Microsoft Azure

Azure webinar series

Containerize Your Applications with Kubernetes on Azure

Welcome

How do I ask a question?

If you have a technical or content-related question, please use the Q&A window

We will address the questions as they come in

Can I view this presentation after the webinar?

Yes, this presentation is being recorded

A link to the recorded presentation will be sent to the email address you used to register

Microsoft Azure

Meet our speaker

Gabe Monroy

Lead PM,
Azure Cloud Native Compute

Microsoft Azure

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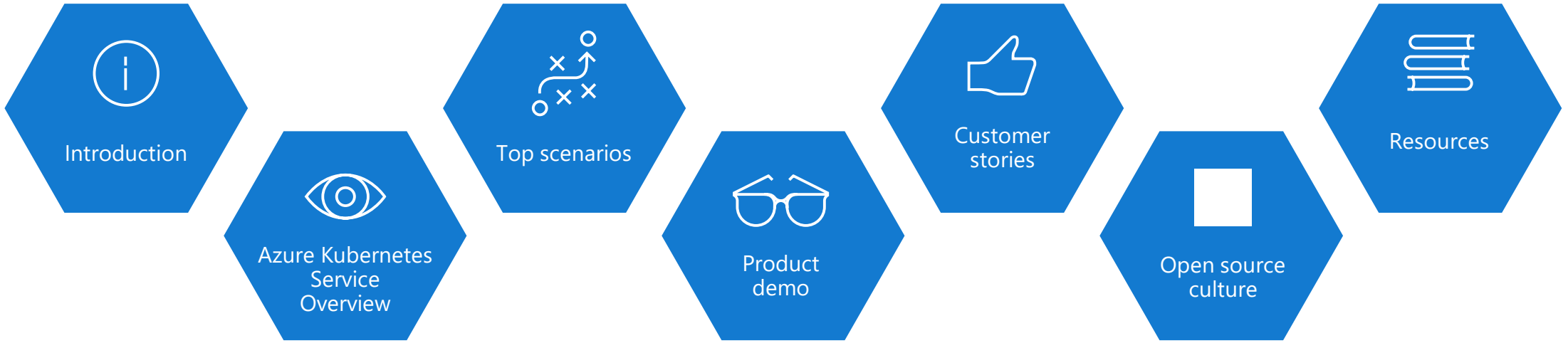
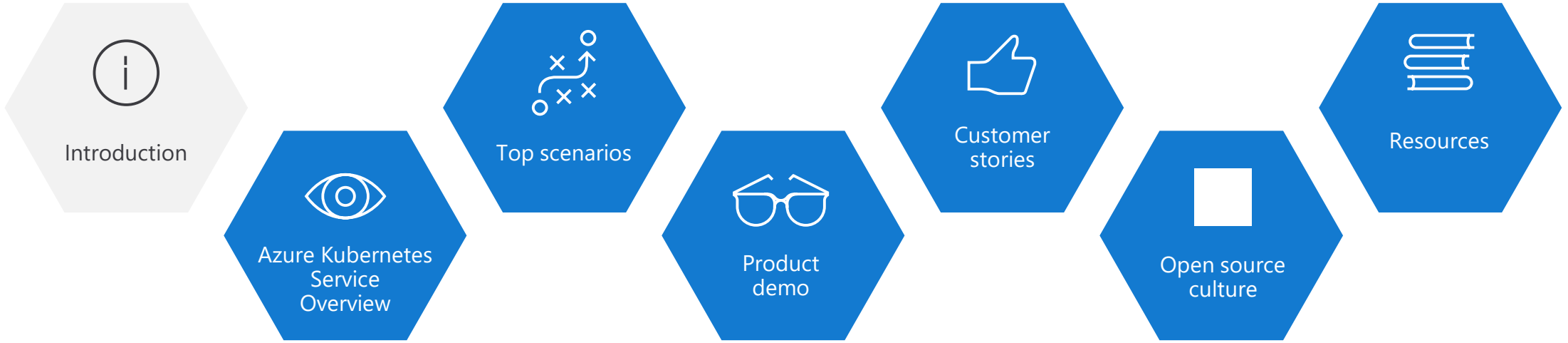


Microsoft Azure

Introduction



Microsoft Azure

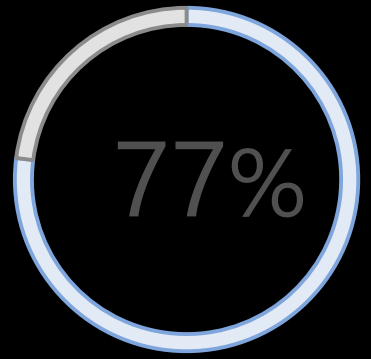
Containers and Kubernetes momentum

"By 2020, more than **50%** of enterprises will run **mission-critical, containerized cloud-native applications** in production."

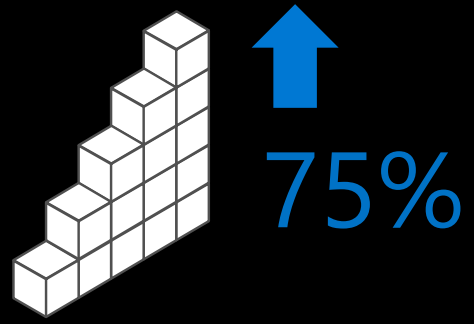
Gartner

Half of container environment is orchestrated.[1]

77% of companies[2] who use container orchestrators choose Kubernetes.

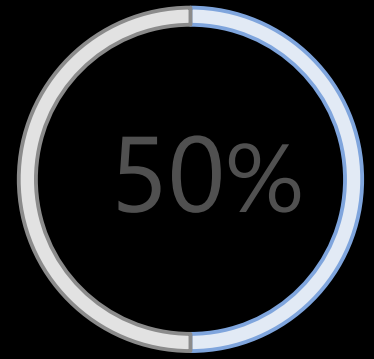


The average size of a container deployment has grown 75% in one year. [1]



Larger companies are leading the adoption.[1]

Nearly **50%** of organizations[1] running 1000 or more hosts have adopted containers.



1: Datadog report: 8 Surprising Facts About Real Docker Adoption
2: CNCF survey: cloud-native-technologies-scaling-production-applications

