The State of **Open Source Serverless**

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Cloud Native Engineer | Container Solutions

@jonatasbaldin
🖥 **twitch.tv/deployeveryday**

serverless?

no server management

not worrying about scalability

paying for what u use

event-driven system

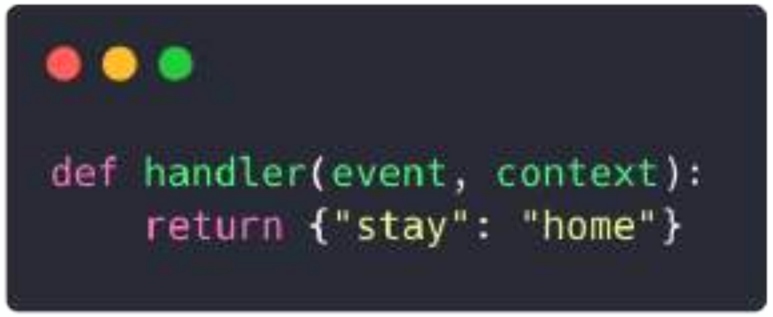
*noise**less***

Function as a Service

⚡

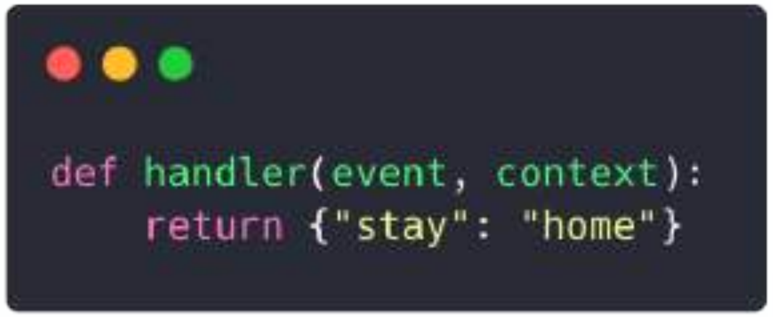
Function as a Service

⚡



```python
def handler(event, context):
    return {"stay": "home"}
```

Function as a Service



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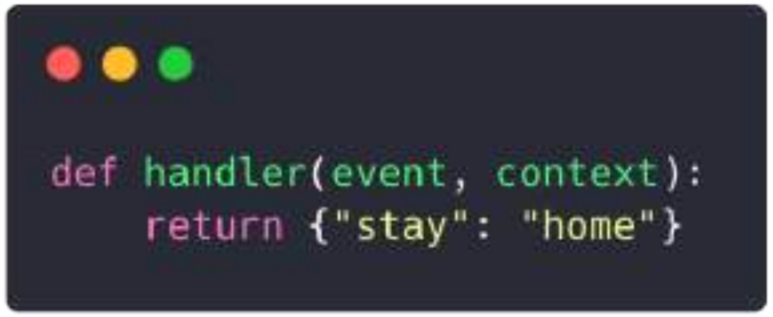


```
def handler(event, context):
    return {"stay": "home"}
```

Function as a Service

Function as a Service

hey cloud, when there’s

a request in thisdomain.io

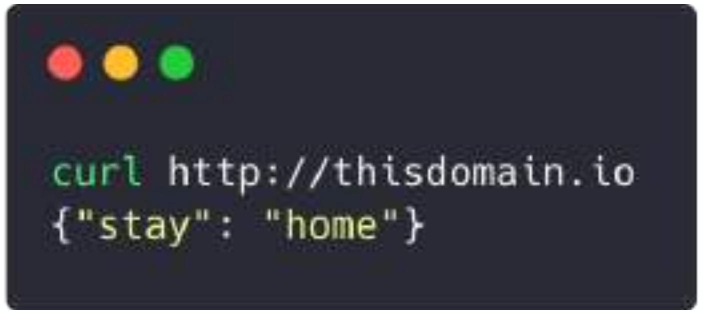
can you trigger my code?

Function as a Service

hey cloud, when there's

a request in thisdomain.io

can you trigger my code?

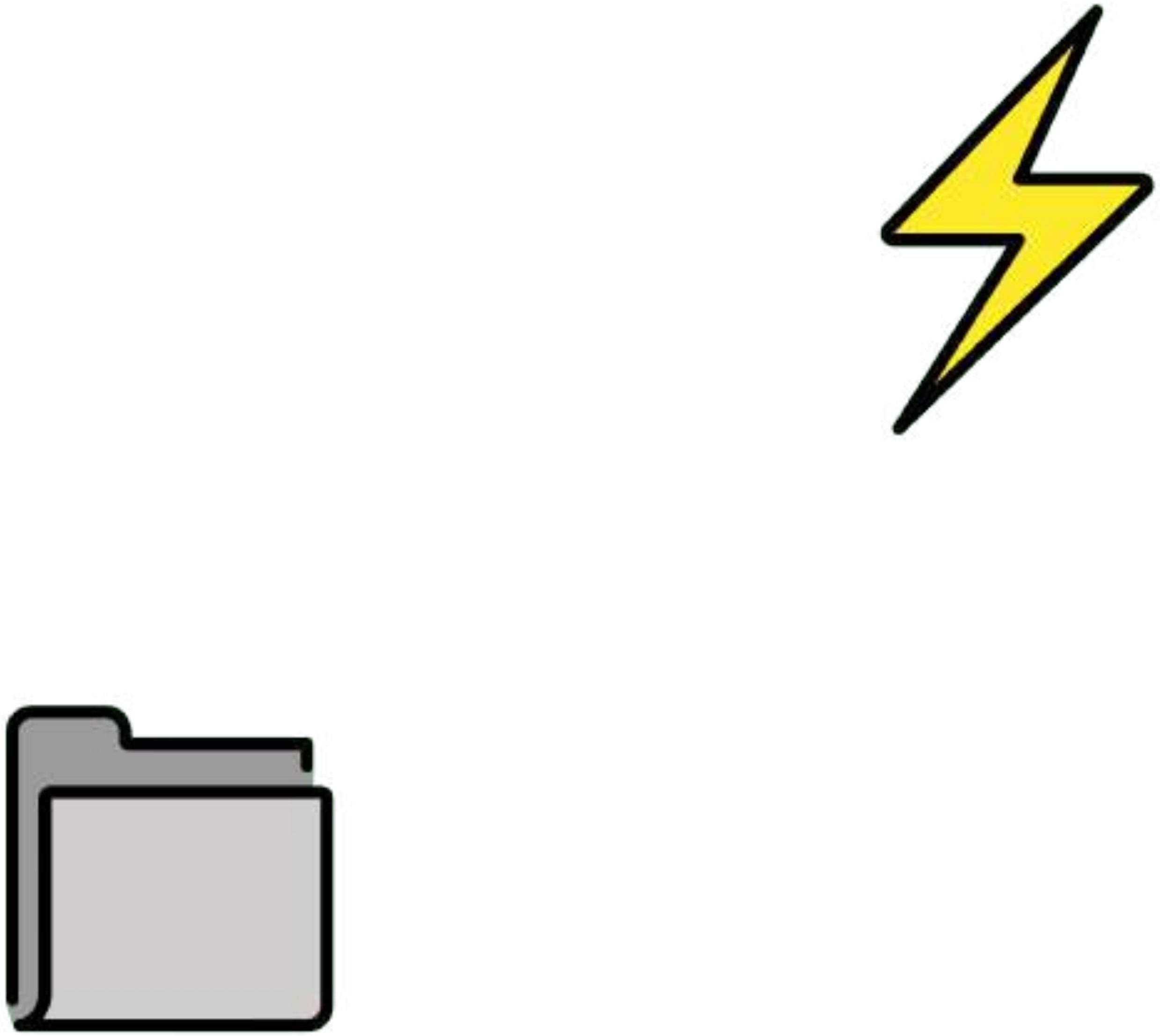


```
curl http://thisdomain.io
{"stay": "home"}
```

