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Europe 2019

Delivering AI Research Algorithms at Speed

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BT Applied Research



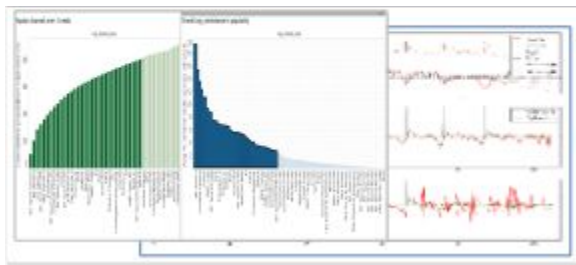
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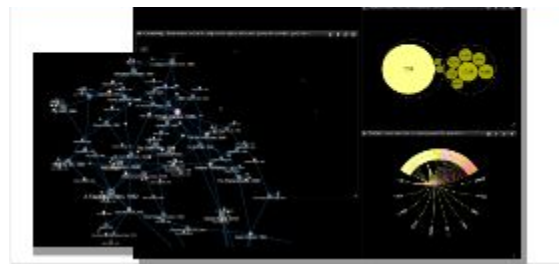
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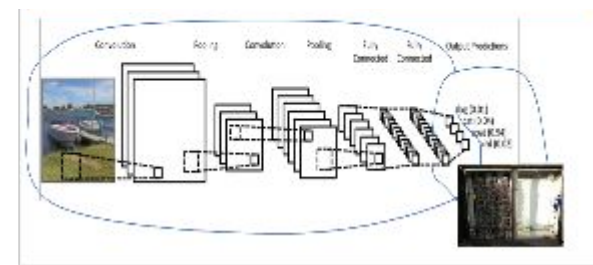
Machine Learning



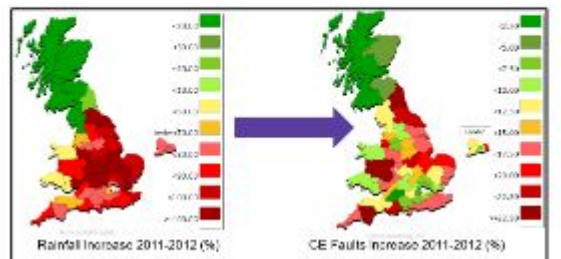
Cyber Defence



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

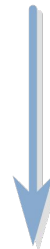
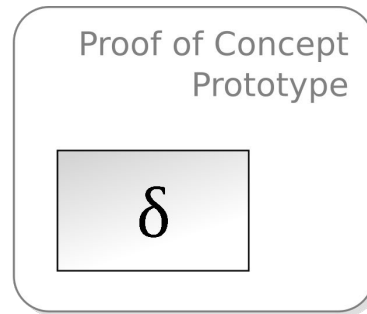
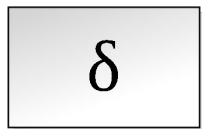


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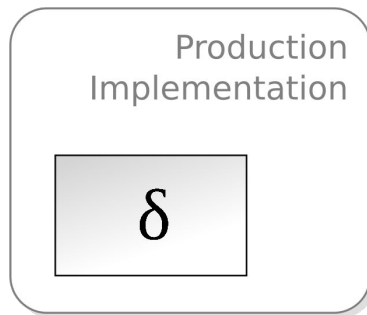
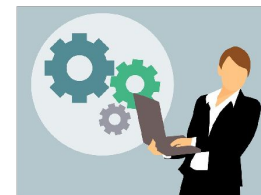


