Derby Developers

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- BI, Data Analytics & Data Science
- Business Change & Transformation
- Cloud, Infrastructure & Security
- Digital
- Embedded & Engineering
- IT Architecture
- NHS / Central Government
- QA & Testing
- Project Delivery
- Senior Appointments
- Software Development

xpertise-recruitment.com

Jonathan Relf

Devel-Ops - Bringing Development Practices to Operations Tasks

Derby Developers

27th June 2019

Jonathan Relf

DEVEL-OPS

Commify

WE'RE HERE TO MAKE BUSINESS COMMUNICATION BRILLIANT

Commify is the team behind a global portfolio of business messaging brands. We work with more than 45,000 companies, helping them transform their mobile communications with their customers and staff.

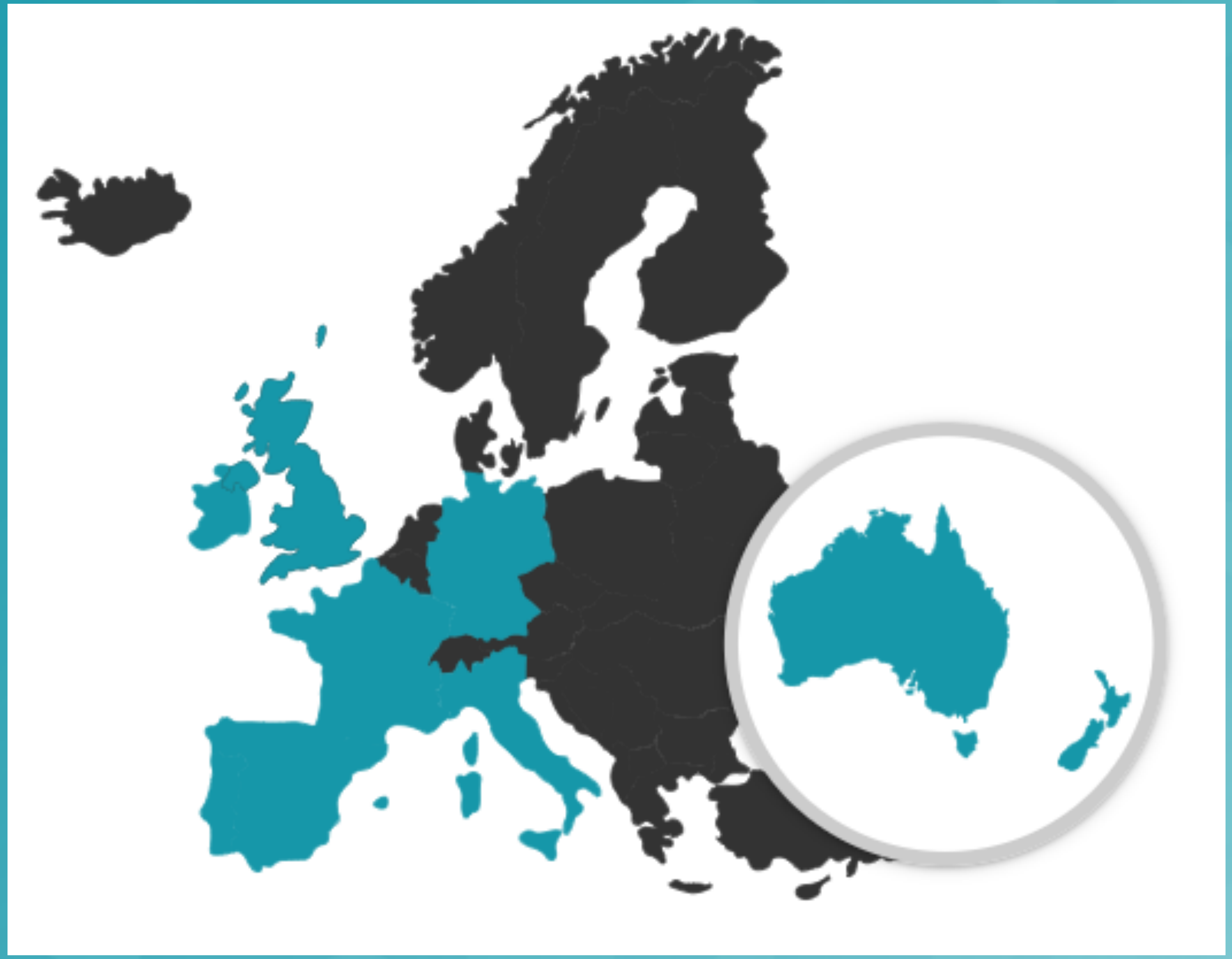
esendex. Mobyt smspubli trendoo skebby cloud sms solutions textmarketer

Massenversand.de SMSenvoi SMS UP fastsms textanywhere mediaburst

Commify

WHAT WE DO

We provide SMS, voice, web, IP/OTT, email and intelligent multichannel messaging services both on a self-serve basis (through an online platform or API), and as tailored solutions to more complex needs.



www.commify.com

BRINGING DEVELOPMENT PRACTICES
TO OPERATIONS TASKS

DEVEL-OPS

THIS TALK IS NOT:

VS

Devs

Ops

THIS TALK IS MORE:

老北京布鞋
老北京布鞋
WILD
古文化

> “THE DEFINITION OF INSANITY
> IS REPEATING THE SAME MISTAKES
> OVER AND OVER AGAIN
> AND EXPECTING DIFFERENT RESULTS”

Unknown

> “THE DEFINITION OF INSANITY IN <u>I.T. OPERATIONS</u>
> IS MANUALLY REPEATING A TASK
> OVER AND OVER AGAIN
> AND EXPECTING THE SAME RESULTS”

Jonathan Relf

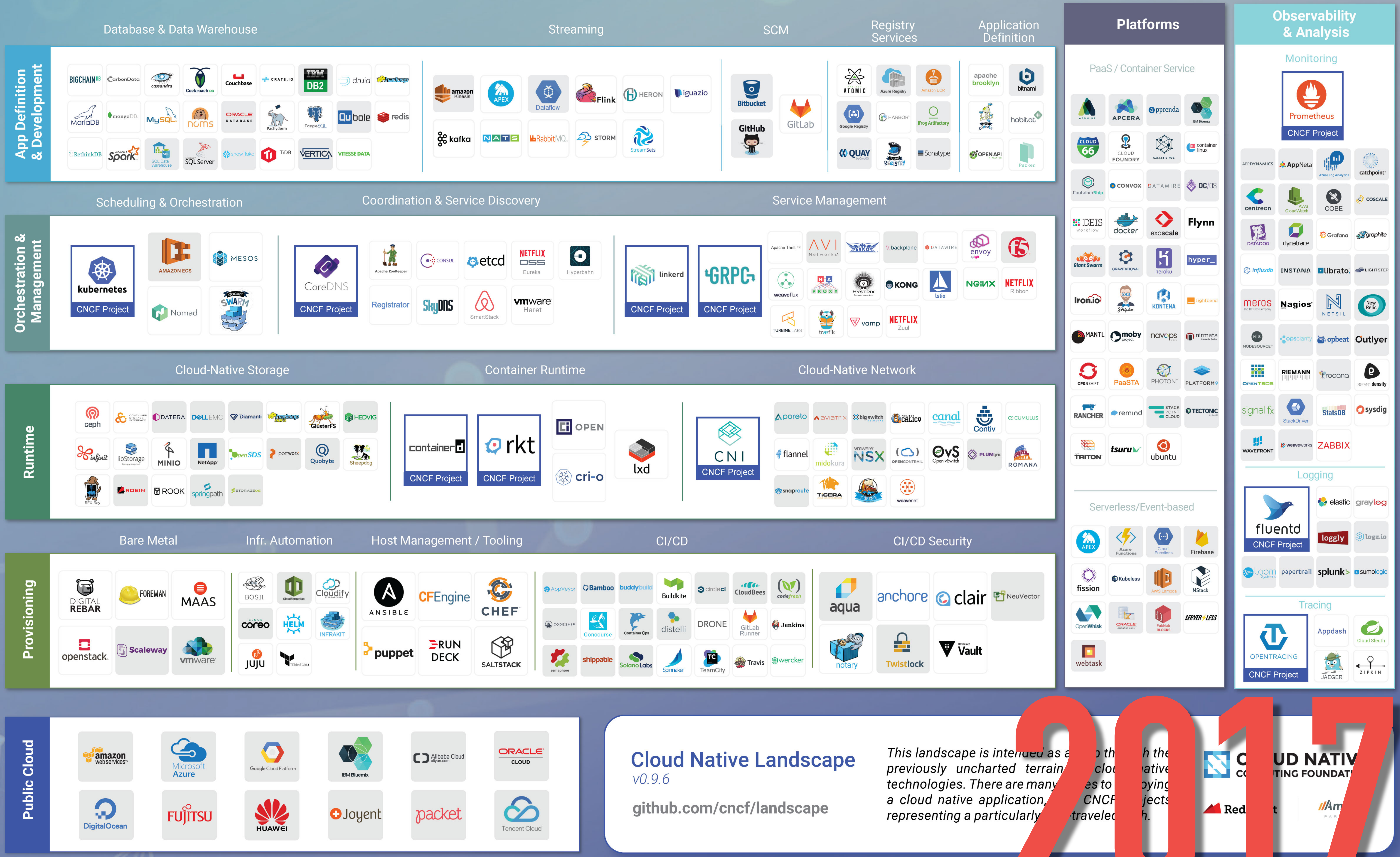
uitgang

THE IRON AGE OF I.T.

THE CLOUD AGE OF I.T.

