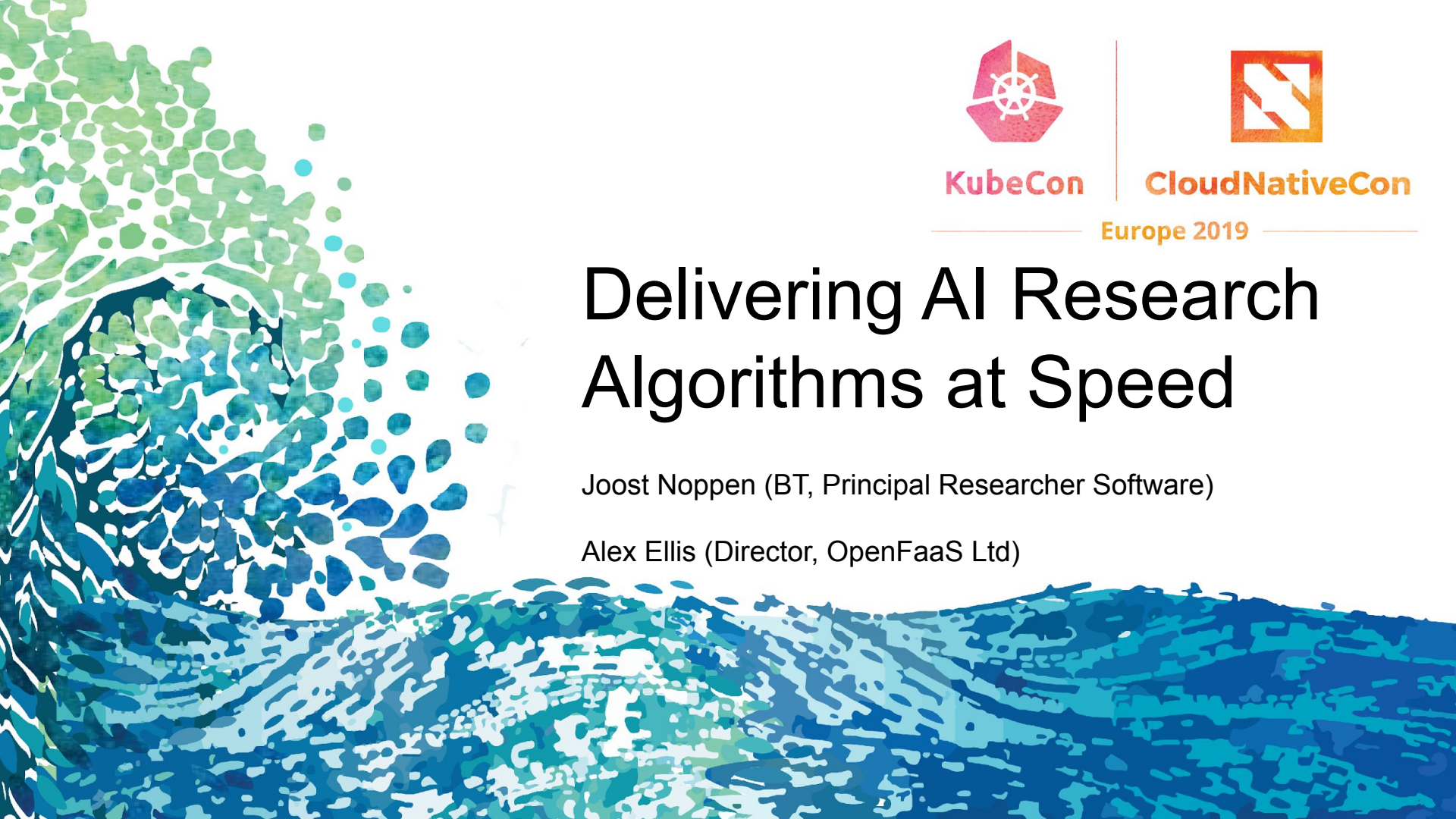


KubeCon | CloudNativeCon Europe 2019

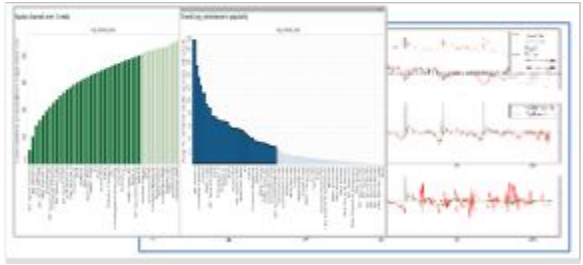
Delivering AI Research Algorithms at Speed

Joost Noppen (BT, Principal Researcher Software)

Alex Ellis (Director, OpenFaaS Ltd)

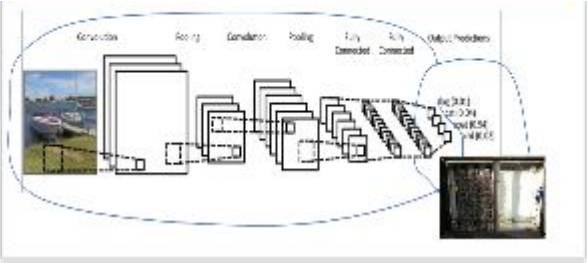
BT Applied Research

Machine Learning

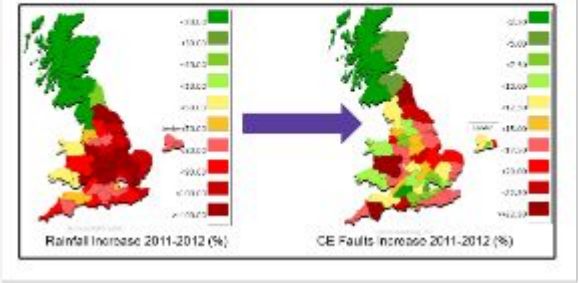


Cyber Defence

Inventory Repair



Automated Forecasting



Intelligent Interfaces

The Challenge...

