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Knative:

Kubernetes Framework to manage Serverless Workloads

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Velocity Conference

Introduction to Knative

01

[kay-native]

Knative

Kubernetes based open source
building blocks for serverless

Serverless model

Operational Model

No Infra Management

Managed Security

Pay only for usage

Programming Model

Service-based

Event-driven

Portable

Kubernetes: The defacto platform

Scheduling
Decide where my containers should run

Lifecycle and health
Keep my containers running despite failures

Scaling
Make sets of containers bigger or smaller

Naming and discovery
Find where my containers are now

Load balancing
Distribute traffic across a set of containers

Storage volumes
Provide data to containers

Logging and monitoring
Track what's happening with my containers

Debugging and introspection
Enter or attach to containers

Identity and authorization
Control who can do things to my containers

Kubernetes ecosystem

5,000+ Contributors

47k+ GitHub stars

*Sources: COCOMO Model, CNCF.io Certified Providers

Developers want serverless

... just want to run their code.

... want to use their favorite languages and dependencies.

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

Operators want Kubernetes

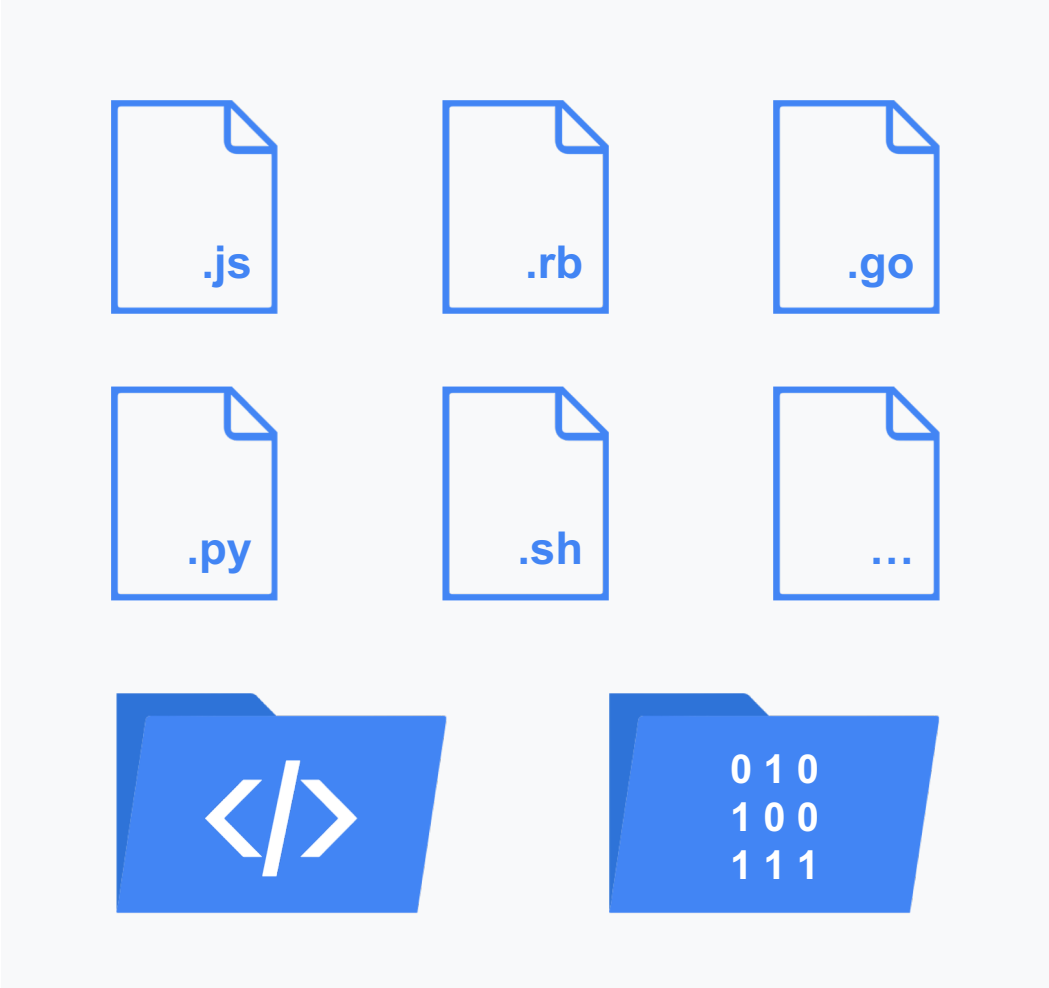
Kubernetes is great orchestrating microservices

