


# Building Docker Images with Cloud Native Buildpacks


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# Modern Application Distribution

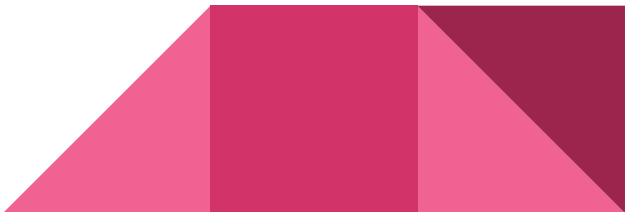
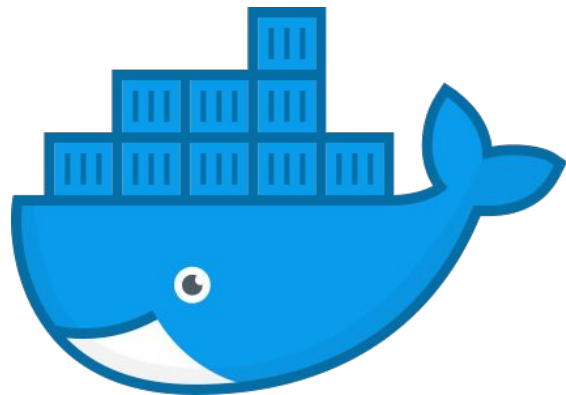
- As languages and frameworks proliferate within development teams, it is becoming harder to treat application artifacts (e.g. JARs) as the immutable artifact passing through systems
  - Many common languages are interpreted rather than compiled, requiring distribution of source repositories
  - Developers want to be able to both test their applications in the environment that they'll run in and...
  - Control the environment that their applications run in, rather than relying on another team to configure it for them
- 



Docker (OCI) Images are the  
Lingua Franca for Platform  
Portability

# Docker Images

- Immutable artifact containing
  - Operating System Filesystem
  - Application Filesystem
  - Command to start application
- Self contained environment
- Runs the same everywhere
  - Laptop, Data Center, Public Cloud, Docker Daemon, Kubernetes, ...







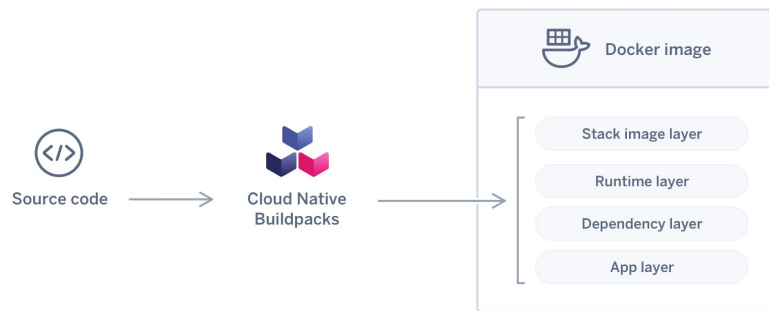
What if...  
you could create a **GOOD** Docker  
image, without all the work

Demo



# Cloud Native Buildpacks

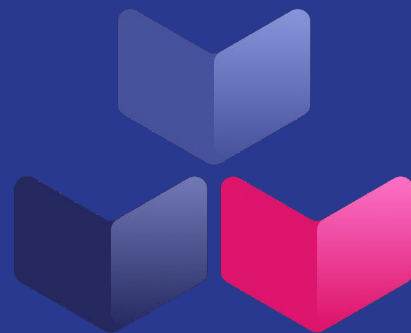
- CNCF Sandbox Project
- Heroku (2011) invented and Cloud Foundry (2013) adopted buildpacks
- Buildpacks raise the value line, allowing developers to focus on apps
- Bring the advantages of buildpacks to the Docker Image world
- They do this with
  - Faster builds
  - Reusable layers (across versions, across apps)
  - Reproducible images
  - Modularity and composability
  - Portability via the OCI standard