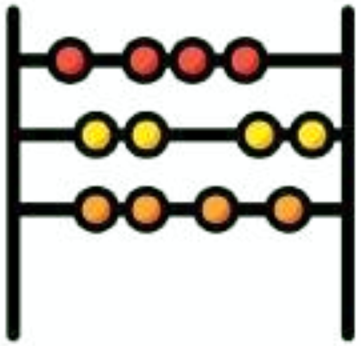
Function as a Service

⚡

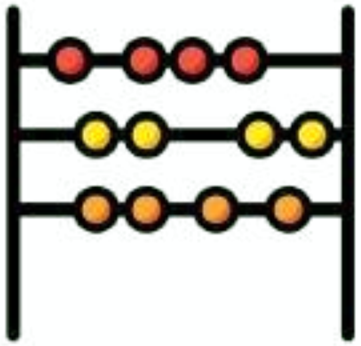
Function as a Service

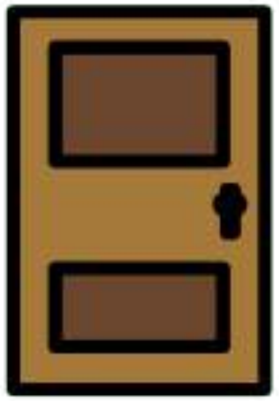


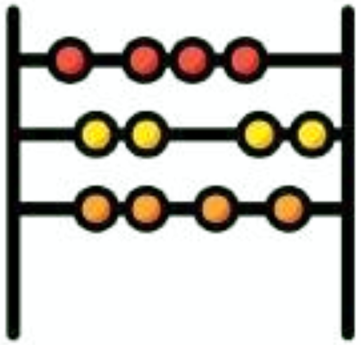
Function as a Service

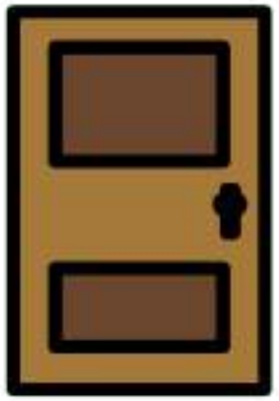


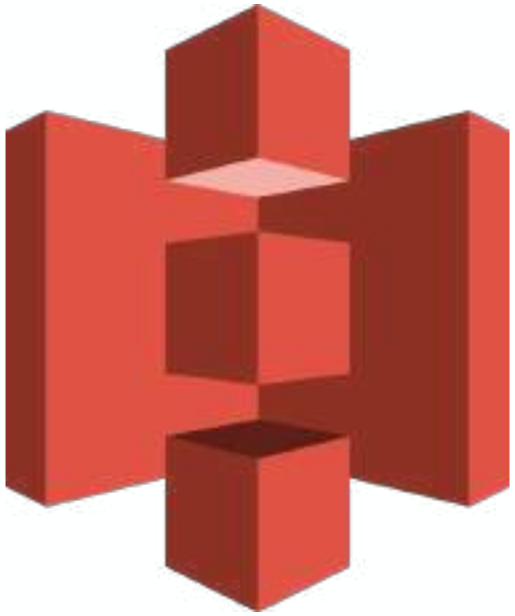
Function as a Service

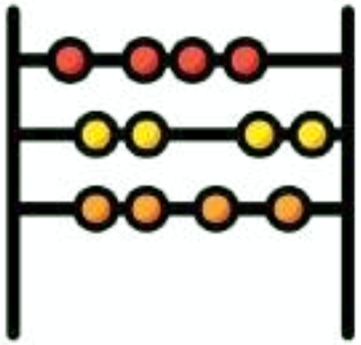


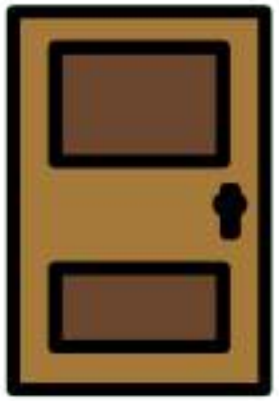


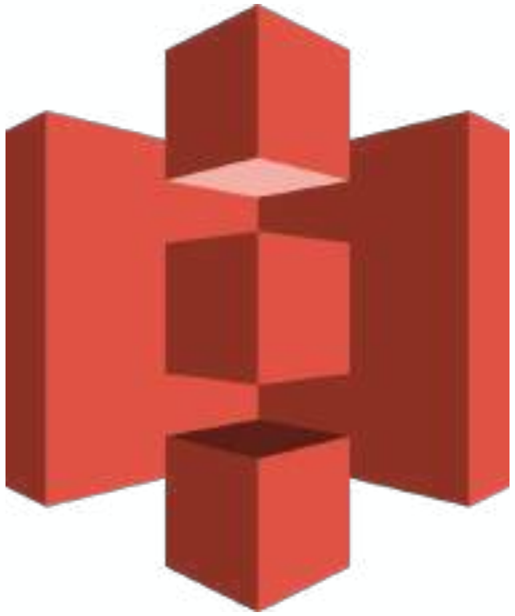


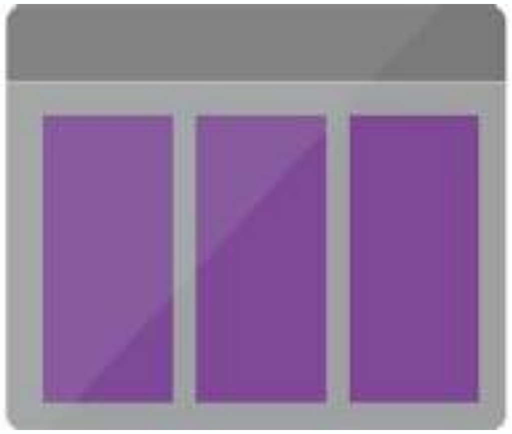


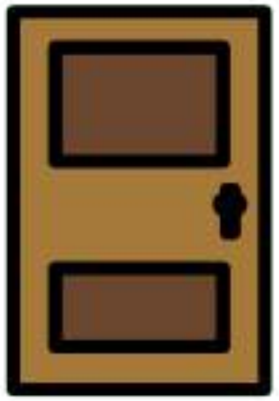


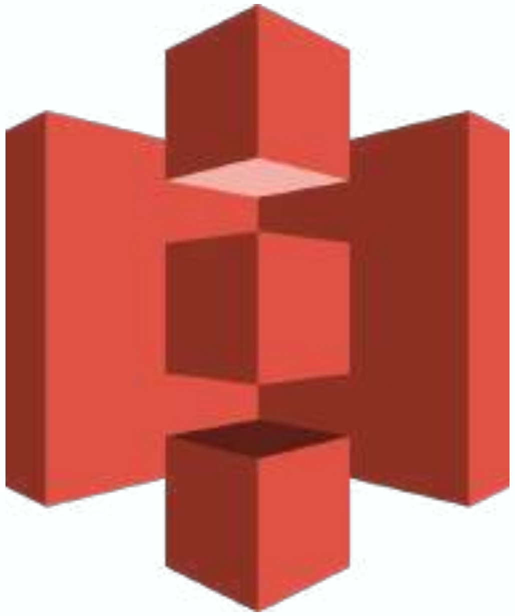


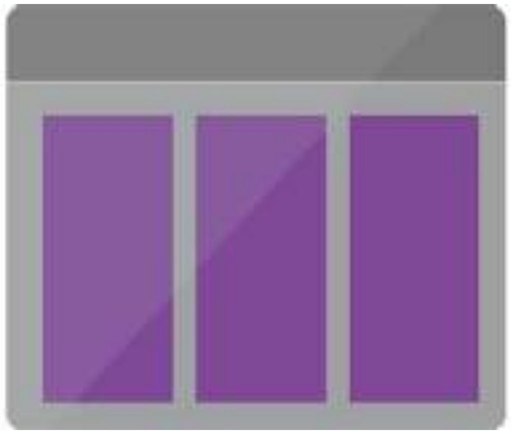






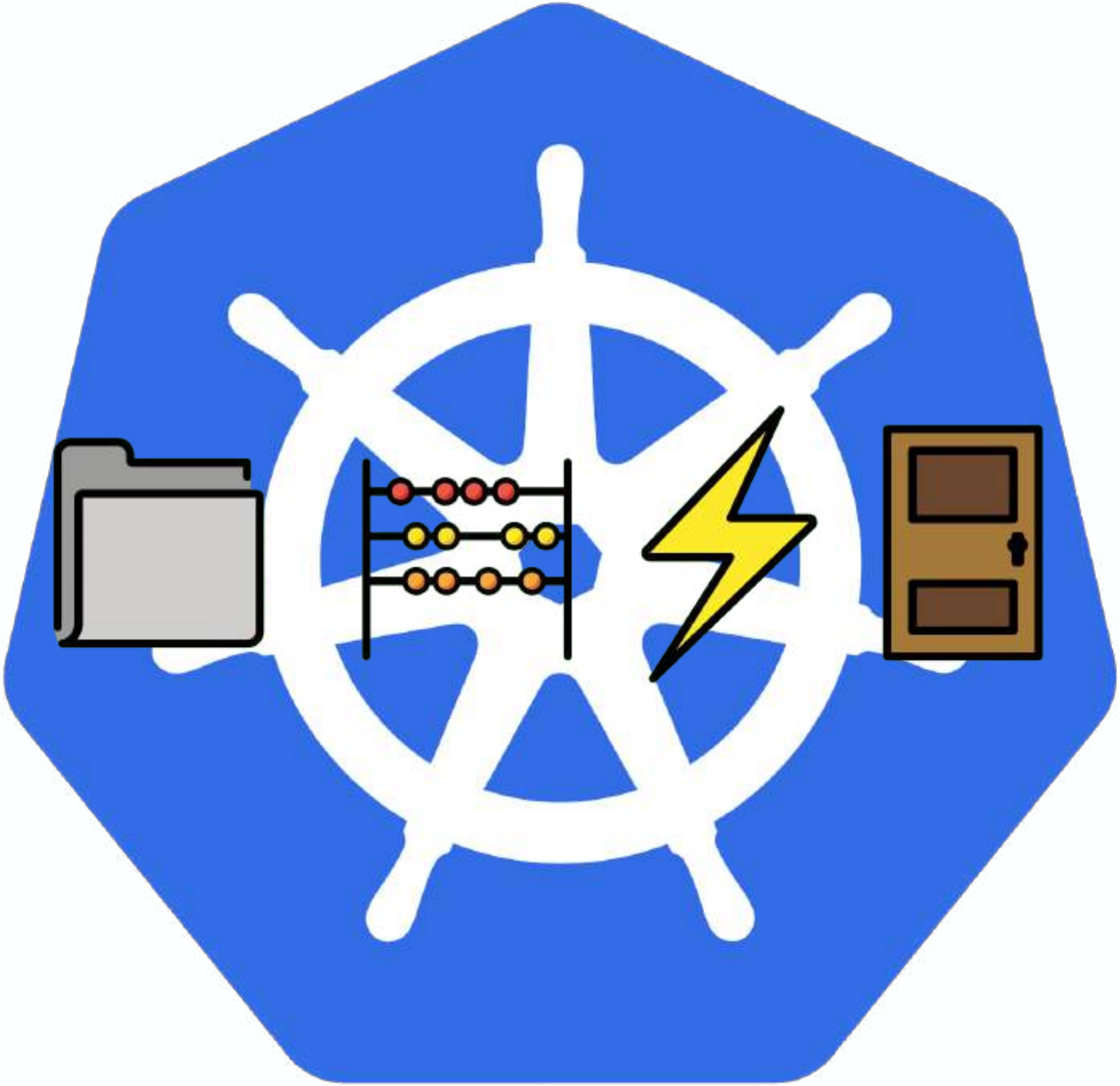


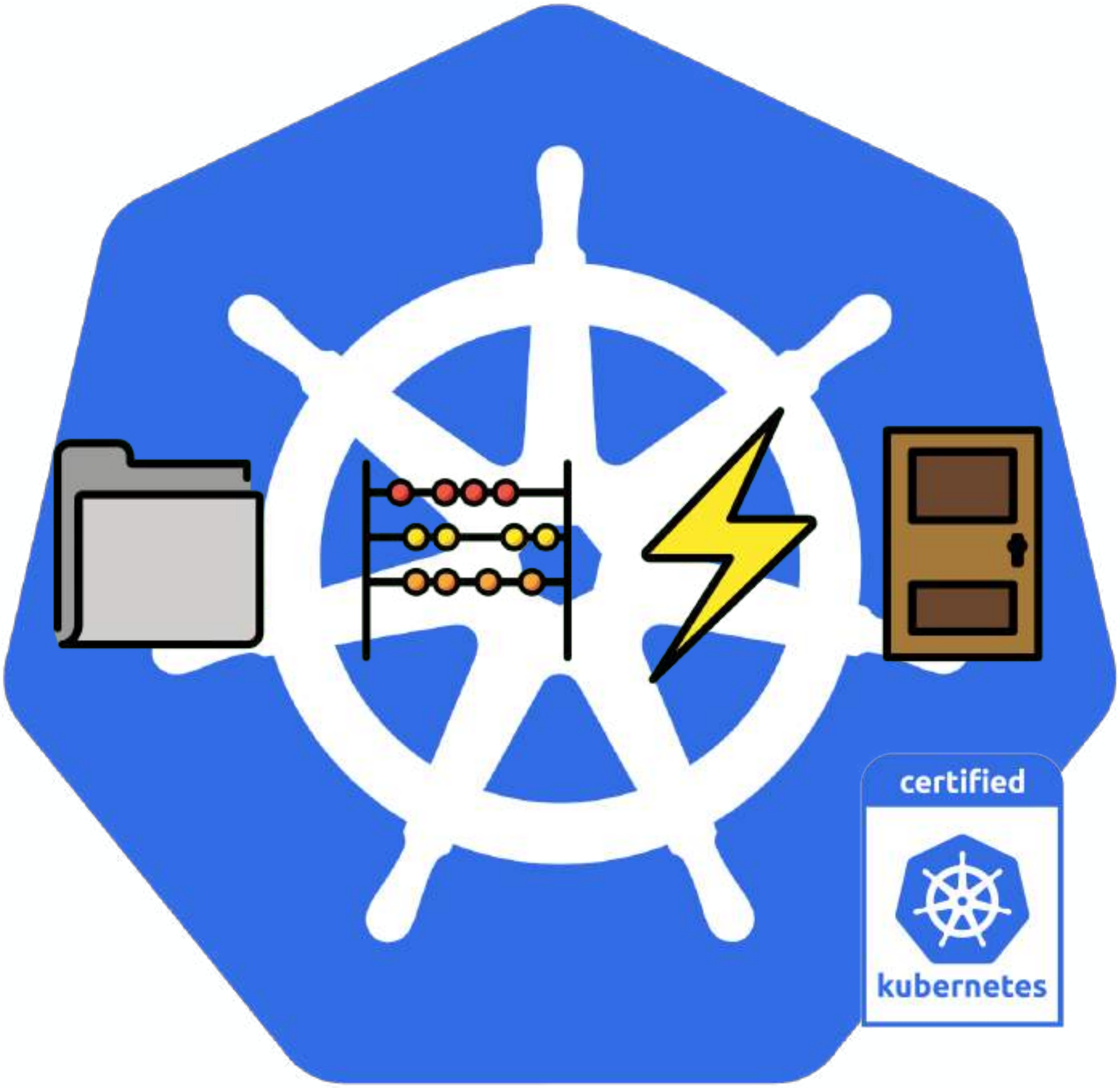




open source serverless?

📁 🧮 ⚡ 🚪



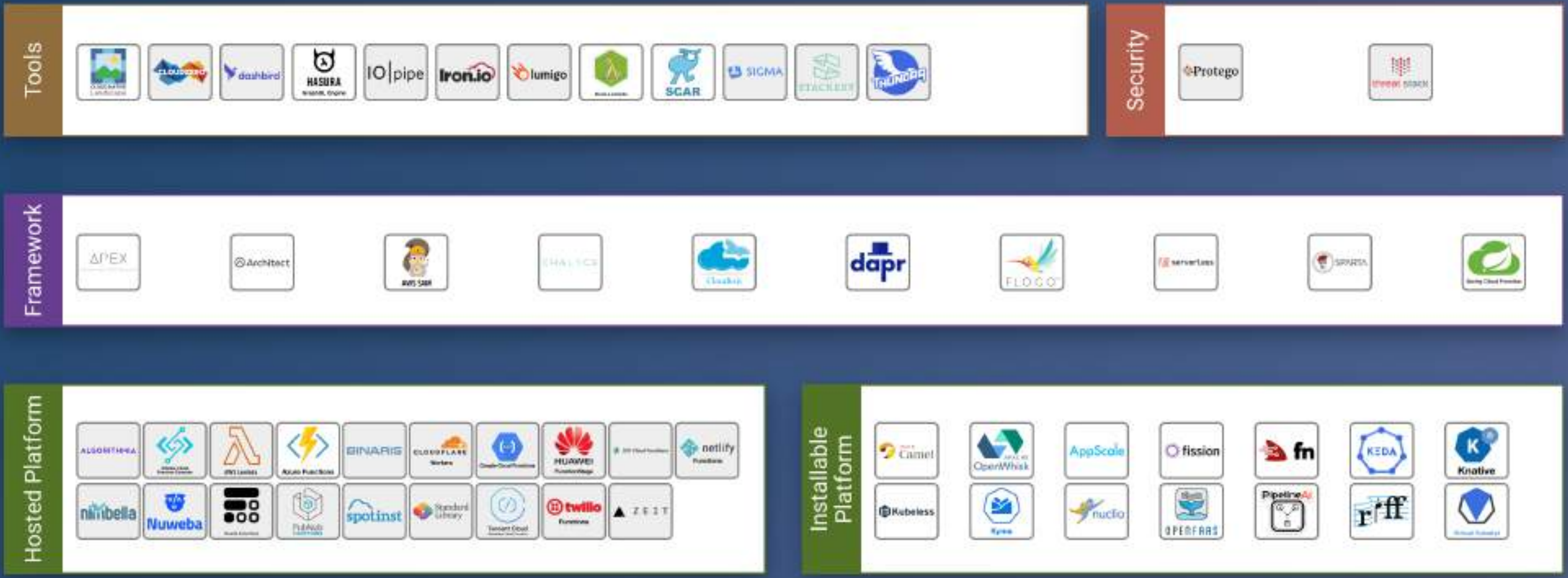

certified
kubernetes

open source serverless!

CNCF Serverless Landscape
2020-03-23T04:05:46Z 4c11ed4

See the serverless interactive display at s.cncf.io

Greyed logos are not open source



s.cncf.io

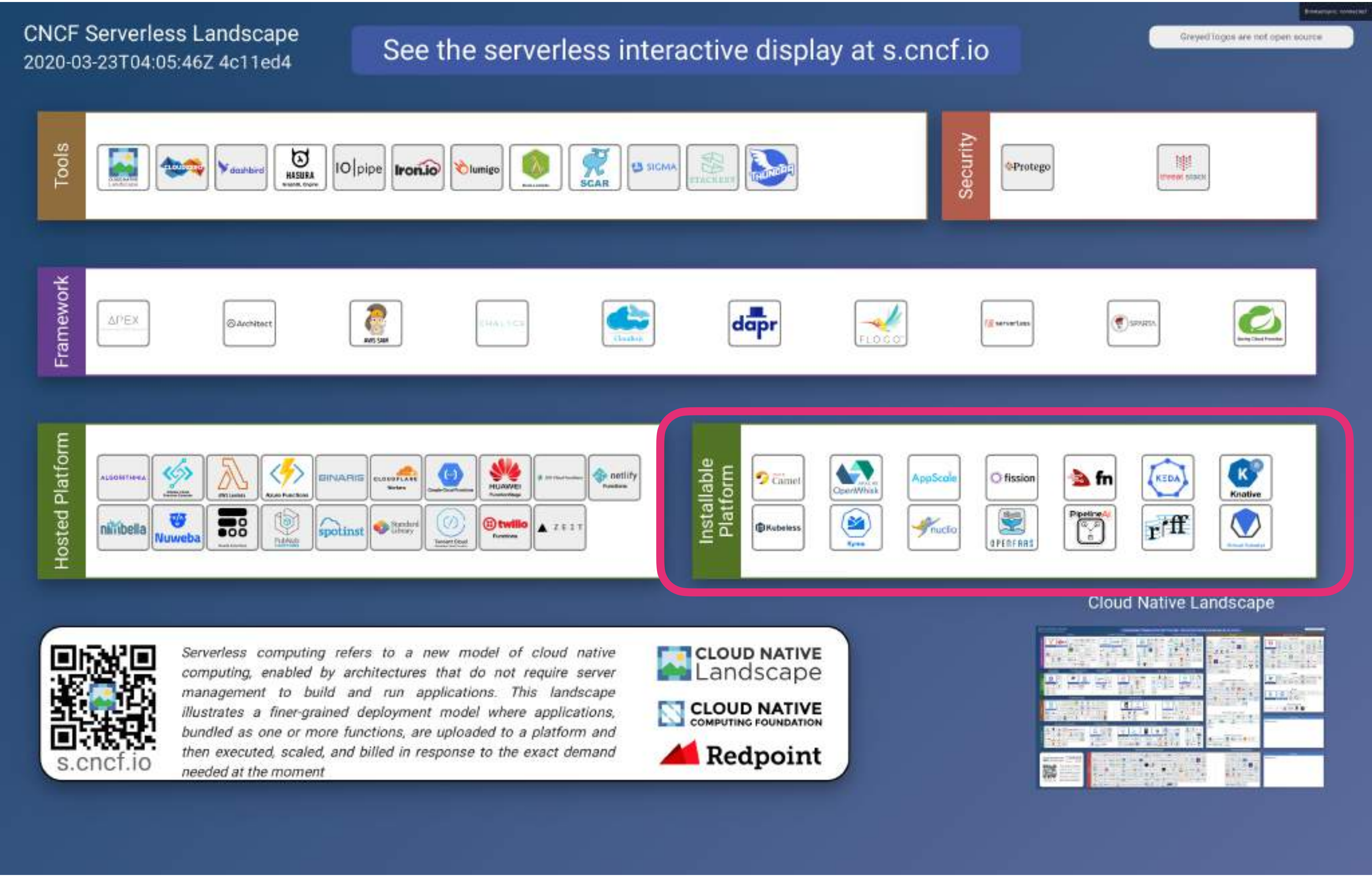
Serverless computing refers to a new model of cloud native computing, enabled by architectures that do not require server management to build and run applications. This landscape illustrates a finer-grained deployment model where applications, bundled as one or more functions, are uploaded to a platform and then executed, scaled, and billed in response to the exact demand needed at the moment

