

An intro to project riff

a FaaS built on top of Knative

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GOTOCon Berlin

please

Ask questions
through the app



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Thank you!



Things We'll Cover

Kubernetes Basics

Knative - Why and How

riff - A FaaS on top of Knative

Serving - *via* a manual deployment

Build - *via* riff function create

Eventing - *via* riff function chaining

A Kubernetes Primer

A platform for running containerized workloads

Using a declarative approach

Users interact with API server by 'applying' resources

- Typical representation is YAML
- `kubectl apply -f some-file.yaml`

Layered Concepts

A **Pod**: just running container(s). "Lowest level" resource

↑ creates

ReplicaSet: I want N of those!

↑ creates

Deployment: The journey to get there matters!

An example

```
apiVersion: v1
kind: Pod
metadata:
  name: nginx
spec:
  containers:
  - name: nginx
    image: nginx:1.7.9
    ports:
    - containerPort: 80
```


Knative

Started by Google

Knative is a platform for platforms

Fully Open Source, ASL v2

Unveiled at Google Next'18

Major contributions from Pivotal, Red Hat, IBM and others

Knative

“ **Knative** (pronounced kay·nay·tiv) **extends** Kubernetes to [...] codify the best practices [...] focus on solving many mundane but difficult tasks such as:

- Orchestrating **source-to-URL** workflows on Kubernetes
- **Routing** and managing traffic with blue/green deployment
- Automatic **scaling** and sizing workloads based on demand
- Binding running services to **eventing** ecosystems ”

<https://github.com/knative/docs>

Knative is ...

native

K8s Custom Resource Definitions

```
apiVersion:
apiextensions.k8s.io/v1beta1
kind: CustomResourceDefinition
metadata:
  name:
crontabs.stable.example.com
spec:
  group: stable.example.com
  versions:
    - name: v1
  scope: Namespaced
  names:
    kind: CronTab
    singular: crontab
    plural: crontabs
```

```
apiVersion:
stable.example.com/v1
kind: CronTab
metadata:
  name: my-new-cron-object
spec:
  cronSpec: "* * * * */5"
  image:
my-awesome-cron-image
```

Knative Components

- **Serving** - request-driven compute that can scale to zero
- **Build** - source-to-container build orchestration
- **Eventing** - management and delivery of events

Target Audience(s)