Microsoft Azure

Kubernetes: the industry leading orchestrator

Portable

Public, private, hybrid, multi-cloud

Extensible

Modular, pluggable, hookable, composable

Self-healing

Auto-placement, auto-restart, auto-replication, auto-scaling

Microsoft Azure

How Managed Kubernetes on Azure works

Automated upgrades, patches

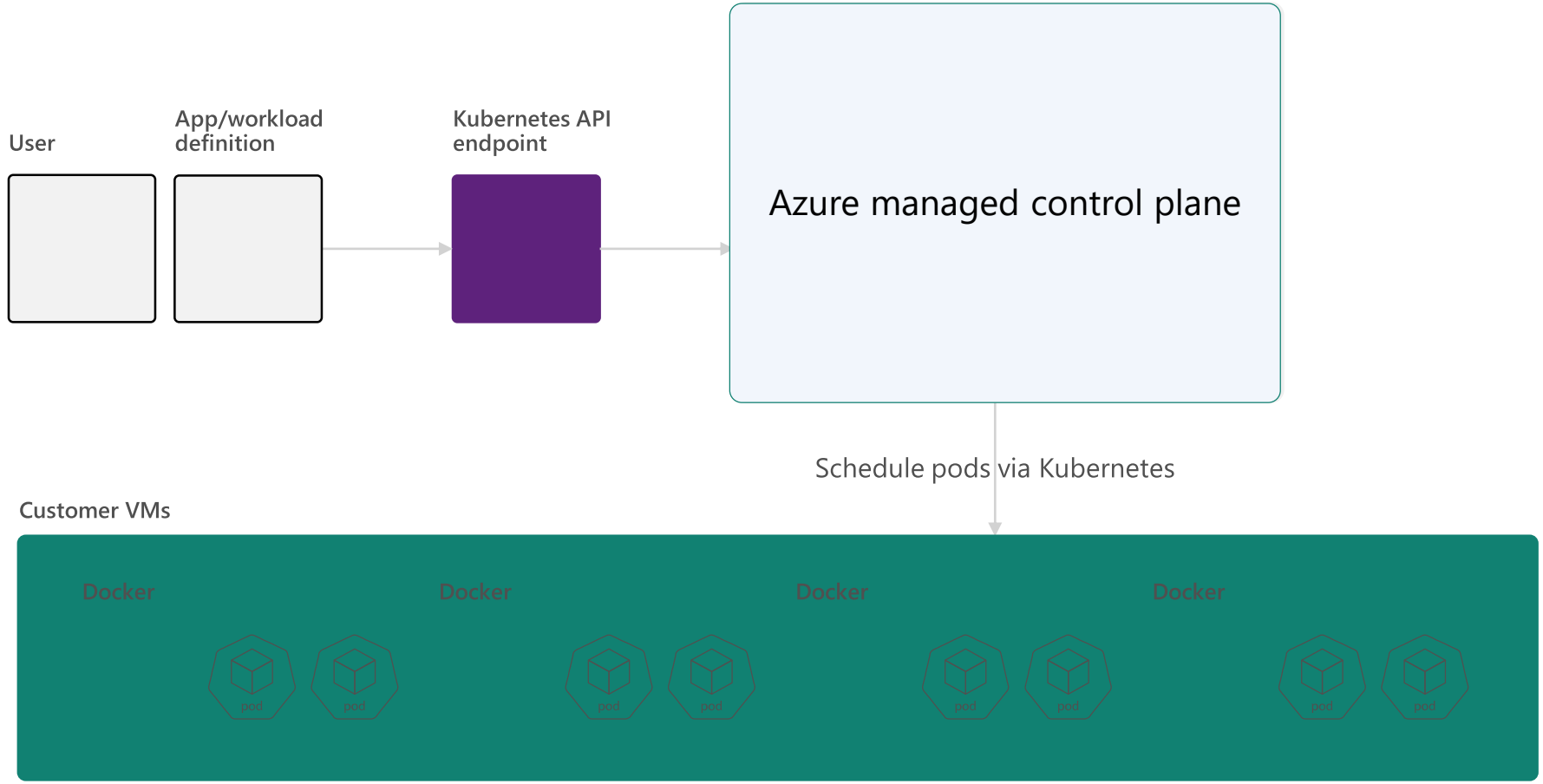
High reliability and availability

Easy and secure cluster scaling

Self-healing

API server monitoring

Control plane at no charge



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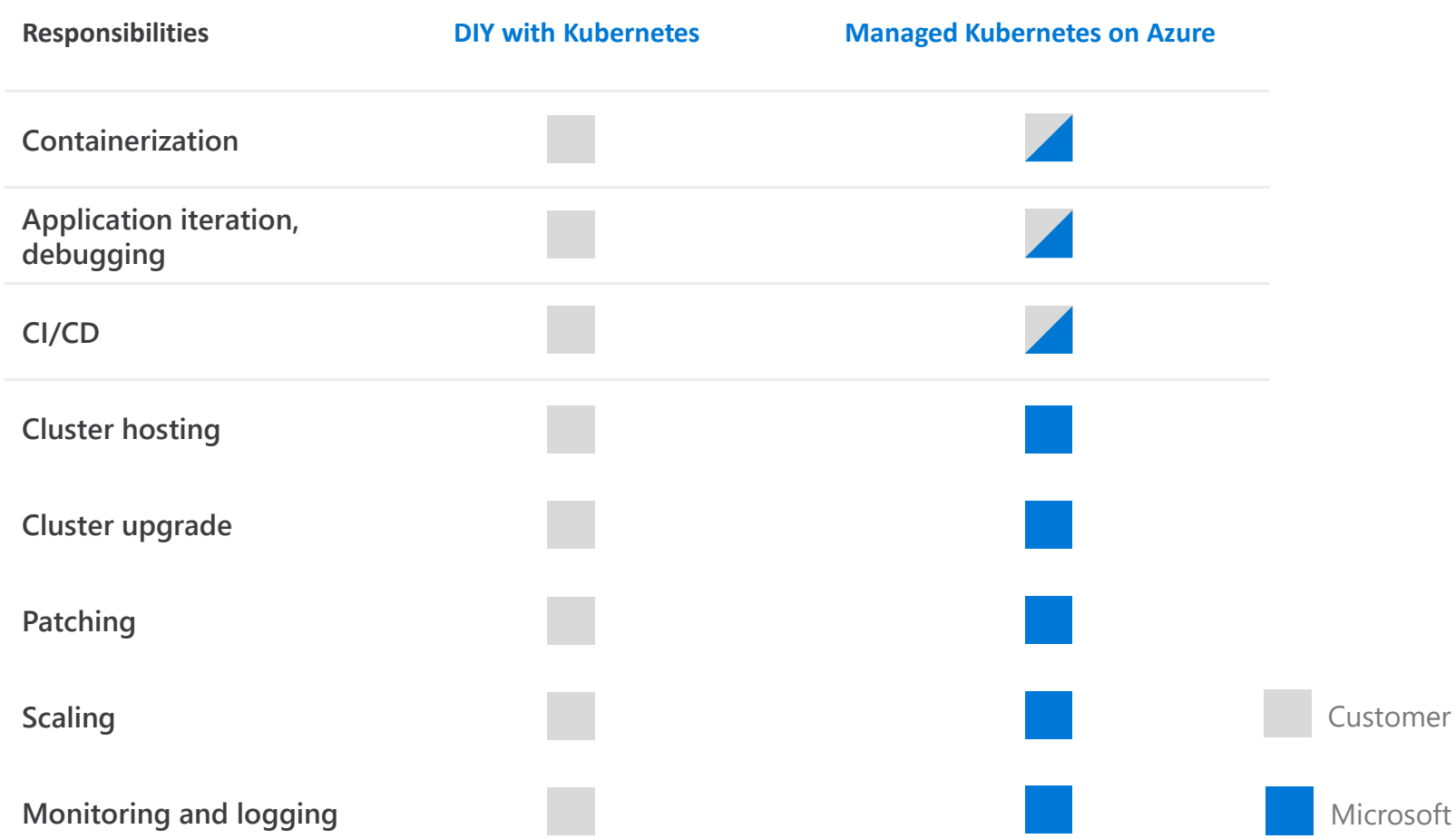
From infrastructure to innovation

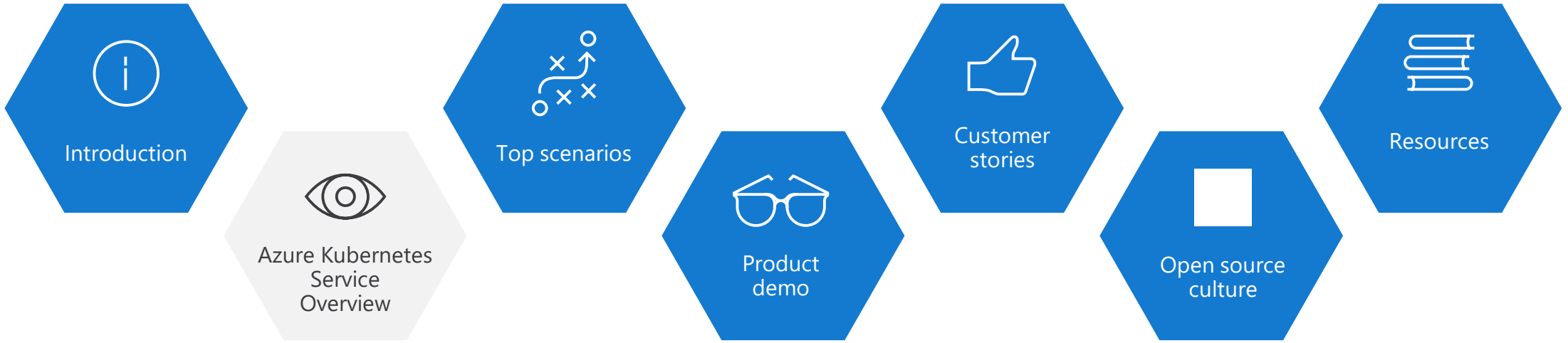
Managed Kubernetes empowers you to do more

Focus on your containers and code, not the plumbing of them.



