Wrangling Kubernetes
into a developer friendly cloud platform

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Kelsey Hightower ✔ · Feb 24, 2019
@kelseyhightower · **Follow**
Kubernetes is a huge step up from IaaS and provides a ton of value. It's a bottoms up approach to platform building and offers more flexibility than fully opinionated PaaS offerings.

Kelsey Hightower ✔
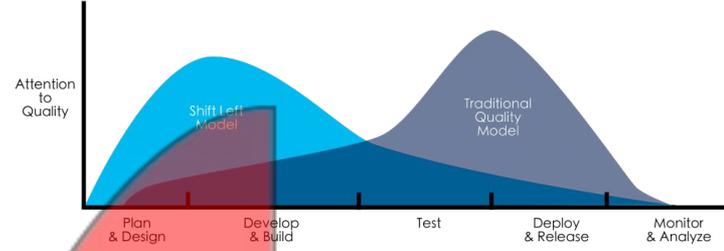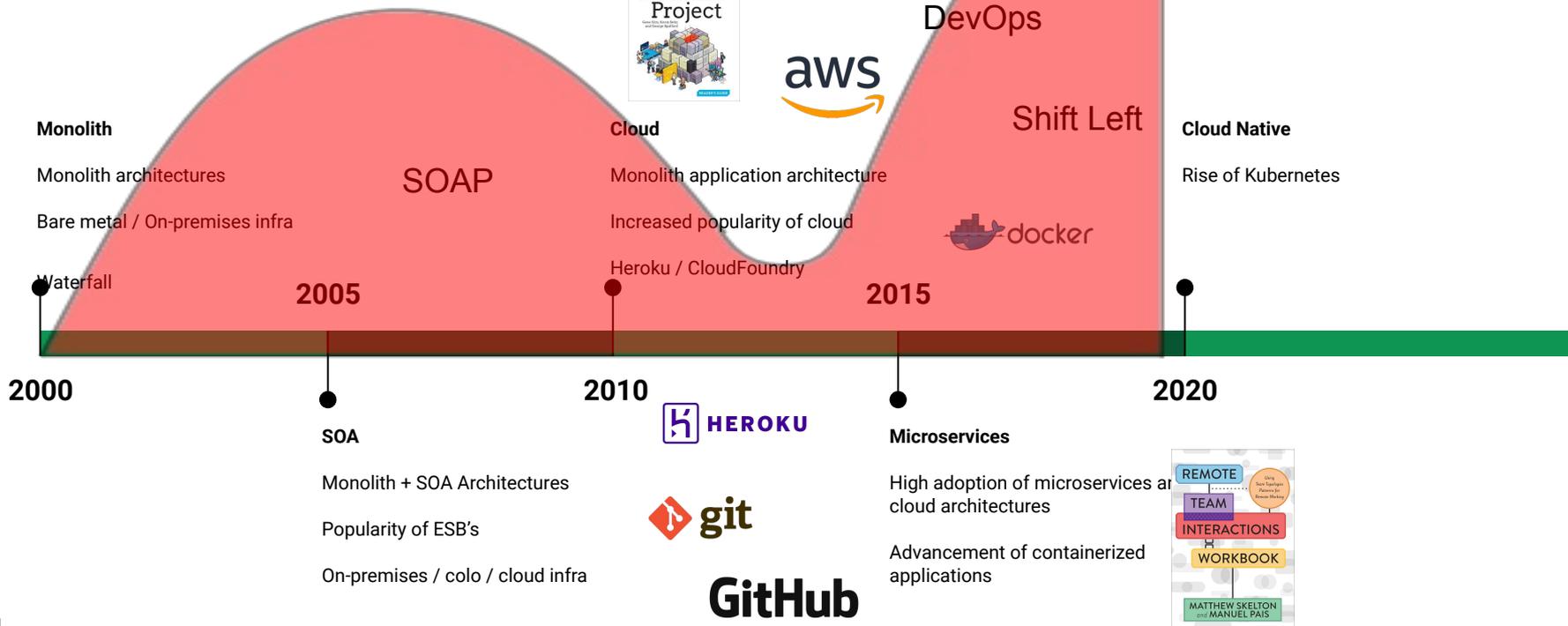@kelseyhightower · **Follow**

The delta between Kubernetes and a developer friendly PaaS is where the next layer of value is and where things tend to get opinionated -- a requirement for reliable end to end workflows.

