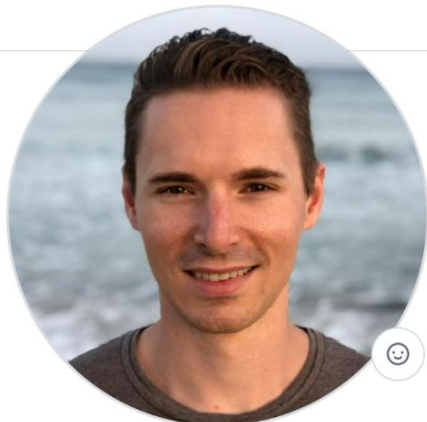




Knative - A story about Serverless Development

Open Source @ Siemens, 23.05.2023, Reto Lehmann

Who am I?



Reto Lehmann

ReToCode

Software Engineer at Red Hat, working on @knative, containers, PaaS (OpenShift/Kubernetes) and cloud native stuff in general.

Overview Repositories 85 Projects Packages Stars 171

ReToCode / README.md

Welcome to my github page 🙌

I am Reto, a passionate technology enthusiast. I am a fan of continuous improvement and making things easier. I'm a continuous learner and like to see things in a bigger perspective and context. I'm happy when I can move things forward.

👤 I'm currently working on [Knative](#) at Red Hat.

Pinned

Customize your pins

[knative/serving](#) (Public)

Kubernetes-based, scale-to-zero, request-driven compute

Go 5k 1k

[openshift-knative/serverless-operator](#) (Public)

Main source repository for OpenShift Serverless

Go 39 59

[raspberrypi-k8s](#) (Public)

[oscp/openshift-monitoring](#) (Public)

Roadmap

- Introduction to Knative
- Demo time
- Peek behind the curtains



Knative Overview



CLOUD NATIVE
COMPUTING FOUNDATION



Knative is an Open-Source Enterprise-level solution to build Serverless and Event Driven Applications

Serverless Containers in Kubernetes environments.

[Try the tutorial](#)

[Install Knative on your cluster](#)

Trusted by





Knative Building Blocks




Knative

Kubernetes-based platform to build, deploy, and manage modern serverless workloads

 477 followers

 <https://knative.dev/>

 @KnativeProject

 admins@knative.dev

 Verified

 Overview

 Repositories 31

 Projects 19

 Packages

 Teams 37

 People 132

Pinned

 **serving** Public

Kubernetes-based, scale-to-zero, request-driven compute

 Go  5k  1k

 **eventing** Public

Open source specification and implementation of Knative event binding and delivery

