QAWARE
SOFTWARE ENGINEERING

# Serverless

# Serverless

is the next logical evolution in Cloud Native Software Development

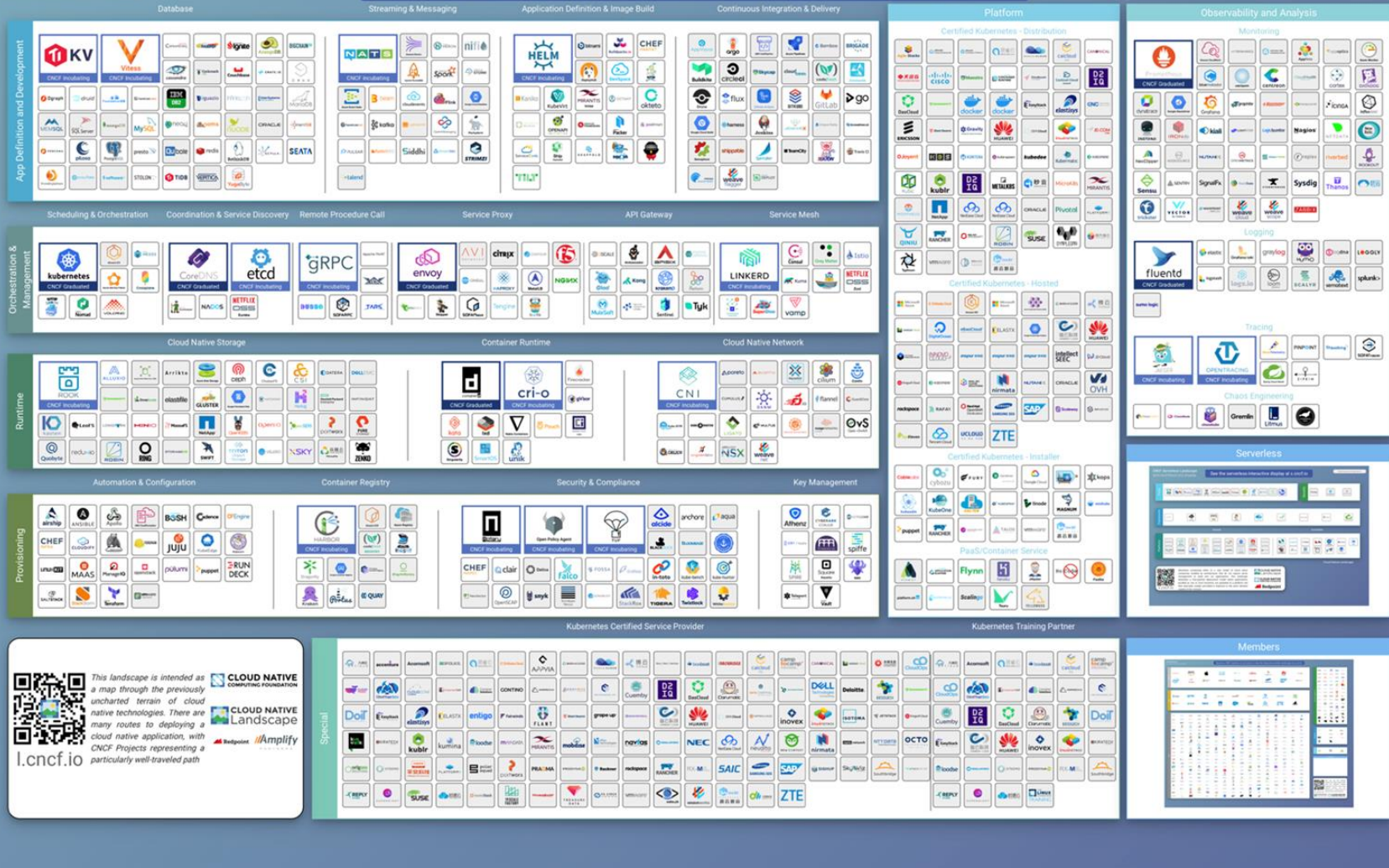
Bild: Jupiterimages – gettyimages.de

Bild: Berkozel – gettyimages.de

CNCF Cloud Native Landscape
2019-10-07T04:21:31Z 37ca95b

Overwhelmed? Please see the CNCF Trail Map. That and the interactive landscape are at l.cncf.io

Greyed logos are not open source




l.cncf.io

*This landscape is intended as a map through the previously uncharted terrain of cloud native technologies. There are many routes to deploying a cloud native application, with CNCF Projects representing a particularly well-traveled path*