6:02 PM · Feb 24, 2019

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Why Platforms? Why Now?

COGNITIVE LOAD

SOAP

DevOps

Shift Left

Monolith

Monolith architectures

Bare metal / On-premises infra

Waterfall

Cloud

Monolith application architecture

Increased popularity of cloud

Heroku / CloudFoundry

Cloud Native

Rise of Kubernetes

2000

2005

2010

2015

2020

SOA

Monolith + SOA Architectures

Popularity of ESB's

On-premises / colo / cloud infra

Microservices

High adoption of microservices and cloud architectures

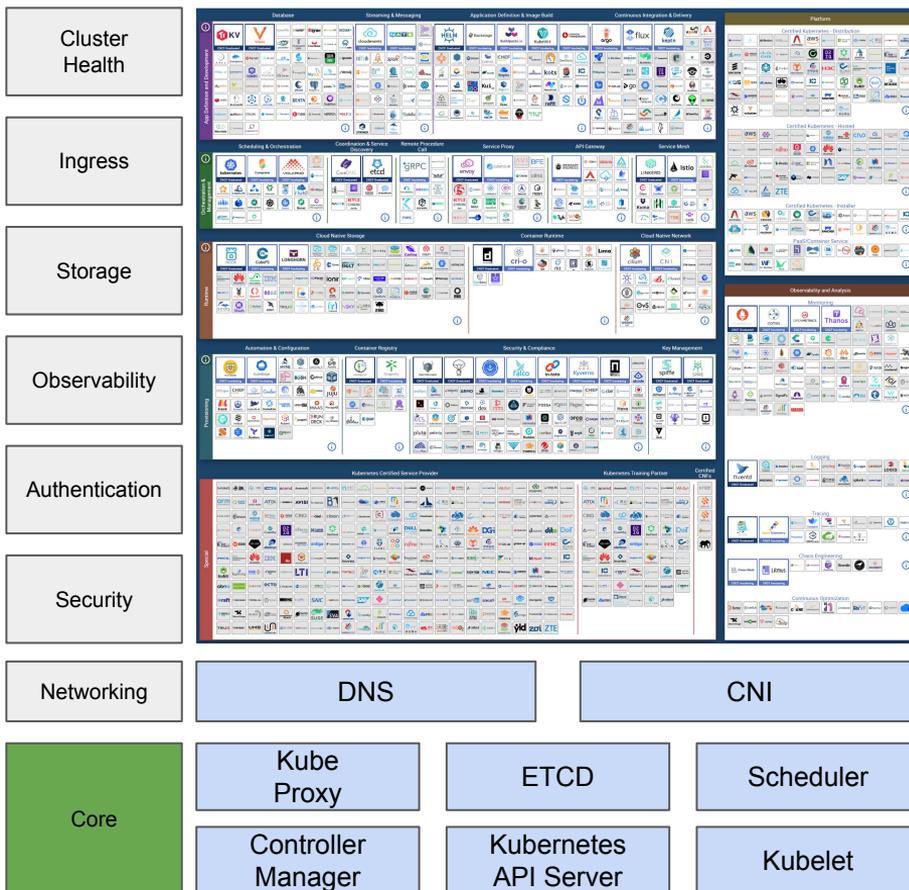Advancement of containerized applications

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Why Platforms? Why Now?

Kubernetes became defacto standard for container orchestration

Kubernetes API → 56 resources (kubeadm install)

Deployment → 1066 fields

CNCF Projects → 139 projects

RUNNING KUBERNETES IN PRODUCTION THEY SAID

EVERGREEN

IT WILL BE EASY THEY SAID

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Wrangling Kubernetes

- Feature Abstractions

- Hide Complexity / Provide Safe Default

- Leverage CNCF Projects

- Extend Kubernetes

Create Feature Abstractions

```
services:
  # A Ruby web service
  - type: web
    name: sinatra
    env: ruby
    repo: https://github.com/renderinc/sinatra-example.git
    scaling:
      minInstances: 1
      maxInstances: 3
      targetMemoryPercent: 60
      targetCPUPercent: 60
    buildCommand: bundle install
    startCommand: bundle exec ruby main.rb
    healthCheckPath: /
    envVars:
      - key: STRIPE_API_KEY
        value: Z2V0IG91dHRhIGhlcmUhCg
      - key: DB_URL
        fromDatabase:
          name: elephant
          property: connectionString
```

