

Why Kubernetes on Azure

Gabe Monroy, Lead PM, Azure Containers
Alessandro Pilotti, Cloudbase Solutions
Andy Randall, Co-founder, Tigera

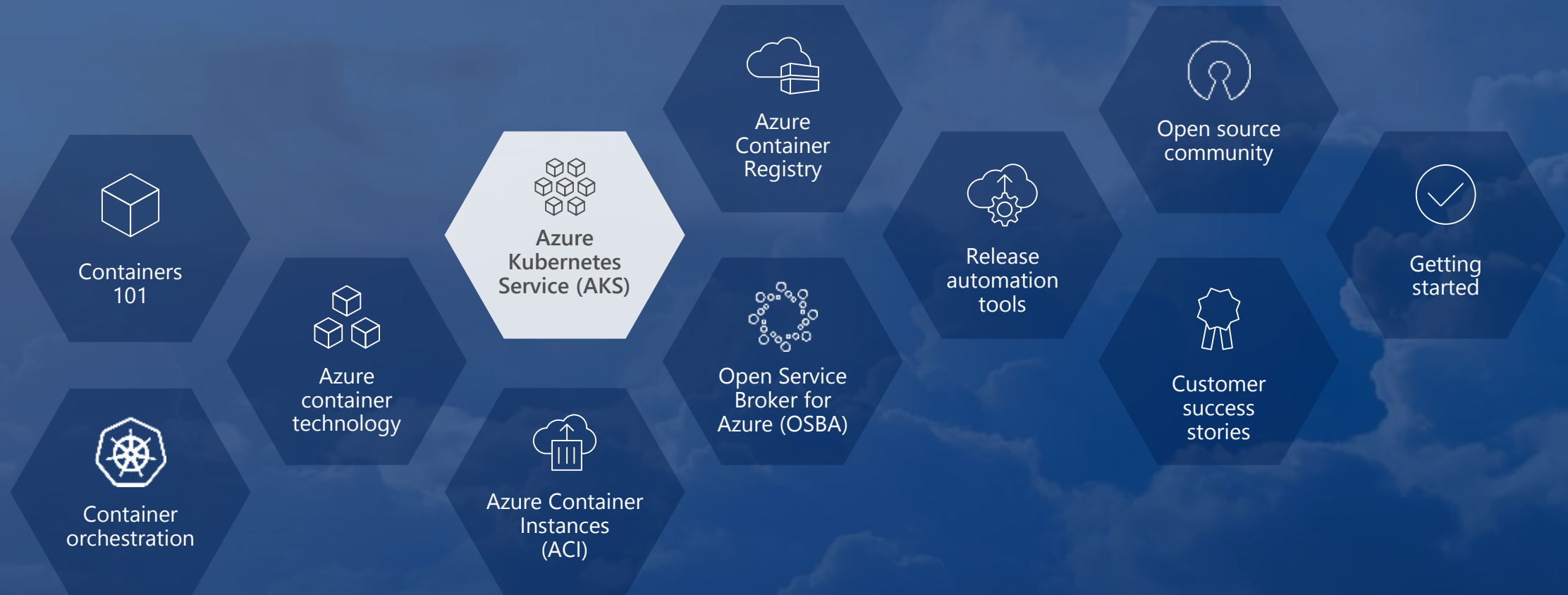
BRK2125

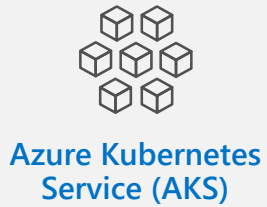
Azure container **momentum**

Kubernetes on Azure **usage** grew 10x
Kubernetes on Azure **customers** grew 5x

...over the last 12 months

Azure Kubernetes Service (AKS)





Azure Kubernetes Service (AKS)

Simplify the deployment, management, and operations of Kubernetes



Azure Container Instances (ACI)



Azure Container Registry



Open Service Broker API (OSBA)



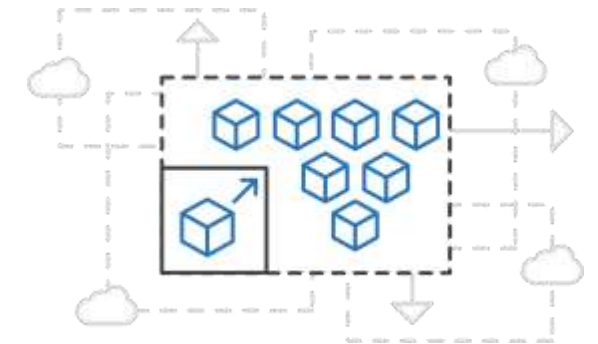
Release Automation Tools



Focus on your containers not the infrastructure



Work how you want with open-source APIs



Scale and run applications with confidence





Azure Container
Instances (ACI)



Azure Container
Registry



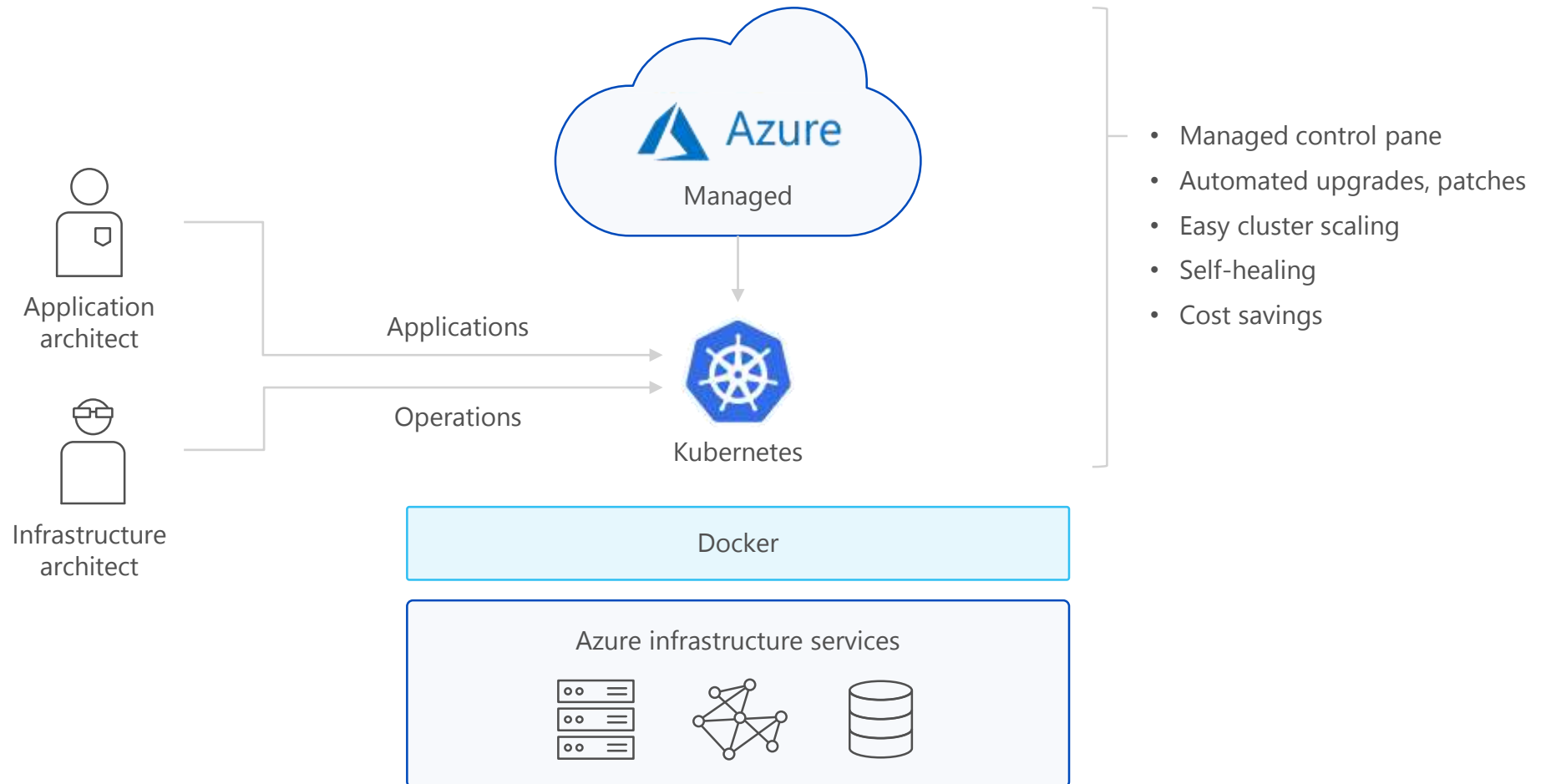
Open Service
Broker API (OSBA)



Release
Automation Tools

Azure Kubernetes Service (AKS)

A fully managed Kubernetes cluster





Azure Kubernetes
Service (AKS)



Azure Container
Instances (ACI)



Azure Container
Registry



Open Service
Broker API (OSBA)



Release
Automation Tools

Azure Kubernetes Service (AKS)

Get started easily

```
> az aks create -g myResourceGroup -n myCluster --generate-ssh-keys  
\ Running ..
```

```
> az aks install-cli  
Downloading client to /usr/local/bin/kubectl ..
```

```
> az aks get-credentials -g myResourceGroup -n myCluster  
Merged "myCluster" as current context ..
```

```
> kubectl get nodes
```

NAME	STATUS	AGE	VERSION
aks-mycluster-36851231-0	Ready	4m	v1.8.1
aks-mycluster-36851231-1	Ready	4m	v1.8.1
aks-mycluster-36851231-2	Ready	4m	v1.8.1



Azure Kubernetes
Service (AKS)



Azure Container
Instances (ACI)



Azure Container
Registry



Open Service
Broker API (OSBA)



Release
Automation Tools

Azure Kubernetes Service (AKS)

Manage an AKS cluster

```
> az aks list -o table
```

Name	Location	ResourceGroup	KubernetesRelease	ProvisioningState
-----	-----	-----	-----	-----
myCluster	westus2	myResourceGroup	1.7.7	Succeeded

```
> az aks upgrade -g myResourceGroup -n myCluster --kubernetes-version 1.8.1  
\ Running ..
```

```
> kubectl get nodes
```

NAME	STATUS	AGE	VERSION
aks-mycluster-36851231-0	Ready	12m	v1.8.1
aks-mycluster-36851231-1	Ready	8m	v1.8.1
aks-mycluster-36851231-2	Ready	3m	v1.8.1

```
> az aks scale -g myResourceGroup -n myCluster --agent-count 10  
\ Running ..
```



Azure Kubernetes
Service (AKS)



Azure Container
Instances (ACI)



Azure Container
Registry



Open Service
Broker API (OSBA)



Release
Automation Tools

Azure Kubernetes Service (AKS)

Azure Portal Experience

The screenshot displays the Microsoft Azure portal interface. On the left, the 'Create a resource' sidebar is visible, listing various services. The main content area shows the 'Create Kubernetes cluster' wizard, with tabs for Basics, Networking, Monitoring, Tags, and Review. The 'Basics' tab is active, showing fields for Subscription, Resource group, Kubernetes cluster name, Region, Kubernetes version, DNS name prefix, and Service principal. The 'Health (preview)' page is also visible, showing a table of cluster components and their status.