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Delivery 3+ Years



Levels of Expertise



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Citizen
Developer



Expert
Developer



Rapid Dev. and Reuse



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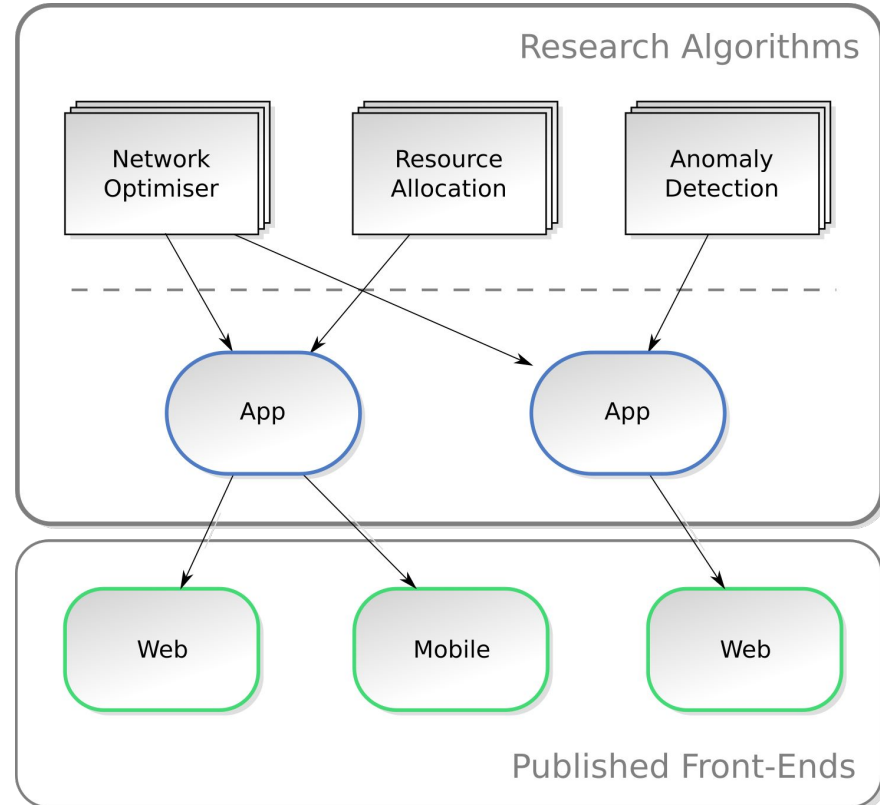
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Uniform delivery

