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CloudNativeCon

Europe 2019

Delivering AI Research Algorithms at Speed

Joost Noppen (BT, Principal Researcher Software)

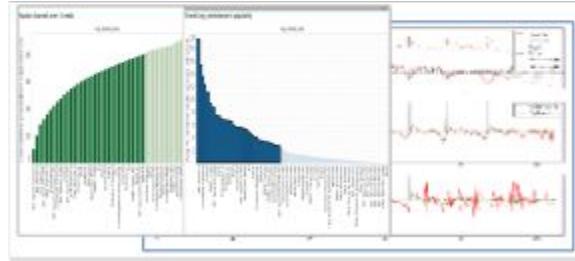
Alex Ellis (Director, OpenFaaS Ltd)

BT Applied Research



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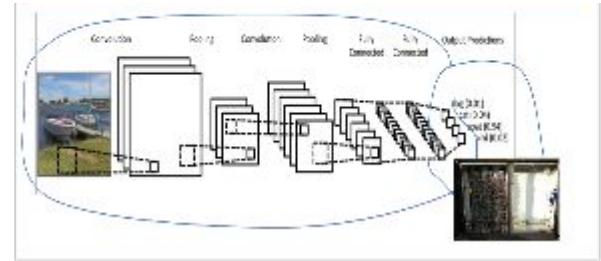
Machine Learning



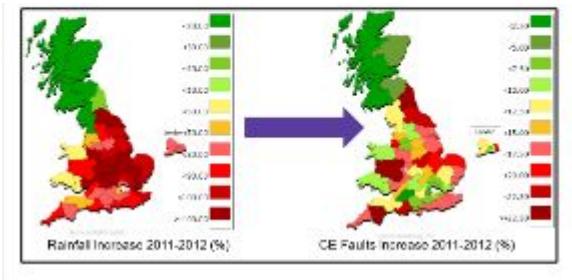
Cyber Defence



Inventory Repair



Automated Forecasting



Intelligent Interfaces



The Challenge...