> “UNRELIABLE SOFTWARE
> DEPENDING ON RELIABLE HARDWARE TO
> RELIABLE SOFTWARE
> RUNNING ON UNRELIABLE HARDWARE”

Infrastructure As Code



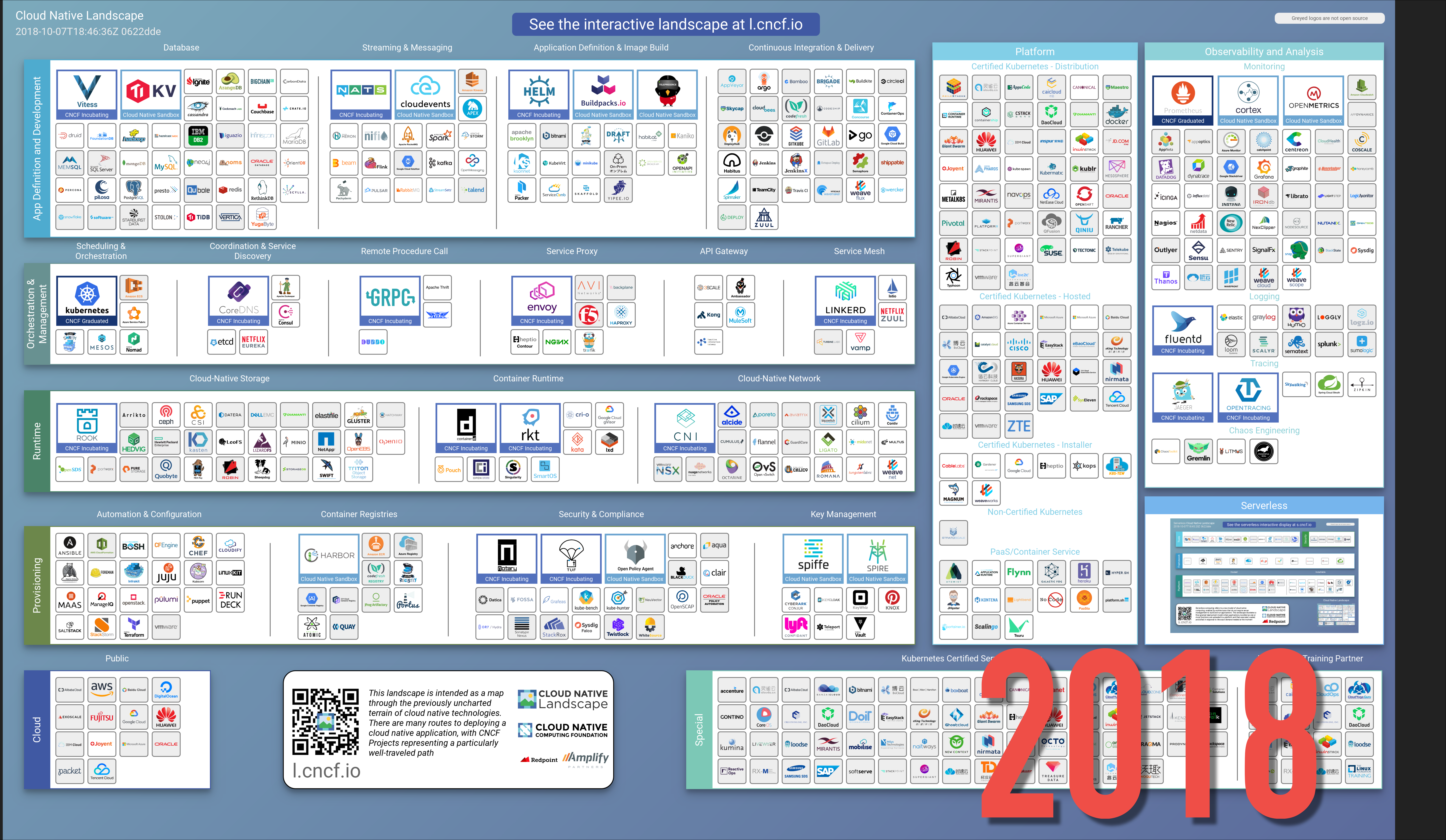
Cloud Native Landscape

v0.9.6

github.com/cncf/landscape

This landscape is intended as a ... th... h the previously uncharted terrain ... clo... native technologies. There are many ... es to ... oying a cloud native application, ... CNCF ... jects representing a particularly ... traveled ... h.

Greyed logos are not open source



Cloud Native Landscape

2018-10-07T18:46:36Z 0622dde

See the interactive landscape at l.cncf.io

Greyed logos are not open source

App Definition and Development

Database

Streaming & Messaging

Application Definition & Image Build

Continuous Integration & Delivery

Orchestration & Management

Scheduling & Orchestration

Coordination & Service Discovery

Remote Procedure Call

Service Proxy

API Gateway

Service Mesh

Runtime

Cloud-Native Storage

Container Runtime

Cloud-Native Network

Provisioning

Automation & Configuration

Container Registries

Security & Compliance

Key Management

Cloud

Public

Platform

Certified Kubernetes - Distribution

Certified Kubernetes - Hosted

Certified Kubernetes - Installer

Non-Certified Kubernetes

PaaS/Container Service

Observability and Analysis

Monitoring

Logging

Tracing

Chaos Engineering

Serverless

Special

Kubernetes Certified Ser

Training Partner

CNCF Graduated

CNCF Incubating

Cloud Native Sandbox

This landscape is intended as a map through the previously uncharted terrain of cloud native technologies. There are many routes to deploying a cloud native application, with CNCF Projects representing a particularly well-traveled path

CLOUD NATIVE Landscape

CLOUD NATIVE COMPUTING FOUNDATION

Redpoint

Amplify PARTNERS

l.cncf.io

2018

CNCF Cloud Native Landscape
2019-06-26T02:23:54Z 1753e1b

Overwhelmed? Please see the CNCF Trail Map. That and the interactive landscape are at l.cncf.io

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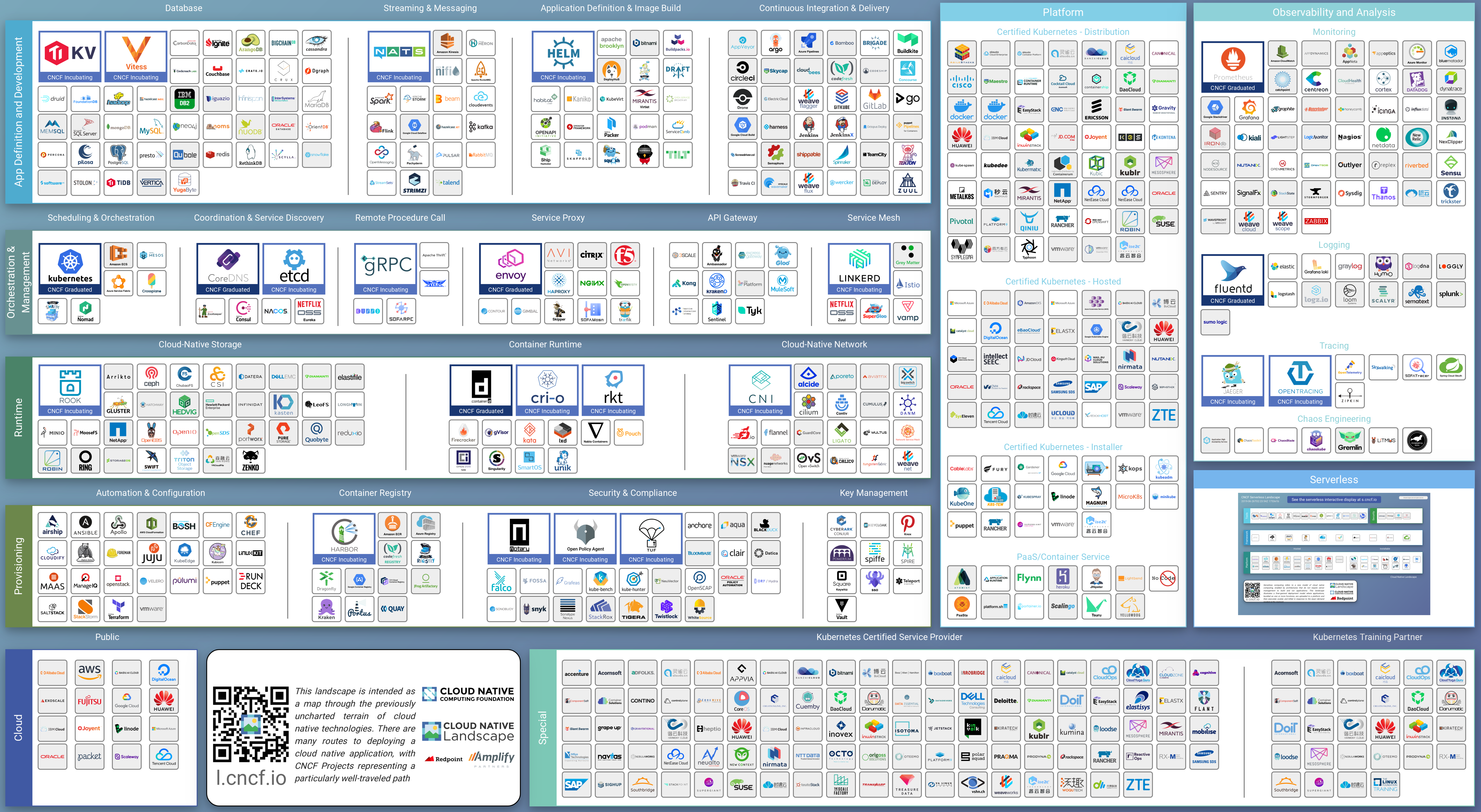

