Cloud Native Infrastructure

Andre Almar
Site Reliability Engineer

This presentation is available at:

https://github.com/andrealmar/talks

CNCF Speaker

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Last Name | Areas of Expertise | Languages Spoken | Brazil

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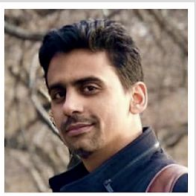
2 Speakers



Andre Almar

Areas of Expertise: Cloud Platforms, Kubernetes, Community

Yago Nobre

Areas of Expertise: Cloud Platforms, Kubernetes

$whoami

- Site Reliability Engineer
- Speaker
- DevOps BH Meetup Organizer
- DevOpsDays BH Organizer
- TDC BH 2019 Organizer & Technical Committee Member

Projects

Graduated

- Kubernetes — Orchestration
- Prometheus — Monitoring
- Envoy — Service Proxy
- CoreDNS — Service Discovery
- containerd — Container Runtime
- Fluentd — Logging

Incubating

- OpenTracing — Distributed Tracing API
- gRPC — Remote Procedure Call
- rkt — Container Runtime
- CNI — Networking API
- Jaeger — Distributed Tracing
- Notary — Security
- TUF — Software Update Spec
- Vitess — Storage
- NATS — Messaging
- Linkerd — Service Mesh
- Helm — Package Management
- Rook — Storage
- Harbor — Registry
- etcd — Key/Value Store
- Open Policy Agent — Policy
- CRI-O — Container Runtime

Members

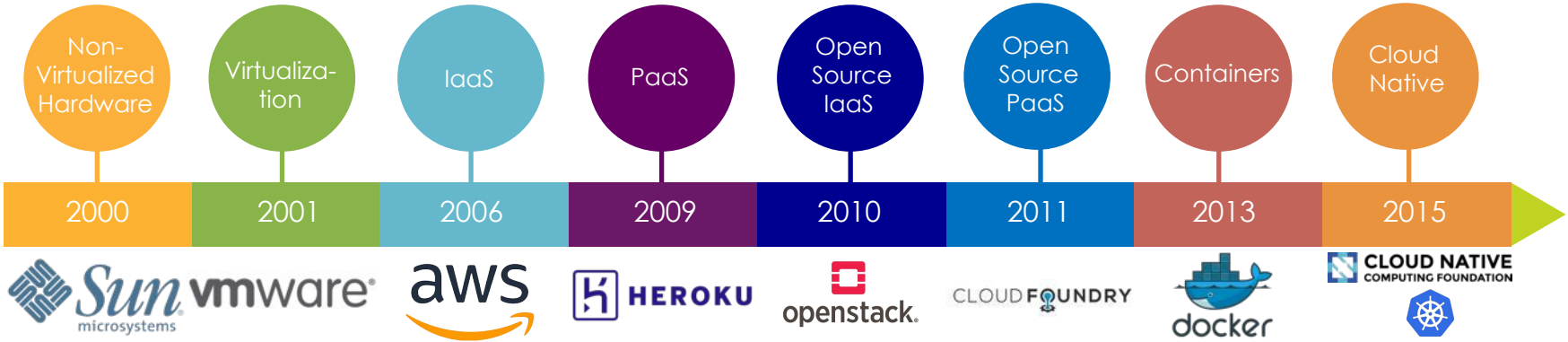
Alibaba Cloud, aws, Cisco, Dell Technologies, Fujitsu, Google Cloud, Huawei, IBM Cloud, Intel, JD.COM, Microsoft Azure, Oracle, Pivotal, Red Hat, Samsung SDS, SAP, VMware

