Building cloud native apps
with Containers, Functions and Managed Services

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About me

Microsoft

@scottcoulton

About me

@chanezon

1994-2005

Software Engineer

accenture

Netscape

AOL

Sun microsystems

2005-2019

Developer Relations

Google

vmware spring CLOUD FOUNDRY

Microsoft

docker

Microsoft

Microsoft

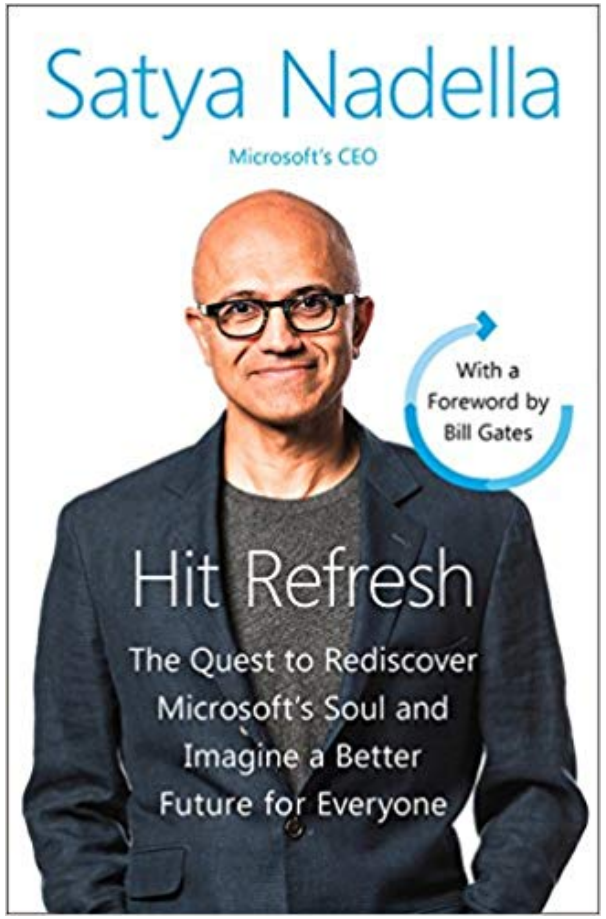
Agenda

- Developer experience
- Application packaging
- Making your application scale

Microsoft's mission

"Our mission is to empower every person and every organization on the planet to achieve more."

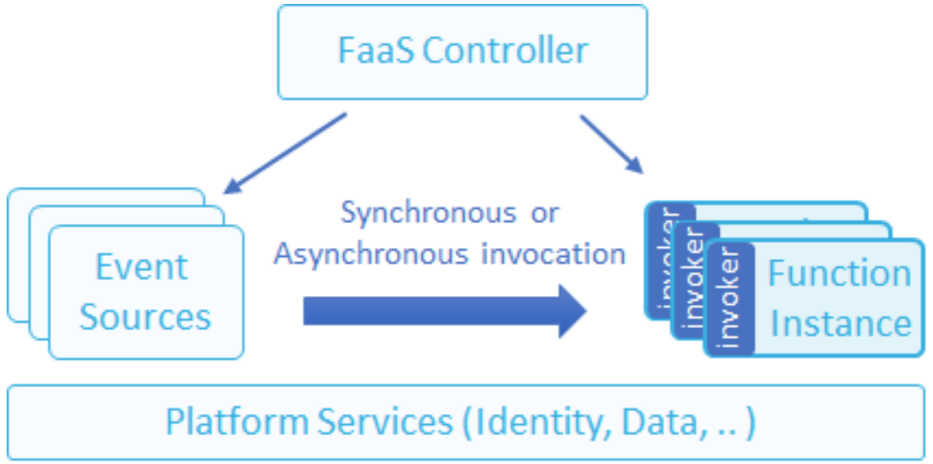
https://www.microsoft.com/en-us/about

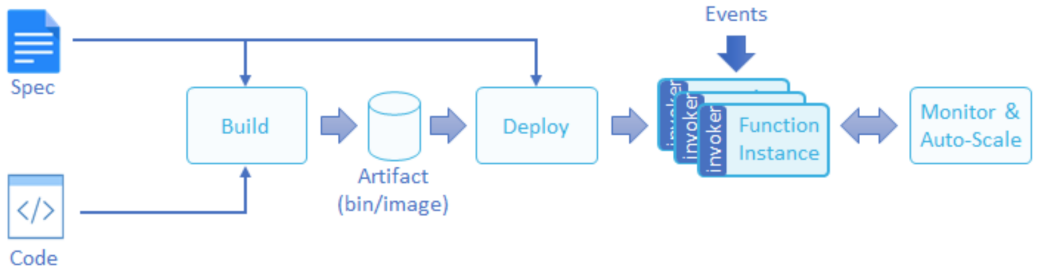


3 abstractions

- Containers
- Functions, triggered by Events
- Managed Cloud Services

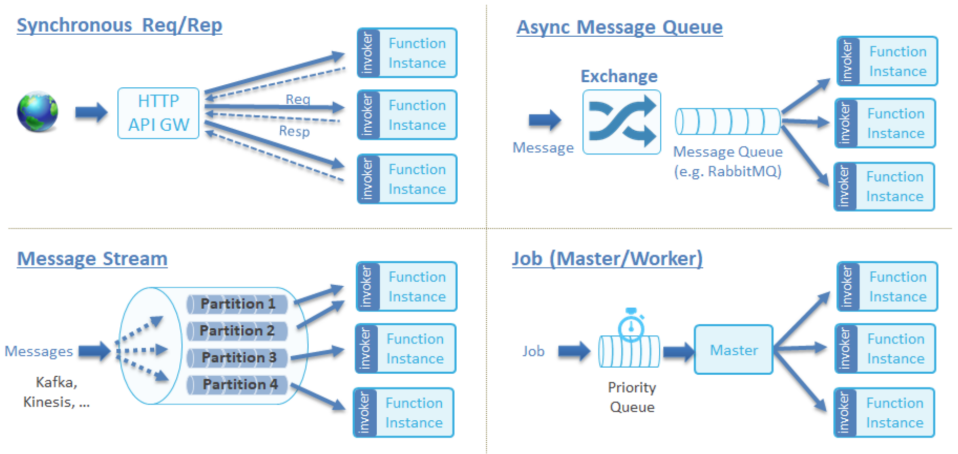
Portable Serverless Platforms on top of Kubernetes