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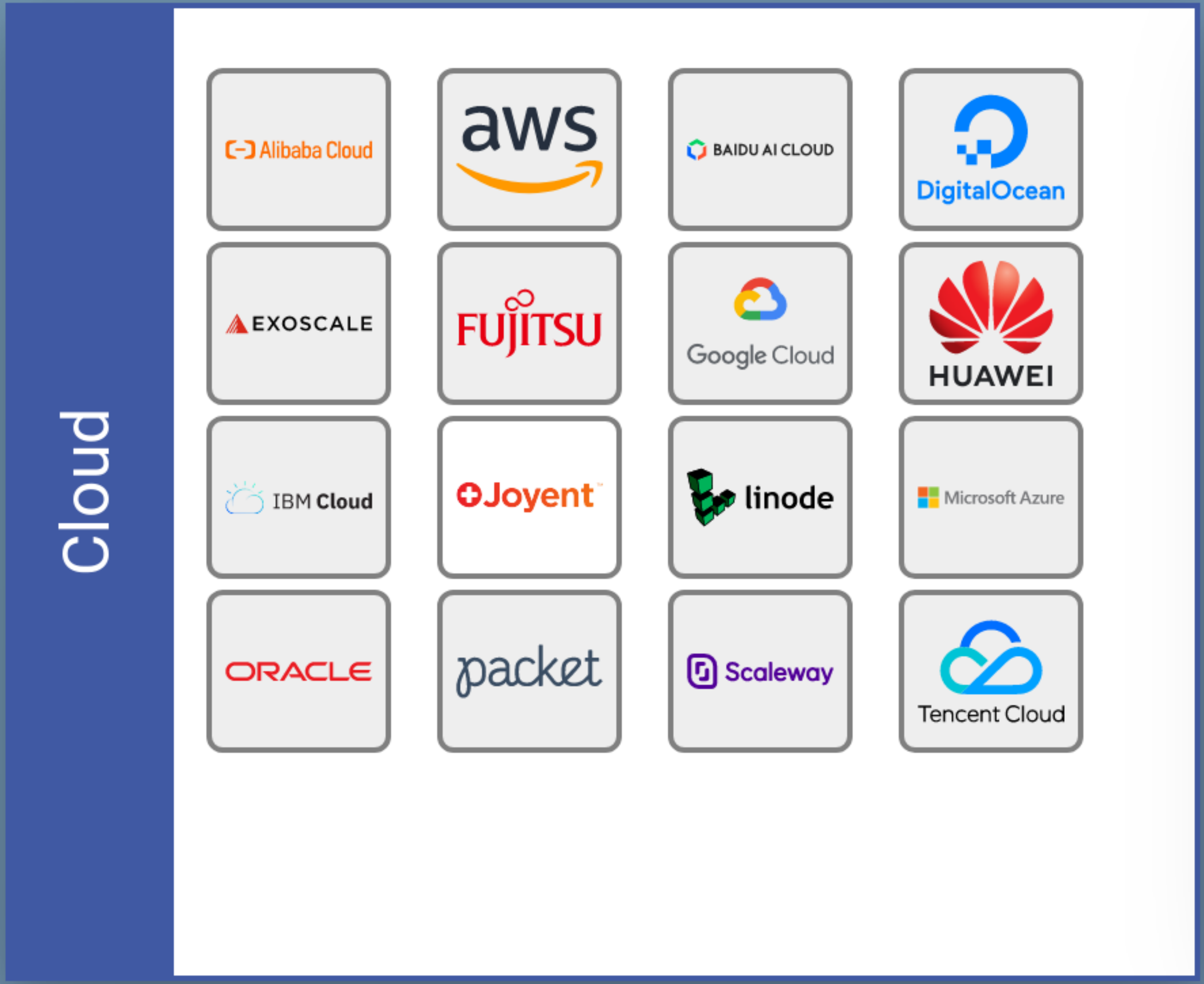
Public



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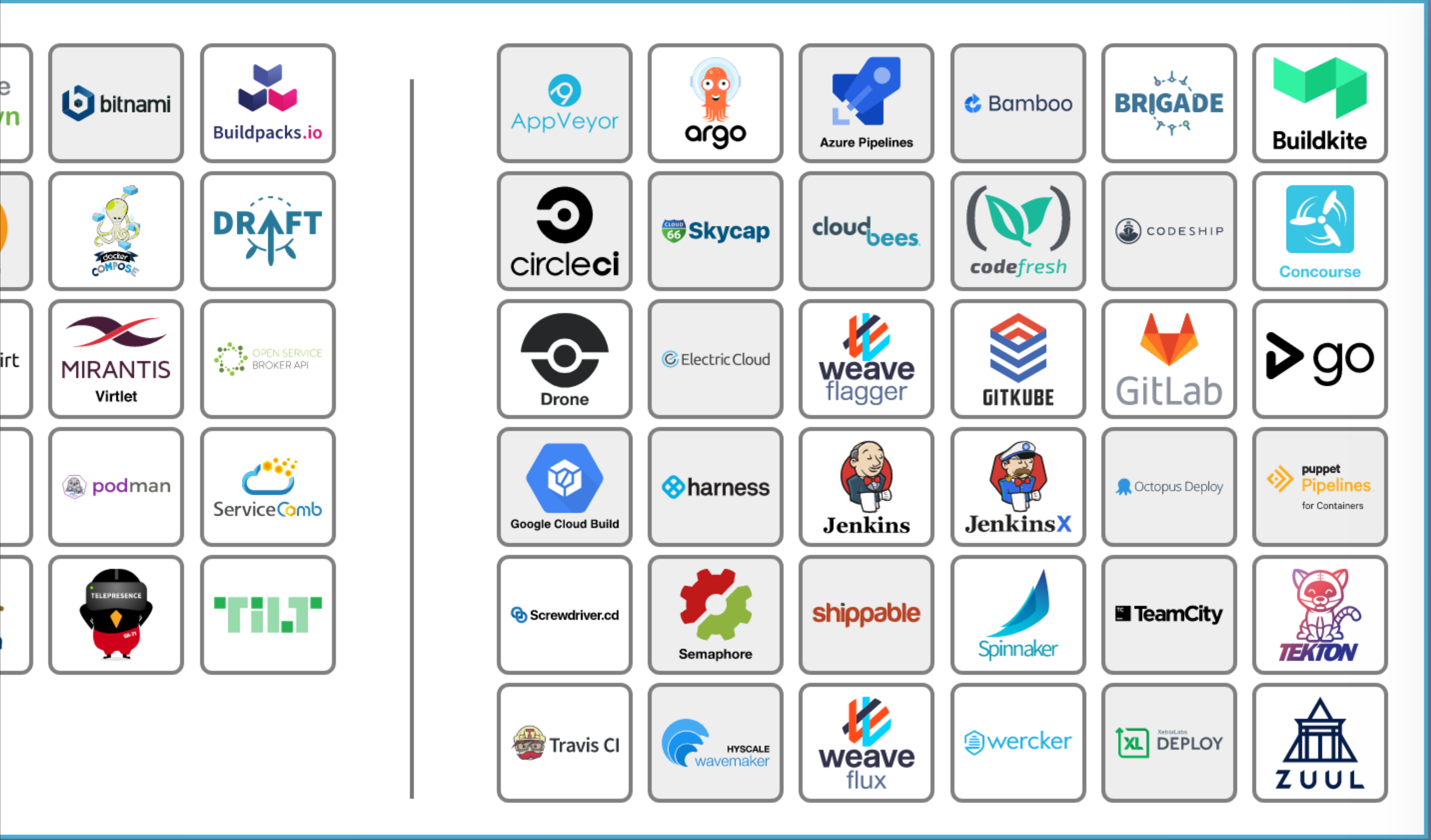
Continuous Integration & Delivery



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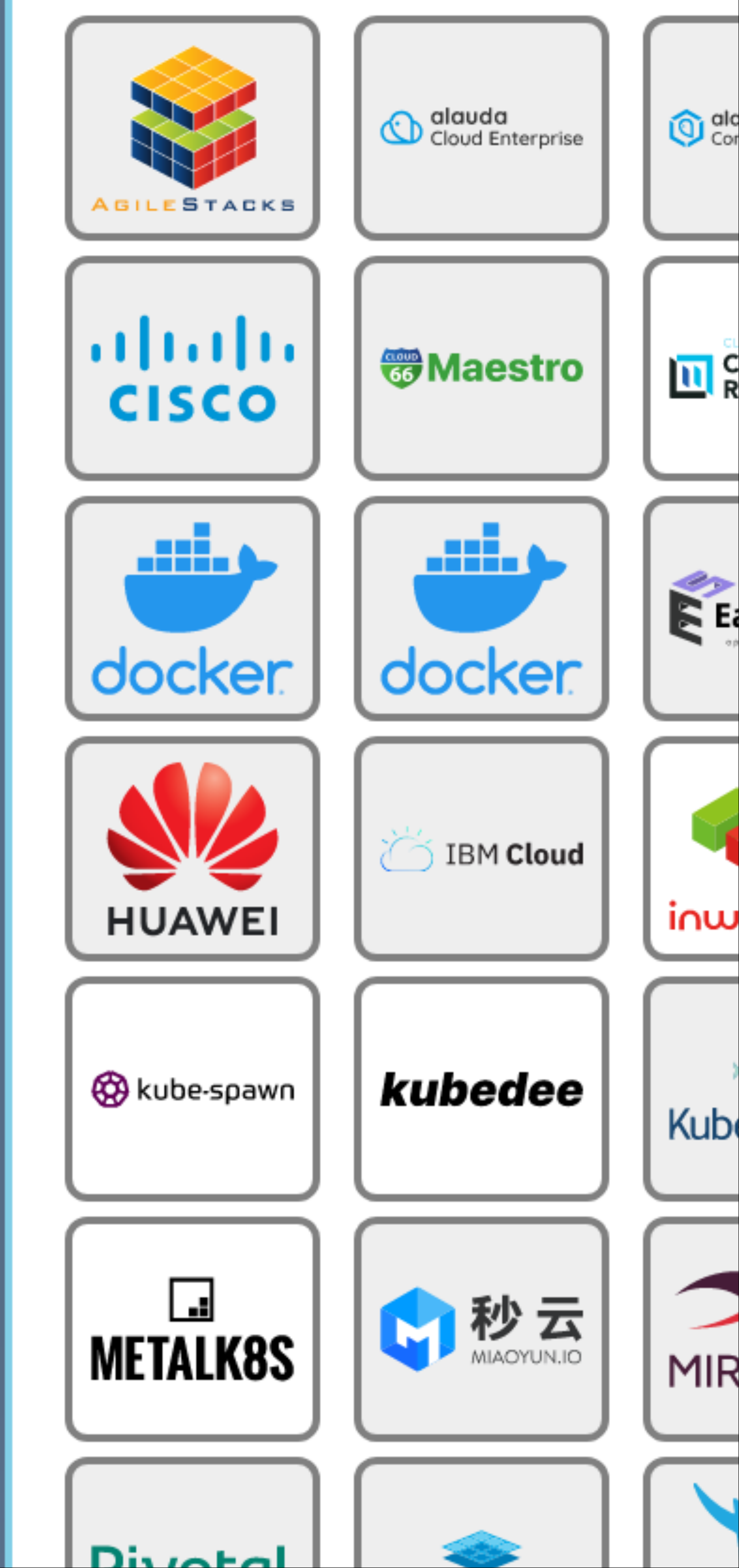