They love using GKE and not having to do operations for Kubernetes.

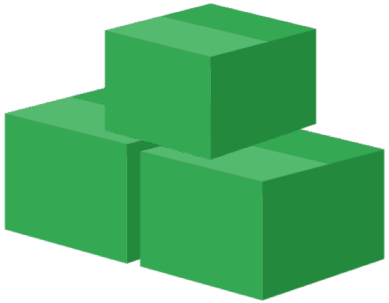
Kubernetes is not the right abstraction for their developers.

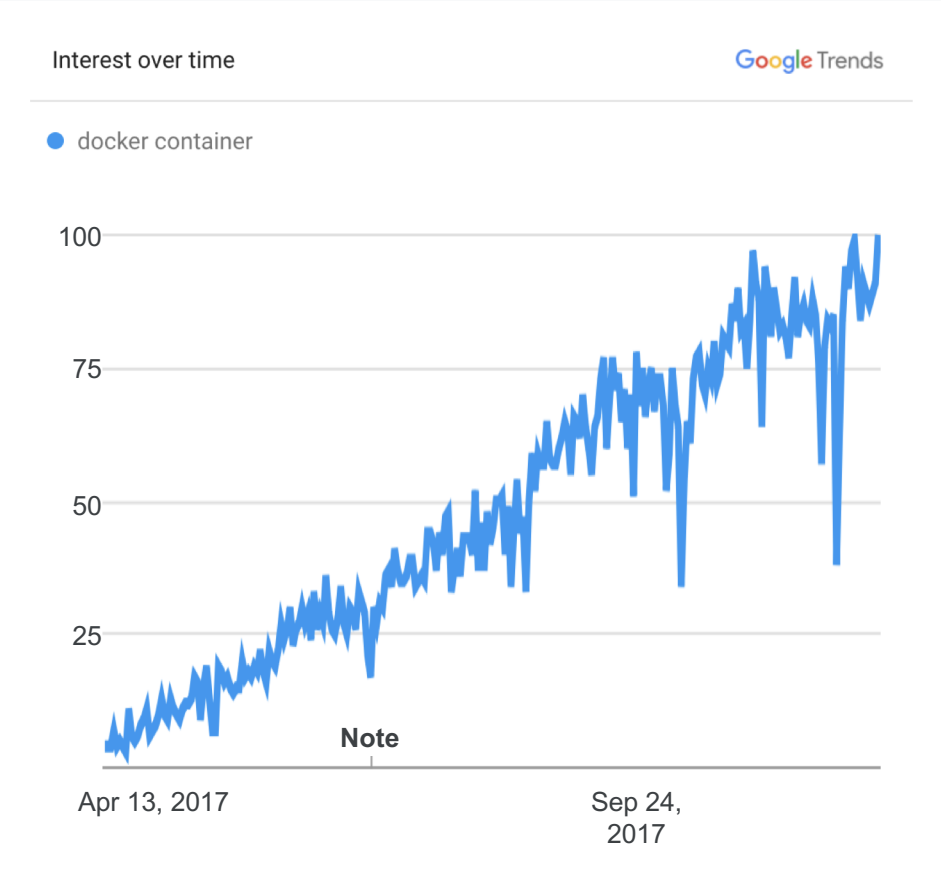
Containers

- Any Language
- Any Library
- Any Binary
- Ecosystem of base images



Containers:
An industry standard

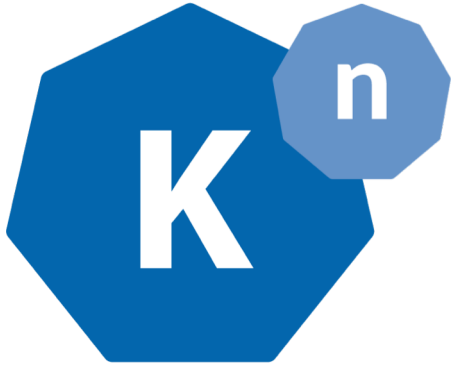




Portability

Kubernetes

Offered by virtually **all** Cloud Service Providers



Knative

Codifies serverless, **broad** contributor/user community

Knative Community

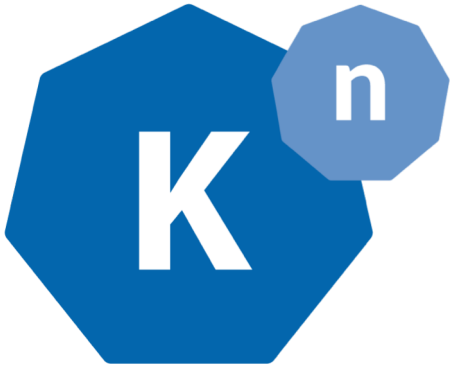
v0.8
Predictable Releases

55+
Contributing Companies

>6K
Pull Requests

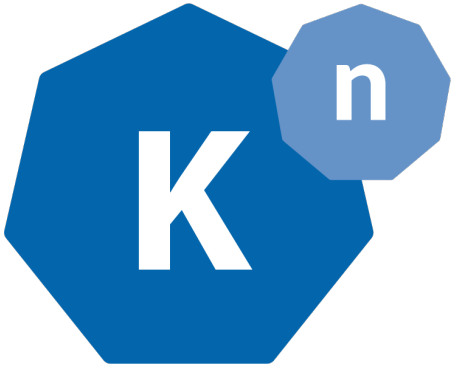
~450
Individual Contributors

9
Working Groups



knative.teststats.cncf.io/d/8/dashboards

Knative project



- Set of components (serving, eventing, ~~build~~)
- Ingredients for Serverless
- Solves for modern development patterns
- Implements learnings from Google, partners

knative.dev

Pivotal

redhat

Knative stack

Products

- Google Cloud Run
- Red Hat OpenShift
- SAP Kyma
- Google Cloud Run on GKE
- IBM Cloud Kubernetes Service
- TriggerMesh

Primitives

- Serving
- Events
- ~~Build~~ Tekton
- ...