Microsoft Azure

Azure Kubernetes Service Overview



Microsoft Azure

Azure Kubernetes Service (AKS)

Simplify the deployment, management, and operations of Kubernetes

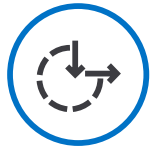
Deploy and manage Kubernetes with ease

Scale and run applications with confidence

Secure your Kubernetes environment

Accelerate containerized application development

Work how you want with open-source tools & APIs



Set up CI/CD in a few clicks

Microsoft Azure

Azure Kubernetes momentum

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

...over the last 12 months

Microsoft Azure

Azure makes Kubernetes easy

Deploy and manage Kubernetes with ease

Task	The Old Way	With Azure
Create a cluster	Provision network and VMs Install dozens of system components including etcd Create and install certificates Register agent nodes with control plane	`az aks create`
Upgrade a cluster	Upgrade your master nodes Cordon/drain and upgrade worker nodes individually	`az aks upgrade`
Scale a cluster	Provision new VMs Install system components Register nodes with API server	`az aks scale`

Microsoft Azure

Azure makes Kubernetes easy

Accelerate containerized application development

Task	The Old Way	With Azure
Build a containerized app and deploy to Kubernetes	Build the app resource Define a Dockerfile/Helm chart Build the container image Push the container to a registry Write Kubernetes manifests/Helm chart Deploy to Kubernetes	`draft init` to configure your environment `draft create` to auto-create Dockerfile/Helm chart `draft up` to deploy to Kubernetes
Build and test individual services in a microservices architecture	Set up a local dev environment using Minikube Determine the transitive closure of dependencies Identify behavior of dependencies for key test cases Stub out dependent services with expected behavior Make local changes, check-in, and hope things work Validate with application logs	Use DevSpaces to iterate, test and debug Do breakpoint debugging in your IDE
Expose web apps to the internet with a DNS entry	Deploy an ingress controller Create a load-balanced IP for it Add an ingress resource to your deployment Acquire a custom domain Create a DNS A-record for your service	Turn HTTP application routing on in your cluster Add an ingress resource to your deployment

Microsoft Azure

Azure makes Kubernetes easy

Set up CI/CD in a few clicks

Task	The Old Way	With Azure
Set up a CI/CD pipeline and deploy to Kubernetes	Create git repo Create a build pipeline Create a container registry Create a Kubernetes cluster Configure build pipeline to push to container registry Configure build pipeline to deploy to Kubernetes	Create an Azure DevOps project with AKS as a target
Make container images available for deployment worldwide	Create a container registry in every region Configure build pipeline with multiple endpoints Loop through all regions and push following build	Create an Azure Container Registry with geo-replication Push your image to a single endpoint
Track health with consolidated cluster and application logs	Choose a logging solution Deploy log stack in your cluster or provision a service Configure and deploy a logging agent onto all nodes	Checkbox “container monitoring” in the Azure portal

Microsoft Azure

Work how you want with opensource tools and APIs

	Development	DevOps	Monitoring	Networking	Storage	Security
Take advantage of services and tools in the Kubernetes ecosystem	HELM, DRAFT	Jenkins, Terraform, BRIGADE, JFrog, CODESHIP	Prometheus, fluentd, Grafana, OPENTRACING, DATADOG, JAEGER	CNI Networking, TIGERA	MAPR, portworx	Twistlock, aqua, heptio, HASHICORP, RBAC
OR, Leverage growing Azure support	VS Code	VSTS, ARM	Azure Monitor	Azure VNET	Azure Storage	Azure Container Registry, AAD, Key Vault

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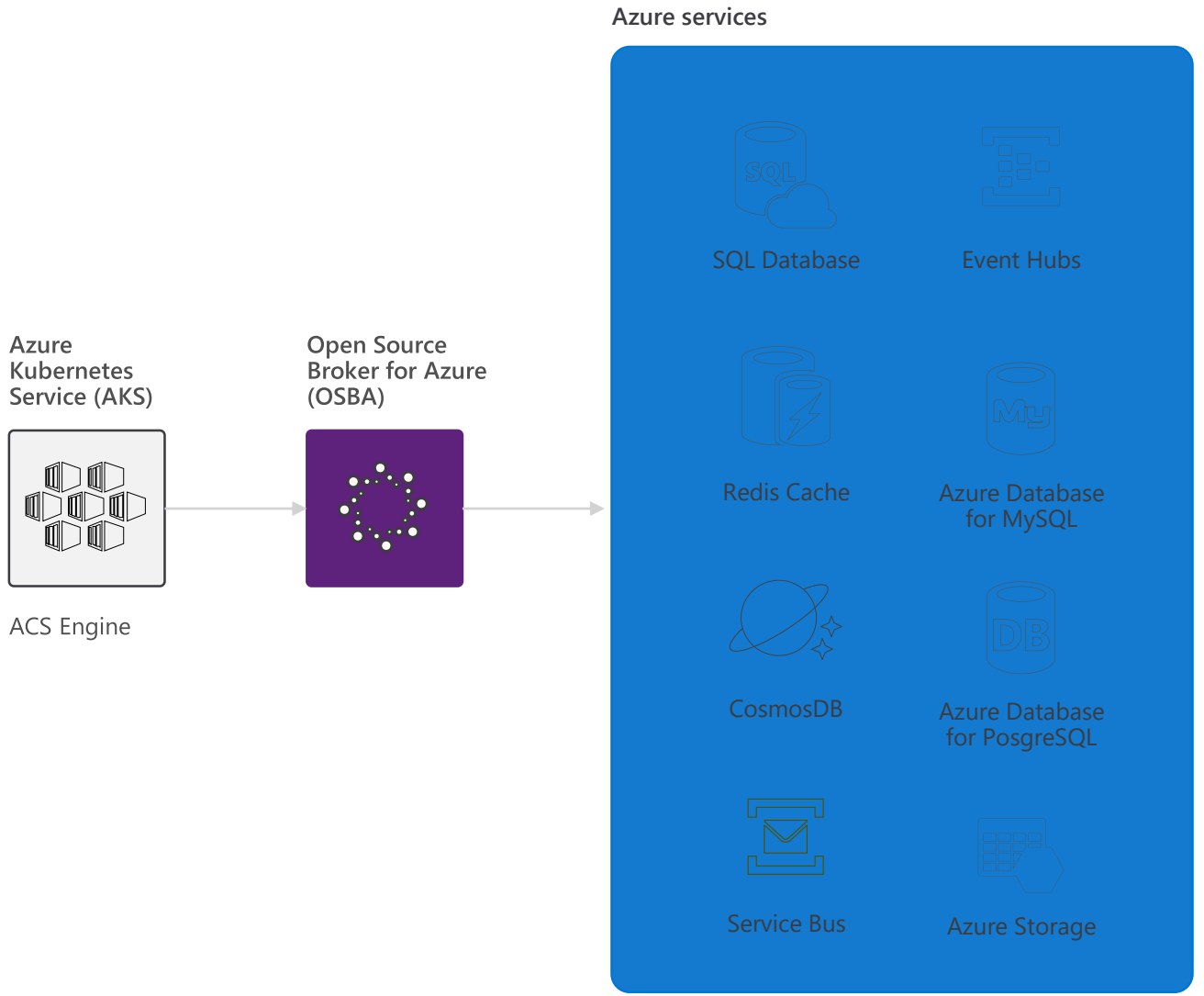
Work how you want with opensource tools and APIs

Easily connect to SLA-backed Azure services with OSBA



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Secure your Kubernetes environment

Control access through AAD and RBAC

Safeguard keys and secrets with Key Vault

Secure network communications with VNET and CNI

Compliant Kubernetes service with certifications covering SOC, HIPAA, and PCI

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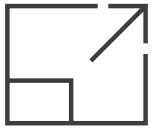
Scale and run applications with confidence



