



Knative: Building serverless platforms on top of Kubernetes

Ahmet Alp Balkan

@ahmetb

Google Cloud

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Kubernetes



Kubernetes is the de facto
platform for **running containers**.

What can it do?

Kubernetes keeps your applications running while you're asleep.

- Container died?
 - Restart it.
- Container unhealthy?
 - Reschedule to another node.
- Container overloaded?
 - Add more replicas automatically.

What can it do?

Kubernetes API is extensible.

- You can create custom API types.
- You can write custom controllers to actuate the custom objects.

```
apiVersion: my.api/v1
kind: MysqlCluster
metadata:
  name: orders-db
spec:
  masters: 3
  replicas: 12
  storage:
    innodb: {}
```

Developers using Kubernetes

Have to do

Write code

Build docker image

Upload image to registry

Deploy service

Expose to the internet

Set up monitoring

Set up autoscaling

Serverless

Promise of serverless



No servers



Idiomatic



Event-driven



Free of lock-in

Developers then can

... just to run their code.

... use their **favorite languages** and dependencies.

... don't need to manage the infrastructure.

The case for

Serverless on Kubernetes

How to get this on Kubernetes?



No servers



Idiomatic



Event-driven



Free of lock-in

Knative

Hello Knative



Building blocks for creating
serverless experiences
on top of **Kubernetes**.

[**github.com/knative**](https://github.com/knative)

Knative collaborators



Pivotal®



Google Cloud

The Knative Stack

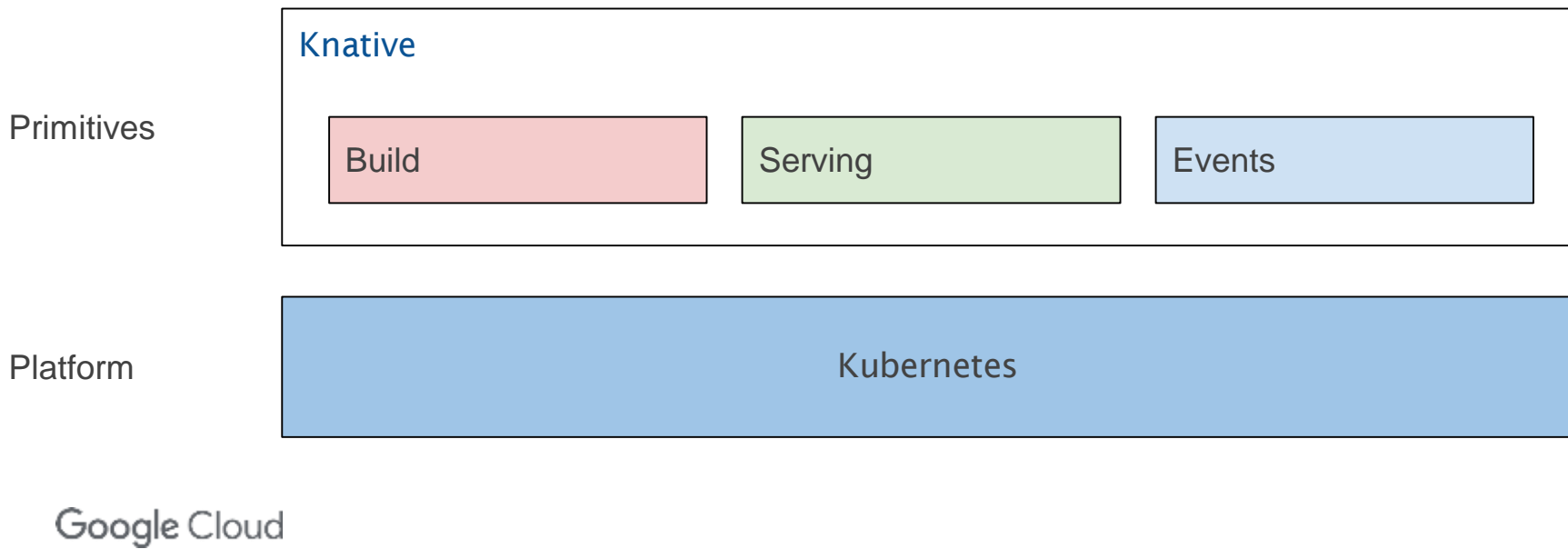
Platform



Kubernetes

Google Cloud

The Knative Stack



Products

Serverless Containers on GCF

GKE Serverless Add-on

SAP Kyma

Pivotal Function Service

IBM CloudFunctions

Red Hat CloudFunctions

riff

OpenFaaS

Jazz

Primitives

Knative

Build

Serving

Events

Platform

Kubernetes

Google Cloud

What Knative is

- An open source project
- Set of building blocks to construct your own FaaS/PaaS
 - abstracts common tasks through custom Kubernetes API objects
- An abstraction on top of Kubernetes.
 - **It's still Kubernetes:** Runs containers at the end of the day.

What **Knative** is **not**

- It's not a Google product.
- It's not a FaaS.

What can you do with Knative?

- [Developers] Use it directly to deploy stuff (not easy, but works fine)
- [Operators] Put a level of abstraction between your devs and Kubernetes.
- [Platform Architects] Use it to build your own serverless platform.
 - e.g. DIY Heroku or GCF/Lambda.