API Gateway

Service Mesh

orm

es - Distribution

BANZAICLOUD
caicloud 才云
CANONICAL
containership
DaoCloud
DIAMANTI
ERICSSON
Giant Swarm
Gravity MADE BY GRAVITATIONAL
Joyent
K8S
KONTENA
Kubic
kublr
MESOSPHERE
NetEase Cloud
NetEase Cloud
ORACLE
RED HAT OPENSHIFT
ROBIN
SUSE

Observability and Analysis

Monitoring

Prometheus
CNCF Graduated

Amazon CloudWatch
APPDYNAMICS
AppNeta
appoptics
Azure Monitor
bluematador
catchpoint
centreon
CloudHealth
cortex
DATADOG
dynatrace
Google Stackdriver
Grafana
graphite
Honeybadger
honeycomb
icinga
influxdata
INSTANA
IRONdb POWERED BY CIRCONUS
kiali
LIGHTSTEP
LogicMonitor
Nagios
netdata
New Relic.
NexClipper
N|S NODESOURCE
NUTANIX
OPENMETRICS
OPENTSDB
Outlyer
replex
riverbed
Sensu
SENTRY
SignalFx
StackState
STORMFORGER
Sysdig
Thanos
听云 TINGYUN
trickster
WAVEFRONT by vmware
weave cloud
weave scope
ZABBIX

ROBIN | RING | STORAGEOS | SWIFT | Triton Object Storage | YRCloudFile | ZENKO

Provisioning

Automation & Configuration

airship | ANSIBLE | Apollo | AWS CloudFormation | CLOUD FOUNDRY BOSH | CFEngine | CHEF

CLOUDIFY | Digital Rebar | FOREMAN | JUJU | KubeEdge | Kubicorn | LinuxKit

MAAS | ManageIQ | openstack | VELERO | pulumi | puppet | RUN DECK

SALTSTACK | StackStorm | HashiCorp Terraform | vmware

Container Re

HARBOR
CNCF Incubating

Ama | cod REG

Dragonfly | Google Container Registry

Kraken | Portus

Public

Alibaba Cloud | aws | BAIDU AI CLOUD | DigitalOcean

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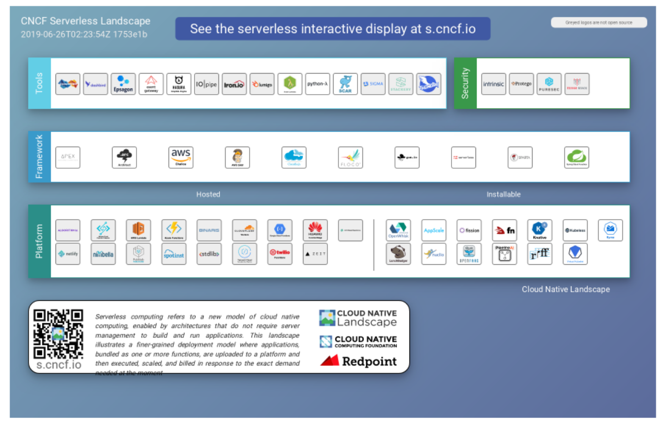

Cloud

Public

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cncf.io/training

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cncf.io/enduser

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Cloud native technologies empower organizations to build and run scalable applications in modern, dynamic environments such as public, private, and hybrid clouds. Containers, service meshes, microservices, immutable infrastructure, and declarative APIs exemplify this approach.

These techniques enable loosely coupled systems that are resilient, manageable, and observable. Combined with robust automation, they allow engineers to make high-impact changes frequently and predictably with minimal toil.

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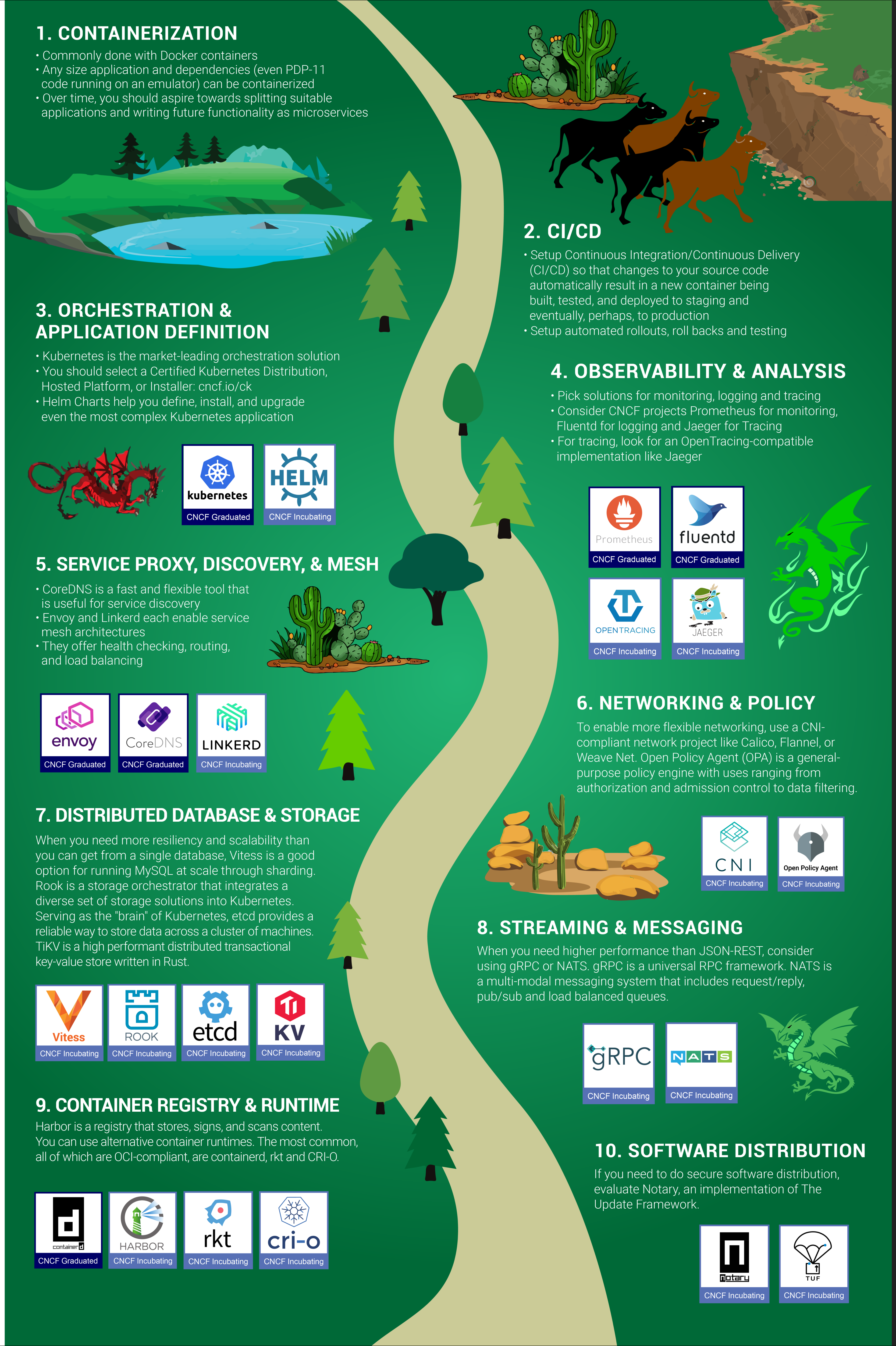
v20190524



1. CONTAINERIZATION

- Commonly done with Docker containers
- Any size application and dependencies (even PDP-11 code running on an emulator) can be containerized
- Over time, you should aspire towards splitting suitable applications and writing future functionality as microservices

2. CI/CD

- Setup Continuous Integration/Continuous Delivery (CI/CD) so that changes to your source code automatically result in a new container being built, tested, and deployed to staging and eventually, perhaps, to production
- Setup automated rollouts, roll backs and testing

3. ORCHESTRATION & APPLICATION DEFINITION

- Kubernetes is the market-leading orchestration solution
- You should select a Certified Kubernetes Distribution, Hosted Platform, or Installer: cncf.io/ck
- Helm Charts help you define, install, and upgrade even the most complex Kubernetes application

kubernetes — CNCF Graduated

HELM — CNCF Incubating

4. OBSERVABILITY & ANALYSIS

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Prometheus — CNCF Graduated

fluentd — CNCF Graduated

OPENTRACING — CNCF Incubating

JAEGER — CNCF Incubating

5. SERVICE PROXY, DISCOVERY, & MESH

- CoreDNS is a fast and flexible tool that is useful for service discovery
- Envoy and Linkerd each enable service mesh architectures
- They offer health checking, routing, and load balancing

envoy — CNCF Graduated

CoreDNS — CNCF Graduated

LINKERD — CNCF Incubating

6. NETWORKING & POLICY

To enable more flexible networking, use a CNI-compliant network project like Calico, Flannel, or Weave Net. Open Policy Agent (OPA) is a general-purpose policy engine with uses ranging from authorization and admission control to data filtering.