NAME	STATUS	AVG %	AVERAGE	CONTAINERS	UPTIME	POD	CONTROLLER	TREND AVG % (1 BAR = 10M)
aks-agentpool-3186882...	Ok	18%	180 mc	14	30 mins			
Other Processes		6%	62 mc					
turnef-front	running	10%	104 mc	1	19 mins	turnefront-6dbb88...	turnefront-6dbb88...	View Logs
redirector	running	0.4%	4 mc	1	22 mins	kube-svc-redirect-p...	kube-svc-redirect...	View Logs
kube-proxy	running	0.2%	2 mc	1	22 mins	kube-proxy-pdvw...	kube-proxy	View Logs
addon-http-applic...	running	0.2%	2 mc	1	20 mins	addon-http-applicat...	addon-http-applicat...	View Logs
kube-dns-v20-7c5...								
healthz	running	0.2%	2 mc	1	19 mins	kube-dns-v20-7c55...	kube-dns-v20-7c55...	View Logs
kubedns	running	0.1%	1 mc	1	19 mins	kube-dns-v20-7c55...	kube-dns-v20-7c55...	View Logs
dnsmasq	running	0%	0.3 mc	1	19 mins	kube-dns-v20-7c55...	kube-dns-v20-7c55...	View Logs
kube-dns-v20-7c5...								
healthz	running	0.2%	2 mc	1	19 mins	kube-dns-v20-7c55...	kube-dns-v20-7c55...	View Logs
kubedns	running	0.1%	0.8 mc	1	21 mins	kube-dns-v20-7c55...	kube-dns-v20-7c55...	View Logs
dnsmasq	running	0%	0.3 mc	1	19 mins	kube-dns-v20-7c55...	kube-dns-v20-7c55...	View Logs
omsagent	running	0.1%	0.6 mc	1	18 mins	omsagent-4nwrf	omsagent	View Logs
main	running	0%	0.1 mc	1	21 mins	kubernetes-dashbo...	kubernetes-dashbo...	View Logs
addon-http-applic...	running	0%	0 mc	1	19 mins	addon-http-applicat...	addon-http-applicat...	View Logs
addon-http-applic...	running	0%	0 mc	1	21 mins	addon-http-applicat...	addon-http-applicat...	View Logs



Azure Kubernetes
Service (AKS)



Azure Container
Instances (ACI)



Azure Container
Registry



Open Service
Broker API (OSBA)



Release
Automation Tools

Microsoft Azure

Dashboard

All resources

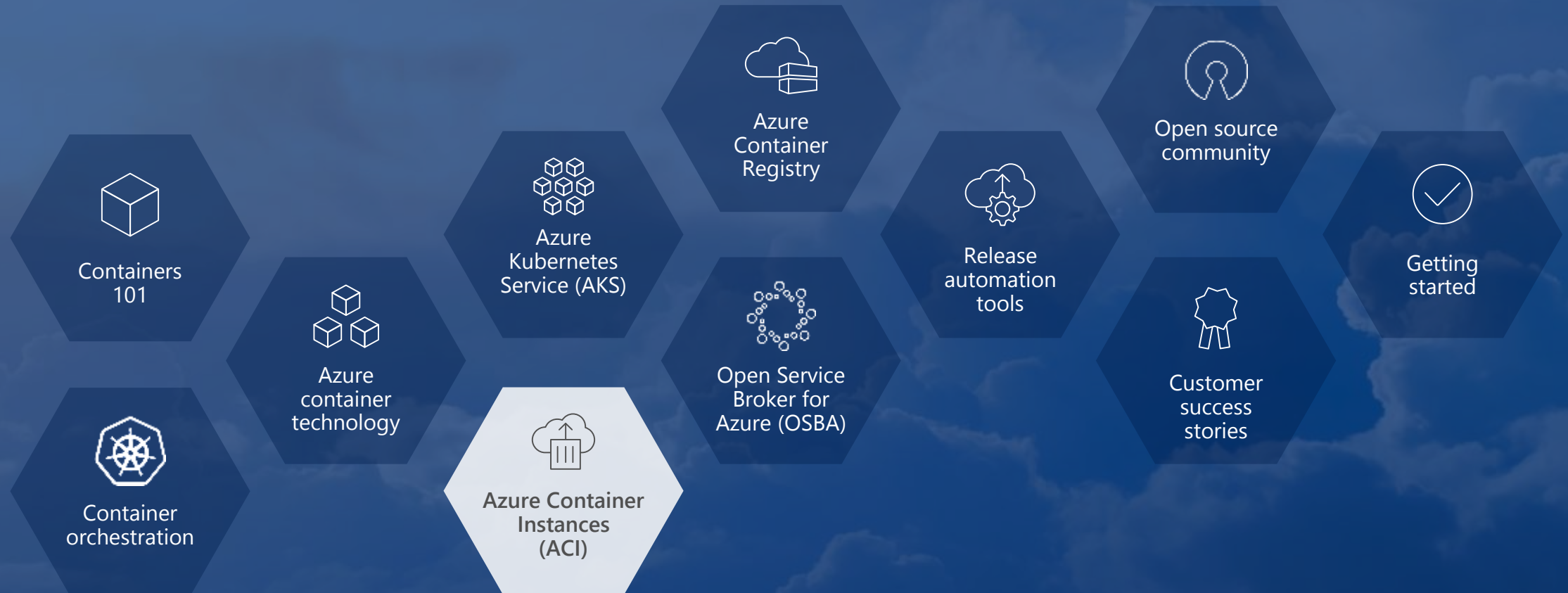
GABE INTERNAL

Resource Name	Resource Type
gabrty	Kubernetes service
gabrty	Container registry
aks-nodepool1-30046036-0	Virtual machine
frdemo	Storage account
gabrty.io	DNS zone
redshirt.io	DNS zone
9c28cd51-f327-4e13-a47b-fb5...	DNS zone
agentpool-availabilitySet-3186...	Availability set

Quickstart tutorials

- Windows Virtual Machines
- Linux Virtual Machines
- App Service
- Functions
- SQL Database

Azure Container Instances (ACI)





Azure Kubernetes
Service (AKS)



Azure Container
Instances (ACI)



Azure Container
Registry



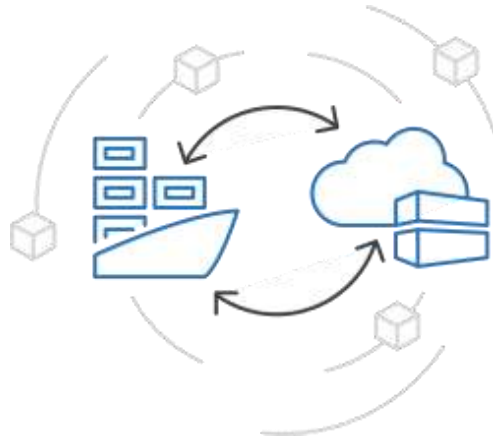
Open Service
Broker API (OSBA)



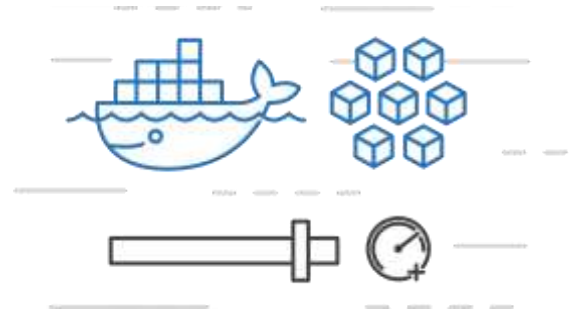
Release
Automation Tools

Azure Container Instances (ACI)

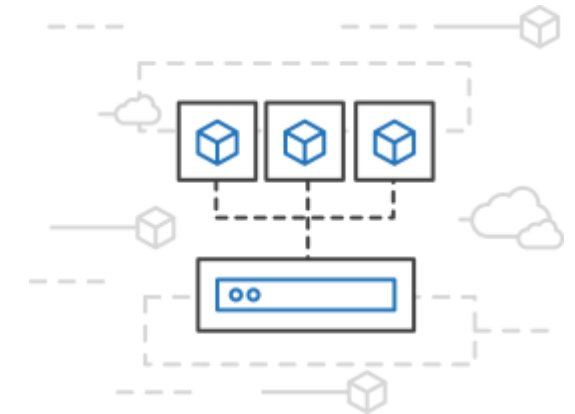
Easily run containers on Azure with a single command



Start using
containers right away



Cloud-scale
container capacity



Hyper-visor
isolation





Azure Kubernetes
Service (AKS)



Azure Container
Instances (ACI)



Azure Container
Registry



Open Service
Broker API (OSBA)



Release
Automation Tools

Azure Container Instances (ACI)

Get started easily

```
> az container create --name mycontainer --image microsoft/aci-helloworld --  
resource-group myResourceGroup --ip-address public
```

```
  "ipAddress": {  
    "ip": "52.168.86.133",  
    "ports": [...]  
  },  
  "location": "eastus",  
  "name": "mycontainer",  
  "osType": "Linux",  
  "provisioningState": "Succeeded",
```

```
> curl 52.168.86.133
```

```
<html>
```

```
<head>
```

```
  <title>Welcome to Azure Container Instances!</title>
```

```
</head>
```



Azure Kubernetes
Service (AKS)



Azure Container
Instances (ACI)



Azure Container
Registry



Open Service
Broker API (OSBA)



Release
Automation Tools

Azure Container Instances (ACI)

Azure Portal Experience

The screenshot displays the Azure Portal interface for managing container instances. The main view shows the 'my-container' instance details, including its status (Running), location (East US), and subscription ID. A CPU usage graph is visible at the bottom. Overlaid on this are two other windows: the 'gabrty - Repositories' page, which lists various container images like 'gabrty/hi-backend' and 'gabrty/hi-frontend', and the 'Create container instance' wizard, which guides the user through setting up a new instance with parameters like container name, image, OS type, and location.



Azure Kubernetes Service (AKS)



Azure Container Instances (ACI)