Built-in auto scaling

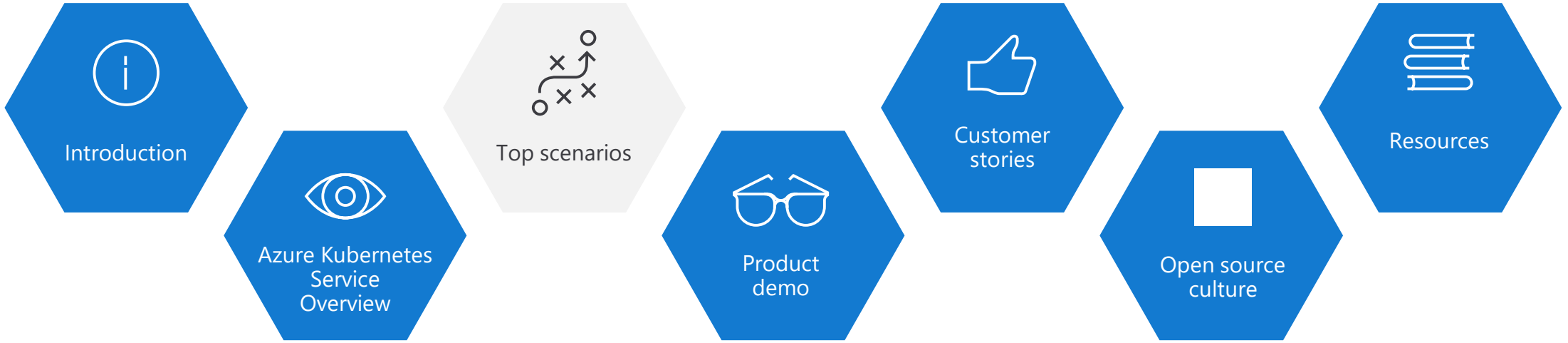
Global data center to boost performance and reach

Elastically burst from AKS cluster using ACI

Geo-replicated container registry

Microsoft Azure

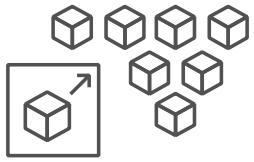
Top scenarios



Microsoft Azure

Top scenarios for Kubernetes on Azure

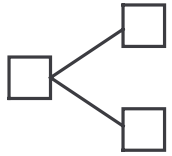
Lift and shift to containers



Cost saving

without refactoring your app

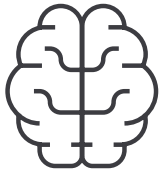
Microservices



Agility

Faster application development

Machine learning



Performance

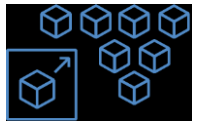
Low latency processing

IoT

Portability

Build once, run anywhere

Microsoft Azure



Lift and shift to containers

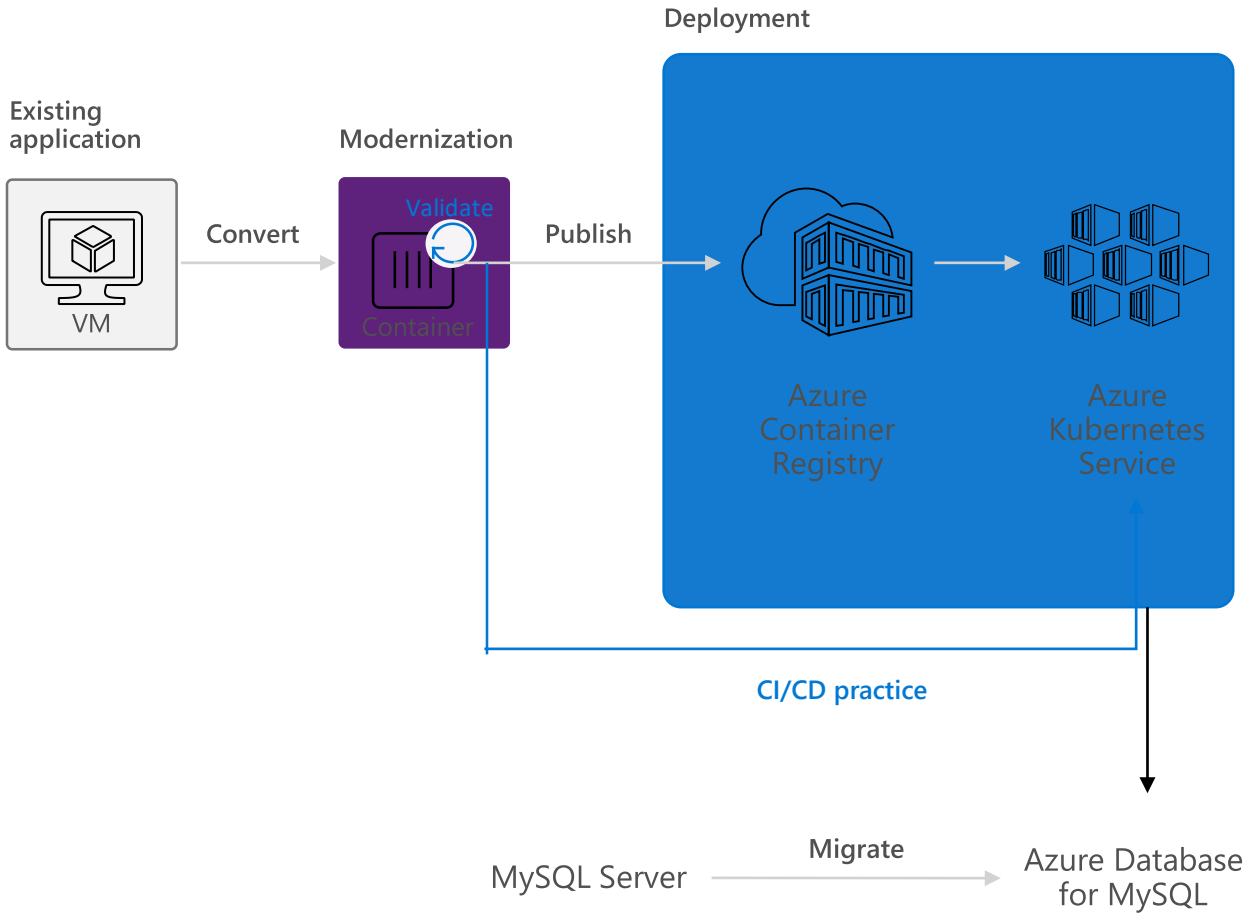
Microservices

Machine learning

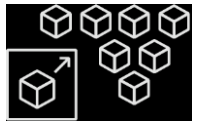
IoT

App Modernization without code changes

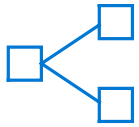
- ✓ Move applications as is to Azure, but with cost savings
- ✓ Containers support all frameworks and technology stacks
- ✓ Faster app deployment with DevOps tools



Microsoft Azure



Lift and shift to containers



Microservices

Machine learning

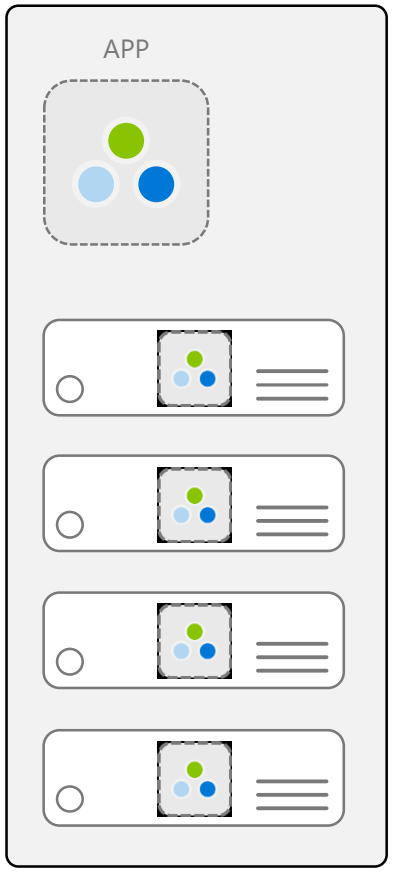
IoT

Microservices: for faster app development

- ✓ Independent deployments
- ✓ Improved scale and resource utilization per service
- ✓ Smaller, focused teams

