aws INNOVATE

MODERN APPLICATIONS EDITION

27&28 October 2021

Develop, operate, and integrate best practices for container apps with AWS Copilot

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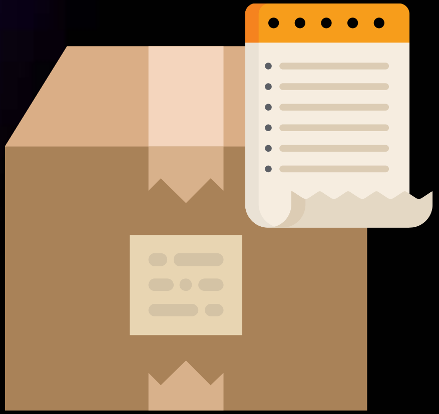
Agenda

- Best practices: Twelve-Factor App and design patterns
- Overview of Amazon Elastic Container Service (Amazon ECS) and AWS Fargate
- Build, release and operate containerized apps with AWS Copilot
- Demo

Key takeaways

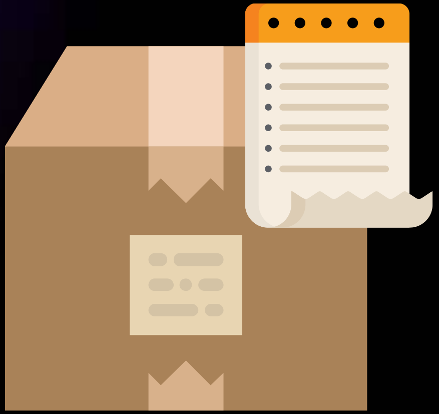
- How to use AWS Copilot to deploy your application
- How to define and use config and secrets
- How to implement backing service and service discovery
- How to implement CI/CD with AWS Copilot
- How to implement Pub/Sub architecture
- How to run one-time task

Twelve-Factor App principles



- I. Codebase
- II. Dependencies
- III. Config
- IV. Backing services
- V. Build, release, run
- VI. Processes
- VII. Port binding
- VIII. Concurrency
- IX. Disposability
- X. Dev/prod parity
- XI. Logs
- XII. Admin processes

Twelve-Factor App principles



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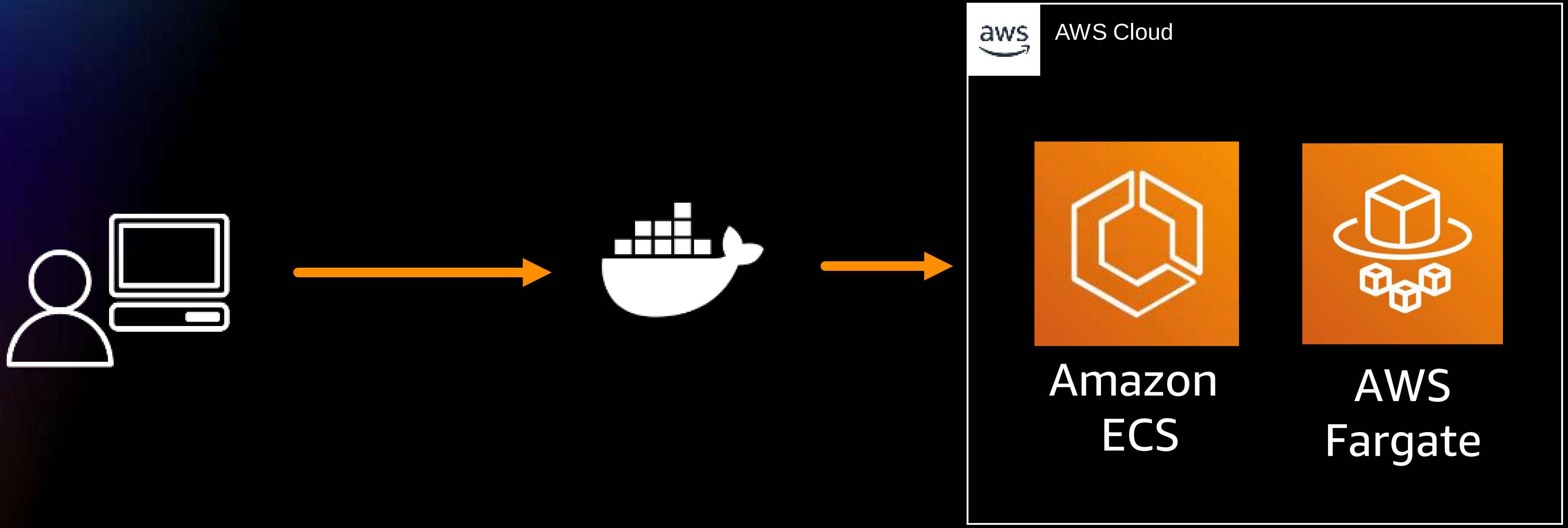
XII. Admin processes

Developing with containers

Typical process to ship app



Amazon Elastic Container Service (Amazon ECS)

- Container-level networking
- Advanced task placement
- Deep integration with AWS platform
- Amazon ECS command line interface (CLI)
- Global footprint
- Powerful scheduling engines
- Automatic scaling
- Amazon CloudWatch metrics
- Load balancers