Fn
Nuclio
OpenFaaS
Galactic Fog
OpenWhisk

KNative
Keda



Azure Functions is an open-source project

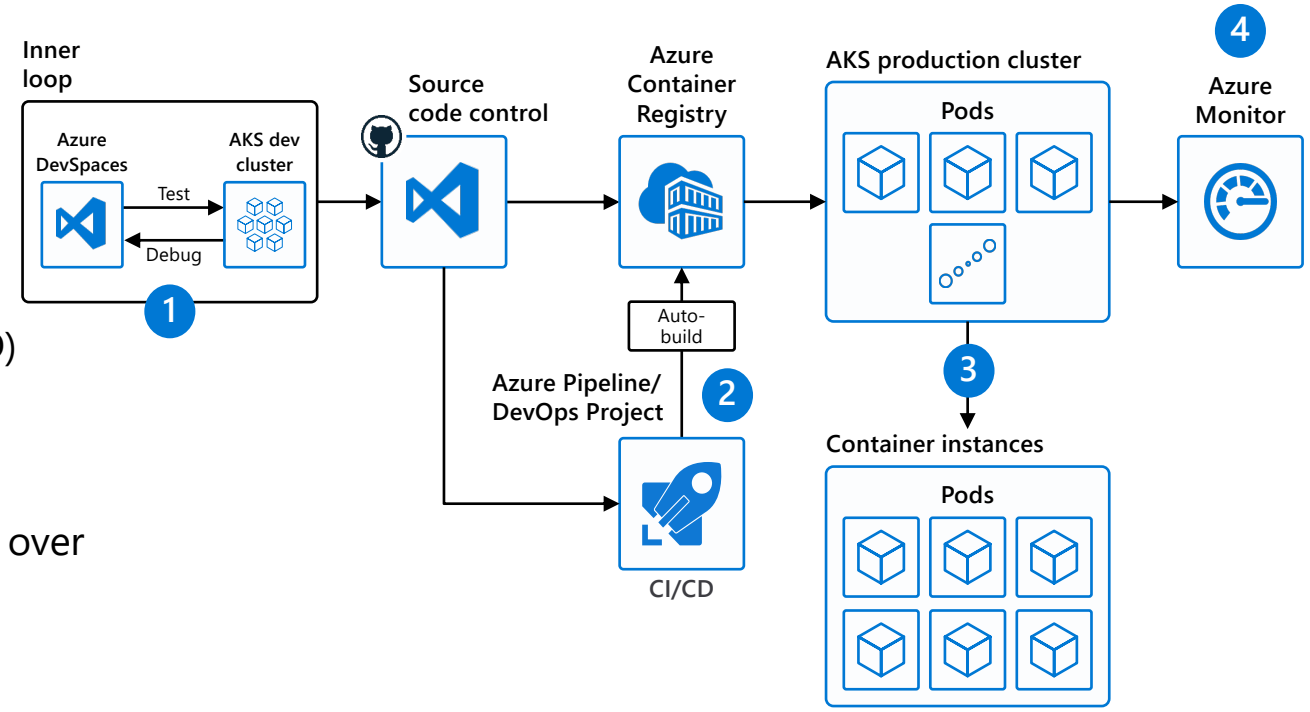
Functions runtime and all extensions are fully open source