CLOUD NATIVE Landscape

CLOUD NATIVE COMPUTING FOUNDATION

Redpoint

Cloud Native Landscape



CNCF Serverless Landscape
2020-03-23T04:05:46Z 4c11ed4

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Tools

Security

Framework

Hosted Platform

Installable Platform

Cloud Native Landscape

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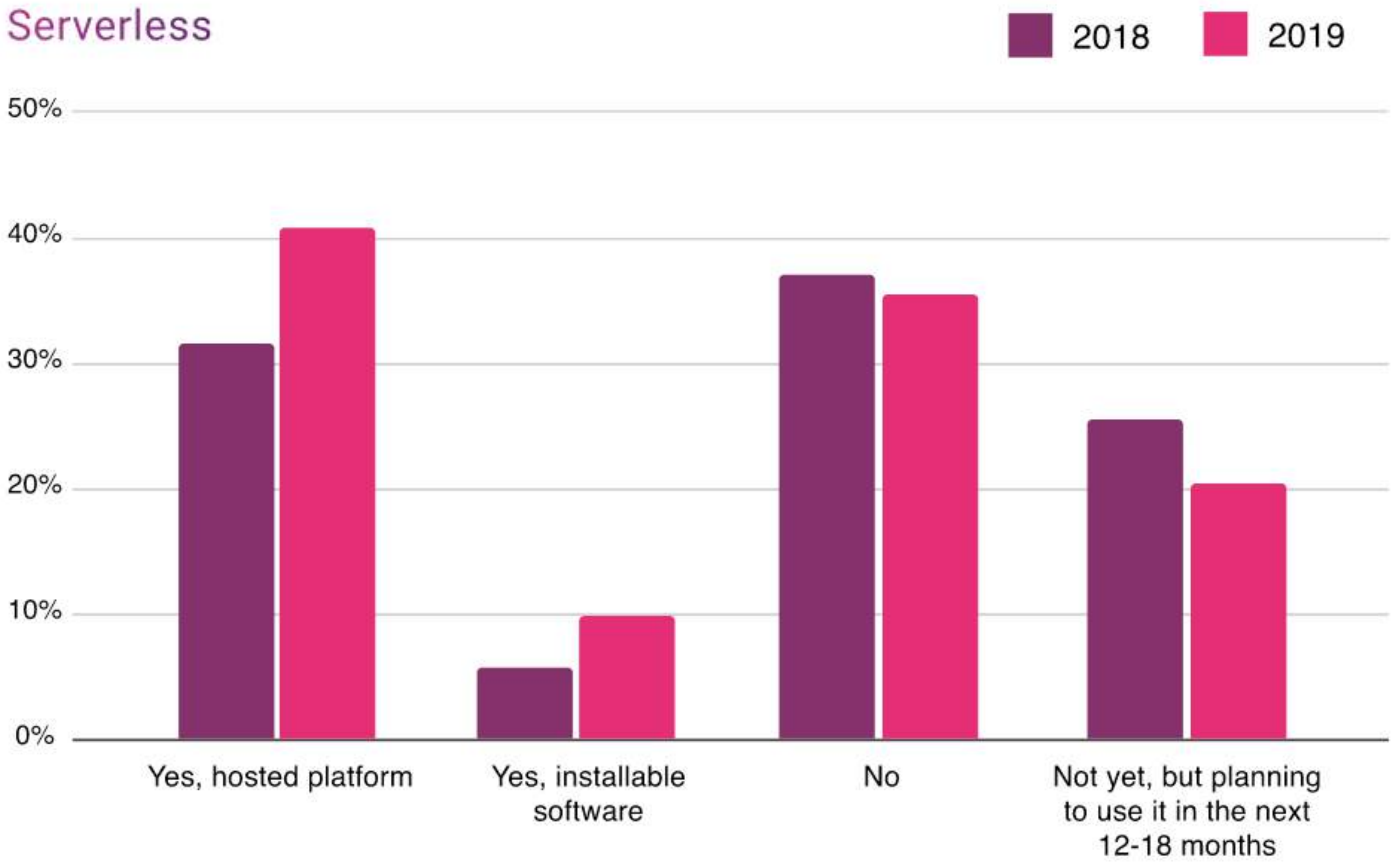
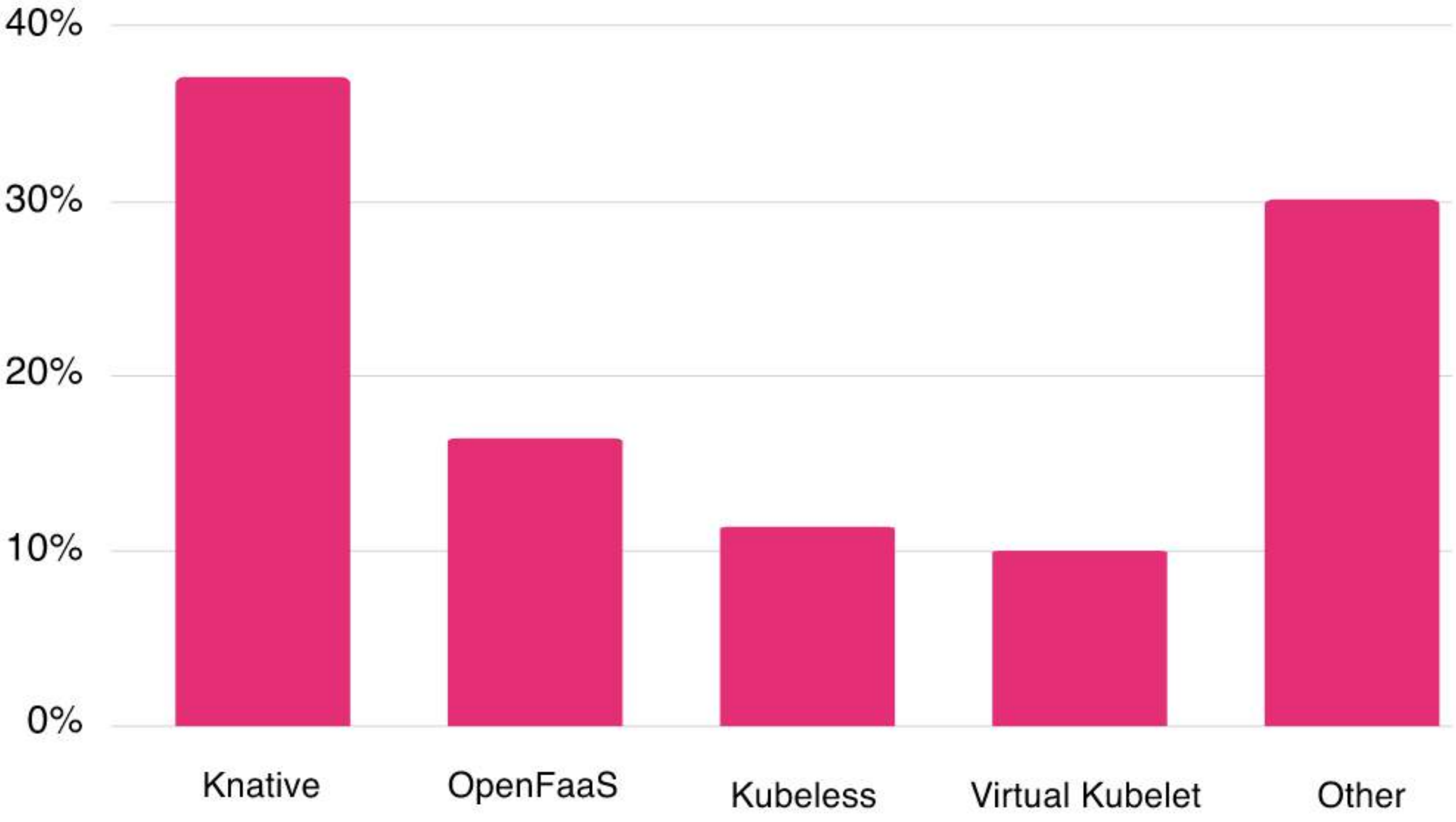
s.cncf.io



CNCF Survey 2019

Installable Serverless Platforms



CNCF Survey 2019

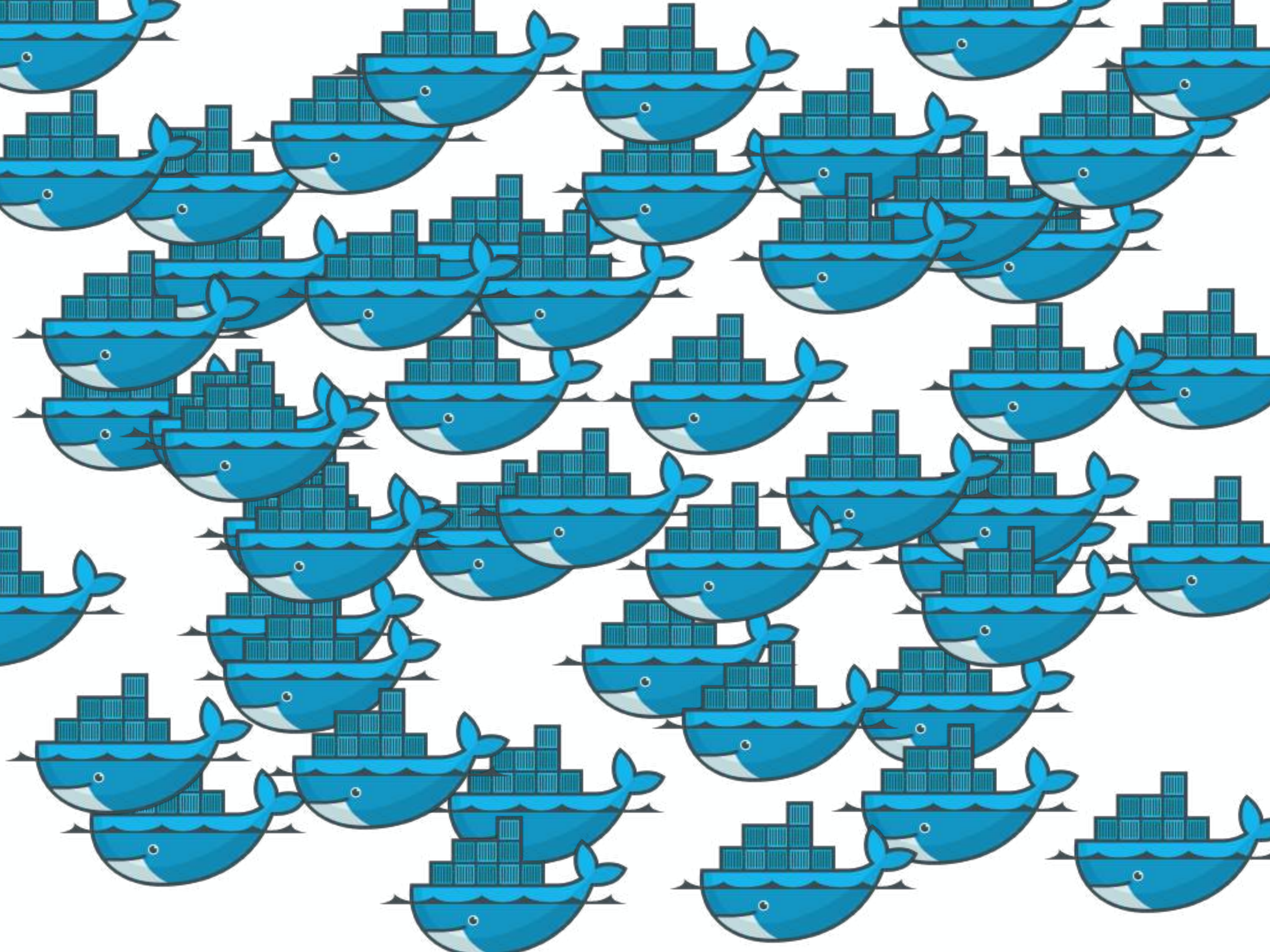
common ground?

container as a function

DOCKERFILE is the new .zip

Knative

OpenWhisk



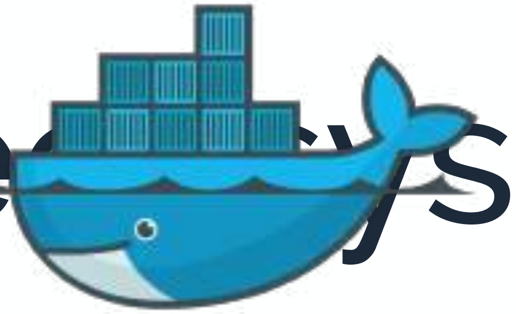
kubernetes is a platform to build platforms, it is far from the end game