AWS Fargate

AWS Fargate

Containers on demand

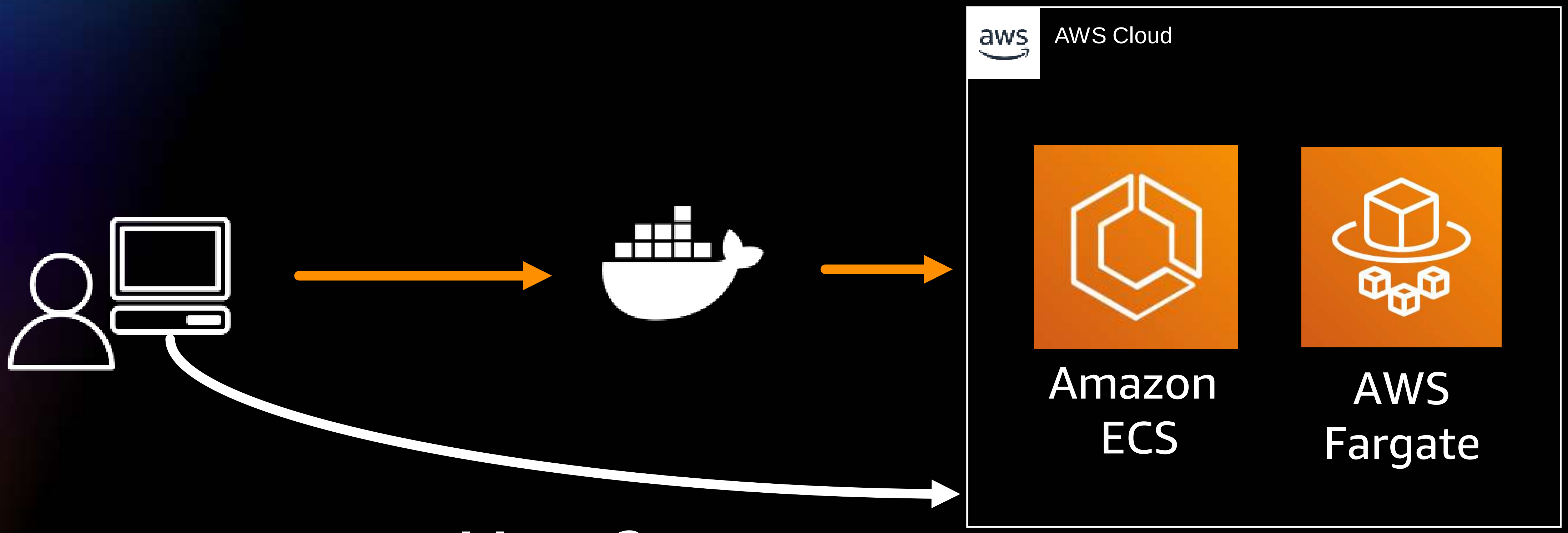
No infrastructure

Manage everything at container level

Launch quickly & scale easily

Resource-based pricing

Typical process to ship app



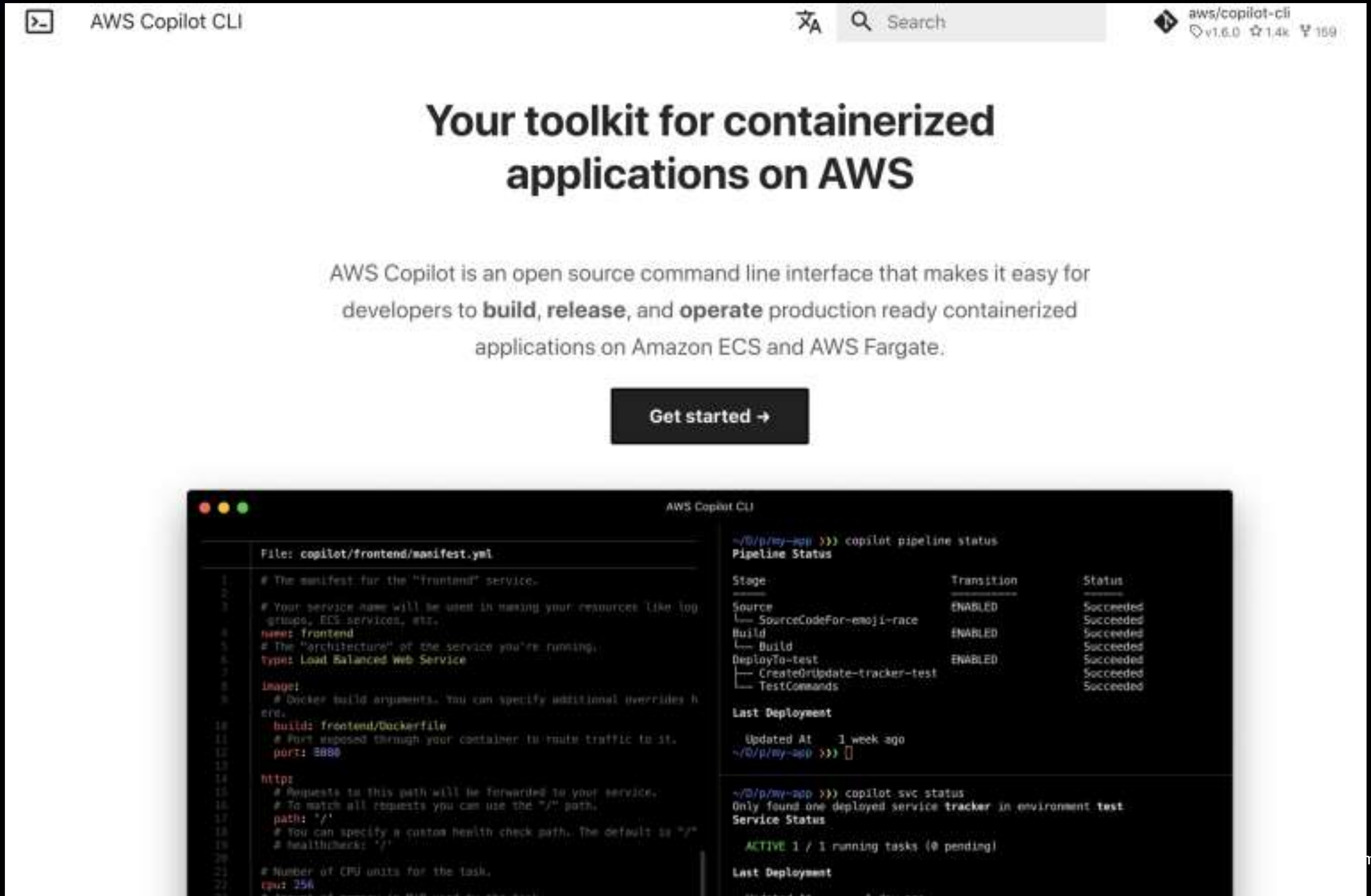
How?