CLOUD NATIVE COMPUTING FOUNDATION

CLOUD NATIVE Landscape

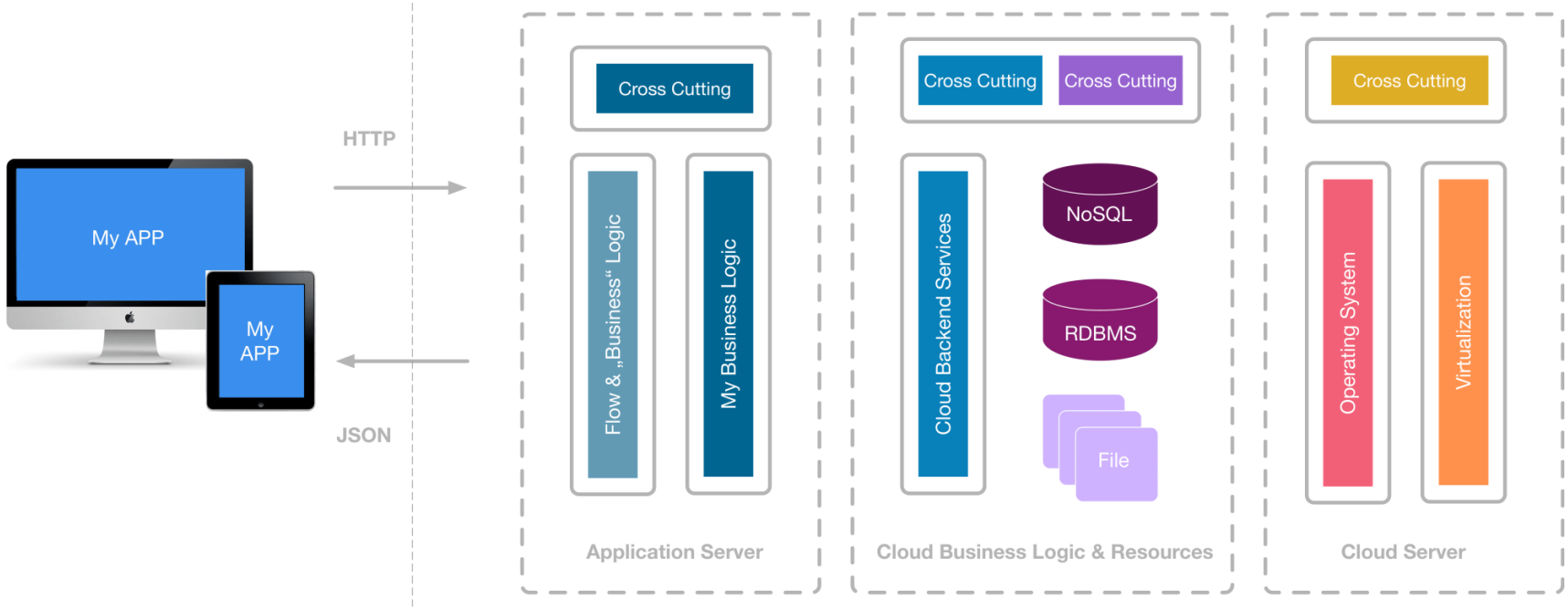
Redpoint Amplify

*CLOUD NATIVE SOFTWARE DEVELOPMENT IS*

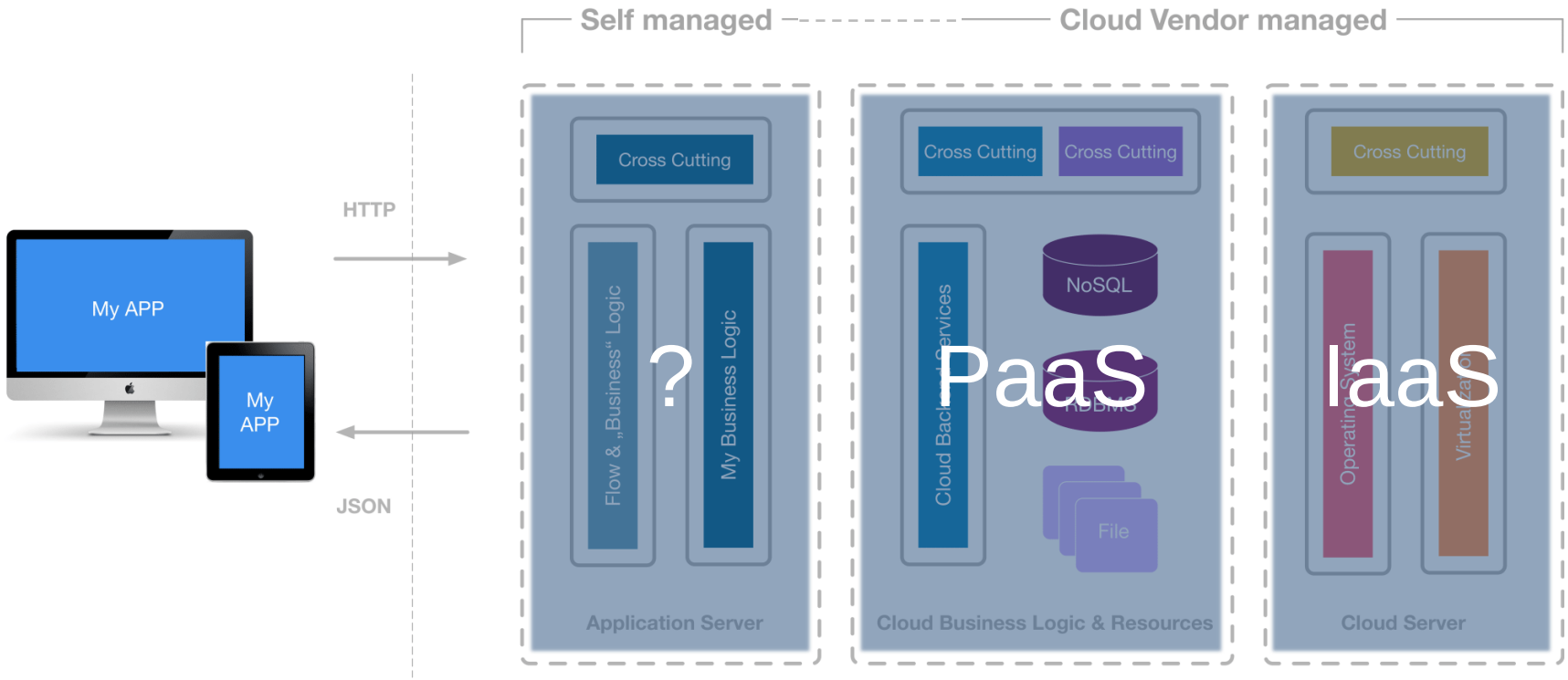
# *COMPLEX.*

*DOCKER, YAML, MICROSERVICES, KUBERNETES, ET.AL.*

# Traditionelle Cloud-basierte Anwendungsarchitektur



# Traditionelle Cloud-basierte Anwendungsarchitektur



*Kein Server ist einfacher zu verwalten, als kein Server!*

*Werner Vogels, CTO, Amazon*

Bild: pavlinec – gettyimages.de

Serverless computing refers to a new model of cloud native computing,

*https://landscape.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.