 Go  1.3k  518

 **client** Public

Knative developer experience, docs, reference Knative CLI implementation

 Go  312  237

 **func** Public

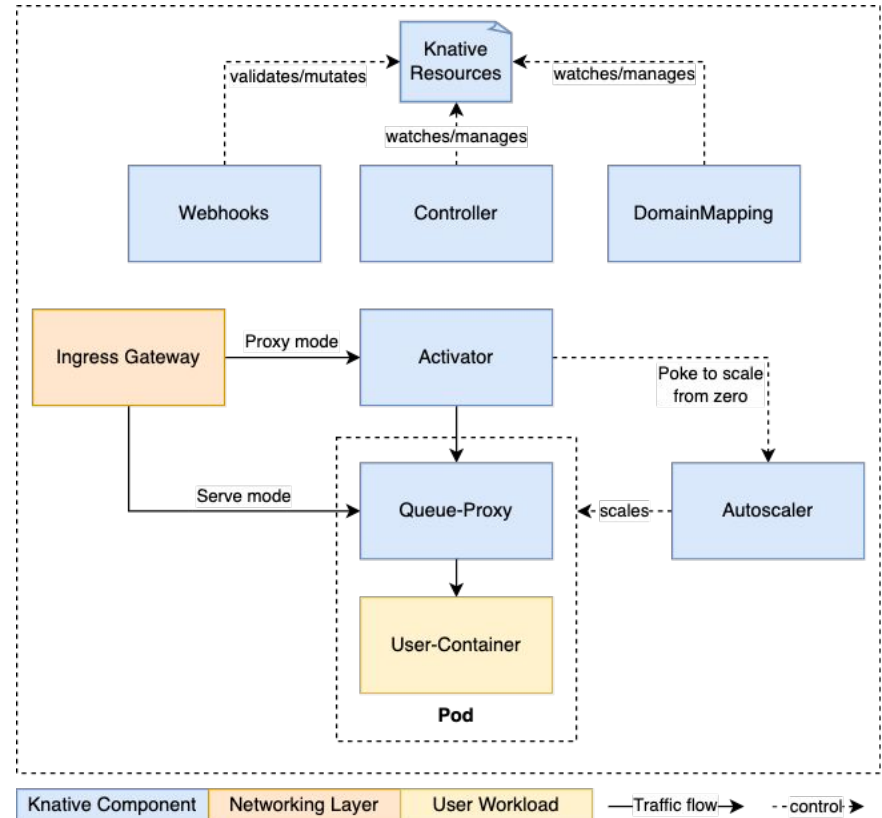
Knative Functions client API and CLI

 Go  173  99



Knative Serving

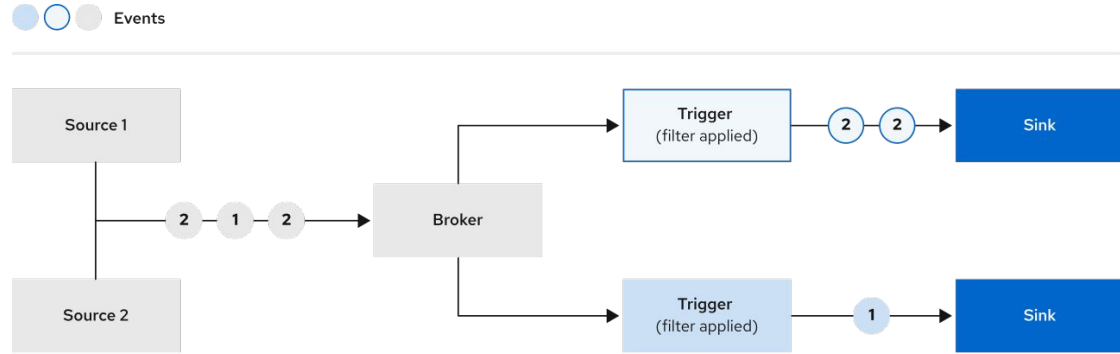
- Autoscaling
- Request Queuing
- Metrics
- Networking stuff
 - A/B, canary deployments
 - Gradual rollouts
 - Auto TLS
 - Domain mapping





Knative Eventing

- Eventing Abstraction
- Payload as [CloudEvents](#)
- [Multiple Event Sources](#)
- Logging + Metrics





Knative Client + Functions

- CLI Tooling
- The `kn` CLI allows to manage Knative resources from CLI
- Knative Functions
 - Enables **development** and **deployment** of Functions
 - Provides the `func` CLI
 - Bootstrap functions for multiple languages
 - Node.js
 - Python
 - Go
 - Quarkus
 - Rust
 - Spring Boot
 - TypeScript

```
func
func is the command line interface for managing Knative Function resources

Create a new Node.js function in the current directory:
func create --language node myfunction

Deploy the function using Docker hub to host the image:
func deploy --registry docker.io/alice

Learn more about Functions: https://knative.dev/docs/functions/
Learn more about Knative at: https://knative.dev

Primary Commands:
create      Create a function
describe   Describe a function
deploy     Deploy a function
delete     Undeploy a function
list       List deployed functions

Development Commands:
run        Run the function locally
invoke    Invoke a local or remote function
build     Build a function container
```