CNI — CNCF Incubating

Open Policy Agent — CNCF Incubating

7. DISTRIBUTED DATABASE & STORAGE

When you need more resiliency and scalability than you can get from a single database, Vitess is a good option for running MySQL at scale through sharding. Rook is a storage orchestrator that integrates a diverse set of storage solutions into Kubernetes. Serving as the "brain" of Kubernetes, etcd provides a reliable way to store data across a cluster of machines. TiKV is a high performant distributed transactional key-value store written in Rust.

Vitess — CNCF Incubating

ROOK — CNCF Incubating

etcd — CNCF Incubating

TiKV — CNCF Incubating

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containerd — CNCF Graduated

HARBOR — CNCF Incubating

rkt — CNCF Incubating

cri-o — CNCF Incubating

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Notary — CNCF Incubating

TUF — CNCF Incubating

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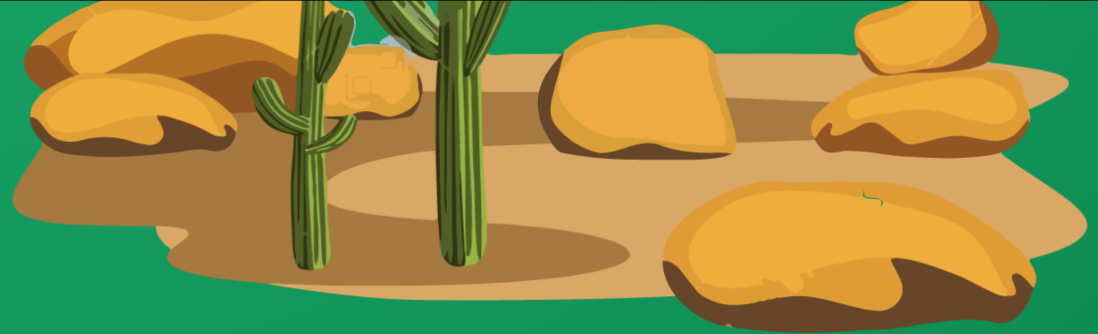

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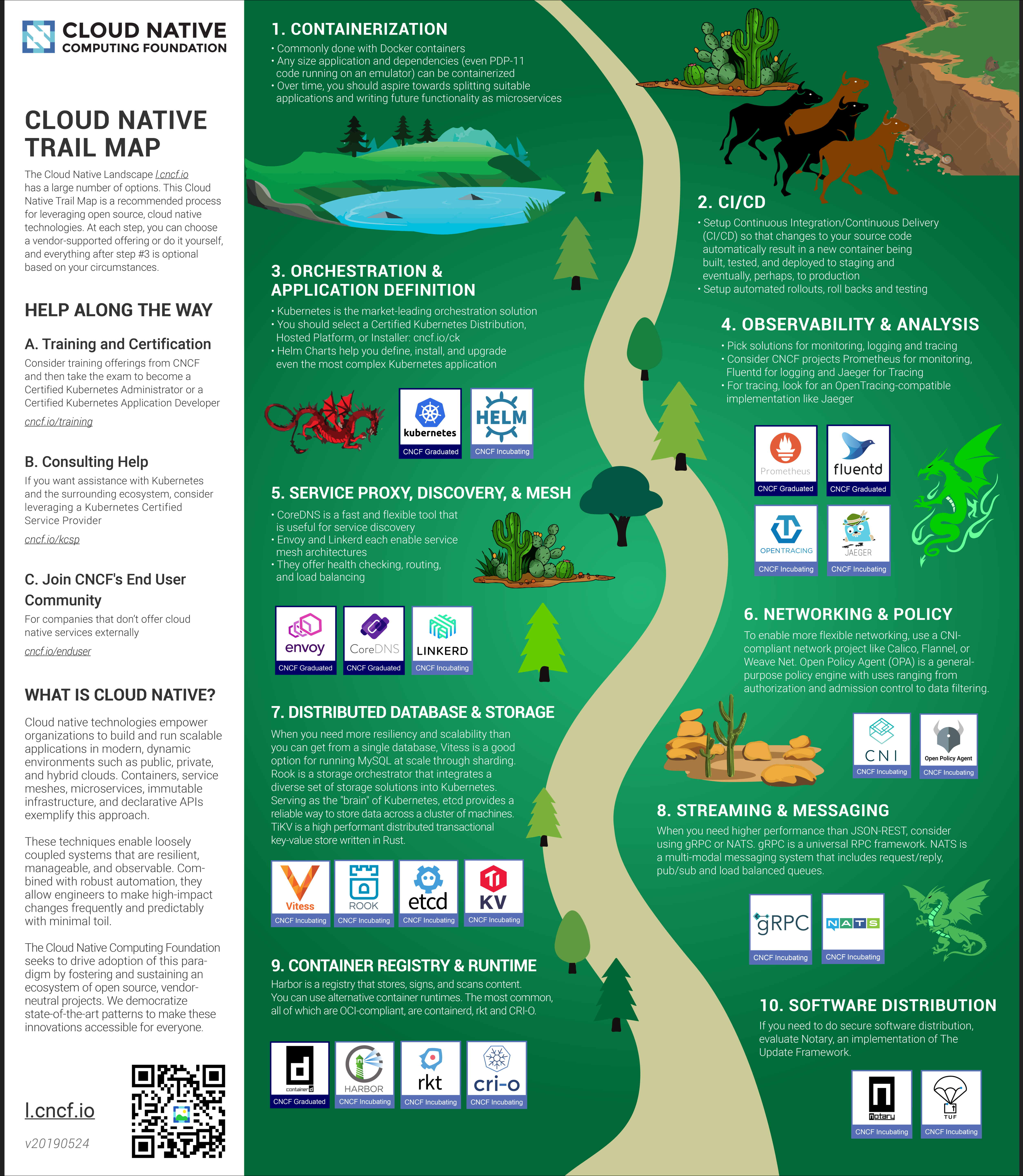

CLOUD NATIVE COMPUTING FOUNDATION

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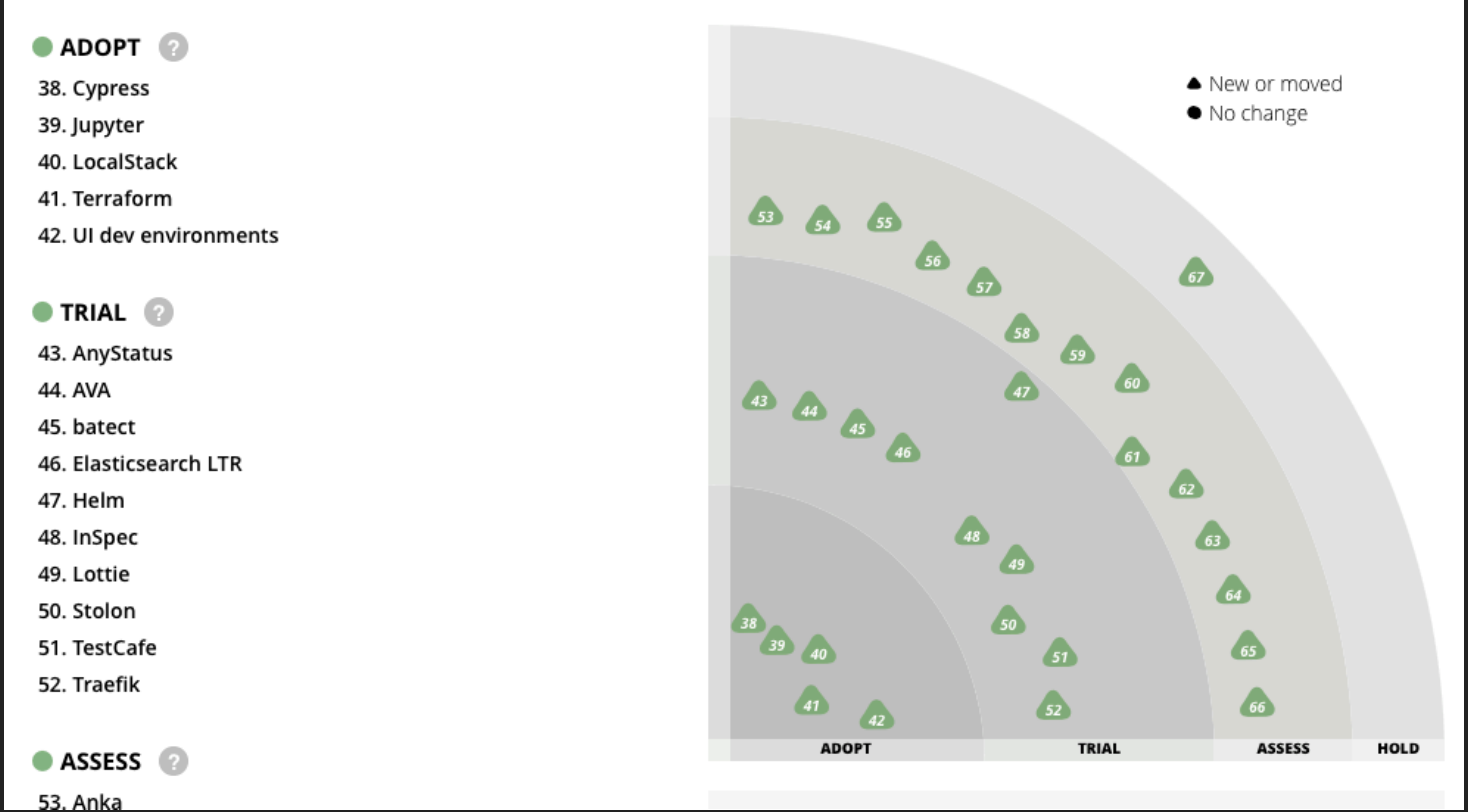
https://landscape.cncf.io/

THOUGHTWORKS RADAR



● ADOPT ?