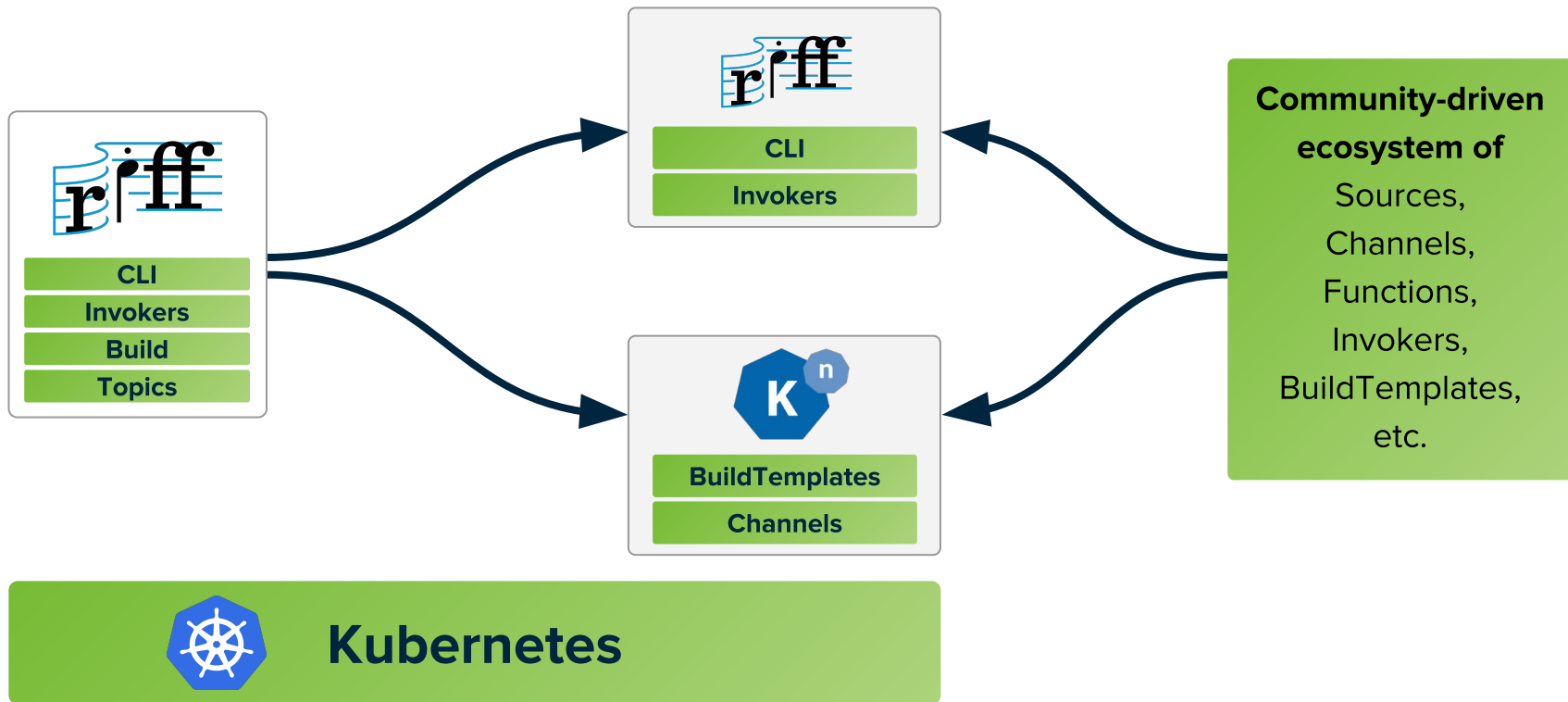


Introducing riff

riff is for functions

- event driven Function as a Service
 - opinionated experience built atop Knative, Kubernetes and Istio
- functions practice Inversion of Control
 - no servers, ports or HTTP, just your logic
- pick your language runtime:
 - Java/Spring
 - JavaScript/Node
 - executable commands
 - more from the community

riff on Knative



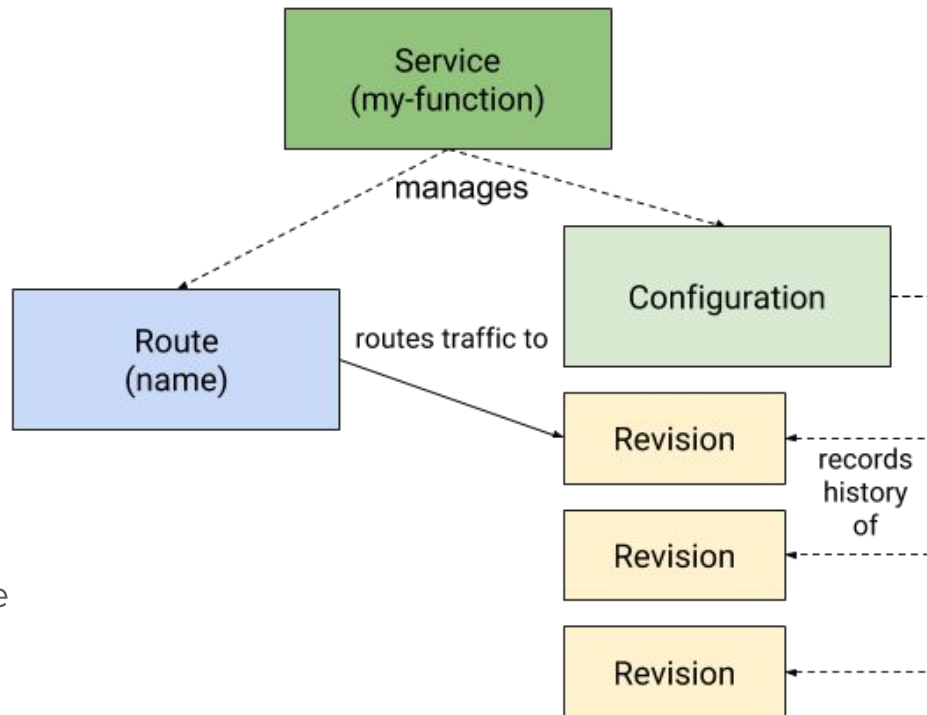
Knative Serving

The Knative Serving project provides middleware primitives that enable:

- Automatic **scaling** up and down to zero
- **Routing** and network programming for Istio components
- Point-in-time **snapshots** of deployed code and configurations

Knative Serving CRDs

- **Service**^{CRD} - creates route and configuration, for either latest or pinned revision
- **Route**^{CRD} - maps a network endpoint to one or more revisions, enabling traffic policy management across revisions
- **Configuration**^{CRD} - mutable desired state for your deployment, with each modification creating a new revision
- **Revision**^{CRD} - immutable point-in-time snapshot for each modification made to the workload code/config



DEMO

Knative Build

A Build is a custom resource in Knative that allows you to define a process that runs to completion and can provide status. For example, fetch, build, and package your code by using a Knative Build that communicates whether the process succeeds.