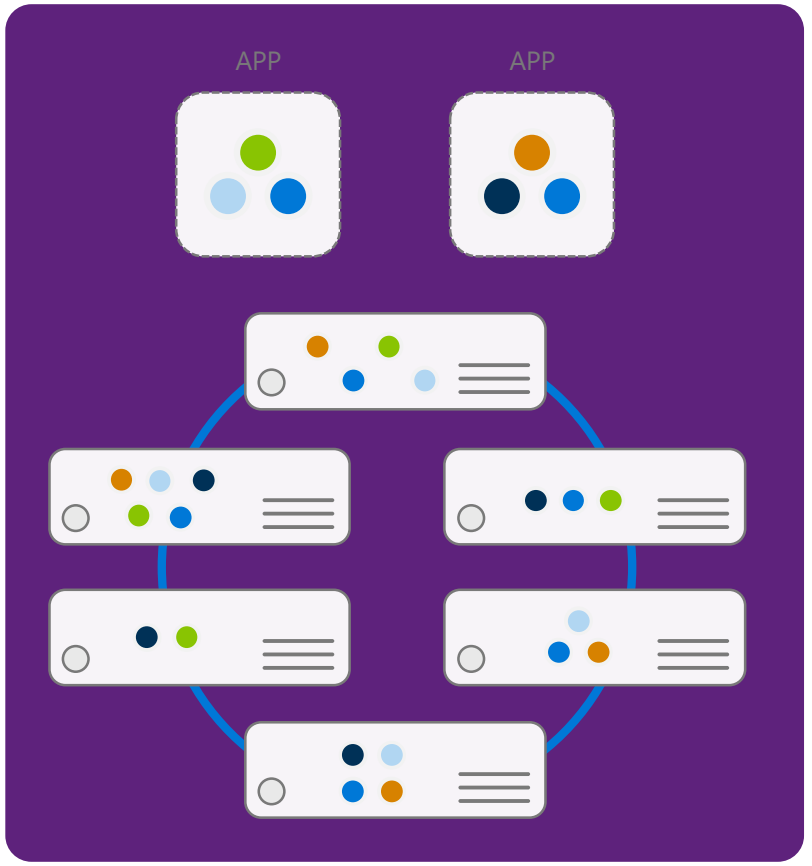
Monolithic

Large, all-inclusive app



Microservices

Small, independent services



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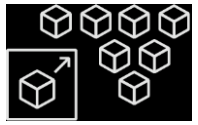


Lift and shift to containers

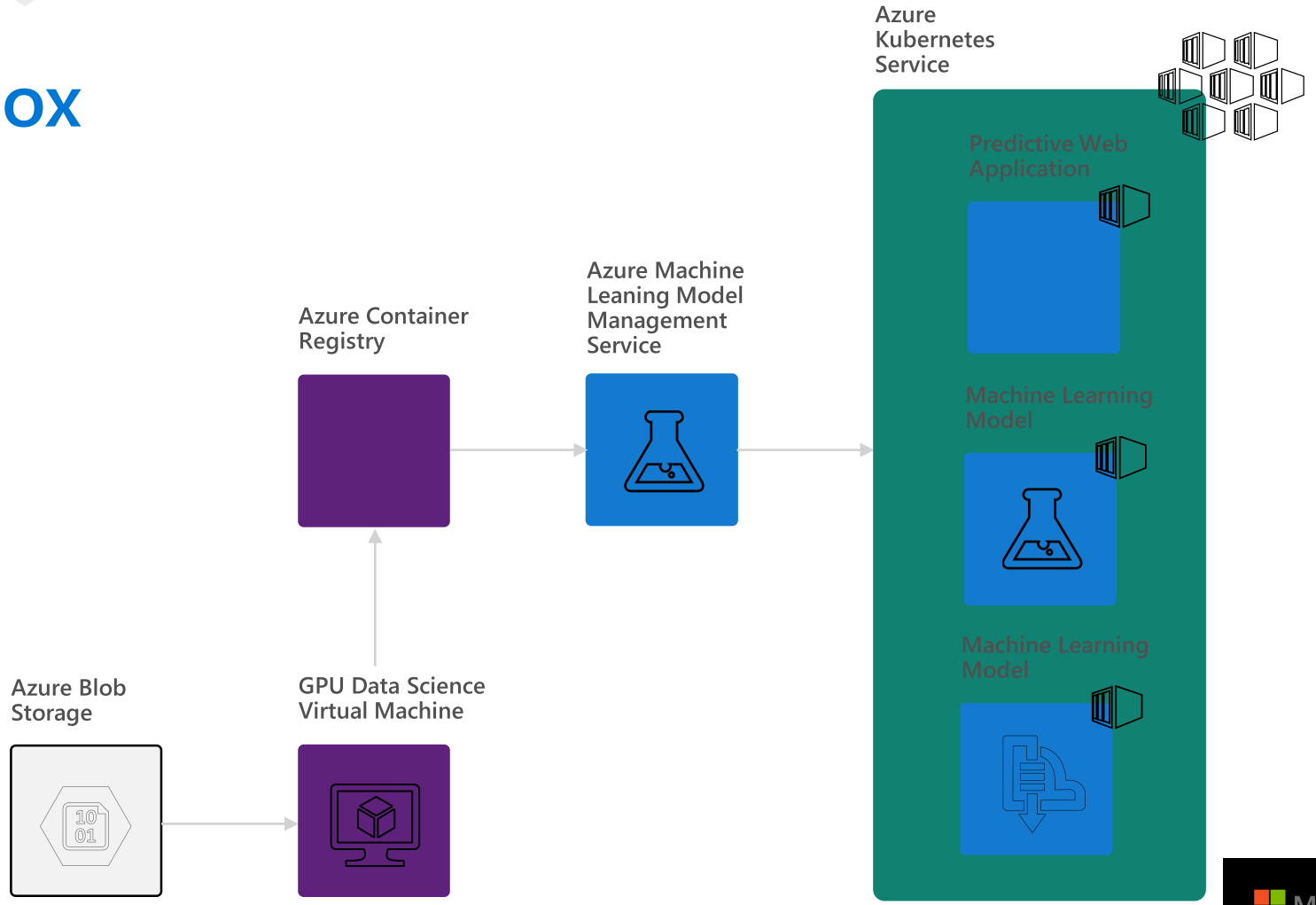
Microservices

Machine learning

IoT

Data Scientist in a box

- ✓ Quick deployment and high availability
- ✓ Low latency data processing
- ✓ Consistent environment across test, control and production



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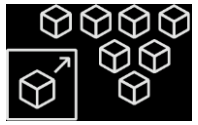