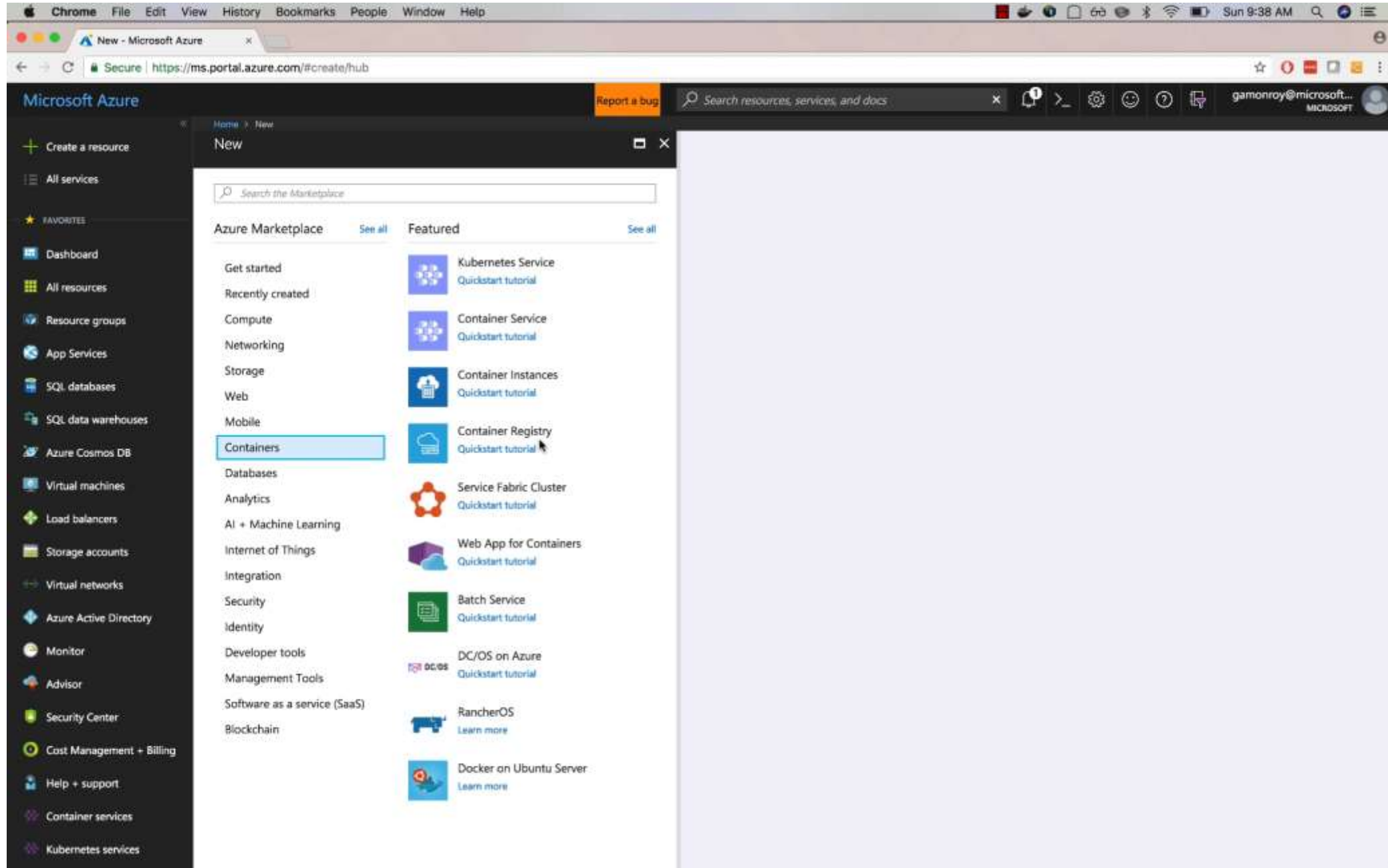
Azure Container Registry



Open Service Broker API (OSBA)



Release Automation Tools





Azure Kubernetes
Service (AKS)



Azure Container
Instances (ACI)



Azure Container
Registry



Open Service
Broker API (OSBA)



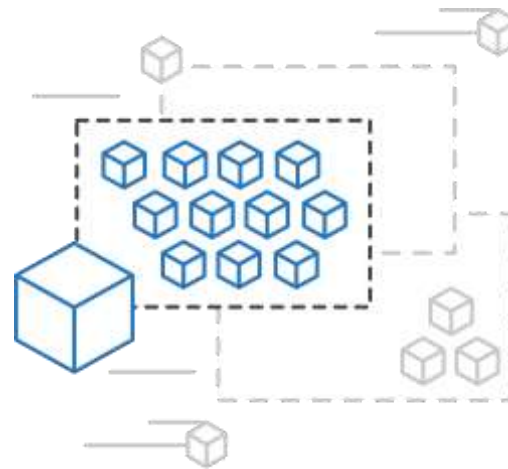
Release
Automation Tools

Azure Container Instances (ACI)

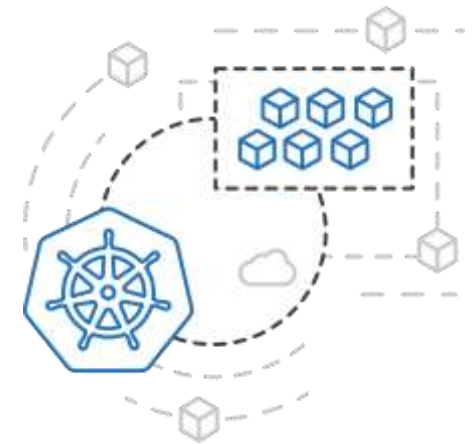
Virtual Kubelet



Kubernetes provides rich
orchestration capabilities



ACI provides infinite
container-based scale



The Virtual Kubelet
brings them together





Azure Kubernetes
Service (AKS)



Azure Container
Instances (ACI)



Azure Container
Registry



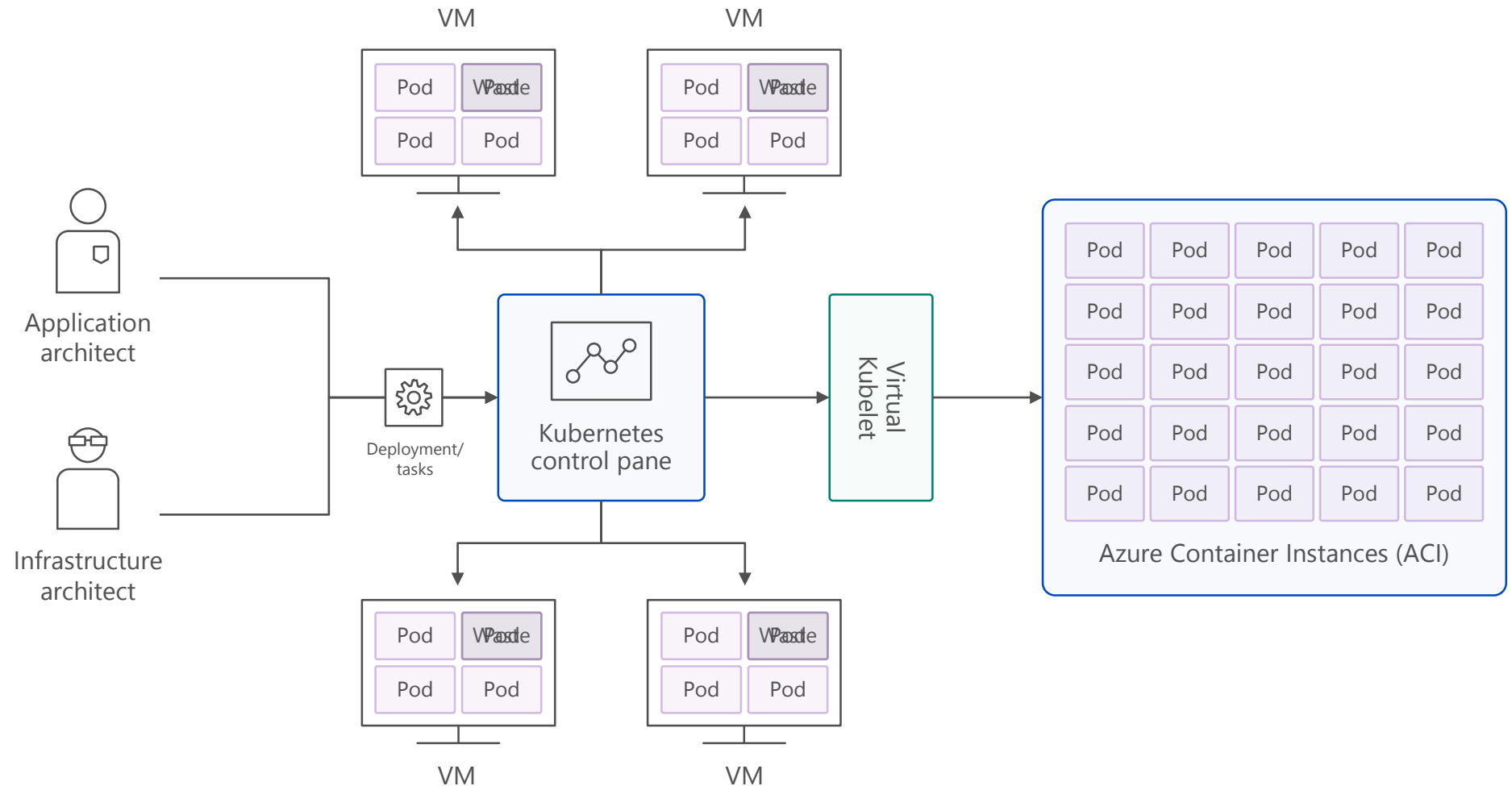
Open Service
Broker API (OSBA)



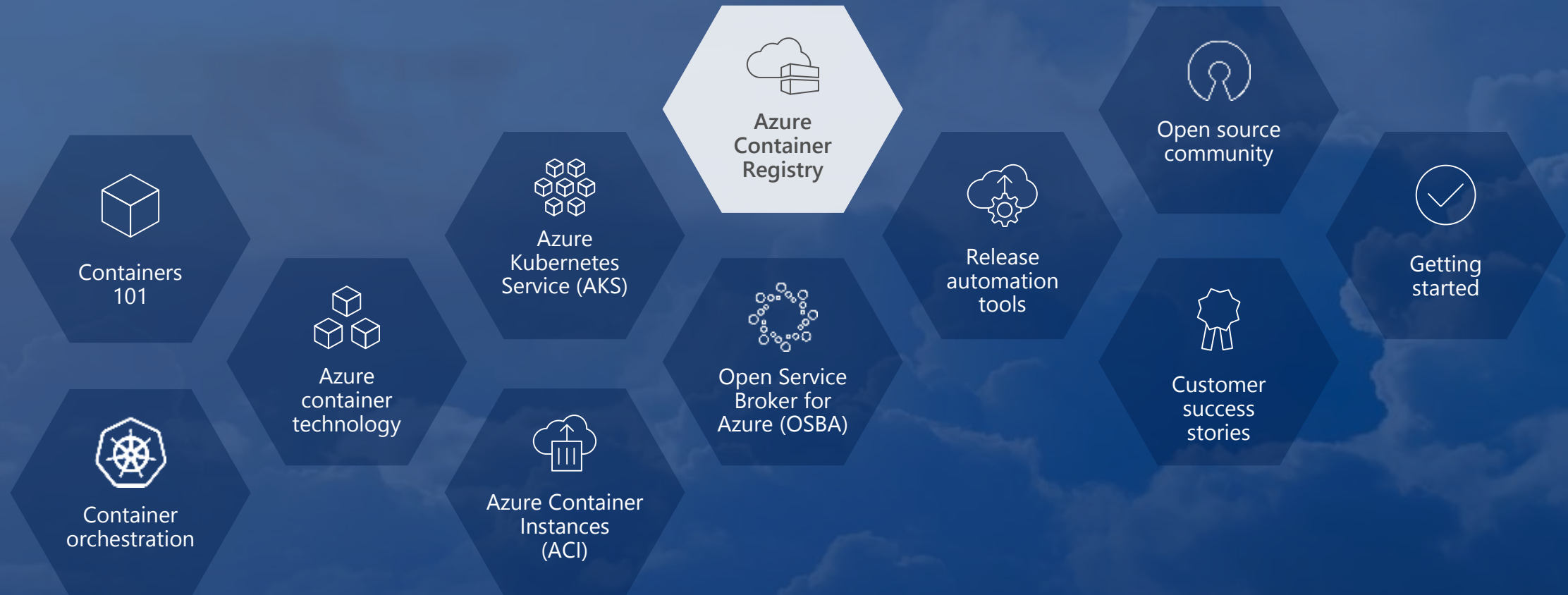
Release
Automation Tools

Azure Container Instances (ACI)

Bursting with the Virtual Kubelet



Azure Container Registry





Azure Kubernetes
Service (AKS)



Azure Container
Instances (ACI)



Azure Container
Registry



Open Service
Broker API (OSBA)



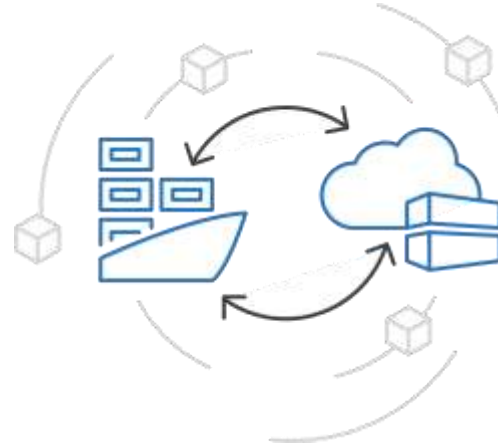
Release
Automation Tools

Azure Container Registry

Manage a Docker private registry as a first-class Azure resource



Manage images for all
types of containers



Use familiar, open-
source Docker CLI tools



Azure Container Registry
geo-replication





Azure Kubernetes Service (AKS)



Azure Container Instances (ACI)



Azure Container Registry



Open Service Broker API (OSBA)



Release Automation Tools

Chrome File Edit View History Bookmarks People Window Help

gabrtv - Microsoft Azure

Secure https://ms.portal.azure.com/#@microsoft.onmicrosoft.com/resource/subscriptions/4f48eeae-9347-40c5-897b-46af1b8811ec/resourceGroups/acr/providers/Microsoft.ContainerRegistry/registries/gabrtv/...