Kelsey Hightower, 2018

k8s as a foundation

k8s ecosystem

k8s ecosystem



http & events

cli, dashboard, yaml, crd

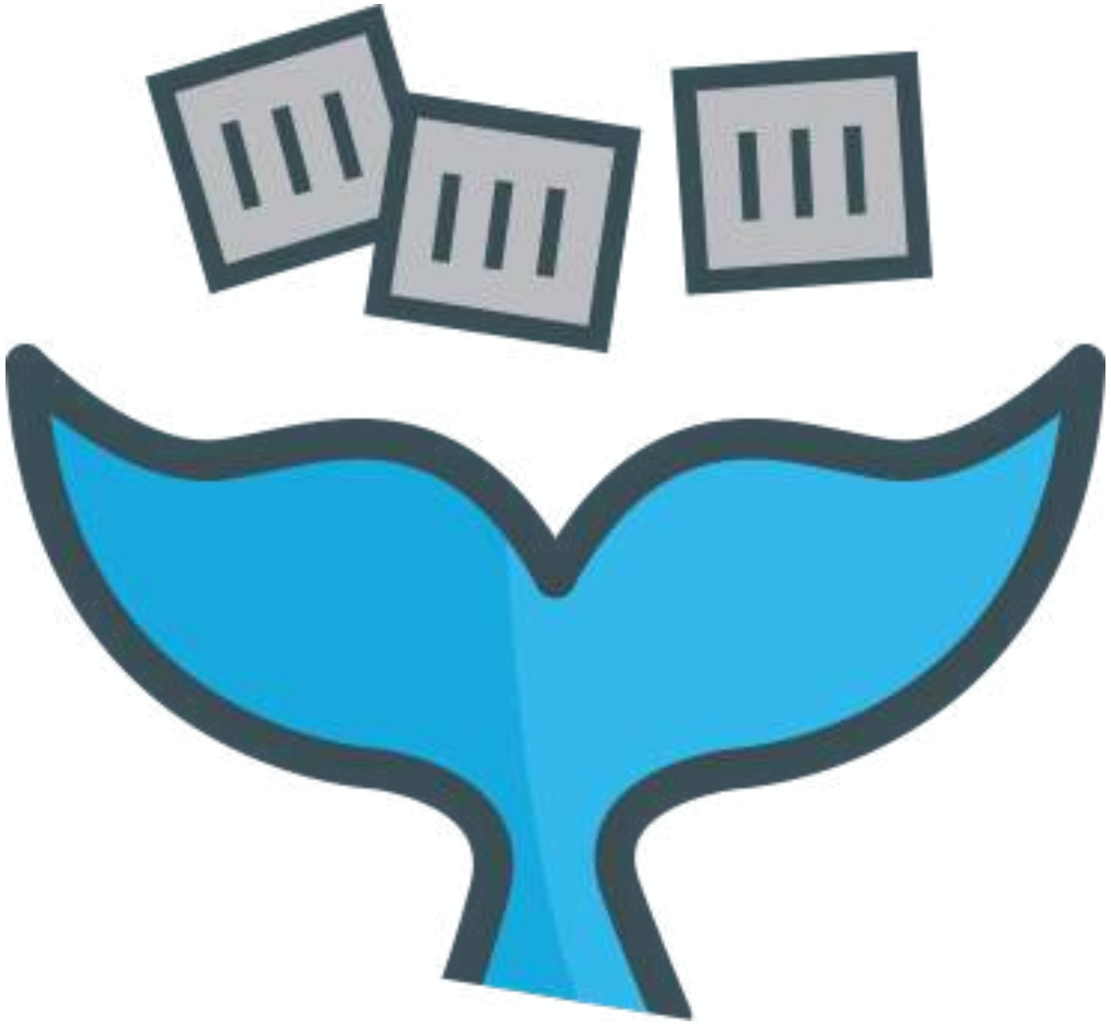
⚠️ about server mgmt ⚠️

platform team

development team

end users

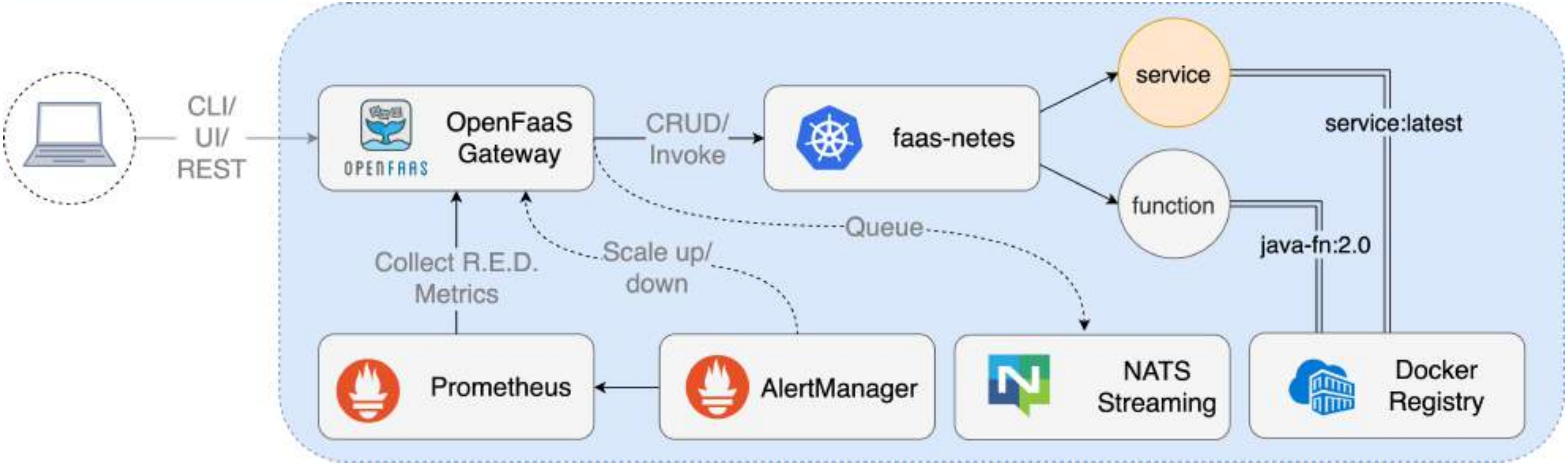
the platforms

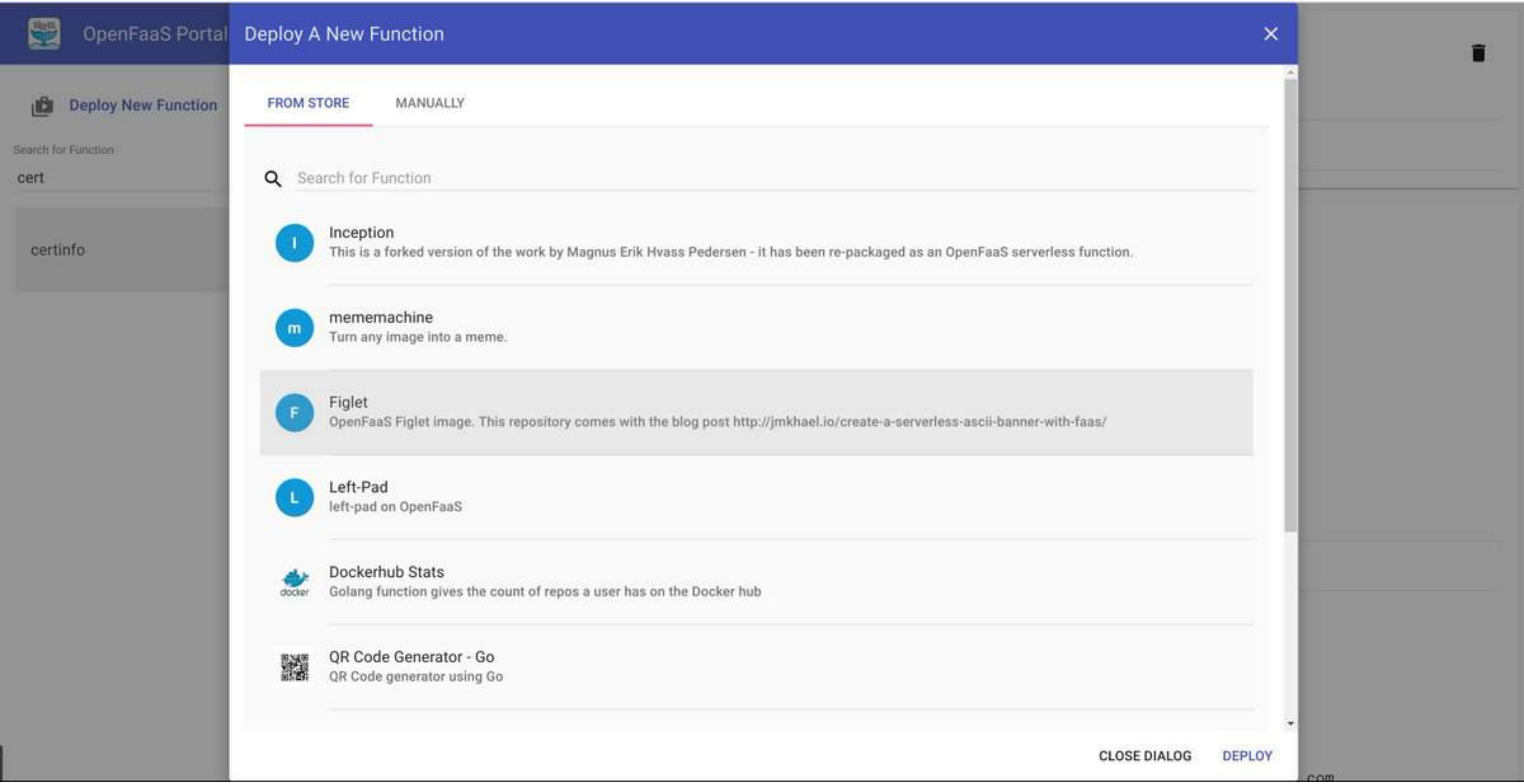


OpenFaaS

not strictly tied to Kubernetes

k3s, k8s, openshift, swarm, **faasd**


CLI/
UI/
REST
OPENFAAS
OpenFaaS
Gateway
CRUD/
Invoke
faas-netes
service
function
service:latest
java-fn:2.0
Queue
Collect R.E.D.
Metrics
Scale up/
down
Prometheus
AlertManager
NATS
Streaming
Docker
Registry



Inception
This is a forked version of the work by Magnus Erik Hvass Pedersen - it has been re-packaged as an OpenFaaS serverless function.

mememachine
Turn any image into a meme.

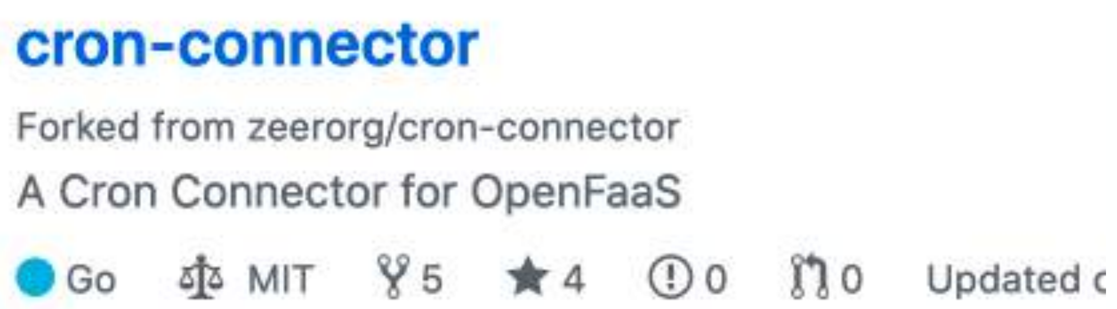
Figlet
OpenFaaS Figlet image. This repository comes with the blog post http://jmkhael.io/create-a-serverless-ascii-banner-with-faas/

Left-Pad
left-pad on OpenFaaS

Dockerhub Stats
Golang function gives the count of repos a user has on the Docker hub

QR Code Generator - Go
QR Code generator using Go

github.com/openfaas-incubator

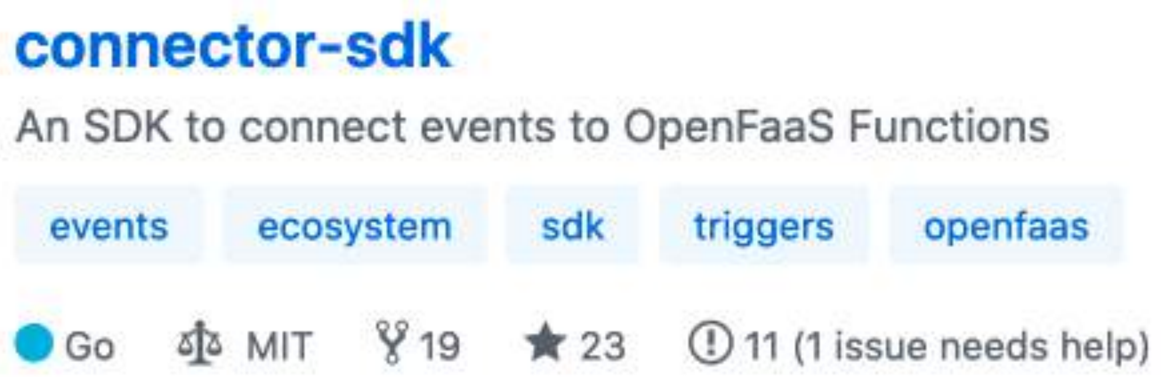


cron-connector

Forked from zeerorg/cron-connector

A Cron Connector for OpenFaaS

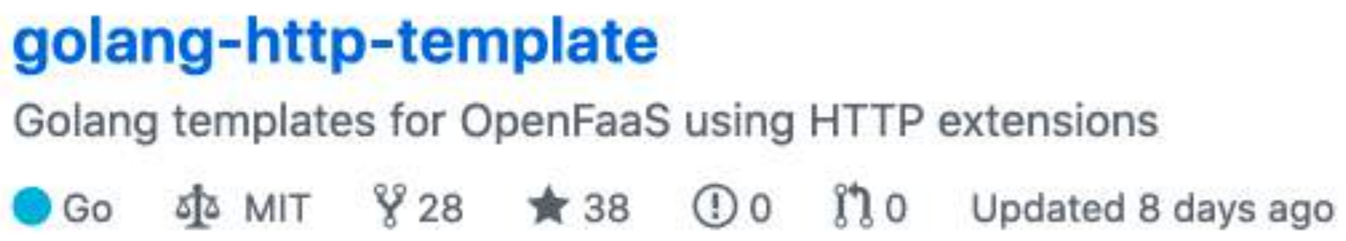
● Go ⚖ MIT ⑂ 5 ★ 4 ❗ 0 ⇅ 0 Updated c



connector-sdk

An SDK to connect events to OpenFaaS Functions

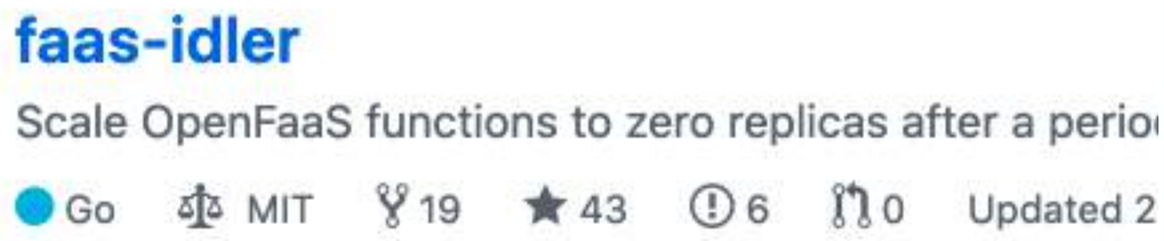
● Go ⚖ MIT ⑂ 19 ★ 23 ❗ 11 (1 issue needs help)



golang-http-template

Golang templates for OpenFaaS using HTTP extensions

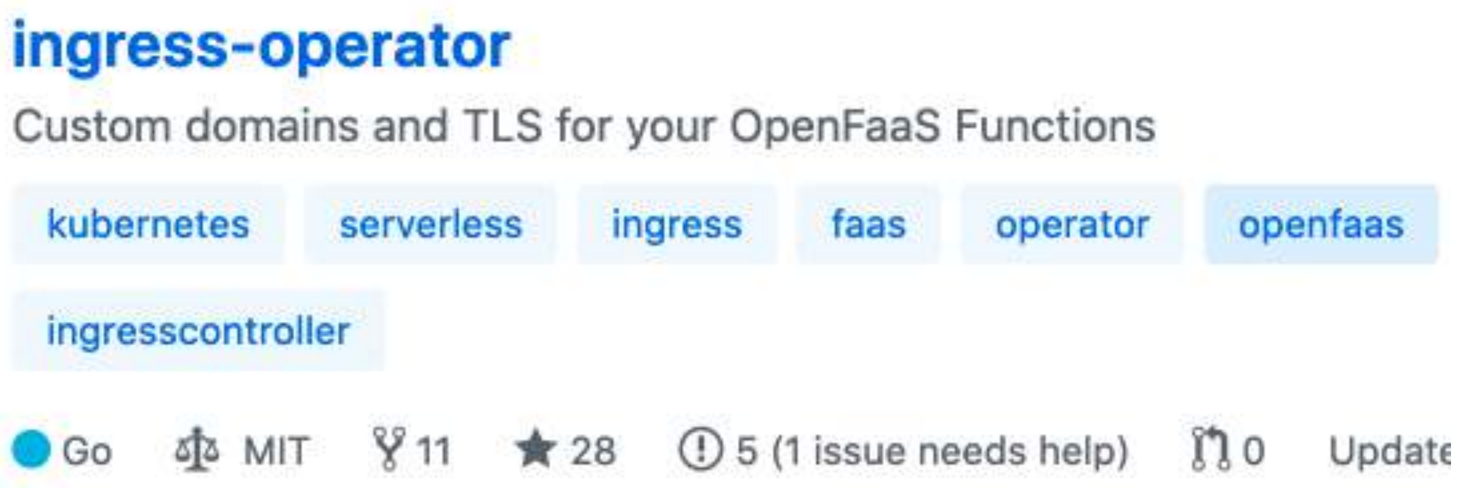
● Go ⚖ MIT ⑂ 28 ★ 38 ❗ 0 ⇅ 0 Updated 8 days ago