Demo 



Way more stuff, like

- A/B, Canary Deployments, Gradual rollouts
- Tag based routing
- Configuration and Revisions
- Metrics and Observability
- Knative Eventing
- Please refer to the [documentation](#)



Knative

v1.10 ▾



GitHub

☆ 4k 🗨 1.2k

[Home](#) [Concepts](#) [Tutorial](#) [Installing](#) [Functions](#) [Serving](#) [Eventing](#) [Knative CLI](#) [Code samples](#) [Reference](#)

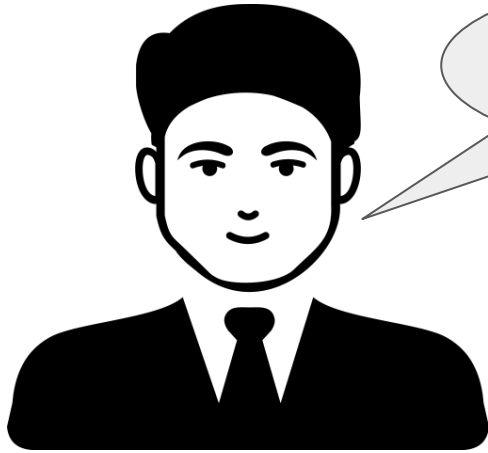
[Blog](#) [About](#) [Community](#)

A close-up photograph of a pair of red curtains. The curtains are made of a textured fabric and feature a ruffled elastic top edge. The lighting is soft, highlighting the vertical folds and the texture of the material. The text "Behind the curtains" is centered in the middle of the image in a white, sans-serif font.

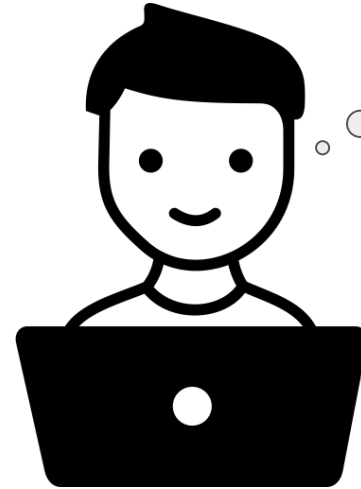
Behind the curtains



Open Source Development



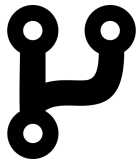
Go and add a new configuration for our environment!



Yes!
Finally,
no VPN



Open Source Development



1. Fork

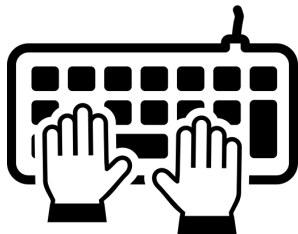
```
$ git clone git@github.com:retocode/serving.git
```

2. Git clone

```
Cloning into 'serving'...
remote: Enumerating objects: 138535, done.
remote: Counting objects: 100% (138535/138535), done.
remote: Compressing objects: 100% (37071/37071), done.
remote: Total 138535 (delta 94630), reused 138190 (delta 94500),
pack-reused 0
Receiving objects: 100% (138535/138535), 83.23 MiB | 12.89 MiB/s, done.
Resolving deltas: 100% (94630/94630), done.
```



3. Hack, hack, hack




4. Git commit, Git push

```
$ git add .; git commit -m "add new configuration variable";
git push
```

```
On branch main
Your branch is up to date with 'origin/main'.
```



The reality is a bit more complicated

 **Knative**

[Overview](#) [Repositories 31](#) [Projects 19](#) [Packages](#) [Teams 37](#) [People 132](#)

Find a repository... Type Language Sort

servicing Public

Kubernetes-based, scale-to-zero, request-driven compute

app networking serverless function container autoscaler developer-productivity

Go Apache-2.0 1,028 4,974 167 (15 issues need help) 15 Updated 29 minutes ago

 **Knative Sandbox**

[Overview](#) [Repositories 50](#) [Projects 6](#) [Packages](#) [Teams 71](#) [People 123](#)

Find a repository... Type Language Sort

eventing-kafka-broker Public

Alternate Kafka Broker implementation.

