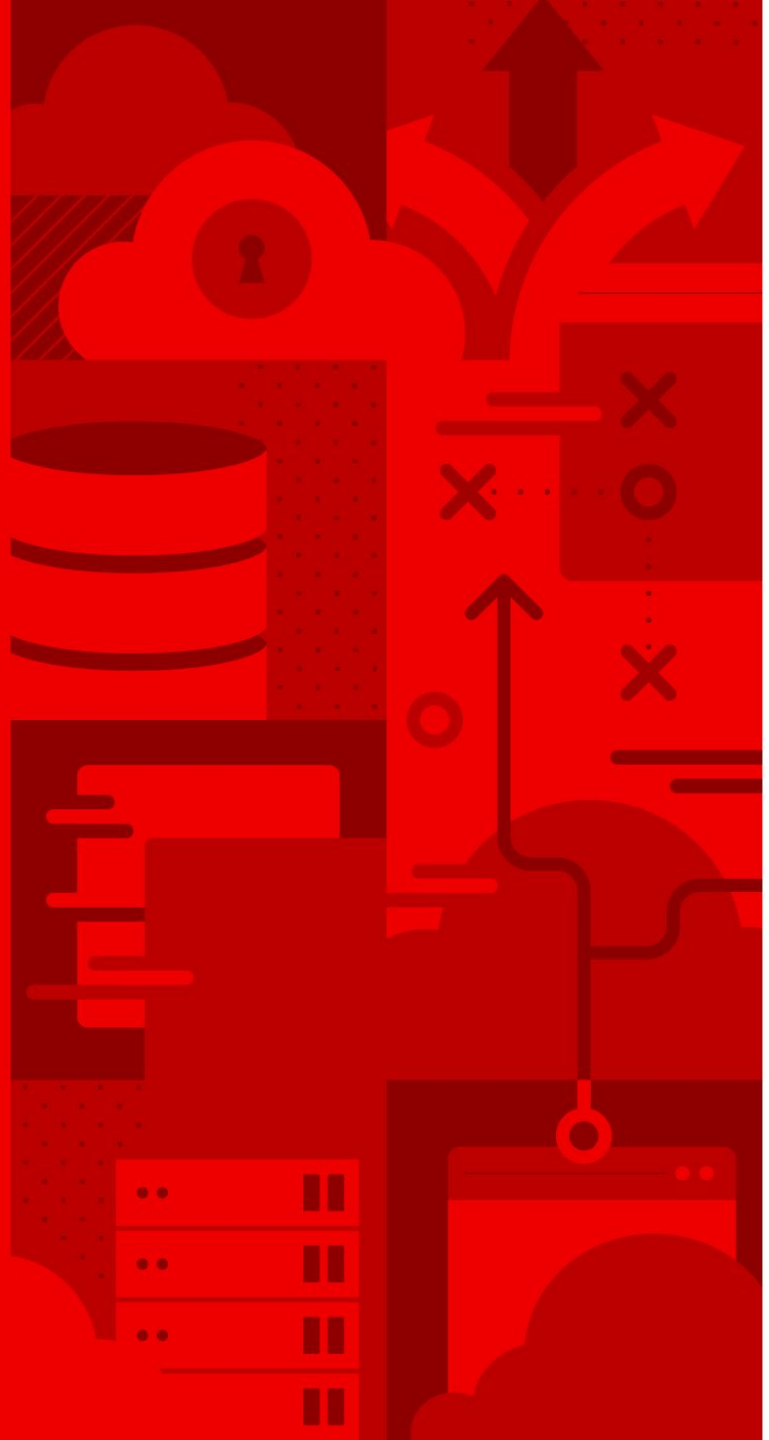


OpenShift Serverless

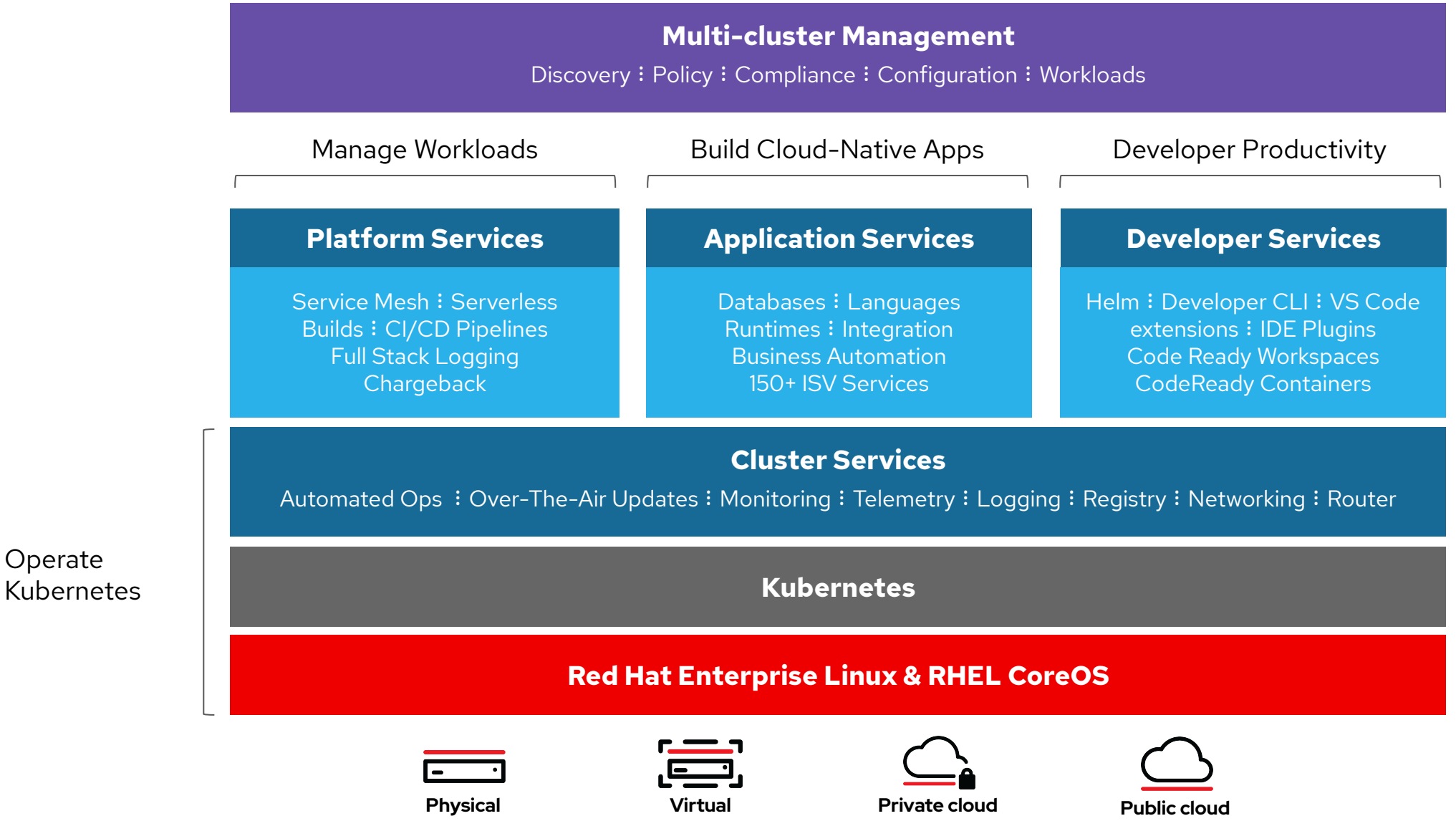
Briefing and Roadmap

Alfred Bach
abach@redhat.com

Updated: April 2020

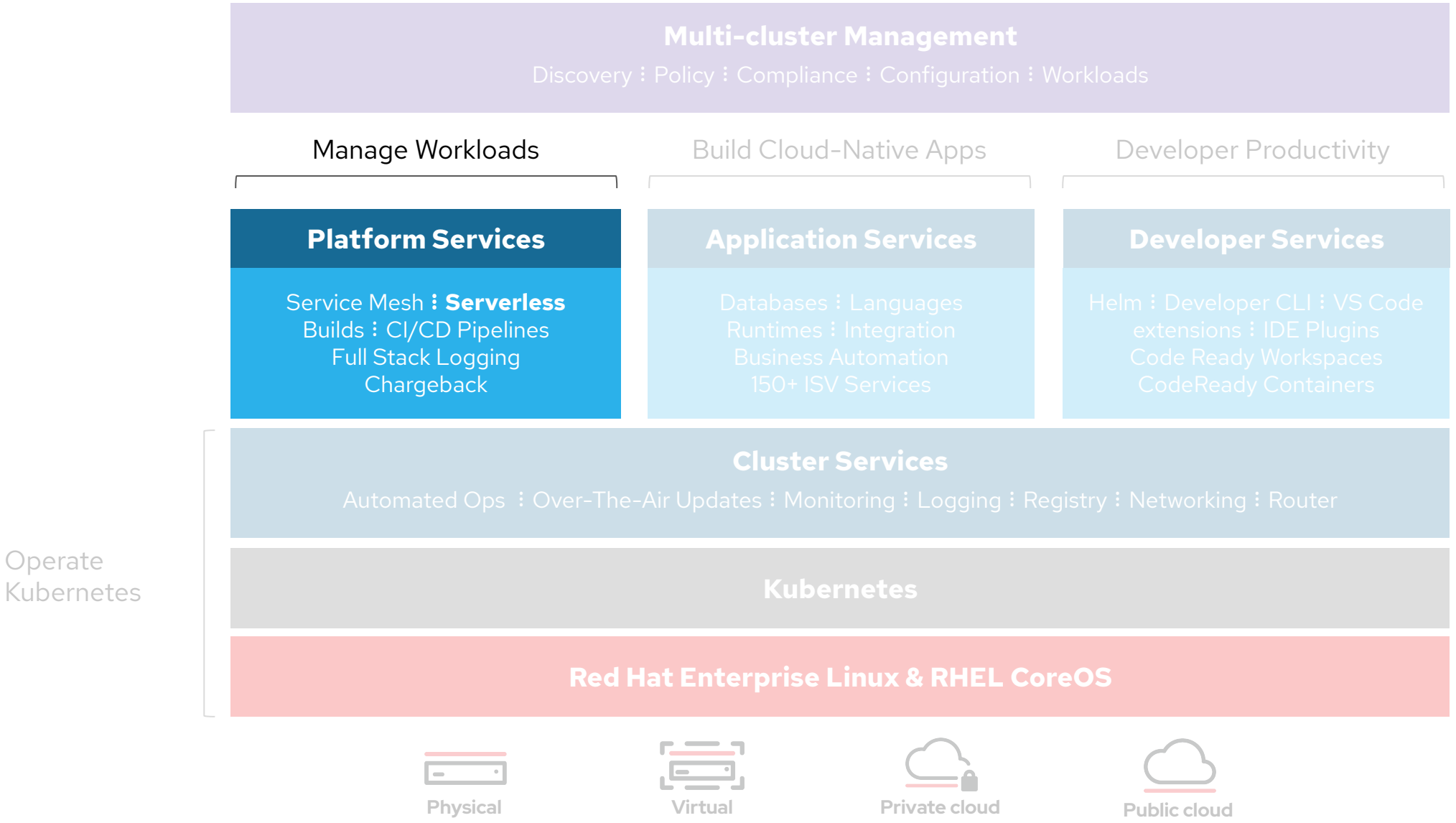
Red Hat

OpenShift Container Platform



Red Hat

OpenShift Container Platform



Red Hat

Serverless Market Trends

"Use Serverless To optimize The Benefits of The cloud" [2]

40%

of enterprises adopted Serverless technologies or practices with expected growth coming in the next 12 to 18 months.[1]

Vendor lock-in is the second biggest concern when adopting Serverless technologies.[1]