Microsoft Azure

Create a resource

All services

FAVORITES

- Dashboard
- All resources
- Resource groups
- App Services
- SQL databases
- SQL data warehouses
- Azure Cosmos DB
- Virtual machines
- Load balancers
- Storage accounts
- Virtual networks
- Azure Active Directory
- Monitor
- Advisor
- Security Center
- Cost Management + Billing
- Help + support
- Container services
- Kubernetes services

gabrtv Container registry

Search (Ctrl+F)

Overview

Activity log

Access control (IAM)

Tags

Quick start

SETTINGS

- Access keys
- Locks
- Automation script

SERVICES

- Repositories
- Webhooks
- Replications (Preview)

SUPPORT + TROUBLESHOOTING

- New support request

Report a bug

Search resources, services, and docs

gamonroy@microsoft... MICROSOFT

Essentials

Resource group: **acr**

Location: **East US**

Subscription name: **Gabe Internal**

Subscription ID: **4f48eeae-9347-40c5-897b-46af1b8811ec**

Login server: **gabrtv.azurecr.io**

Creation date: **11/15/2017, 3:26 AM PST**

SKU: **Premium**

Provisioning state: **Succeeded**

Registry metrics

Registry quota usages

USED: **1.6 GiB**

REMAINING: **498.4 GiB**

500 GiB SIZE QUOTA

Container security integrations

Aqua Security

Aqua provides development-to-production lifecycle controls for securing containerized applications.

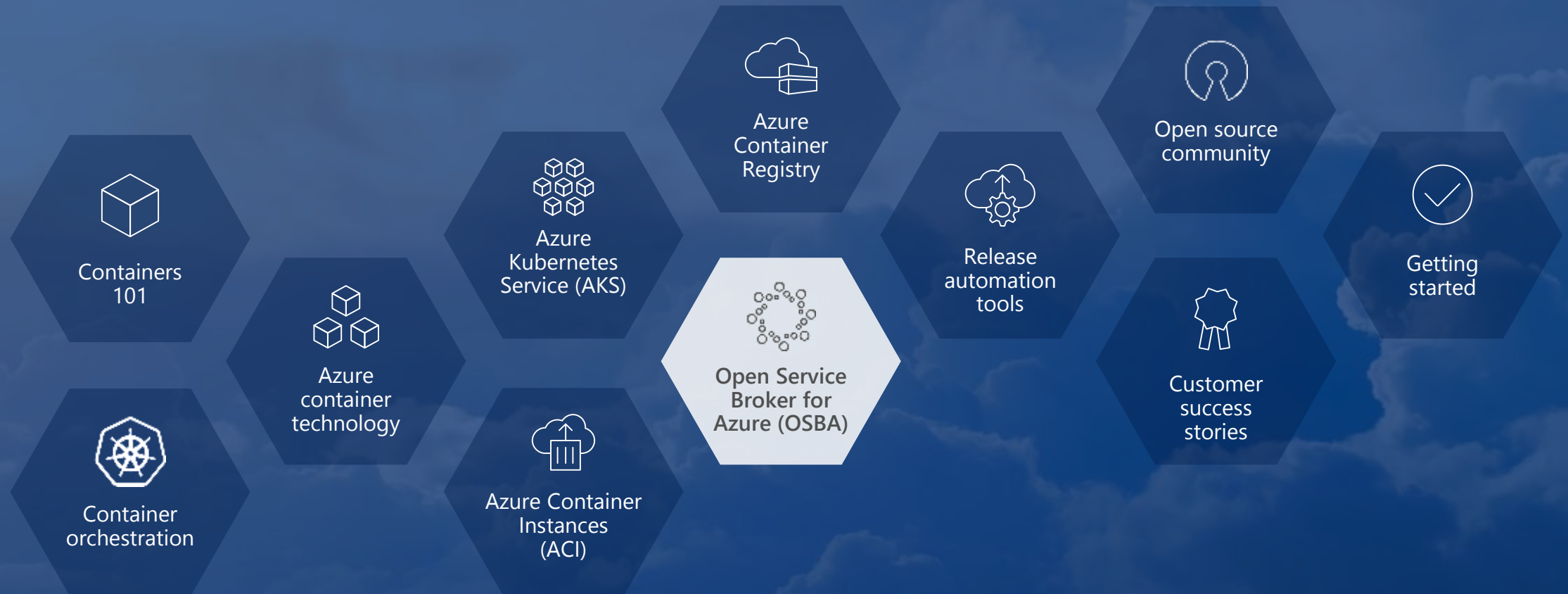
Azure Marketplace

Twistlock

Providing vulnerability management and runtime protection across your environments.

Azure Marketplace

Open Service Broker for Azure





Azure Kubernetes
Service (AKS)



Azure Container
Instances (ACI)



Azure Container
Registry



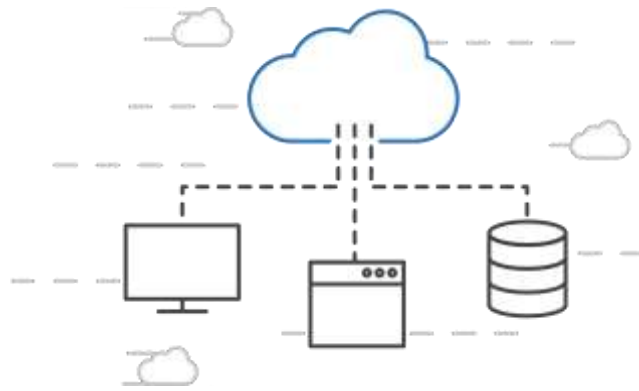
Open Service
Broker API (OSBA)



Release
Automation Tools

Open Service Broker for Azure (OSBA)

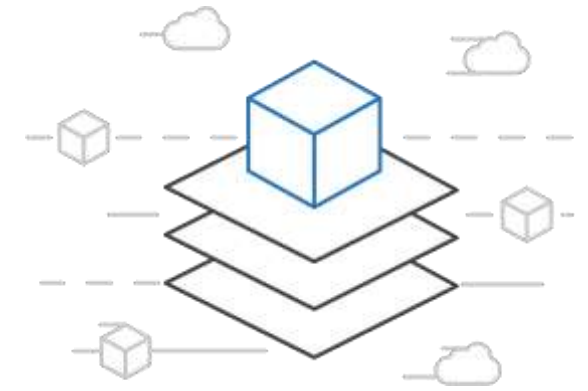
Connecting containers to Azure services and platforms



A standardized way to
connect with Azure services



Simple and flexible
service integration



Compatible across
numerous platforms





Azure Kubernetes
Service (AKS)



Azure Container
Instances (ACI)



Azure Container
Registry



Open Service
Broker API (OSBA)



Release
Automation Tools

Open Service Broker for Azure (OSBA)

An implementation of the Open Service Broker API

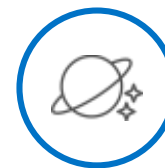
Azure SQL Database



Redis Cache



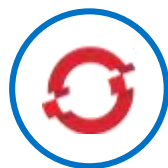
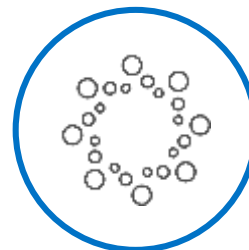
CosmosDB



And more!



Open Service Broker
for Azure (OSBA)



OpenShift



Cloud Foundry



Service Fabric
(Coming soon)



Kubernetes
(AKS)



Azure Kubernetes
Service (AKS)



Azure Container
Instances (ACI)



Azure Container
Registry



Open Service
Broker API (OSBA)



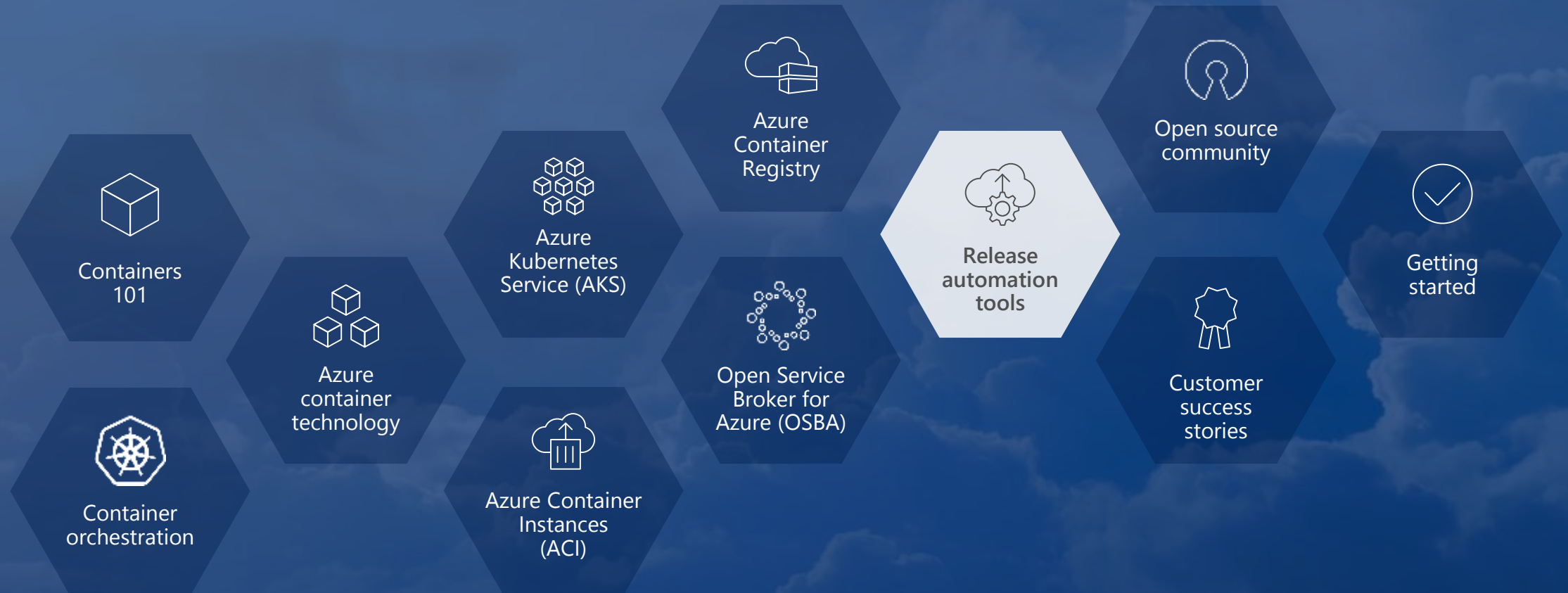
Release
Automation Tools

Open Service Broker for Azure (OSBA)