Go Apache-2.0 78 99 61 (5 issues need help) 20 Updated 29 minutes ago

The reality is a bit more complicated

- Massive amount of code
- Domain Knowledge
 - [Example 1](#)
 - [Example 2](#)
- Shared Components and Packages
- Reasoning in past PRs
- Outdated documentation
- A **LOT** of bash scripts

```
$ tree serving
├── AUTHORS
├── CODE-OF-CONDUCT.md
├── CONTRIBUTING.md
├── DEVELOPMENT.md
├── LICENSE
├── Makefile
├── OWNERS
├── OWNERS_ALIASES
├── README.md
├── ...
├── ┌── yaml
├── SECURITY_CONTACTS
├── ┌──
├── code-of-conduct.md
├── ┌── fields.go
├── ┌── yaml.go
├── └──
├── yaml_go110.go

2207 directories, 7335 files
```



Planning is chaotic at times

- Not a single team/person/organization responsible
- Multiple tools/processes
- People are no longer working on Knative

knative / serving Public

<> Code Issues 167 Pull requests 15

Filters

🕒 167 Open ✓ 4,197 Closed


Support GRPC and HTTP2 without explicit port labeling

🕒 Open rgregg opened this issue on Jun 6, 2019 · 24 comments

 **dprotaso** commented on Jun 2, 2021 Member ⋮

@gh-user Are you continuing work on the queue proxy/activator issues?

😊

 **ZhiminXiang** commented on Jun 2, 2021 Member ⋮

I don't think @gh-user will continue working on it.

😊



Roles (I)

Role	Responsibilities	Requirements	Privileges	Scope
Member	Regular active contributor in the community	Has made multiple contributions to the project	Member of the GitHub Knative org Member of the Knative Slack workspace Edit access to team drive	GitHub Organization
Approver	Approve contributions from other members	Highly experienced and active reviewer and contributor to an area	Entry in one or more OWNERS files in GitHub, and write permissions on one or more repos allowing PRs to be merged	GitHub Directory

More detailed on: <https://github.com/knative/community/blob/main/ROLES.md>



Roles (II)

Role	Responsibilities	Requirements	Privileges	Scope
Working Group Technical Lead	<p>Set priorities for a functional area and approve proposals</p> <p>Triage incoming issues set milestones, repo labels</p> <p>Roadmap alignment with top-level backlog</p> <p>Mentor new contributors project members, and approvers</p> <p>Responsible for technical health of their functional area</p>	<p>Sponsored by the technical oversight committee as documented here</p>	<p>Write permissions on one or more repos allowing issues to be manipulated</p>	<p>Working Group</p>

More detailed on: <https://github.com/knative/community/blob/main/ROLES.md>



Working Groups

- Serving
- Eventing
- Client
- Docs and User Experience
- Functions
- Productivity
- Operations
- Security

Regular public meetings (recorded)

Public agenda and notes



More detailed on:

<https://github.com/knative/community/blob/main/working-groups/WORKING-GROUPS.md>