60%

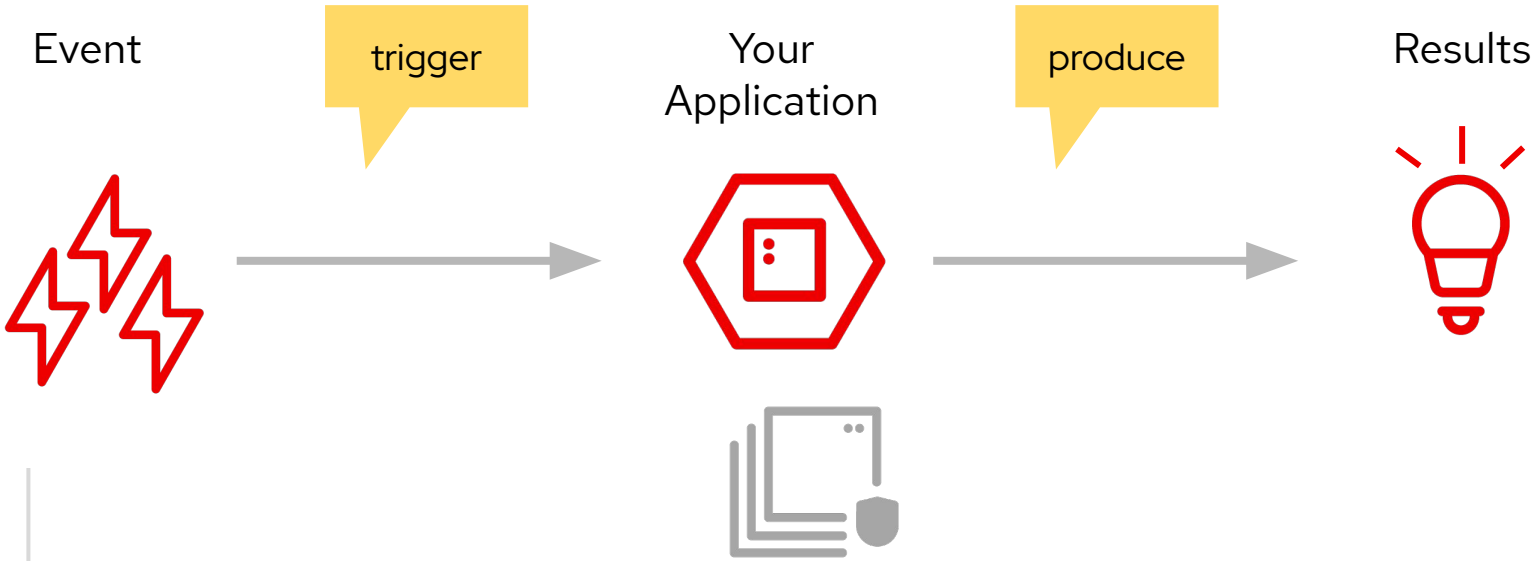
of the serverless practitioners reported *"reduction of operational costs"* with the second biggest benefit being *"scale with demand automatically"*

Source:

1. https://www.oreilly.com/radar/oreilly-serverless-survey-2019-concerns-what-works-and-what-to-expect/
2. Forrester - Now Tech: Serverless, Q4 2019

Red Hat

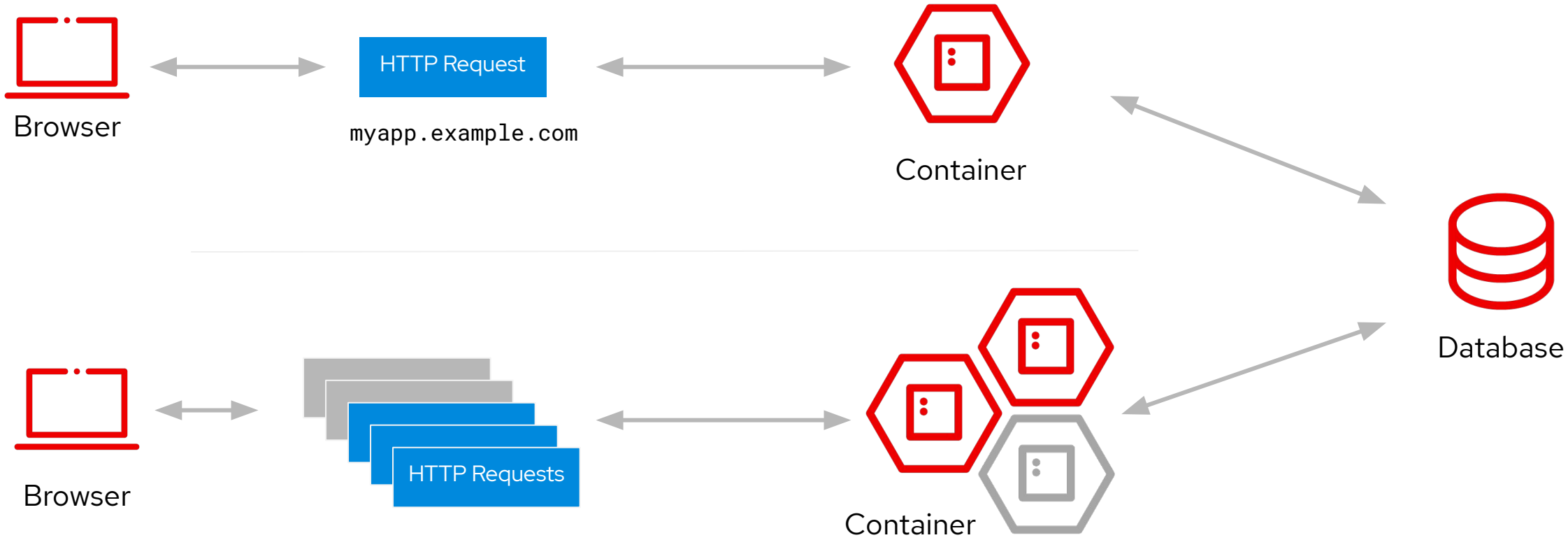
The "Serverless Pattern"



- HTTP Requests
- Kafka Messages
- Image Uploaded
- New Order
- Login from user

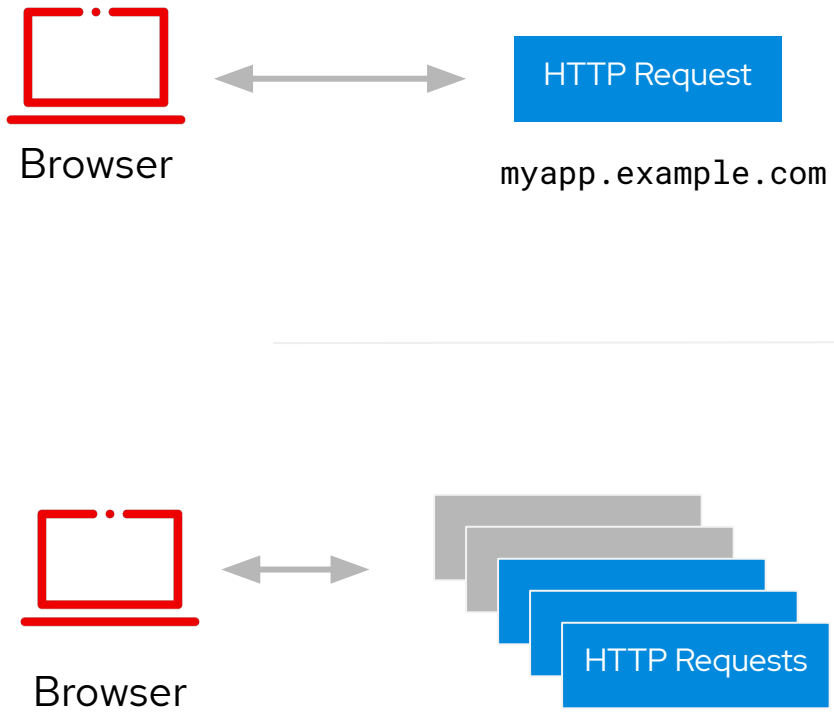
The "Serverless Pattern"