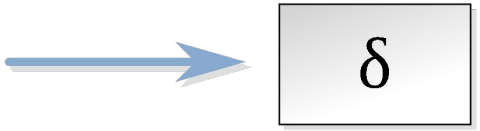
Problems Identified

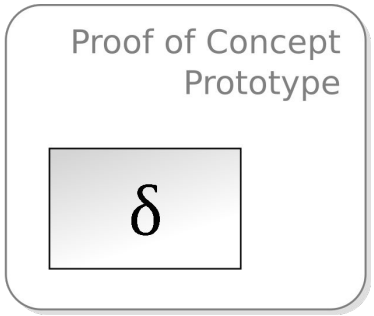
1. Diverse range of skills
2. Lack of modern CI/CD practice
3. Need for Cloud-Native model for web-scale delivery

Constraints

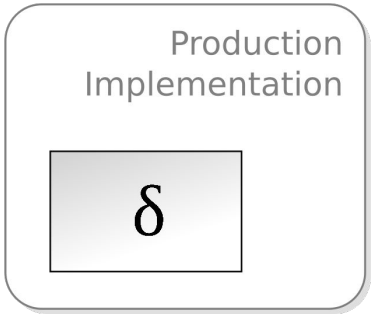
1. Must run on-premises
2. Cope well with confidential data
3. Enterprise controls