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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. It leverages a finer-grained deployment model where applications, bundled as one or more functions, are uploaded to a platform

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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. It leverages 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.

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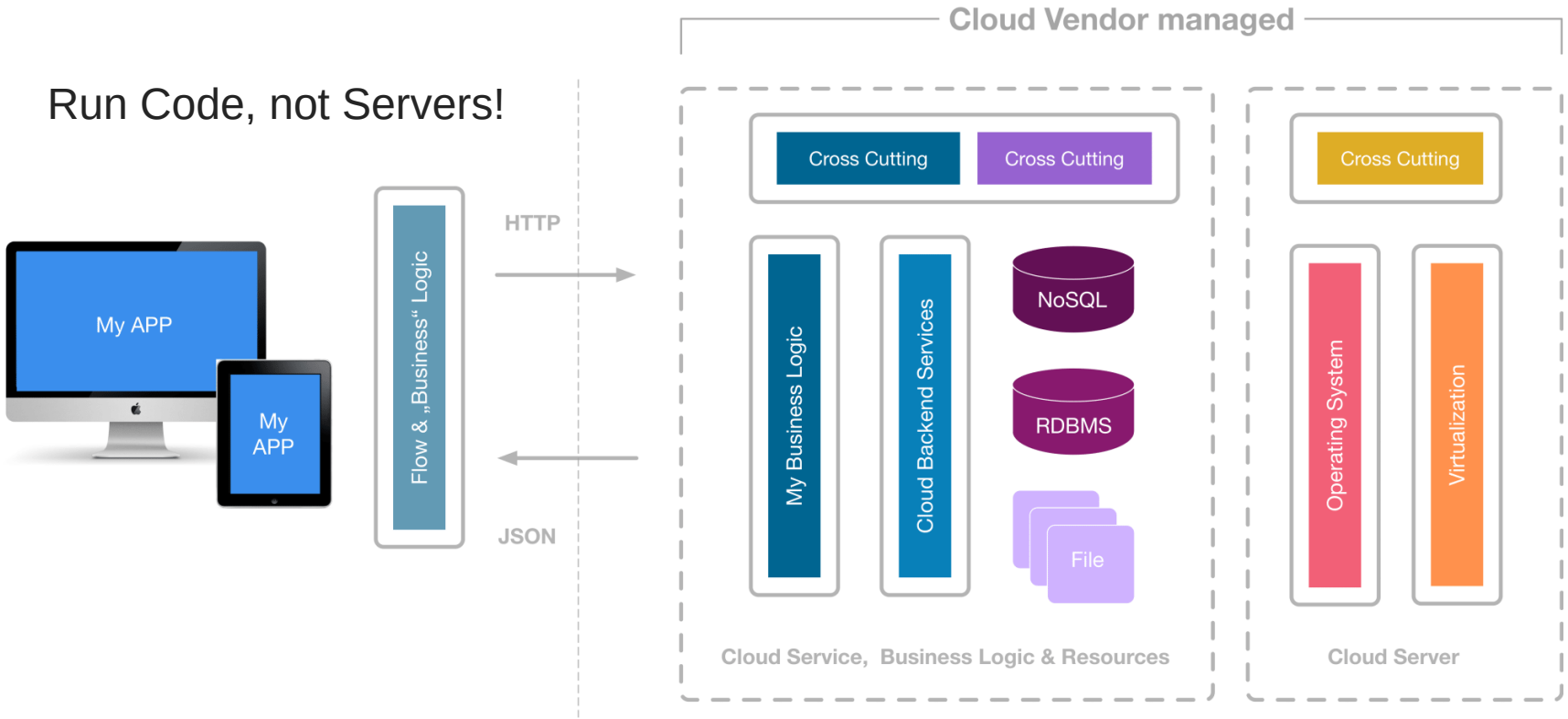
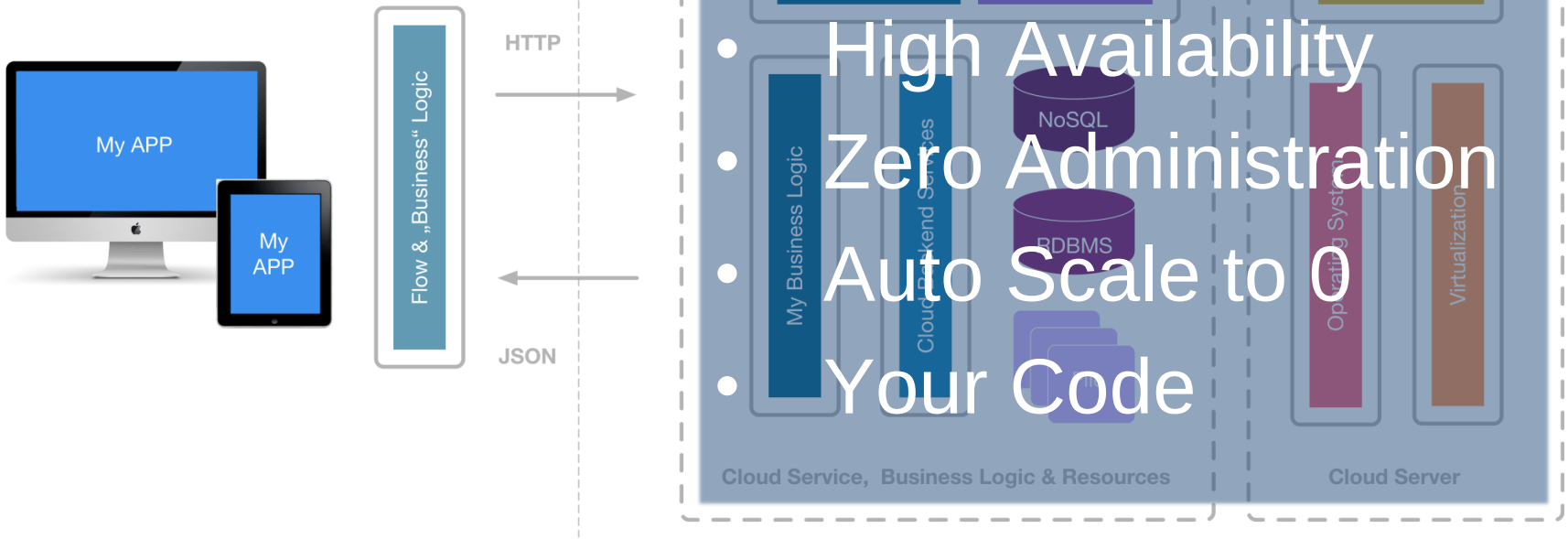
# Serverless Anwendungsarchitektur