faas-idler

Scale OpenFaaS functions to zero replicas after a perio

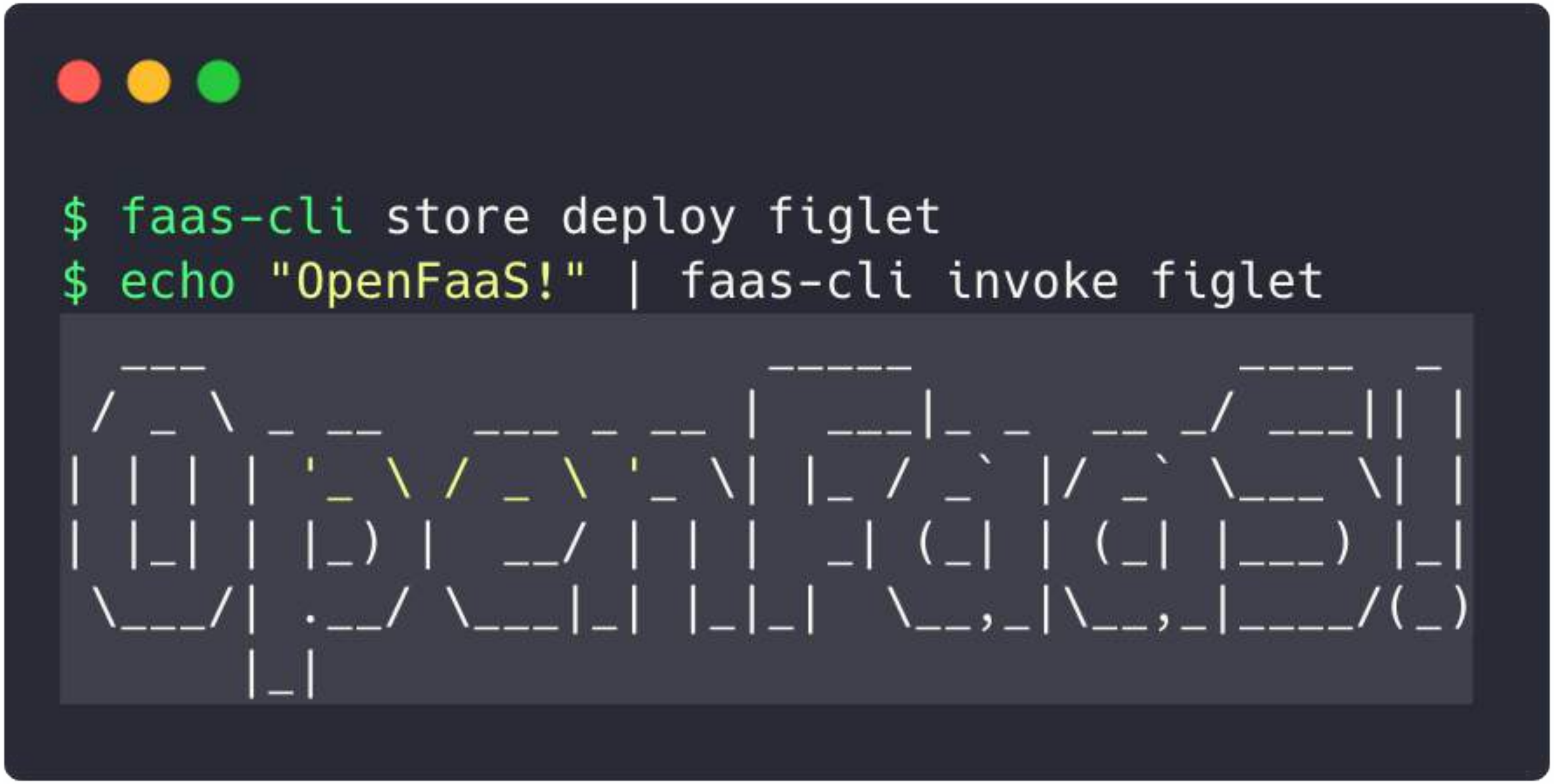
● Go ⚖ MIT ⑂ 19 ★ 43 ❗ 6 ⇅ 0 Updated 2



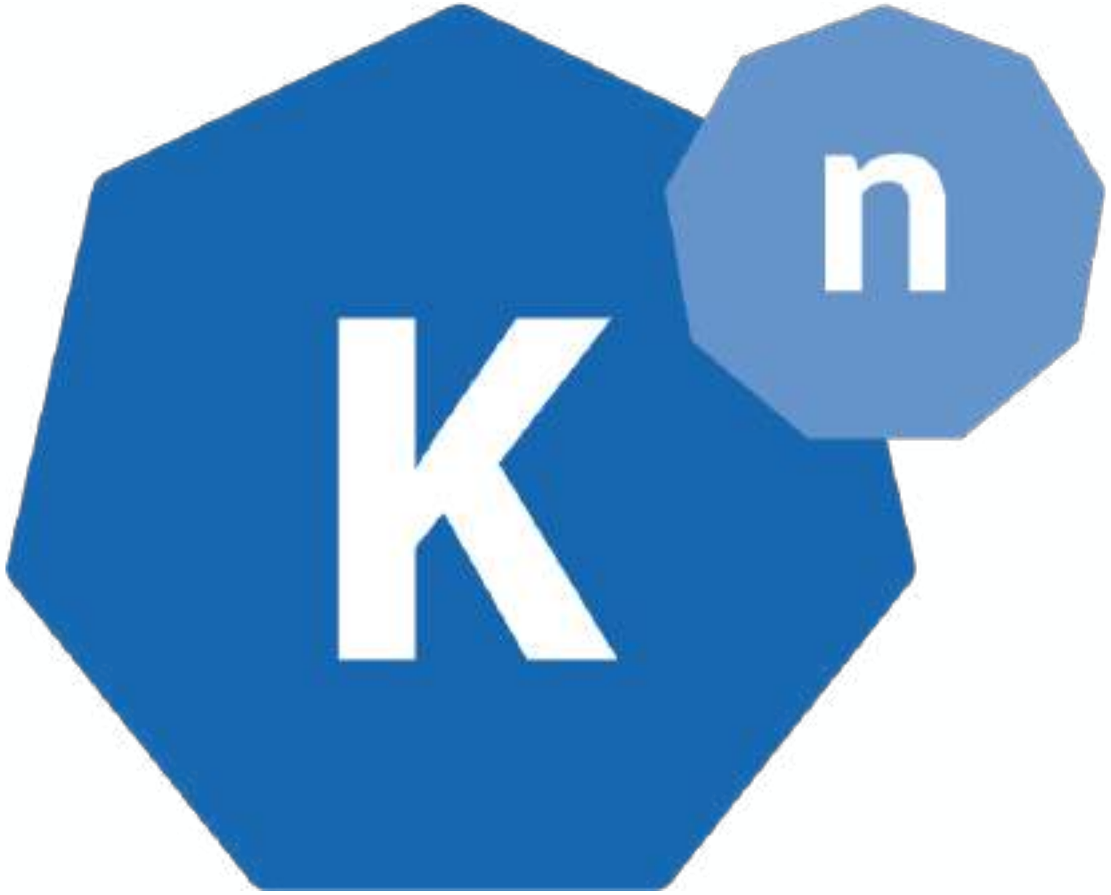
ingress-operator

Custom domains and TLS for your OpenFaaS Functions

● Go ⚖ MIT ⑂ 11 ★ 28 ❗ 5 (1 issue needs help) ⇅ 0 Update



```
$ faas-cli store deploy figlet
$ echo "OpenFaaS!" | faas-cli invoke figlet
  ___                   _____           ____  _ 
 / _ \ _ __   ___ _ __ |  ___|_ _  __ _/ ___|| |
| | | | '_ \ / _ \ '_ \| |_ / _` |/ _` \___ \| |
| |_| | |_) |  __/ | | |  _| (_| | (_| |___) |_|
 \___/| .__/ \___|_| |_|_|  \__,_|\__,_|____/(_)
      |_|                                       
```



