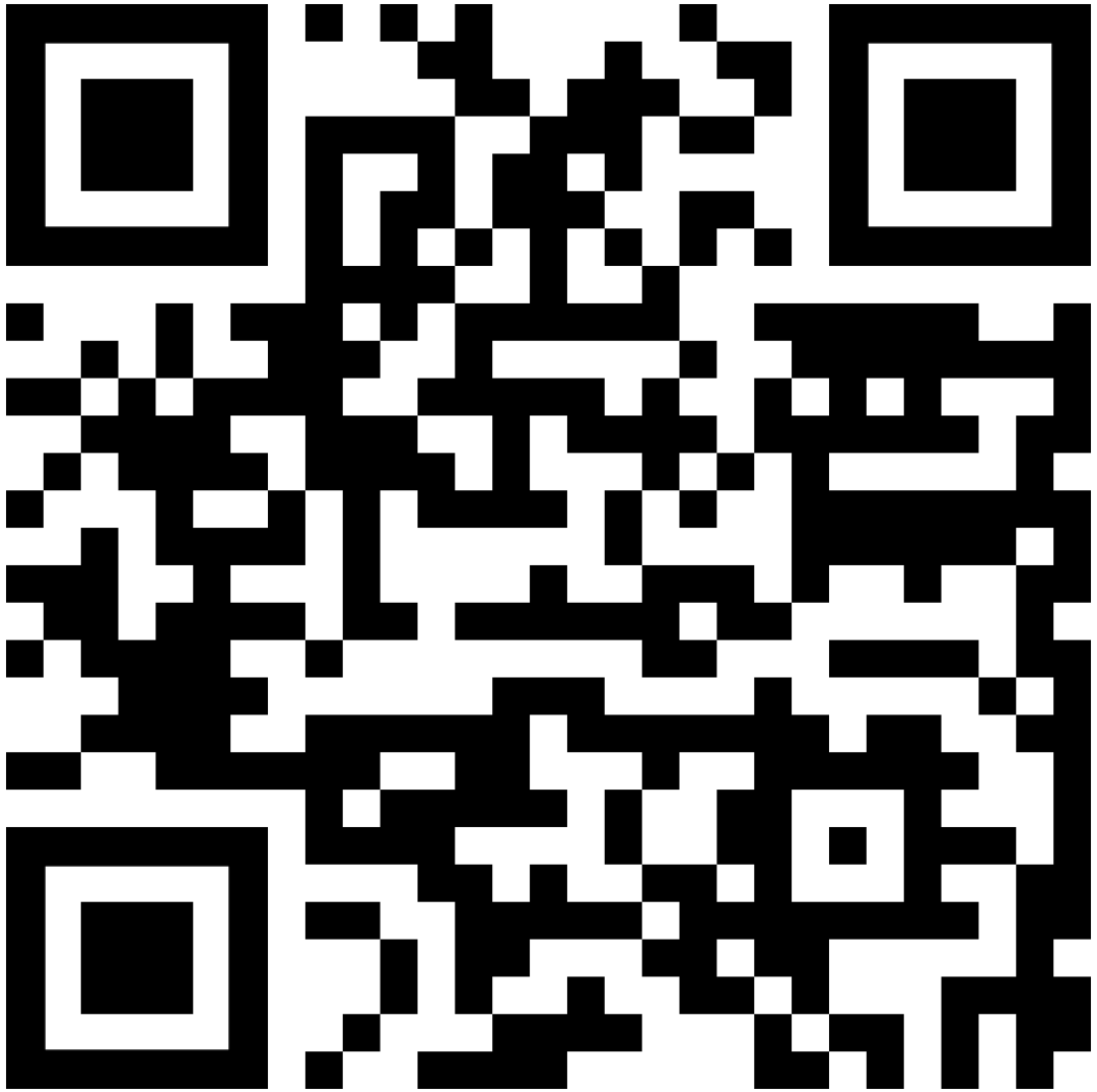

No more Dockerfiles? Buildpacks to help you ship your image!

Confoo February 22nd 2024

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https://blog.dahanne.net

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Agenda

- What are buildpacks?
- Compare some use cases with Dockerfiles
- Buildpacks usage

Your presenter for this session

Java and Go developer, Cloud architect, Devops guy… But also community leader!

Montreal JUG co-lead

https://github.com/anthonydahanne

Devoxx4kids QC co-lead

@anthonydahanne@framapiaf.org

CNCF Eastern Canada co-organizer

blog.dahanne.net

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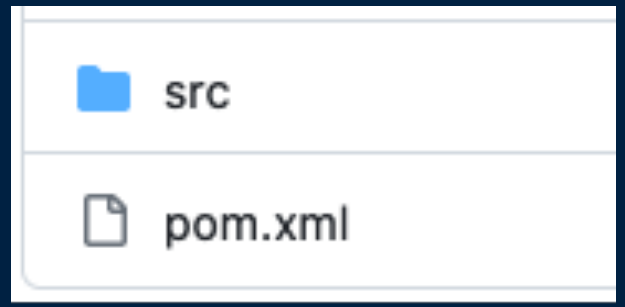
What are buildpacks?