A Knative Build runs on-cluster [...] to build the source code of your apps into container images, which you can then run on Knative serving.

<https://github.com/knative/docs/tree/master/build>

Key Concepts of Knative Build


- a **Build**^{CRD} = specific instance of a process
 - made of steps
 - runs a sequence of images, *aka* Builders
- a **BuildTemplate**^{CRD} = a recipe for instantiating Builds^{CRD}.
 - accepts parameters
- runs under a given **ServiceAccount**
 - can hold credentials




Square.js






```
module.exports = x => x ** 2;
```


DEMO

Knative Build - Plenty to Choose From

 knative / build-templates

 Watch ▾ 20  Star 81  Fork 28


 Code  Issues 13  Pull requests 4  Projects 0  Insights












A library of build templates.

kubernetes build template containers

45 commits 8 branches 0 releases 13 contributors Apache-2.0

Branch: master ▾ New pull request Create new file Upload files Find file Clone or download ▾

 AkihiroSuda and knative-prow-robot add BuildKit build template (#70) ... Latest commit 32de6ab 5 days ago

 bazel	Use revision instead of branch (#31)	3 months ago
 buildah	Fix buildah build-template (#73)	13 days ago
 buildkit	add BuildKit build template (#70)	5 days ago
 buildpack	Update buildpack.yaml (#53)	2 months ago
 gcr_helper	Use openssl base64 for gcr_helper (#40)	3 months ago
 hack	Fail fast in update-deps.sh when sourcing library.sh (#56)	2 months ago
 jib	Adds CACHE to Jib templates to make builds run faster. (#64)	a month ago
 kaniko	Use revision instead of branch (#31)	3 months ago
 test	Vendor the test-infra scripts (#52)	2 months ago
 vendor/github.com/knative/test-infra...	Update knative/test-infra (#69)	21 days ago
 CONTRIBUTING.md	readme cleanuo before openina repo (#35)	3 months ago

W A I T



Knative Eventing

Knative Events is a system which is designed to address a common need for cloud native development:

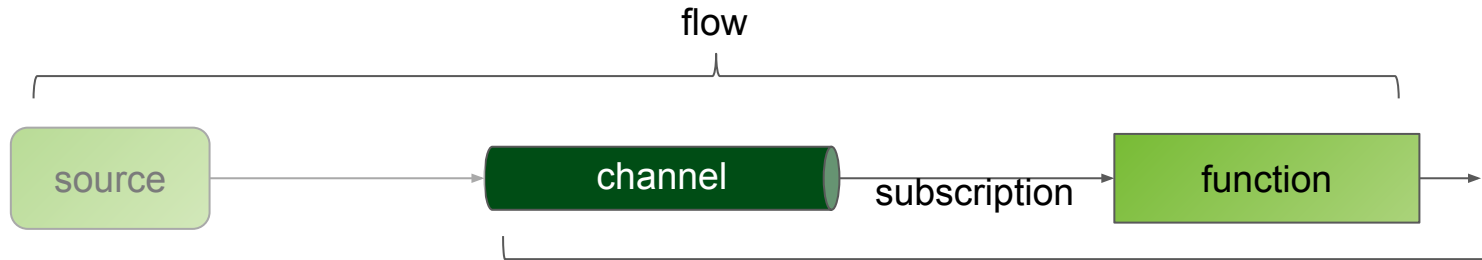
1. Services are **loosely coupled** during development and deployed independently on a variety of platforms (Kubernetes, VMs, SaaS or FaaS).
2. A **producer** can generate events **before** a consumer is listening, and a **consumer** can express an interest in an event or class of events that is **not yet** being produced.
3. Services can be connected to create new applications
 - **without** modifying producer or consumer.
 - with the ability to select a specific **subset** of events from a particular producer

<https://github.com/knative/docs/tree/master/eventing>

Knative Eventing

- **Channel**^{CRD} is a network endpoint which receives (and optionally persists) events using a Bus-specific implementation.
- **Subscription**^{CRD} connects events received on a Channel to an interested target, represented as a DNS name. There may be multiple Subscriptions on a single channel.
- **Bus**^{*} defines the adaptation layers needed to implement channels and subscriptions using a specific persistence strategy (such as delivery of events to a Kafka topic).