Container deployment challenges

- How do I deploy applications?
- How do I add a service & integrate with AWS services?
- How can I test without affecting productions?
- How do I release applications?
- How to implement service discovery?

Introducing AWS Copilot command line interface (CLI)

https://aws.github.io/copilot-cli/



Your toolkit for containerized applications on AWS

AWS Copilot is an open source command line interface that makes it easy for developers to **build**, **release**, and **operate** production ready containerized applications on Amazon ECS and AWS Fargate.

```
File: copilot/frontend/manifest.yml

# The manifest for the "frontend" service.

# Your service name will be used in naming your resources like log
 groups, ECS services, etc.
name: frontend
# The "architecture" of the service you're running.
type: Load Balanced Web Service

image:
  # Docker build arguments. You can specify additional overrides h
ere.
  build: frontend/Dockerfile
  # Port exposed through your container to route traffic to it.
  port: 8080

http:
  # Requests to this path will be forwarded to your service.
  # To match all requests you can use the "/" path.
  path: '/'
  # You can specify a custom health check path. The default is "/"
  # healthcheck: '/'

# Number of CPU units for the task.
cpu: 256
```

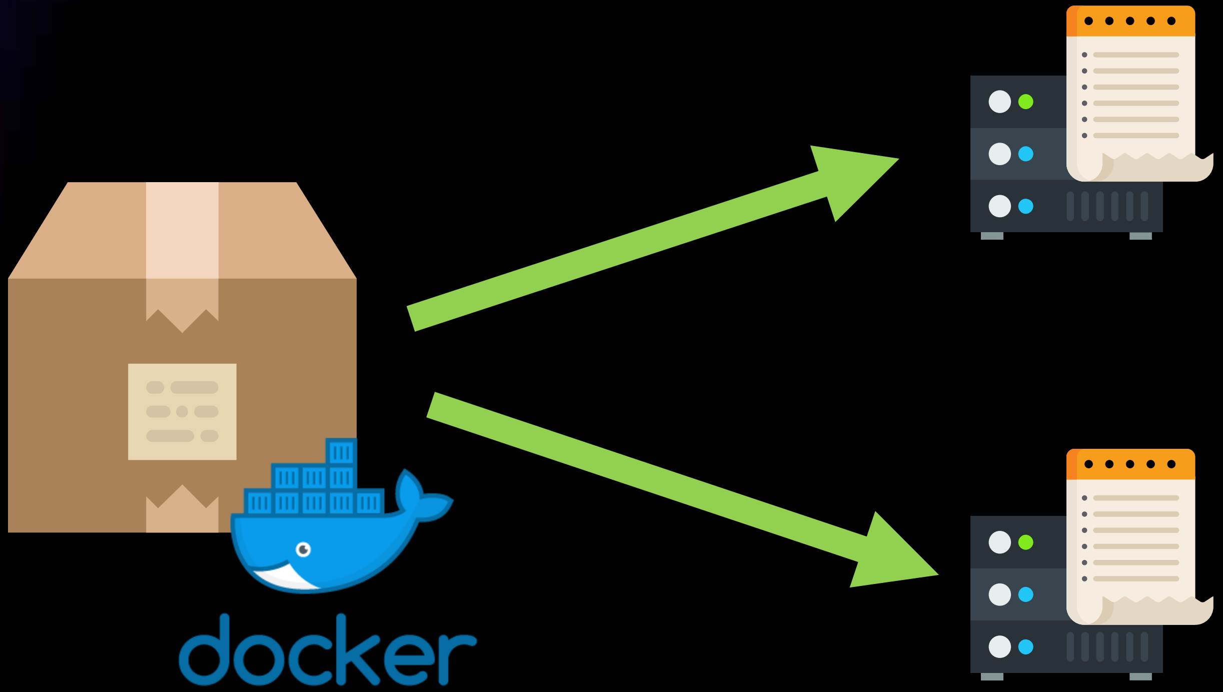
```
~/D/p/my-app ››› copilot pipeline status
Pipeline Status

Stage                               Transition        Status
-----                               ----------        ------
Source                              ENABLED           Succeeded
└── SourceCodeFor-emoji-race                          Succeeded
Build                               ENABLED           Succeeded
└── Build                                             Succeeded
DeployTo-test                       ENABLED           Succeeded
├── CreateOrUpdate-tracker-test                       Succeeded
└── TestCommands                                      Succeeded

Last Deployment

  Updated At    1 week ago
~/D/p/my-app ››› 
```

```
~/D/p/my-app ››› copilot svc status
Only found one deployed service tracker in environment test
Service Status

  ACTIVE 1 / 1 running tasks (0 pending)

Last Deployment
```