A serverless web application



The "Serverless Pattern"

A serverless web application

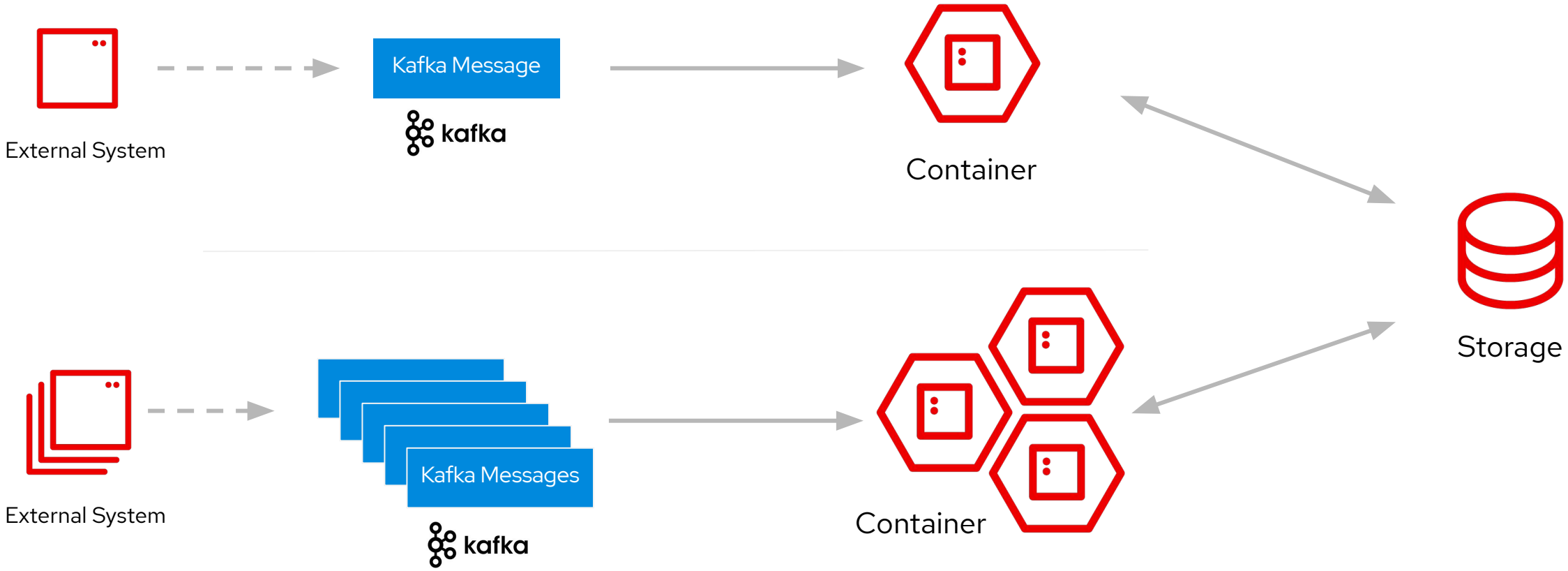


Benefits of this model:

- No need to setup auto-scaling and load balancers
  - Scale down and save resources when needed.
  - Scale up to meet the demand.
- No tickets to configure SSL for applications
- Enable Event Driven Architectures (EDA) patterns
- Enable teams to associate cost with IT
- Modernize existing applications to run as serverless containers

The "Serverless Pattern"

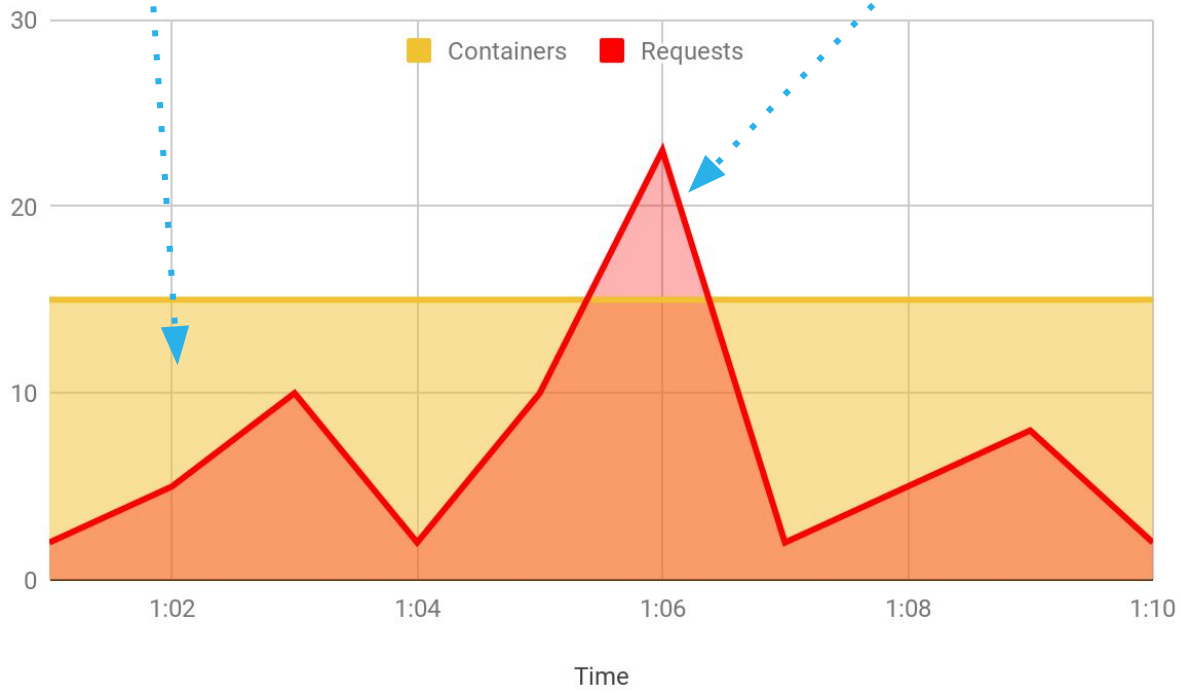
Processing a Kafka message



Serverless Operational Benefits

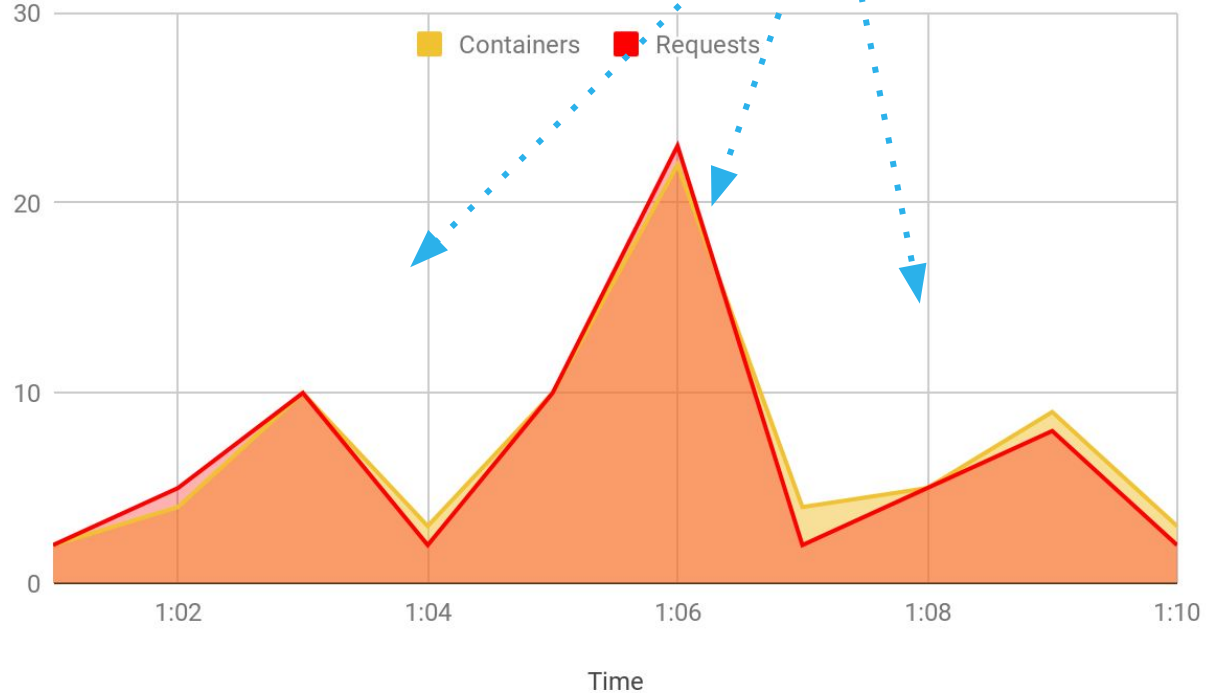
Over provisioning
Time in capacity planning
IT cost of idle resources