LifeCycle of an Algorithm





Delivery 3+ Years

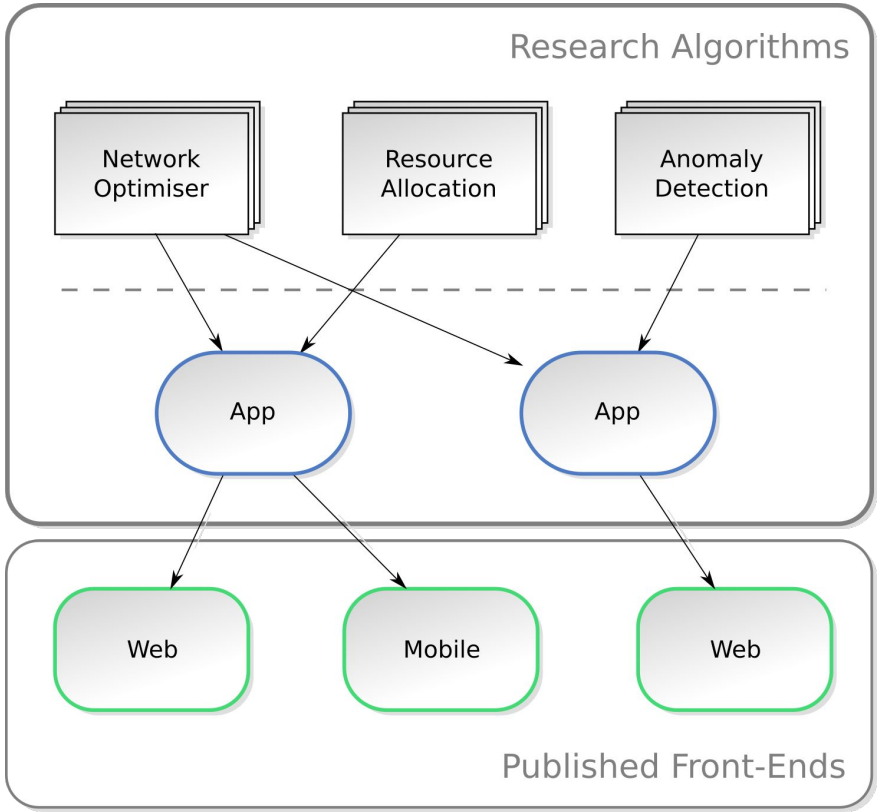


Rapid Dev. and Reuse

Uniform delivery

Reuse across research

Ready for production



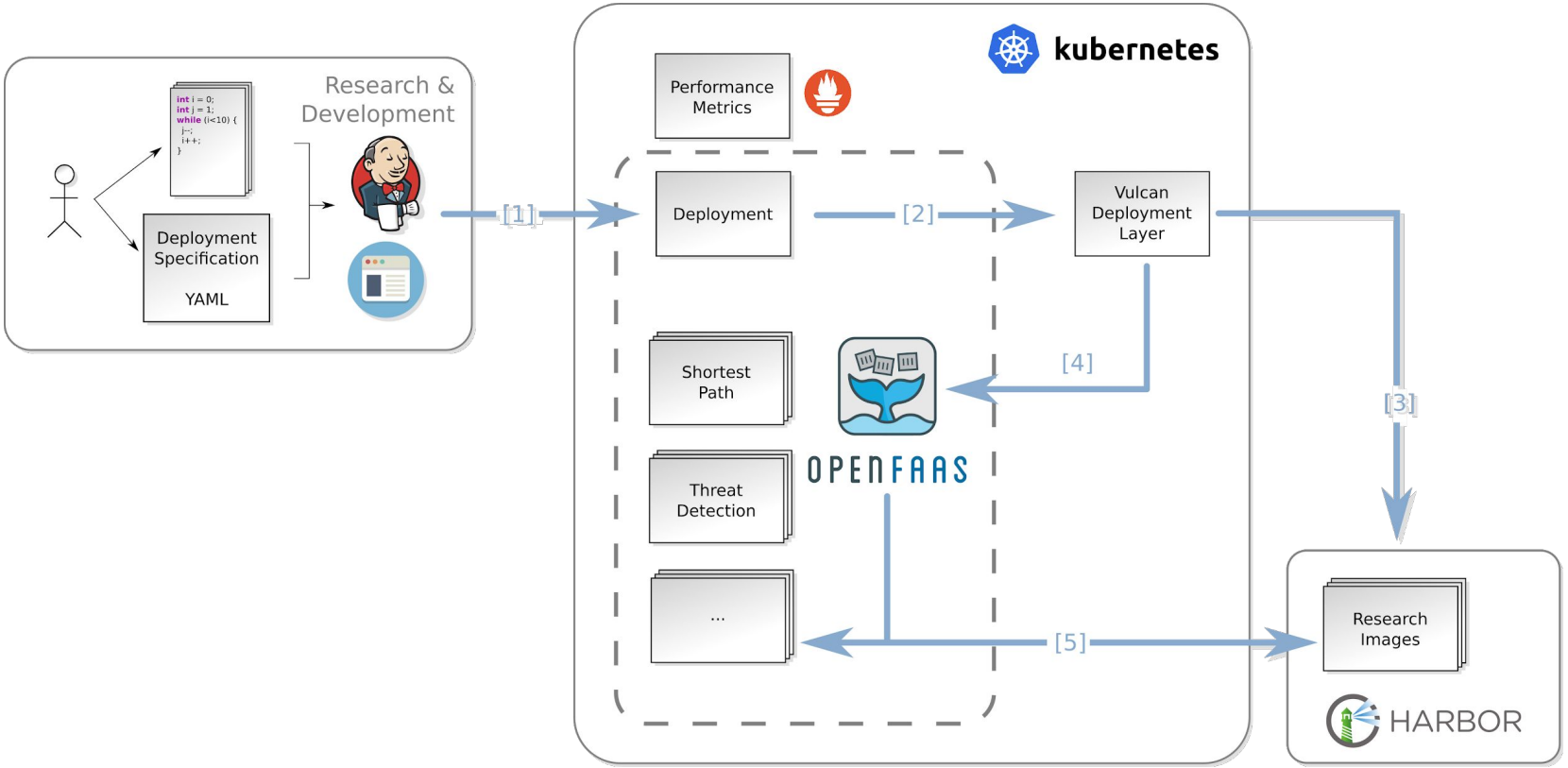
Levels of Expertise

Expertise

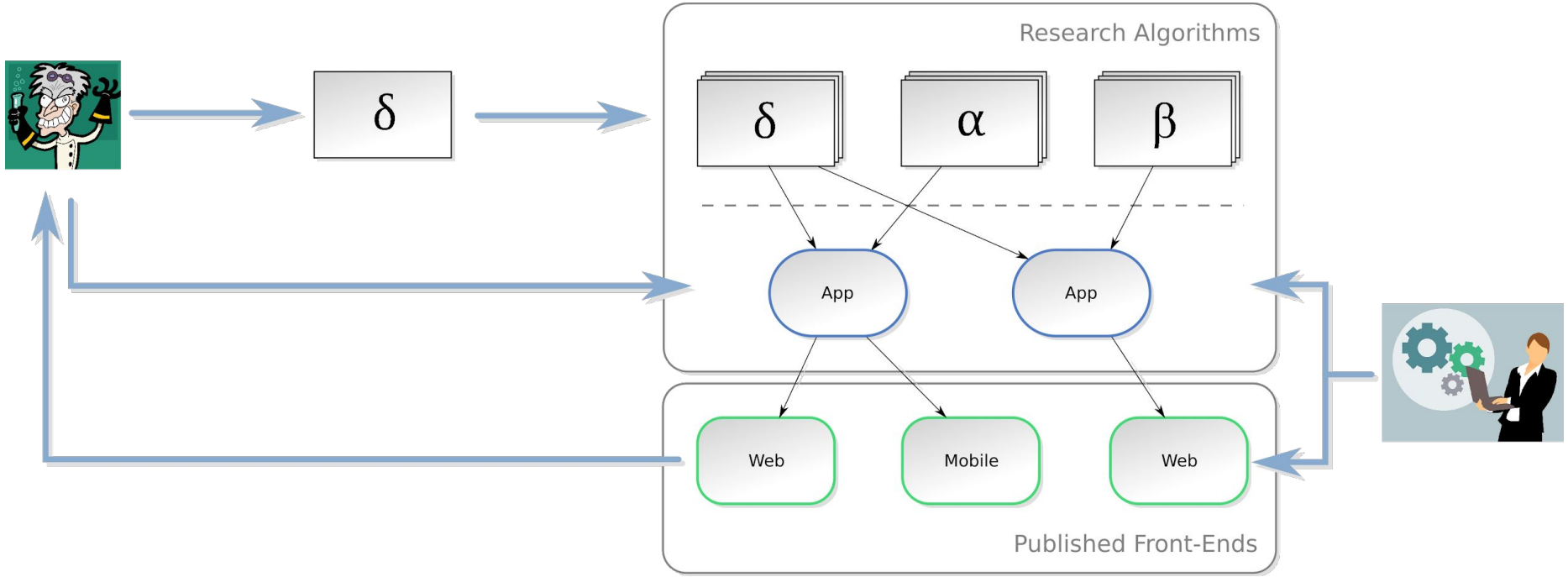
Citizen Developer

Expert Developer

OpenFaaS AI Pipeline

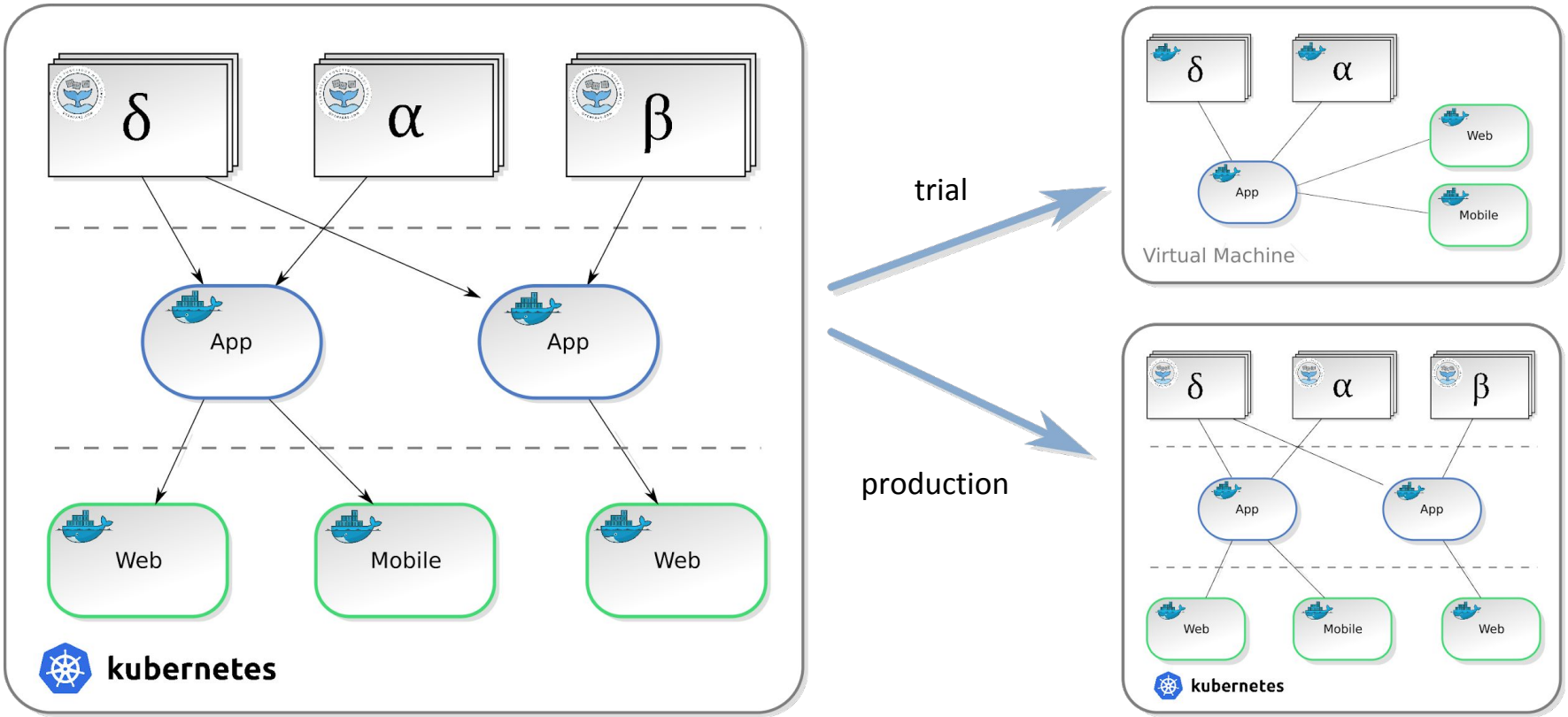


New Algorithm LifeCycle



Continuous Delivery less than 3 months

Cloud-Native Delivery



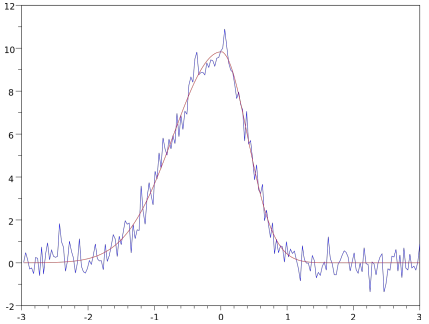
Demonstration

Bug prediction

git

Bugzilla

SUBVERSION