Knative

Bring Your Own Container

serving

eventing

serving

expose a webserver on port 8080

eventing

serving

expose a webserver on port 8080

listen to CloudEvents

eventing

Event System 100% CloudEvents

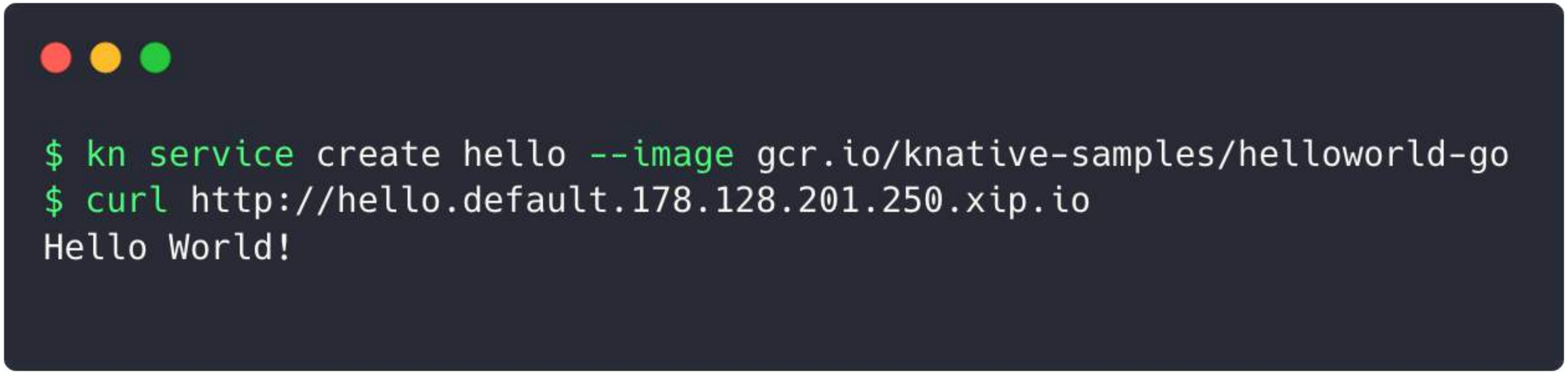
Google Cloud Run

Red Hat Open Shift Serverless

Managed Knative IBM Kubernetes Services

Pivotal Function Service

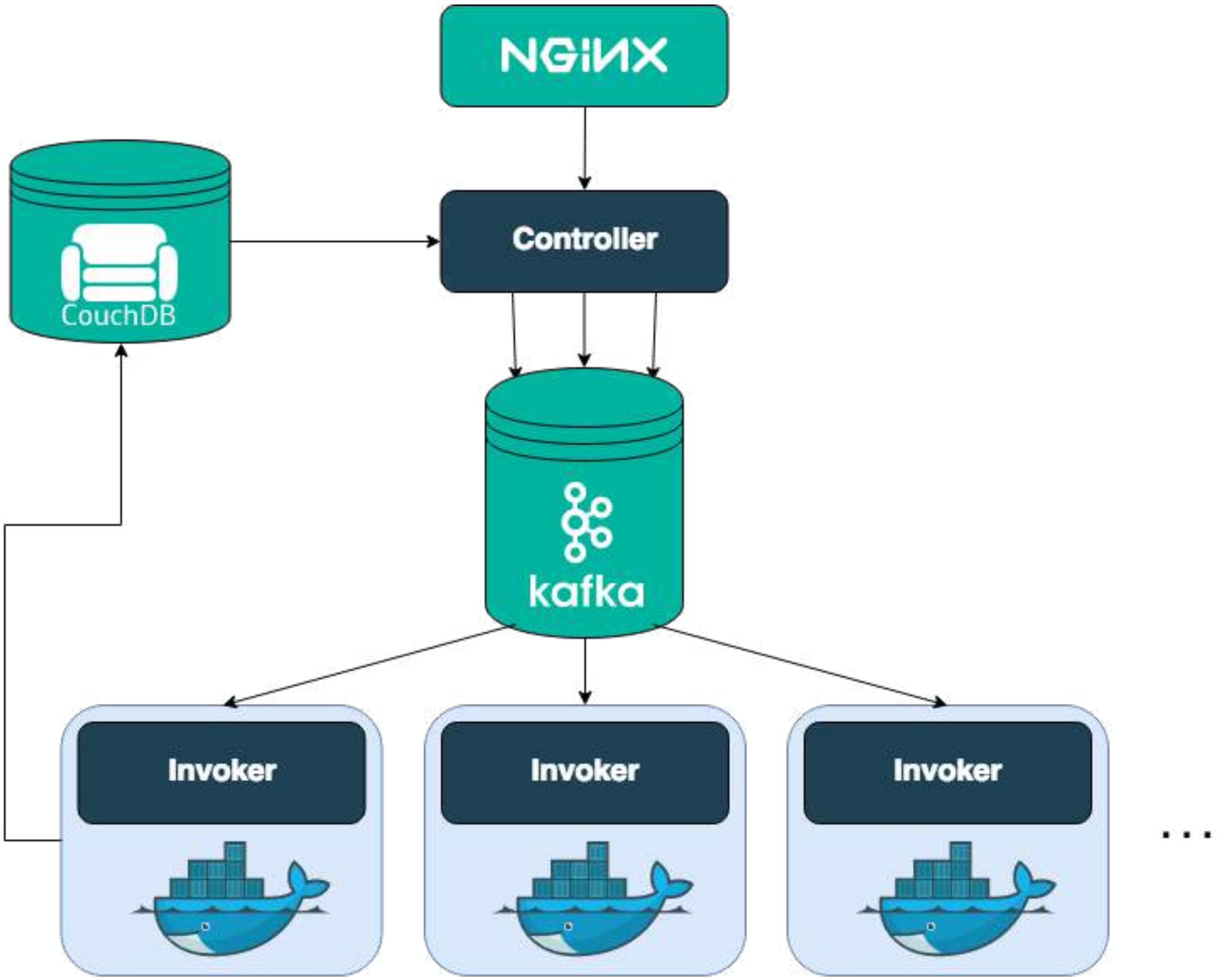
TriggerMesh Cloud

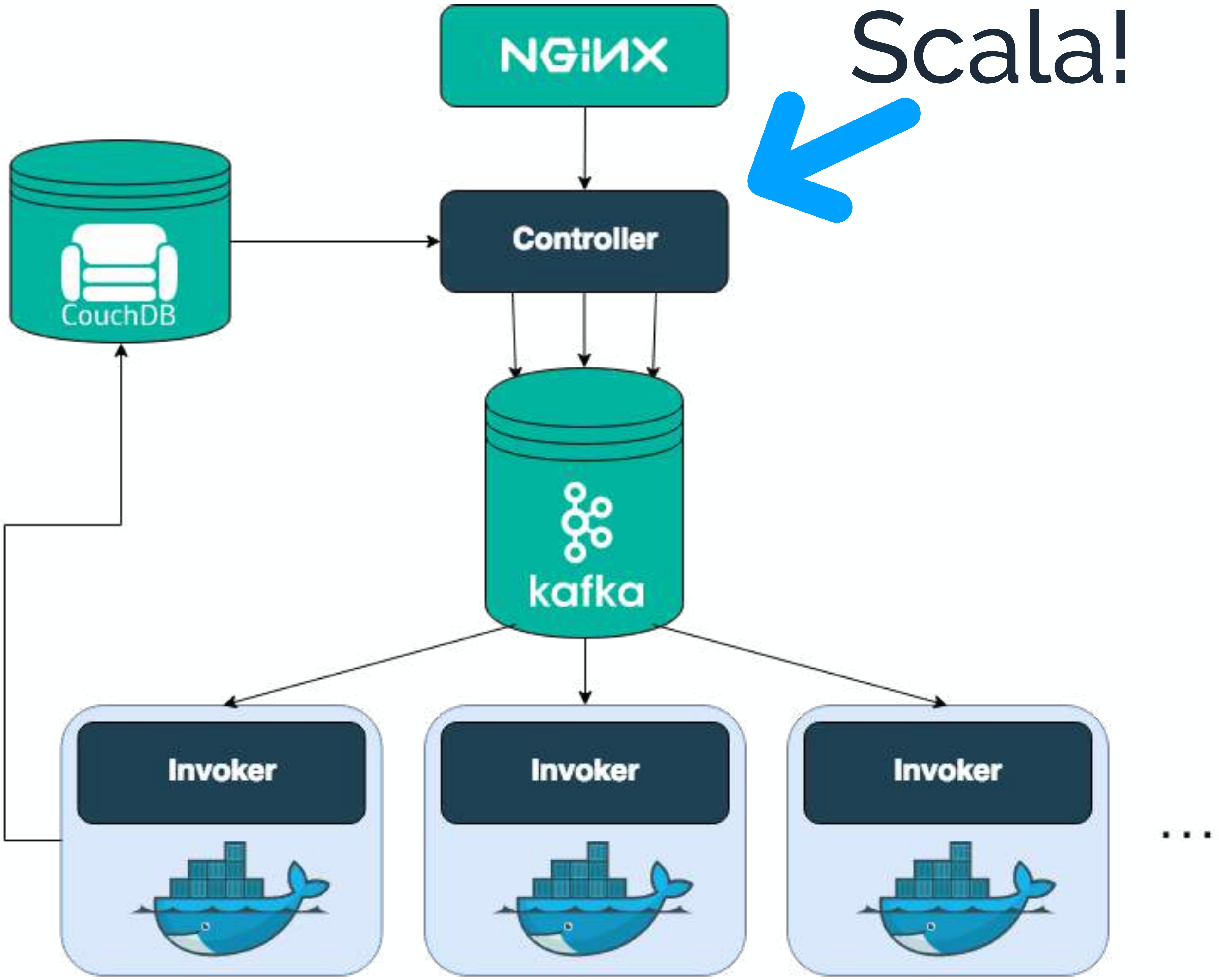


```
$ kn service create hello --image gcr.io/knative-samples/helloworld-go
$ curl http://hello.default.178.128.201.250.xip.io
Hello World!
```

Apache OpenWhisk

powers IBM Cloud Functions


NGINX
Controller
CouchDB
kafka
Invoker
Invoker
Invoker
...

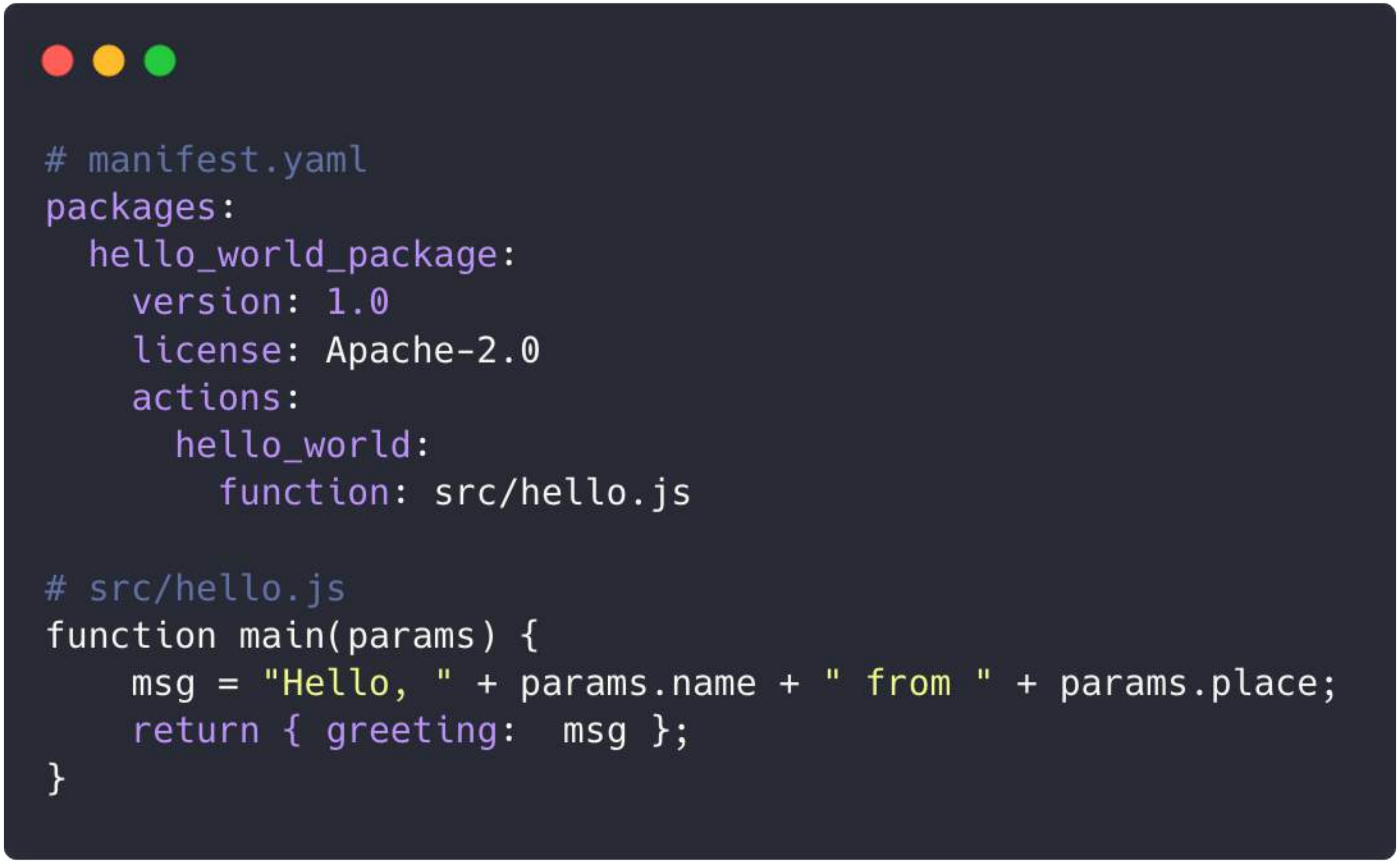


Scala!

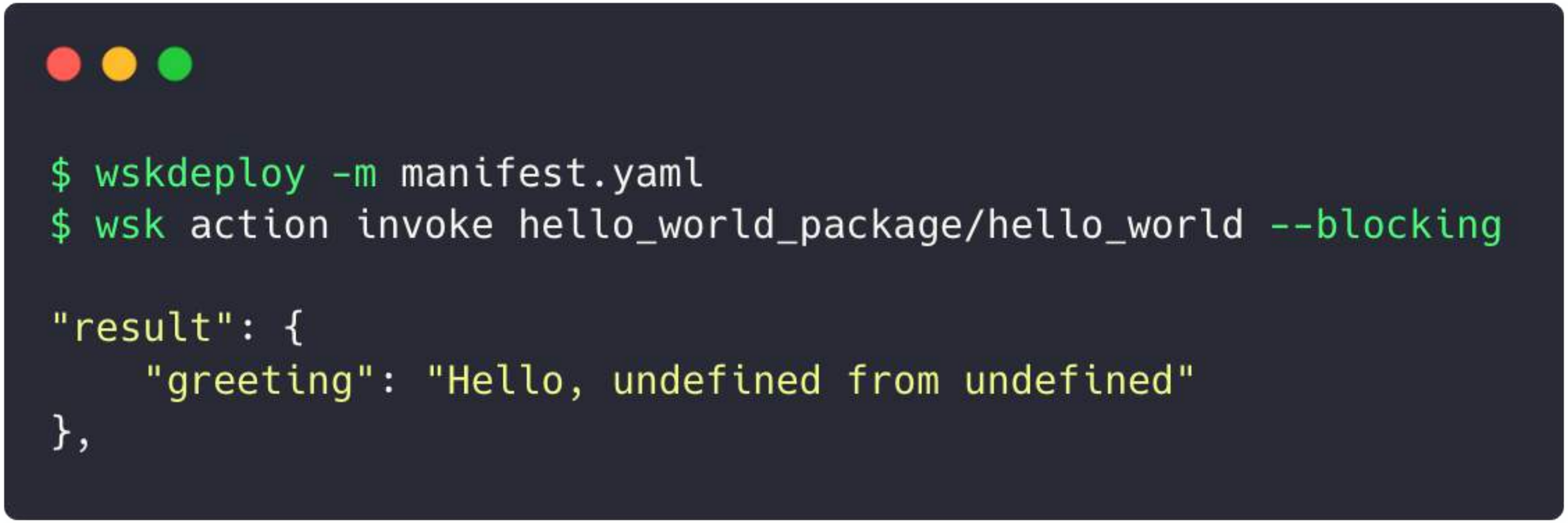
hides k8s very well

no CRD, kubectl-like experience

unique spec

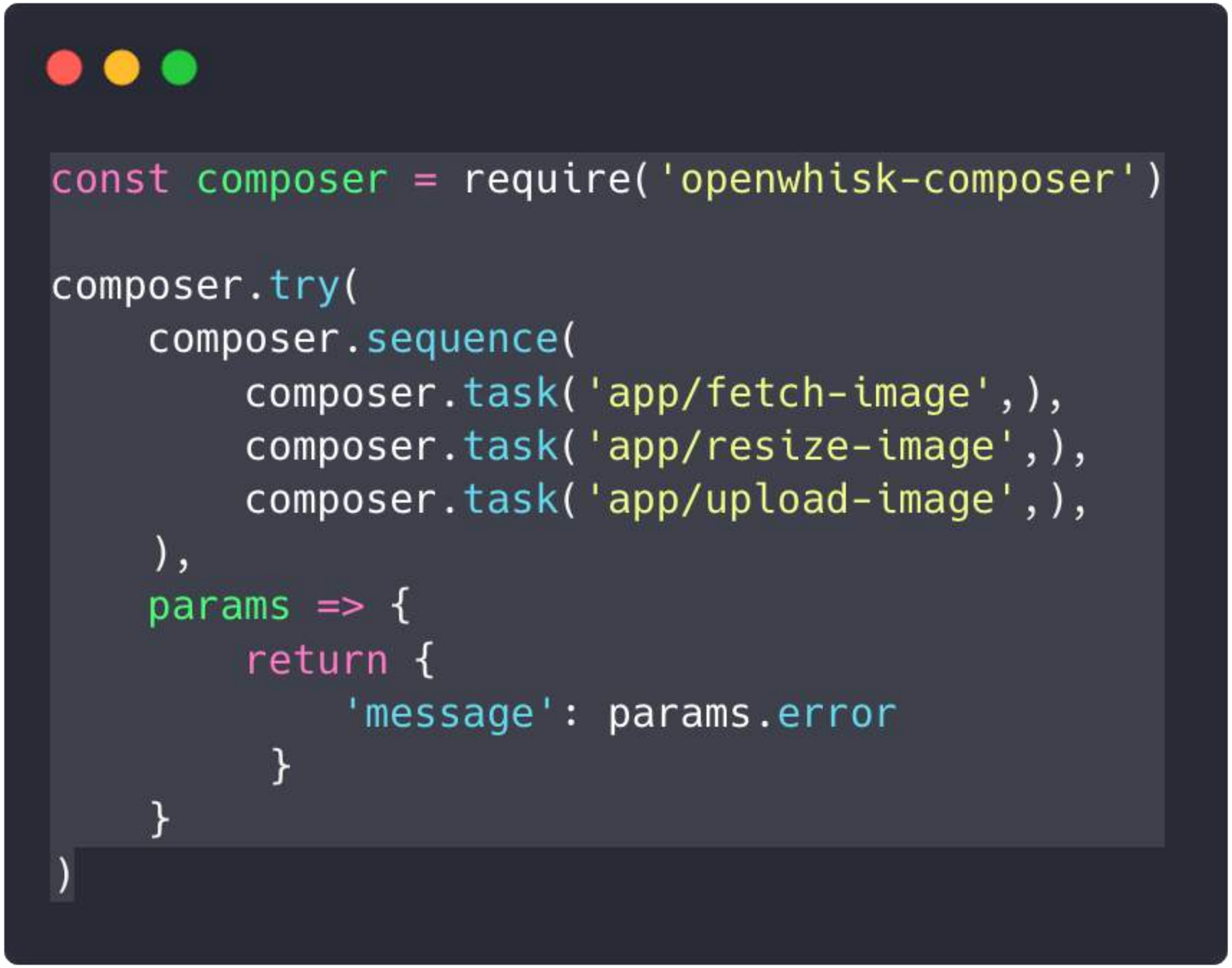


```
# manifest.yaml
packages:
  hello_world_package:
    version: 1.0
    license: Apache-2.0
    actions:
      hello_world:
        function: src/hello.js

# src/hello.js
function main(params) {
    msg = "Hello, " + params.name + " from " + params.place;
    return { greeting:  msg };
}
```