Reuse across research

Ready for production



OpenFaaS AI Pipeline

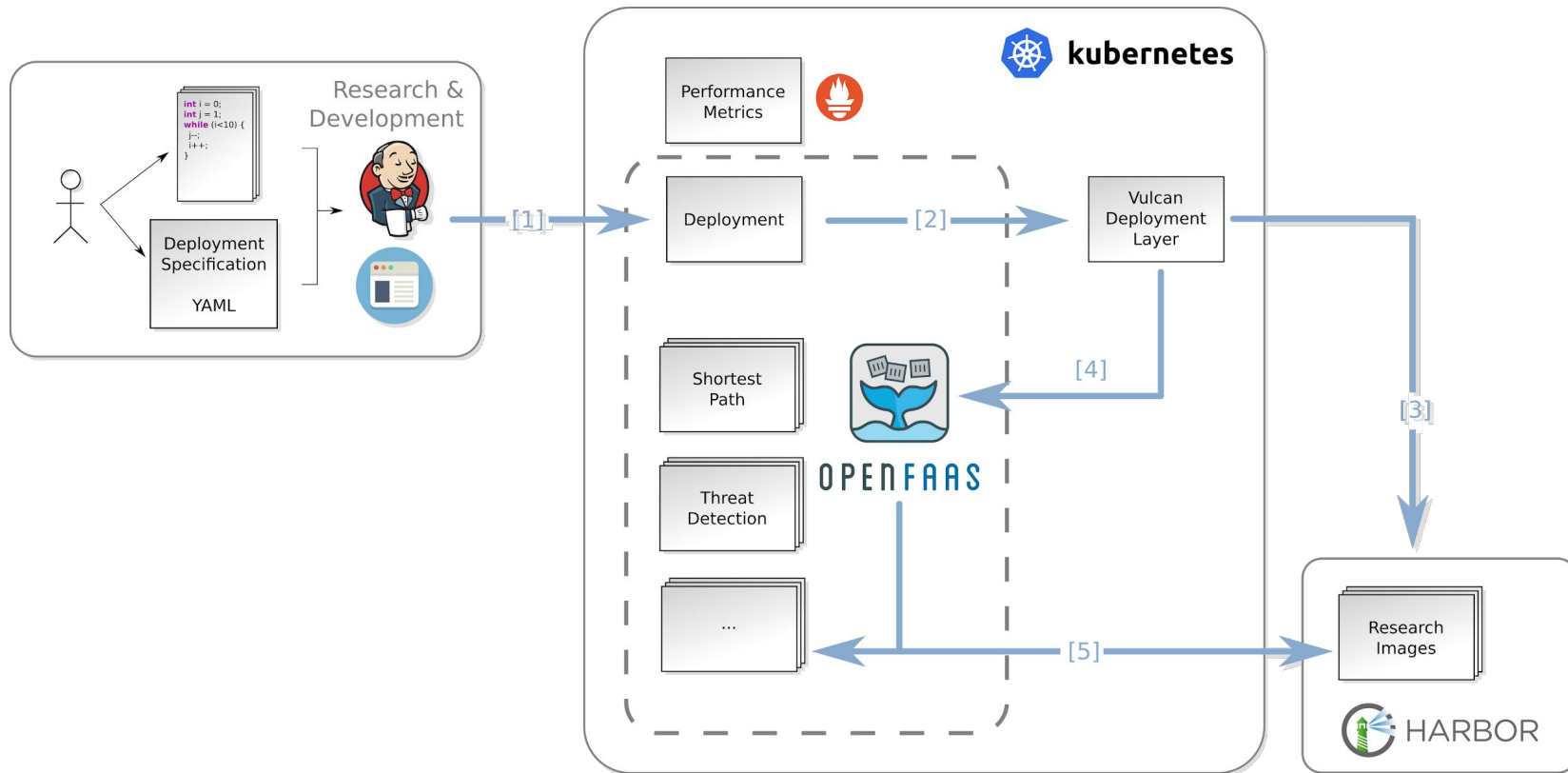


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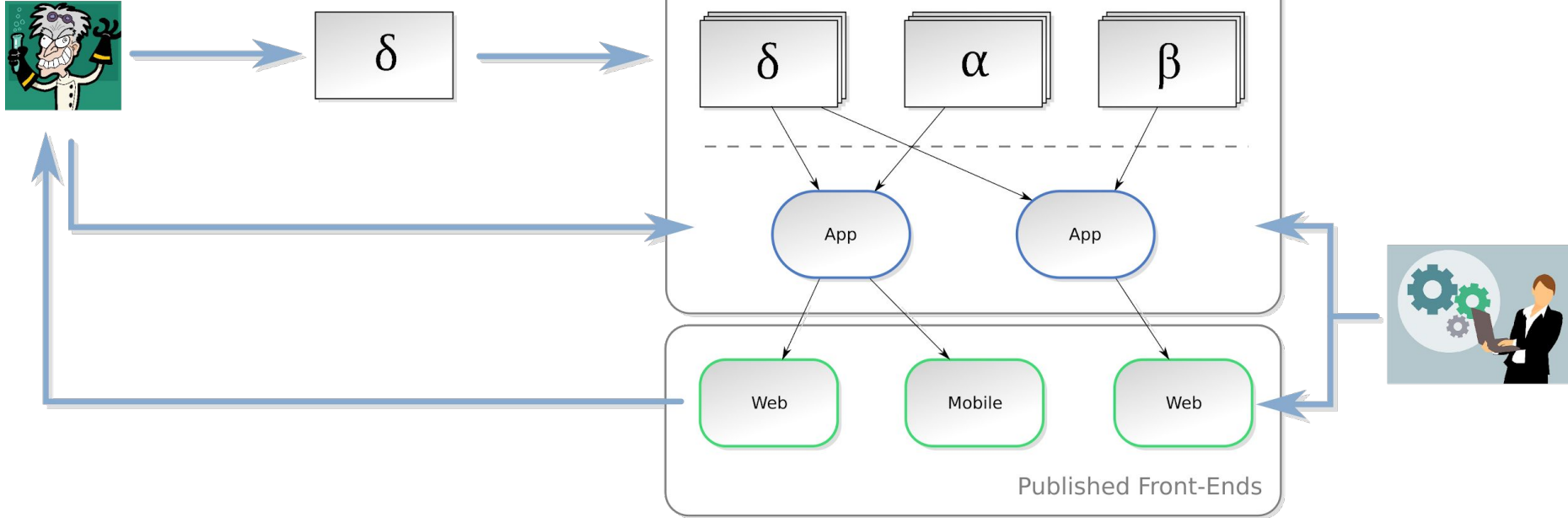