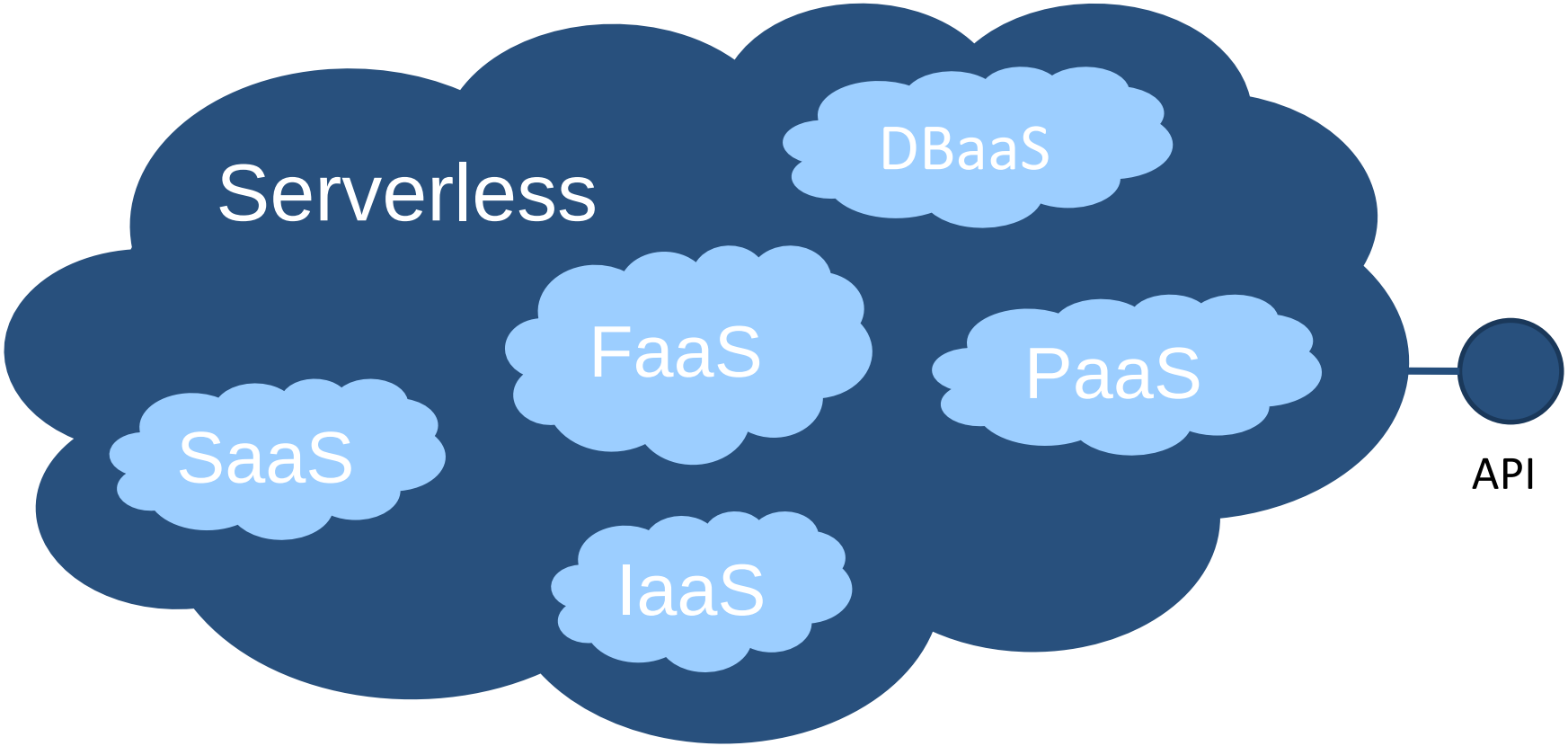


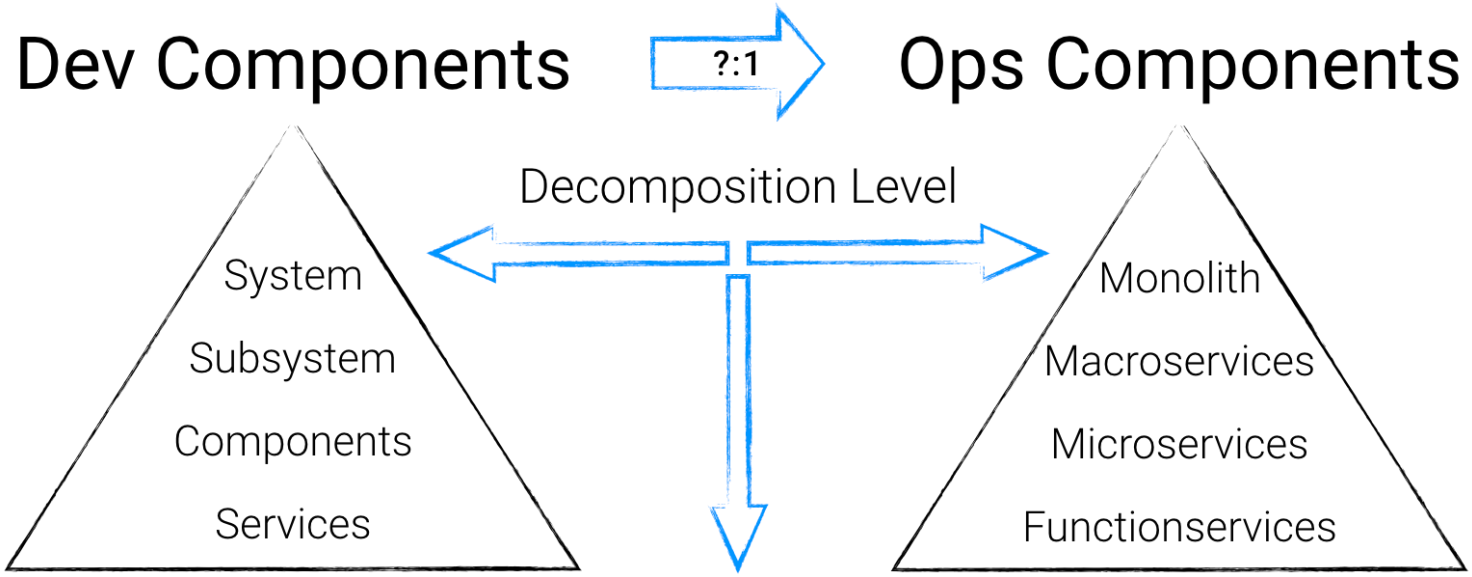
# Serverless Anwendungsarchitektur

Run Code, not Servers!



# Out-of the Box Self-scaling Fully Managed Backend





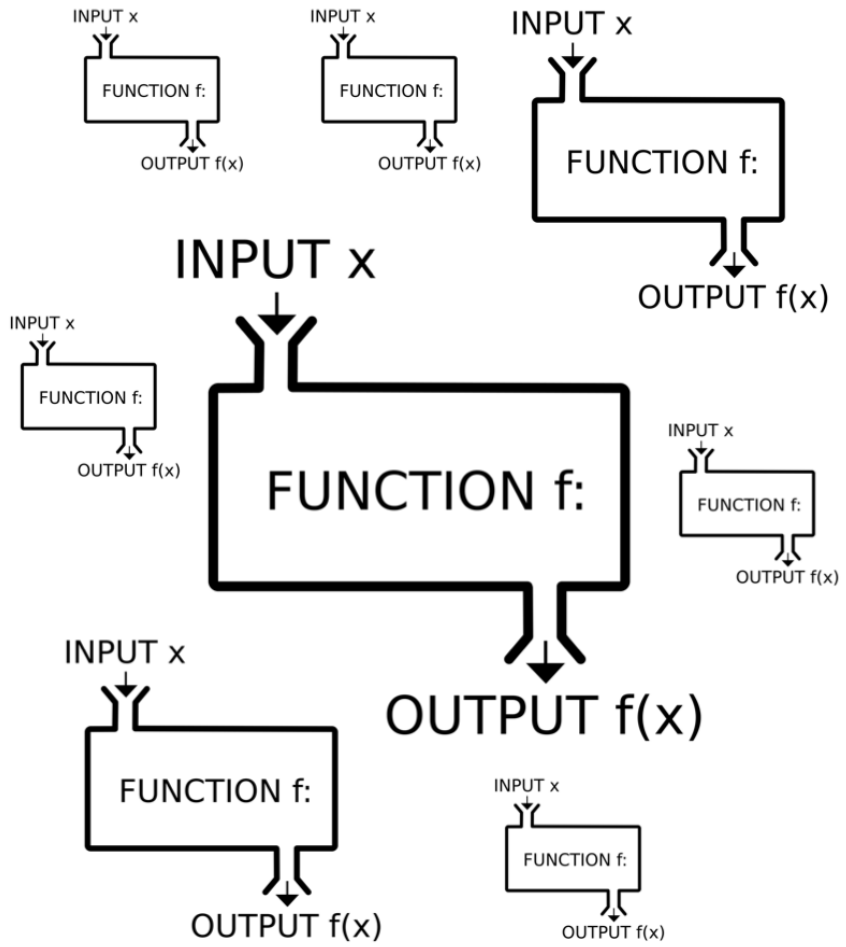

## Decomposition Trade-Offs

- \+ More flexible to scale
- \+ Runtime isolation (crash, slow-down, …)
- \+ Independent releases, deployments, teams
- \+ Higher resources utilisation
- – Distribution debt: Latency, Consistency
- – Increased infrastructure complexity
- – Increased troubleshooting complexity
- – Increased integration complexity