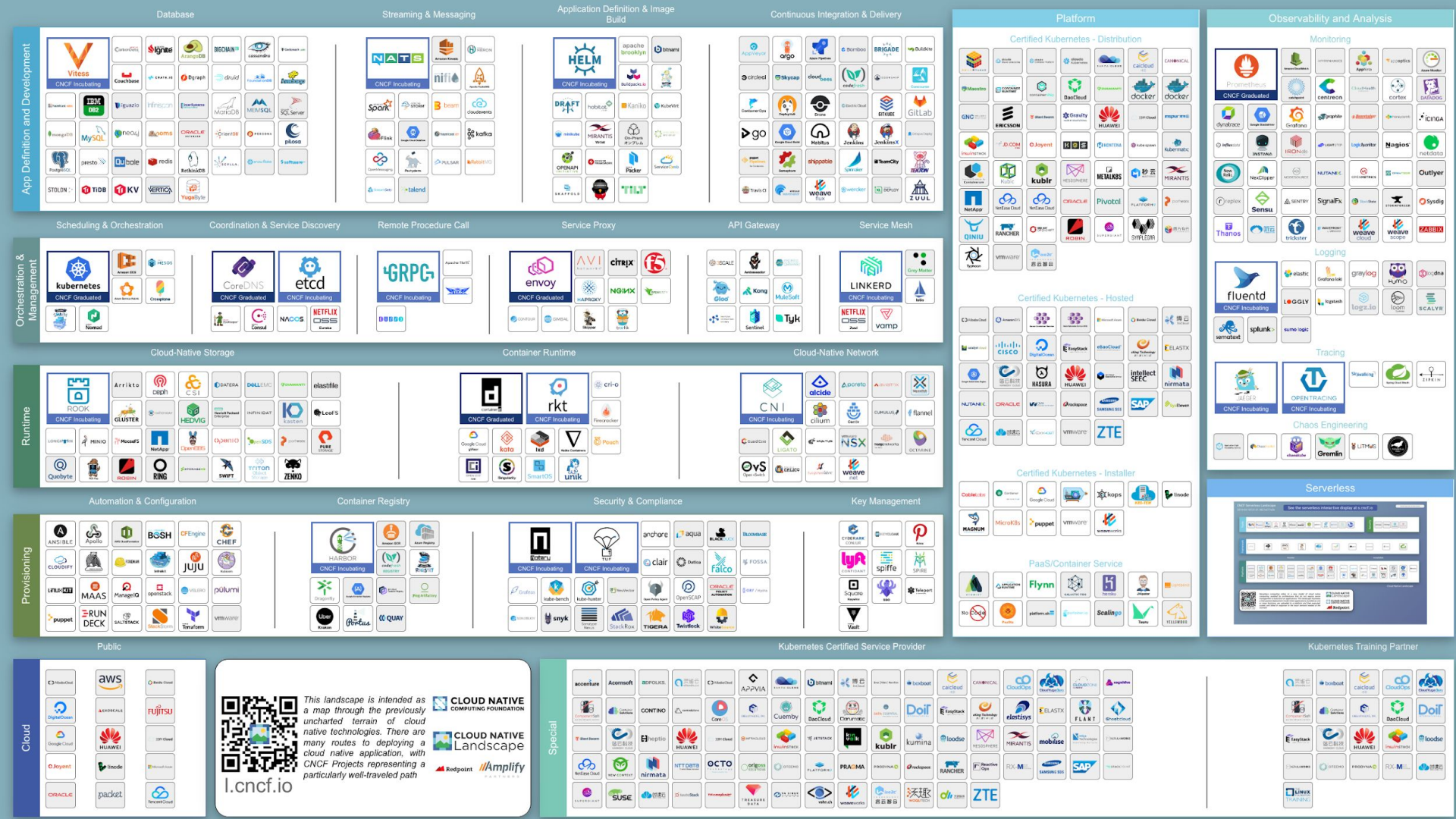
From Virtualization to Cloud Native

CLOUD NATIVE COMPUTING FOUNDATION

kubernetes

- Cloud native computing uses an open source software stack to:
  - segment applications into *microservices*,
  - package each part into its own *container*
  - and dynamically *orchestrate* those containers to optimize resource utilization