Lift and shift to containers

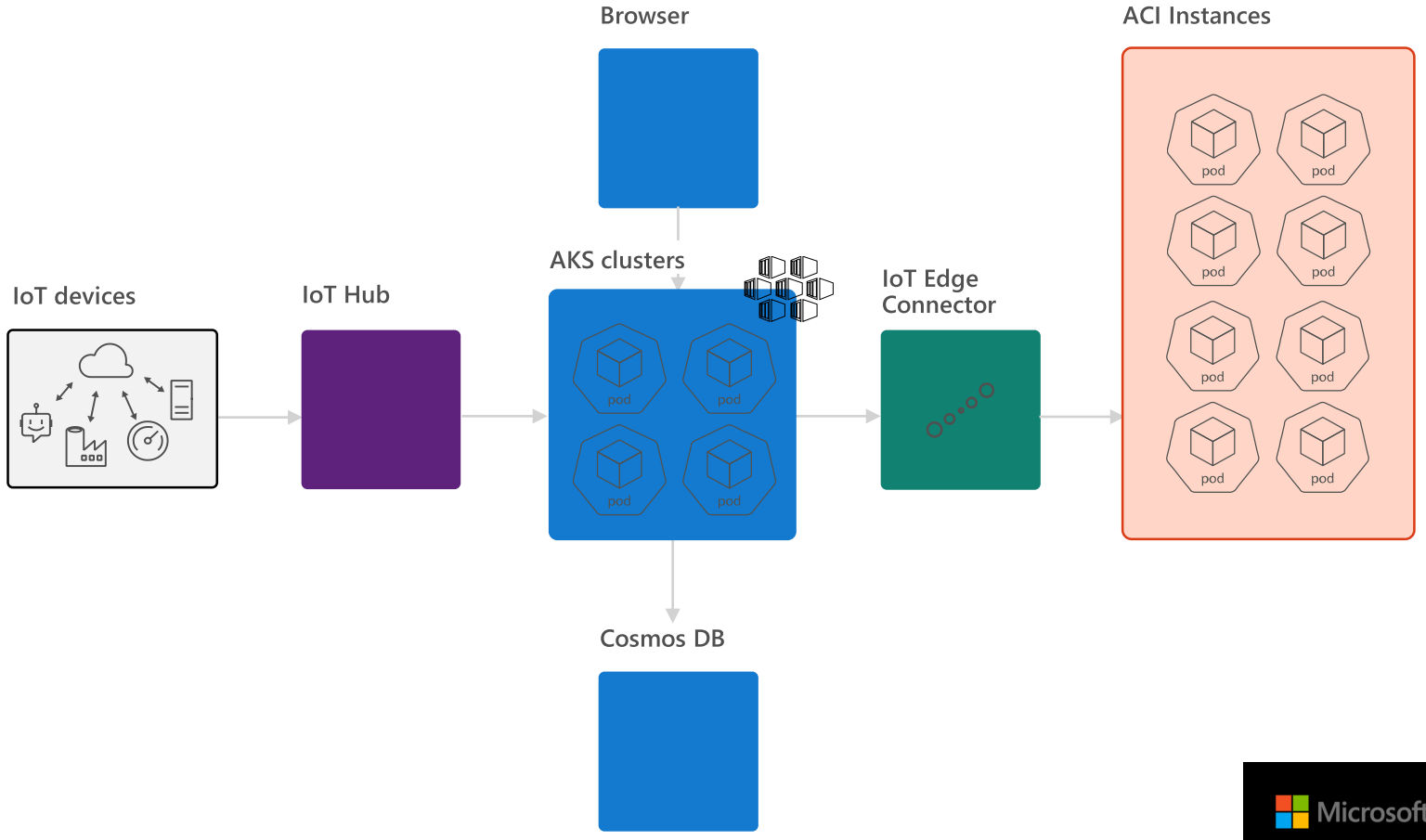
Microservices

Machine learning

IoT

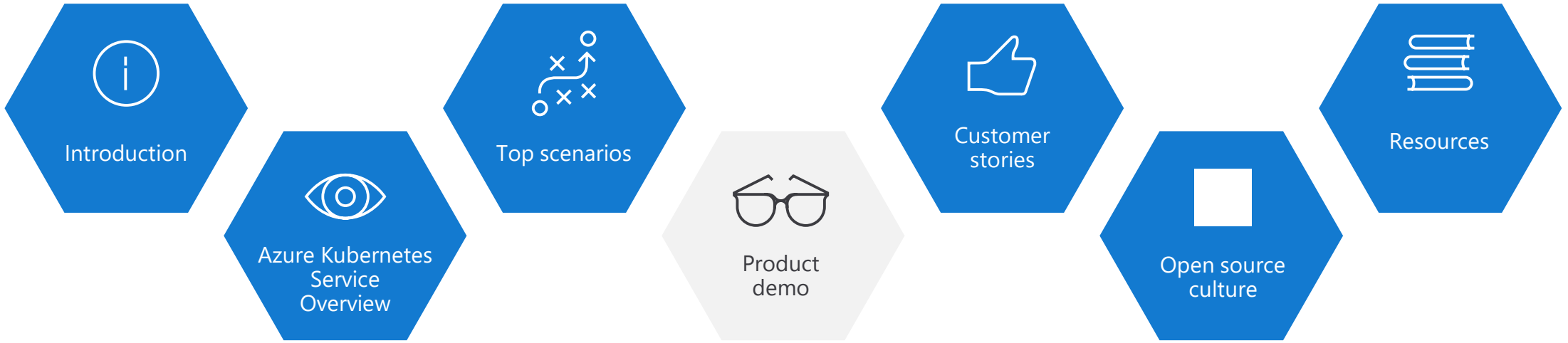
Scalable Internet of Things solutions

- ✓ Portable code, runs anywhere
- ✓ Elastic scalability and manageability
- ✓ Quick deployment and high availability



Microsoft Azure

Product deep dive



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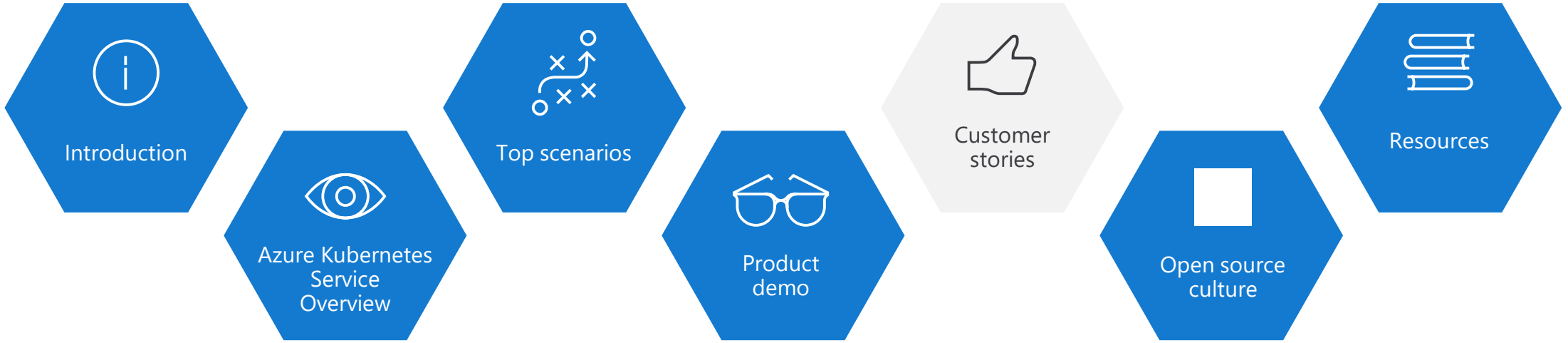
Customer stories



