

Elevator Pitch

Let's see, you can run containers in these Azure services: App Service, Functions, ACI, ACA, and AKS. So which one should you use? In this session, we try to find what workload type best runs in each service, and see how to move to a different service if you outgrow the current one.

Description

Let's see, you can run containers in these Azure services: App Service, Functions, Container Instances (ACI), Container Apps (ACA), and Azure Kubernetes Service (AKS). So which one should you use? Like tools in a toolbox, each service can run different workload types. In this session, we try to find what workload type best runs in each service, and see how to move to a different service if you outgrow the current one.



Containers on Azure Why so many choices?



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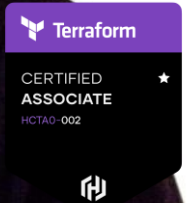
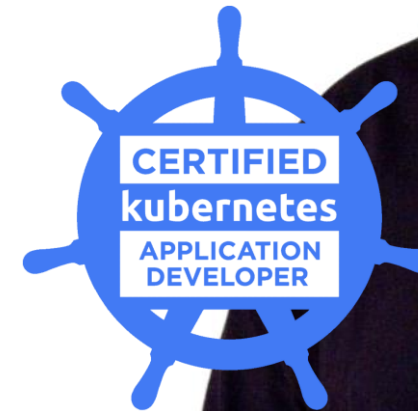
Agenda

- Why containers?
- Look at the Azure services that can run containers
- Look at the use cases / workloads
- Conclusion



Who am I?

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Why Containers?



What is a container?

A unit of software/deployment

Code

Runtime

System
tools

System
libraries



Containers = Kubernetes



Containers on Azure





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AI + machine learning

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Databases

DevOps

Developer tools

Hybrid + multicloud

Identity

Integration

Internet of Things

Management and governance

Media

Containers

Develop and manage your containerized applications faster with integrated tools



Azure Kubernetes Service (AKS)

Deploy and scale containers on managed Kubernetes



Azure Red Hat OpenShift

Deploy and scale containers on managed Red Hat OpenShift



Azure Container Apps

Build and deploy modern apps and microservices using serverless containers



Azure Functions

Execute event-driven serverless code functions with an end-to-end development experience



Web App for Containers

Run containerized web apps on Windows and Linux



Azure Container Instances

Launch containers with hypervisor isolation



Azure Service Fabric

Deploy and operate always-on, scalable, distributed apps



Azure Container Registry

Build, store, secure, and replicate container images and artifacts

Chat with Sales



Containers

Develop and manage your containerized applications faster with integrated tools



Azure Kubernetes Service (AKS)

Deploy and scale containers on managed Kubernetes



Azure Red Hat OpenShift

Deploy and scale containers on managed Red Hat OpenShift



Azure Container Apps

Build and deploy modern apps and microservices using serverless containers



Azure Functions

Execute event-driven serverless code functions with an end-to-end development experience



Web App for Containers

Run containerized web apps on Windows and Linux



Azure Container Instances

Launch containers with hypervisor isolation

Why so many choices?



Azure Container Registry

Build, store, and replicate container images and artifacts



The right tool for the right job



Azure Container Registry



What are Container Registries?

- Central repositories for container images
- Private or/or public
- Docker Hub
 - hub.docker.com
- Microsoft
 - Azure Container Registry
 - Microsoft Container Registry (public images)
 - mcr.microsoft.com
- Elsewhere
 - Amazon Elastic Container Registry
 - Google Container Registry



Azure Container Registry

- Private or public (Premium) registries
- Your images are stored near the services that will run them
 - No hop over the Internet
- You can secure access using Azure AD, RBAC roles, policies
- You can also store Helm charts
- Task base compute for building containers
 - Linux, Windows, and ARM
 - Triggers: public or private Git repository in GitHub or Azure DevOps



What use cases?



Container Registry - Use Cases

Private

Near the
compute
ressources

Security

Build



Azure App Service



App Service



=



Web Apps



Web Apps
For Containers



App Service Benefits

- Windows or Linux
- Automatic OS patching
- High availability
- Automated scale out/in
- Built-in load balancing
- Compliances: ISO, SOC, PCI, etc



Web App for Containers

- All App Service benefits plus...
- Integration with
 - Docker Hub, Azure Container Registry
 - Azure Storage, Key Vault
- Single Docker image
- Multi containers
 - Docker compose
- Windows containers
 - Install drivers, tools, COM objects



What workload?