Demo 1

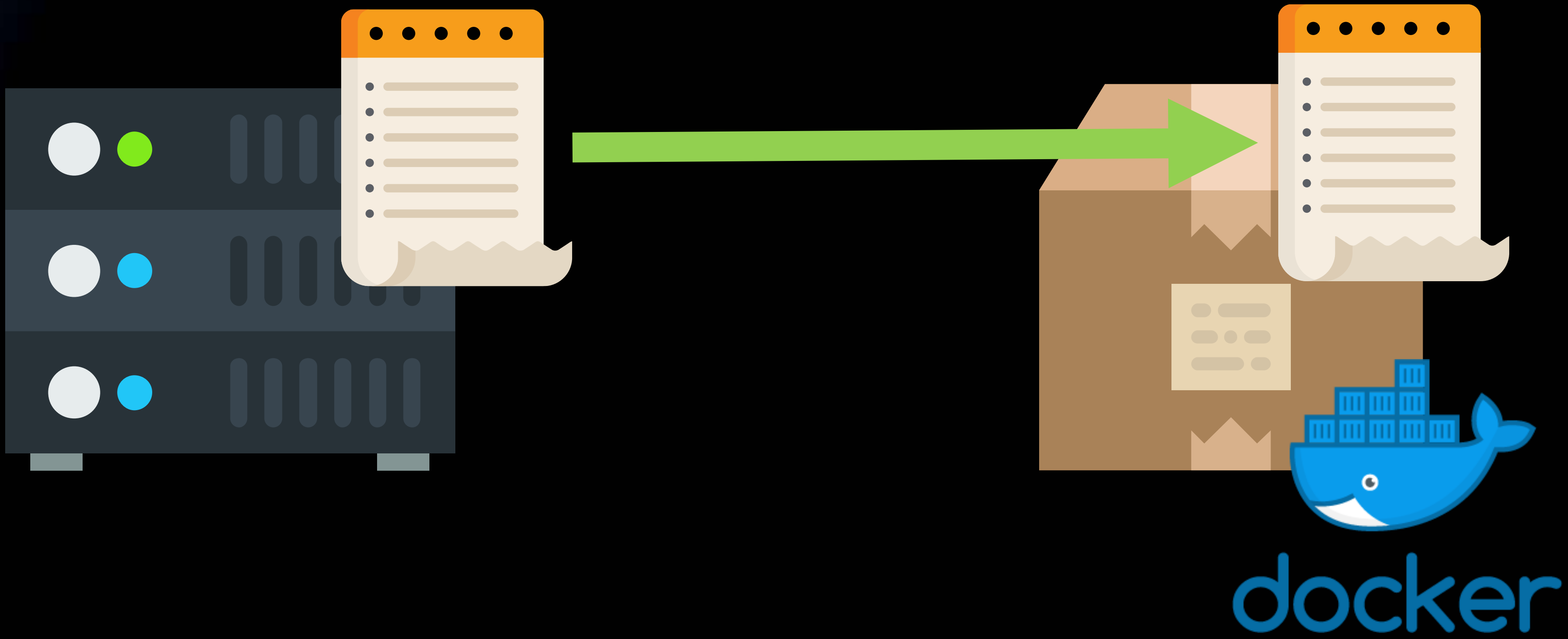
Twelve-Factor App: 03: Config

Same container deployed to both environments. Configuration is part of the environment on the host.



- Development
- Production

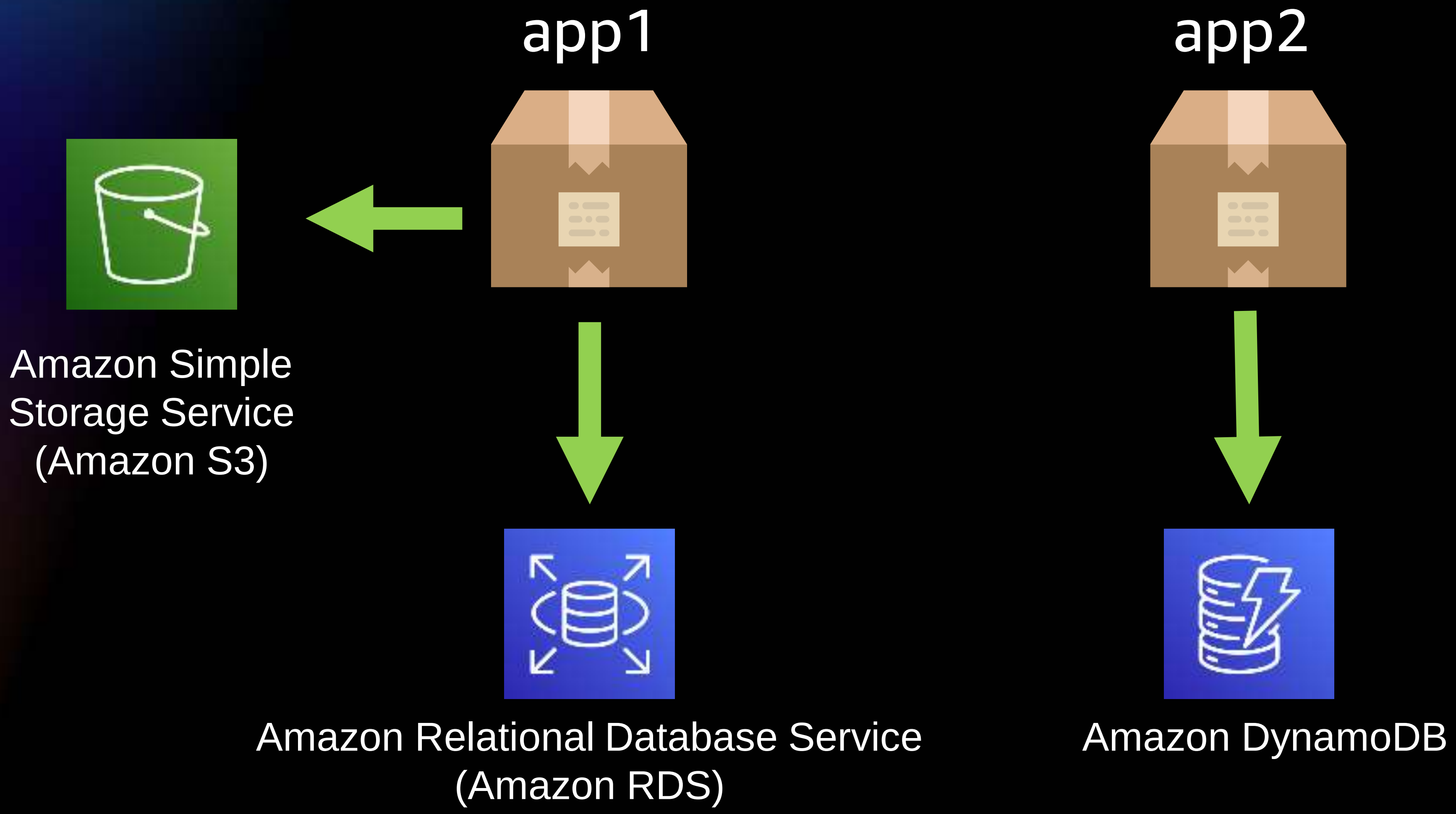
At runtime, the container gets config from the environment.