App Definition and Development
Database
Streaming & Messaging
Application Definition & Image Build
Continuous Integration & Delivery
Vitess
CNCF Incubating
NATS
CNCF Incubating
HELM
CNCF Incubating
Orchestration & Management
Scheduling & Orchestration
Coordination & Service Discovery
Remote Procedure Call
Service Proxy
API Gateway
Service Mesh
kubernetes
CNCF Graduated
CoreDNS
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envoy
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LINKERD
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Runtime
Cloud-Native Storage
Container Runtime
Cloud-Native Network
ROOK
CNCF Incubating
rkt
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CNI
CNCF Incubating
Provisioning
Automation & Configuration
Container Registry
Security & Compliance
Key Management
HARBOR
CNCF Incubating
Notary
CNCF Incubating
TUF
CNCF Incubating
Platform
Certified Kubernetes - Distribution
Certified Kubernetes - Hosted
Certified Kubernetes - Installer
PaaS/Container Service
Observability and Analysis
Monitoring
Prometheus
CNCF Graduated
Logging
fluentd
CNCF Incubating
Tracing
JAEGER
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OPENTRACING
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Chaos Engineering
Serverless
Public
Cloud
Kubernetes Certified Service Provider
Special
Kubernetes Training Partner
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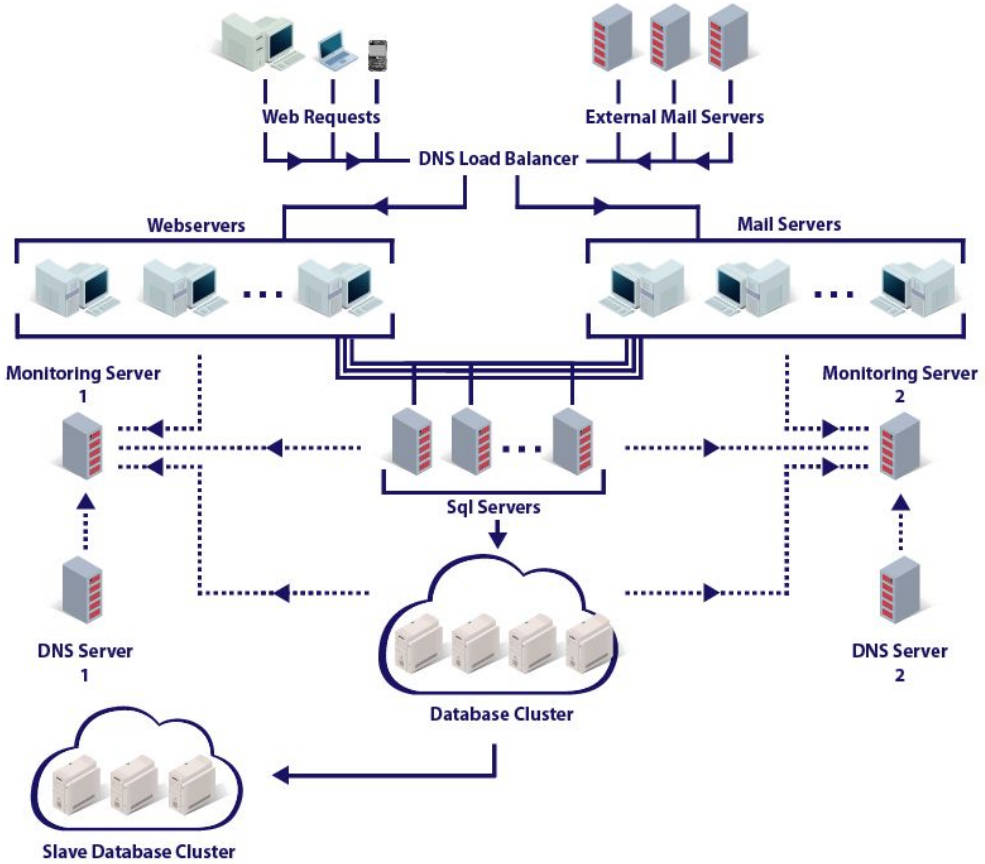
This landscape is intended as a map through the previously uncharted terrain of cloud native technologies. There are many routes to deploying a cloud native application, with CNCF Projects representing a particularly well-traveled path
CLOUD NATIVE COMPUTING FOUNDATION
CLOUD NATIVE Landscape
Redpoint
Amplify