App Service - Workloads

Small
Web App

API



Azure Functions



Azure Functions

- Event driven apps
- Consumption (serverless)
 - Code
- App Service Elastic Premium plans
 - Code & containers
 - Avoid cold starts with warm instances
 - Virtual network connectivity
 - Unlimited execution duration, with 60 minutes guaranteed



Azure Functions

- Instead of deploying your compiled code, you package it in a container
- The base image must include the Functions runtime
- Can run in Kubernetes
 - KEDA must be installed in the cluster
 - Supported triggers in KEDA
 - Azure Storage Queues
 - Azure Service Bus Queues
 - Azure Event / IoT Hubs
 - Apache Kafka
 - RabbitMQ Queue



What workload?



Azure Functions - Workloads

Blocked by
something with
Code Functions

Run Functions
in Kubernetes



Service Fabric



Service Fabric

- Orchestrate microservices and containers
- Windows and Linux
- Stateless and stateful services
- Application platform
- Powers many Microsoft services



What workload?



Service Fabric - Workloads

Legacy



Azure Container Instances



Azure Container Instances

- Per-second billing
- Linux and Windows
- Created and destroyed on demand
- Fast startup time
- Public IP and DNS name
- Supports virtual networks & persistent storage

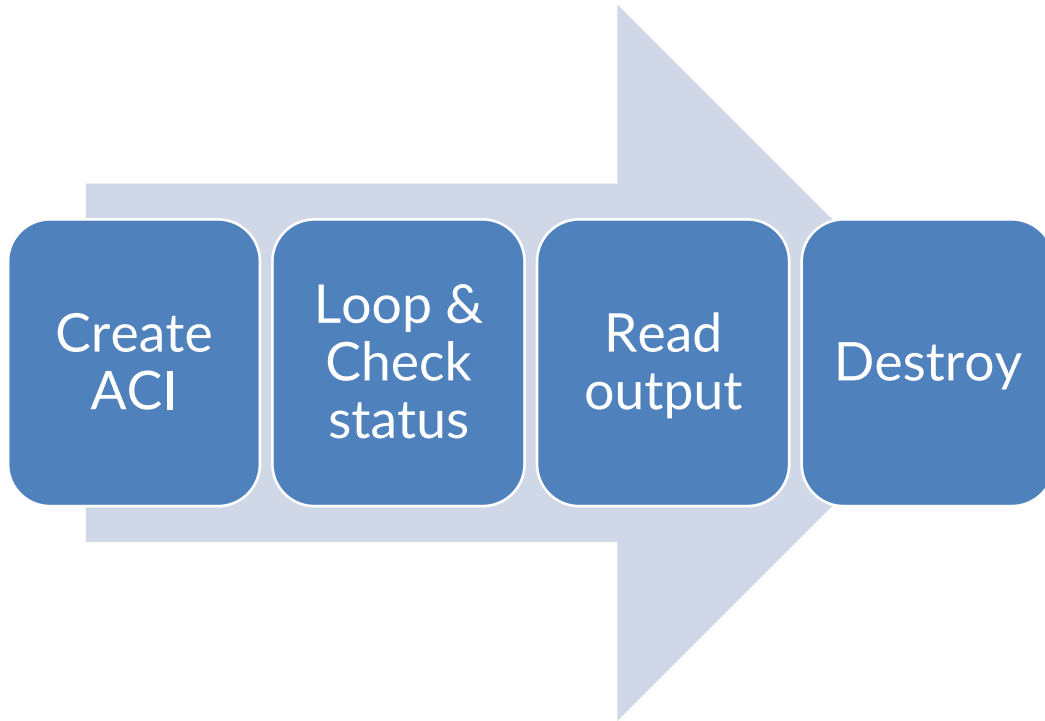


Azure Container Instances

- Save costs in hosting & maintenance for temporary workloads
- Can act as Kubernetes pods to provide elastic bursting
- Can be created using
 - Azure Portal
 - Docker CLI
 - C# code
 - Logic Apps



Logic Apps



A screenshot of the 'Create container group' form in the Azure portal. The form is titled 'Create container group' and includes a 'Recurrence' section at the top. The form fields are as follows:

- * Subscription Id:** Visual Studio Enterprise
- * Resource Group:** myResourceGroup
- * Container Group Name:** mycontainergroup
- * Location:** westus
- * containers Container Name - 1:** mycontainer
- * containers Container Image - 1:** mcr.microsoft.com/azuredocs/aci-helloworld
- * containers CPU Request - 1:** 1
- * containers Memory Request - 1:** 1.5

The form also includes a 'Recurrence' section at the top with a '+' icon and a 'Create container group' button at the bottom right.