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Problems Identified

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

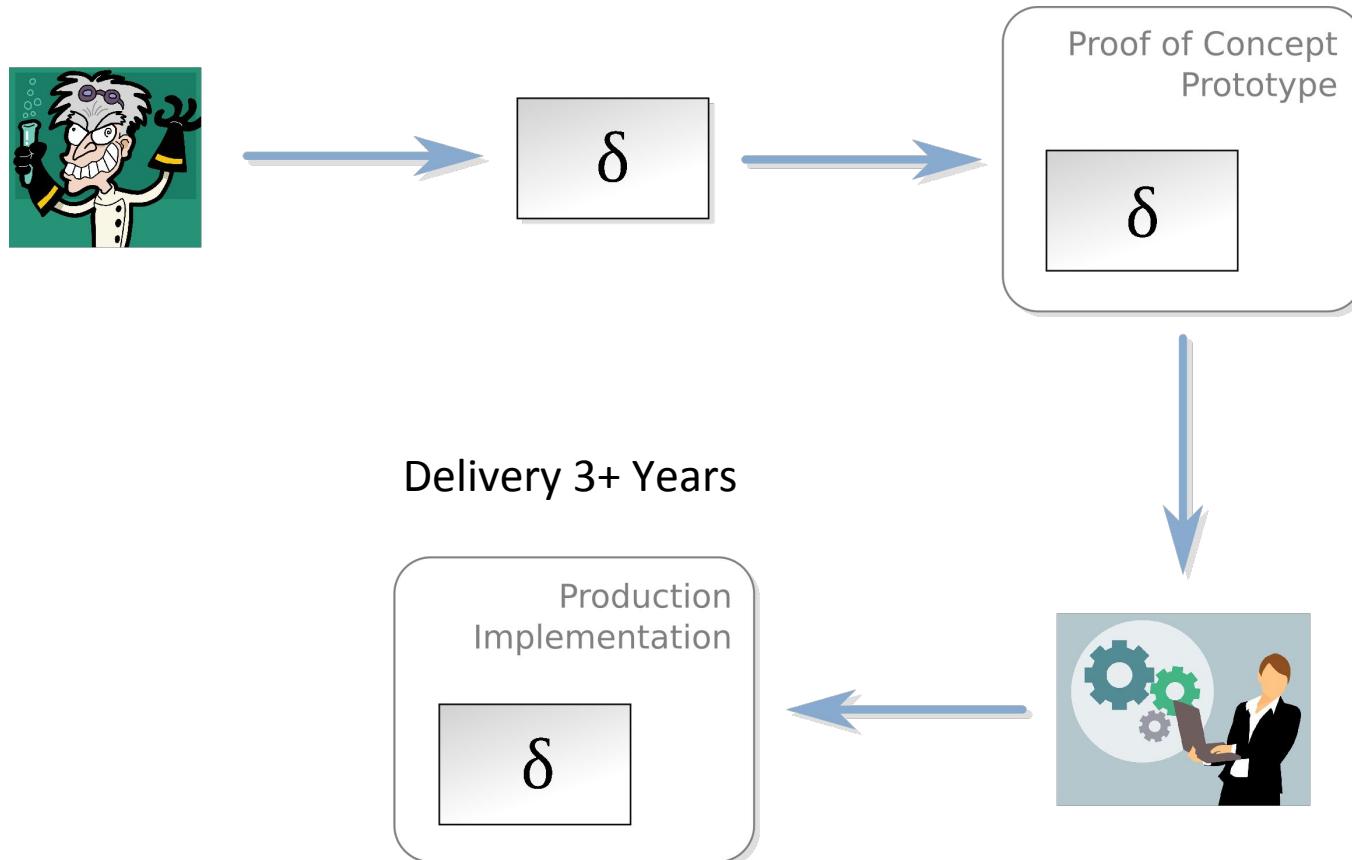
Constraints

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

LifeCycle of an Algorithm



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Levels of Expertise



Citizen
Developer

Expertise



Expert
Developer



OPENFAAS

Rapid Dev. and Reuse



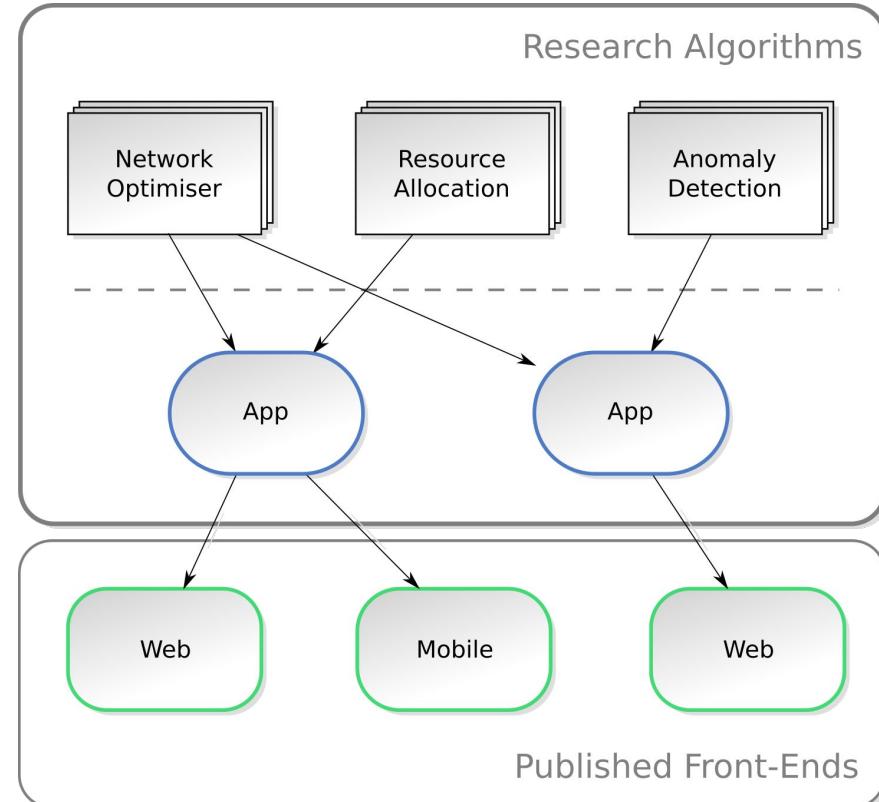
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Uniform delivery