# Functions

as preferred Serverless Application

Programming Model

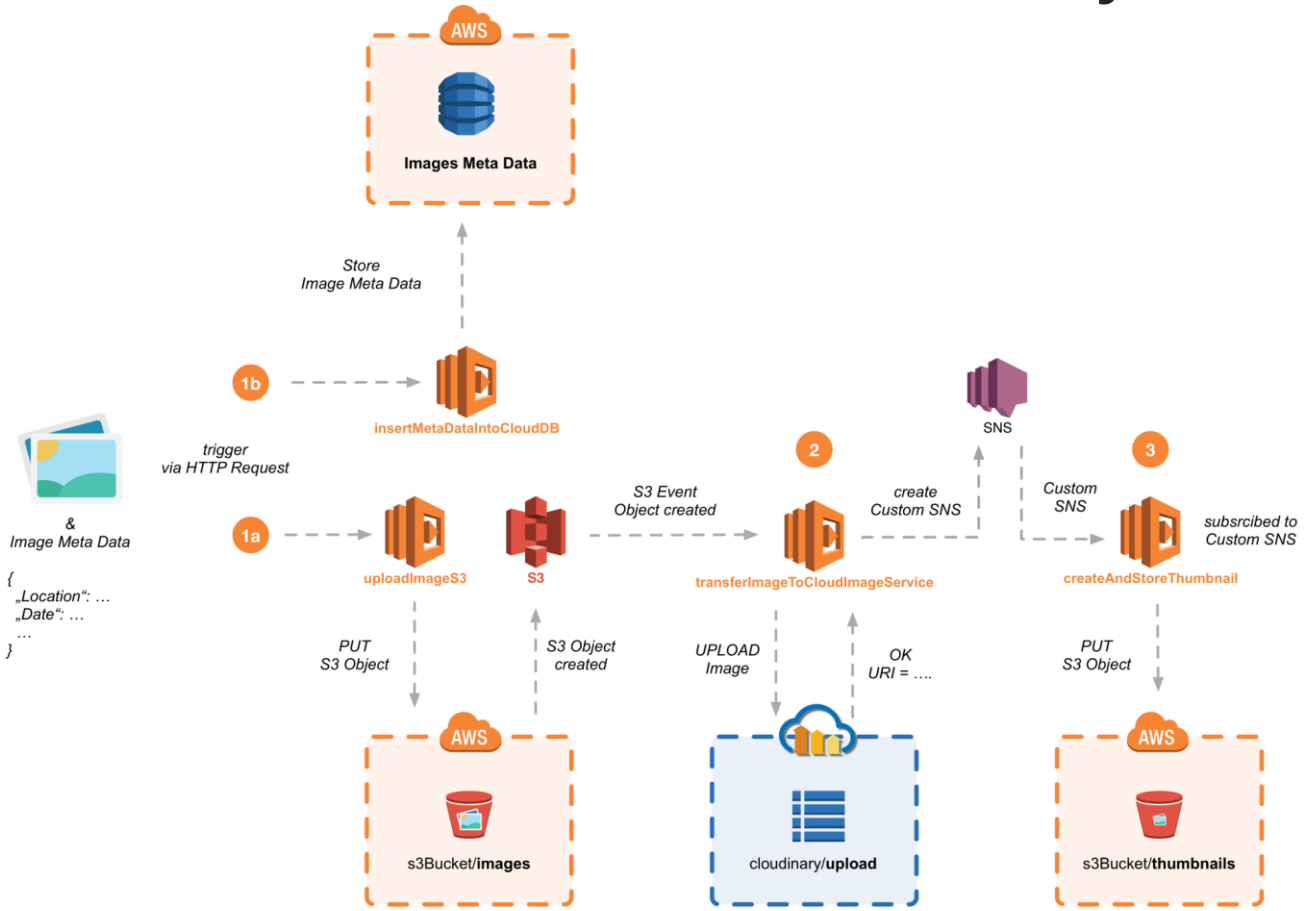


*EVENT-DRIVEN ARCHITECTURE*

*enables loosly coupled reactive*

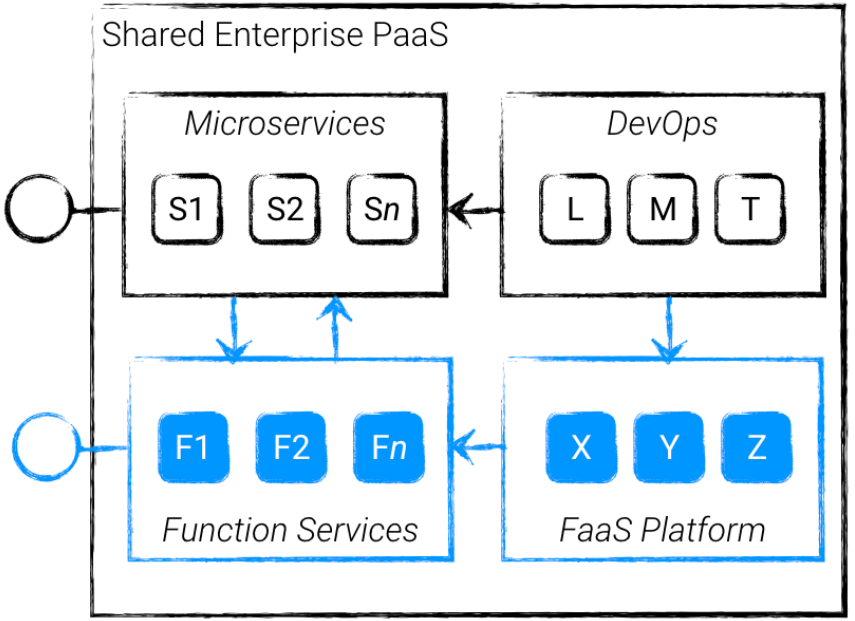
***software components and services.***

# Create Thumbnails the AWS Lambda Way



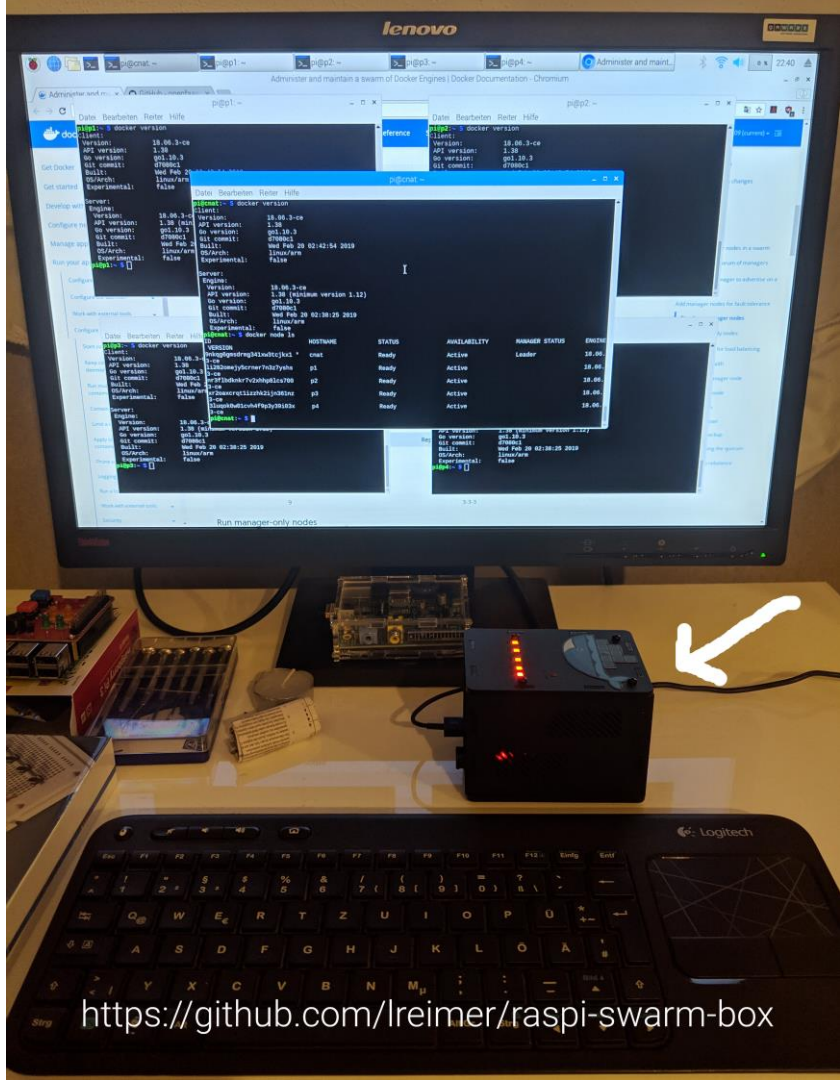
# Use Case 1
# Hybrid Architectures

- Kombination von Microservice Architektur mit Event Driven Architecture
- Nutzung von Function Services für Event-getriebene Use Cases
- Reduzierter Ressourcen-Verbrauch durch Scale-to-Zero
- Integration in bestehende Enterprise PaaS Umgebung



# Use Case 2
# Edge und Fog Computing

- Anbindung unserer LoRaWan Raum-Sensoren mittels Serverless Backend
- Couch Projekt: Nutzung von FaaS auf Low Power Devices



# CNCF Serverless Landscape

2019-03-27T01:59:06Z 48d8a56

See the serverless interactive display at s.cncf.io

Greyed logos are not open source

## Tools

Epsagon, event gateway, HASURA, IO|pipe, Iron.io, python-λ, SCAR, SIGMA, STACKERY, THUNDRA

## Security

intrinsic, Protego, PURESEC, threat stack

## Framework

APEX, Architect, aws Chalice, AWS SAM, Claudia.js, FLOGO, gun.io, serverless, SPARTA, Spring Cloud Function

Hosted | Installable

## Platform

Hosted: ALGORITHMIA, IBM Cloud Functions, kitpune, AWS Lambda, netlify, Azure Functions, PubNub Functions, BINARIS, spotinst, cloudboost, stdlib, CLOUDFLARE Workers, Tencent Cloud, Google Cloud Functions, twilio Functions, HUAWEI FunctionStage, ZEIT