Microsoft Azure

SIEMENS

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

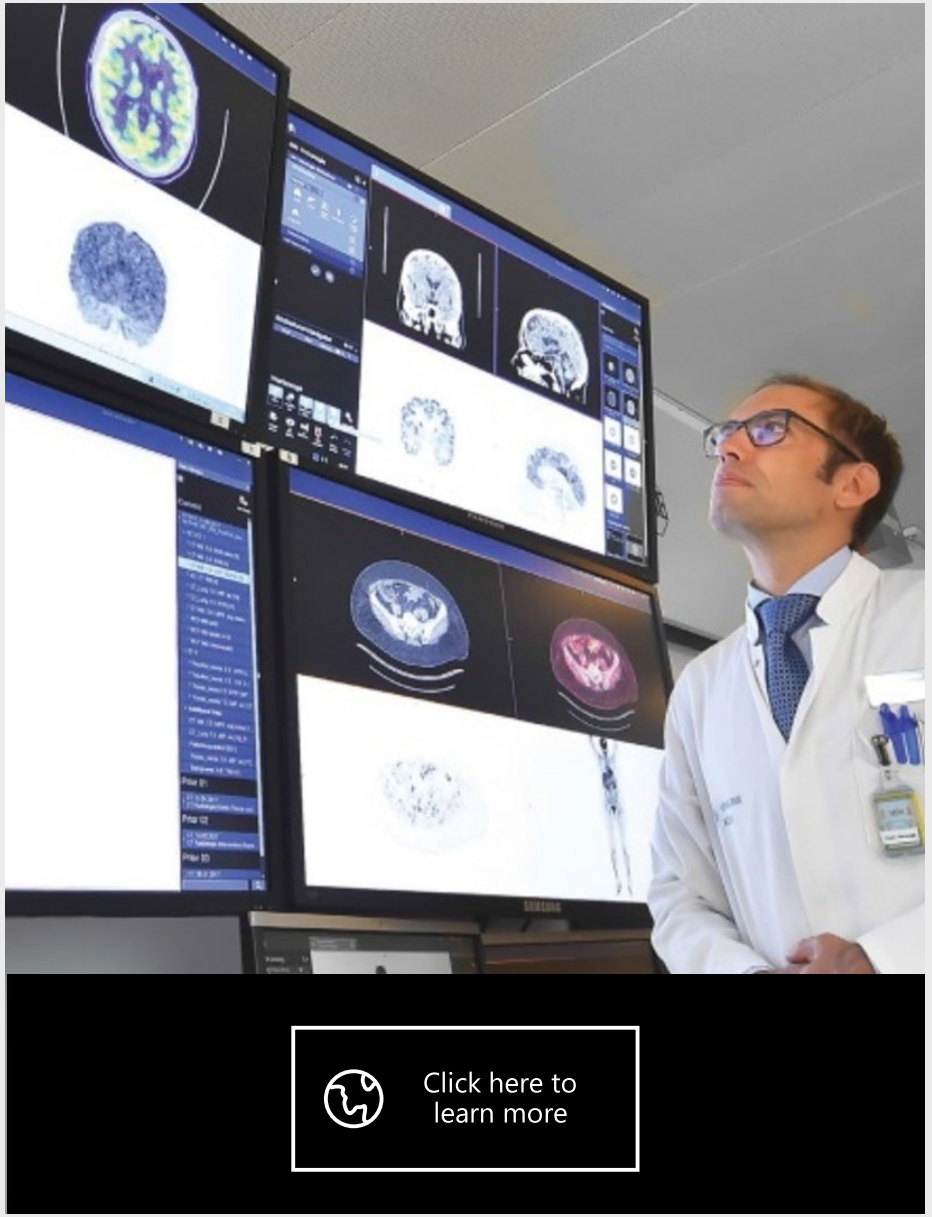
Challenge: Siemens needed to speed up their development process to make the transition from value-added services provider to platform provider.

Solution: Siemens adopted Azure Kubernetes Service (AKS) to speed up application development and run their microservices-based apps.

Outcome: With AKS, Siemens has driven newfound product development agility. AKS enables them to use an applicant gateway and API management to manage exposure, control, and to meter the access continuously.

> *The managed Azure Kubernetes Service puts us really into a position to not only deploy our business logic in Docker containers, including the orchestration, but it's also really easy through application gateway and API management to manage that exposure and control and meter the access continuously.*

Thomas Gossler, Lead Architect
Digital Ecosystem Platform, Siemens



Microsoft Azure

AMBIT ENERGY

Energy company electrifies pace of innovation and expansion

Challenge: To meet aggressive growth goals, Ambit Energy needed to automate infrastructure provisioning to match their pace of new software creation.

Solution: To stand up infrastructure quickly, Ambit used Microsoft Azure services such as Azure Container Service, together with infrastructure as code and open source technologies, to completely automate infrastructure provisioning.

Outcome: 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.

Azure support for Docker, Kubernetes, Puppet, Terraform, Cassandra, and other open source tools has become very important to us and has really accelerated our move into Azure.

Robert Rudduck, Director of Architecture and DevOps
Ambit Energy

Microsoft Azure

Altair

Altair Engineering democratizes HPC access using the cloud

Challenge: Altair needed a specialized HPC architecture containing high-performance graphics processing units to deliver their latest topology optimization and analysis application to customers.

Solution: Altair used Kubernetes in Azure Container Service to handle back-end functions and increase the density of services running across compute nodes.

Outcome: With Azure, Altair provides customers with a scalable, cost-effective back-end HPC infrastructure, eliminating the need for expensive engineering workstations.

Customers are limited as to what they can do on workstations, but with Azure we can give them a scalable, cost-effective back-end HPC infrastructure.

Sam Mahalingam, Chief Technical Officer Cloud Computing and High-Performance Computing Strategy
Altair Engineering

Microsoft Azure

varian

Cancer treatment company streamlines IT, focuses on innovation using container software technology

Challenge:	Varian needed to provide broader cancer care and enable faster innovation for the benefit of cancer patients.
Solution:	Varian chose Microsoft Azure as its cloud platform and Azure Kubernetes Service to scale application deployments to thousands of customers, utilizing containers to modernize existing apps and create new ones.
Outcome:	With AKS, Varian's developers can deliver features to customers quickly and get their feedback without the overhead of provisioning a group of virtual machines.

With AKS, developers get a safe place to innovate and to experiment with new technologies and ideas…. It's the best of open service combined with the best of Azure.

Shivakumar Gopalakrishnan, Senior Manager
Varian Medical Systems

Click here to learn more

Microsoft Azure

falkonry

Tech startup creates a “data scientist in a box” with machine learning and Microsoft Azure

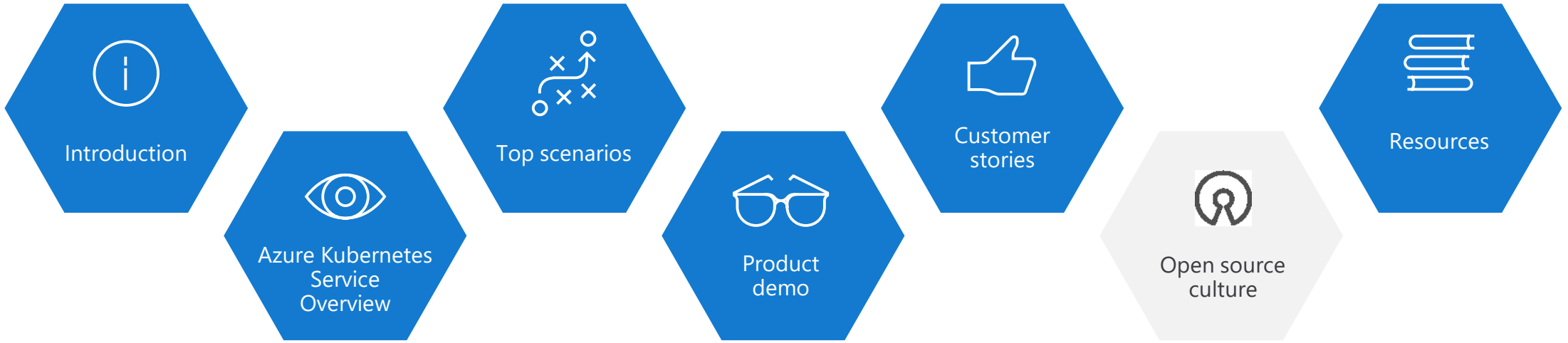
Challenge:	Falkonry needed a solution to scale the deployment of its machine learning application to reach customers in the oil and gas industries.
Solution:	Falkonry used Azure Kubernetes Service to automate the deployment of Kubernetes clusters to deliver their application globally.
Outcome:	With Azure Kuburnetes Service, Falkonry is able to deploy their solutions in days, compared to months it takes for companies using a more traditional platform approach.

We’re very happy with the speed of deployment we can offer our customers with Azure. If we had to fly people out to configure and set up hardware and software, we would lose several weeks in the process.