Getting started with ease

- > `helm repo add azure`
<https://kubernetescharts.blob.core.windows.net/azure>
- > `helm install azure/wordpress`

Release automation tools





Azure Kubernetes
Service (AKS)



Azure Container
Instances (ACI)



Azure Container
Registry



Open Service
Broker API (OSBA)



**Release
Automation Tools**

Release automation tools

Simplifying the Kubernetes experience



The package
manager for
Kubernetes



Streamlined
Kubernetes
development



Event-driven
scripting for
Kubernetes





Azure Kubernetes
Service (AKS)



Azure Container
Instances (ACI)



Azure Container
Registry



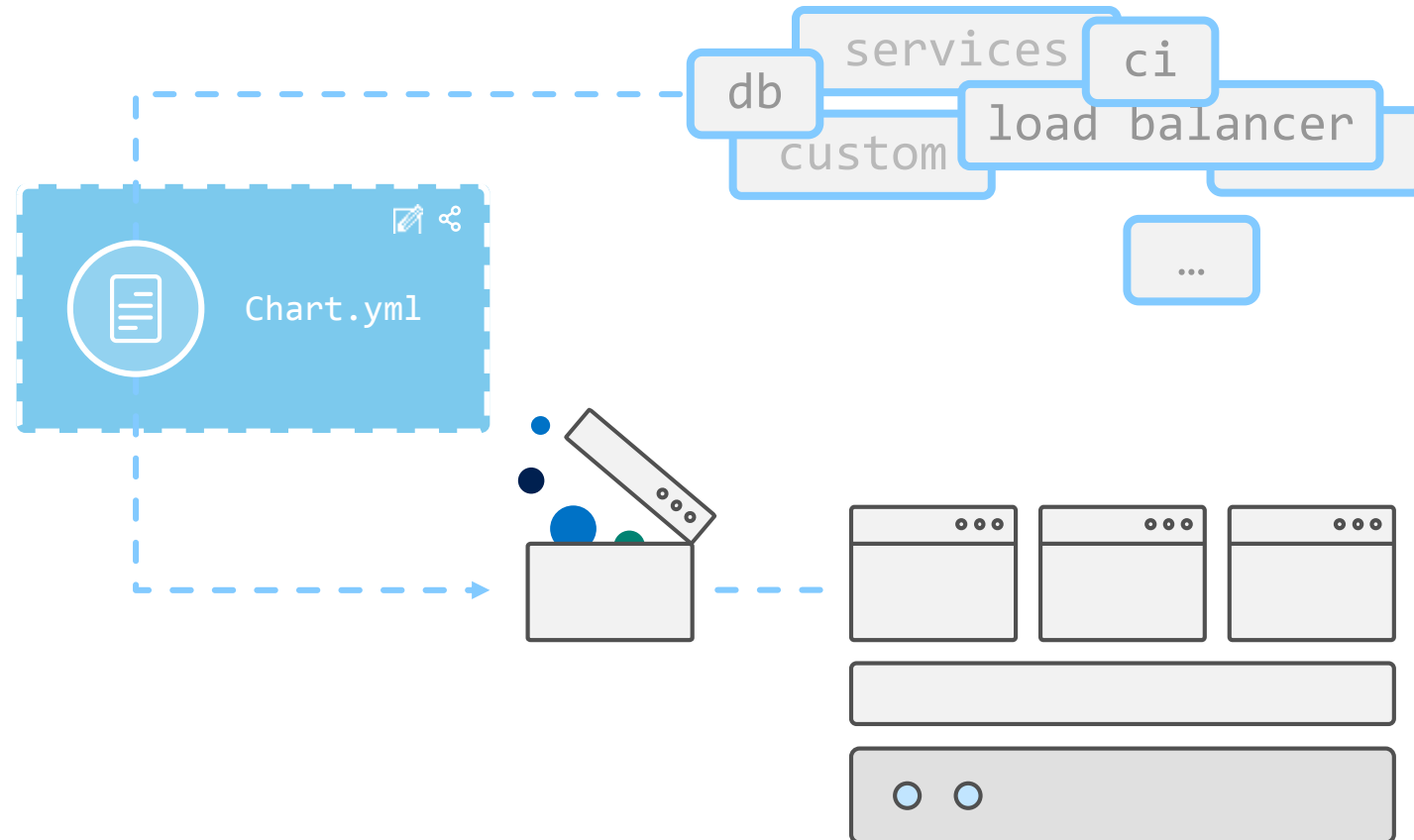
Open Service
Broker API (OSBA)



Release
Automation Tools

Helm

Helm Charts helps you define, install, and upgrade even the most complex Kubernetes application





Azure Kubernetes
Service (AKS)



Azure Container
Instances (ACI)



Azure Container
Registry



Open Service
Broker API (OSBA)



Release
Automation Tools

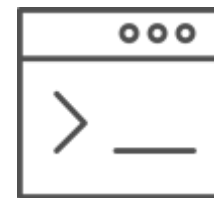
Draft

Simple app development and deployment – into
any Kubernetes cluster



Simplified development

Using two simple commands, developers
can now begin hacking on container-based
applications without requiring Docker or
even installing Kubernetes themselves



Language support

Draft detects which language your app is
written in, and then uses packs to
generate a Dockerfile and Helm Chart
with the best practices for that language





Azure Kubernetes
Service (AKS)



Azure Container
Instances (ACI)



Azure Container
Registry



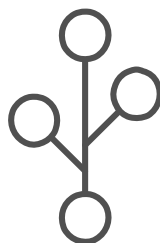
Open Service
Broker API (OSBA)



Release
Automation Tools

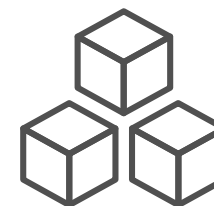
Brigade

Run scriptable, automated tasks in the cloud — as
part of your Kubernetes cluster



Simple, powerful pipes

Each project gets a `brigade.js` config file, which is where you can write dynamic, interwoven pipelines and tasks for your Kubernetes cluster



Runs inside your cluster

By running Brigade as a service inside your Kubernetes cluster, you can harness the power of millions of available Docker images





Azure Kubernetes
Service (AKS)



Azure Container
Instances (ACI)



Azure Container
Registry



Open Service
Broker API (OSBA)



Release
Automation Tools

Brigade

Brigade in action

The screenshot displays the Brigade build interface and a code editor. The build interface on the left shows a build #01C0HX5S1GH7A0TZBJA2EY0 with a job run inside the build. The code editor on the right shows the `brigade.js` file with the following code:

```
const { events, Job, Group } = require('brigadier')

events.on("push", (brigadeEvent, project) => {

  // setup variables
  var gitPayload = JSON.parse(brigadeEvent.payload)
  var brigConfig = new Map()
  brigConfig.set("acrServer", project.secrets.acrServer)
  brigConfig.set("acrUsername", project.secrets.acrUsername)
  brigConfig.set("acrPassword", project.secrets.acrPassword)
  brigConfig.set("dbImage", "chzbrgr71/rating-db")
  brigConfig.set("gitSHA", brigadeEvent.commit.substr(0,7))
  brigConfig.set("eventType", brigadeEvent.type)
  brigConfig.set("branch", getBranch(gitPayload))
  brigConfig.set("imageTag", `${brigConfig.get("branch")}-${brigConfig.get("gitSHA")}`)
  brigConfig.set("dbACRImage", `${brigConfig.get("acrServer")}/${brigConfig.get("dbImage")}:${brigConfig.get("imageTag")}`)

  console.log(`=> gitHub webhook (${brigConfig.get("branch")}) with commit ${brigConfig.get("gitSHA")}`)

  // setup brigade jobs
  var docker = new Job("job-runner-docker")
  var helm = new Job("job-runner-helm")
  dockerJobRunner(brigConfig, docker)
  helmJobRunner(brigConfig, helm, "prod")

  // start pipeline
  console.log(`=> starting pipeline for docker image: ${brigConfig.get("dbACRImage")}`)
  var pipeline = new Group()
  pipeline.add(docker)
  pipeline.add(helm)
})
```



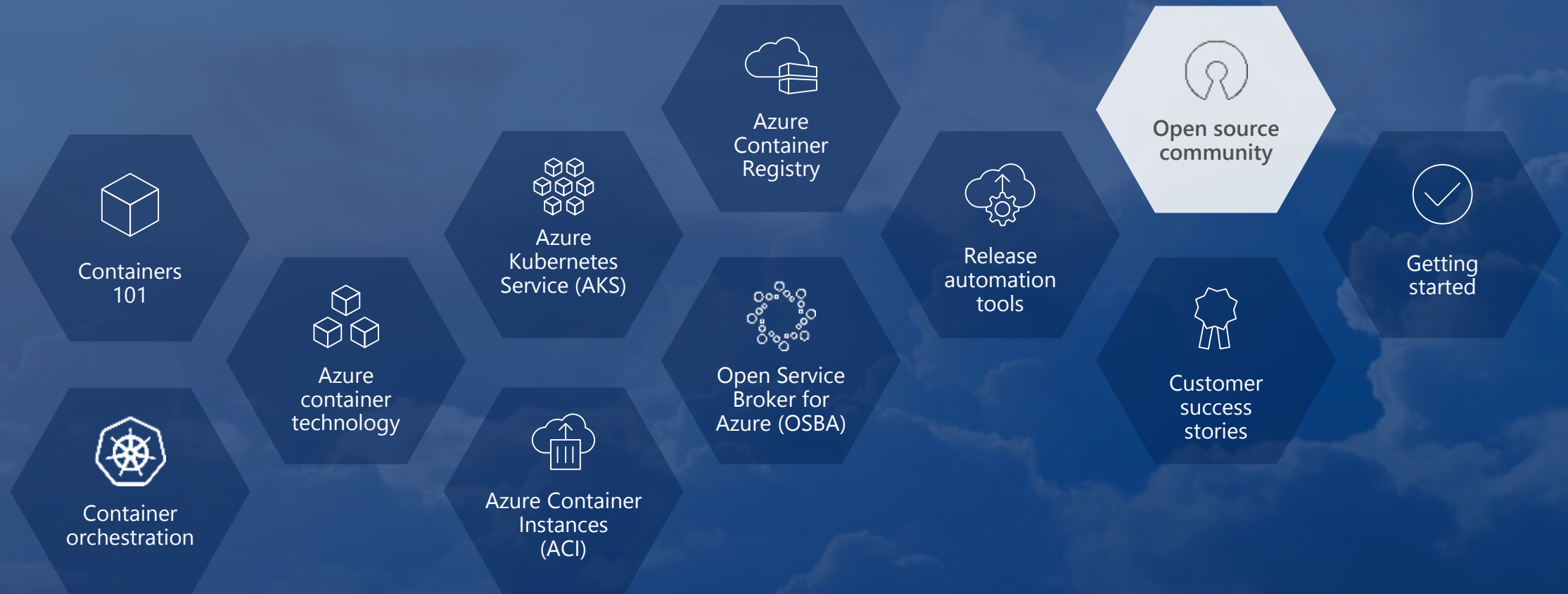
Bringing Draft to Visual Studio

Alessandro Pilotti, Cloudbase Solutions

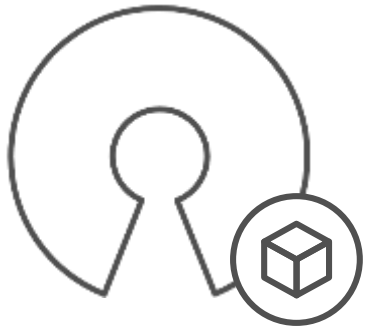
@cloudbase.it | <https://cloudbase.it>
<https://github.com/cloudbase/VSKubernetes>