Detect and build!

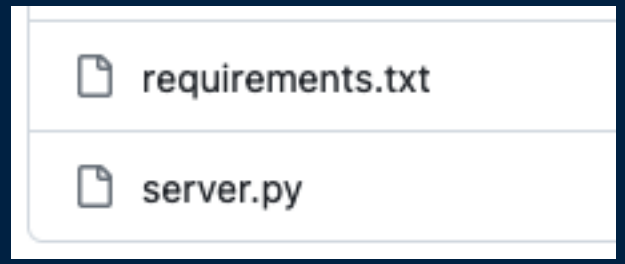


Java Buildpack

java –jar my-app.jar

NodeJS Buildpack

node server.js



Python Buildpack

python3 server.py

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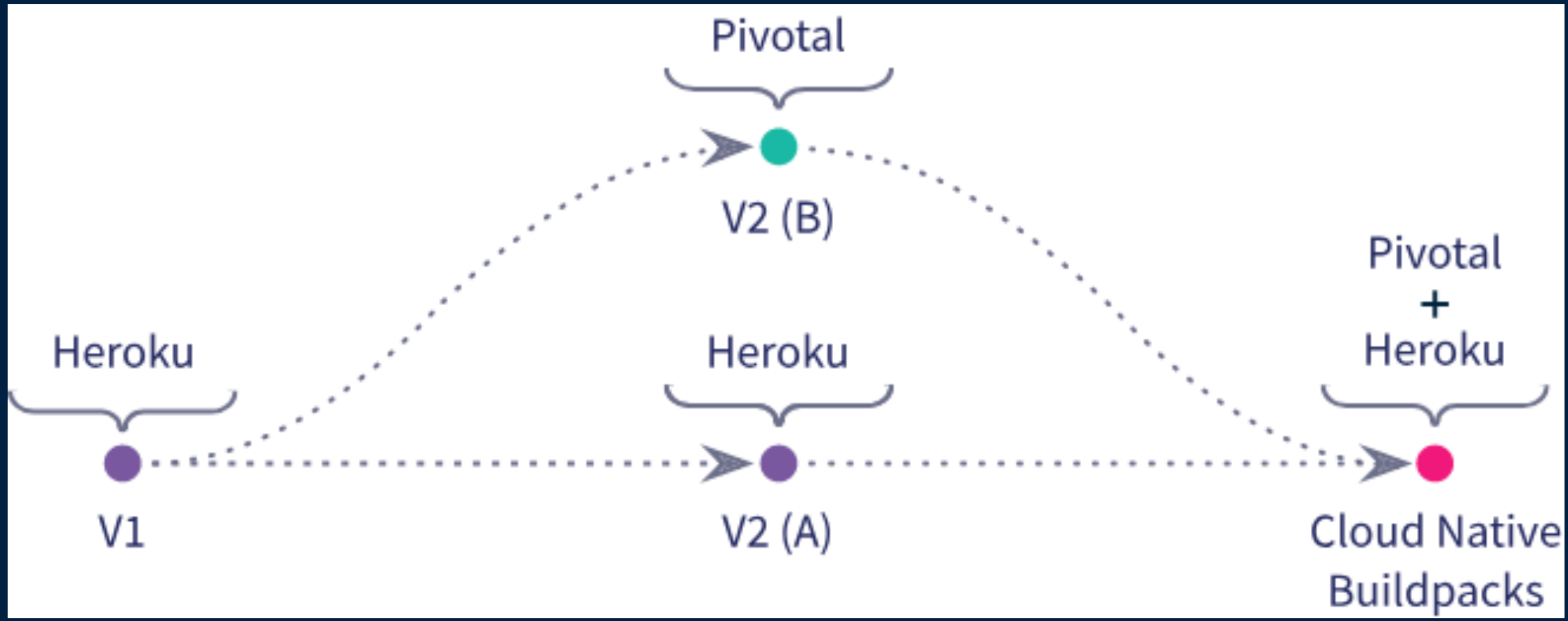
What are buildpacks?

Many iterations across the years!



2011 2014'ish 2018

https://buildpacks.io

What are buildpacks?

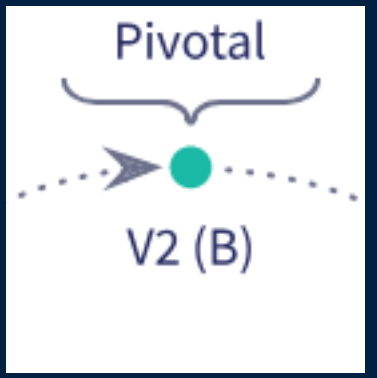
Heroku the OG


```
~/workspaces/anthonydahanne/buildpacks-the-other-way main 38s ❯ heroku git:remote -a restcrudapp
```

Git TODO Problems Terminal Profiler Services Build Endpoints Dependencies Messages

What are buildpacks?