Reuse across research

Ready for production



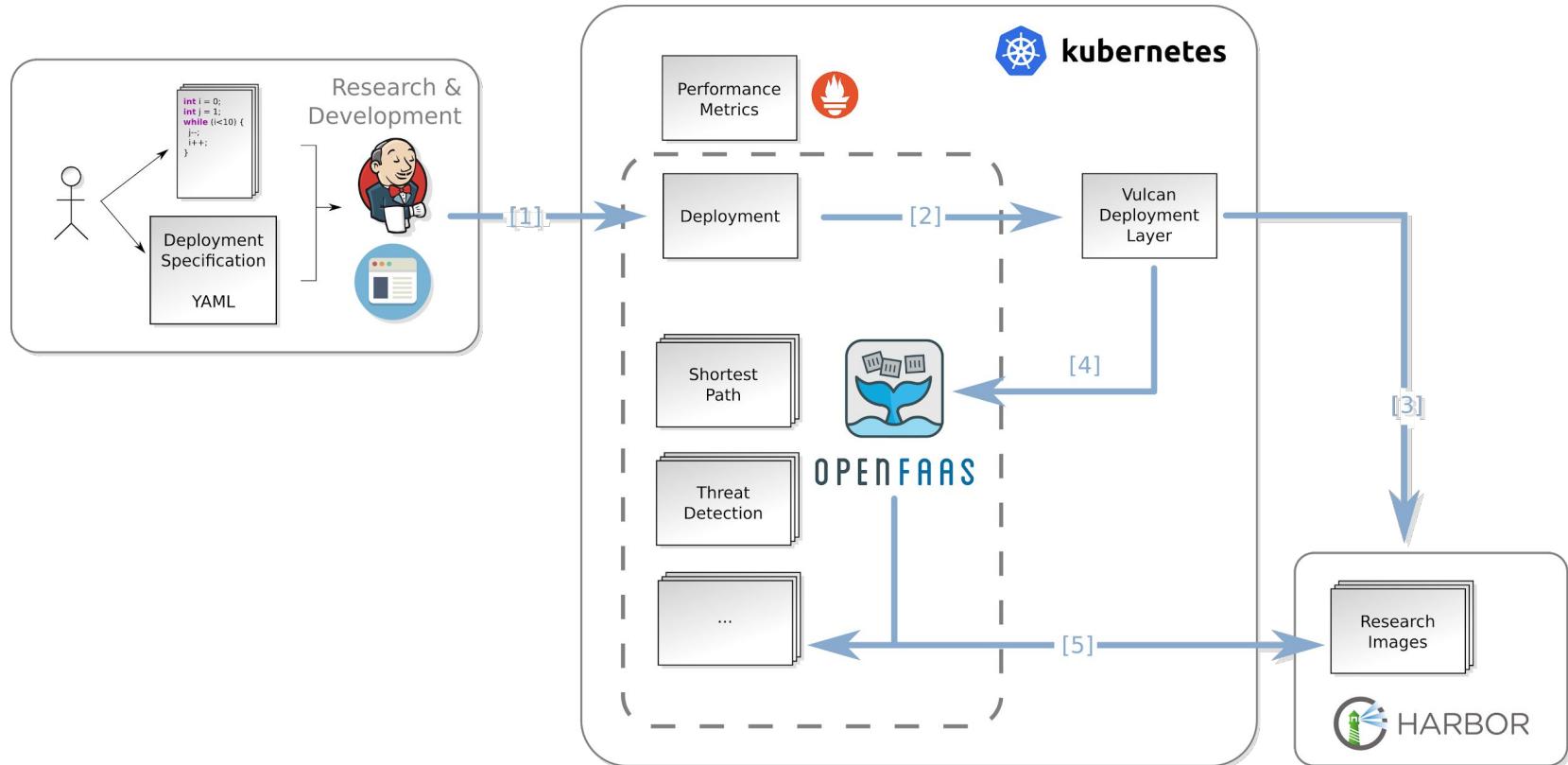
OpenFaaS AI Pipeline



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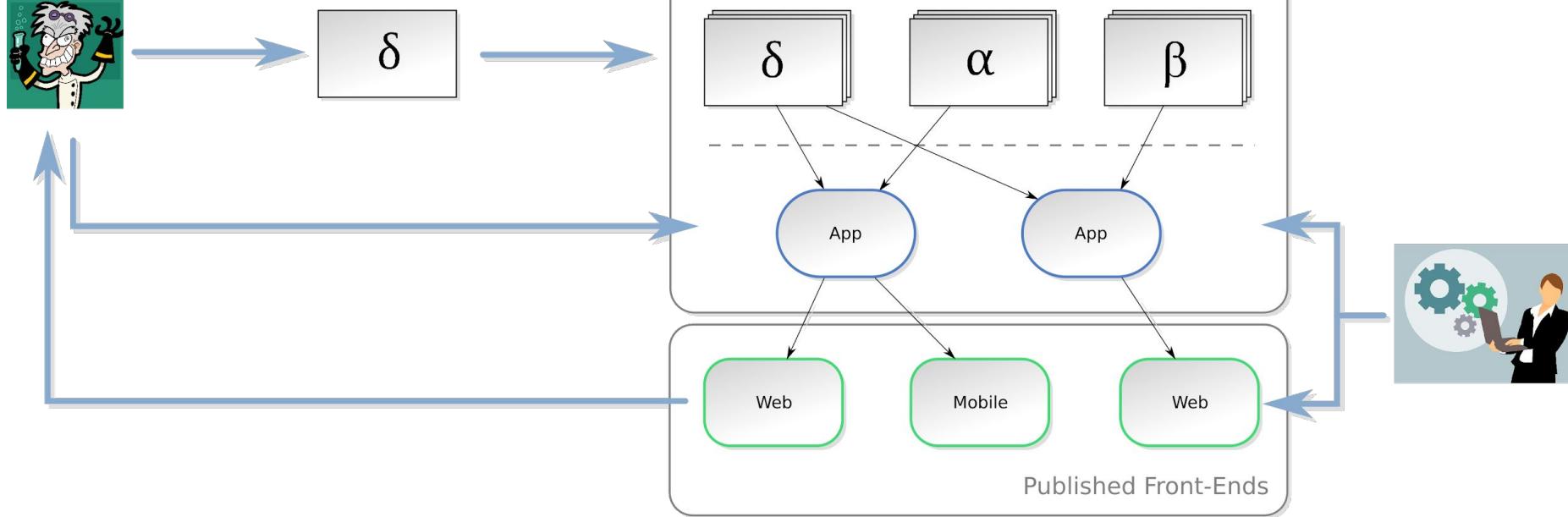
New Algorithm LifeCycle