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New Algorithm LifeCycle



Continuous Delivery less than 3 months

Cloud-Native Delivery

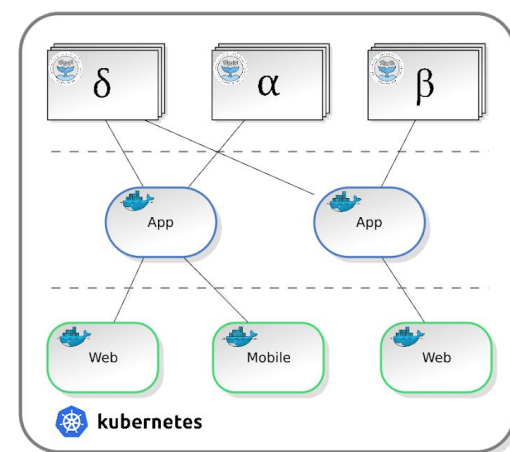
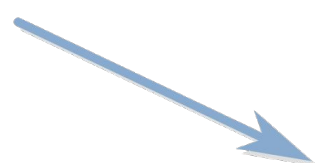
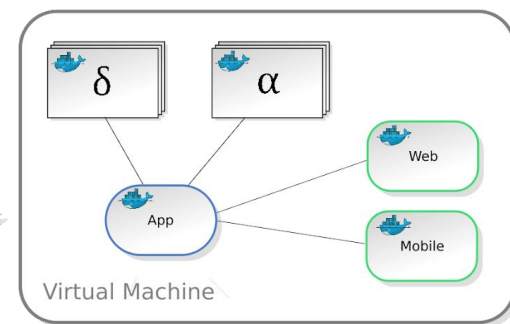
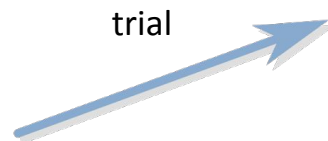
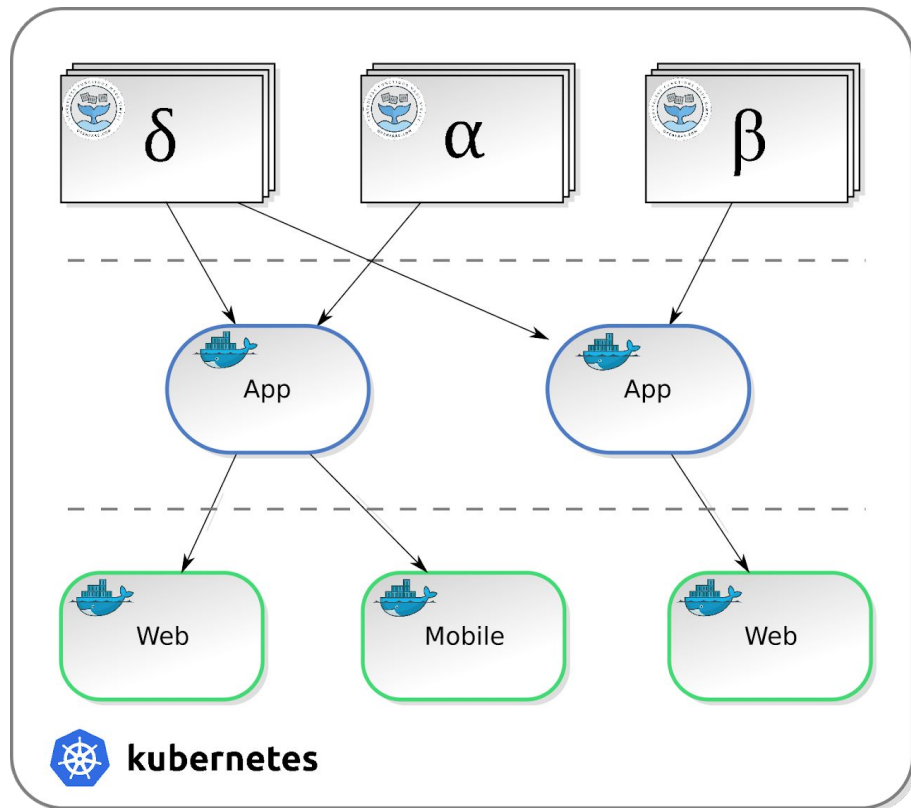


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Demonstration



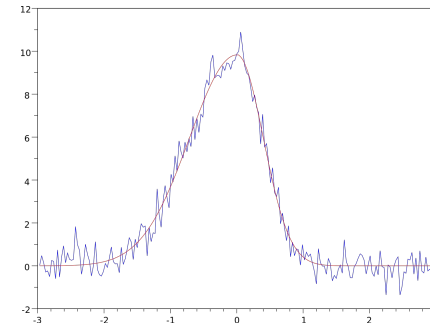
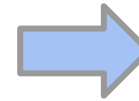
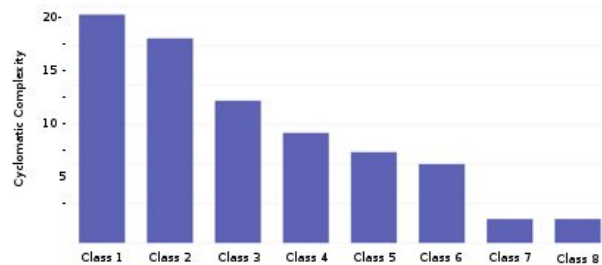
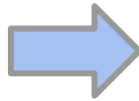
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Bug prediction