# Revisiting Cloud Native Buildpacks

Demo

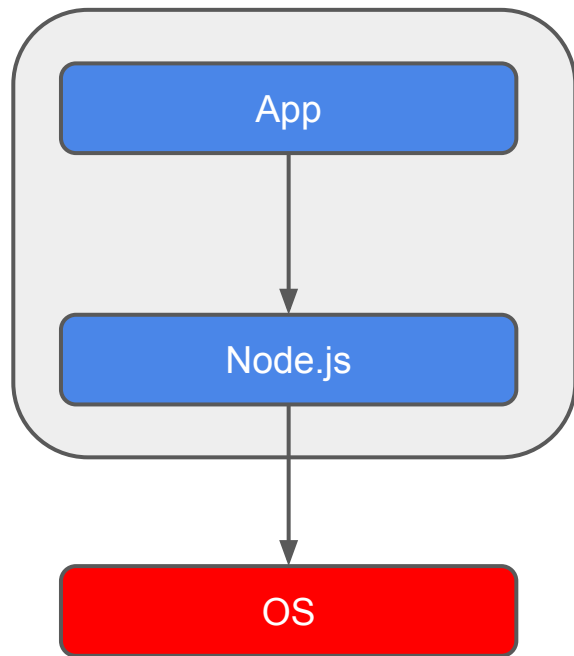


# Not Your Average Docker Image

- Day 2 Operations
  - Bill of Materials
  - Rebase
- OCI image manifests have ordered pointers to layers
  - Unlike Docker Image V1, pointers are not a tree
- Images build with CNBs identify which layers are the base image
- Like a Git rebase, image metadata (< 100Kb) is downloaded, modified to point at new base image and uploaded back to the registry (< 0.15s)
- Depends on Application Binary Interface (ABI) compatibility for safety