BRK2125

Open source community



Community culture



Open source container
code contributions



Numerous open source
project builds



Open source community
leadership



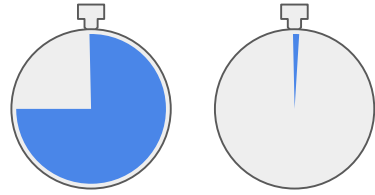


Microsoft and Tigera: Collaborating to Secure Container Networking

Andy Randall
Co-founder, VP Partners & Customer Success
Tigera

BRK2125

Implications of Dynamically Orchestrated Containers



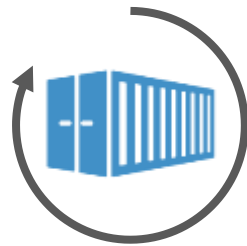
900x
start time



10x
workloads



25x shorter
lifetime

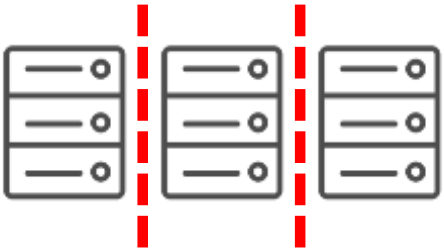


250x
network churn

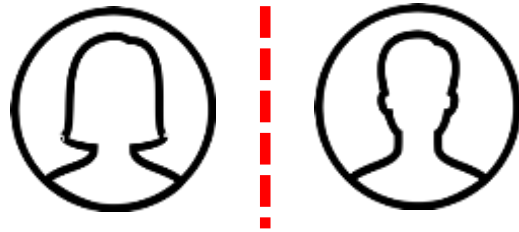


10x
attack surface area

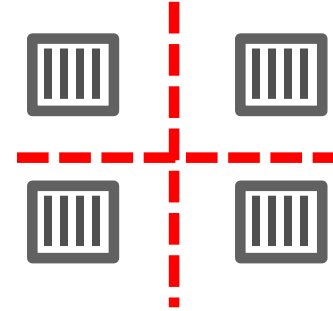
Motivation for Network Policy



Stage/tier separation



**Tenant/namespace
isolation**



Micro-segmentation



Compliance

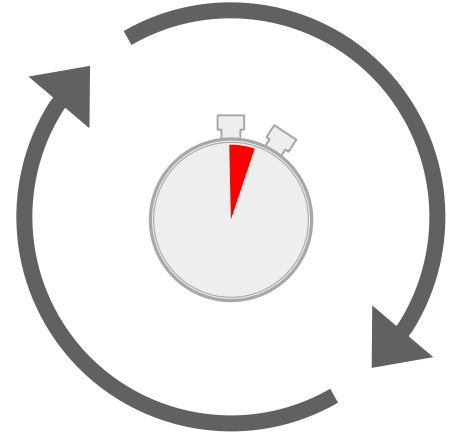
Kubernetes Network Policy



Label-based



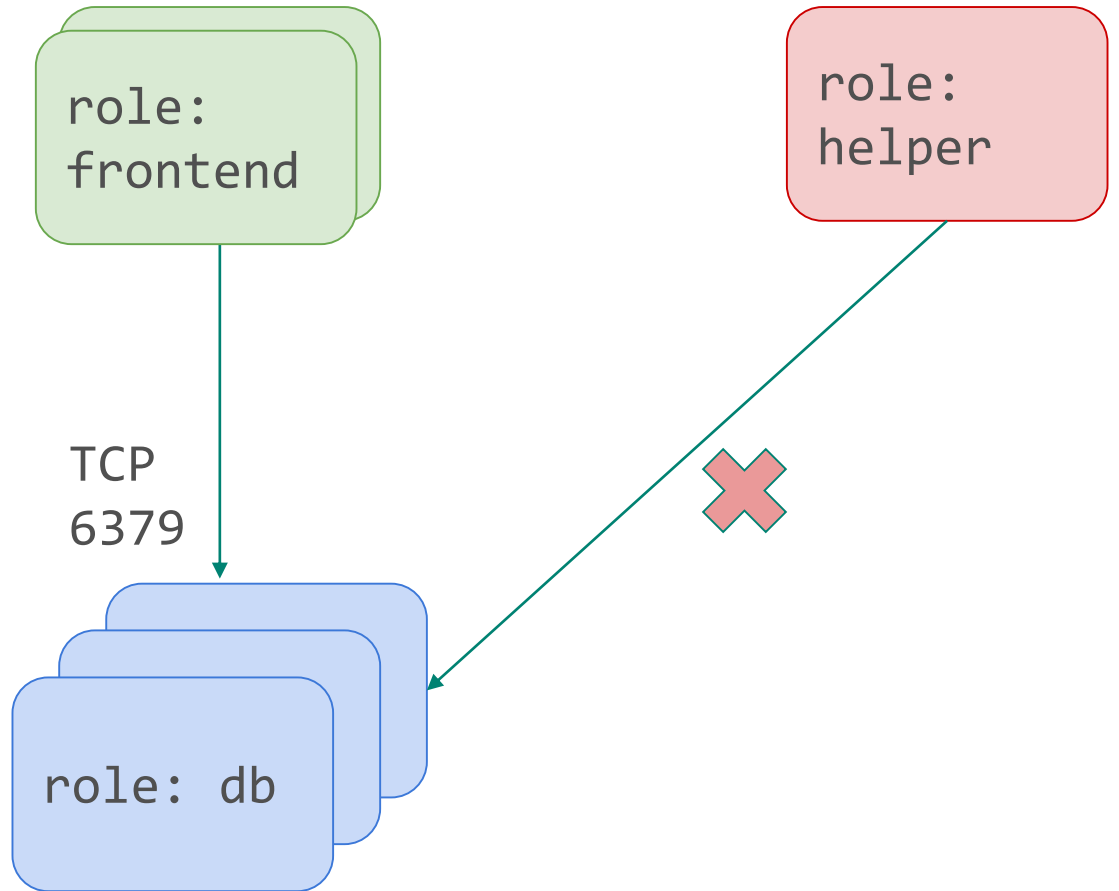
Declarative



Dynamic

Kubernetes Network Policy Example

```
apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
metadata:
  name: my-network-policy
  namespace: my-namespace
spec:
  podSelector:
    matchLabels:
      role: db
  ingress:
    - from:
      - podSelector:
          matchLabels:
            role: frontend
      ports:
        - protocol: TCP
          port: 6379
```



Kubernetes Network Policy Example

```
apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
```

```
metadata:
```

```
  name: my-network-policy
```

```
  namespace: my-namespace
```

```
spec:
```

```
  podSelector:
```

```
    matchLabels:
```

```
      role: db
```

```
  ingress:
```

```
    - from:
```

```
      - podSelector:
```

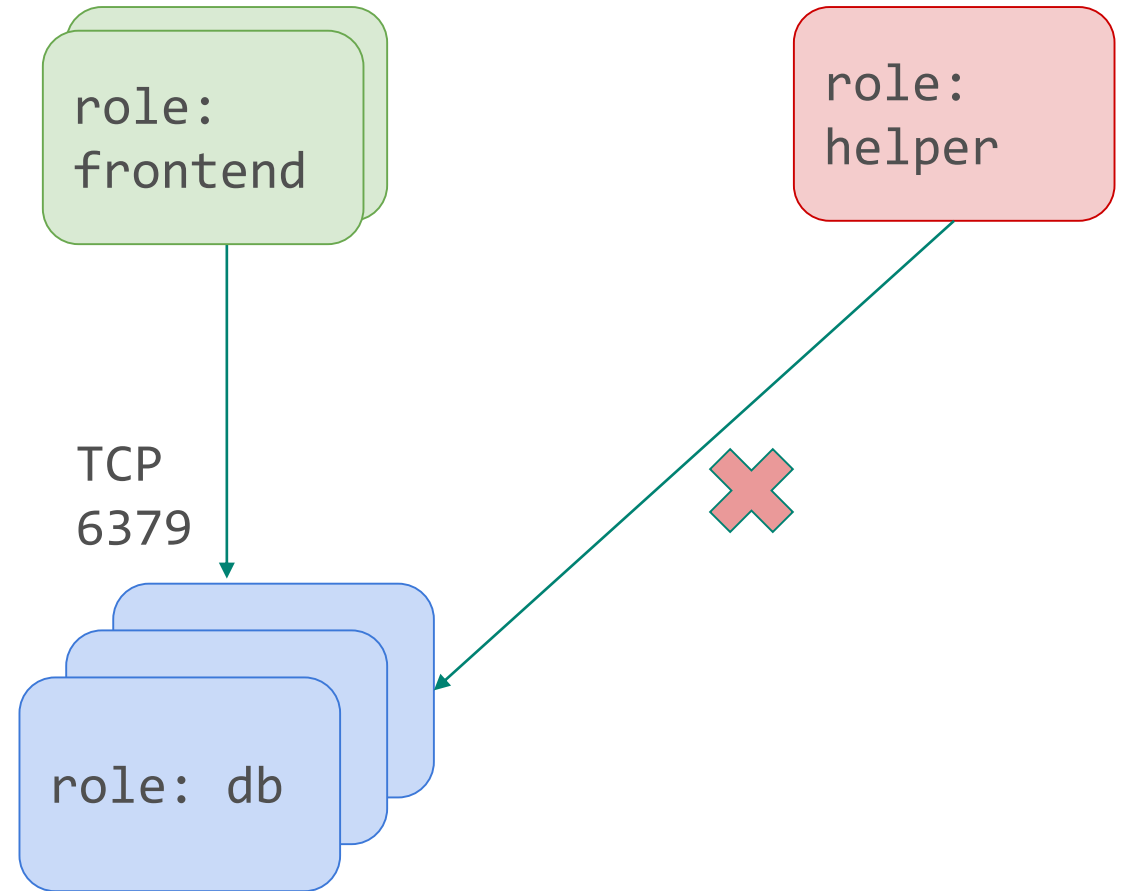
```
        matchLabels:
```

```
          role: frontend
```

```
  ports:
```

```
    - protocol: TCP
```

```
      port: 6379
```



Kubernetes Network Policy Example

```
apiVersion: networking.k8s.io/v1
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kind: NetworkPolicy
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  podSelector:
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```
    matchLabels:
```

```
      role: db
```

```
  ingress:
```

```
    - from:
```

```
      - podSelector:
```