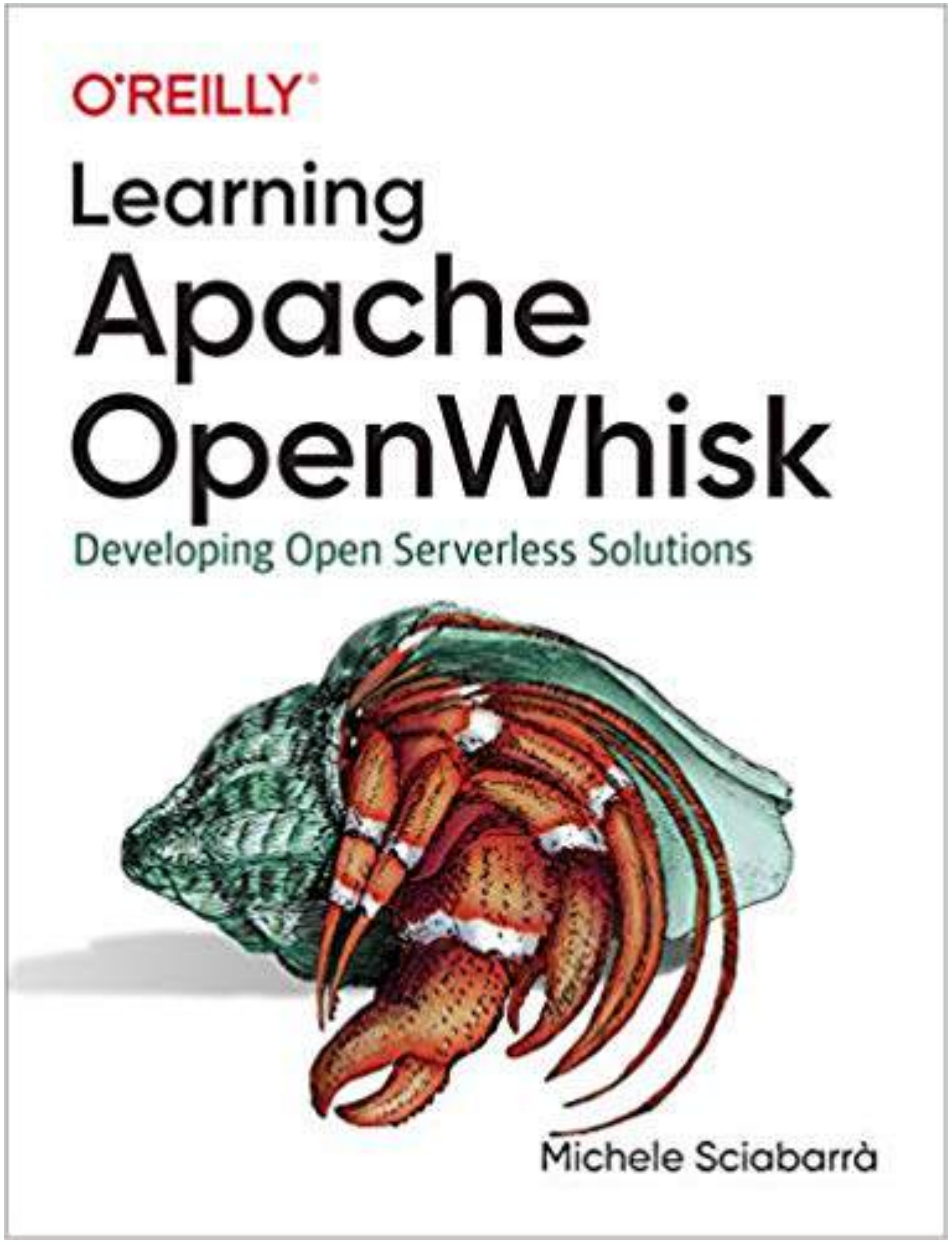


```
$ wskdeploy -m manifest.yaml
$ wsk action invoke hello_world_package/hello_world --blocking

"result": {
    "greeting": "Hello, undefined from undefined"
},
```

openwhisk-composer



```
const composer = require('openwhisk-composer')

composer.try(
    composer.sequence(
        composer.task('app/fetch-image',),
        composer.task('app/resize-image',),
        composer.task('app/upload-image',),
    ),
    params => {
        return {
            'message': params.error
         }
    }
)
```

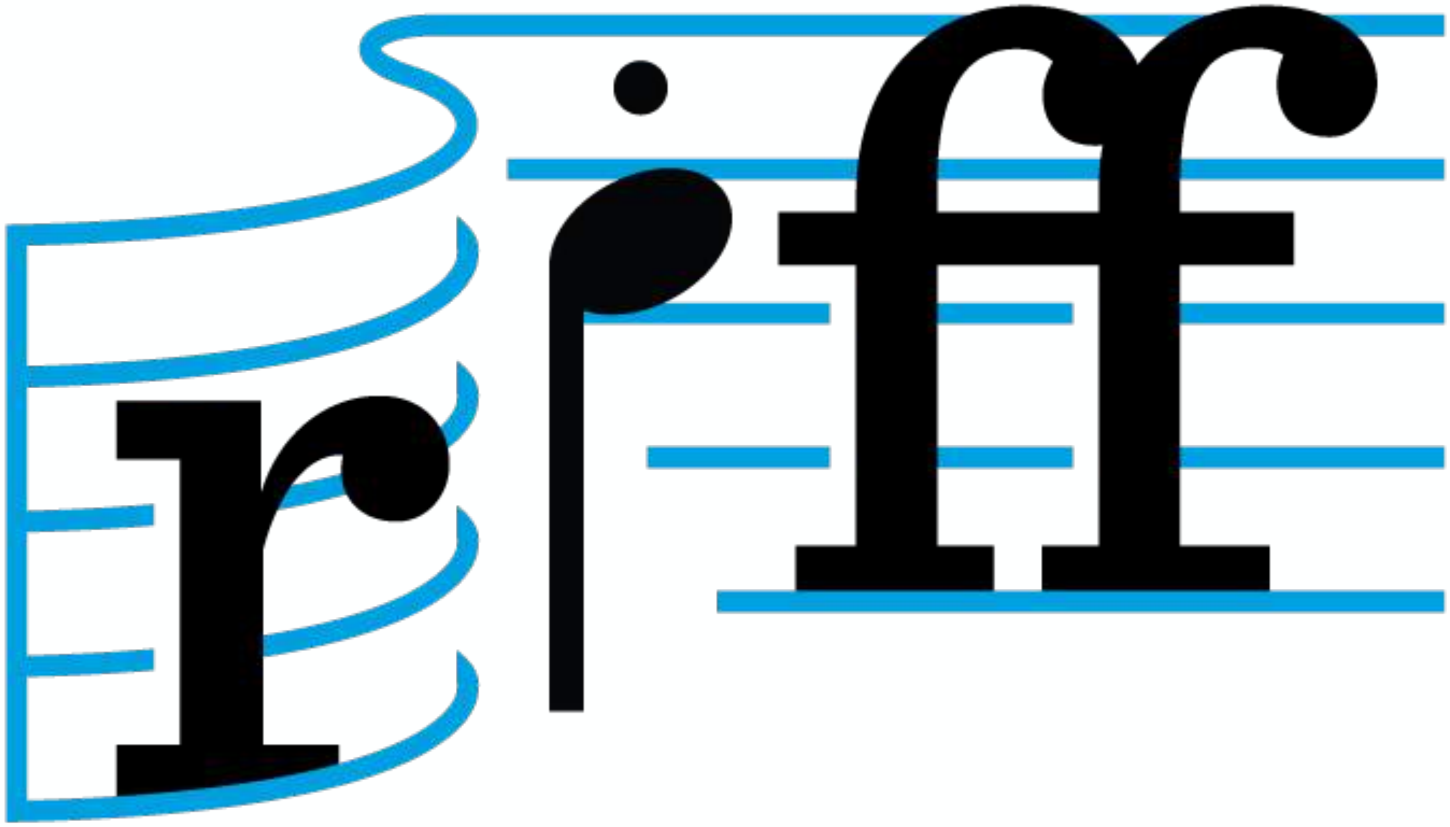


O'REILLY

Learning Apache OpenWhisk

Developing Open Serverless Solutions

Michele Sciabarrà



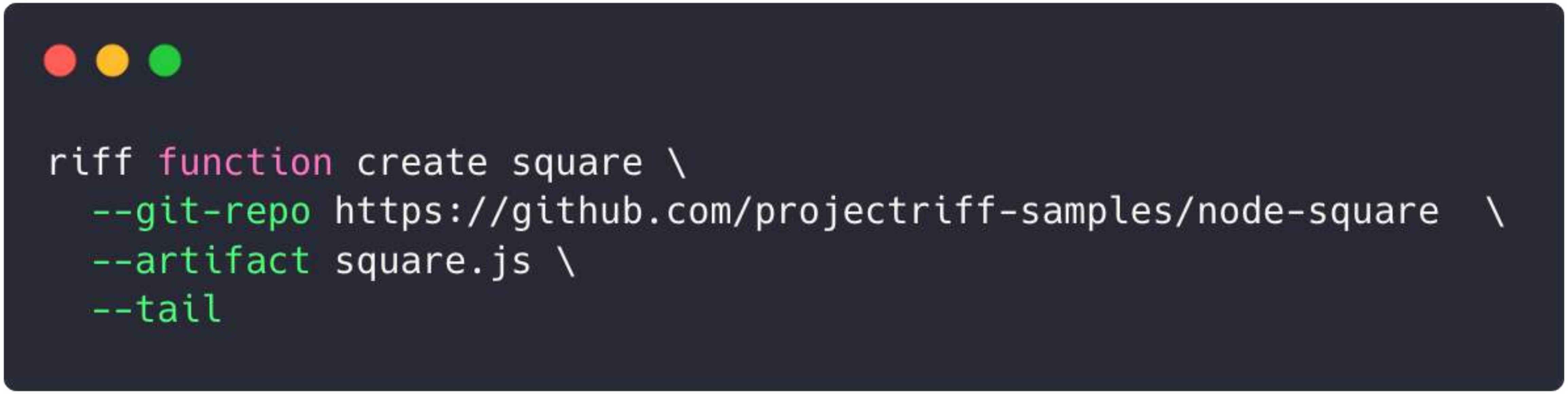
riff

powers Pivotal Function Service

(alpha)

uses Knative Serving as runtime

Cloud Native Buildpacks



```
riff function create square \
  --git-repo https://github.com/projectriff-samples/node-square  \
  --artifact square.js \
  --tail
```

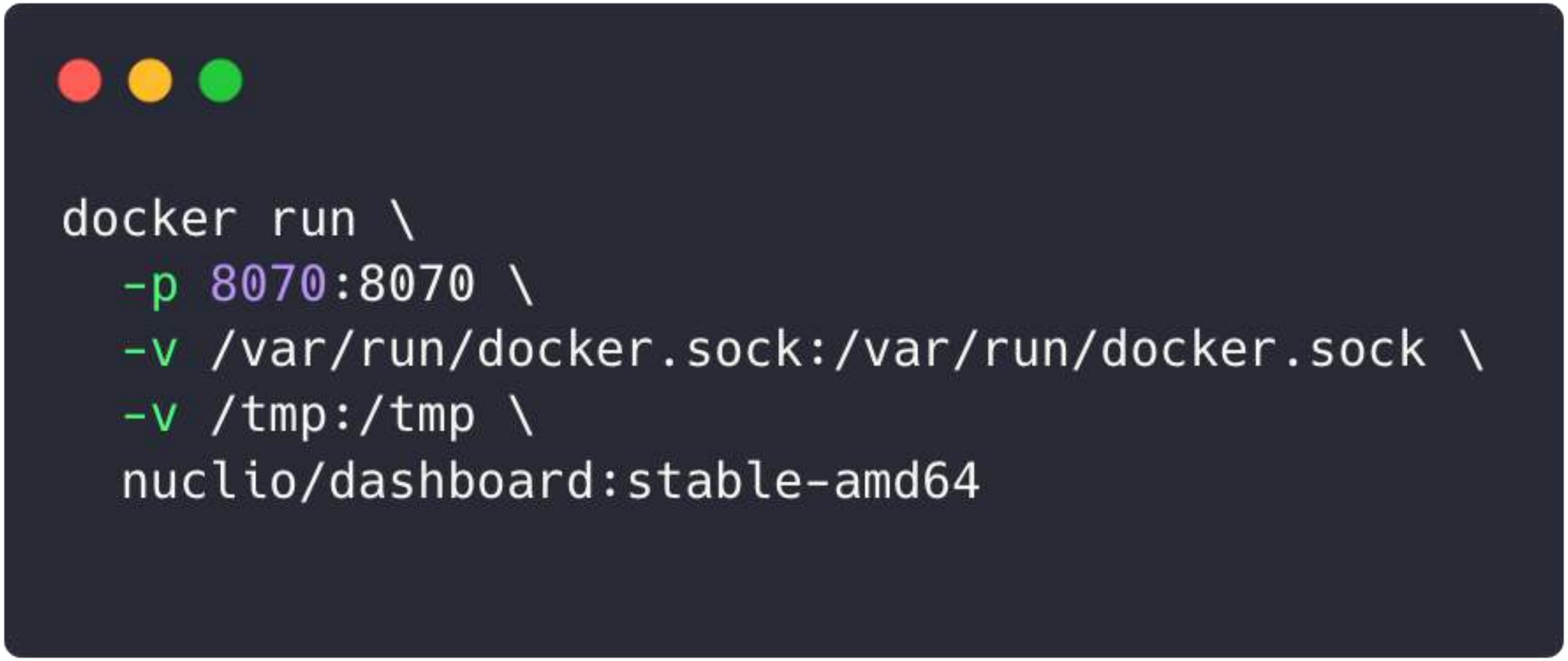
```
root@riff:~#
```

Nuclio

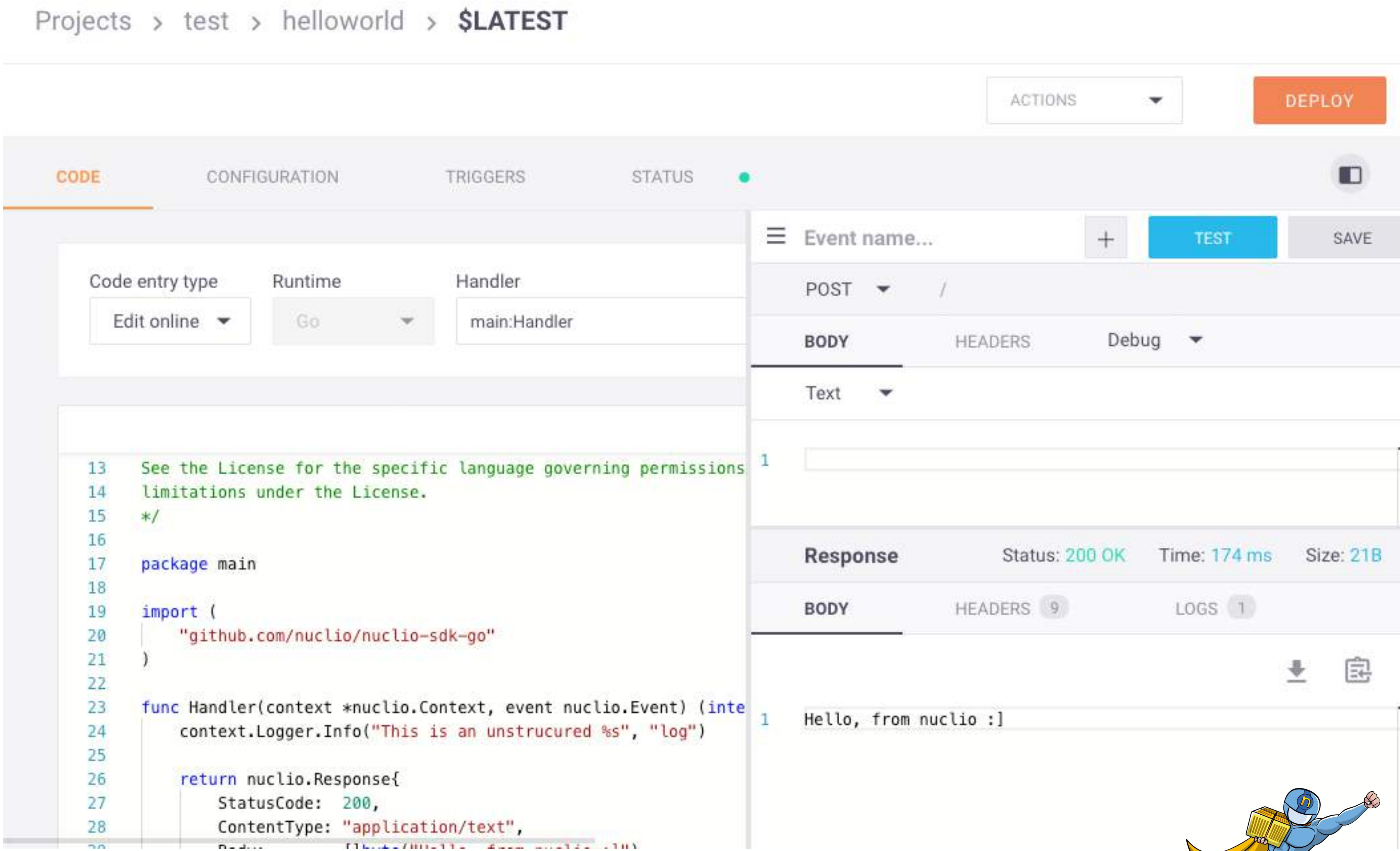
focused on Data Science pipelines

access to GPU

easiest to get up and running



```
docker run \
  -p 8070:8070 \
  -v /var/run/docker.sock:/var/run/docker.sock \
  -v /tmp:/tmp \
  nuclio/dashboard:stable-amd64
```