Under provisioning
Lost business revenue
Poor quality of service



NOT Serverless

More applications
Direct line between IT
costs & business revenue



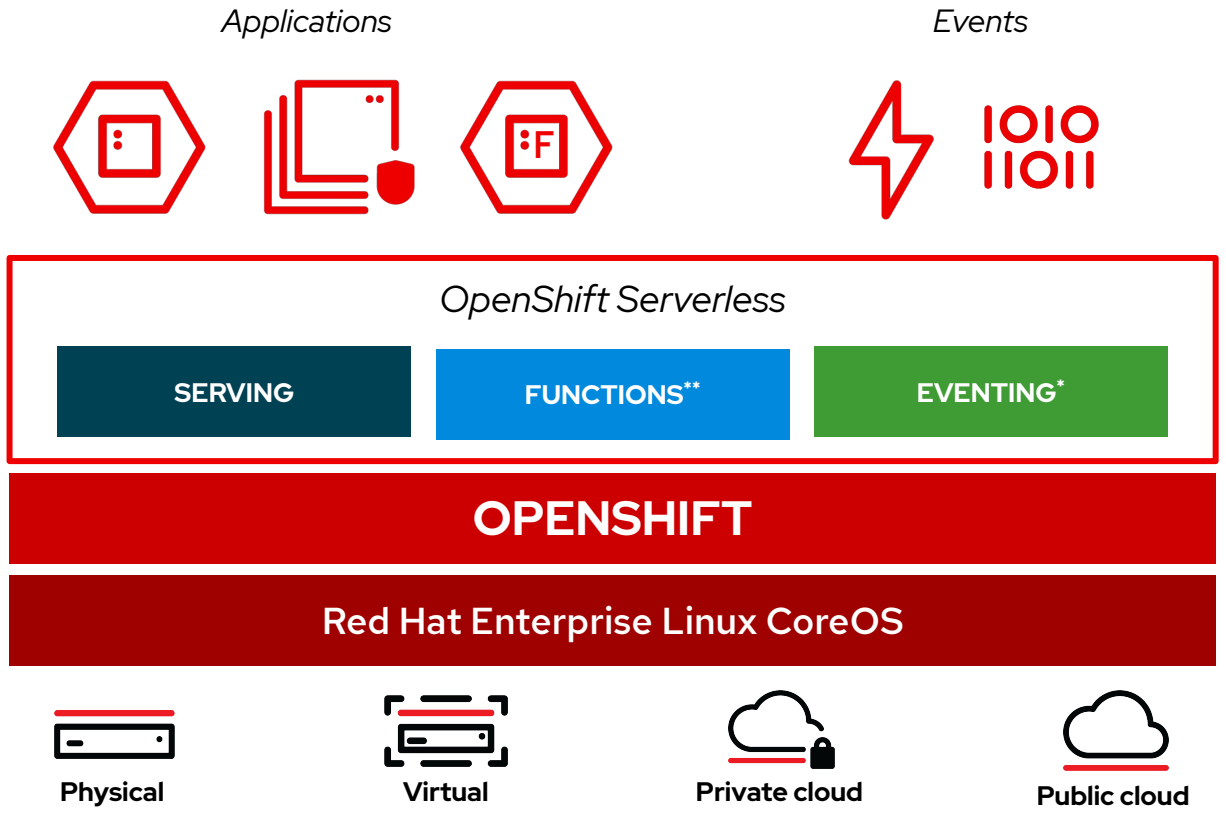
with Serverless

Generally Available

Openshift Serverless

Event-driven serverless containers and functions

- Deploy and run **serverless containers**
- Use any programming language or runtime
- Modernize existing applications to run serverless
- Powered by a rich ecosystem of event sources
- Manage serverless apps natively in Kubernetes
- Based on open source project **Knative**
- Run anywhere OpenShift runs



* Eventing is currently in Technology Preview

** Functions are currently a work in progress initiative

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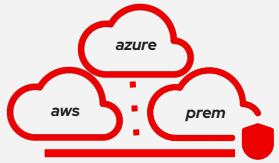
OpenShift Serverless

Key Features

Containers made easy

Simplified developer experience to deploy applications/code on serverless containers abstracting infrastructure & focusing on what matters.

Ready for the Hybrid Cloud



Truly portable serverless running anywhere OpenShift runs, that is on-premises or on any public cloud. Leverage data locality and SaaS when needed.

Immutable revisions

Deploy new features: performing canary, A/B or blue-green testing with gradual traffic rollout with no sweat and following best practices.

Any programming language

Use any programming language or runtime of choice. From Java, Python, Go and JavaScript to Quarkus, SpringBoot or Node.js.

Automatic scaling

No need to configure number of replicas, or idling. Scale to zero when not in use, auto scale to thousands during peak, with built-in reliability and fault-tolerance.

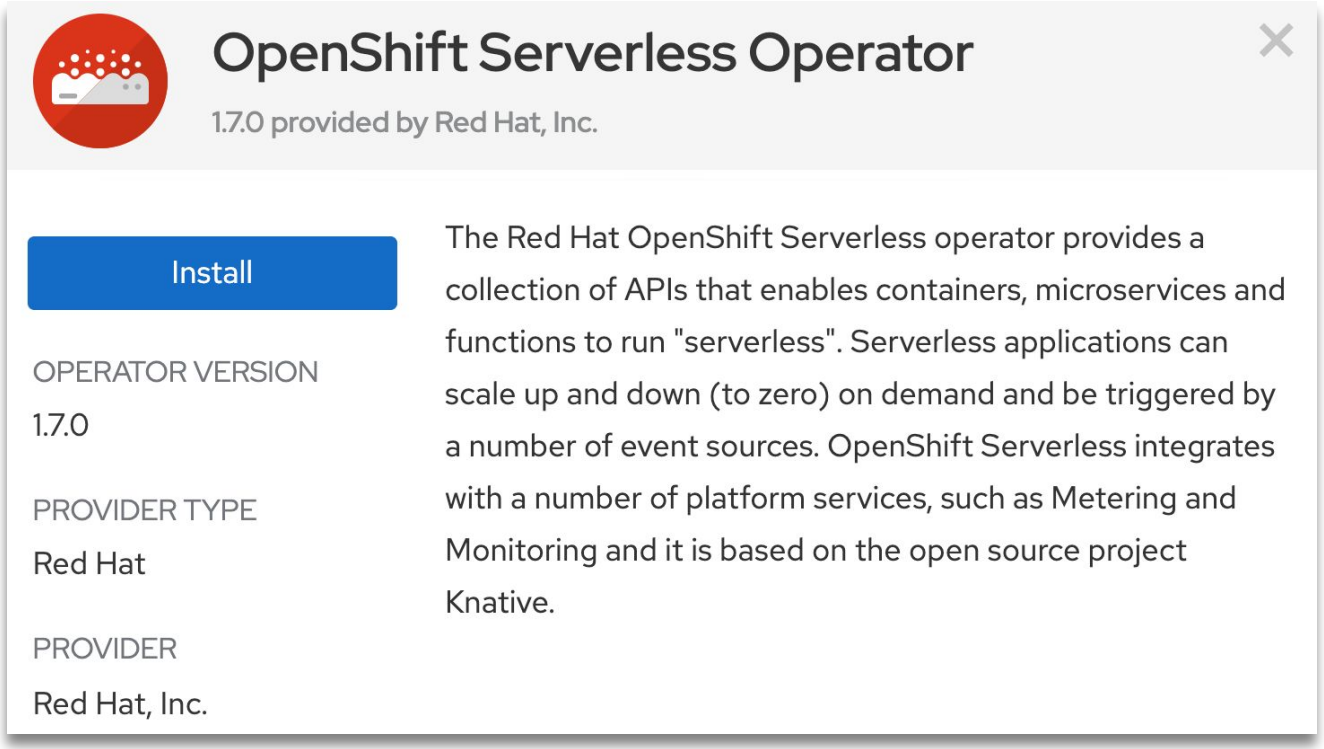
Event Driven Architectures

Build loosely coupled & distributed apps connecting with a variety of built-in or third-party event sources or connectors powered by Operators.

Installation experience

"Easy day 1 and even better for day 2"

- Click Install experience
- Developer & admin experience in Console
- Built-in event sources
- No external dependencies.
- ***"Just works."***



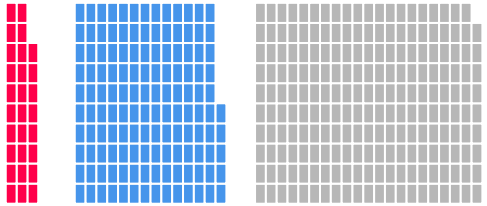
Red Hat

Choosing the Right Tool

Your Team

The Ecosystem

Performance



LOGIC

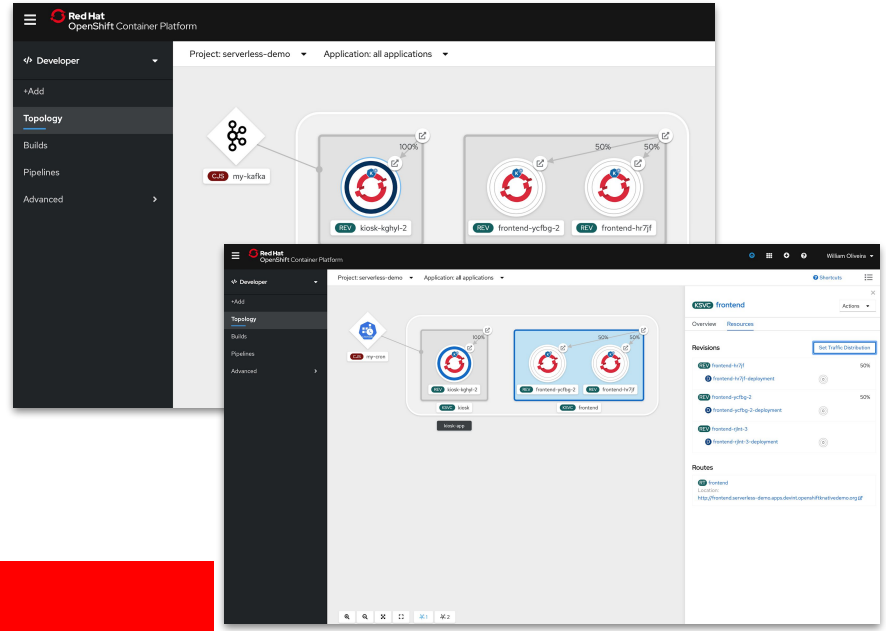
Developer experience

- Java
- Node
- Python
- Go
- Ruby
- Ruby on Rails
- PHP
- Perl
- .NET Core

```
$ kn service create --image=
```