Service Mesh

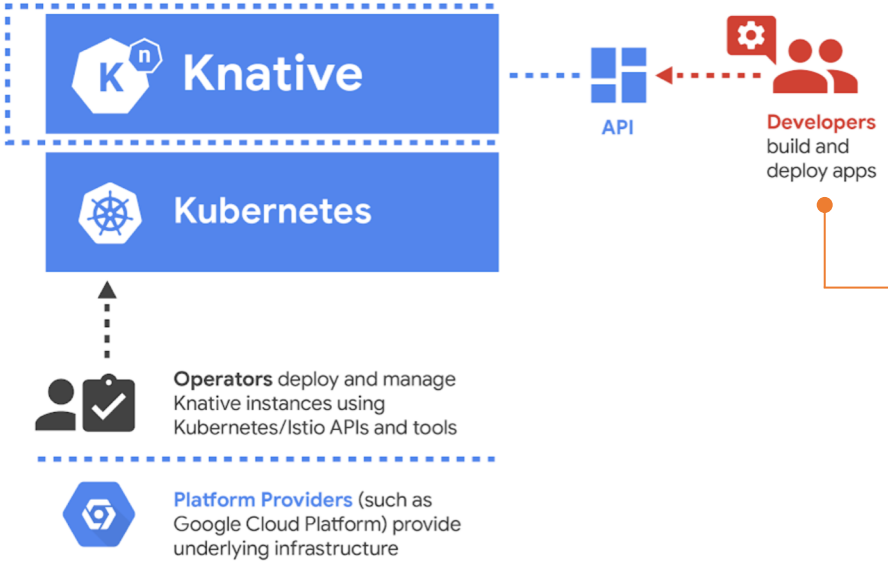
- Istio
- Gloo
- AMBASSADOR*

*No eventing

Platform

- Kubernetes

Knative for developer



Want to: Write code

Don't have to

- Build docker image
- Upload image to registry
- Deploy service
- Expose to the internet
- Setup logging & monitoring
- Scale workload...

Knative for operator

Abstracts operational complexity, smooth infrastructure surface

Universal supported by all major Cloud providers, enables portability

Extendable platform with clear separation of concerns between operator and developer

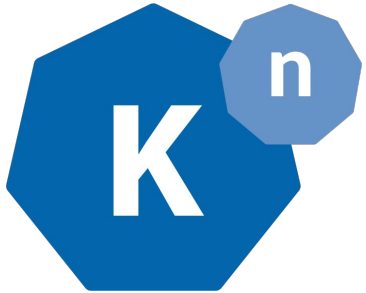
Serverless on Google Cloud

Cloud Run

Fully managed, deploy your workloads and don't see the cluster.

Cloud Run on GKE

Deploy into your GKE cluster, run serverless side-by-side with your existing workloads.



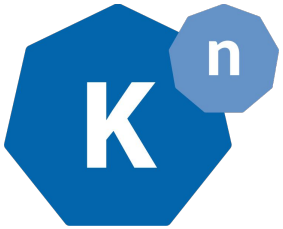
Knative Everywhere

Use the same APIs and tooling anywhere you run Kubernetes with Knative.

Knative Serving

02

Knative Serving



What is it?

- Rapid deployment of serverless containers
- Automatic (0-n) scaling
- Configuration and revision management
- Traffic splitting between revisions

Pluggable

- Connect to your own logging & monitoring platform, or use the built-in system
- Auto-scaler can be tuned or swapped out for custom code

Knative Serving Primitives

Knative Service

High level abstraction for the application

Configuration

Current/desired state of an application

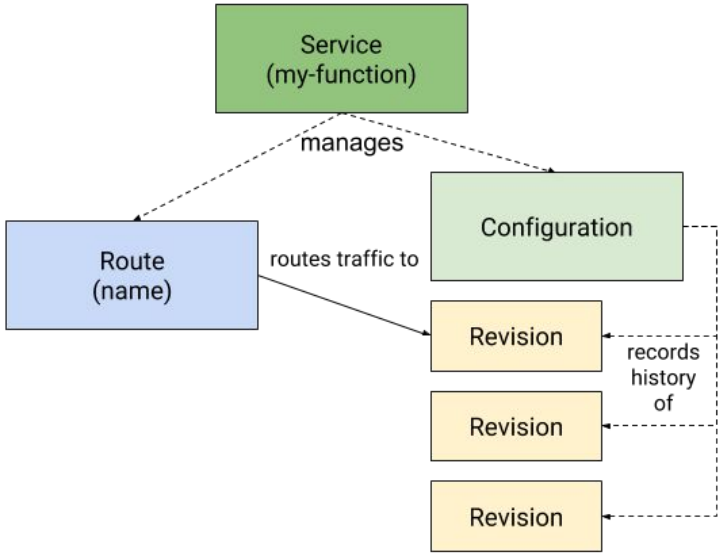
Code & configuration separated (a la 12-factor)