https://github.com/Azure/Azure-Functions

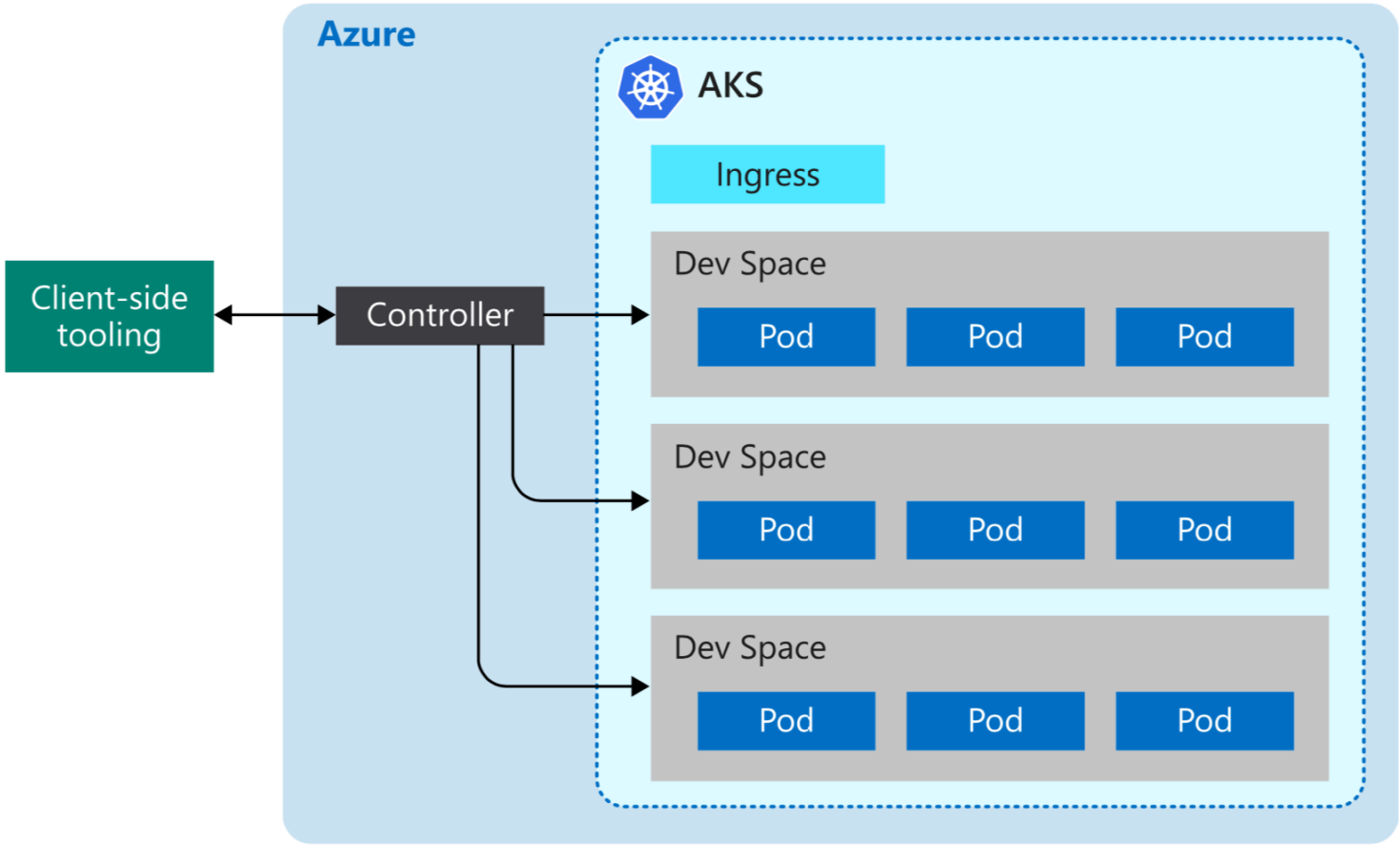
Dev experience: Azure Dev Spaces

Capabilities

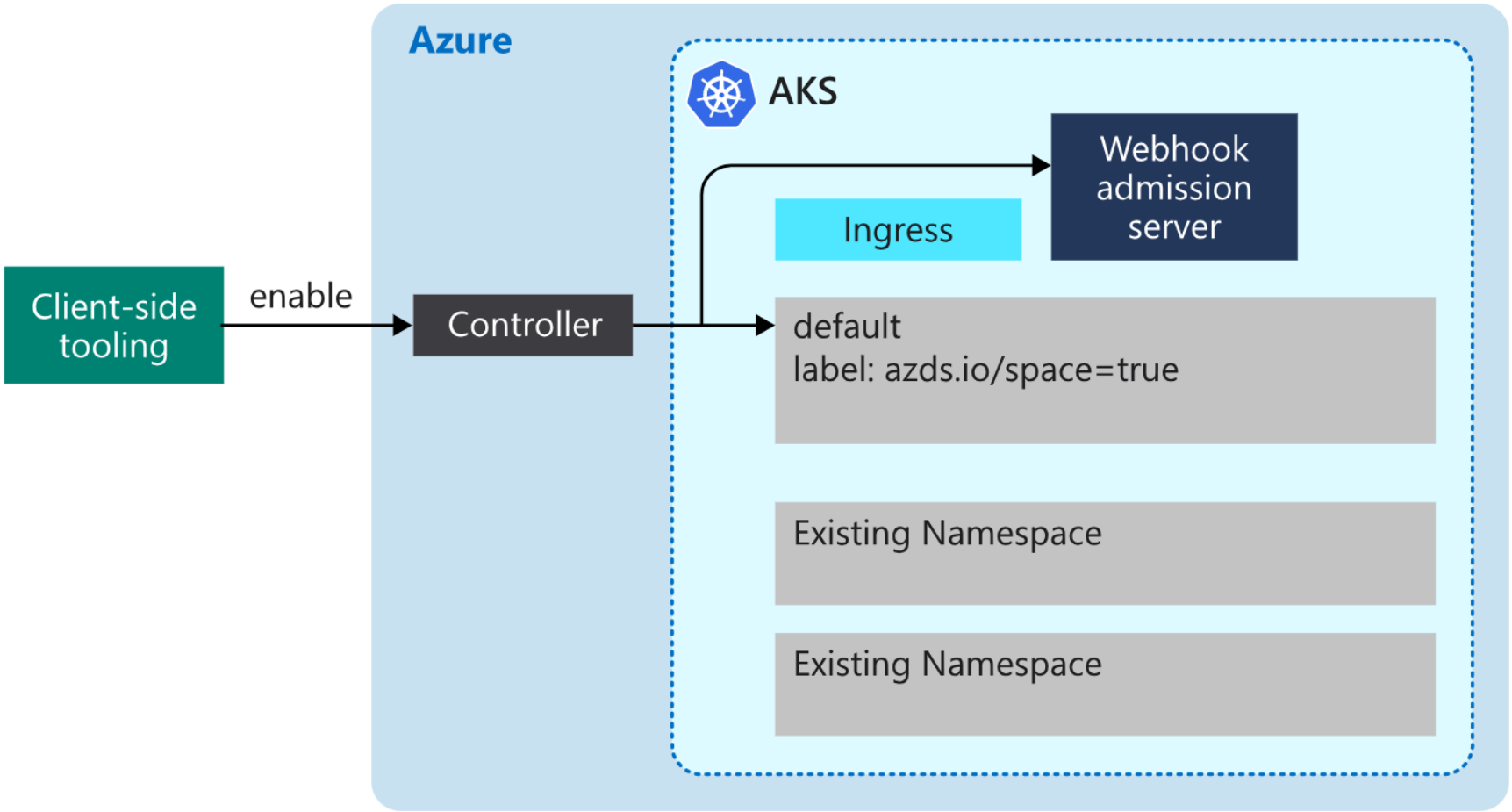
1. Use **Azure Dev Spaces** to iteratively develop, test, and debug microservices targeted for AKS clusters.
2. **Azure DevOps** has native integration with Helm and helps simplifying continuous integration/continuous delivery (CI/CD)
3. **Virtual node**—a Virtual Kubelet implementation—allows fast scaling of services for unpredictable traffic.
4. **Azure Monitor** provides a single pane of glass for monitoring over app telemetry, cluster-to-container level health analytics.