Cloud Foundry: the open-source PaaS



/workspaces/anthonydahanne/buildpacks-the-other-way main* ↑)

What are Cloud Native buildpacks?

Detect and build an OCI image!!


```
~/workspaces/paketo-buildpacks/samples/java/maven main* ❯ pack build my-app
```

Where do they come from?

A spec and CLI under the CNCF umbrella

THE LINUX FOUNDATION

CLOUD NATIVE COMPUTING FOUNDATION

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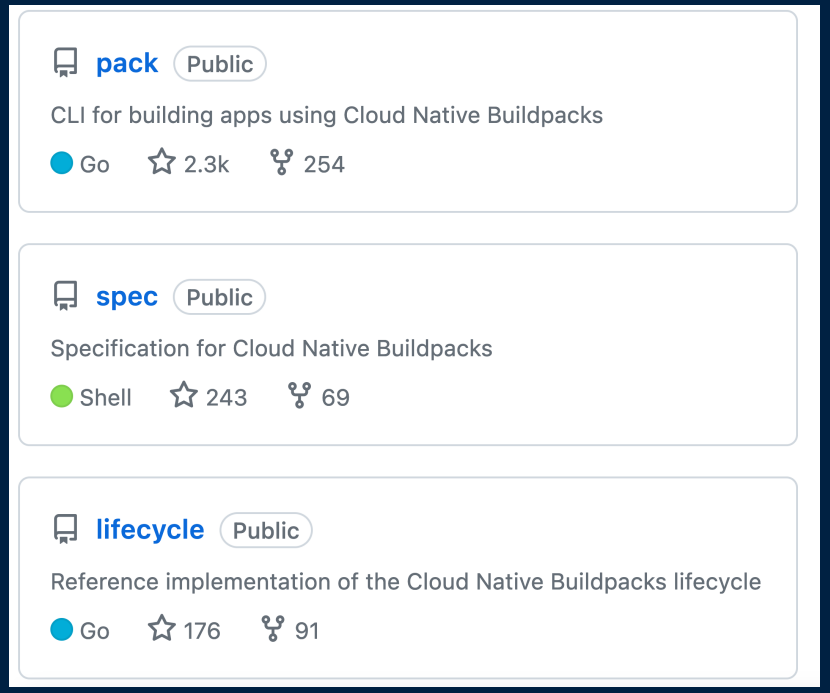
HEROKU

Buildpacks.io

https://buildpacks.io

https://github.com/buildpacks



Where do they come from?

Basically 3 big implementers

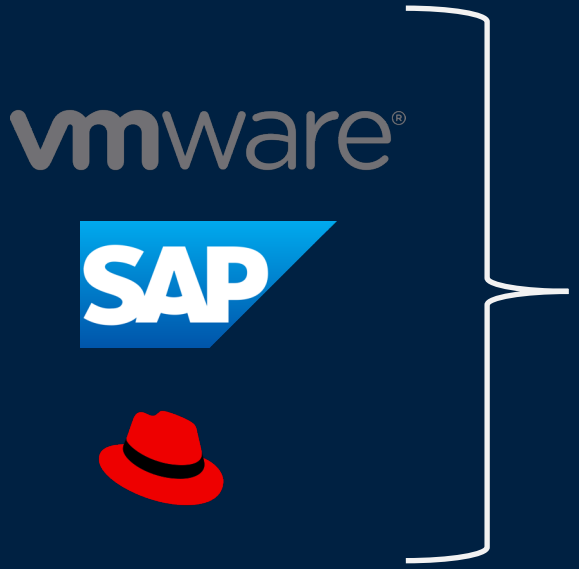
```
~ ⟩ pack builders suggest
Suggested builders:
        Google:                 gcr.io/buildpacks/builder:v1                    Ubuntu 18 base image with buildpacks for .NET, Go, Java, Node.js, and Python
        Heroku:                 heroku/builder:20                               Base builder for Heroku-20 stack, based on ubuntu:20.04 base image
        Heroku:                 heroku/builder:22                               Base builder for Heroku-22 stack, based on ubuntu:22.04 base image
        Paketo Buildpacks:      paketobuildpacks/builder-jammy-base             Ubuntu 22.04 Jammy Jellyfish base image with buildpacks for Java, Go, .NET Core, Node.js, Python,
        Paketo Buildpacks:      paketobuildpacks/builder-jammy-buildpackless-static Static base image (Ubuntu Jammy Jellyfish build image, distroless-like run image) with no buildpac
        Paketo Buildpacks:      paketobuildpacks/builder-jammy-full             Ubuntu 22.04 Jammy Jellyfish full image with buildpacks for Apache HTTPD, Go, Java, Java Native Im
        Paketo Buildpacks:      paketobuildpacks/builder-jammy-tiny             Tiny base image (Ubuntu Jammy Jellyfish build image, distroless-like run image) with buildpacks fo
```

What's a Paketo?