Ulster University

BT Ireland Innovation Centre

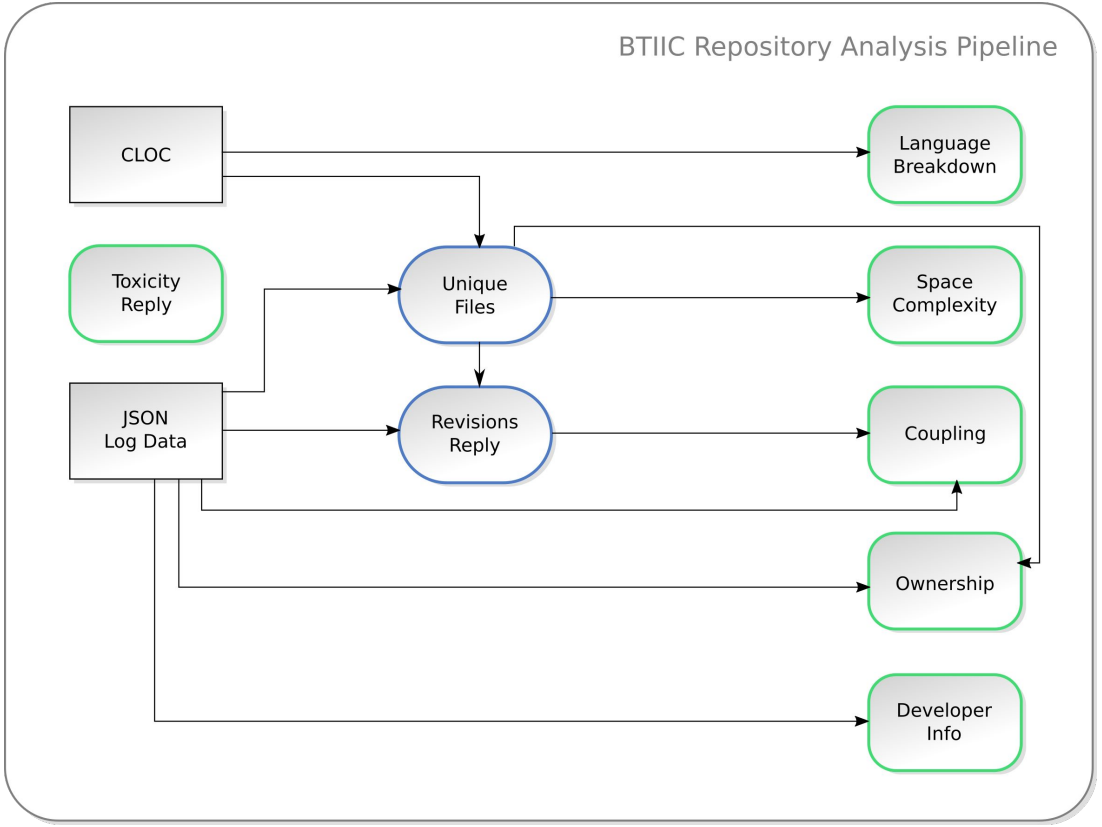
Demonstration

git

SUBVERSION

Ulster University

BT Ireland Innovation Centre



Problems addressed

1. Diverse range of skills
2. Lack of modern CI/CD practice
3. Need for Cloud-Native model for web-scale delivery

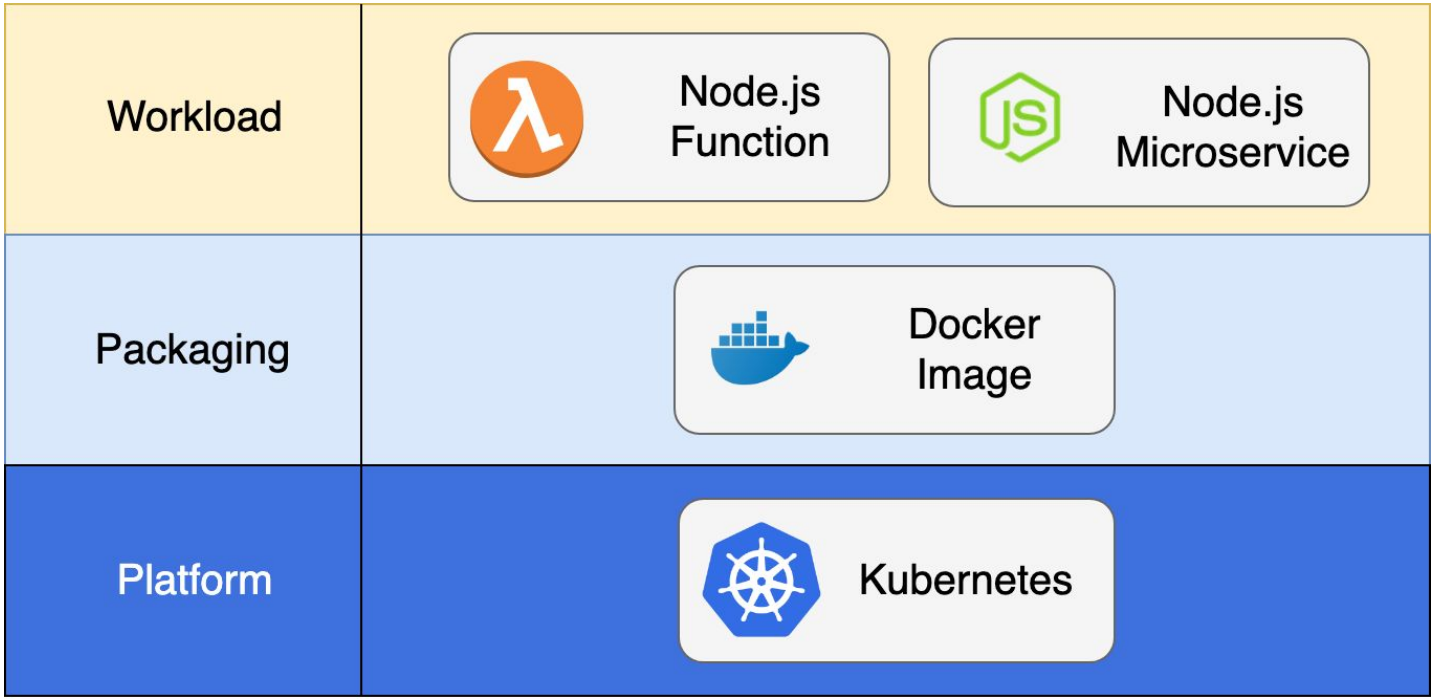
Serverless 1.0

Workload	Node.js Function	Node.js Function	Node.js Microservice
Packaging	Zip File	Zip File	?
Platform	AWS Lambda	Google Cloud Functions	?
Infrastructure	AWS	GCP	Enterprise

Credit: Alex Ellis, 2019

Serverless 2.0

KubeCon CloudNativeCon Europe 2019



Credit: Alex Ellis, 2019

"Serverless 2.0" Landscape

"Big tent thinking" - interop, convergence, co-operation

Build Templates	 OPENFAAS  Buildpacks.io 
Events	 OPENFAAS  Knative KEDA
Serving Runtime	 OPENFAAS  Knative
Scale From Zero	 OPENFAAS  Knative Osiris
Self-hosted	 kubernetes  RED HAT OPENSHIFT
Managed	 Cloud Run  OpenFaaS Cloud 

Credit: Alex Ellis, 2019

Serverless Functions Made Simple

Anywhere

Avoid lock-in through the use of Docker. Run on any public or private cloud.

Any code

Build both microservices & functions in any language. Legacy code and binaries.