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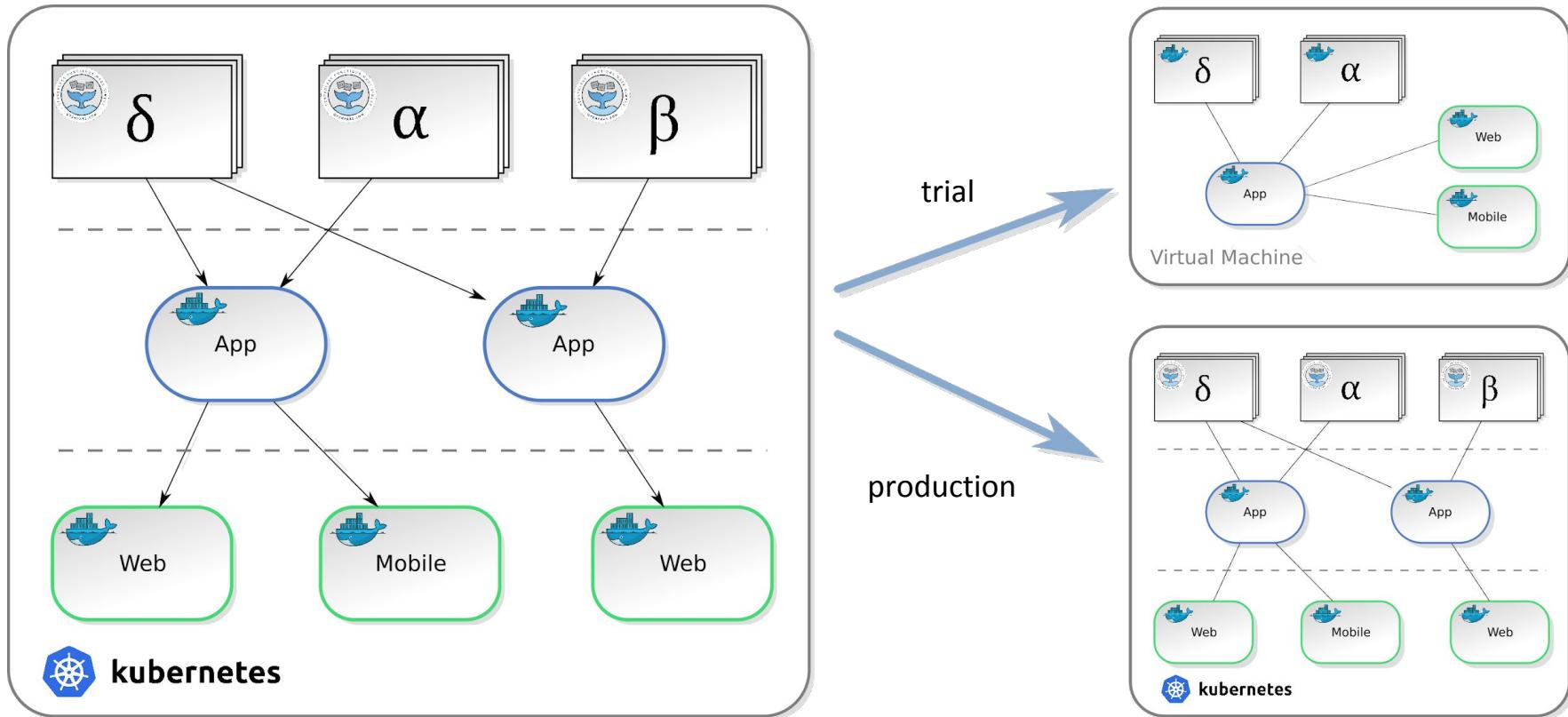
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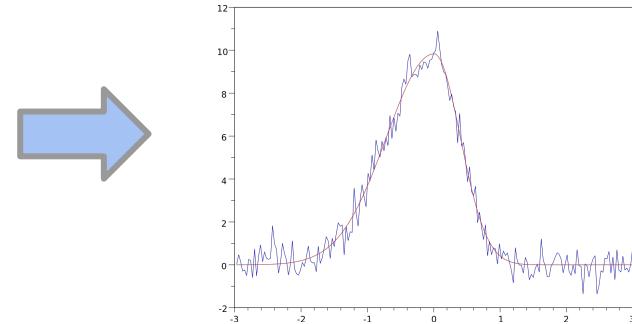
Continuous Delivery less than 3 months