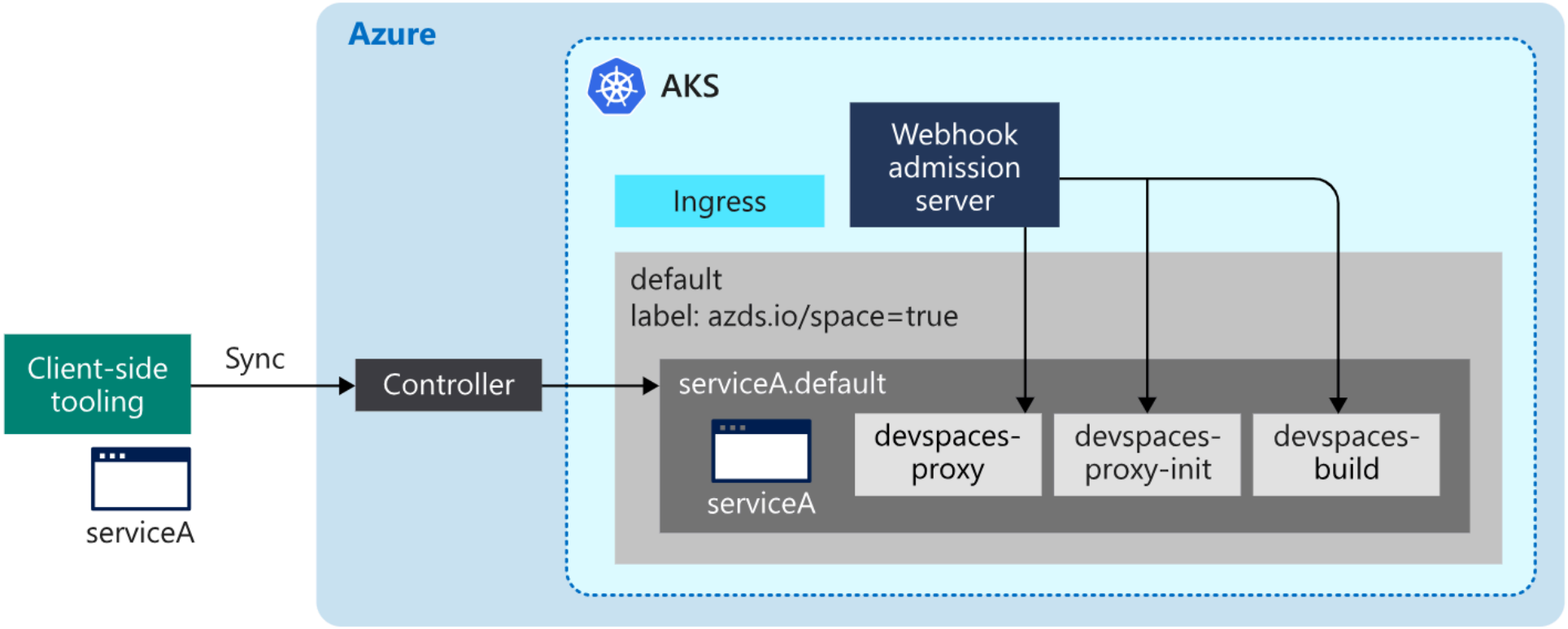
Developer experience



Developer experience



Developer experience