Any scale

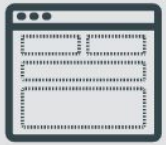
Auto-scale for demand or to zero when idle.

Credit: Alex Ellis, 2019

Ecosystem demo

Functions Store

An ecosystem for sharing, reusing and collaborating on functions



Templating system

Reduce boilerplate code, share code in the templates store

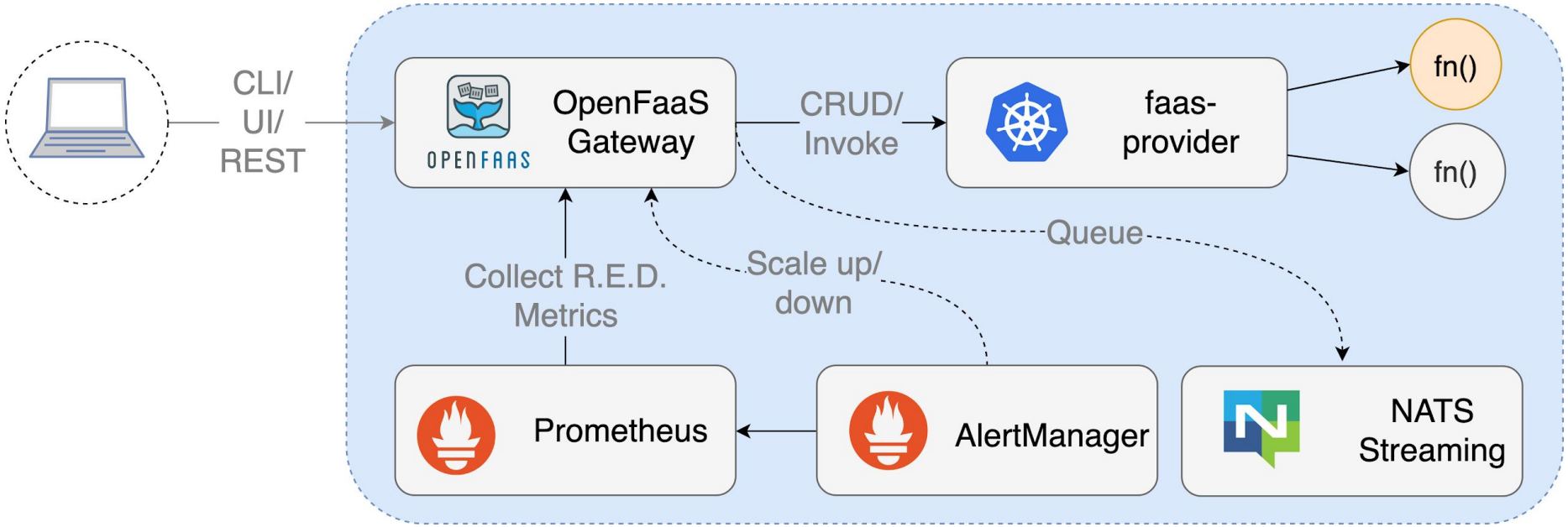
Functions or Microservices

Deploy existing microservices using Express.js, Sinatra, ASP.NET Core or simplify with functions.