Revision

Point in time snapshots for your code and configuration

Route

Maps traffic to revisions



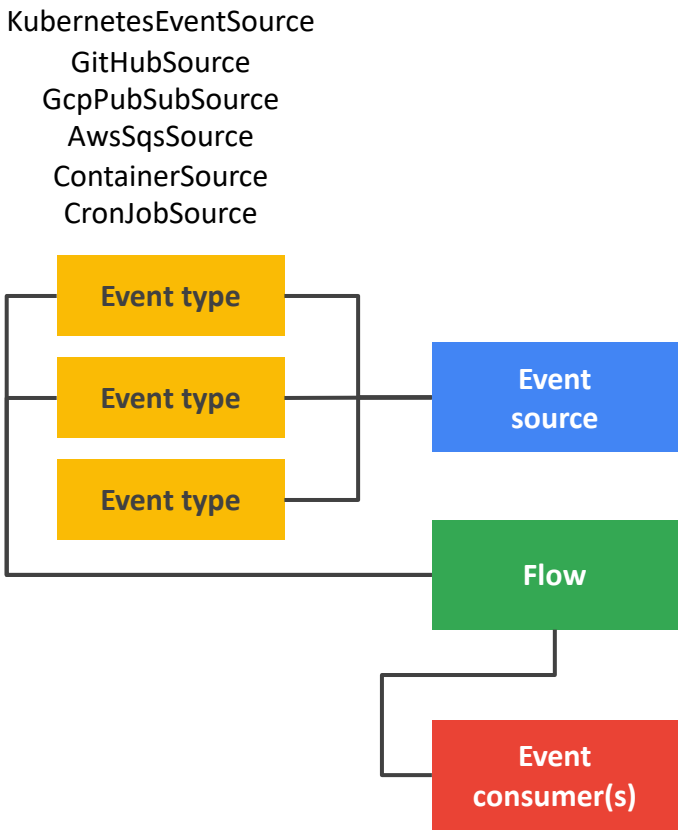
Knative Eventing

03

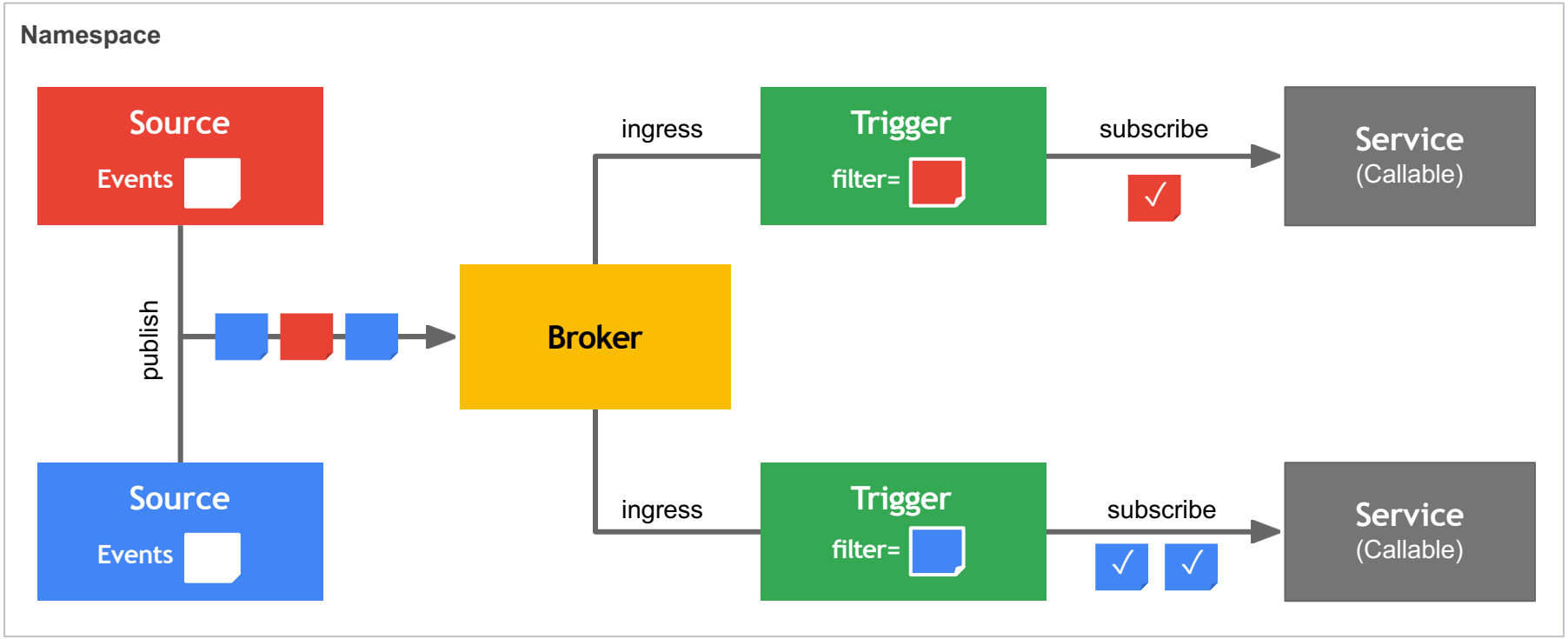
Knative Eventing

What is it?

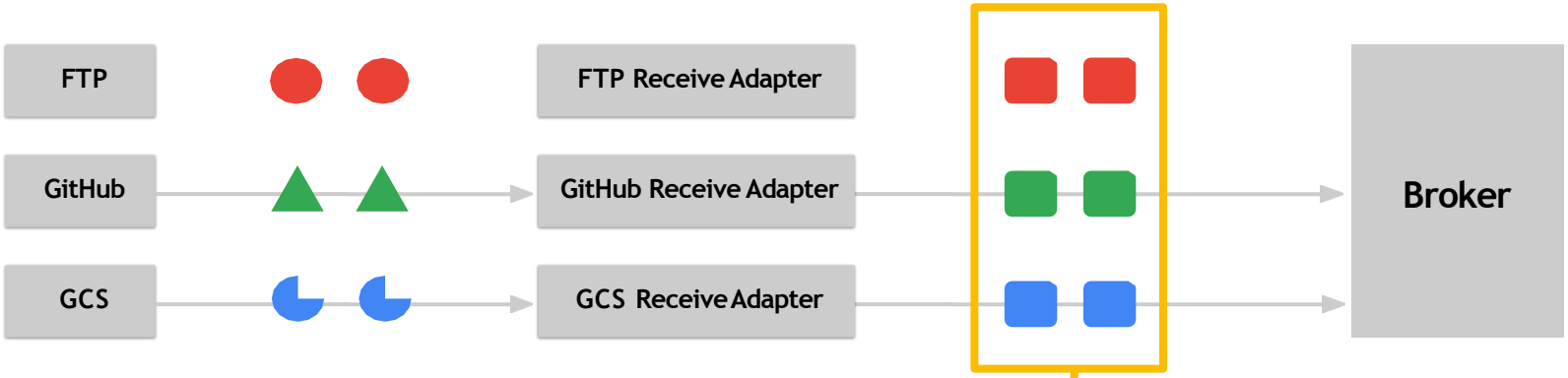
- For loosely coupled, event-driven services
- Declaratively bind between event producers and Knative services
- Scales from just few events to live streams
- Custom event pipelines to connect with your own existing systems



Knative Eventing



Knative Events



https://cloudevents.io

CloudEvent

```
{
    "specversion": "0.2",
    "type": "com.github.pull.create",
    "source": "https://github.com/cloudevents/spec/pull/123",
    "id": "A234-1234-1234",
    "time": "2019-04-08T17:31:00Z",
    "datacontenttype": "application/json",
    "data": "{ GitHub Payload... }"
}
```