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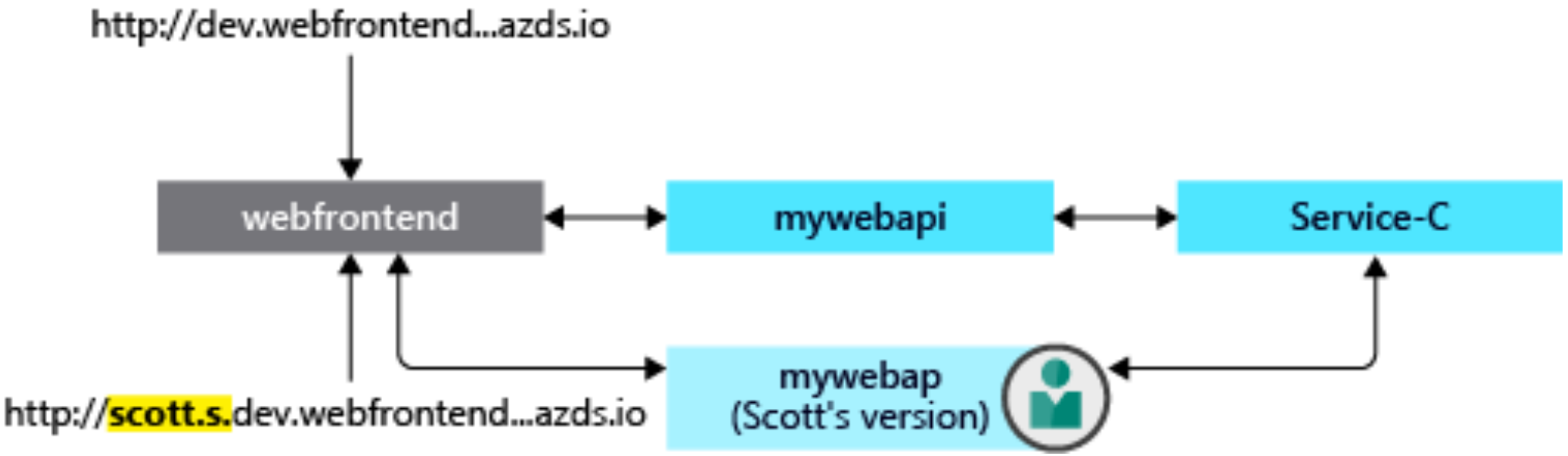
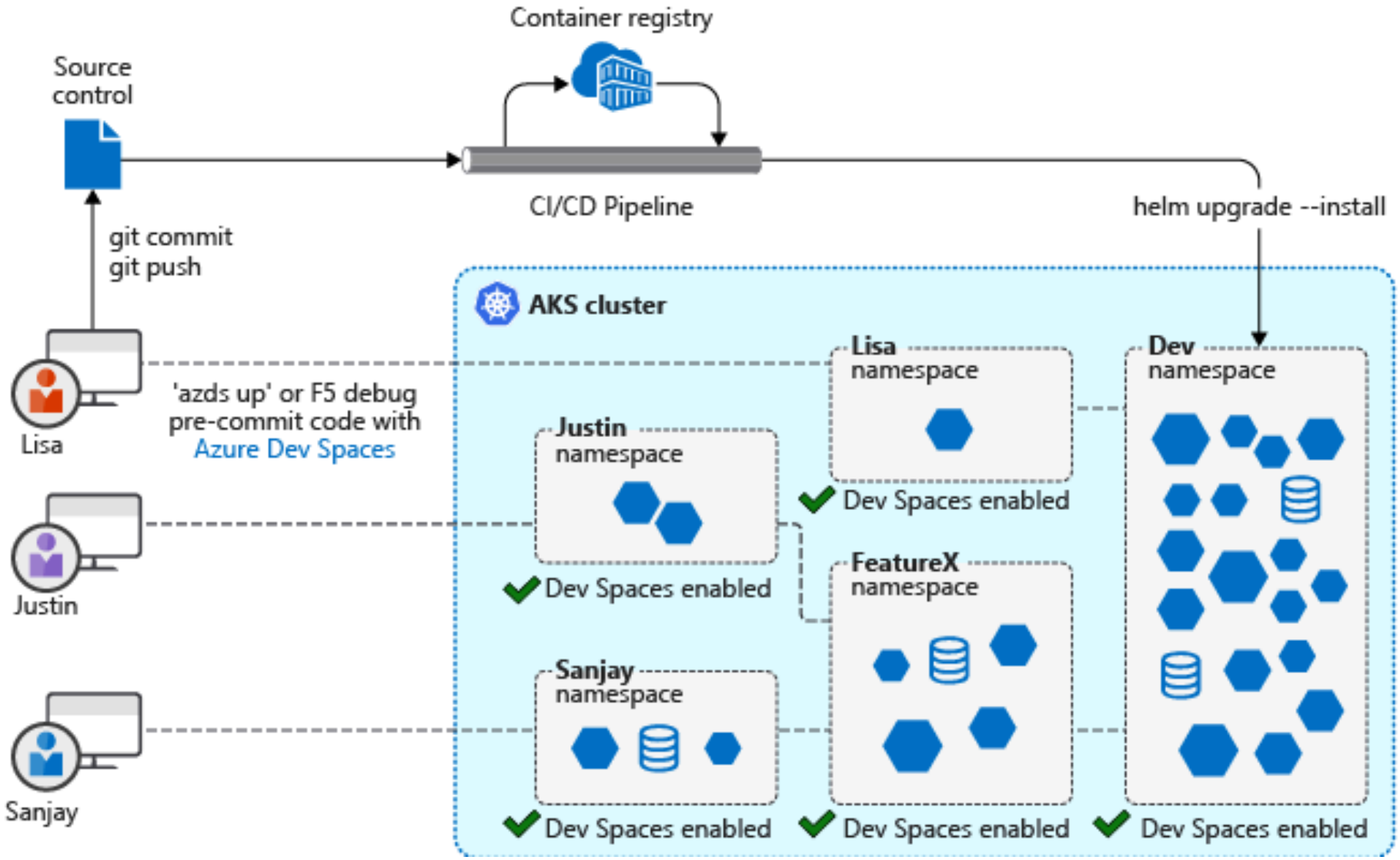