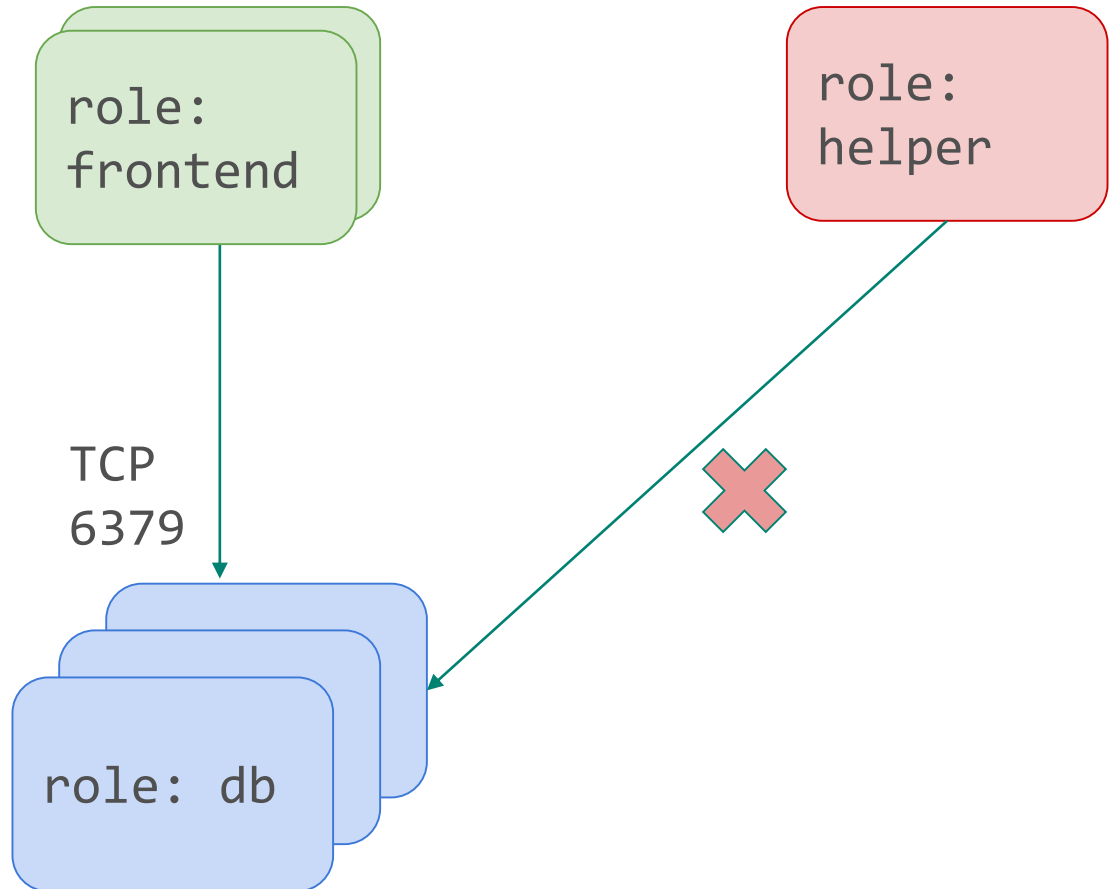
```
        matchLabels:
```

```
          role: frontend
```

```
  ports:
```

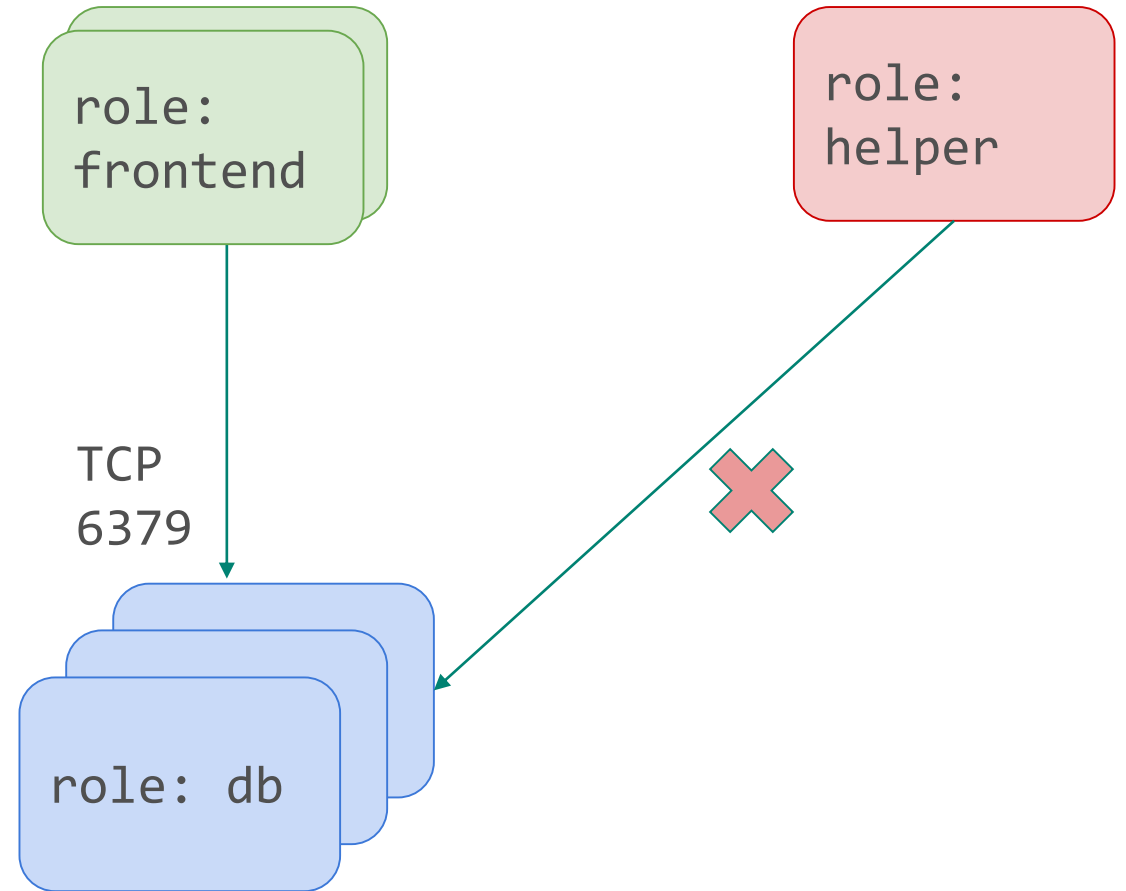
```
    - protocol: TCP
```

```
      port: 6379
```



Kubernetes Network Policy Example

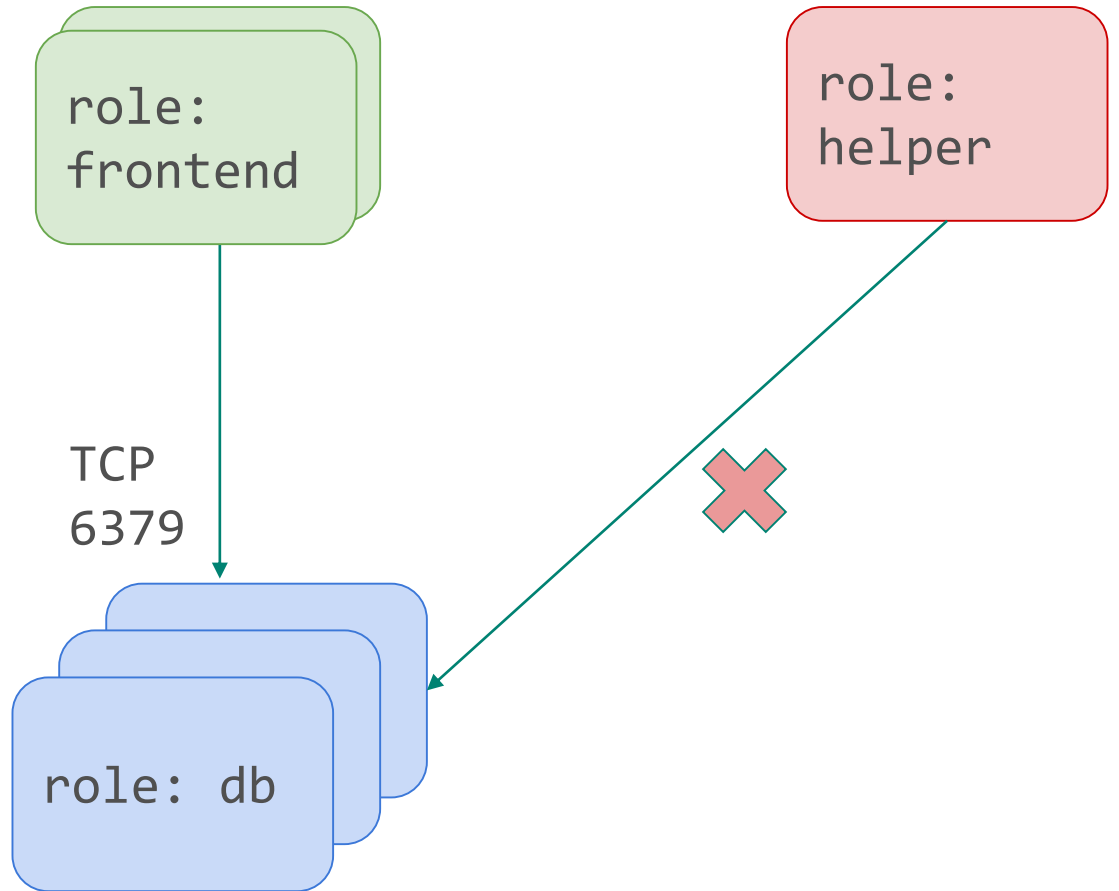
```
apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
metadata:
  name: my-network-policy
  namespace: my-namespace
spec:
  podSelector:
    matchLabels:
      role: db
  ingress:
    - from:
      - podSelector:
          matchLabels:
            role: frontend
      ports:
        - protocol: TCP
          port: 6379
```



Kubernetes Network Policy Example

```
apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
metadata:
  name: my-network-policy
  namespace: my-namespace
spec:
  podSelector:
    matchLabels:
      role: db
```

```
ingress:
- from:
  - podSelector:
      matchLabels:
        role: frontend
    ports:
  - protocol: TCP
    port: 6379
```