Knative Eventing: Benefits

- Declaratively bind between event producers and deployed services
- Scales from just few events to live streams
- Custom event pipelines to connect with your own existing systems

Knative Event Sources

Name	Description
Apache Camel	Allows to use Apache Camel components for pushing events into Knative
Apache Kafka	Brings Apache Kafka messages into Knative
AWS SQS	Brings AWS Simple Queue Service messages into Knative
Cron Job	Uses an in-memory timer to produce events on the specified Cron schedule.
GCP PubSub	Brings GCP PubSub messages into Knative
GitHub	Brings GitHub organization/repository events into Knative
GitLab	Brings GitLab repository events into Knative.
Google Cloud Scheduler	Google Cloud Scheduler events in Knative when jobs are triggered
Google Cloud Storage	Brings Google Cloud Storage bucket/object events into Knative
Kubernetes	Brings Kubernetes cluster/infrastructure events into Knative

https://github.com/knative/docs/tree/master/docs/eventing/sources

Building

04

Knative Build (Pre 0.8)

Tekton Pipelines (Post 0.8)

Knative build (Deprecated)

What is it?

- Go from source code to container images on repositories
- Build pipelines can have multiple steps and can push to different registries
- Builds run in containers in the cluster. No need for Docker locally

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Primitives

- **Build:** Represents a single build job with 1 or more steps.
- **BuildTemplate:** A set of ordered and parameterized build steps.
- **ServiceAccount:** For auth with DockerHub etc

Tekton Pipelines

Primitives

- Task: Represents the work to be executed with 1 or more steps
- TaskRun: Runs the Task with supplied parameters
- Pipeline: A list of Tasks to execute in order
- ServiceAccount: For authentication with DockerHub etc.

What is it?

Kubernetes style resources for declaring CI/CD-style pipelines

Go from source code to container images on repositories

Build pipelines can have multiple steps and can push to different registries

Builds run in containers in the cluster. No need for Docker locally

github.com/tektoncd/pipeline


DEMO

Knative: Ready for you!

Install, Samples, Docs

github.com/knative/docs

Have questions?

knative.slack.com

Want to contribute?

knative/docs/community

Anything else?

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Questions?

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Cyberconflict: A new era of war, sabotage, and fear

See passes & pricing

David Sanger (The New York Times)
9:55am-10:10am Wednesday, March 27, 2019
Location: Ballroom
Secondary topics: Security and Privacy

Add to Your Schedule
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We're living in a new era of constant sabotage, misinformation, and fear, in which everyone is a target, and you're often the collateral damage in a growing conflict among states. From crippling infrastructure to sowing discord and doubt, cyber is now the weapon of choice for democracies, dictators, and terrorists.

David Sanger explains how the rise of cyberweapons has transformed geopolitics like nothing since the invention of the atomic bomb. Moving from the White House Situation Room to the dens of Chinese, Russian, North Korean, and Iranian hackers to the boardrooms of Silicon Valley, David reveals a world coming face-to-face with the perils of technological revolution—a conflict that the United States helped start when it began using cyberweapons against Iranian nuclear plants and North Korean missile launches. But now we find ourselves in a conflict we're uncertain how to control, as our adversaries exploit vulnerabilities in our hyperconnected nation and we struggle to figure out how to deter these complex, short-of-war attacks.

David Sanger

The New York Times

David E. Sanger is the national security correspondent for the *New York Times* as well as a national security and political contributor for CNN and a frequent guest on *CBS This Morning*, *Face the Nation*, and many PBS shows.

Session page on conference website

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Cyberconflict: A new era of war, sabotage, and fear

9:55 AM - 10:10 AM, Wed, Mar 27, 2019

Speakers

David Sanger
National Security Correspondent
The New York Times

Ballroom

Keynotes

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SESSION EVALUATION

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