Developer experience



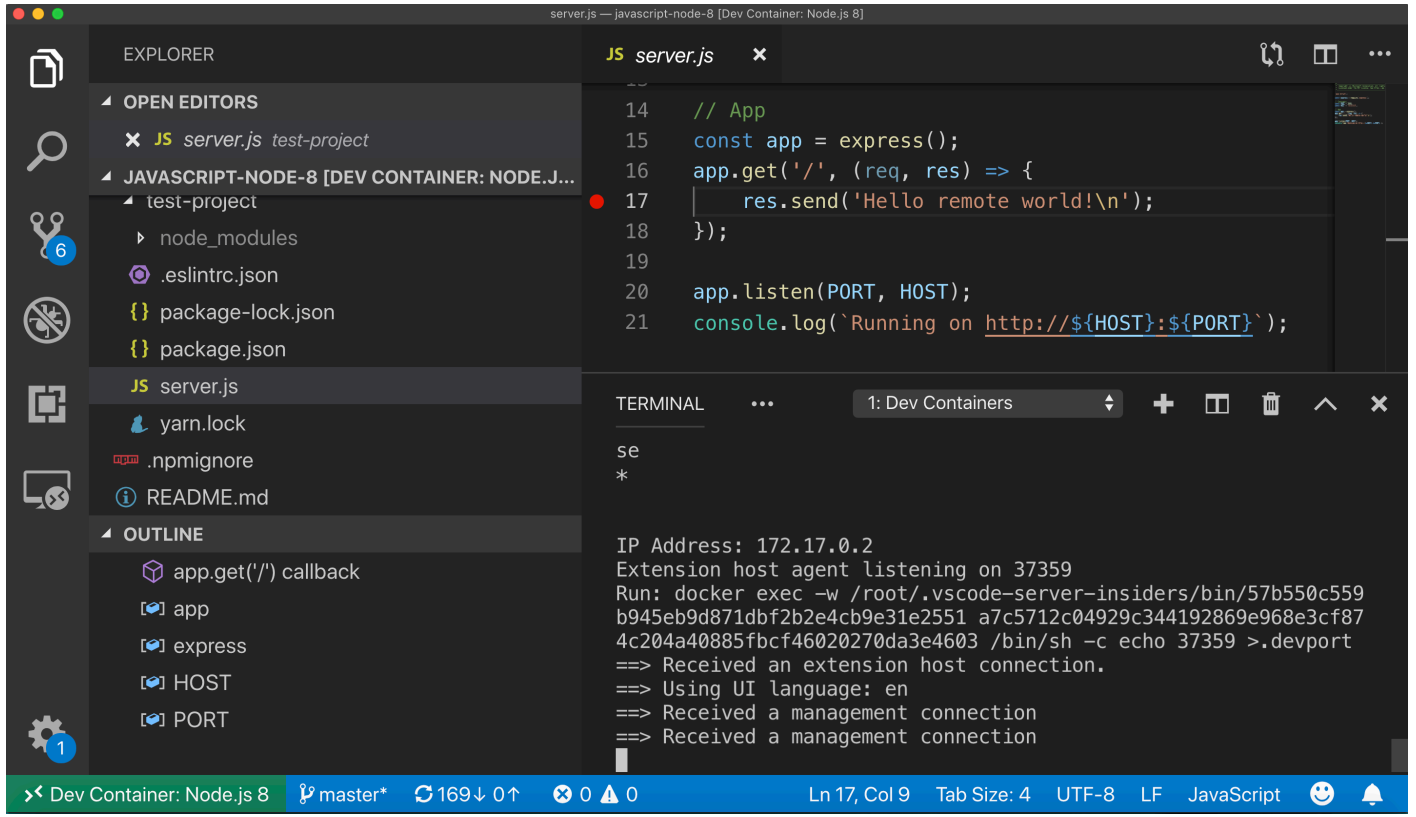
Azure Dev Spaces + VS Code Liveshare

VS Code Live Share: you just need VS Code locally.

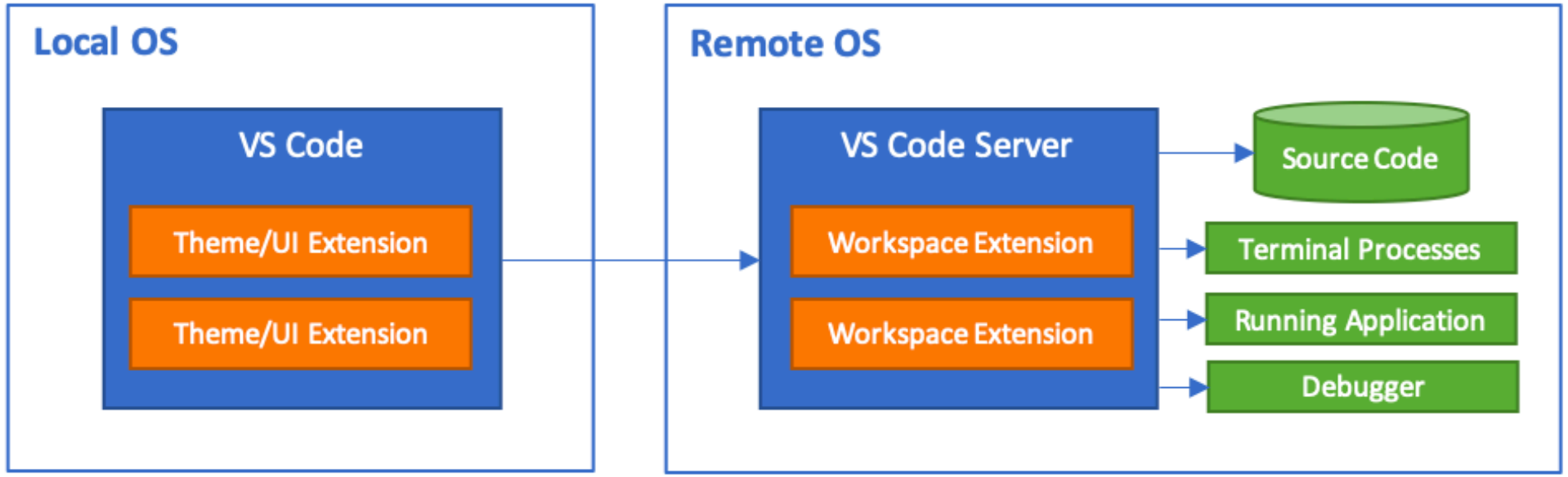
- Code and all setup on your collaborator's machine
- Code together without setting anything up
- Access services on remote machine from localhost
- Access terminal on remote machine from VS Code
- Works with Azure Dev Spaces on machine sharing the session: double jump to AKS

VS Code Remote Extension for Containers

KubeCon CloudNativeCon OPEN SOURCE SUMMIT China 2019



VS Code Remote Extension for Containers



Other projects to look at

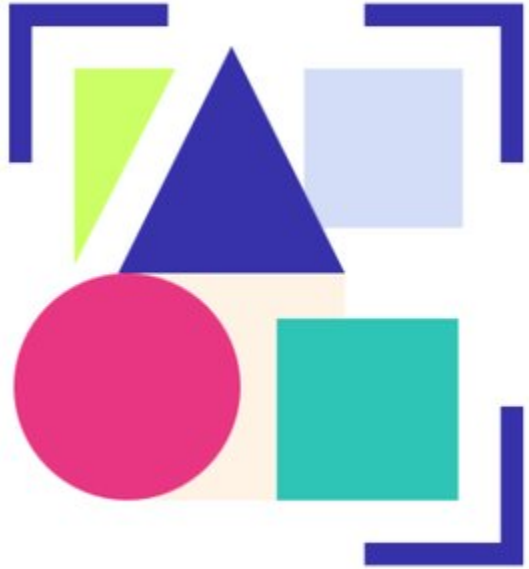
squash

Telepresence

KSYNC

Tilt

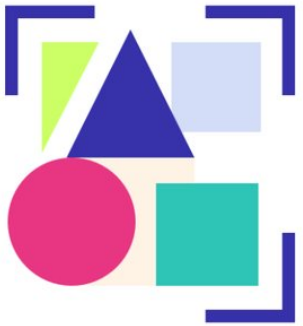
Application packaging



Application packaging

CNAB is a specification for building apps

- CNAB is not a platform-specific tool
- *Standard packaging format* for multi-component distributed applications
- Is agnostic to the cloud or runtime
- Uses tools and code you already have