Also: Sources, Flows



A Loosely Coupled Example



square

A Loosely Coupled Example

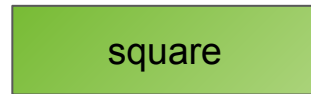
```
riff service create correlator --image projectriff/correlator:fats
```

correlator

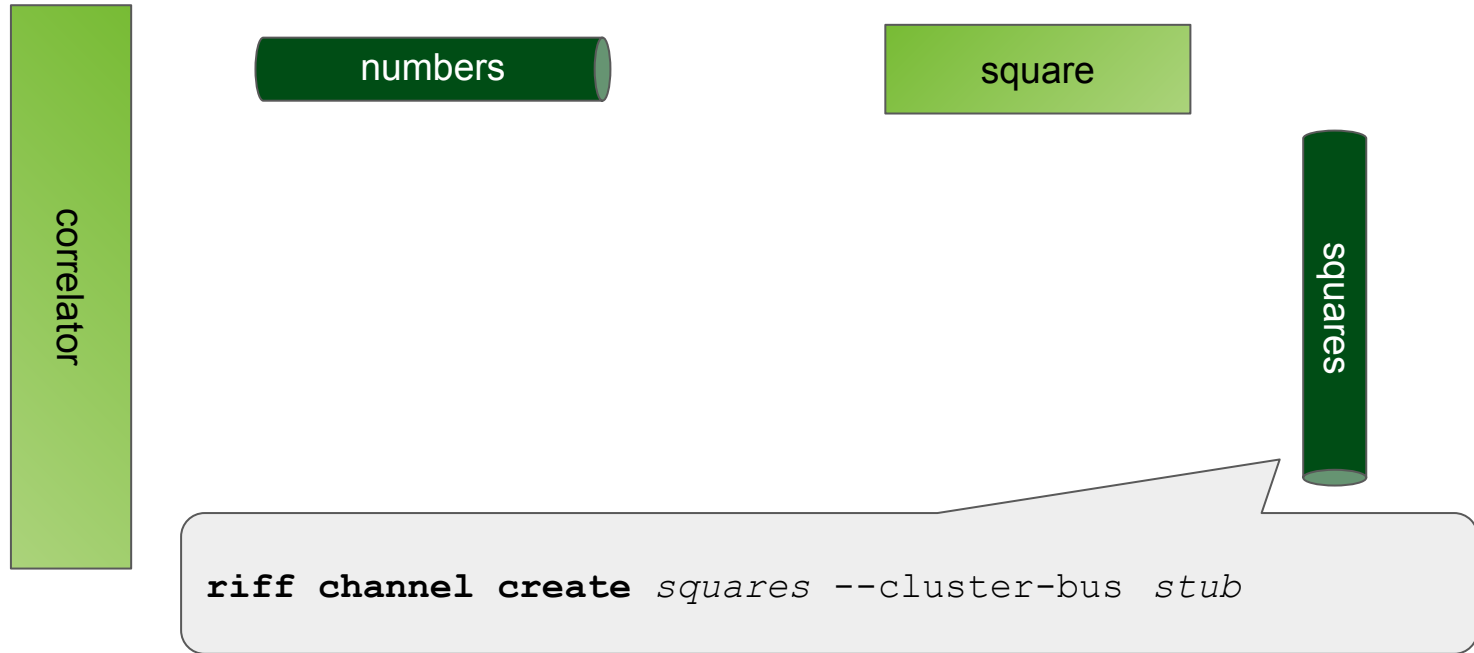
square

A Loosely Coupled Example

```
riff channel create numbers --cluster-bus stub
```