38. Cypress
39. Jupyter
40. LocalStack
41. Terraform
42. UI dev environments

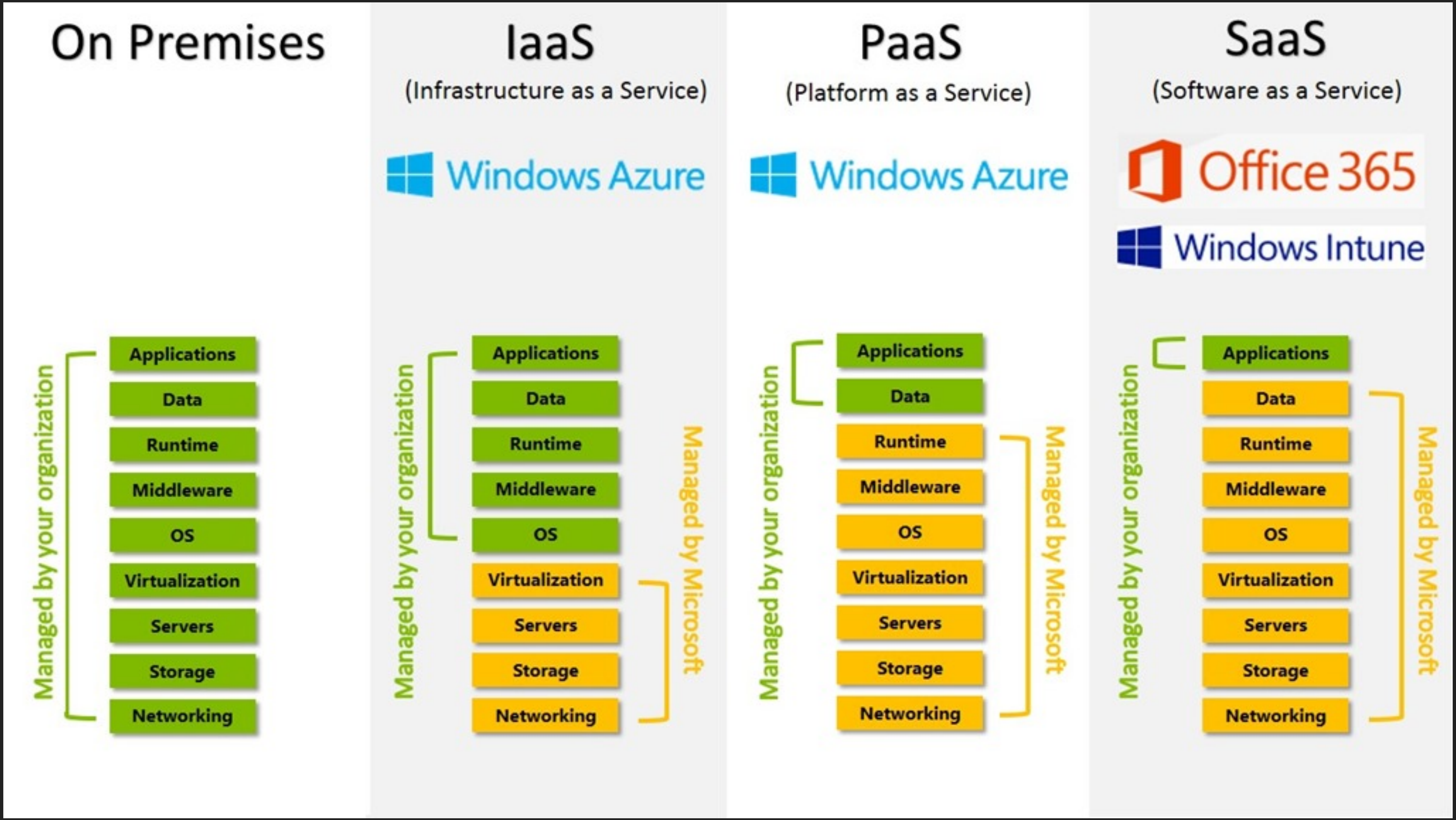
● TRIAL ?

43. AnyStatus
44. AVA
45. batect
46. Elasticsearch LTR
47. Helm
48. InSpec
49. Lottie
50. Stolon
51. TestCafe
52. Traefik

● ASSESS ?

53. Anka

https://www.thoughtworks.com/radar/tools



On Premises

Managed by your organization

Applications
Data
Runtime
Middleware
OS
Virtualization
Servers
Storage
Networking

IaaS

(Infrastructure as a Service)

Windows Azure

Managed by your organization

Applications
Data
Runtime
Middleware
OS

Managed by Microsoft

Virtualization
Servers
Storage
Networking

PaaS

(Platform as a Service)

Windows Azure

Managed by your organization

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Data

Managed by Microsoft

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OS
Virtualization
Servers
Storage
Networking

SaaS

(Software as a Service)

Office 365

Windows Intune

Managed by your organization

Applications

Managed by Microsoft

Data
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Middleware
OS
Virtualization
Servers
Storage
Networking

https://blogs.technet.microsoft.com/xdot509/2013/07/24/getting-started-with-windows-azure-part-2-what-are-cloud-services/

WHY BOTHER DEFINING YOUR OWN INFRASTRUCTURE IN CODE?

REGULATORY REQUIREMENTS

3RD PARTY SOLUTION UNCERTAINTY

HARDEN APPLICATION HOSTING

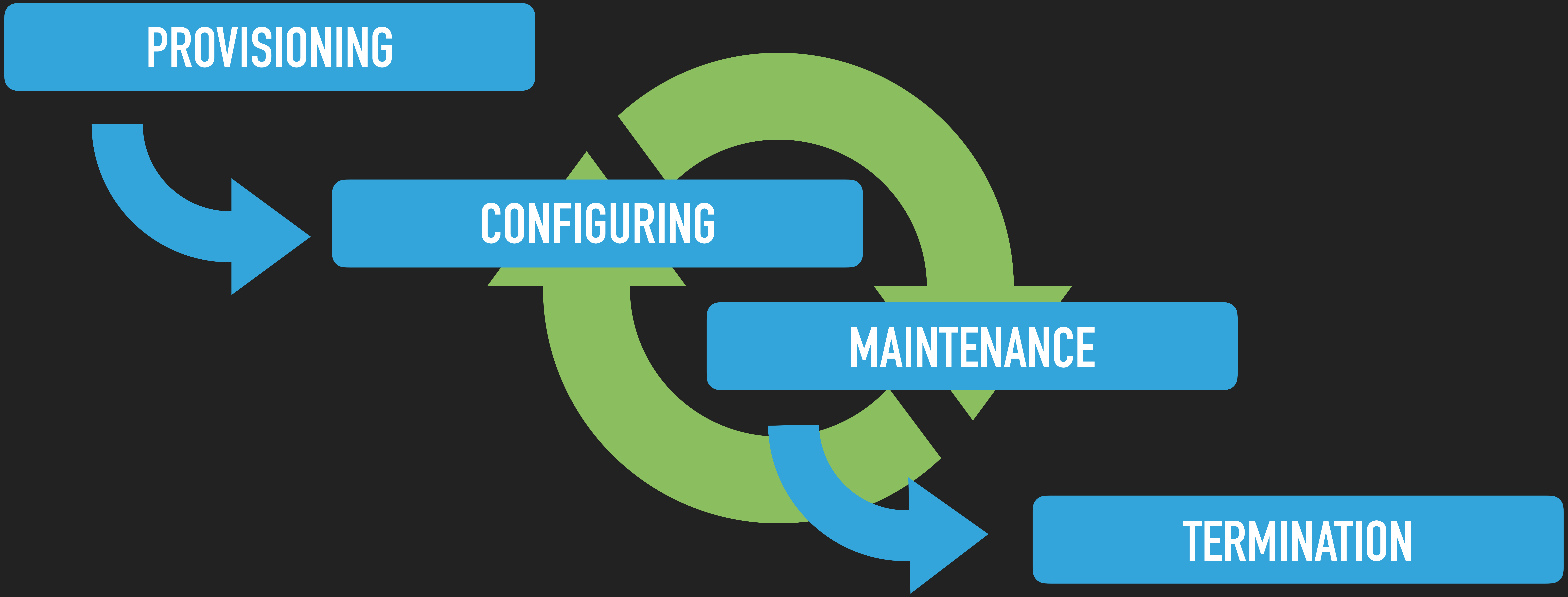
AVOID VENDOR LOCK-IN

COFERASTA
San Pietro

MAINTAINING SERVERS OVER TIME

OWN SOFTWARE	CONFIGURATION	UPDATES	
3RD PARTY SOFTWARE	CONFIGURATION	UPDATES	
OPERATING SYSTEM	FEATURES	CONFIGURATION	UPDATES
HYPERVISOR	CONFIGURATION	UPDATES	
PHYSICAL SERVER	CONFIGURATION	UPDATES	

THE FOUR STAGES OF INFRASTRUCTURE



PROVISIONING

CONFIGURING

MAINTENANCE

TERMINATION

PROVISIONING

- Since virtualisation, one of the easiest of the phases
- Traditionally based off ISO images
- Out of date, unpatched images

CONFIGURATION

- Can be where most configuration drift is added if not done through automation
- It may involve ‘tinkering’ to get a server working
- Can end up with ‘Snowflake servers’
- Configuration Management software like Puppet & Chef