https://cnab.io

Application packaging

Microsoft's implementation of the spec Porter

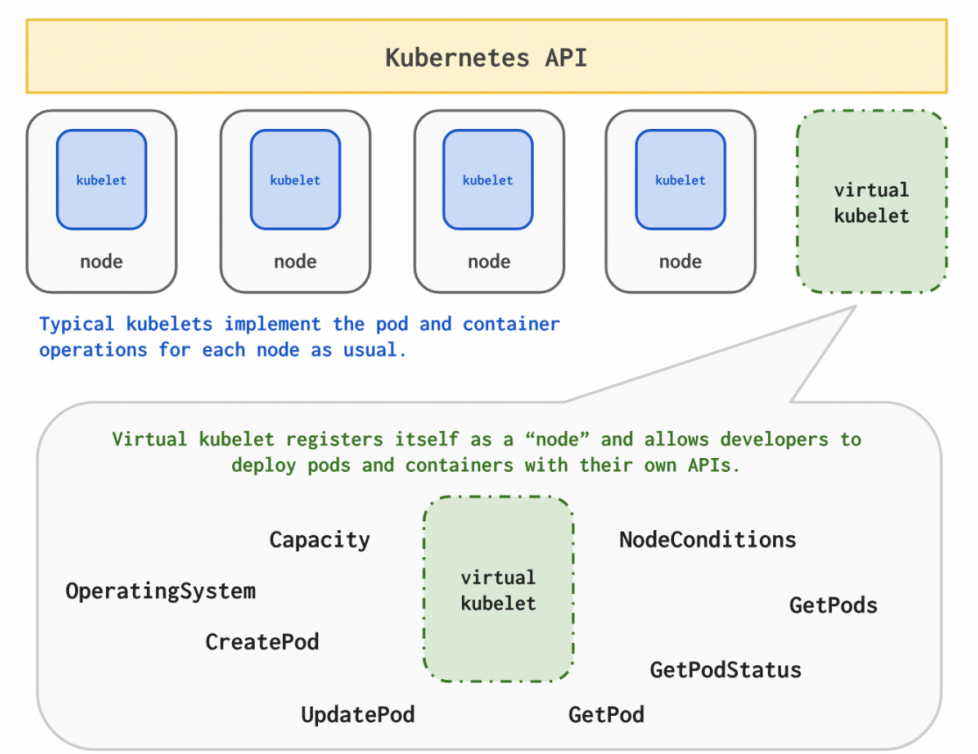
- Porter abstracts the complexity of resources via mixins
- Porter uses yaml to define the bundles
- Uses containers for the invocation image
- Mixin's can be written for any resources
- Supports Kubernetes, Helm, exec and Terraform

https://porter.sh

Scaling your application

Virtual Kubelet

Scaling your application



https://github.com/virtual-kubelet/virtual-kubelet

Scaling your application

KEDA allows for fine grained autoscaling (including to/from zero) for event driven Kubernetes workloads. KEDA serves as a Kubernetes Metrics Server and allows users to define autoscaling rules using a dedicated Kubernetes custom resource definition.

https://github.com/kedacore/keda

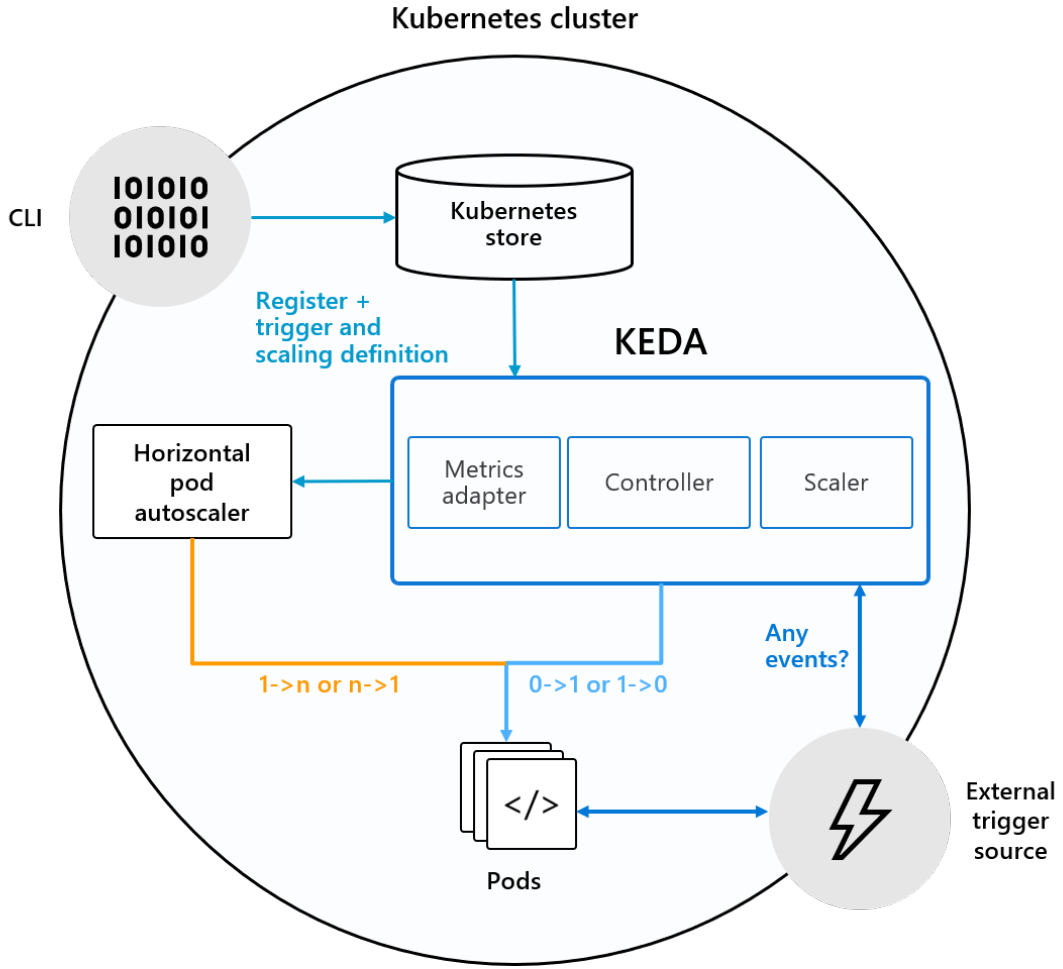
Scaling your application

KEDA can run on both the cloud and the edge, integrates natively with Kubernetes components such as the Horizontal Pod Autoscaler, and has no external dependencies.