History of Infrastructure

- Infrastructure as a Diagram
- Infrastructure as a Script
- Infrastructure as a Code
- Infrastructure as a Software

Infrastructure as a Diagram



Infrastructure as a Script

```
#!/bin/bash
for instance in  $(gcloud compute instances list --filter= "status=terminated"
                    --format= "value(name)" --quiet)
do
  zone=$(gcloud compute instances list --filter= "name=$instance"
         --format= "value(zone)" --quiet)
  status=$(gcloud compute instances describe $instance --zone=$zone
           --format= "value(status)" --quiet)
  created_on=$(gcloud compute instances describe $instance --zone=$zone
               --format= "value(creationTimestamp.date('%Y-%m-%d'))" --quiet)
  echo "Instance name: $instance"
  echo "Created on $created_on"
  gcloud compute instances delete $instance --zone=$zone --quiet
done
```


Infrastructure as a Code

Infrastructure as a Code

```
variable "credentials" {}
variable "project" {}
variable "region" {}
variable "cluster_name" {}

// Configure the Google Cloud Provider
provider "google" {
  credentials  = "${file("${var.credentials}")}"
  project      = "${var.project}"
  region       = "${var.region}"
}

data "terraform_remote_state" "app_nodepool_remote_state" {
  backend = "gcs"
  config {
    bucket  = "somos-terraform-remote-state"
    prefix  = "stg"
    credentials  = "${file("${var.credentials}")}"
  }
}
```

```
resource "google_container_node_pool" "np" {
  name               = "app-nodepool-1"
  zone               = "us-central1-a"
  cluster            = "${var.cluster_name}"

  autoscaling = {
    min_node_count = 1,
    max_node_count = 10,
  }

  management = {
    auto_repair  = true
    auto_upgrade = false
  }

  node_config = {

    labels {
      type = "app"
    }

    metadata {
      type = "app"
    }

    oauth_scopes = [
      "gke-default",
    ]

    disk_size_gb = 200
    disk_type = "pd-standard"
    machine_type = "n1-standard-4"

  }
}
```


Infrastructure as Software

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What is Cloud Native Infrastructure ?

- CLOUD + INFRASTRUCTURE

- Servers as a Service
- Extreme Automation
- Decoupled architecture
- Encapsulate processes
- Automated Orchestration