Demo 2

Twelve-Factor App: 04: Backing services

Treat local services just like remote third party ones



app1

app2

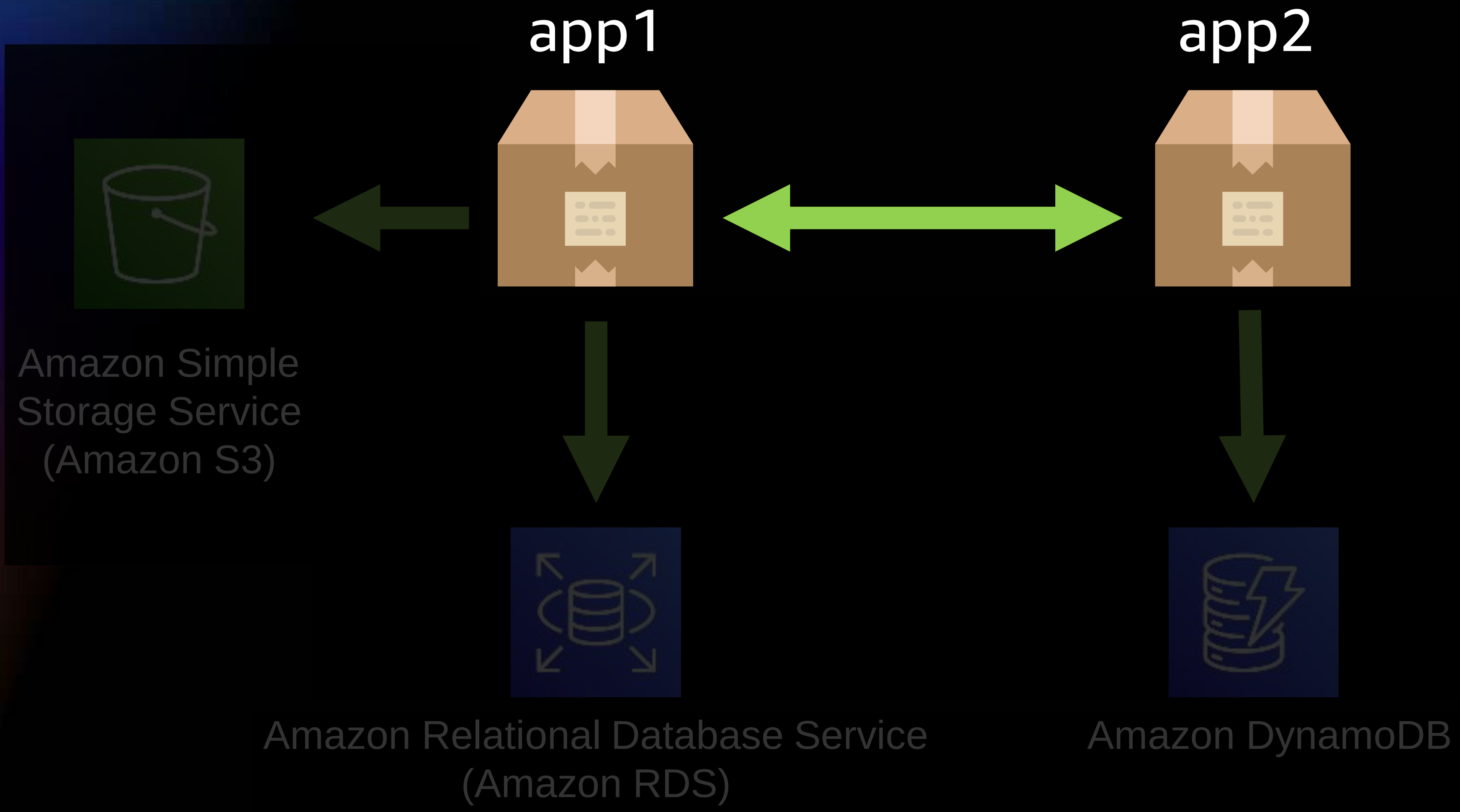
Amazon Simple Storage Service (Amazon S3)

Amazon Relational Database Service (Amazon RDS)