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Innovation Centre

Demonstration



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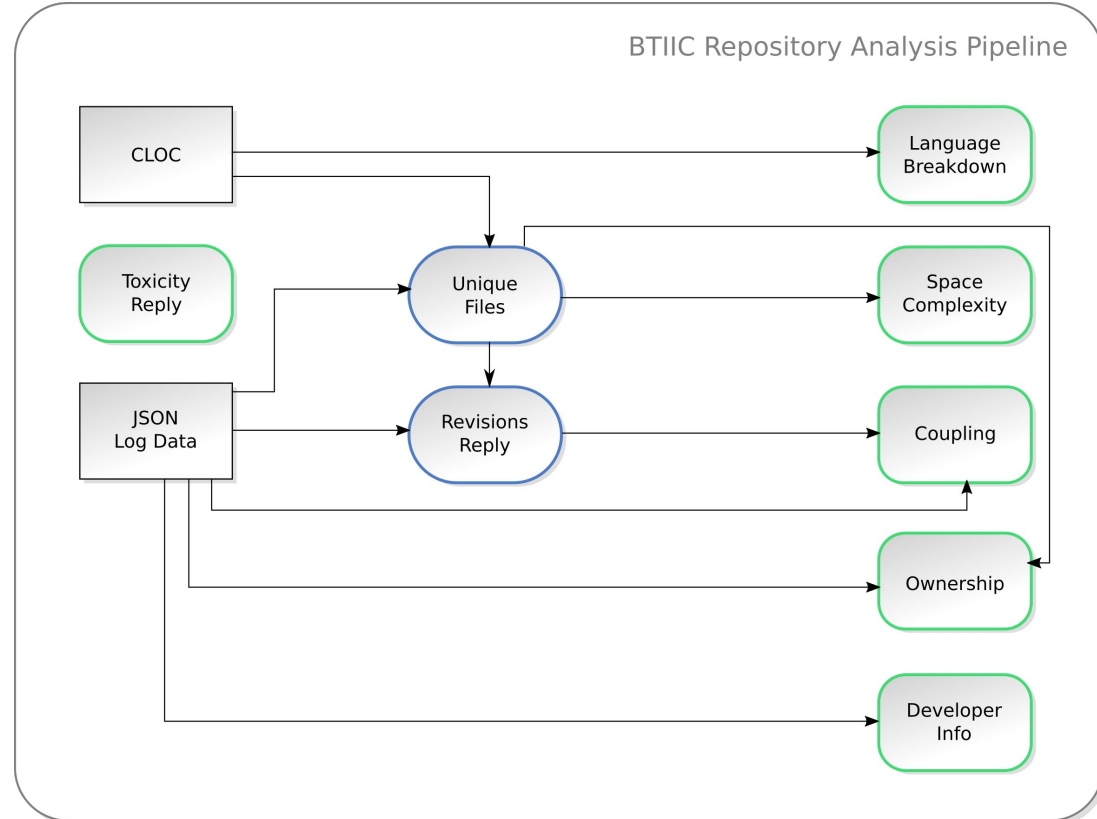


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BT Ireland
Innovation Centre



Problems addressed



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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





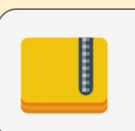
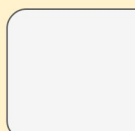
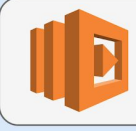

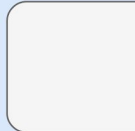





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Workload	 Node.js Function	 Node.js Function	 Node.js Microservice
Packaging	 Zip File	 Zip File	
Platform	 AWS Lambda	 Google Cloud Functions	
Infrastructure	 AWS	 GCP	 Enterprise

Serverless 2.0







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Workload	 Node.js Function	 Node.js Microservice
Packaging	 Docker Image	
Platform	 Kubernetes	

"Serverless 2.0" Landscape



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




Build Templates	 OPENFAAS	 Buildpacks.io	
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Events	 OPENFAAS	 Knative	
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Serving Runtime	 OPENFAAS	 Knative
------------------------	---	--

Scale From Zero	 OPENFAAS	 Knative	Osiris
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Self-hosted	 kubernetes	 RED HAT OPENSIFT
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Managed	 Cloud Run	 OpenFaaS Cloud	
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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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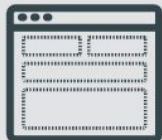
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Functions Store