- Using the function store
- Finding a custom template
- Auto-scaling

Credit: www.openfaas.com, 2019

OpenFaaS Architecture



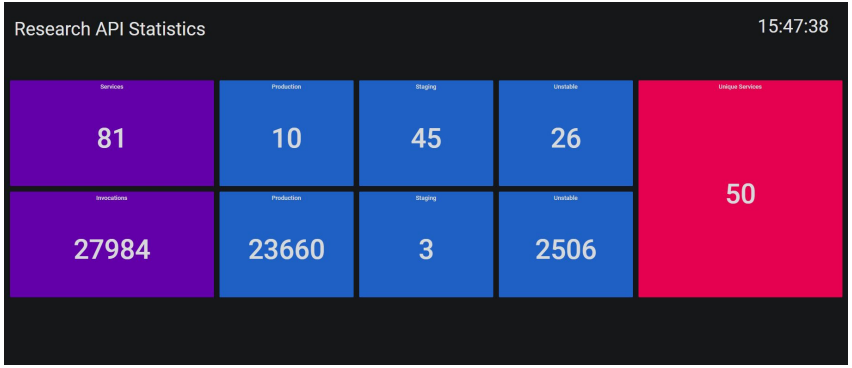
Credit: Alex Ellis, 2019

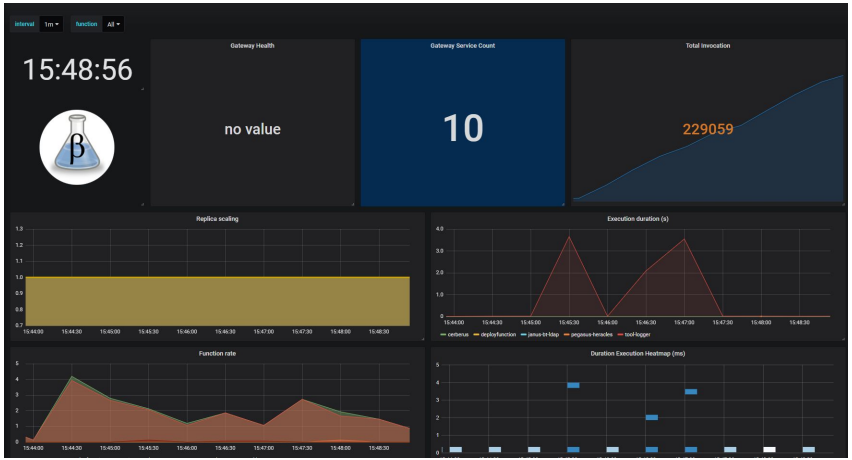
BT Dashboards

KubeCon CloudNativeCon Europe 2019

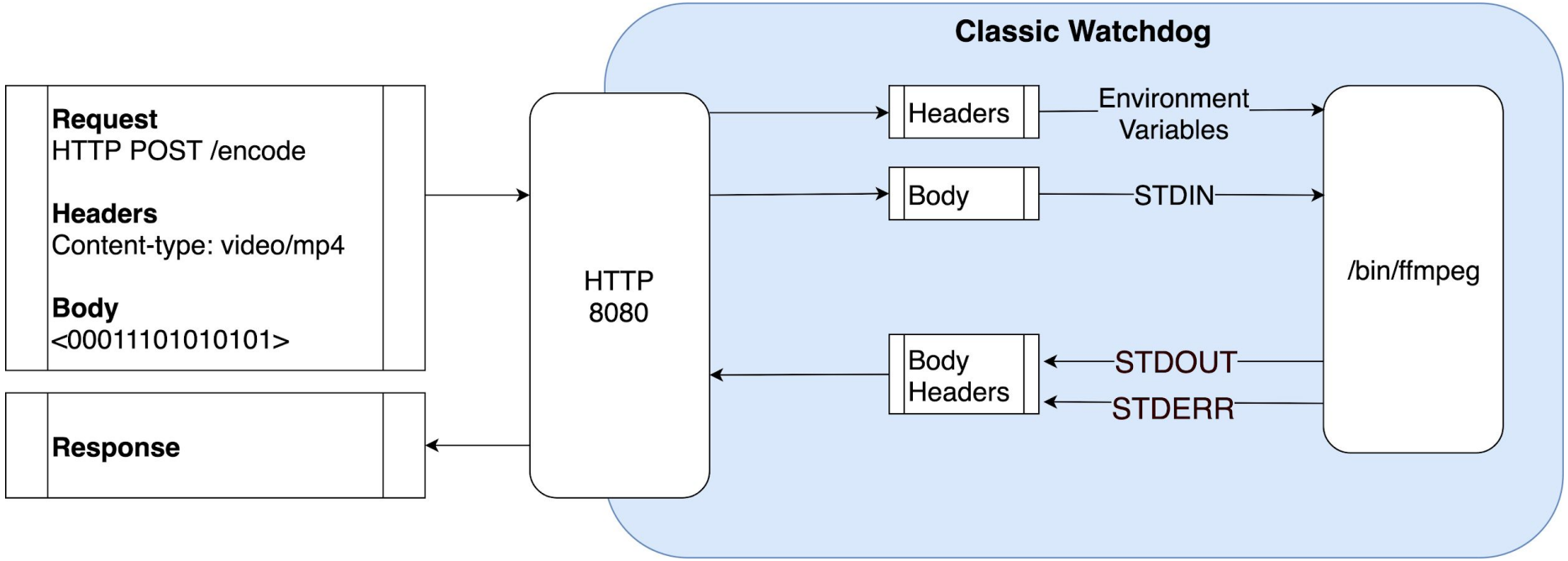
Search

	Production	Staging	Unstable
janus-demo	☑	☑	☑
commitsperdevpercent		☑	
generatebusroutes		☑	☑
cloc-filter		☑	
java-sleep			☑
convexhull		☑	
janus-aws-cognito		☑	☑
space-complexity-analyser		☑	☑
pegasus-heracles	☑	☑	☑
sleep-json		☑	
commitsperdev		☑	
svn-json-log		☑	☑
java-calc		☑	
route-tester	☑	☑	☑
cloc		☑	☑