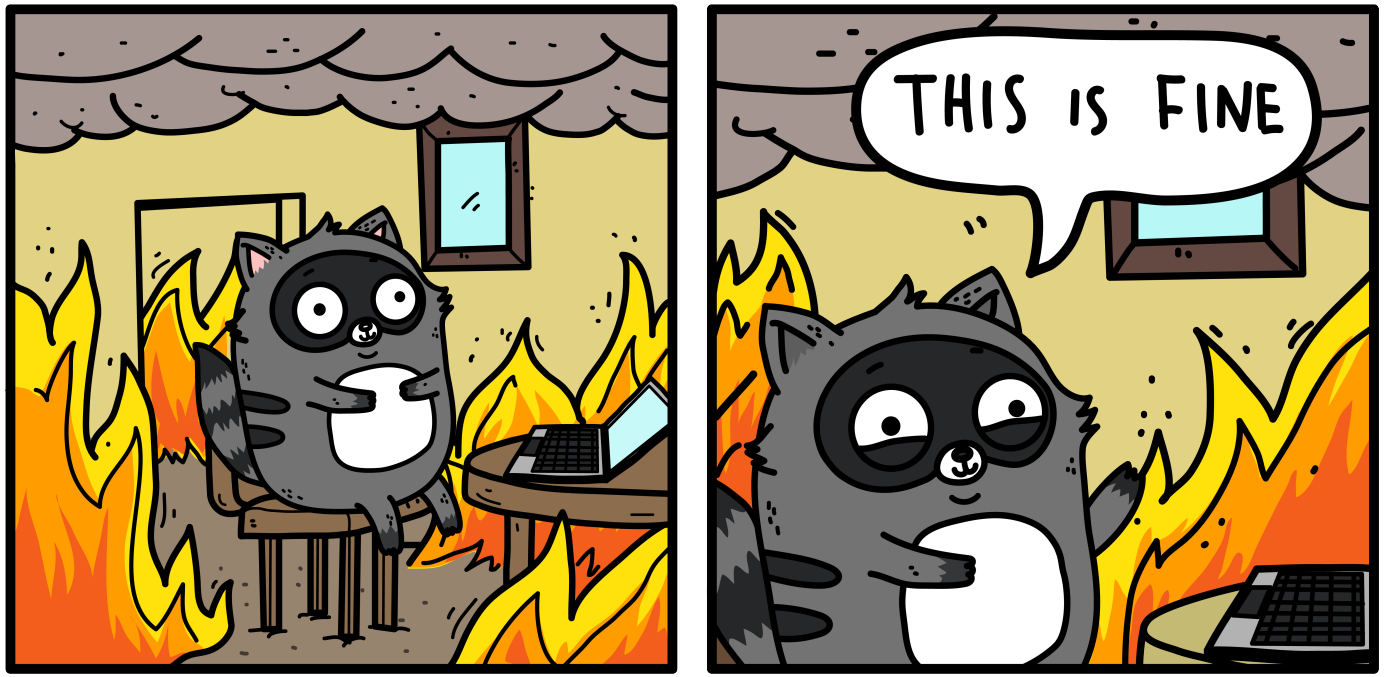
https://github.com/kedacore/keda

KEDA

Scaling your application



Demo time



Scaling your application

We are going to use RabbitMQ

```
helm install --name rabbitmq --set rabbitmq.username=user,rabbitmq.password=PASSWORD stable/rabbitmq
```

Scaling your application


```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: rabbitmq-consumer
  namespace: default
  labels:
    app: rabbitmq-consumer
spec:
  selector:
    matchLabels:
      app: rabbitmq-consumer
  template:
    metadata:
      labels:
        app: rabbitmq-consumer
    spec:
      containers:
      - name: rabbitmq-consumer
        image: jeffhollan/rabbitmq-client:dev
        imagePullPolicy: Always
        command:
          - receive
        args:
          - 'amqp://user:PASSWORD@rabbitmq.default.svc.cluster.local:5672'
      dnsPolicy: ClusterFirst
      nodeSelector:
        kubernetes.io/role: agent
        beta.kubernetes.io/os: linux
        type: virtual-kubelet
      tolerations:
      - key: virtual-kubelet.io/provider
        operator: Exists
      - key: azure.com/aci
        effect: NoSchedule
---
```

Scaling your application


```yaml
apiVersion: keda.k8s.io/v1alpha1
kind: ScaledObject
metadata:
  name: rabbitmq-consumer
  namespace: default
  labels:
    deploymentName: rabbitmq-consumer
spec:
  scaleTargetRef:
    deploymentName: rabbitmq-consumer
  pollingInterval: 5   # Optional. Default: 30 seconds
  cooldownPeriod: 30   # Optional. Default: 300 seconds
  maxReplicaCount: 30  # Optional. Default: 100
  triggers:
  - type: rabbitmq
    metadata:
      queueName: hello
      host: 'amqp://user:PASSWORD@rabbitmq.default.svc.cluster.local:5672'
      queueLength  : '5'
```

Scaling your application


```
apiVersion: batch/v1
kind: Job
metadata:
  name: rabbitmq-publish
spec:
  template:
    spec:
      containers:
      - name: rabbitmq-client
        image: jeffhollan/rabbitmq-client:dev
        imagePullPolicy: Always
        command: ["send",  "amqp://user:PASSWORD@rabbitmq.default.svc.cluster.local:5672", "300"]
      restartPolicy: Never
  backoffLimit: 4
```

Resources

https://github.com/scotty-c/kubecon-china

Free Azure Account https://aka.ms/pat/account

Containers https://aka.ms/pat/container

Functions https://aka.ms/pat/functions

Azure Dev Spaces https://aka.ms/pat/ds

VS Code Live Share https://aka.ms/pat/ls

We're hiring https://aka.ms/awesomejobs

Questions


KubeCon
CloudNativeCon
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China 2019