CLI

UI



OpenShift Serverless

OPENSHIFT

Red Hat Enterprise Linux CoreOS

Physical

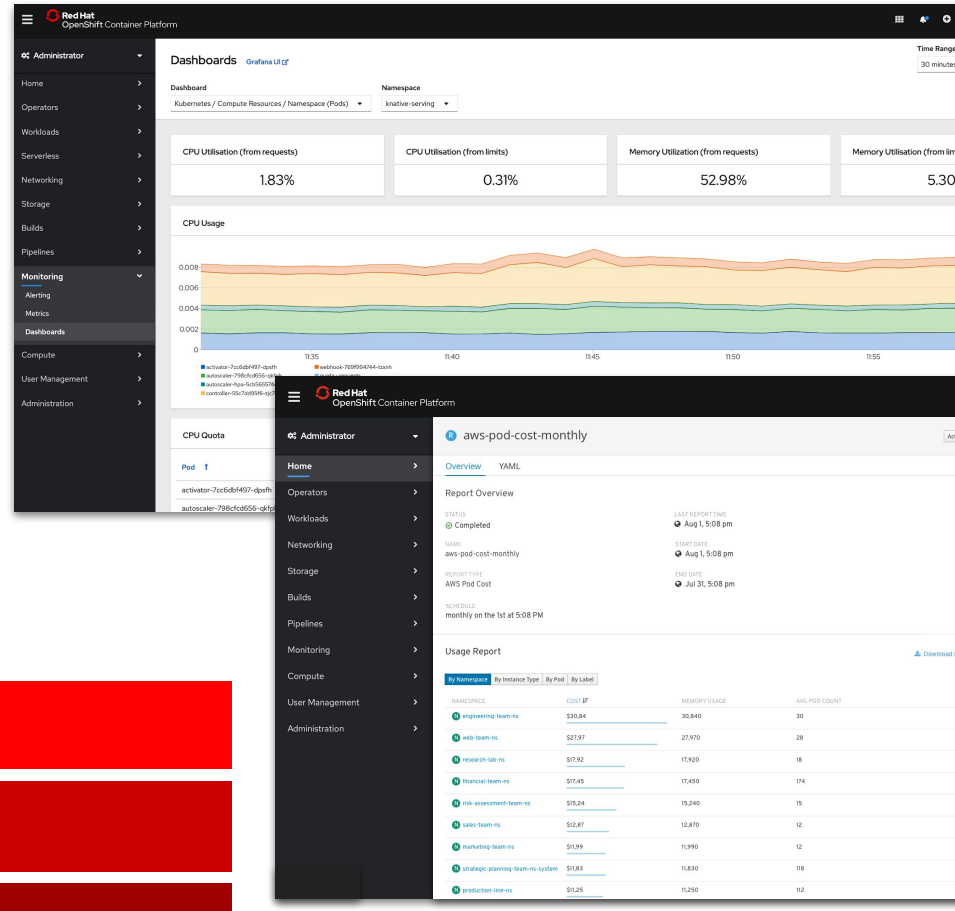
Virtual

Private cloud

Public cloud

Admin experience

- Monitoring, Metering and Logging
- Disconnected install support (air-gapped)
- Egress proxy with TLS support
- Over the air updates and patches



UI

OpenShift Serverless

OPENSHIFT

Red Hat Enterprise Linux CoreOS

Physical

Virtual

Private cloud

Public cloud

Kubernetes

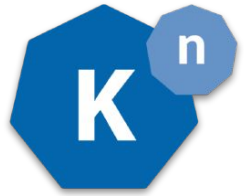
```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
name: frontend
labels:
  app: guestbook
spec:
selector:
  matchLabels:
    app: guestbook
    tier: frontend
replicas: 1
template:
  metadata:
    labels:
      app: guestbook
      tier: frontend
  spec:
    containers:
    - image: markusthoemmes/guestbook
      name: guestbook
      resources:
        requests:
          cpu: 100m
          memory: 100Mi
      env:
      - name: GET_HOSTS_FROM
        value: dns
      ports:
      - containerPort: 80
```

```yaml
apiVersion: extensions/v1beta1
kind: HorizontalPodAutoscaler
metadata:
 name: guestbook
 namespace: default
spec:
 scaleRef:
   kind: ReplicationController
   name: guestbook
   namespace: default
   subresource: scale
 minReplicas: 1
 maxReplicas: 10
 cpuUtilization:
   targetPercentage: 50
```

```yaml
apiVersion: v1
kind: Service
metadata:
name: frontend-service
labels:
  app: guestbook
  tier: frontend
spec:
ports:
- port: 80
selector:
  app: guestbook
  tier: frontend
---
apiVersion: route.openshift.io/v1
kind: Route
metadata:
name: frontend-route
spec:
to:
  kind: Service
  name: frontend-service
```

~70 lines

Knative




```yaml
apiVersion: serving.knative.dev/v1
kind: Service
metadata:
name: frontend
spec:
template:
  metadata:
    labels:
      app: guestbook
      tier: frontend
  spec:
    containers:
    - image: markusthoemmes/guestbook
      resources:
        requests:
          cpu: 100m
          memory: 100Mi
      env:
      - name: GET_HOSTS_FROM
        value: dns
      ports:
      - containerPort: 80
```

22 lines

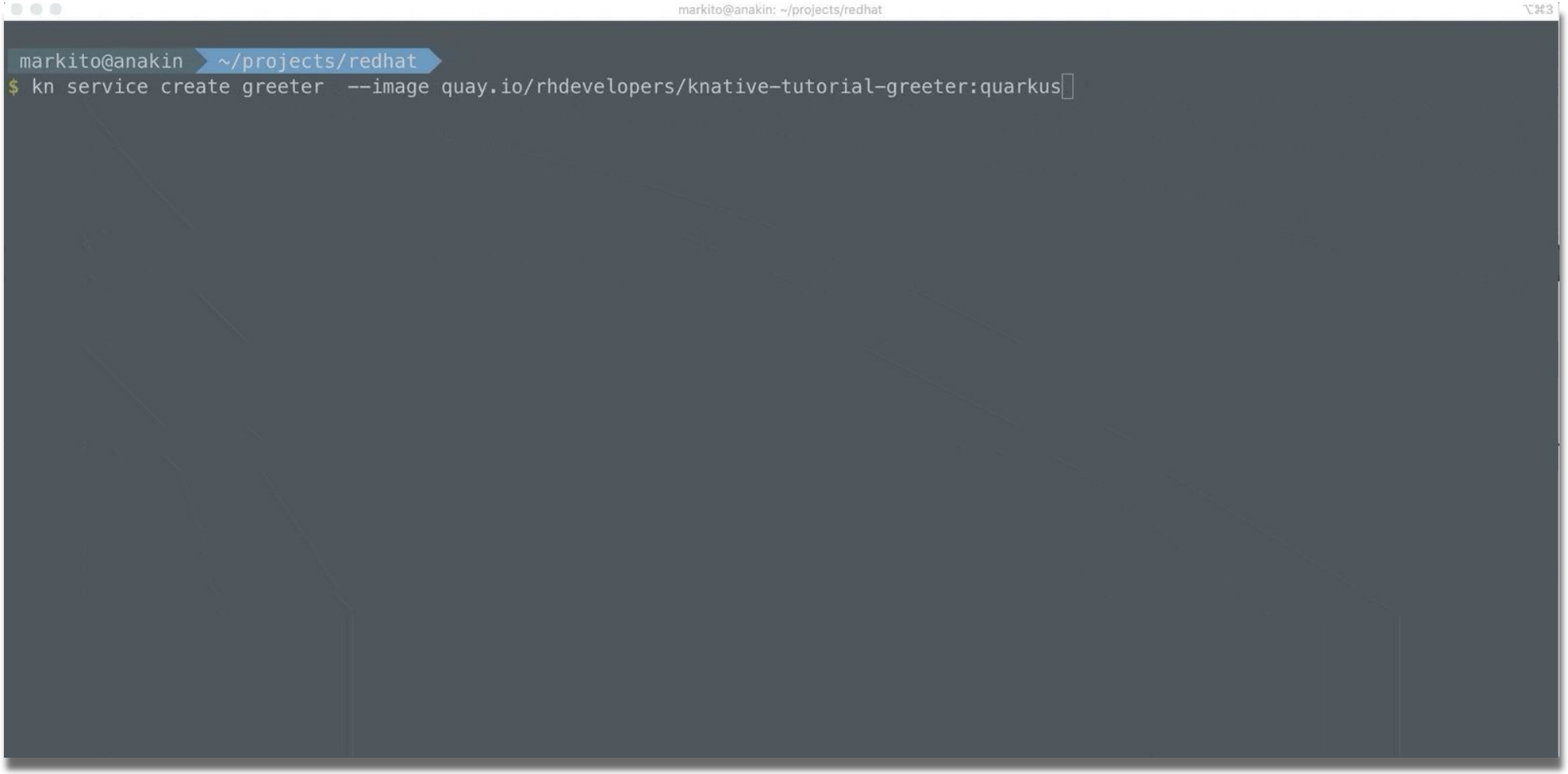
Command Line Experience

```
$ kn service create create myService --image=[registry/mycontainer:v1] --min-scale=1 --max-scale=100
```

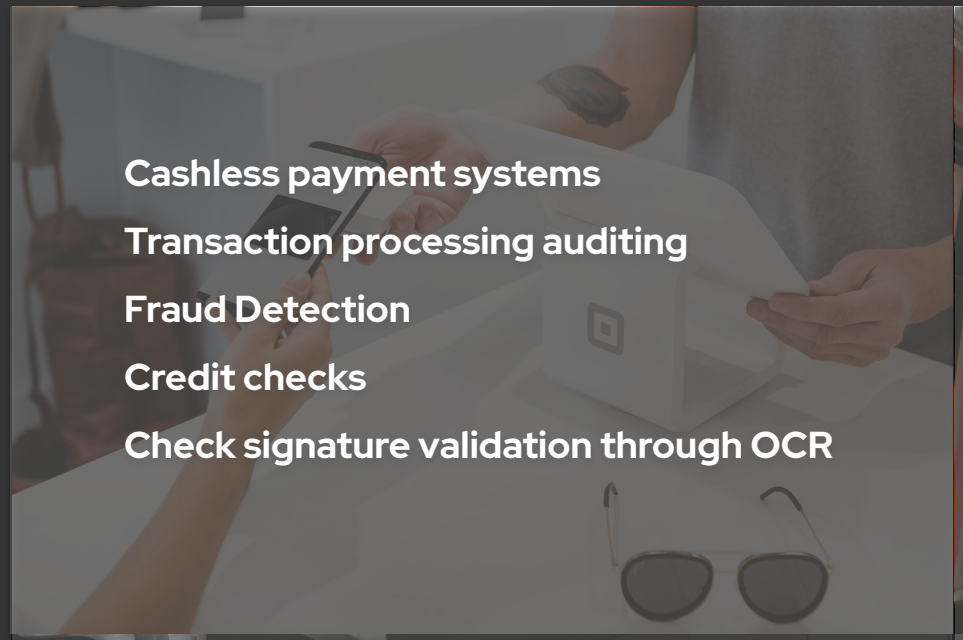
```
$ kn service update myService --traffic myService-rev1=50,myService-rev2=50
```

```
$ kn source cronjob create my-cron --schedule "* * * * */1" --data "ping" --sink svc:myService
```

Hello World with Quarkus!