Knative Serving Specification

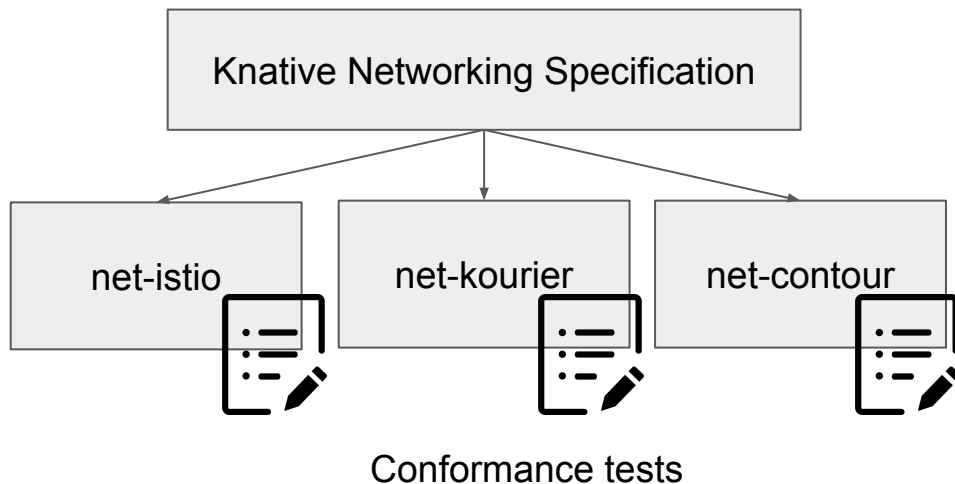
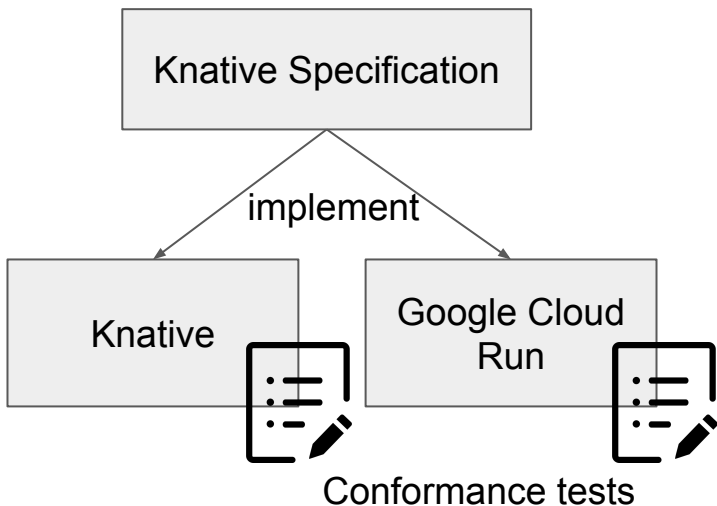


The Knative Serving specifications have been moved. See the links below for document locations:

- [Knative Serving Conformance Tests](#)

Docs in this directory:

- [Motivation and goals](#) - non-normative
- [Resource type overview](#) - non-normative
- [Knative Serving API Specification](#)
- [Knative Serving Runtime Specification](#)



CI/CD

- Standardized go-build, go-test, security check, style-check, pr-verification
- Serving
 - ~3000 Unit Tests
 - E2E tests on [Kind](#) on GitHub Actions with a matrix of
 - Multiple Kubernetes versions
 - All networking layers
 - Non TLS/TLS/Service Mesh
 - E2E tests on "real clusters" in GKE with the same matrix
- Cross-Repository tests (imports go tests)



GitHub Actions



59 checks passed

- ✓ build
- ✓ build / Build
- ✓ style / changes
- ✓ analyze / Analyze CodeQL
- ✓ test / Unit Tests
- ✓ verify / Verify Deps and Codegen
- ✓ test (v1.24.7, kourier, runtime)
- ✓ test (v1.24.7, kourier, api)

A close-up photograph of a pair of red curtains with a ruffled top edge. The curtains are made of a textured fabric and hang in vertical folds. The lighting is slightly darker at the top and bottom, creating a sense of depth. Centered on the curtains is the text "Behind the Red Hat curtains" in a white, sans-serif font.