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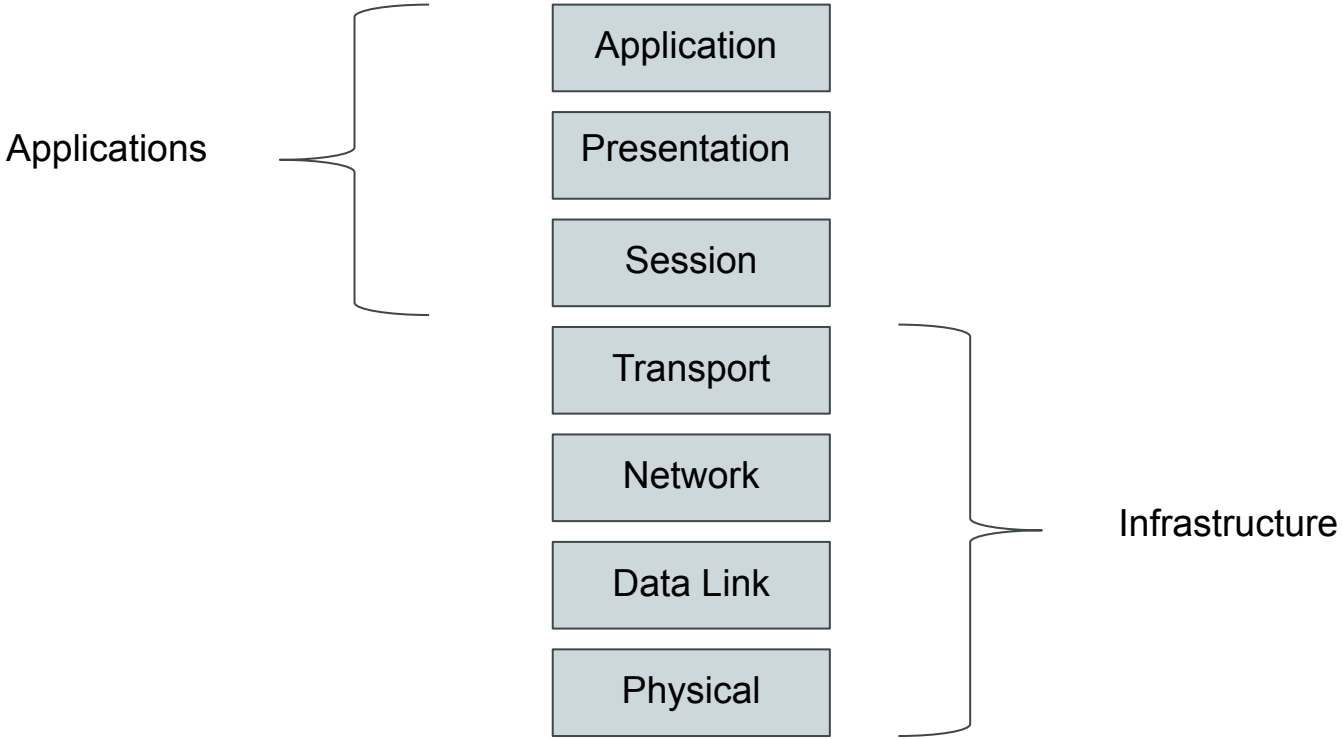
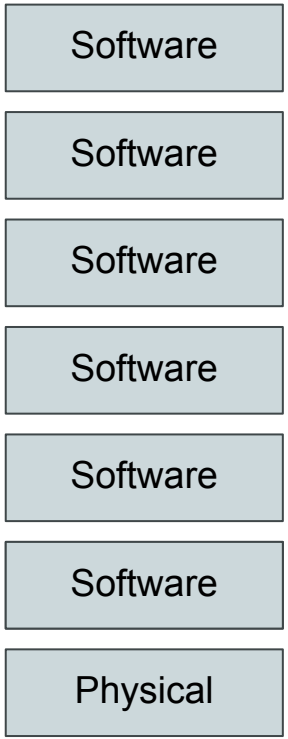
OSI Reference Model