Code entry type: Edit online

Runtime: Go

Handler: main:Handler

POST /

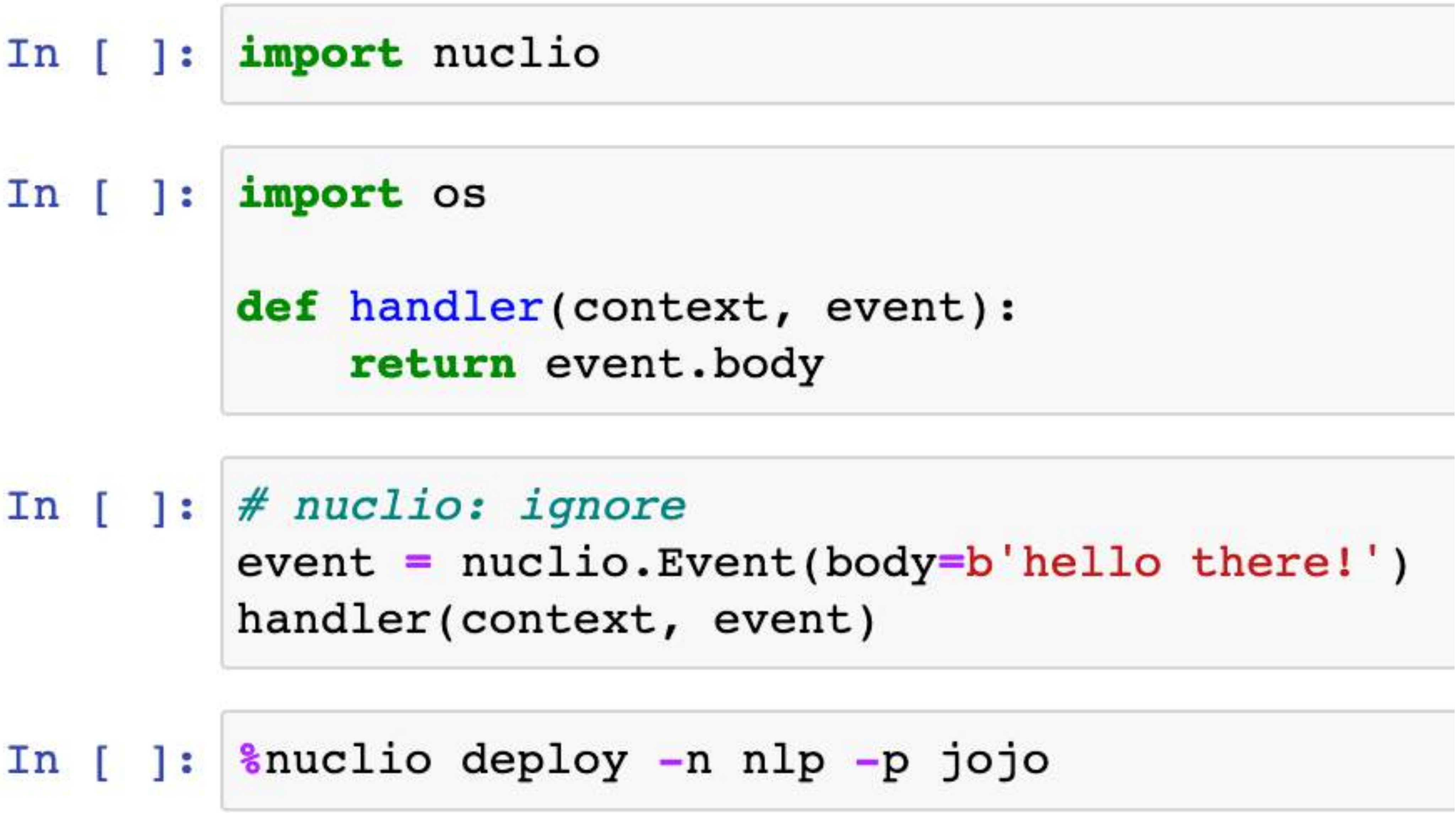
Text

Response Status: 200 OK Time: 174 ms Size: 21B

```
See the License for the specific language governing permissions
limitations under the License.
*/

package main

import (
    "github.com/nuclio/nuclio-sdk-go"
)

func Handler(context *nuclio.Context, event nuclio.Event) (inte
    context.Logger.Info("This is an unstrucured %s", "log")

    return nuclio.Response{
        StatusCode:  200,
        ContentType: "application/text",
        Body:        []byte("Hello, from nuclio :]"),
```

```
1  Hello, from nuclio :]
```

nuclio-jupyter



```
In [ ]: import nuclio
```

```
In [ ]: import os

        def handler(context, event):
            return event.body
```

```
In [ ]: # nuclio: ignore
        event = nuclio.Event(body=b'hello there!')
        handler(context, event)
```

```
In [ ]: %nuclio deploy -n nlp -p jojo
```

quick shout out for other tools

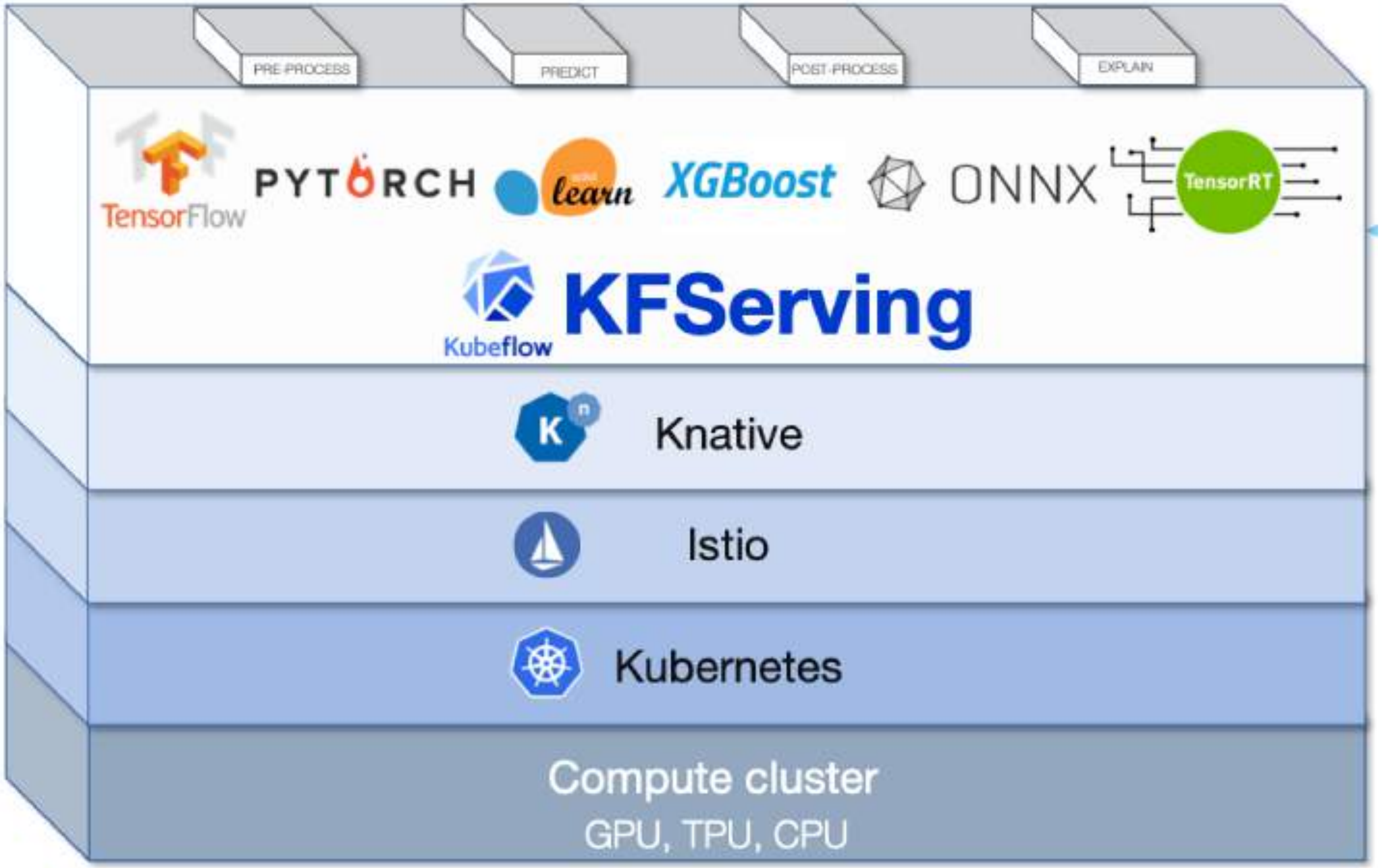
Kubeless

fn

fission

```
$ func kubernetes deploy --name func …
```

KEDA


PRE-PROCESS
PREDICT
POST-PROCESS
EXPLAIN
TensorFlow
PYTORCH
scikit learn
XGBoost
ONNX
TensorRT
Kubeflow
KFServing
Knative
Istio
Kubernetes
Compute cluster
GPU, TPU, CPU

TRIGGER**MESH KLR**

KNATIVE LAMBDA RUNTIME

CNCF
Serverless Working Group

CNCF
Serverless Whitepaper

CNCF Serverless Landscape

2020-04-15T04:02:13Z 09acae8

See the serverless interactive display at s.cncf.io

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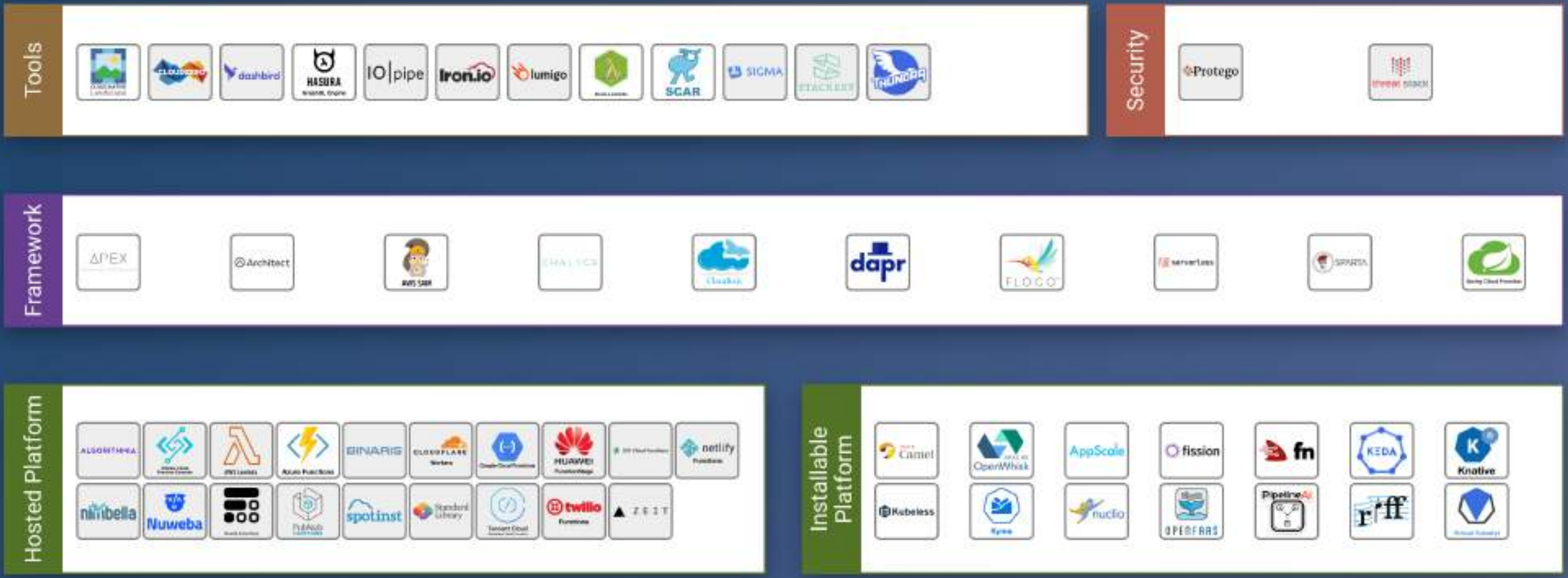

Cloud Native Landscape

s.cncf.io

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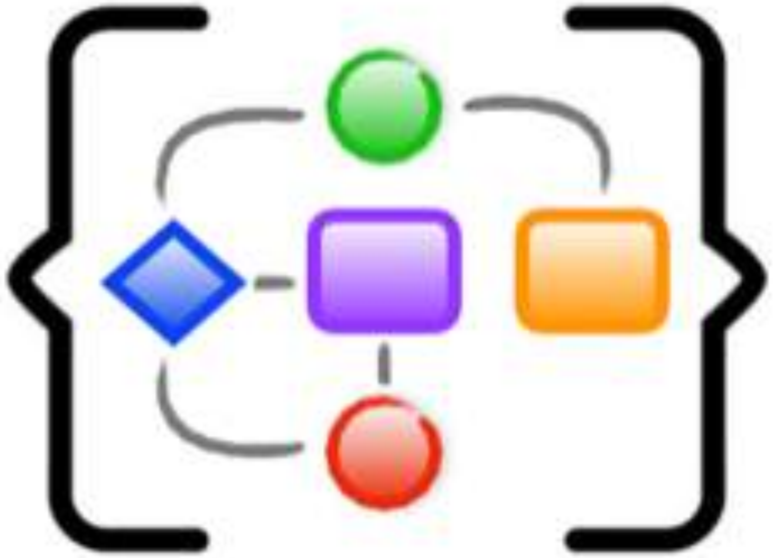
CLOUD NATIVE Landscape

CLOUD NATIVE COMPUTING FOUNDATION

Redpoint

cloudevents



Serverless Workflow

why should you care about

open source serverless?

things that **are** amazing

open source

leverage of k8s ecosystem

observability

“avoid lock-in”

unlimited resource consumption

fine-tuned scalability

things that ~~could~~ **will** be better

maturity

learning content

server management

The State of **Open Source Serverless**

thanks ❤

specially to

Alex Ellis

Andres Martines Gotor

Lian Li

Markus Thömmes

Matt Moore

Ta-Ching Chen

https://bit.ly/3bLz3cX

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