Installable: OpenWhisk, Kyma, AppScale, LunchBadger, DISPATCH, nuclio, fission, OPENFAAS, fn, PipelineAI, GALACTIC FOG, riff, Knative, Virtual Kubelet, Kubeless

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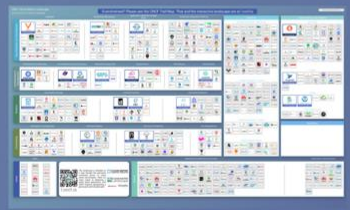
CLOUD NATIVE COMPUTING FOUNDATION

Redpoint

Cloud Native Landscape



# MY CRITERIA TO CHOOSE THE IDEAL FAAS PLATFORM

- OPEN SOURCE - NO INITIAL $$$ AND NO VENDOR LOCK-IN PLEASE
- MATURITY - GOOD AND ACTIVE COMMUNITY, LITTLE ISSUES, FREQUENT RELEASES
- USE CASES - GENERAL PURPOSE, ENTERPRISE, BIG DATA, AI, EDGE COMPUTING
- APPROACHABLE - QUICK START AND SUFFICIENT DOCUMENTATION
- LANGUAGE RUNTIMES - PLEASE MORE THAN JAVASCRIPT!
- DEVELOPER FRIENDLY - TOOLS & FRAMEWORKS, LOCAL RUNTIME, TESTING, IDE SUPPORT
- OPERABILITY - EASY SETUP, SUPPORTED PLATFORMS, TECHNOLOGY FOOTPRINT
- INTEGRATION - SUPPORTED TRIGGERS, INFRASTRUCTURE, PLUGINS, STANDARDS
- PERFORMANCE - GOOD COLD STARTUP PERFORMANCE AND THROUGHPUT

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## Security


## Framework


~~Hosted~~ Installable

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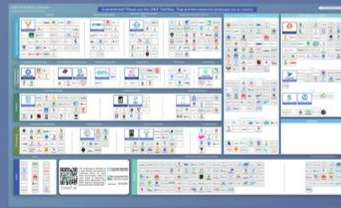

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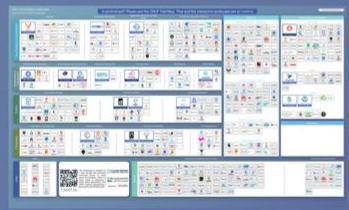

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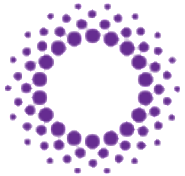
OPENFAAS



fission

Kubeless

nuclio

Kyma

siehe auch https://bit.ly/2Mh1kxJ

# Die Kandidaten

- OpenFaas
  https://www.openfaas.com
- Fission
  https://fission.io
- Kubeless
  https://kubeless.io
- Nuclio
  https://nuclio.io
- Knative
  https://knative.dev/
- Kyma
  https://kyma-project.io

| | LANGUAGE | USE CASES | GENERATION | PLATFORMS | RUNTIMES | TRIGGERS |
|---|---|---|---|---|---|---|
| FISSION | GO | ENTERPRISE | 2ND | K8S | GO, PYTHON, NODEJS, JAVA/JVM | CRON, HTTP, NATS, AZURE QUEUE STORAGE, KAFKA, KUBEWATCH |
| KUBELESS | GO | ENTERPRISE | 2ND | K8S | NODEJS, JAVA, GO, JVM, PYTHON, PHP, RUBY, .NET CORE, BALLERINA, VERT.X | CRON, HTTP, NATS, KINESIS, KAFKA |
| OPENFAAS | GO | ENTERPRISE, IOT | 1ST | K8S, DOCKER | GO, C#, JAVA8, DOCKERFILE, NODEJS, PHP, PYTHON, RUBY | HTTP, CRON, KAFKA, AWS SNS, S3, CLOUDEVENTS, IFTTT, REDIS, MQTT, NATS |
| NUCLIO | GO | ENTERPRISE, IOT | 2ND | DOCKER, K8S, AWS, GCP | .NET CORE, GO, JAVA, NODEJS, PYTHON, SHELL | CRON, EVENTHUB, HTTP, KAFKA, KINESIS, NATS, RABBITMQ, MQTT |
| OPENWHISK | SCALA | ENTERPRISE, HOSTED? | 2ND | K8S, MESOS, DOCKER, OPENSHIFT | NODEJS, SWIFT, JAVA, GO, SCALA, PYTHON, PHP, RUBY, .NET CORE, BALLERINA | CLOUDANT, RSS, KAFKA, JIRA, BLUEMIX PUSH, SLACK, GITHUB |
| FN PROJECT | GO | ENTERPRISE, HOSTED? | 1ST | DOCKER, K8S | JAVA, GO, NODEJS, PYTHON, RUBY | HTTP |

# IT DEPENDS ON YOUR USE CASE.

- FISSION IS A PRETTY COMPLETE PLATFORM.
- OPENFAAS IS VERY POPULAR WITH AN ACTIVE COMMUNITY. CURRENTLY THE ONLY ONE WITH SUPPORT FOR ARM DEVICES.
- NUCLIO IS FAST, LIGHTWEIGHT AND HAS SUPPORT FOR MANY TRIGGERS. PROMISING ROADMAP.
- KUBELESS IS LIGHTWEIGHT AND SIMPLE.