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

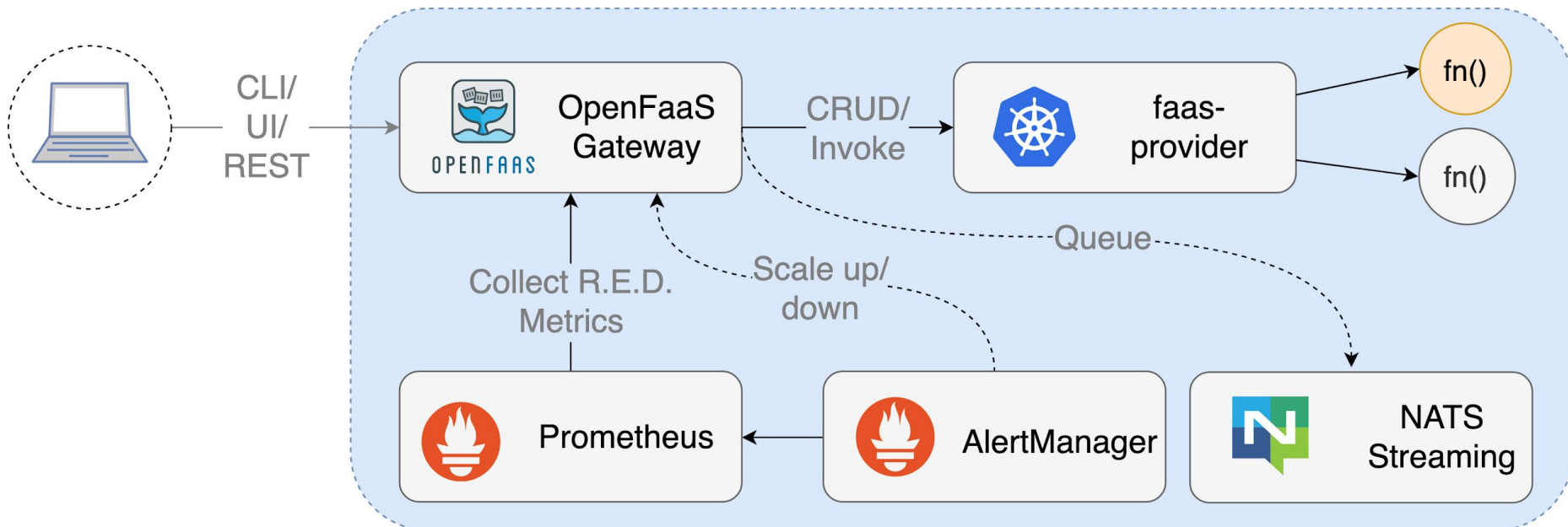


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BT Dashboards



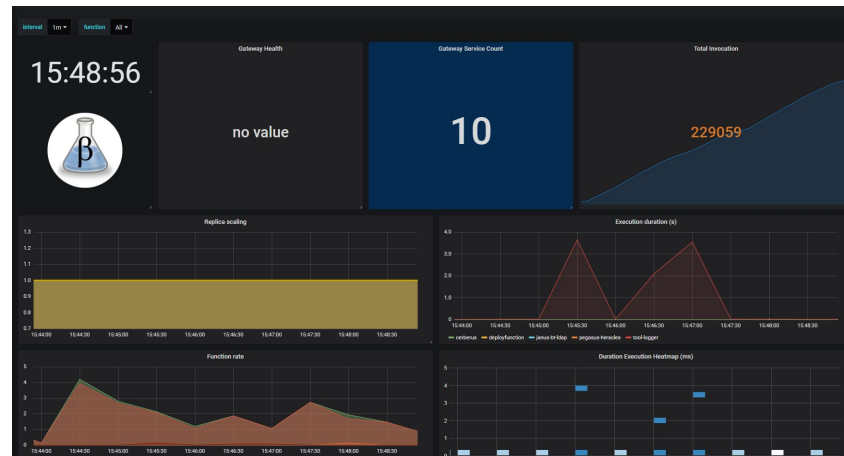
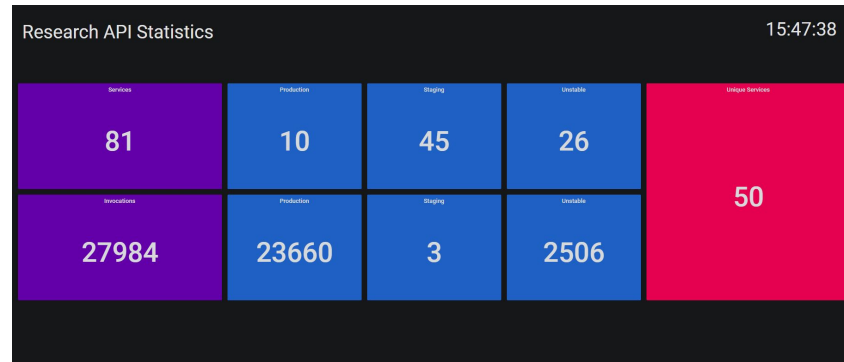
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Search	Production	Staging	Unstable
janus-demo	✓	✓	✓
commitsperdevpercent		✓	
generatebusroutes		✓	✓
cloc-filter		✓	
java-sleep			✓
convexhull		✓	
janus-aws-cognito		✓	✓
space-complexity-analyser		✓	✓
pegasus-heracles	✓	✓	✓
sleep-json		✓	
commitsperdev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