Serverless
Use cases



Cashless payment systems

Transaction processing auditing

Fraud Detection

Credit checks

Check signature validation through OCR

Product thumbnail generation

Chatbots and CRM functions

Marketing Campaign notifications

Sales Audit

Content Push

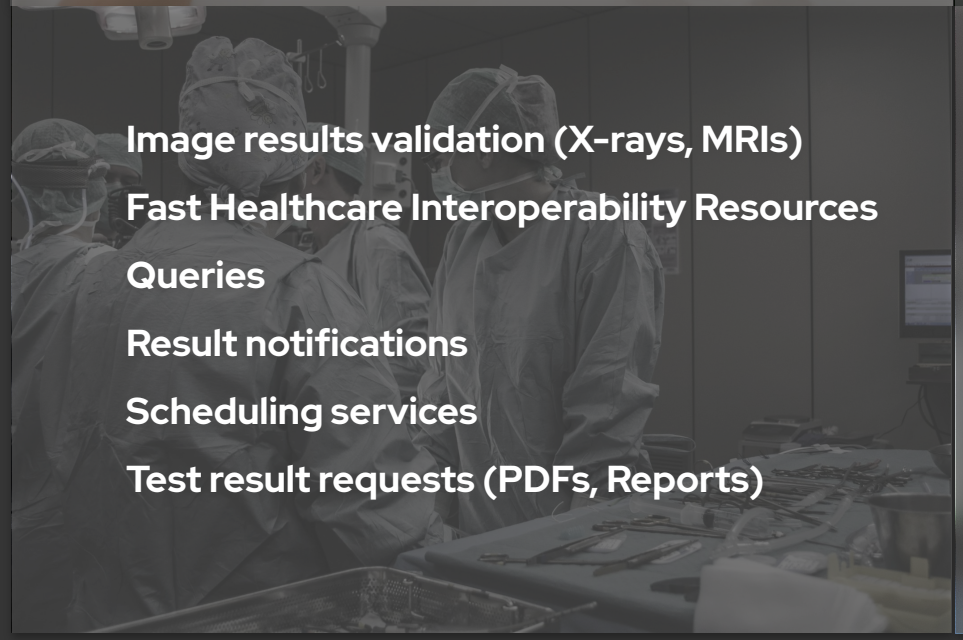


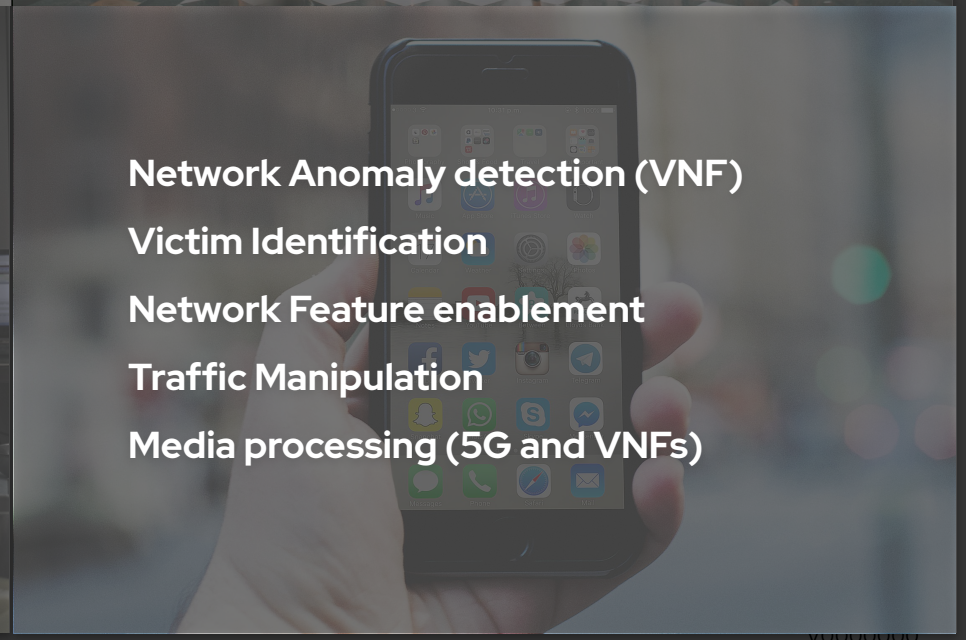
Image results validation (X-rays, MRIs)

Fast Healthcare Interoperability Resources Queries

Result notifications

Scheduling services

Test result requests (PDFs, Reports)



Network Anomaly detection (VNF)

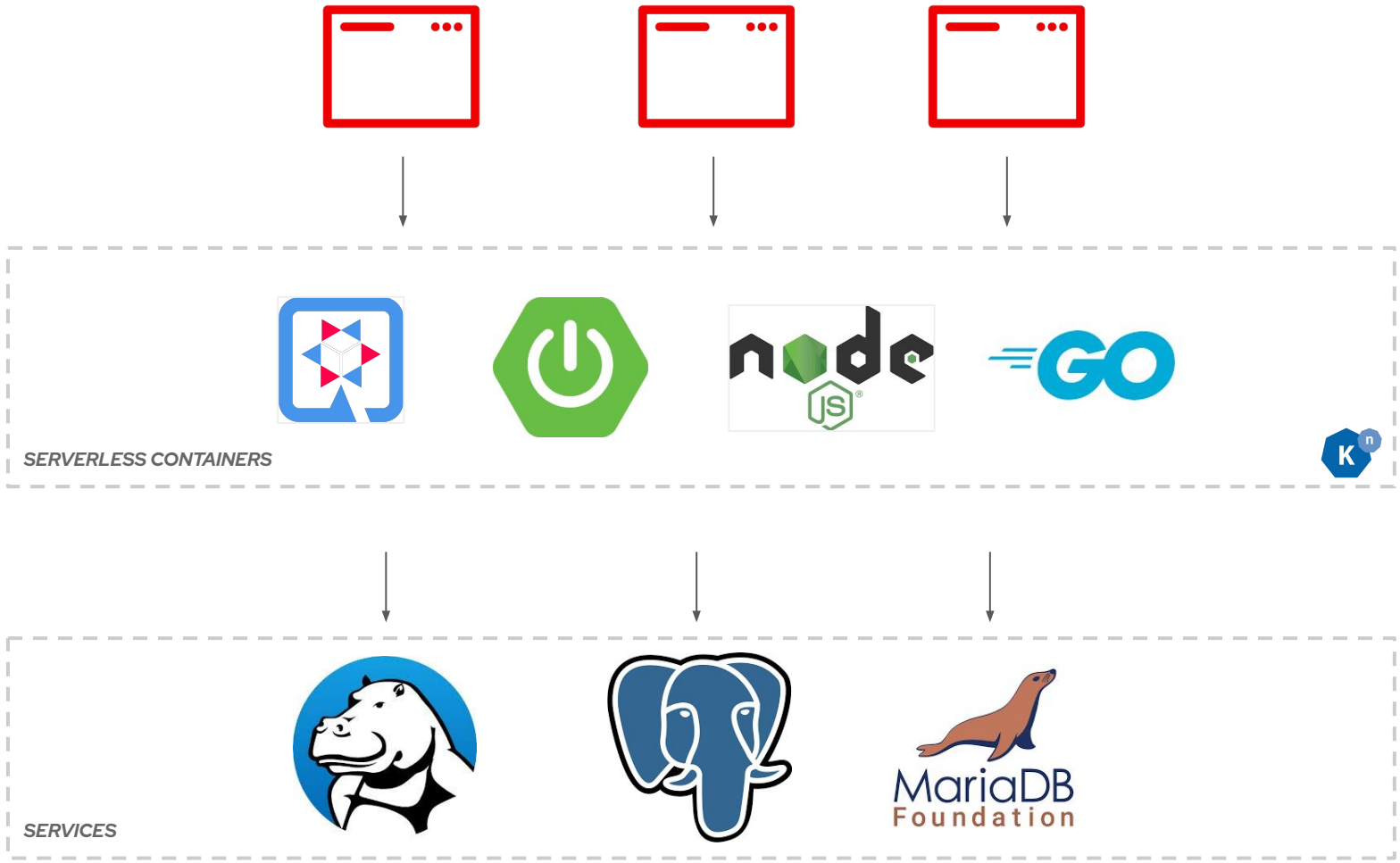
Victim Identification

Network Feature enablement

Traffic Manipulation

Media processing (5G and VNFs)