Sanket Amberkar, Senior Vice President of Marketing
Falkonry

Microsoft Azure

Open source culture



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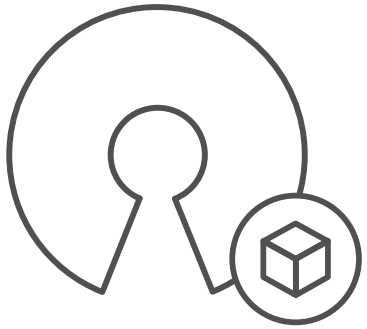
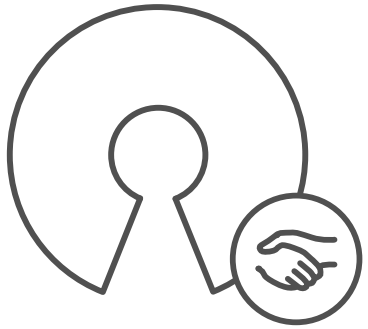
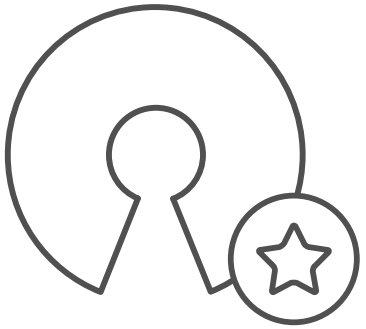
Community culture



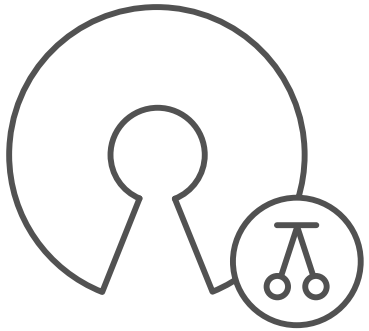
Open source container code contributions



Numerous open source project builds



Open source community leadership

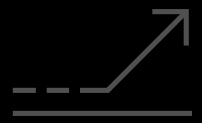


Ongoing partner and customer growth

Microsoft Azure

Azure + Open Source Momentum

Azure is a strong platform for Open Source



Linux VMs are growing at ~2 times Windows VMs today

GitHub

Microsoft announced GitHub acquisition

1 in 3 VMs on Azure are Linux

~60% of 3rd party Azure Marketplace images are open source

suse

CLOUD FOUNDRY

docker

Pivotal

Partnerships

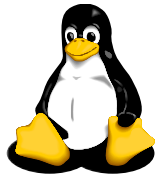
"Microsoft Joins Cloud Native Computing Foundation as Platinum Member"

Microsoft Azure

Microsoft leads open source communities

Two members of the Kubernetes steering committee

Member of the technical board of the Cloud Native Compute Foundation



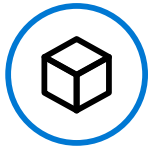
Board member of the Linux Foundation

Several leads or co-leads of Kubernetes SIGs (special interest groups)

Microsoft Azure

Microsoft contributes open source containers

#2 overall individual contributor to Kubernetes (Brendan Burns)



#4 overall individual contributor to Docker (John Howard)

#1-3 overall individual contributors to Helm

70 Microsoft employees have made contributions to Kubernetes

Microsoft Azure

Microsoft builds open source projects

Helm – The de-facto package manager for kubernetes (https://helm.sh), Top level CNCF project

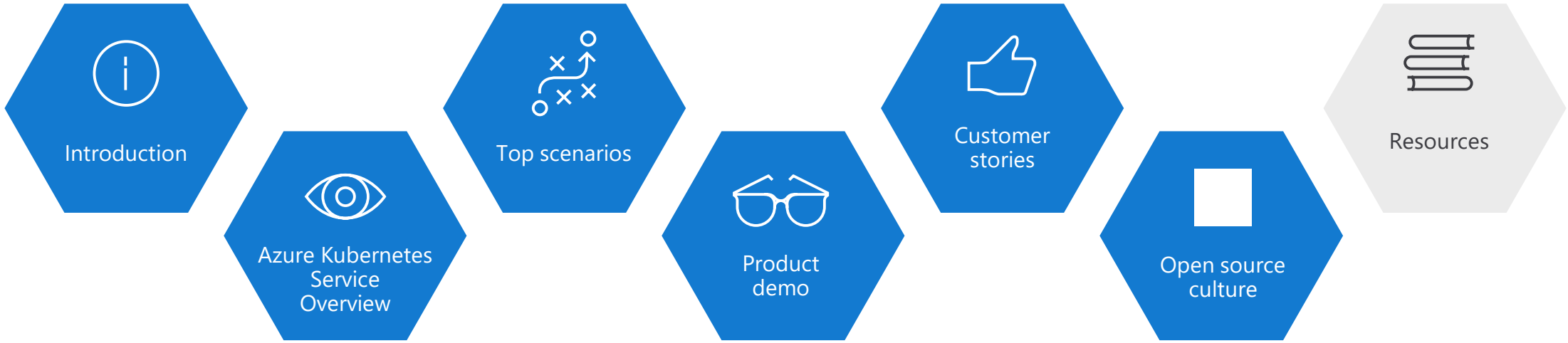
Draft – A rapid-development environment for new kubernetes developers (https://draft.sh)

Brigade – Easy to use javascript based workflow definition for kubernetes (https://brigade.sh)

Kubernetes + VS-Code (https://github.com/Azure/vscode-kubernetes-tools)

Microsoft Azure

Open source culture



Microsoft Azure

Check out resources

Azure Kubernetes Service (AKS)

https://azure.microsoft.com/en-us/services/kubernetes-service/

Containers on Azure pitch deck

https://aka.ms/containerstdmdeck

Smart Hotel 360 Demo

https://aka.ms/containerstdmdeck

Documentation resources

https://docs.microsoft.com/en-us/azure/aks/

Ebook for distributed systems

https://azure.microsoft.com/en-us/resources/designing-distributed-systems/

Distributed system HoL

https://github.com/brendandburns/designing-distributed-systems-labs

AKS HoL

https://aka.ms/aks360hol

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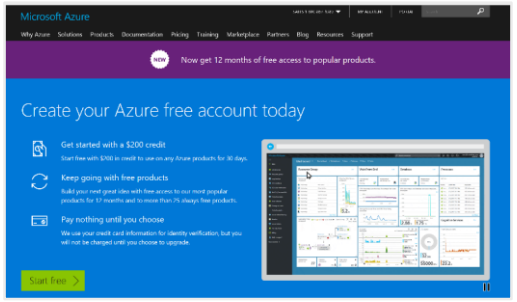
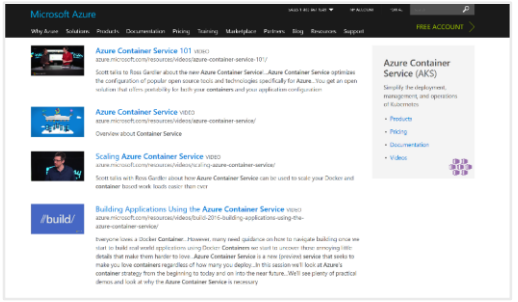


Check out the Azure container videos page



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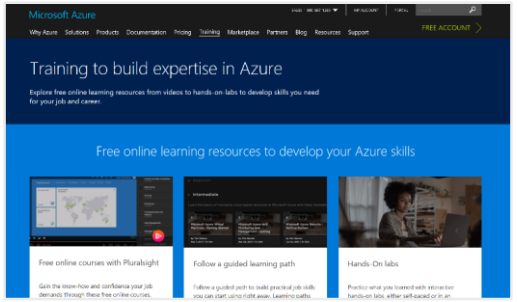
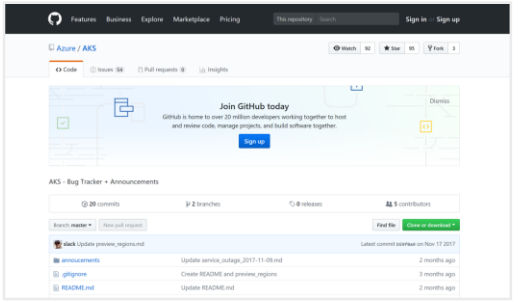


Get the code from GitHub



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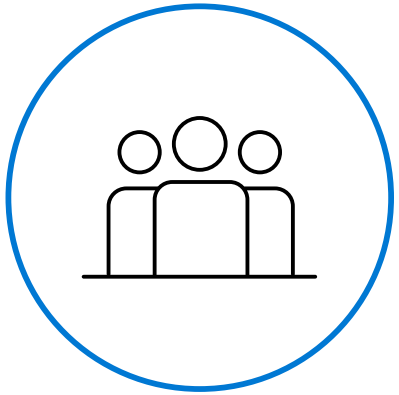

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PM: Jason Hansen

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