MAINTENANCE

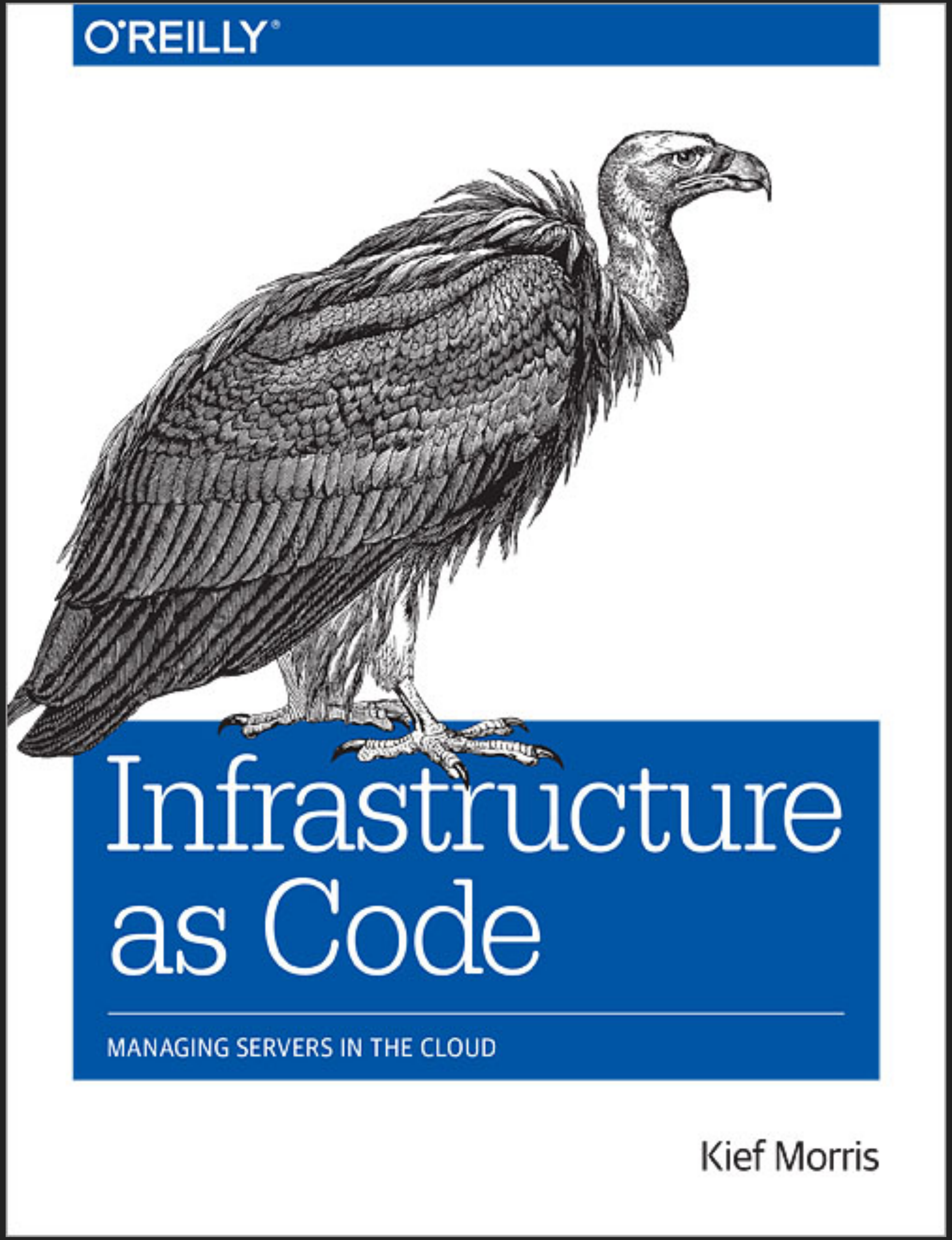
- Updates or upgrades of software components
- From security patches to in-place upgrades of O.S.
- Ordering of patches may affect outcome
- Scripting can help ensure consistency

TERMINATION

- Fear of shutting off servers
- Treating servers like “pets, not cattle”
- Anti-pattern: Celebrating up-time
- Plan for the fact an instance could disappear

YALE

GOALS OF INFRASTRUCTURE AS CODE



IT INFRASTRUCTURE SUPPORTS & ENABLES CHANGE

Kief Morris

> CHANGES TO THE SYSTEM ARE ROUTINE WITHOUT DRAMA OR STRESS

Kief Morris

IT STAFF SPEND THEIR TIME ON VALUABLE THINGS…
NOT REPETITIVE TASKS

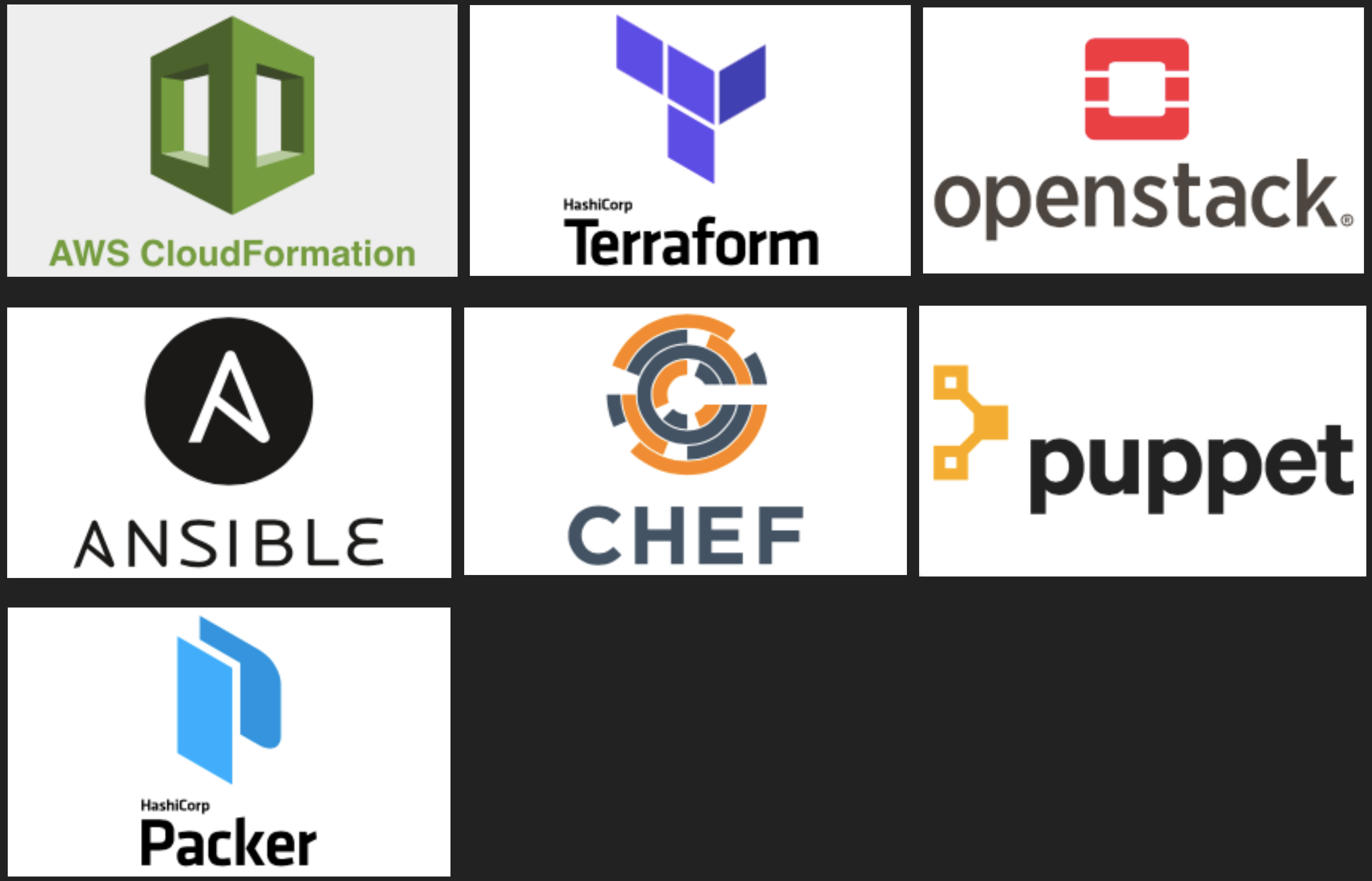
Kief Morris

> USERS ARE ABLE TO DEFINE, PROVISION, AND MANAGE THE RESOURCES THEY NEED WITHOUT I.T. STAFF TO DO IT FOR THEM

Kief Morris

DEFINITION TOOLS

- Good Infrastructure As Code tools
  - have scriptable interfaces
  - can be run unattended
  - can be tailored through config
  - allow tasks to be defined in code
  - the definition files become 'living documentation'



VERSION CONTROL

- Natural part of development workflow
  - branching, rollbacks, ownership
- Single point of truth
- Living documentation