C#

```
using Microsoft.Azure.Management.ContainerInstance.Fluent;
using Microsoft.Azure.Management.ContainerInstance.Fluent.Models;
using Microsoft.Azure.Management.Fluent;

IContainerGroup containerGroup = azure.ContainerGroups.Define(aciName)
    .WithRegion(region)
    .WithNewResourceGroup(rgName)
    .WithLinux()
    .WithPublicImageRegistryOnly()
    .WithoutVolume()
    .DefineContainerInstance(aciName + "-1")
        .WithImage(containerImageName1)
        .WithExternalTcpPort(80)
        .WithCpuCoreCount(.5)
        .WithMemorySizeInGB(1)
        .Attach()
    .WithRestartPolicy(ContainerGroupRestartPolicy.Never)
    .WithDnsPrefix(aciName)
    .Create();

SdkContext.DelayProvider.Delay(20000);
containerGroup = azure.ContainerGroups.GetByResourceGroup(rgName, aciName);
string logContent = containerGroup.GetLogContent(aciName + "-1");
Utilities.Log($"Logs for container instance: {aciName}-1\n{logContent}");

azure.ContainerGroups.DeleteById(containerGroup.Id);
```



Kubernetes Virtual Nodes

Create Kubernetes cluster

+ Add node pool 🗑 Delete

Name	Mode	OS type	Node count	Node size
<input type="checkbox"/> agentpool	System	Linux	1-5	Standard_DS2_v2

Enable virtual nodes

Virtual nodes allow burstable scaling backed by serverless Azure Container Instances. [Learn more about virtual nodes](#)

Enable virtual nodes ⓘ

☐

Node pool OS disk encryption

By default, all disks in AKS are encrypted at rest with Microsoft-managed keys. For additional control over encryption, you can

```
kubectl get nodes
```

NAME	STATUS	ROLES	AGE	VERSION
virtual-node-aci-linux	Ready	agent	28m	v1.11.2
aks-agentpool-14693408-0	Ready	agent	32m	v1.11.2