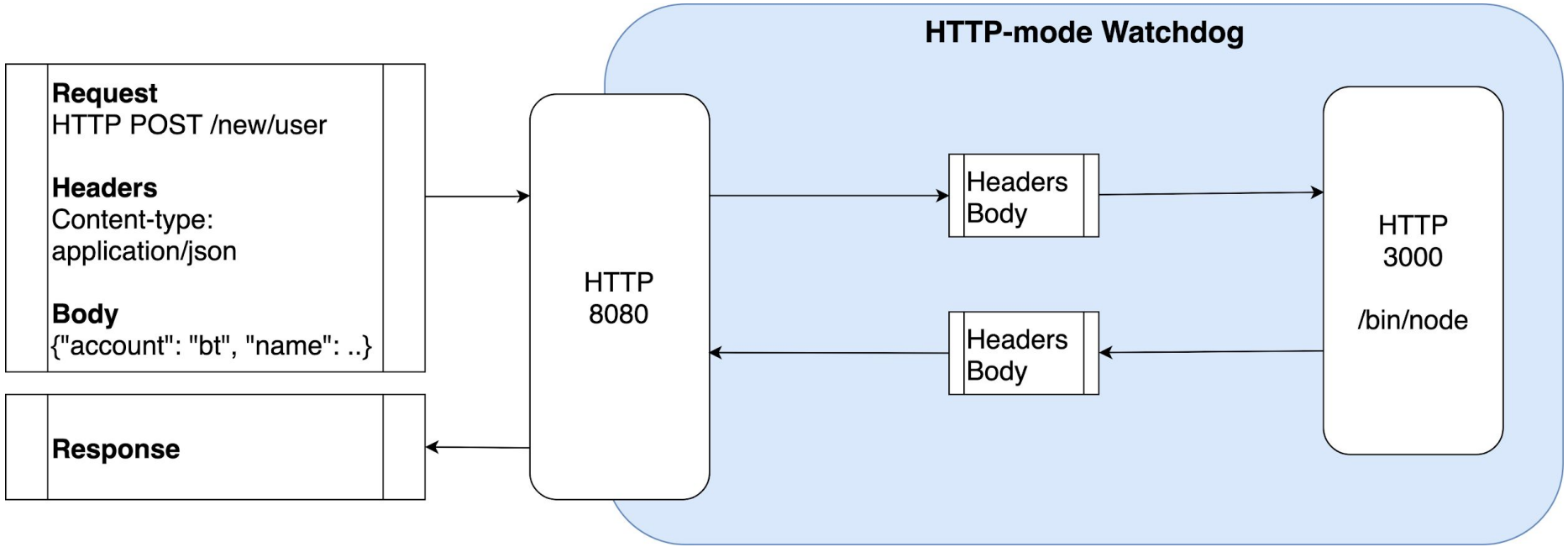


OpenFaaS Classic Watchdog



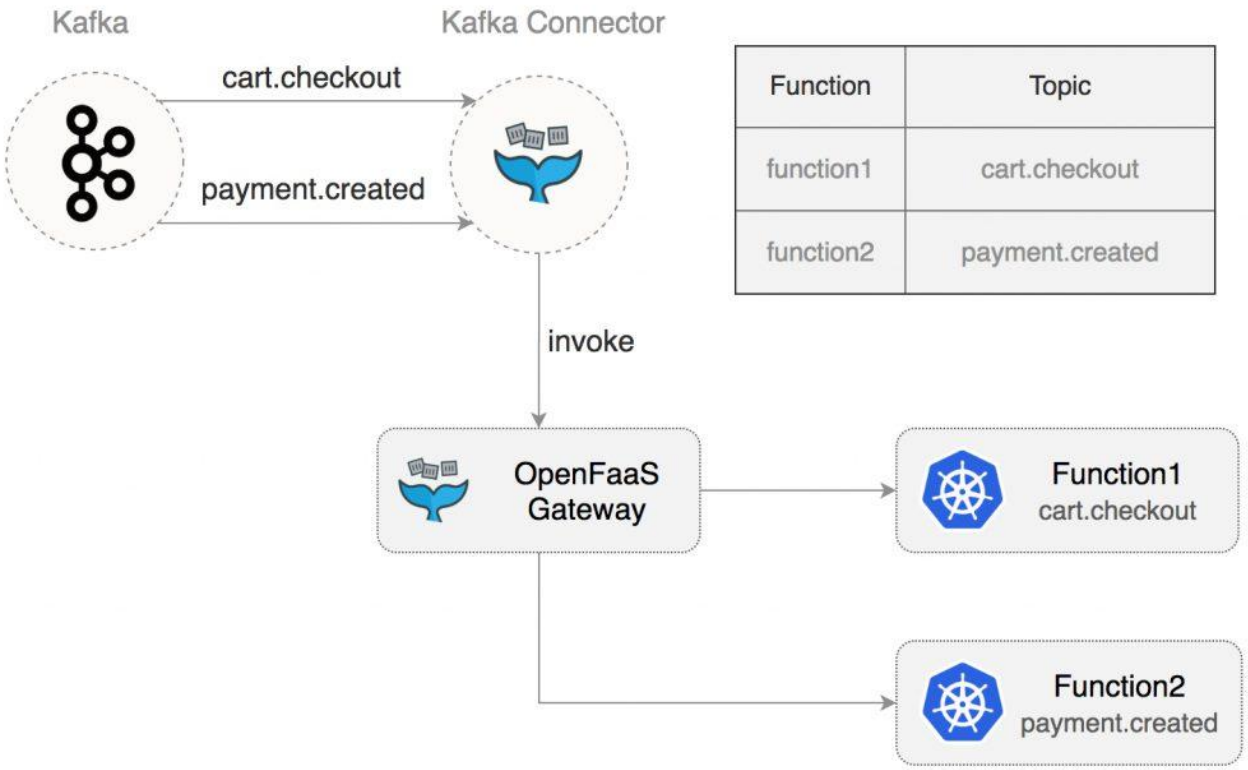
Any binary - Linux / Windows

OpenFaaS (new) Watchdog



Pass-through proxy with health-checks, metrics and compliance

Events



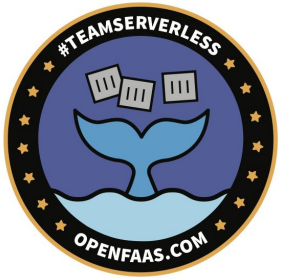
Function	Topic
function1	cart.checkout
function2	payment.created

connector-sdk:

- Kafka
- RabbitMQ
- vSphere
- Cron

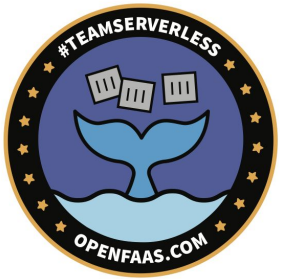
Open Source feedback

- Community briefings
- 1:1 Zoom calls
- Pain-points / wishlist
  - Project goals & aims
  - GitHub issues

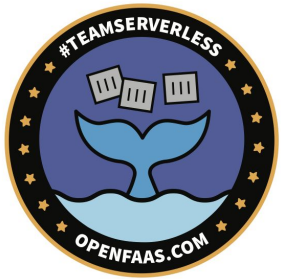


Impact to BT

- Understanding Serverless / OpenFaaS
- Insight into engaging with open-source
- Speed of change if you get it right
- DevOps skills required for an organisation
- New roles in the organisation
- Open source and BT software



Future work



Enterprise/multi-tenant features:

- OAuth2
- Multiple namespaces
- Function revisions
- Air-gapped config
- OpenShift 4

Coming-up:

- One-click VM with k3s
- Internal Kubernetes service
- CORS per function
- Personalised dashboards
- Data Science migration

KubeCon | CloudNativeCon

Europe 2019

Joost Noppen - johannes.noppen@bt.com
Alex Ellis - alex@openfaas.com