OSS buildpacks implementations

https://paketo.io

https://github.com/paketo-buildpacks



- Java
- Node.js
- .NET Core
- Go
- Web Servers
- Python
- PHP
- Ruby

Why Paketo buildpacks over … the Dockerfile?

Benefit from maintainers expertise

```
FROM openjdk
COPY target/*runner.jar /app/app-runner.jar
WORKDIR /app
EXPOSE 8080
ENTRYPOINT [ "java","-jar" ]
CMD ["app-runner.jar"]
```

```
java -jar app-runner.jar
```

```
pack build my-app
--builder paketobuildpacks/builder-jammy-base
```

```
Setting Active Processor Count to 5
Calculating JVM memory based on 15788052K available memory
Calculated JVM Memory Configuration: -XX:MaxDirectMemorySize=10M -
Xmx15397353K -XX:MaxMetaspaceSize=83498K -
XX:ReservedCodeCacheSize=240M -Xss1M (Total Memory: 15788052K,
Thread Count: 50, Loaded Class Count: 12328, Headroom: 0%)
Enabling Java Native Memory Tracking
Adding 137 container CA certificates to JVM truststore
Spring Cloud Bindings Enabled
Picked up JAVA_TOOL_OPTIONS: -
Djava.security.properties=/layers/paketo-buildpacks_bellsoft-
liberica/java-security-properties/java-security.properties -
XX:+ExitOnOutOfMemoryError -XX:ActiveProcessorCount=5 -
XX:MaxDirectMemorySize=10M -Xmx15397353K -
XX:MaxMetaspaceSize=83498K -XX:ReservedCodeCacheSize=240M -Xss1M -
XX:+UnlockDiagnosticVMOptions -XX:NativeMemoryTracking=summary -
XX:+PrintNMTStatistics -
Dorg.springframework.cloud.bindings.boot.enable=true
```

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Why Paketo buildpacks over … the Dockerfile?

Benefit from the ecosystem for common use cases : custom CA certificate

```
FROM openjdk
WORKDIR /app
COPY custom-ca.crt /app
RUN keytool -importcert -file custom-ca.crt -alias custom-ca.crt -cacerts -storepass changeit -noprompt
EXPOSE 8080
ENTRYPOINT [ "java","-jar" ]
CMD ["app-runner.jar"]
```

```
FROM golang:1.15 AS builder
RUN apk update
RUN apk add -U --no-cache ca-certificates && update-ca-certificates
WORKDIR /GreetingAPI
COPY . /greeting
WORKDIR /greeting
ENV GO111MODULE=on
RUN CGO_ENABLED=0 GOOS=linux go build -o greeting

FROM scratch
COPY --from=builder /etc/ssl/certs/ca-certificates.crt /etc/ssl/certs/
COPY --from=builder /greeting .
CMD ["./greeting"]
```

```
pack build java-app
--volume $PWD/ca-certs/:/platform/bindings/my-certs
--builder=paketobuildpacks/builder-jammy-base
```

```
pack build go-app
--volume $PWD/ca-certs/:/platform/bindings/my-certs
--builder=paketobuildpacks/builder-jammy-base
```

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Why Paketo buildpacks over … the Dockerfile?

SBOM generation out of the box!

```
pack sbom download myapp --output-dir ./app-sbom
```


```
{
 "id": "1a3e0473bf22b7d6",
 "name": "jackson-databind",
 "version": "2.14.1",
 "type": "java-archive",
 "foundBy": "sbom-cataloger",
 "locations": [
  {
   "path": "layers/sbom/launch/paketo-buildpacks_executable-jar/sbom.cdx.json"
  }
 ],
 "licenses": [],
 "language": "java",
 "cpes": [
  "cpe:2.3:a:jackson-databind:jackson-databind:2.14.1:*:*:*:*:*:*:*",
  "cpe:2.3:a:jackson-databind:jackson_databind:2.14.1:*:*:*:*:*:*:*",
```


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How to integrate them to my existing pipelines?

- They’re images pushed to a registry, so you can keep your existing workflow
- Spring Boot Maven / Gradle plugins
- Building images natively from Kubernetes, using kpack
- And many others…
  - Github Actions
  - Gitlab CI/CD
  - CircleCI
  - Tekton
  - Skaffold
  - PaaS : Heroku, Google Cloud, Tanzu Application Platform, etc.
  - etc.

Thank You