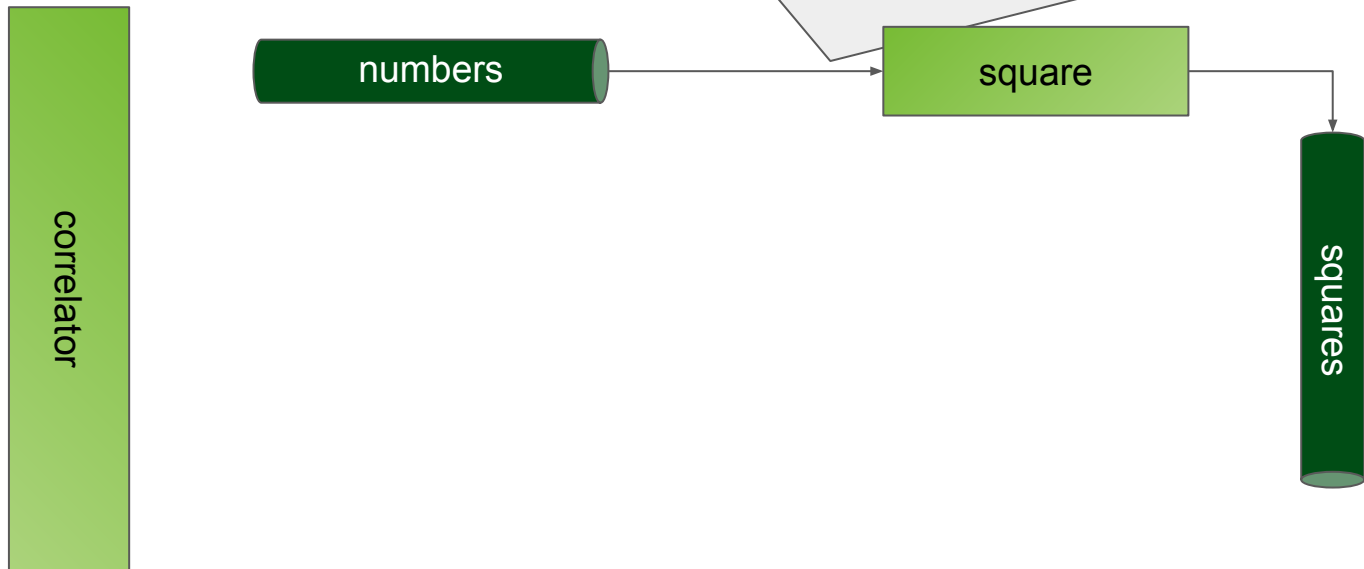


A Loosely Coupled Example

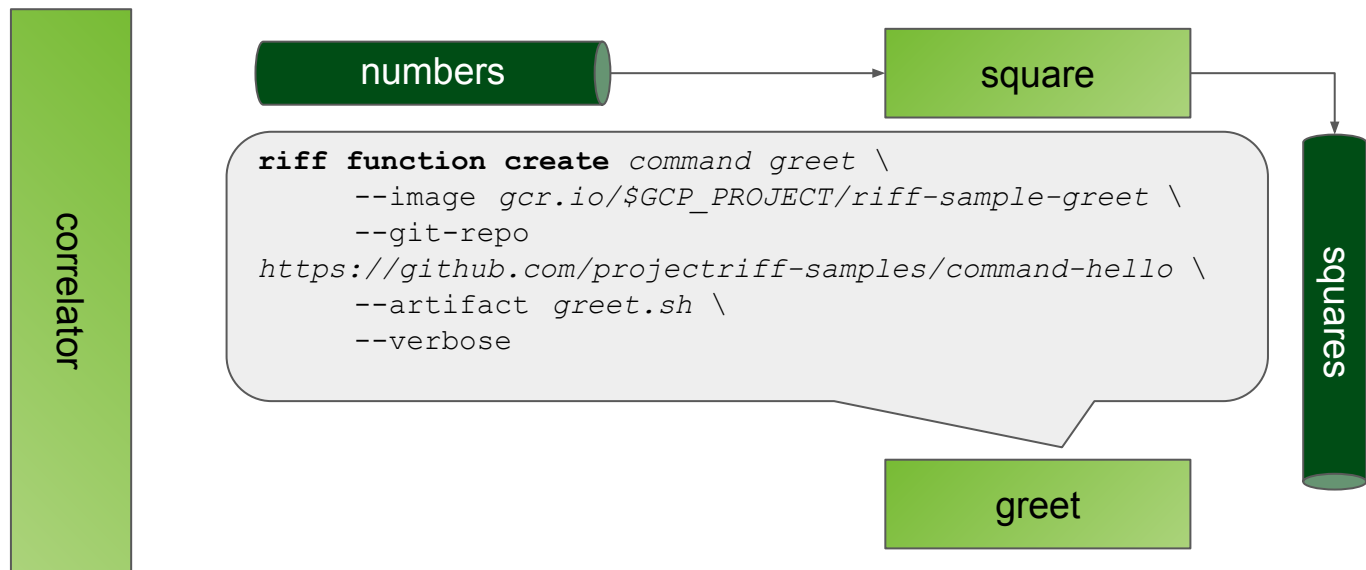


A Loosely Coupled Example