Cloud-Native Delivery



Demonstration

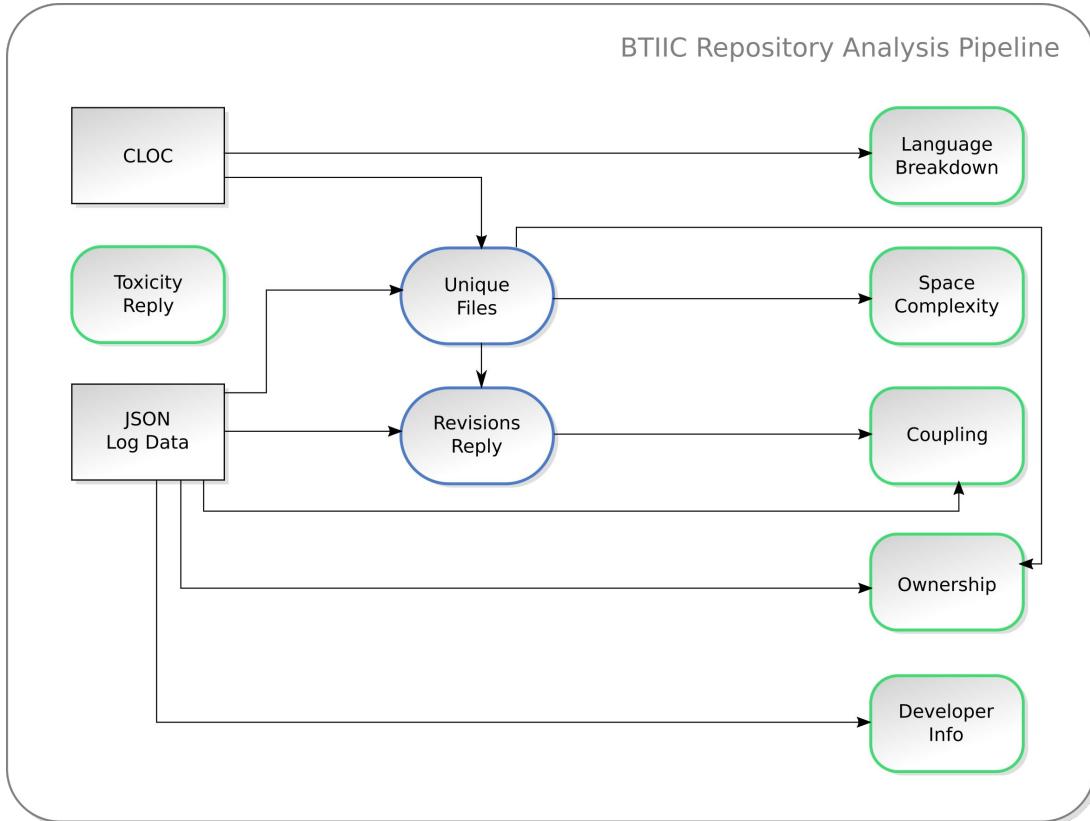
Bug prediction



Demonstration



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



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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