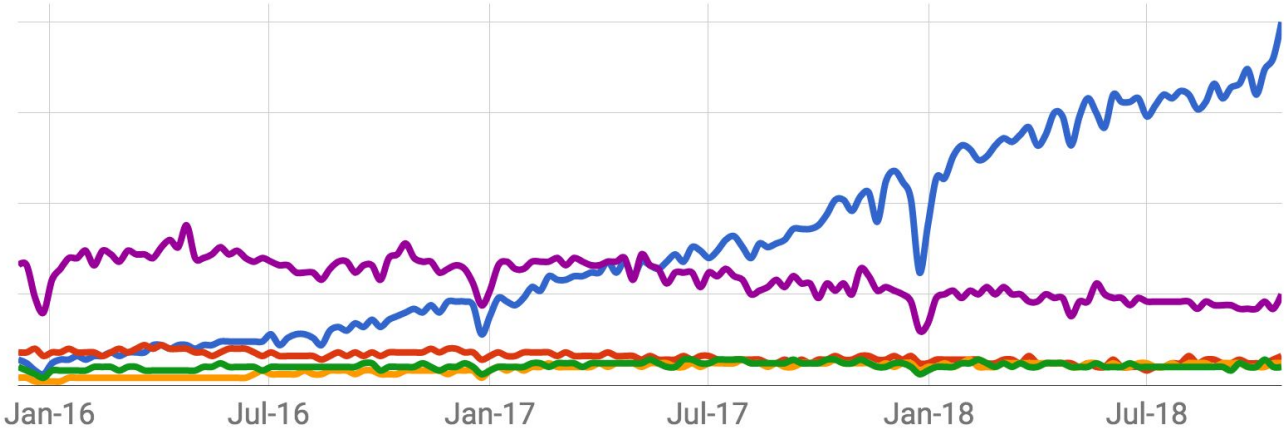


NEW OSI Reference Model



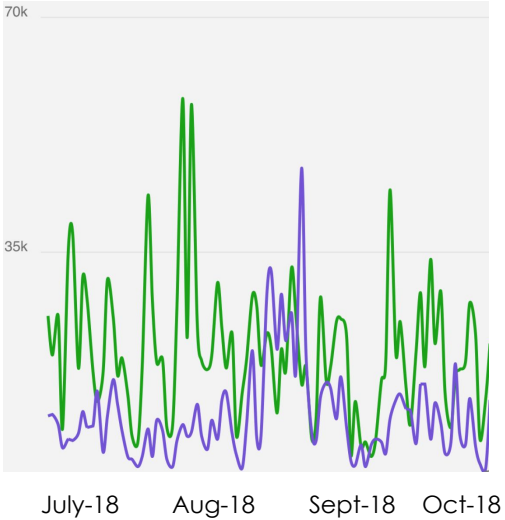
Kubernetes in Search Trends

Google Trends



Kubernetes OpenStack Mesos Docker Swarm Cloud Foundry

WeChat



Kubernetes OpenStack

Kubernetes

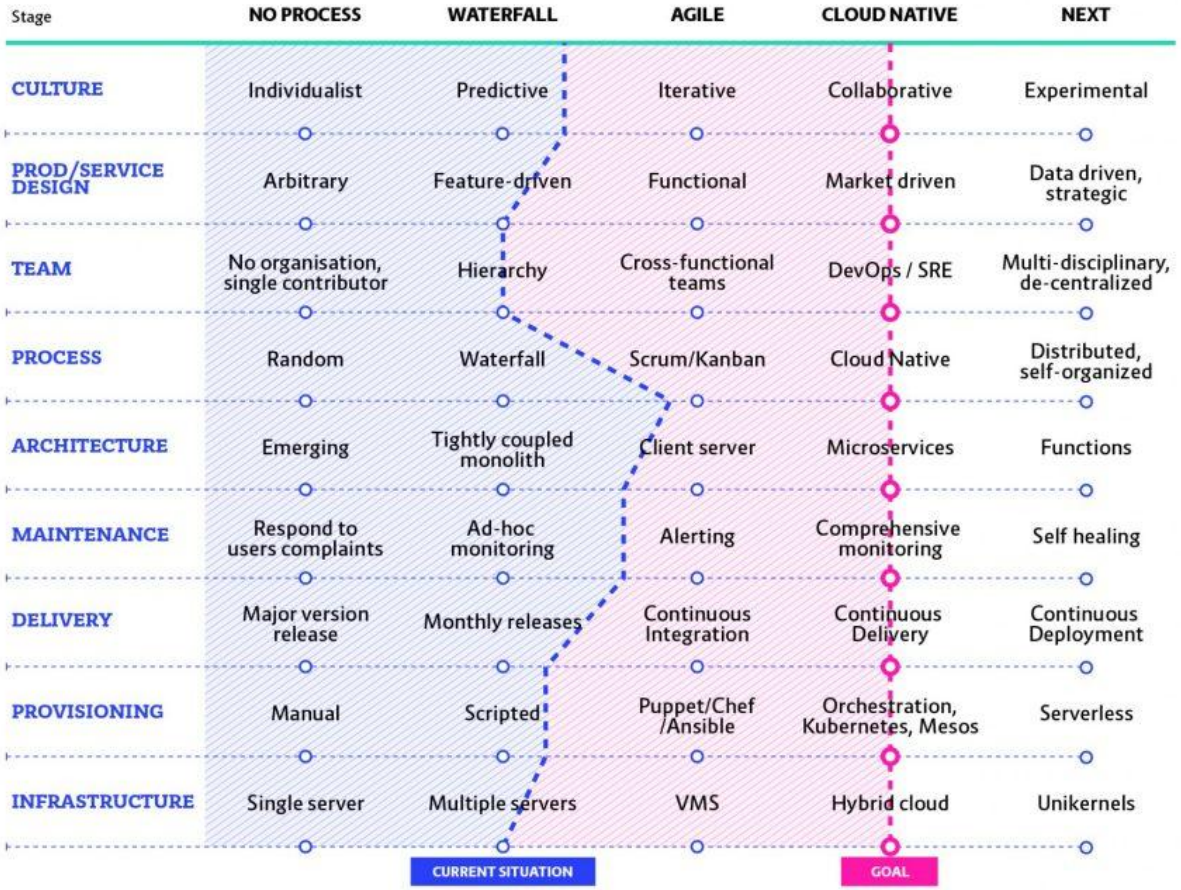
CONTROLLER

```
for {
  getActual()
  getExpected()
  reconcile()
}
```