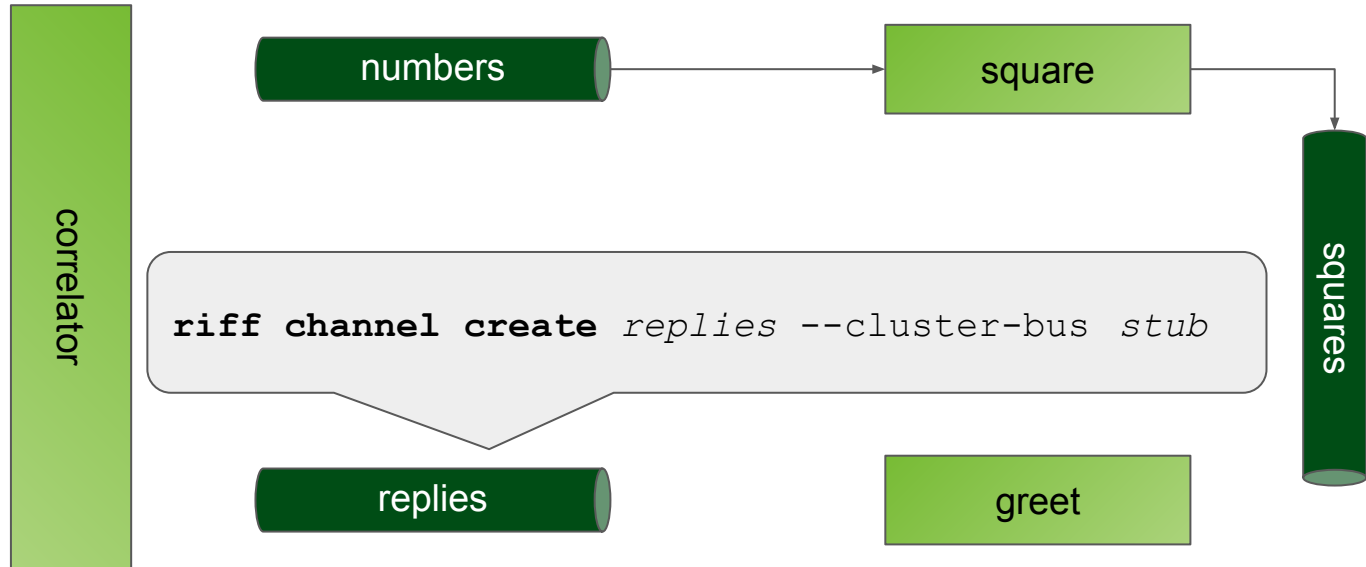
```
riff subscription create --channel numbers --subscriber square  
--reply-to squares
```