Serverless 2.0

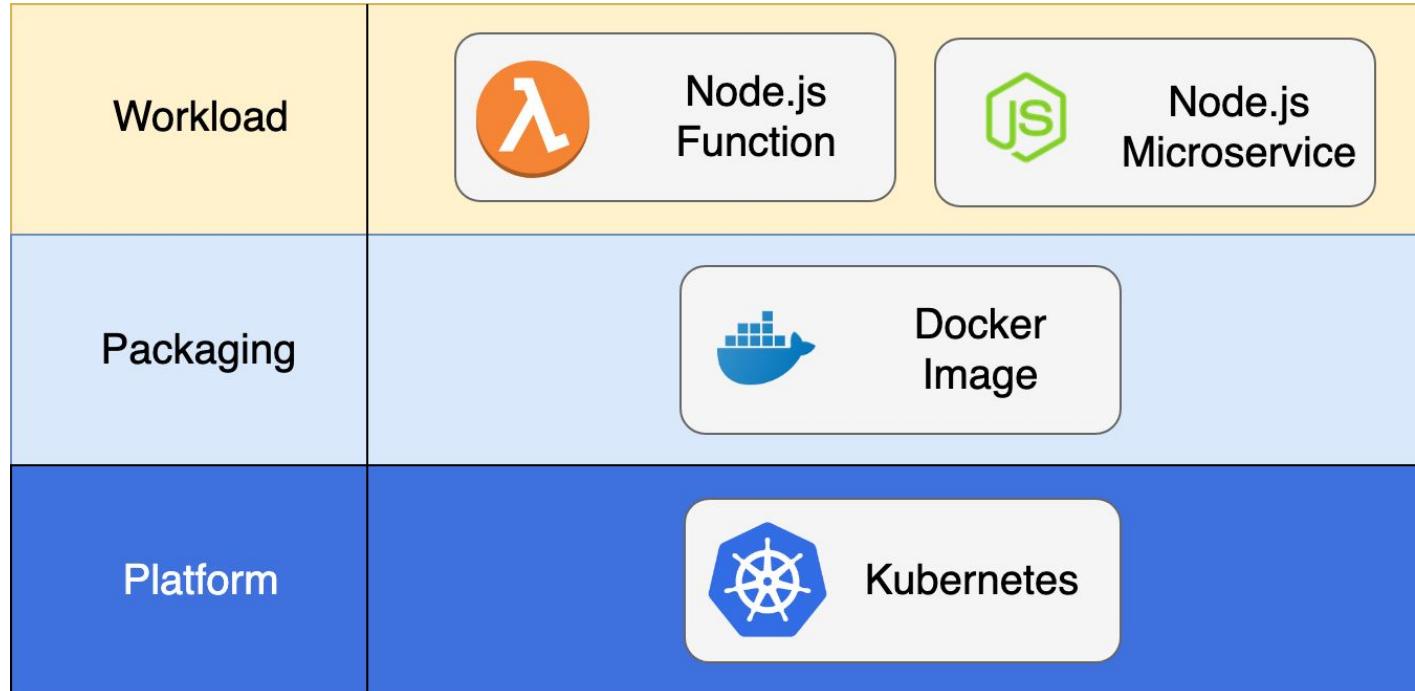


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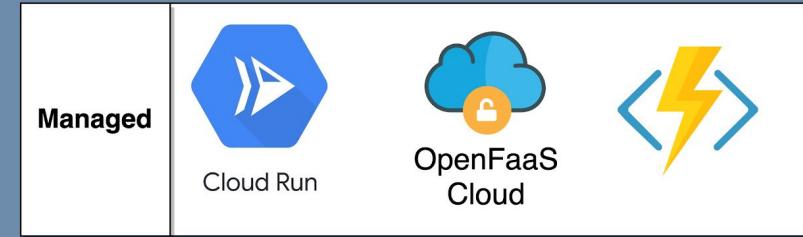
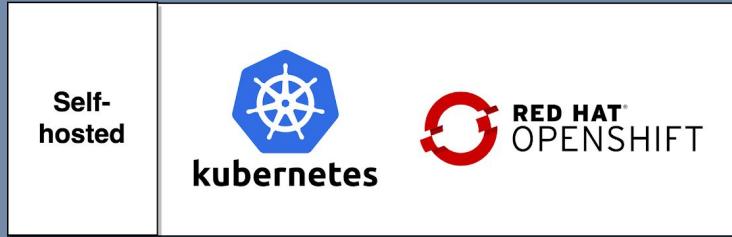
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"Serverless 2.0" Landscape

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



Serverless Functions Made Simple



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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.

Ecosystem demo



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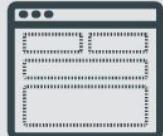
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Functions Store