Web Applications and APIs



Language or runtime of your choice:

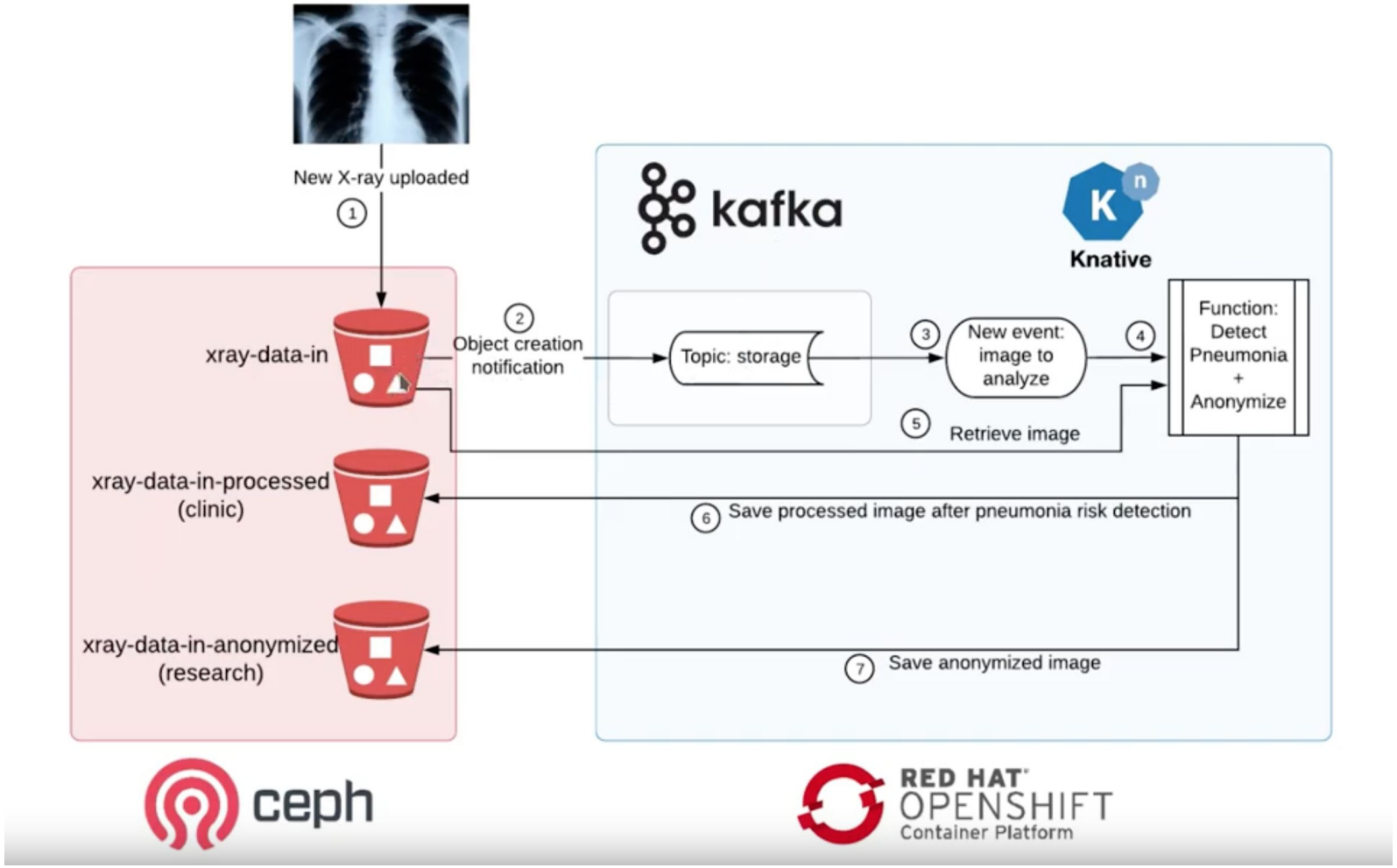
OpenJDK
python
django
VERT.X
RAILS

Red Hat

Data Transformation

Common Use cases

- Image analysis* (medical, AI/ML, media)
- Video format transcoding
- File type conversion (financial, medical)
- Data extraction
- Lightweight Data Transformation
- Invoice Generation



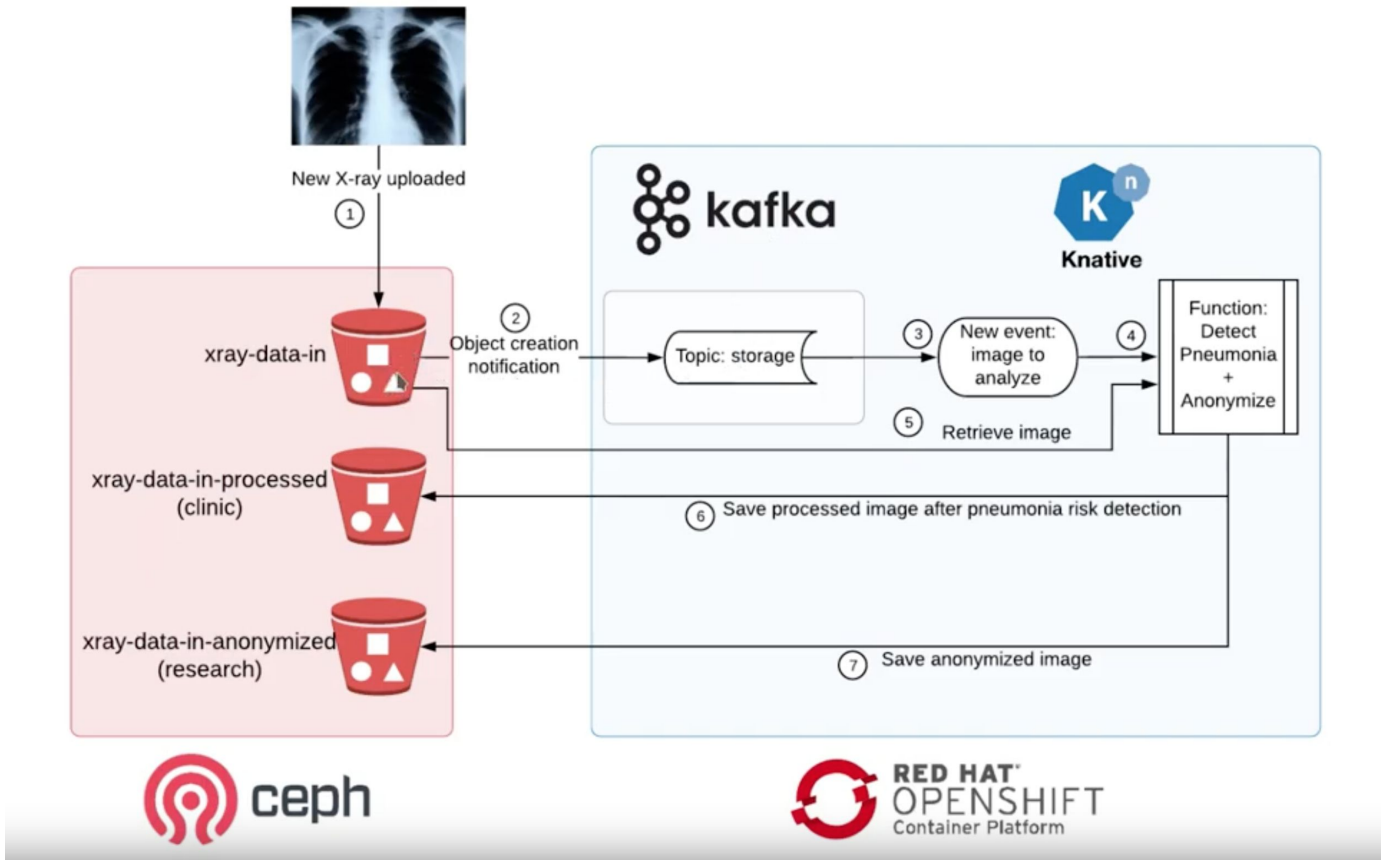
* Article: https://medium.com/analytics-vidhya/automated-data-pipeline-using-ceph-notifications-and-kserving-5e1e9b996661

Ceph + Kafka + Serverless

"Automated AI/ML Data Pipelines"

Common Use cases

- Image analysis* (medical, AI/ML, media)
- Video format transcoding
- File type conversion (financial, medical)
- Data extraction
- Data Transformation
- Invoice Generation