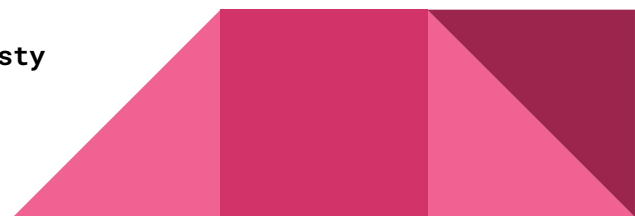


# Rebase

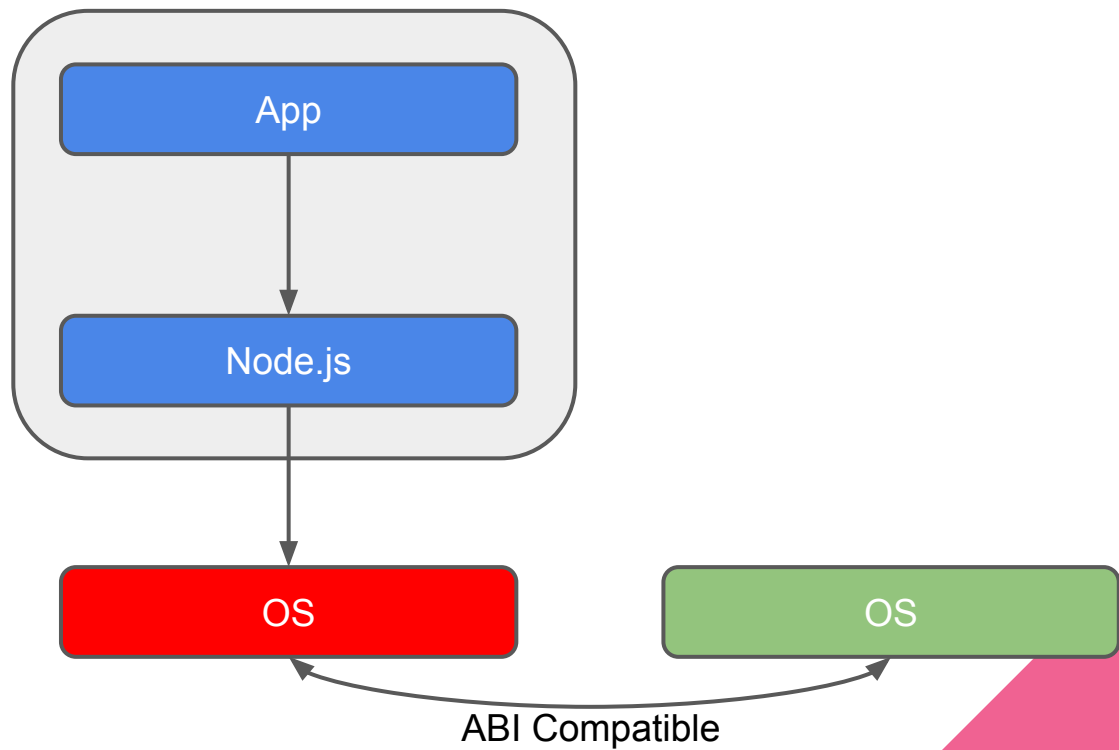


**Buildpack: node**

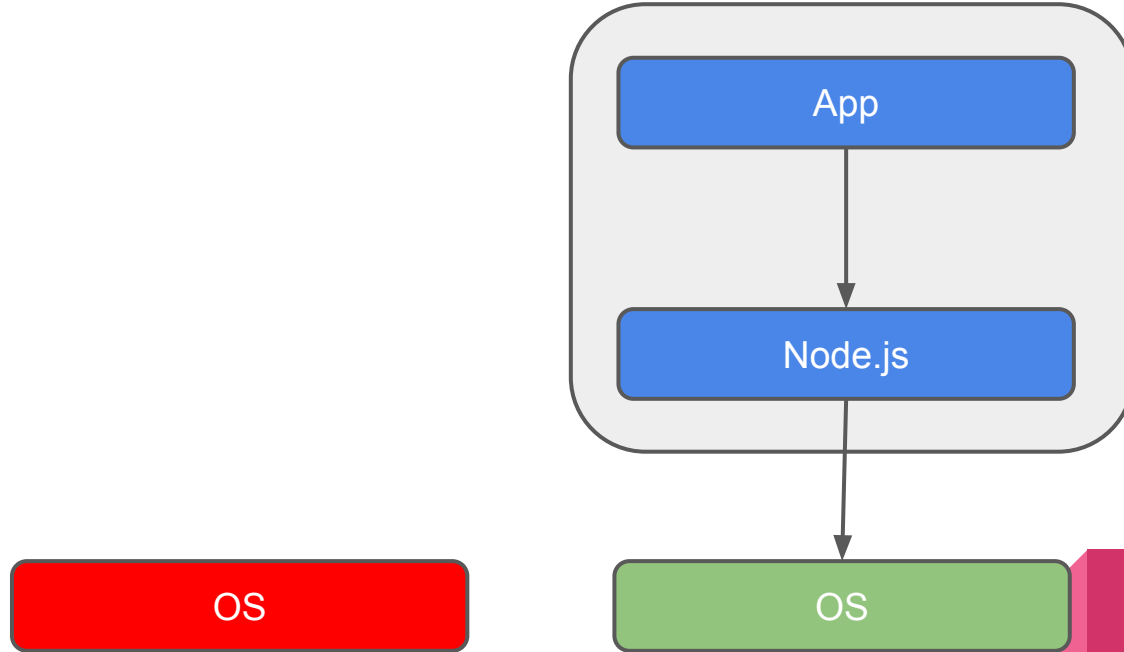
**FROM ubuntu:trusty**



# Rebase



# Rebase



# Day 2 Operations

Demo

# In the wild!

- Azure Spring Cloud
- Google AppEngine
- Heroku
- VMware (Pivotal) kpack
- Spring Boot
  - Maven and Gradle plugins drive the CNB lifecycle
  - Automatic (but configurable)
    - Image name
    - Image tag
    - Java version



# Spring Boot

Demo

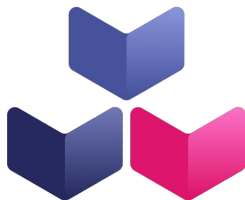


# Closing

- Cloud Native Buildpacks bring the advantages of buildpacks to the Docker Image world
  - Faster builds, reusable layers, reproducible images, etc.
- Dockerfiles don't have
  - Composability
  - Automated BOM
  - Rebasing
- Multiple platforms
  - pack, kpack, Heroku, Google, Microsoft, Spring Boot
- Meet Developers where they are, at the app level



# Try it out!



**Buildpacks.io**

- Pack CLI Beta – v0.12.0
  - Paketo and Heroku Buildpacks
- Read the docs
  - [buildpacks.io/docs](https://buildpacks.io/docs)
- Join us on Slack:
  - [slack.buildpacks.io](https://slack.buildpacks.io)
- Join our Mailing List:
  - [lists.cncf.io/g/cncf-buildpacks](https://lists.cncf.io/g/cncf-buildpacks)