OpenFaaS Classic Watchdog

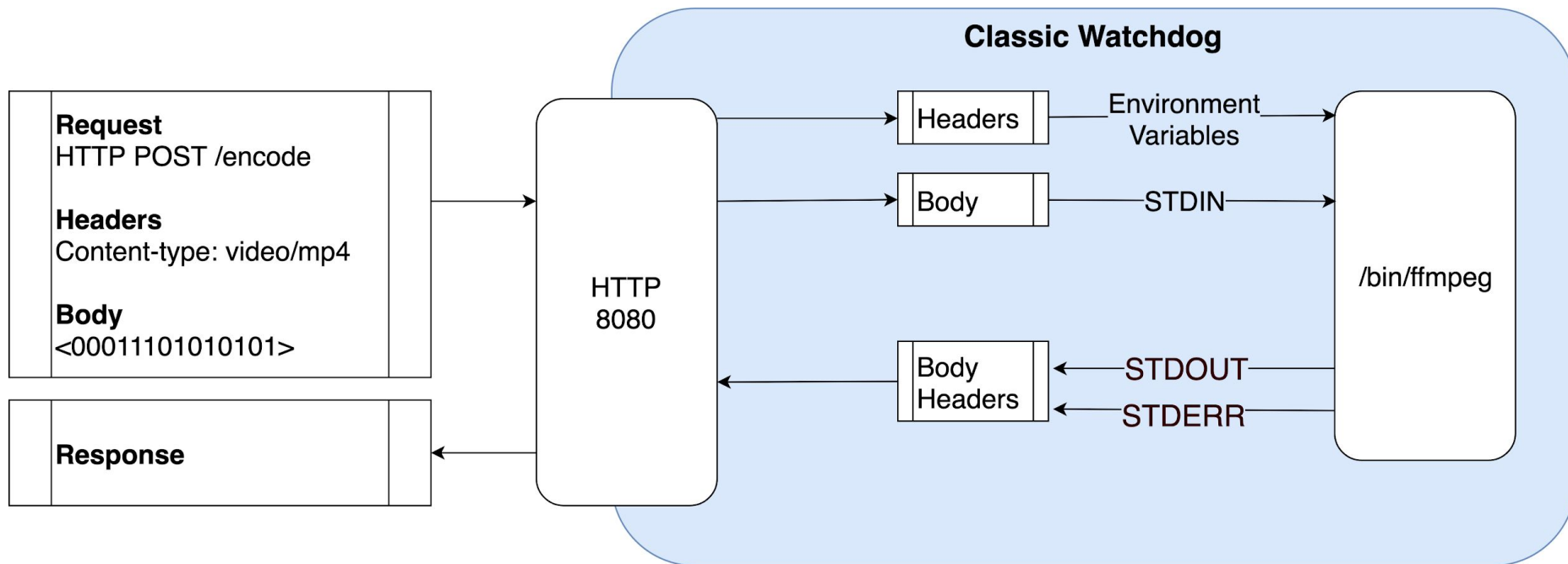


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Any binary - Linux / Windows