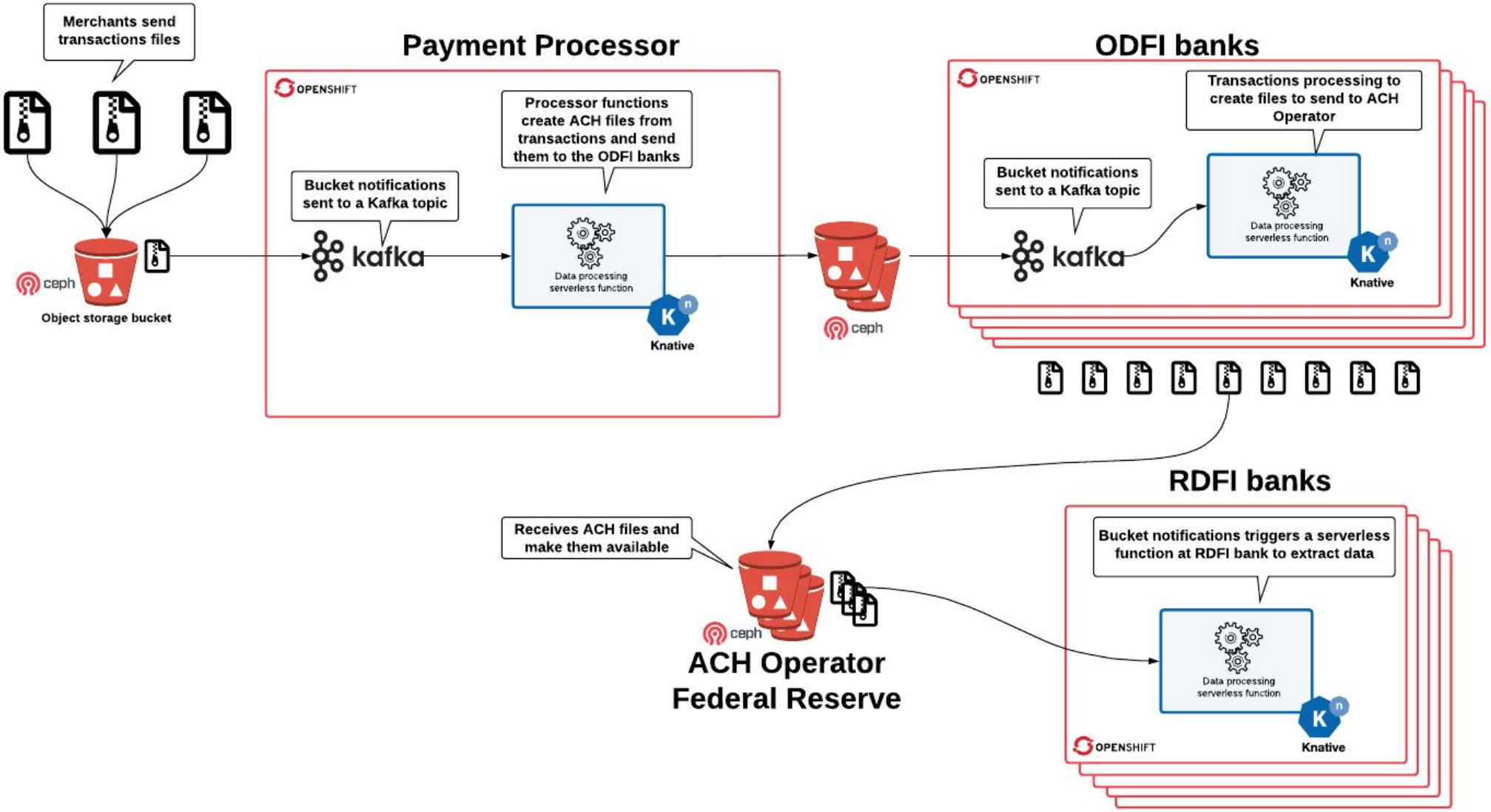


TensorFlow

https://medium.com/analytics-vidhya/automated-data-pipeline-using-ceph-notifications-and-kserving-5e1e9b996661

Red Hat

Serverless Open Banking



Red Hat

Building on OpenShift Serverless with Red Hat Services

Connected Services
How Knative services interact with the outside world.

API Gateway
Next gen APIs still require management.

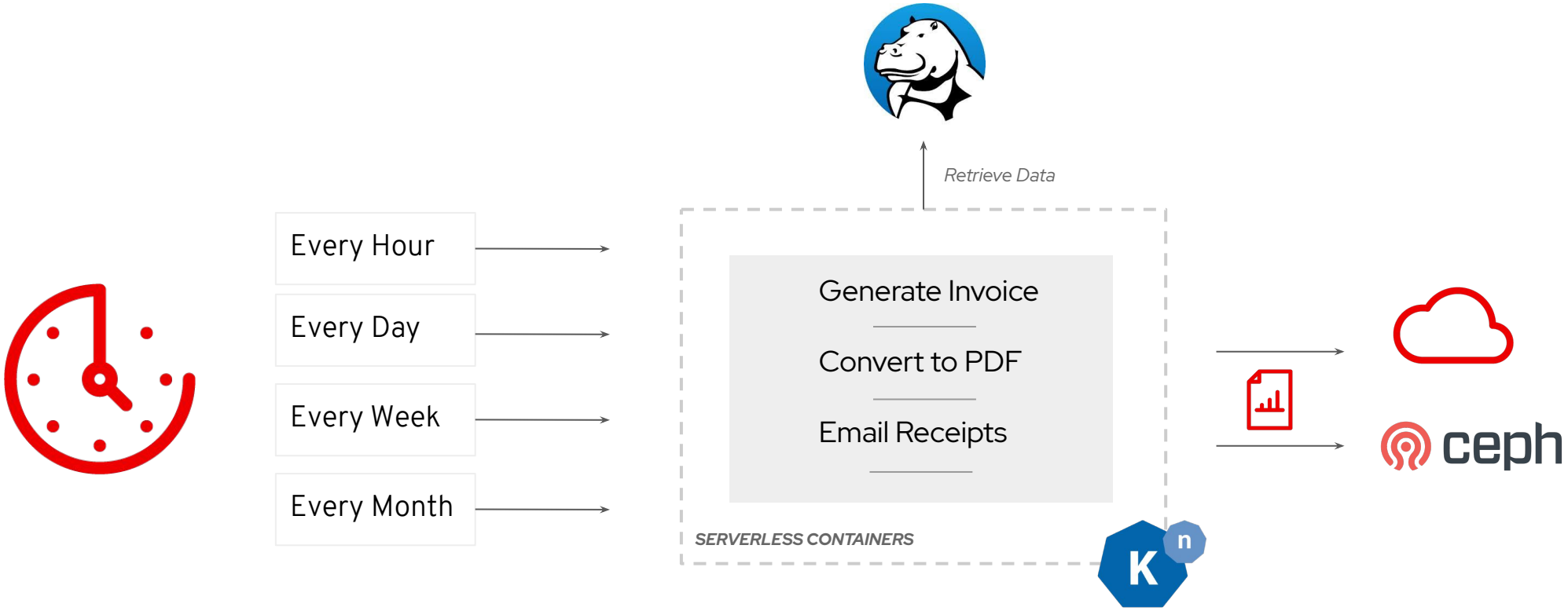
Service Orchestrator
Composing multiple services together into an application.

Implementing Services
Functions, languages, and the vagaries of cold starts.

Event Streaming
All modern architectures need some Kafka.

The Dirty Word in Serverless
Yep, you still need state to handle long-lived orchestration.

Scheduled Apps Cron Jobs



Partners and ecosystem

Red Hat

Red Hat | Microsoft Azure

KEDA

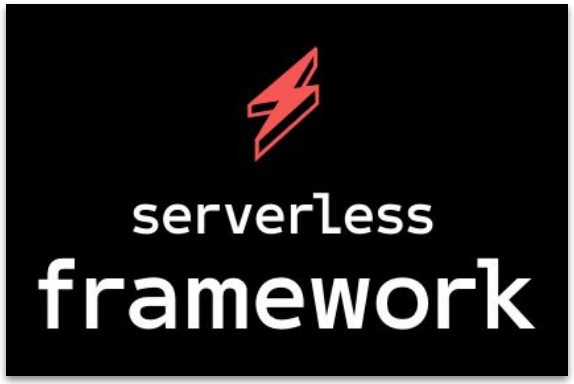
Unstar 1.8k Fork 151

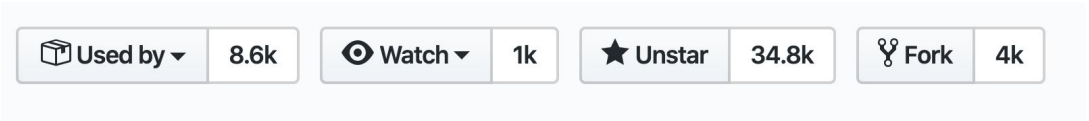
CLOUD NATIVE SANDBOX

"KEDA serves as a Kubernetes Metrics Server and allows users to define autoscaling rules and scalers for any containerized workload. It enables Azure Functions on Kubernetes.

Partners

```
# Create a new Serverless service/project
$ serverless create --template knative-docker

# Change into the newly created directory
$ cd my-service

# deploy your application
$ serverless deploy

# Invoke from the CLI
$ serverless invoke -f hello

# Remove the service
$ serverless remove
```





> *"The #1 framework to deploy functions in AWS Lambda can now be used with OpenShift and deploy containers and microservices.*

Partners

"TriggerMesh has a certified Operator for OpenShift and is focusing on Serverless cloud native integration use cases, enabling a hybrid cloud even bus.

"IBM Cloud Services provide event sources that can trigger serverless applications running in OpenShift and will be using Knative as basis for a unified developer experience.

Generally Available

OpenShift Serverless

Links

- ✓ https://www.openshift.com/serverless
- ✓ Knative Tutorial by Red Hat Developers
- ✓ Knative Cookbook by Red Hat Developers
- ✓ try.openshift.com/serverless (coming soon)

Red Hat's OpenShift Serverless for hybrid, legacy and greenfield

FEBRUARY 21 2020

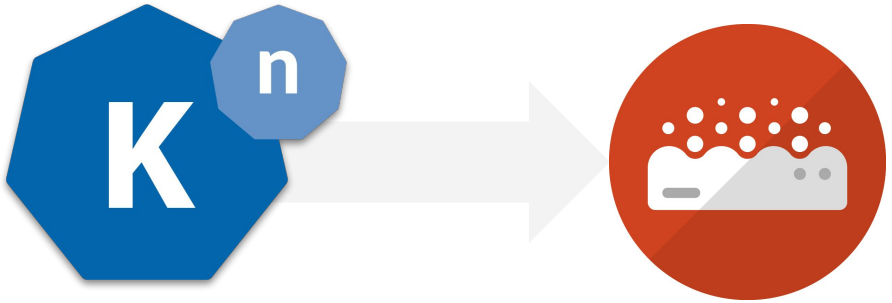
By William Fellows

Kubernetes is complex and difficult to deploy – it autoscales based on available resources, not on requests themselves. OpenShift Serverless is designed to resolve this complexity to deliver the benefits 'as advertised' of quicker time to market and faster recovery.

Read the analyst report

451 Research®

Thank you



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twitter.com/RedHat

Red Hat