Calico, by Tigera, is the Industry's Gold-Standard Network Policy Technology



Free & open source
100's of contributors

Broad adoption
Large community

Proven reliability
and performance

Enterprise
Solutions from
Tigera

Microsoft and Tigera Collaboration



**Calico + Azure CNI
in ACS Engine**



**Sample
Helm
Charts**



**Network Policy
for AKS**

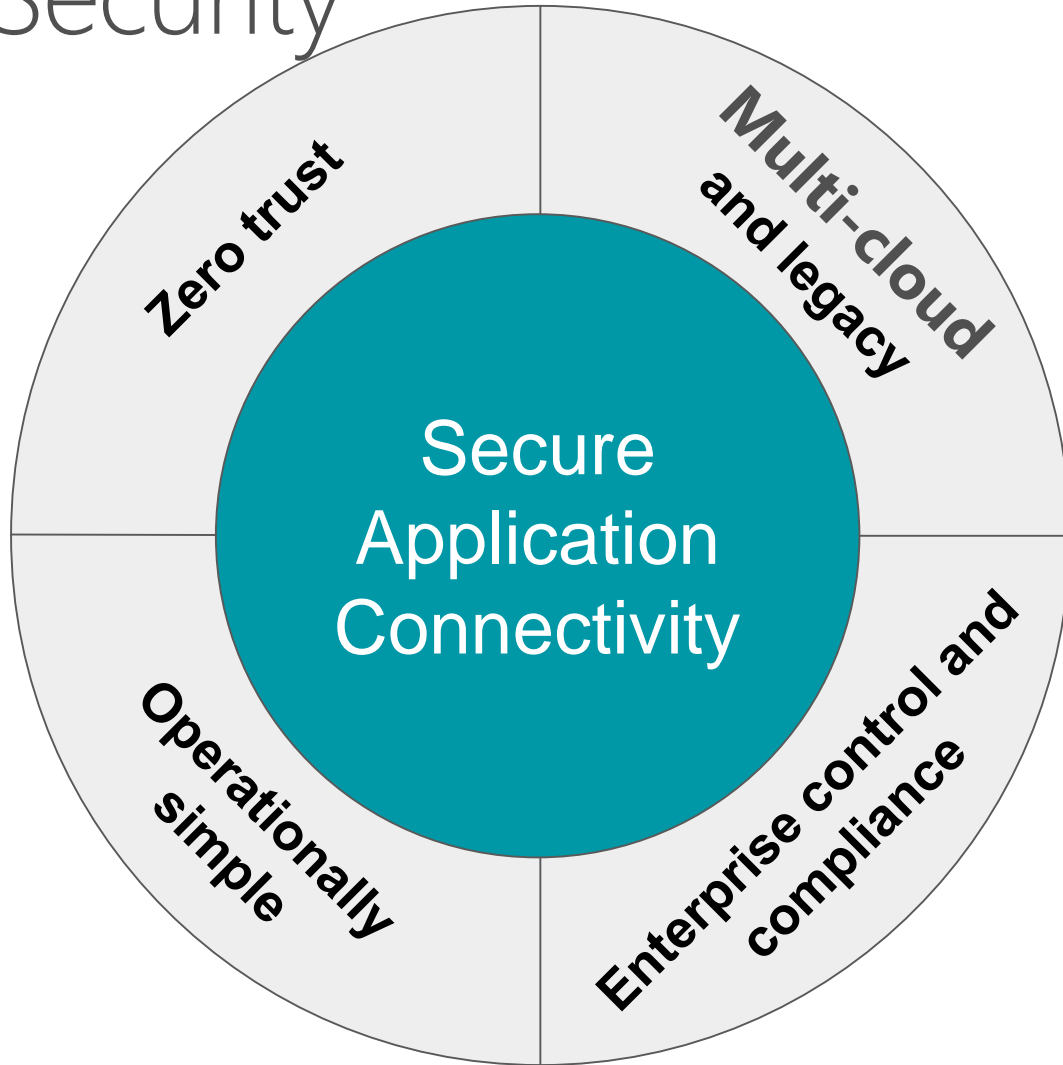


**Calico for
Windows**

Apply Your Calico Policies Wherever You Deploy Your Code



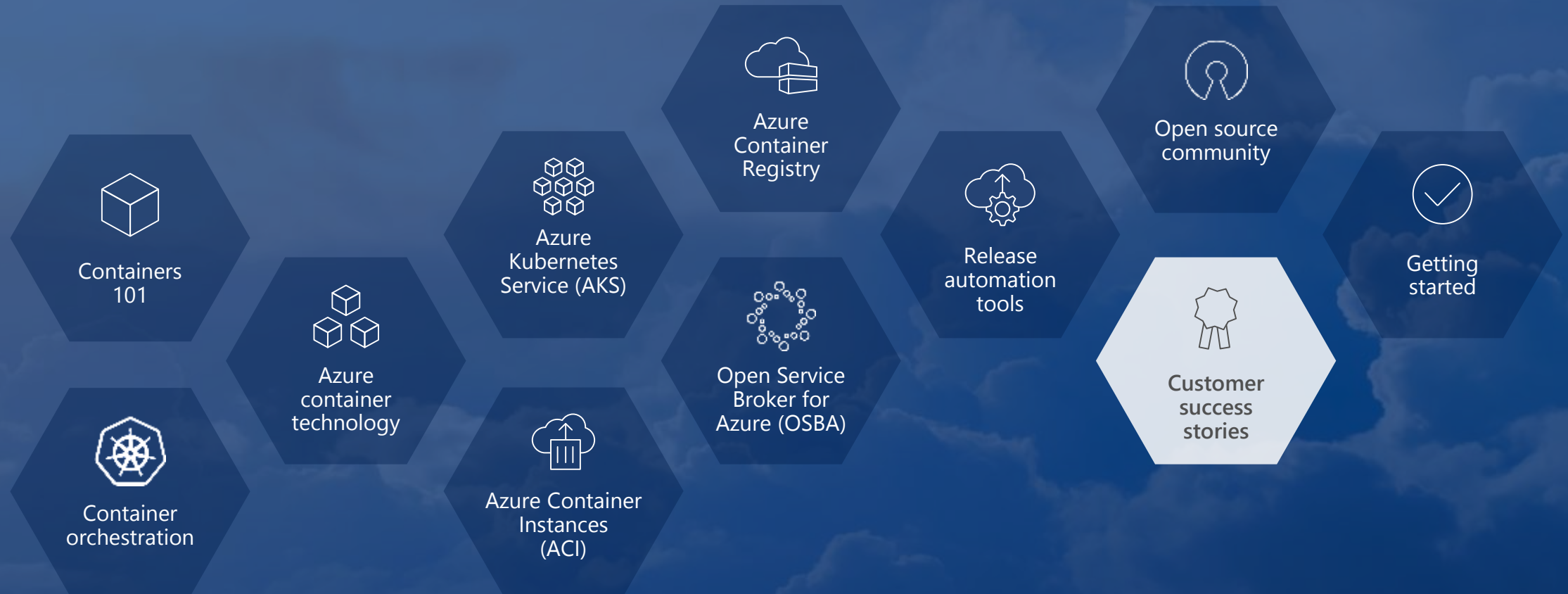
Tigera CNX: Enterprise Grade Cloud Network Security



Builds on Calico to address enterprise security & compliance requirements

- Hierarchical, RBAC-controlled policies
- Multi-layer policy enforcement
- Monitoring
- Auditing
- Troubleshooting
- Policy violation alerting
- Multi-cluster federation
- Graphical UI
- REST API

Customer success stories



Energy company electrifies pace of innovation and expansion

Ambit Energy provides electricity and natural-gas services in deregulated markets around the world. It uses technology as a competitive differentiator, employing microservices, DevOps, and continuous deployment to speed software development. To stand up infrastructure just as quickly, Ambit uses Microsoft Azure services such as Azure Kubernetes Service, together with infrastructure as code and open source technologies, to completely automate infrastructure provisioning. By implementing Azure, Ambit can move dramatically faster to enhance its services and enter new markets. Infrastructure redundancy is flexible and worry-free. And costs are 22 percent lower, which helps Ambit compete in the crowded electricity market. Because Ambit's cloud journey is gradual, it appreciates the fact that Azure is a great hybrid-cloud enabler, connecting easily to Ambit datacenters.



Products and services

Microsoft Azure
Kubernetes Service

Organization size

1,000 employees

Industry

Power and utilities

Country

United States

Business need

Optimize operational
efficiency





Siemens Health leverages technology to connect medical devices to the cloud through AKS

Digitization and networking between healthcare providers and software development companies are essential to value-based care. Moving from the development of value-added services into becoming more of a platform provider, it became important for Siemens to adopt a microservices approach to application delivery. To that end, Siemens adopted Azure Kubernetes Service (AKS) to run their microservices-based apps. AKS puts Siemens in a position not only to deploy business logic in Docker containers—including the orchestration—but also enables them to use an applicant gateway and API management to manage exposure, control, and to meter the access continuously. With their cloud-based development approach, Siemens has driven newfound product development agility. This project is already having a positive impact within the healthcare industry.

SIEMENS

Products and services

Microsoft Azure
Kubernetes Service

Organization size

100,000+ employees

Industry

Healthcare

Country

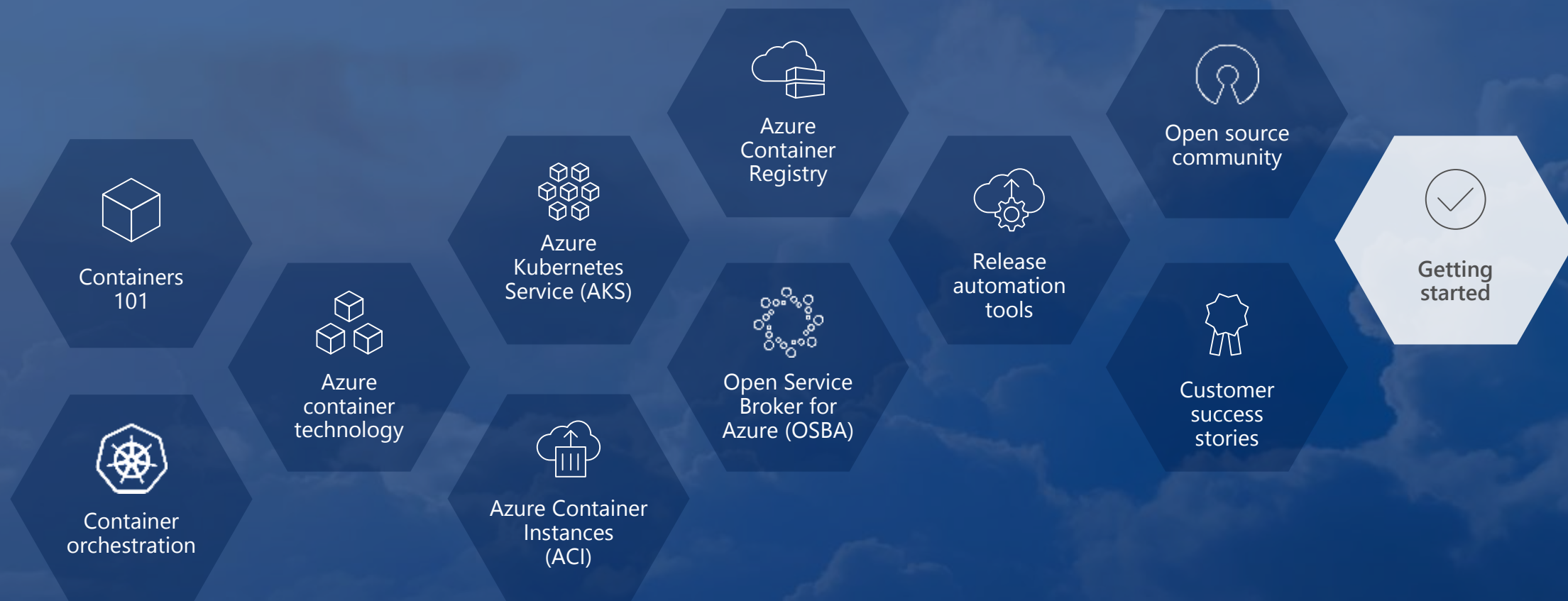
Germany

Business need

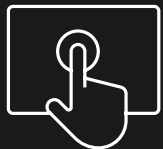
Faster application
development



Getting started



Learn more
aka.ms/kubernetes-build-2018



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Xbox One X



DJI Spark Drone



Starbucks gift cards



Be eligible to win!

Make sure you are scanned into your session and complete your session eval to be eligible to win.



Seven winners each day!

Winners will be notified via email.



Pick up your prize before leaving!

Prizes can be claimed at the info counter located on WSCC level 4, Galleria level.

Monday: pick up 2:15pm–6:30pm.

Tuesday: pick up 7:00am–6:00pm.

Wednesday: pick up 7:00am–5:30pm.