Behind the Red Hat curtains

Creating a product out of OSS

- OpenShift Serverless is Knative
- Still Open Source: <https://github.com/openshift-knative>
- Changes are always done **upstream** if possible
- Extended operator to support installation on OpenShift
- A lot of additional testing for OpenShift



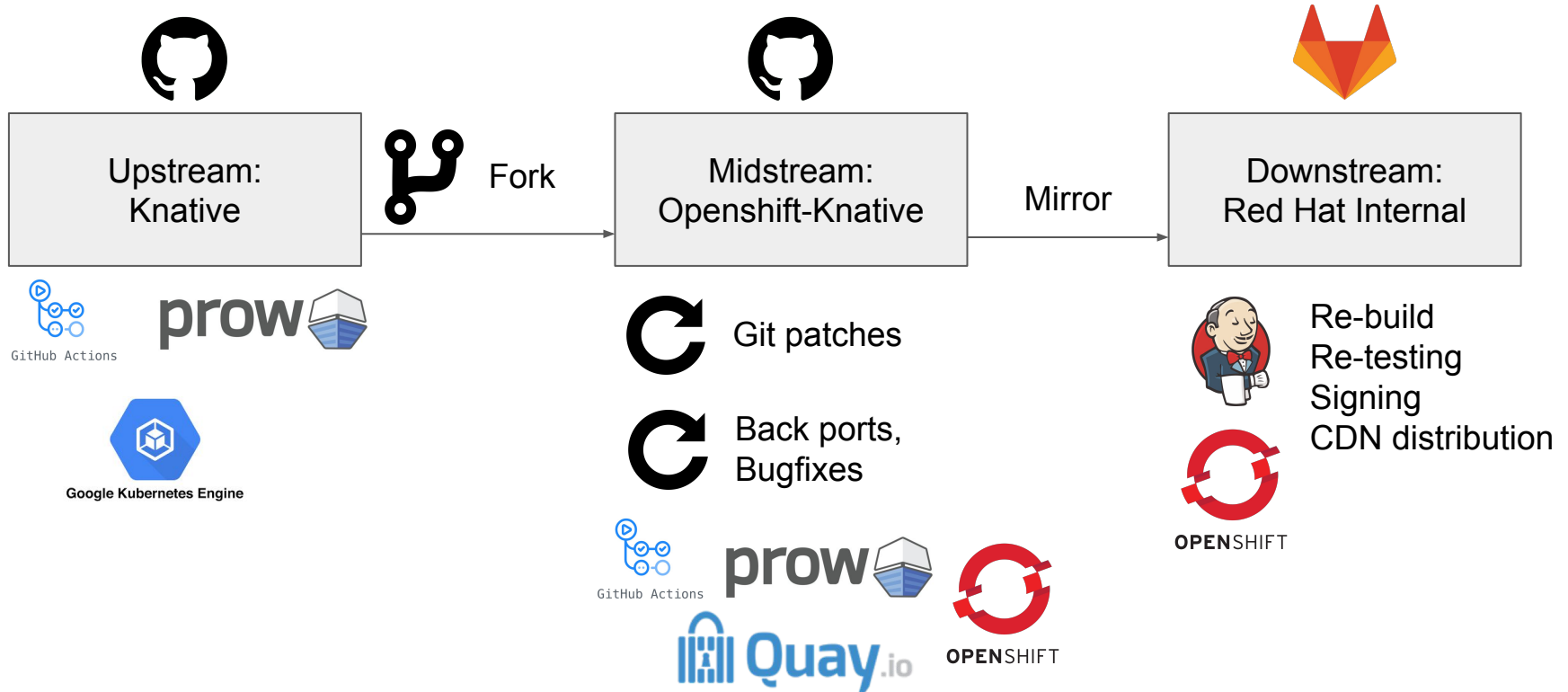
openshift-knative

👤 5 followers

🔗 <https://www.openshift.com/learn/to...>

✉ serverless-support@redhat.com

The pipeline



Personal summary on OSS development

- Can be chaotic at times, but very welcoming, helpful and open community
- It can be hard to get started, look for guidance (like good-first-issues) and mentorship
- Good documentation and communication is key
- Having a good coverage of features/functionality by tests enable automation
- Bash is *still* a pretty common ground
- Git patches are a pretty solid way to extend/adapt some OSS code that you do not have full control over (you can also do pretty hacky stuff, but that is better discussed over 🍺😄)

Thank you