CONTINUOUS INTEGRATION

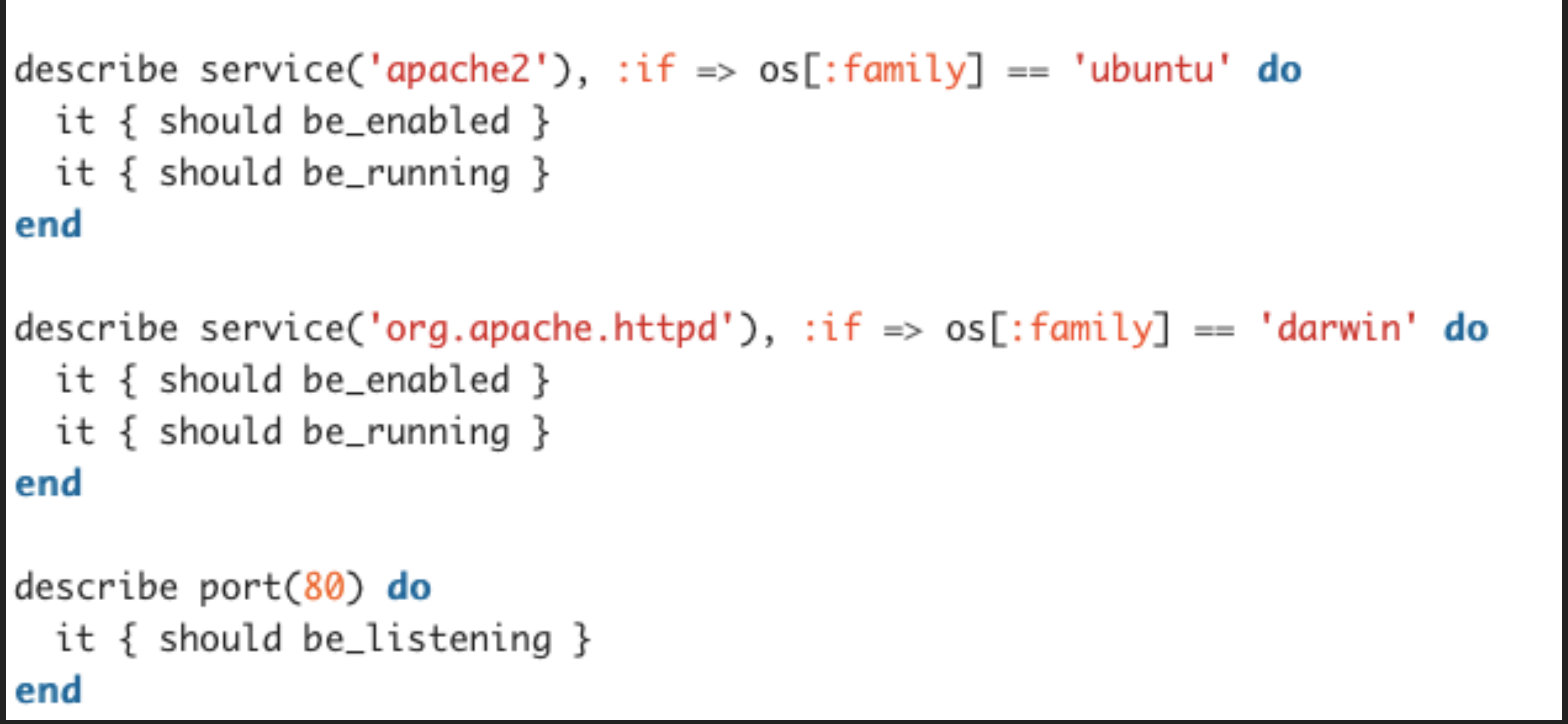
- Early feedback about potentially breaking changes
- Changes tested in isolation from production
- Can apply to infrastructure, server, and configuration changes
  - *"Does this produce the instance I expect?"*
  - *"Does this instance have all the features I expect?"*
  - *"Is this instance configured for its role correctly?"*

BUILD PIPELINES

- Avoid 'automation fear'
- Build regularly as well as on changes
- Pipelines maintaining templates ensures up-to-date images
- Reduces manual knowledge fading
- Services used to build can be provisioned temporarily
- Packer supports building machine images

AUTOMATED TESTING

- One of the best practices to borrow from Development
- Not relying on ‘Green builds’
- Frameworks like ServerSpec (http://serverspec.org)



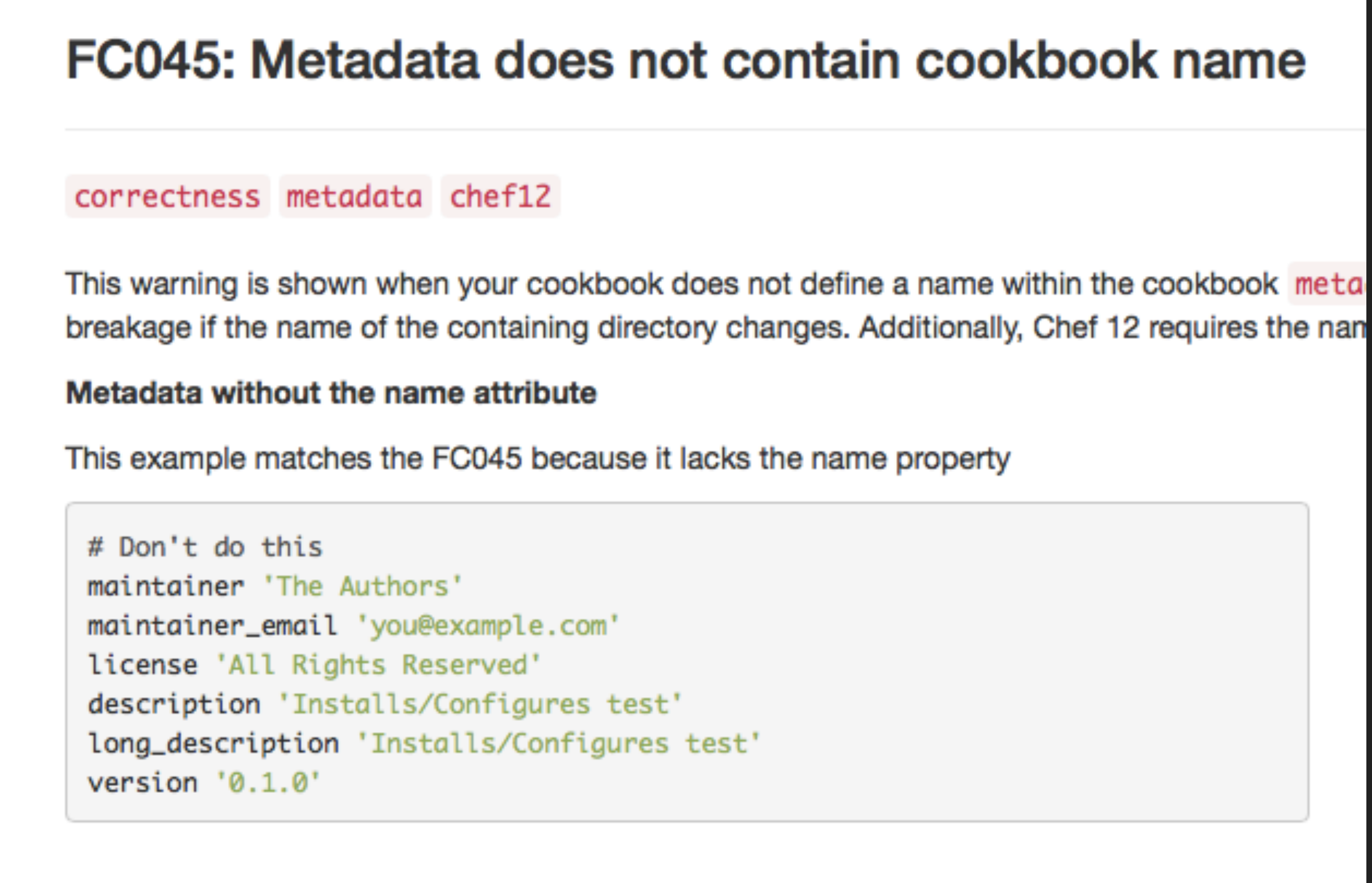
```
describe service('apache2'), :if => os[:family] == 'ubuntu' do
  it { should be_enabled }
  it { should be_running }
end

describe service('org.apache.httpd'), :if => os[:family] == 'darwin' do
  it { should be_enabled }
  it { should be_running }
end

describe port(80) do
  it { should be_listening }
end
```

CONTINUOUS DELIVERY

- Not ‘Continuous Deployment’
- Being able to update Test / Lab environments regularly
- Risk increases with ‘Time Since Last Success’

CODE ANALYSIS

- Emerging area drawing from Dev practices
- Config management declarative languages have 'lint' tools



FC045: Metadata does not contain cookbook name

correctness metadata chef12

This warning is shown when your cookbook does not define a name within the cookbook meta
breakage if the name of the containing directory changes. Additionally, Chef 12 requires the nam

Metadata without the name attribute

This example matches the FC045 because it lacks the name property

```
# Don't do this
maintainer 'The Authors'
maintainer_email 'you@example.com'
license 'All Rights Reserved'
description 'Installs/Configures test'
long_description 'Installs/Configures test'
version '0.1.0'
```

> “A NETFLIX TEAM KNEW THAT A PERCENTAGE OF AWS INSTANCES, WHEN PROVISIONED, WILL PERFORM MUCH WORSE THAN THE AVERAGE INSTANCE SO THEY WROTE THEIR PROVISIONING SCRIPTS TO IMMEDIATELY TEST THE PERFORMANCE OF EACH NEW INSTANCE. IF IT DOESN’T MEET THEIR STANDARDS, THE SCRIPT DESTROYS THE INSTANCE AND TRIES AGAIN WITH A NEW INSTANCE.”

Kief Morris

WAYS TO START INTRODUCING THIS

- Start small
- Script everything
- Automate the process
- Run it regularly
- Test the changes in a safe environment
- Monitor all the things

แบบหัดอ่าน A B C สำหรับเด็ก
A a เอ
B b บี
C c ซี
D d ดี
E e อี
F f เอฟ
G g จี
H h เอช
I i ไอ
J j เจ
K k เค
L l แอล
M m เอ็ม
N n เอ็น
O o โอ
P p พี
Q q คิว
R r อาร์
S s เอส
T t ที
U u ยู
V v วี
W w ดับเบิ้ลยู
X x เอ็กซ์
Y y วาย
Z z แซด
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

QUESTIONS?

ABOUT ME

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- about.me/jbjon

@jbjon