An ecosystem for sharing, reusing and collaborating on functions



Templating system

Reduce boilerplate code, share code in the templates store

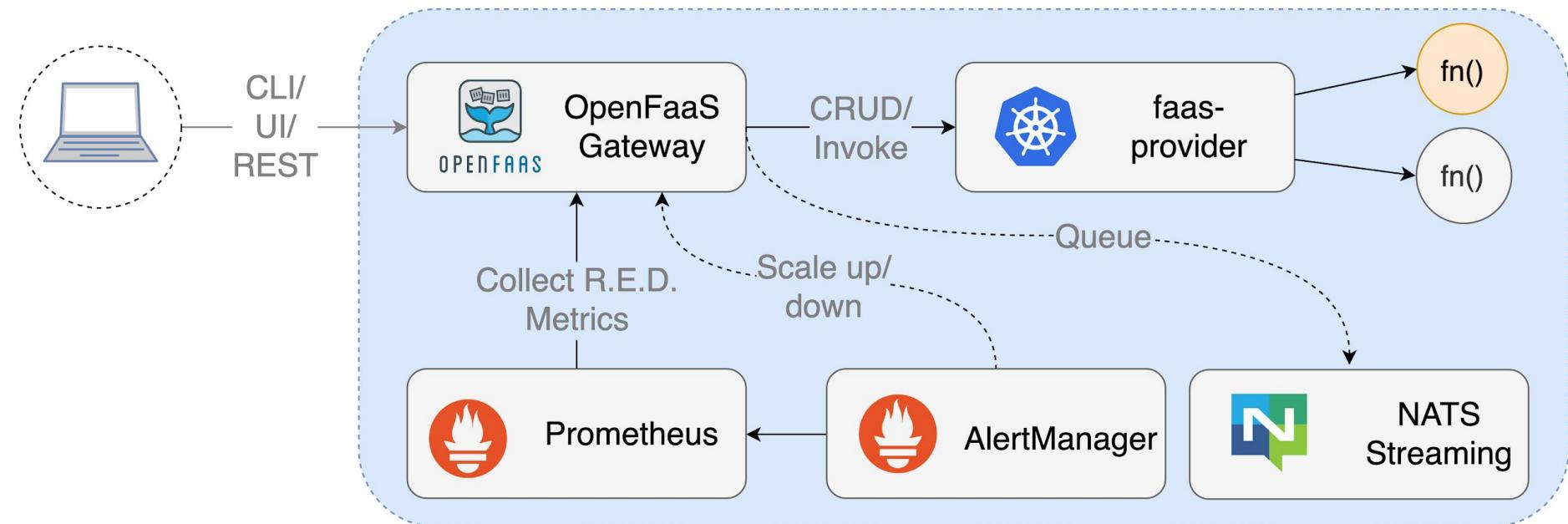


Functions or Microservices

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

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

OpenFaaS Architecture



BT Dashboards



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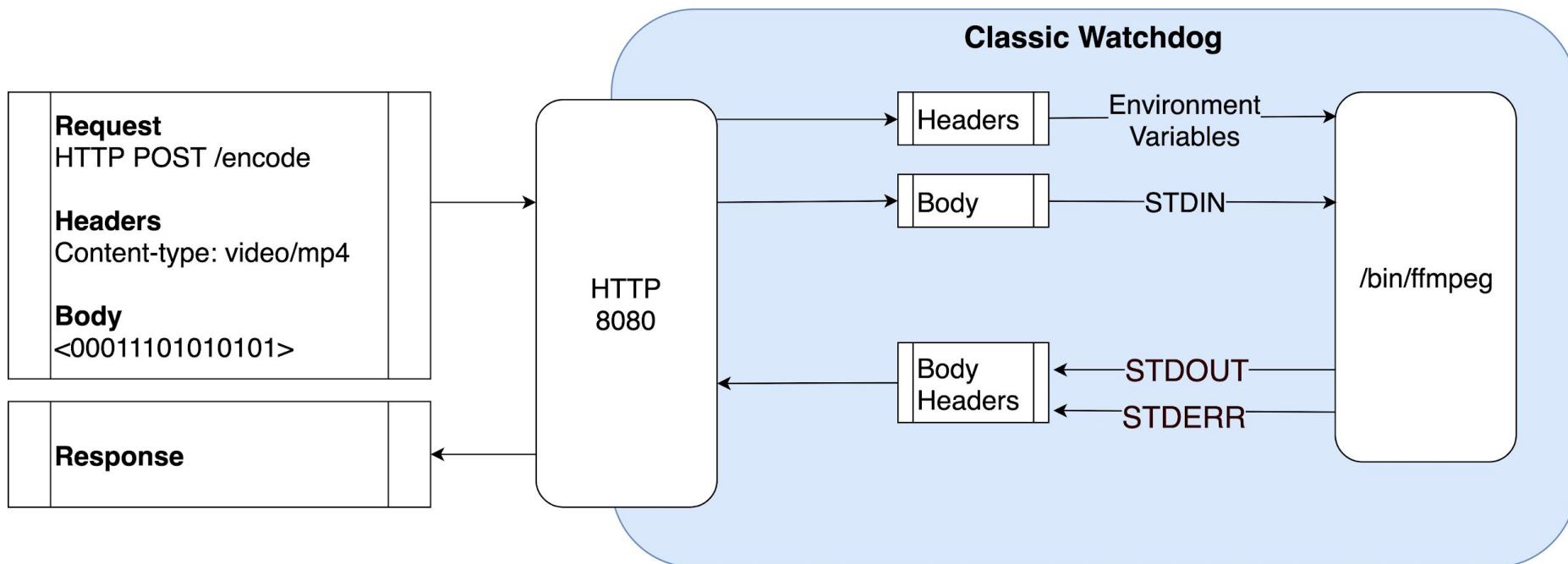
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	Production	Staging	Unstable
janus-demo	✓	✓	✓
commitsperdevpercent		✓	
generatebusroutes		✓	✓
cloc-filter		✓	
java-sleep			✓
convexhull		✓	
janus-aws-cognito		✓	✓
space-complexity-analyser		✓	✓
pegasus-heracles	✓	✓	✓
sleep-json		✓	
commitsperdev		✓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