Operators

- **etcd** operator
- **postgresql** operator
- **mysql** operator
- **prometheus** operator
- and so on...

Cloud Maturity Matrix



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What is the lesson?

CLOUD NATIVE
COMPUTING FOUNDATION

Cloud Native Infrastructure

Key Takeaways

Stop managing Infrastructure the OLD way

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Key Takeaways

Your Infrastructure MUST be:

- Horizontally scalable
- No single point of failure
- Resilient and self-healing
- Minimal operator overhead
- Decoupled from the underlying platform

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Key Takeaways

You are now a SOFTWARE ENGINEER

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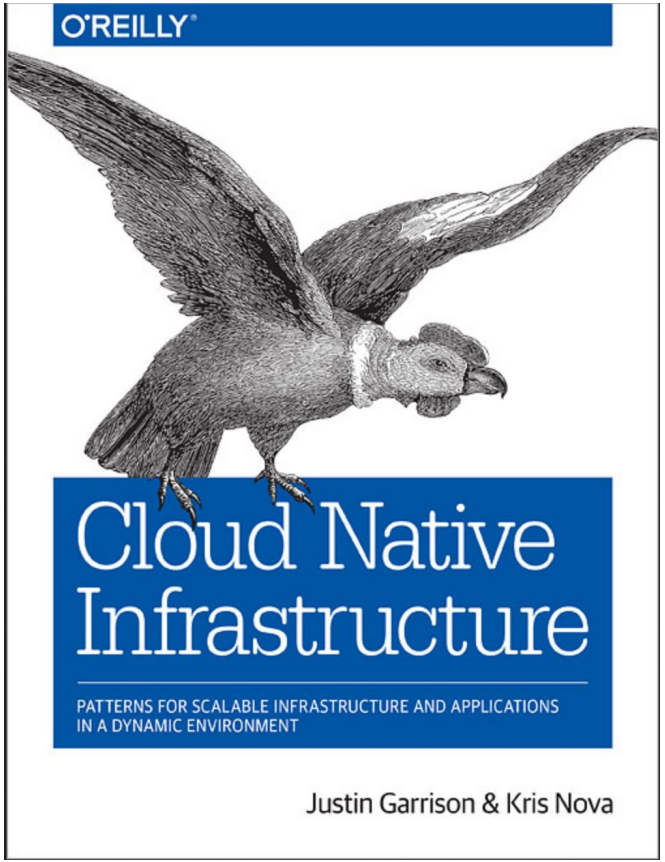
Cloud Native Infrastructure



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Please follow up with Andre Almar

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This presentation is available at:
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