Amazon DynamoDB

Service discovery

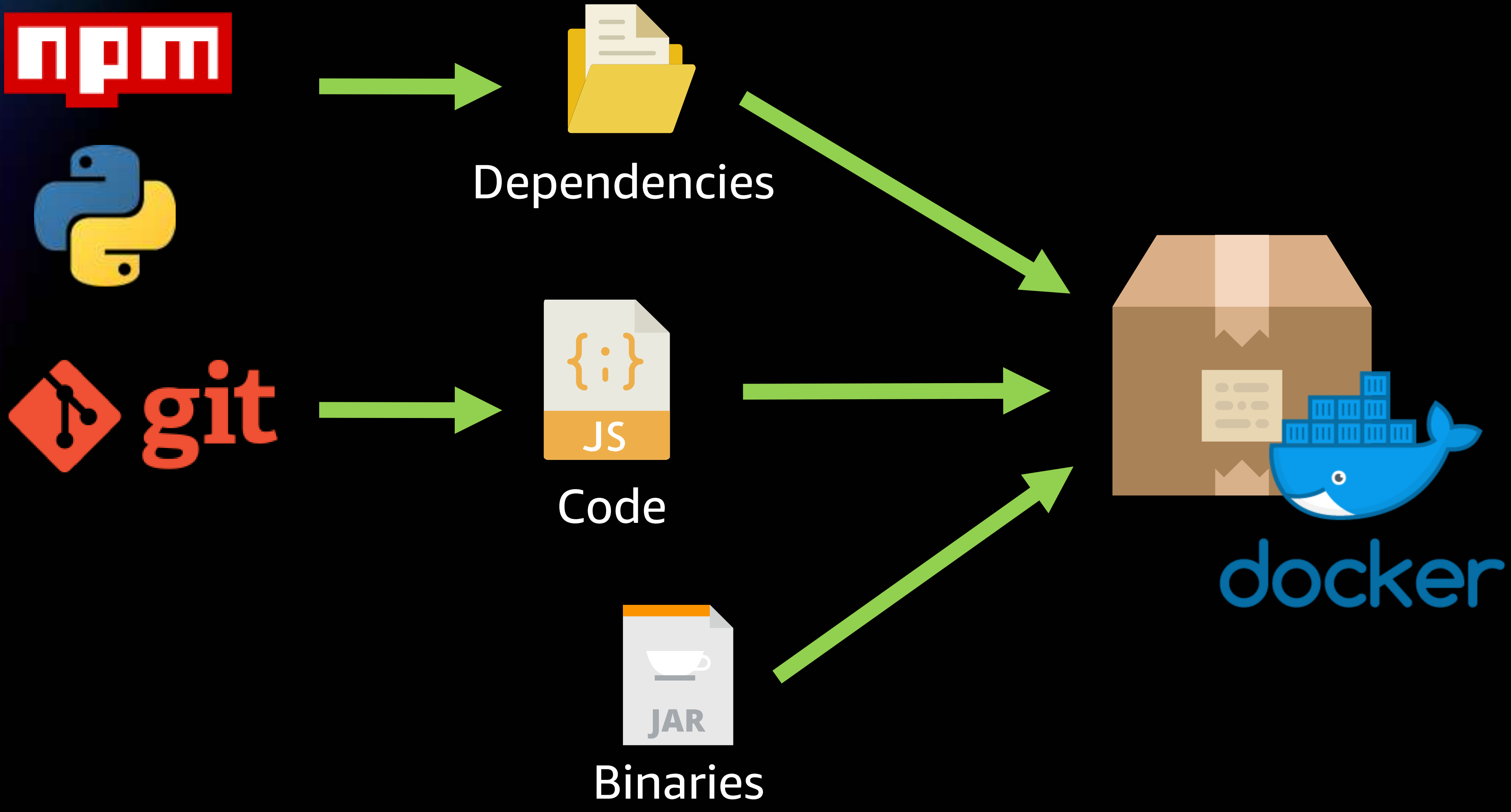
A mechanism for services to discover and interact with each other


app1
app2
Amazon Simple Storage Service (Amazon S3)
Amazon Relational Database Service (Amazon RDS)
Amazon DynamoDB

Demo 3

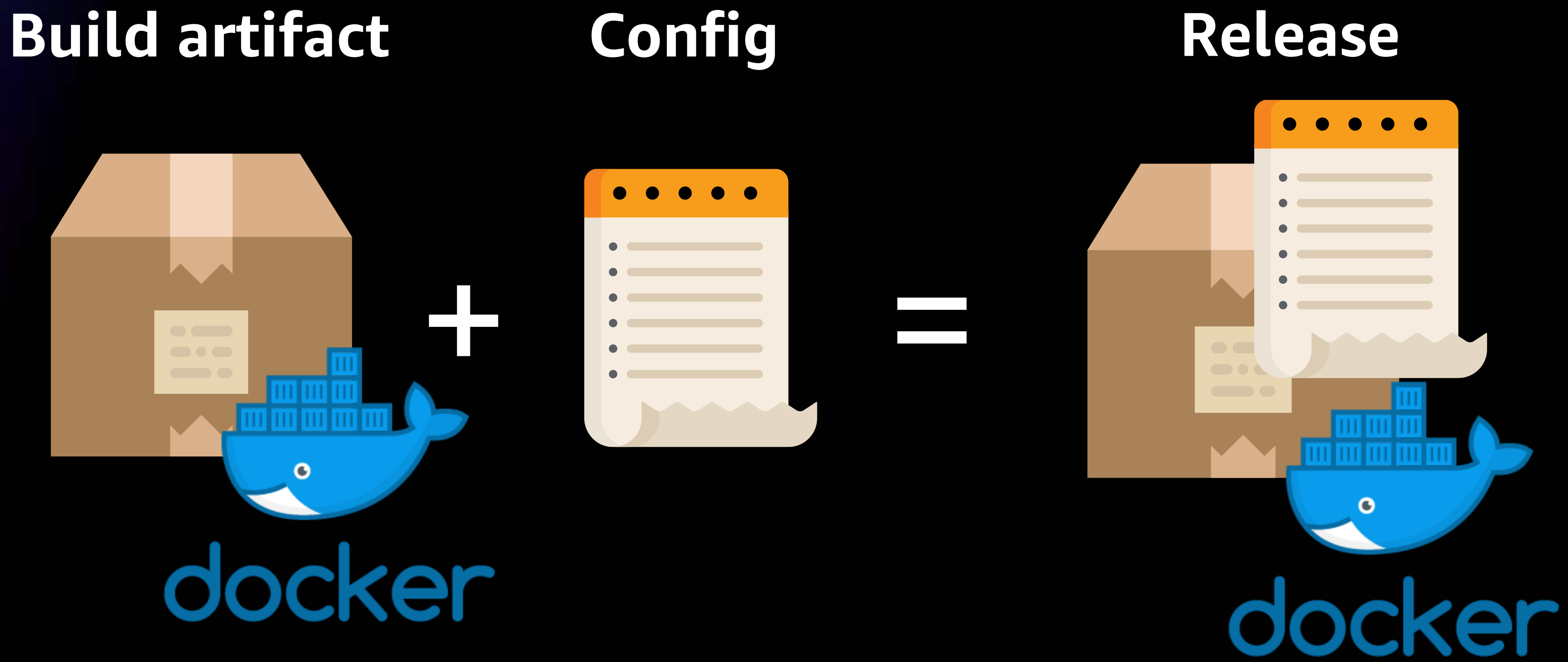
Twelve-Factor App:
05: Build, release, run