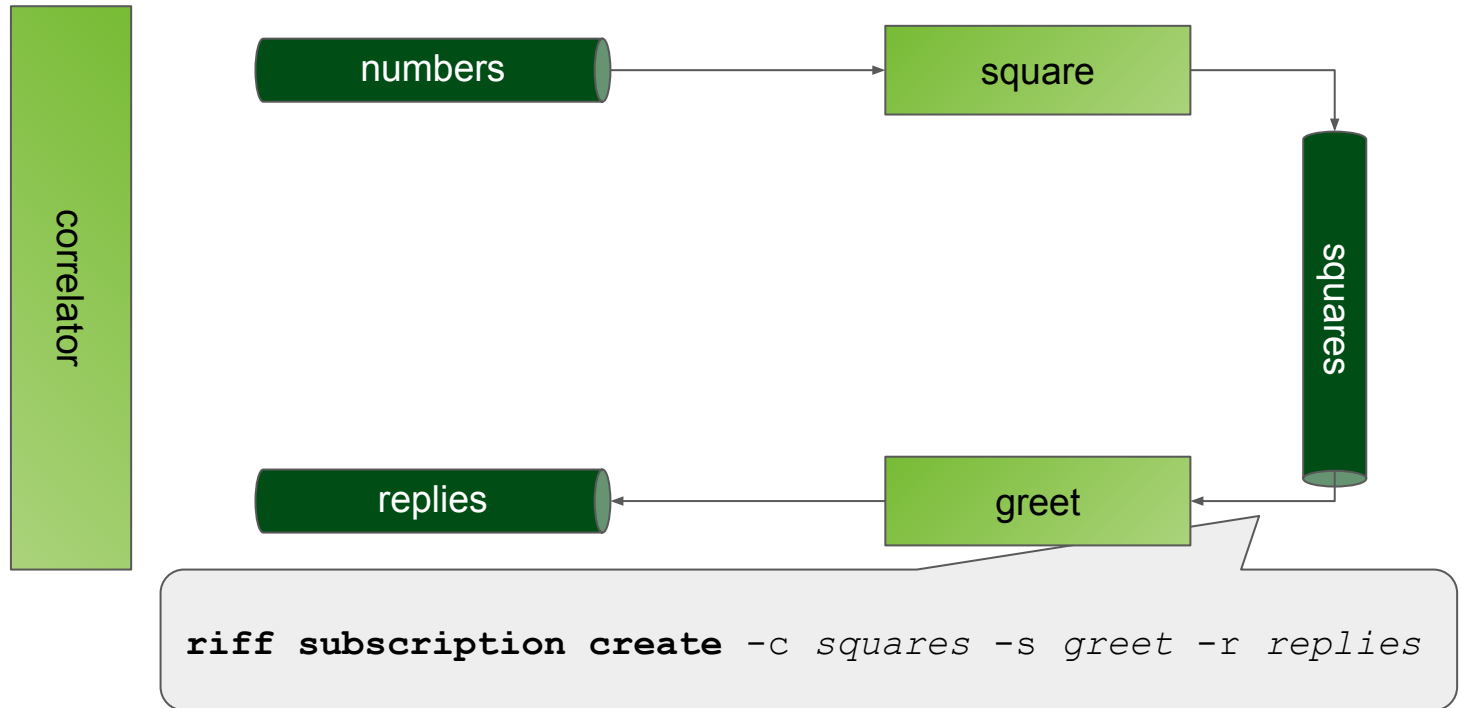
A Loosely Coupled Example



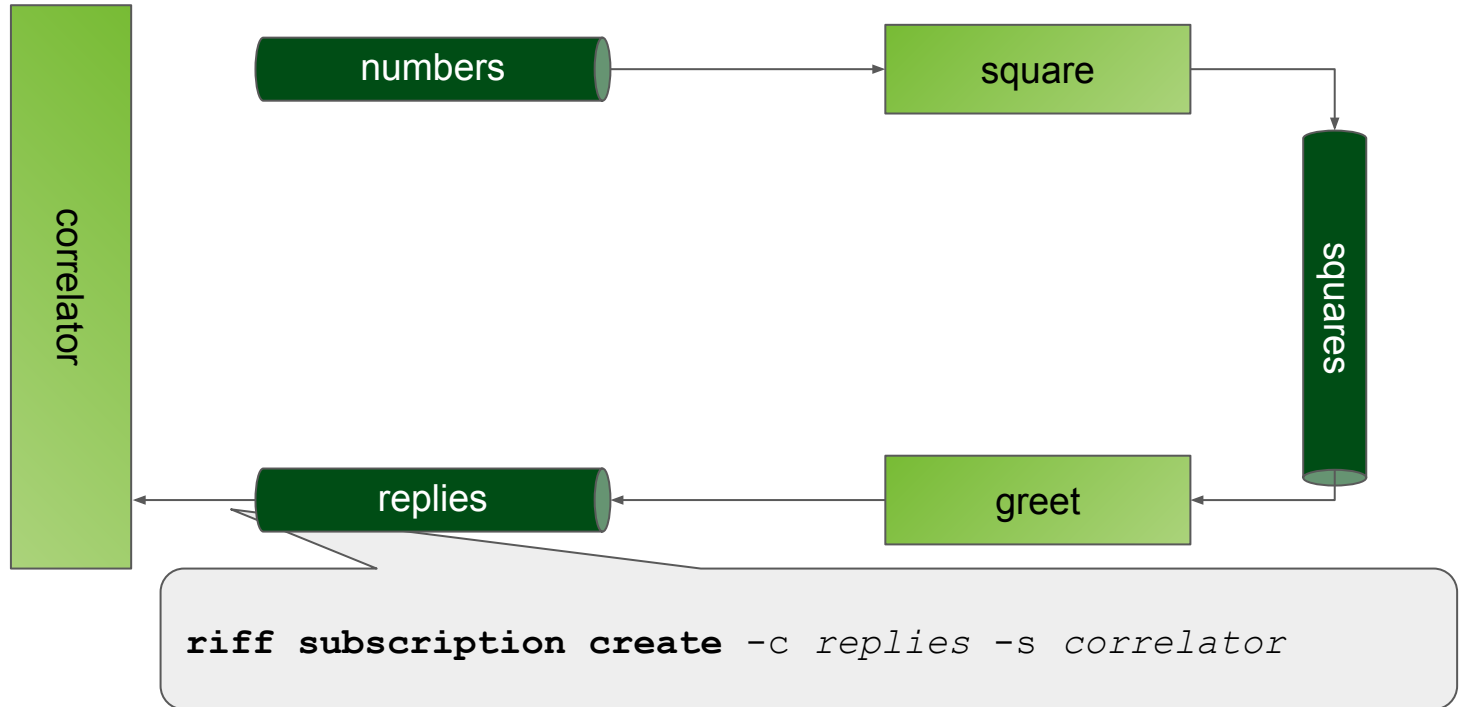
A Loosely Coupled Example



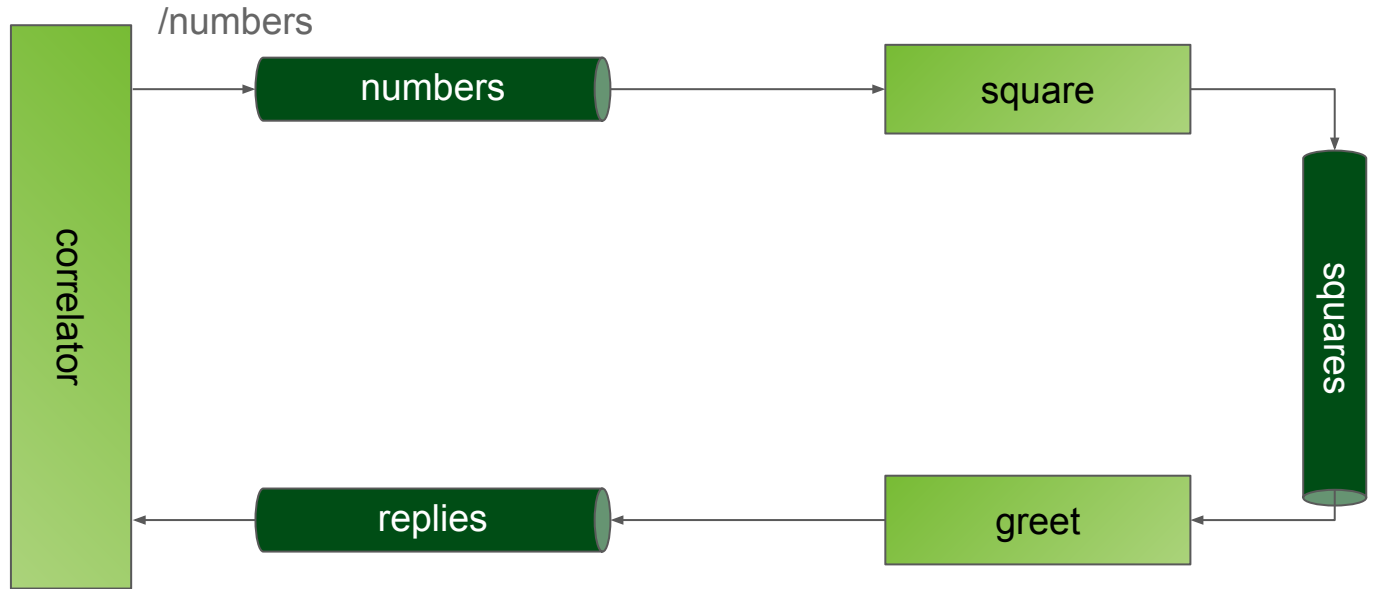
A Loosely Coupled Example



A Loosely Coupled Example



A Loosely Coupled Example



DEMO

Let's Recap

Kubernetes is extensible

Knative is a platform for platforms

Serving scale to/from zero. Route traffic

Build optionally build from source

Eventing decouple workloads in space / time

riff is a FaaS on top of Knative

Please

**Remember to
rate this session**

Thank you!