Knative components

- **Serving:** Revisions, Traffic Splitting, Autoscaling
- **Build:** On-cluster builds and transformations
- **Eventing:** Declarative way to bind event sources to services

Knative Serving



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Provides

- Seamlessly scale up and down
- Built-in traffic splitting between revisions
- Integrates networking and service mesh automatically
- Easy to reason about object model
- Connect to your own logging and monitoring platform, or use the built-in system
- Auto-scaler can be tuned or swapped out for custom code

Knative Serving

Primitives with clear separation of concerns:

Configuration

Current/desired state of an application

Code & configuration separated (a la 12-factor)

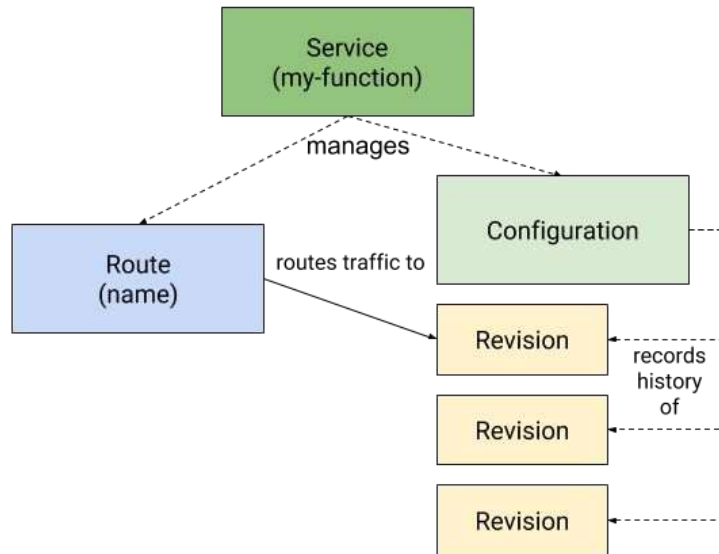
Revision

Point in time snapshots for your code and configuration

Route

Maps traffic to a revisions

Supports fractional, named routing



Google Cloud

Knative Build

Lets you go from source code to container images.

- Build pipelines can consist of **multiple steps**
- Each build step is a **container image**.
- Builds run inside the containers on the cluster.

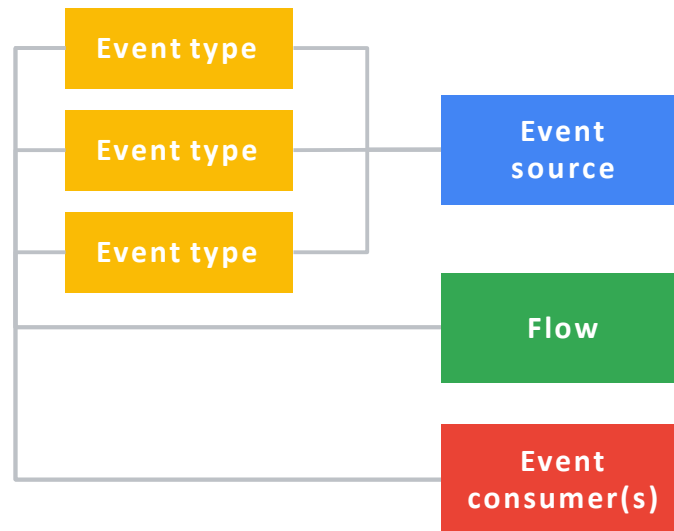
Makes it possible to do **GitOps** and go from "git push" to a running URL.

Knative Eventing

(Work in progress, subject to change.)

Eventing constructs :

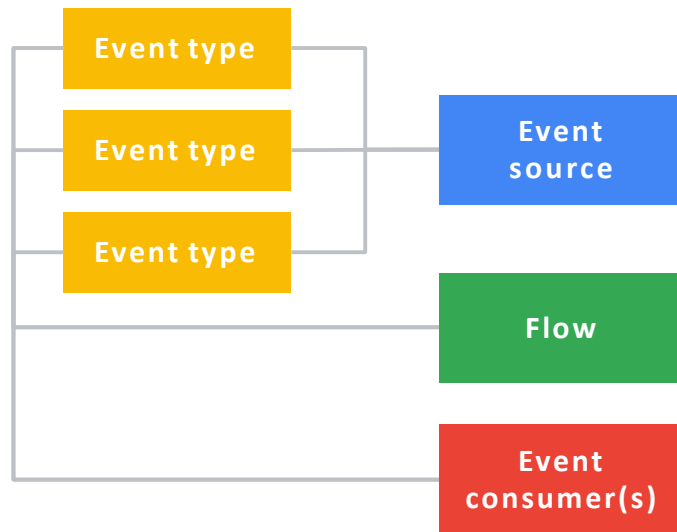
- **Event Sources** (producer)
- **Event Types** (different events)
- **Event Actions** (any route)
- **Event Feeds** (configuration)



Knative Eventing

Benefits

- Declaratively bind between event produces and your services
- Custom event pipelines to connect with your own existing systems



Installation

<https://knative.dev/docs/install/>

Thanks!

github.com/knative

cloud.google.com/knative

g.co/serverlessaddon (alpha sign-up)