OpenFaaS (new) Watchdog

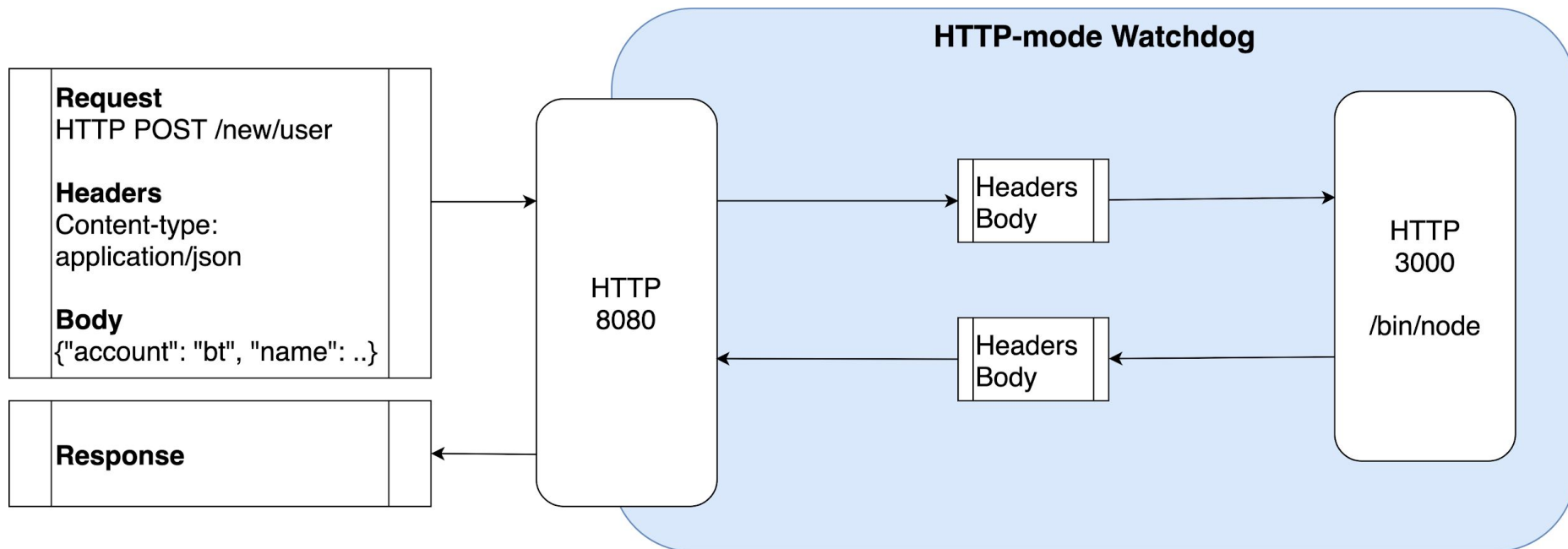


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Pass-through proxy with health-checks, metrics and compliance

Events

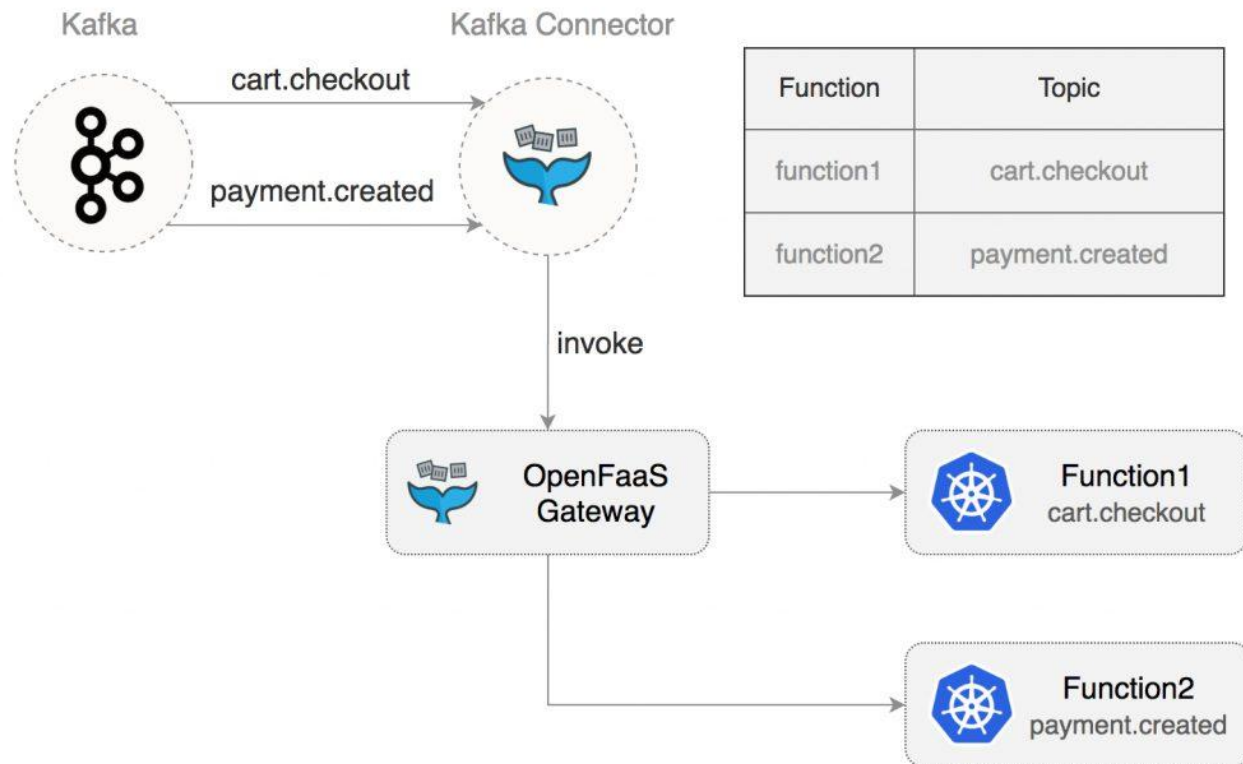


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connector-sdk:

- 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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