Build



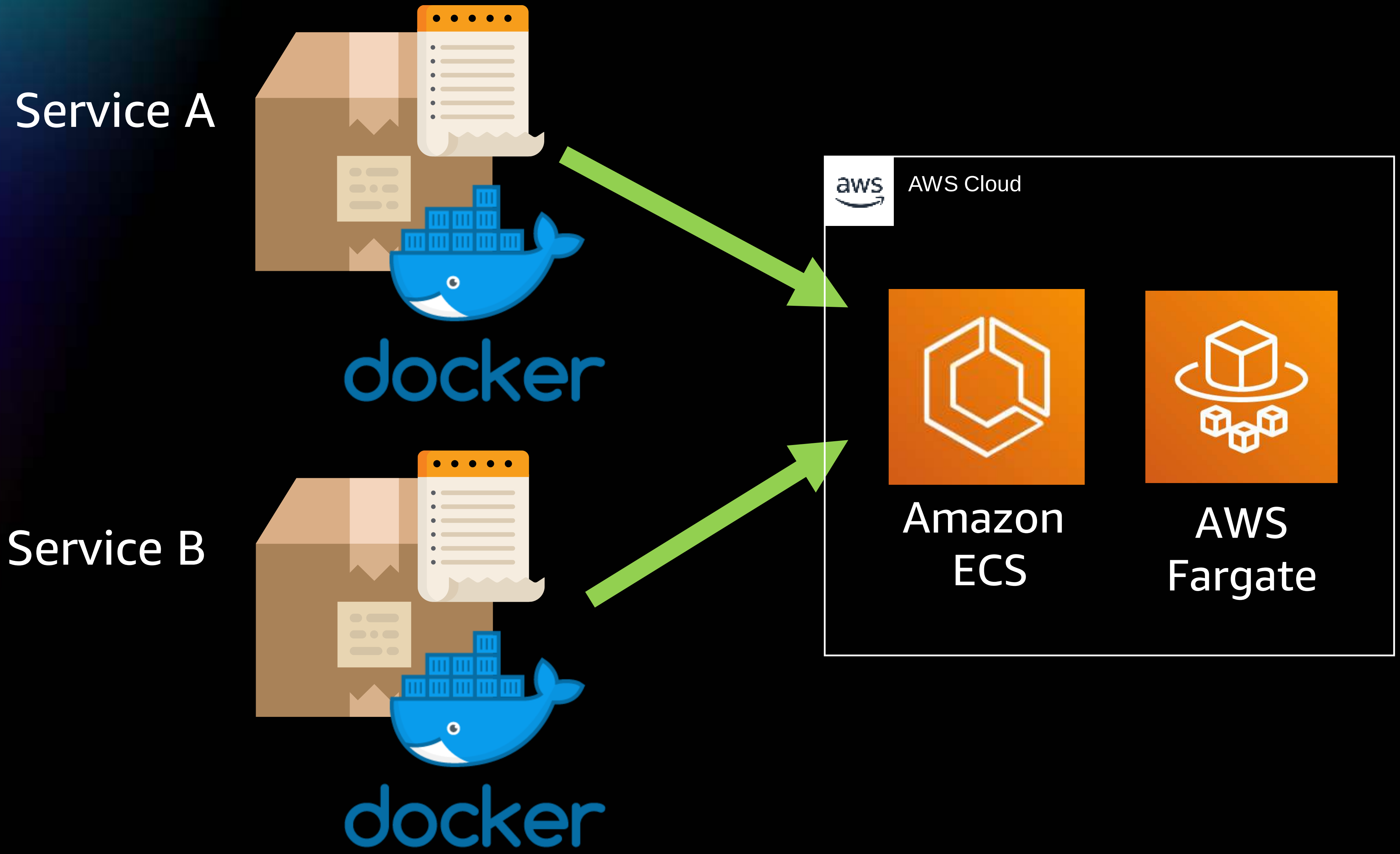
aws

Release



Build artifact + Config = Release

Run



Service A

Service B

AWS Cloud

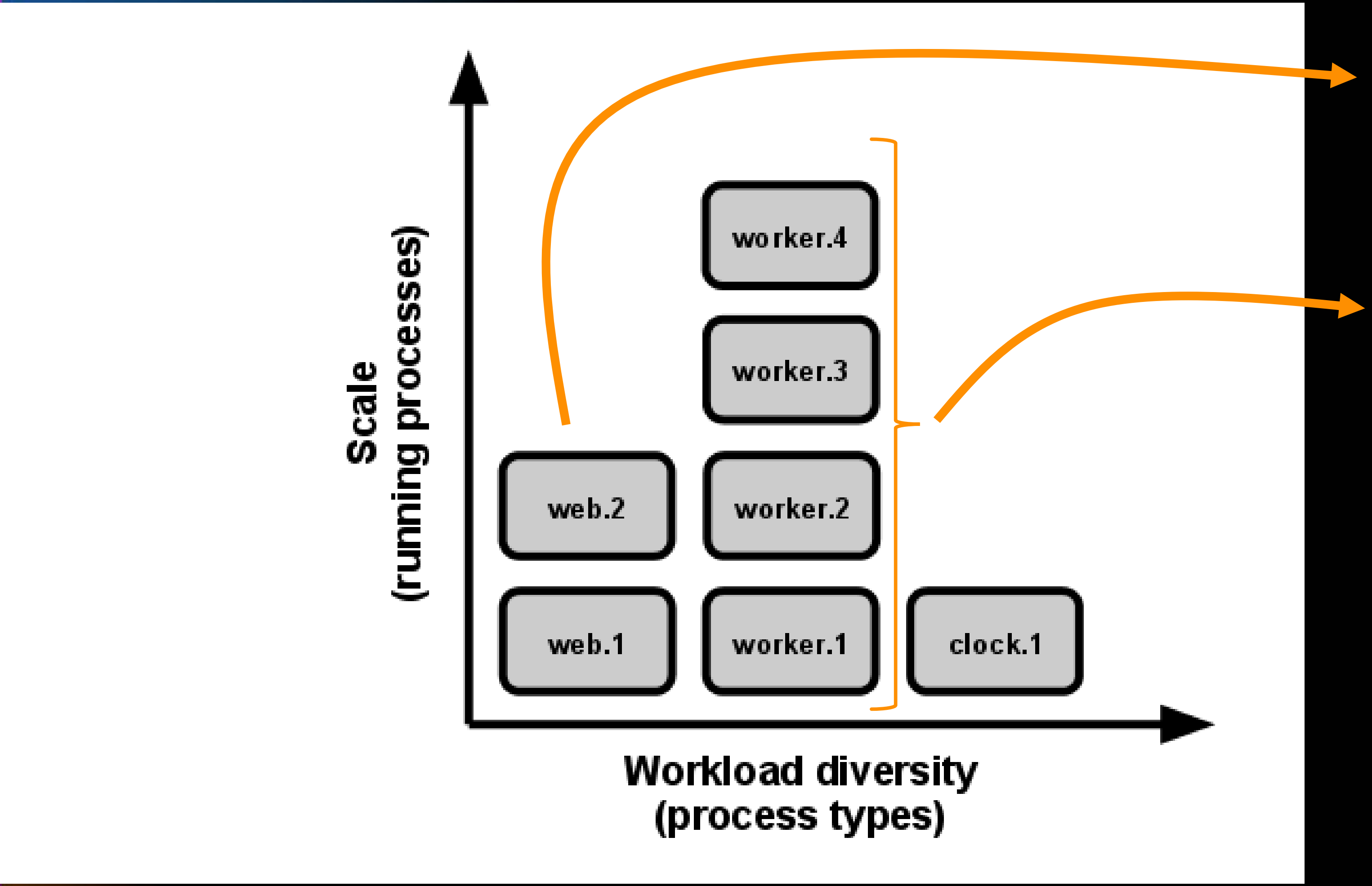
Amazon ECS

AWS Fargate

Demo 4

Twelve-Factor App: 08: Concurrency

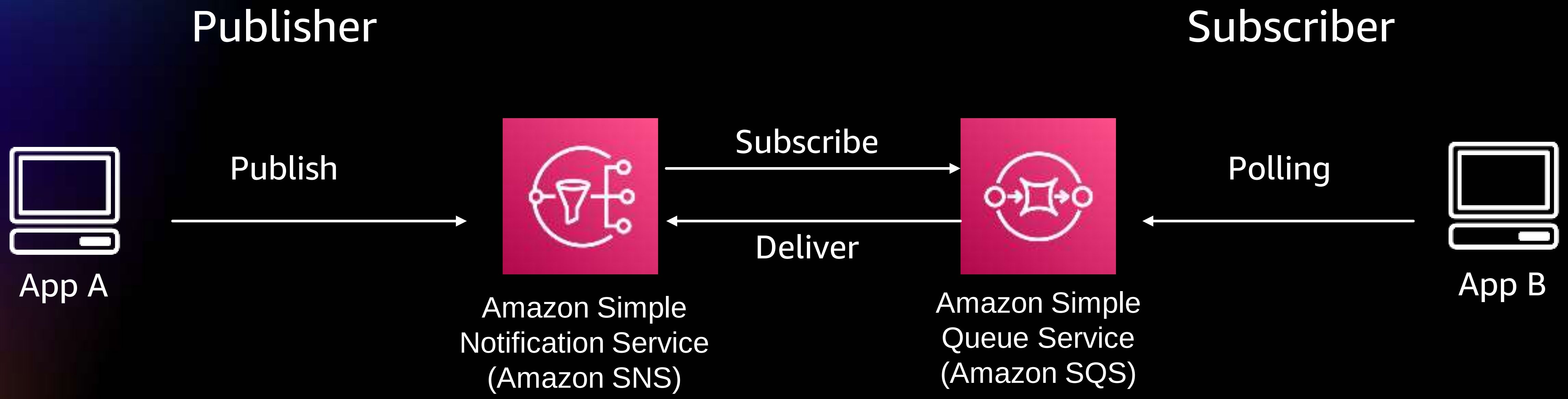
Concurrency



> Load balanced web service

> Worker service

Pub/Sub


Publisher
Subscriber
Publish
Subscribe
Deliver
Polling
App A
Amazon Simple Notification Service (Amazon SNS)
Amazon Simple Queue Service (Amazon SQS)
App B

Demo 5

Twelve-Factor App:
12: Admin processes

Running admin processes

Admin/ management processes are inevitable:

- Migrate database
- Repair some broken data
- Once a week move database records older than X to cold storage
- Every day email a report to this person

Demo 6

Visit the Modern Applications Resource Hub for more resources

Dive deeper with these resources to help you develop an effective plan for your modernization journey.

- Build modern applications on AWS e-book
- Build mobile and web apps faster e-book
- Modernize today with containers on AWS e-book
- Adopting a modern Dev+Ops model e-book
- Modern apps need modern ops e-book
- Determining the total cost of ownership: Comparing Serverless and Server-based technologies paper
- Continuous learning, continuous modernization e-book
- … and more!

https://bit.ly/3yfOvbK

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Thank you!

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