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: aci-helloworld
spec:
  replicas: 1
  selector:
    matchLabels:
      app: aci-helloworld
  template:
    metadata:
      labels:
        app: aci-helloworld
    spec:
      containers:
        - name: aci-helloworld
          image: aci-helloworld
          ports:
            - containerPort: 80
      nodeSelector:
        kubernetes.io/role: agent
        beta.kubernetes.io/os: linux
        type: virtual-kubelet
      tolerations:
        - key: virtual-kubelet.io/provider
          operator: Exists
```



What workload?



Container Instances - Workloads

Task
automation

Agents

Small-scale
batch
processing

Bursting out



Azure Container Apps



Container Apps

- Serverless container platform powered by Kubernetes
 - General availability in June 2022
- Optimized for running general purpose containers
- Supports Kubernetes-style apps and microservices
- Enables event-driven application architectures
- Scale based on traffic including background tasks
- Support of long running tasks

So it's a serverless
Kubernetes service?



Container Apps - Features

- HTTP, HTTPS, WebSocket, gRPC
- Visibility
 - External or internal only
- Auto scaling
 - Scaling to zero incur no charges
 - Supports Keda event-driven autoscaling
- Multi containers
 - While the multi container pod pattern is supported, the preferred method is to deploy containers individually
- Health Probes



Container Apps - Features

- Linux-based x86-64 (linux/amd64) container image only
- Revisions
 - Traffic split
- Secrets
- Darp integration
- Support for Managed Identities
- Easy Auth
- Publish revision using GitHub Actions



What workload?



Container Apps - Workloads

Web Apps

- HTTP/S
- Scaling by concurrent HTTP requests

API Apps

- WebSocket, gRPC
- Scaling by CPU or memory load

Background Processes

- Continuously running
- Scaling by CPU or memory load

Event-Driven Processes

- Continuously running
- Event-driven scaling
- Scaling by Keda scalers



Azure Batch



Azure Batch

- Runs large-scale parallel and high-performance computing (HPC) batch jobs
 - Creates and manages a pool of compute nodes
 - Installs applications
 - Schedule jobs
- Tasks can be Docker-compatible containers



What workload?



Azure Batch - Workloads

Large-scale
batch jobs

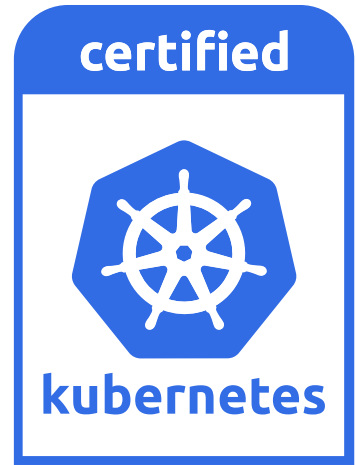


Azure Kubernetes Service






























Azure Kubernetes Service

- Kubernetes as a service
- CNCF certified as Kubernetes conformant
- Not a hacked version
- Spin a cluster in a few minutes
- Azure takes care of the control-plane (master node)
- You pay for the nodes
 - Linux or Windows



Use what you want

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



What workload?



AKS - Workloads

Manage many
containers

Leverage K8s
skillset

Use K8s native
tools

Active
Directory
integration

Integration
with other
Azure services

Corporate
features &
integration



RedHat OpenShift



RedHat OpenShift

- OpenShift is an Enterprise-ready Kubernetes container platform
- OpenShift extends Kubernetes
 - Provides added-value features to complement Kubernetes
- Managed OpenShift clusters
- Jointly engineered, operated, and supported by Red Hat and Microsoft



What workload?



OpenShift - Workloads

Complete
Solution

Support



Demo



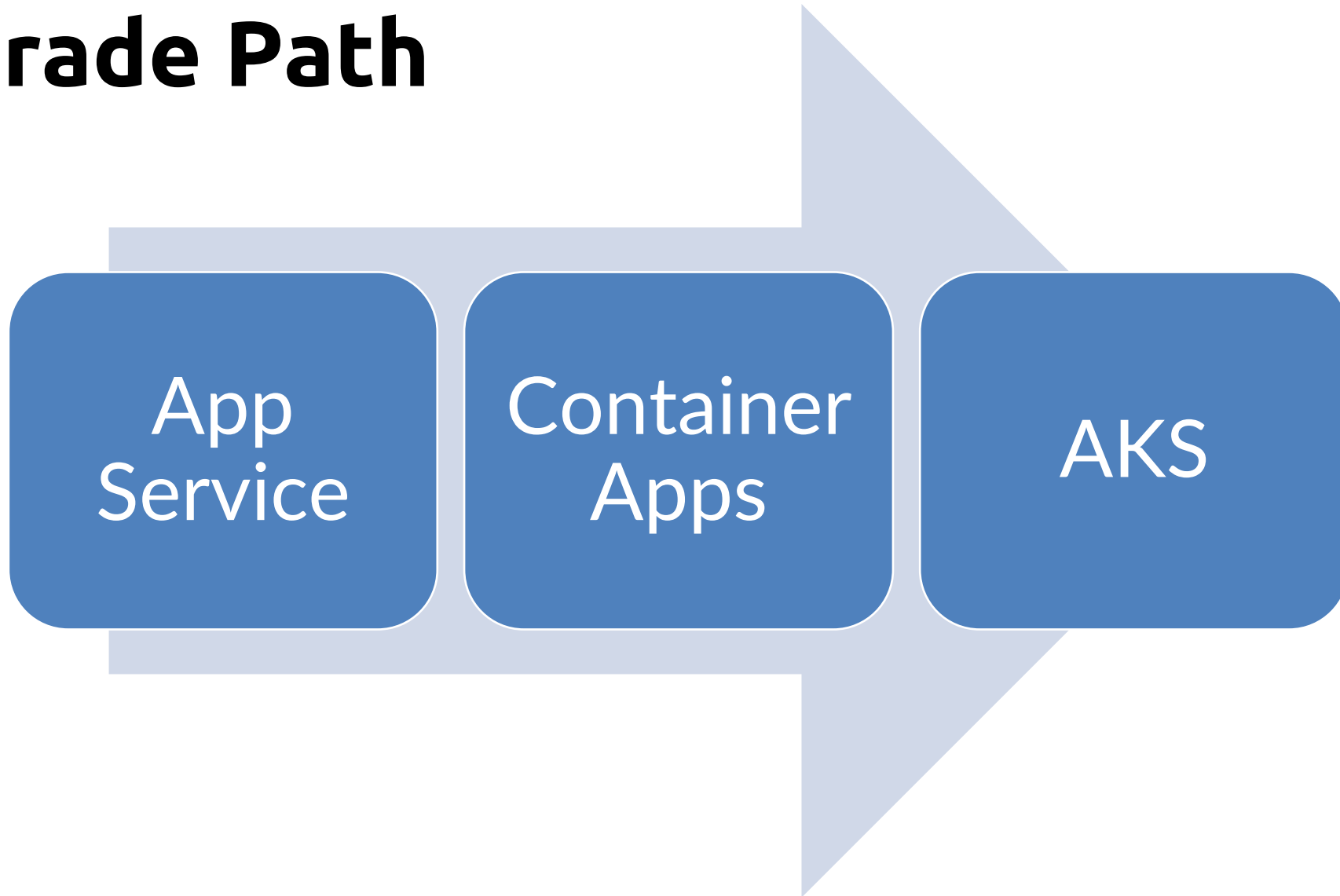
Conclusion



The right tool for the right job



Upgrade Path



END OF LINE ■

Thank You!