OpenFaaS Classic Watchdog



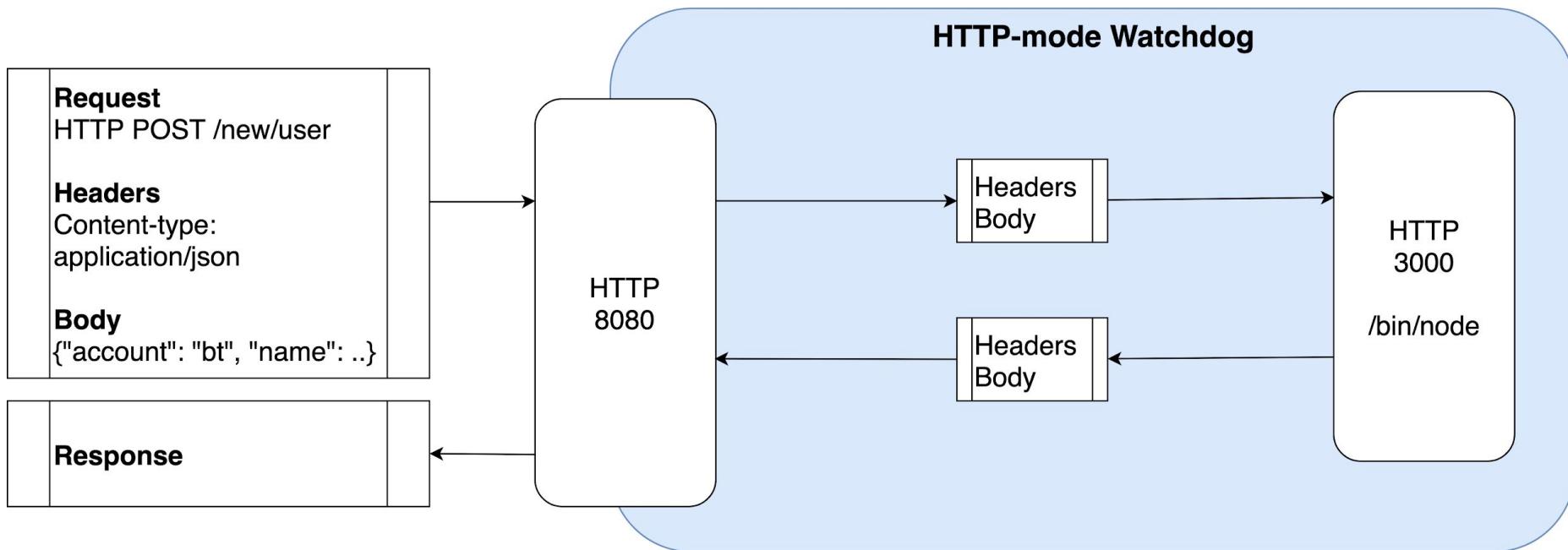
OpenFaaS (new) Watchdog



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

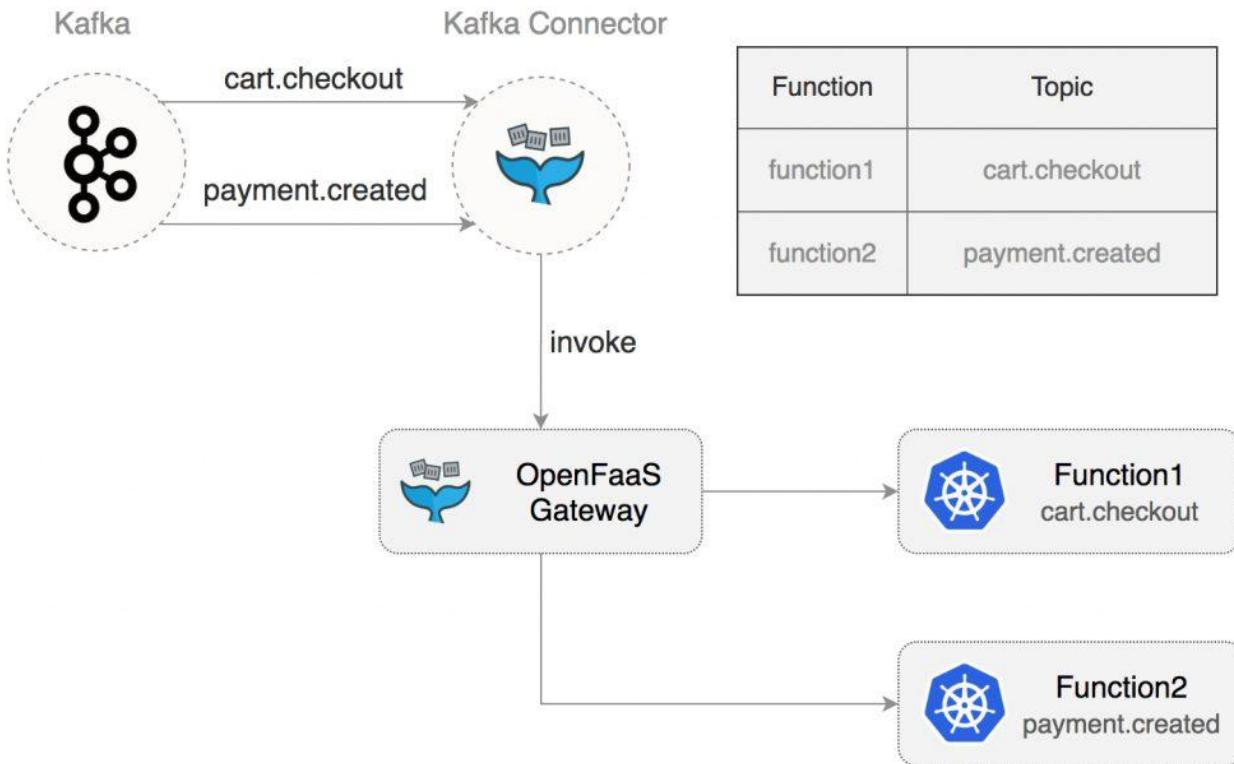
Events



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connector-sdk:

- Kafka
- RabbitMQ
- vSphere
- Cron

Open Source feedback



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



Impact to BT



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- 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



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Enterprise/multi-tenant features:

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

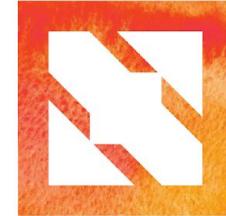


Coming-up:

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



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