Abstract Complexity / Provide Safe Defaults

> "*One of the key principles of any developer platform is that **it should be easy to do the right things, and hard to do the wrong things**.*" - Charity Majors

https://www.honeycomb.io/blog/future-ops-platform-engineering

- Namespaces provide logical segregation
- Network policies provide network isolation
- Set resource requests and limits
- Set security context / Disable privileged containers / Limit Capabilities
- Runtime security
- Provide logging and observability
- Use Horizontal Pod Autoscaler
- Use Cluster Autoscaler
- Manage Volumes and Storage

https://www.toddmclellan.com/thingscomeapart

Extending Kubernetes

Leverage CNCF projects to extend
Kubernetes with additional functionality

Prometheus



Grafana

Cert Manager

Extending Kubernetes

Kubernetes controllers:

- Controller can watch one or more objects

- Controller will constantly compare the desired state with the current state

- Reconciliation loop ensures that the objects get transitioned to the desired state (Implements functions to handle ADD/DELETE/UPDATE)

- Desired state is encapsulated in one or more Kubernetes custom resources

Custom Resource Definitions (CRD):

- Extension of the the default Kubernetes API with your own abstractions (e.g. MyAwesomeApp)

- Defines how such an object looks like (which fields exist and how the CRD is named)

- Stores desired state of the resource (e.g. MyAwesomeApp)

- Used by your controller to retrieve resource configuration and do something
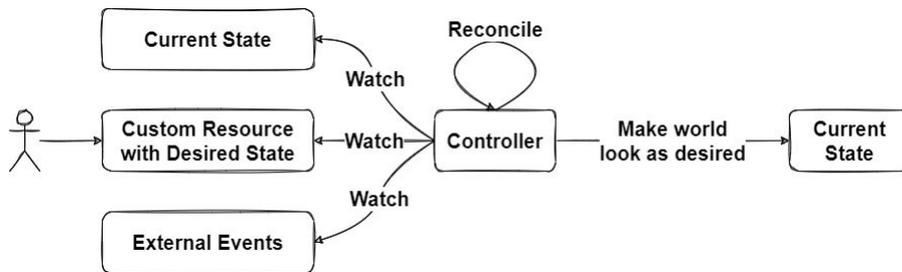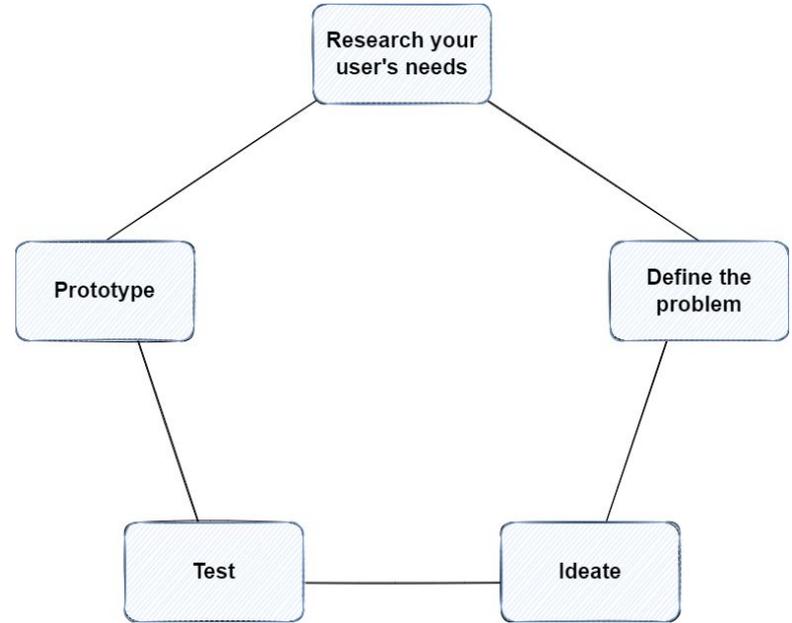
Platforms as a Product

Platform engineering uses product management to build the platform.

Developers are the customer.

Platform engineering focuses on marketing, advocacy, and driving usage for the platform.

"*...your application developers shouldn't be concerned with setting up, running, and maintaining any of that: they'll just use that stuff so they can write their apps, move pixels on the screen, not containers in the cloud.*" - Michael Coté

https://buttondown.email/cote/archive/what-is-platform-engineering-i-think-maybe/

Research your user's needs

Define the problem

Ideate

Test

Prototype

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