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base it

ACP IT for innovators.

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Azure Container Apps

Stefan Baresch

Experts Live Austria

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für Azure Core & Security
@Microsoft

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The benefits of using containers

Agility
+
Ship apps faster

Portability
+
Easily move workloads

Density
+
Achieve resource efficiency and cost-savings

Rapid scale
+
Scale easily to meet demand

Anywhere

On-premises

Cloud

Any app

Monolith

Microservice

Any language

Java

Python

.NET

Node

QUIZ: How many container solutions are available on Azure?

- 3
- 5
- 8
- 10
- 12

Containers on Azure

Azure App Service

Deploy web apps or APIs using containers in a PaaS environment

Azure Service Fabric

Modernize .NET applications to microservices using Windows Server containers

Azure Kubernetes Service

Scale and orchestrate Linux and Windows containers using Kubernetes

Azure Container Instance

Elastically burst from your Azure Kubernetes Service (AKS) cluster

Azure Batch

Batch processing as a Service
Large-scale parallel jobs
High-Performance Computing jobs

Azure Functions

Serverless compute service that enables you to run code on-demand or in response to events

Azure IoT Edge

Extend cloud intelligence and analytics to edge devices

Azure Red Hat OpenShift

- 1st Party Service
- Fully Managed
- Jointly Supported by Red Hat & Microsoft

Azure Spring Cloud*

- PaaS
- Fully managed
- Microservices
- Java/Spring Cloud
- Steeltoe .NET
- Enterprise Tier (Preview)

Azure Container Apps

- Serverless containers
- Microservices
- Language agnostic
- Dapr integration
- PaaS
- Fully managed

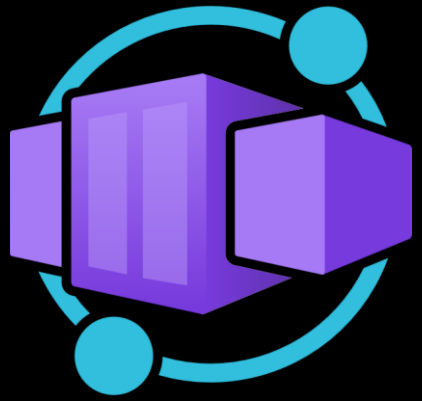
* ASC: Containers are implementation detail, not customer facing


WE USE KUBERNETES NOW
BECAUSE IT SIMPLIFIES OUR OPERATIONS, RIGHT?
IT SIMPLIFIES OUR OPERATIONS, RIGHT?
imgflip.com


You still need to manage the managed Kubernetes !!!
#managedserviceisamyth

Azure Container Apps

Generally Available



Serverless containers for microservices

Build modern apps on open source

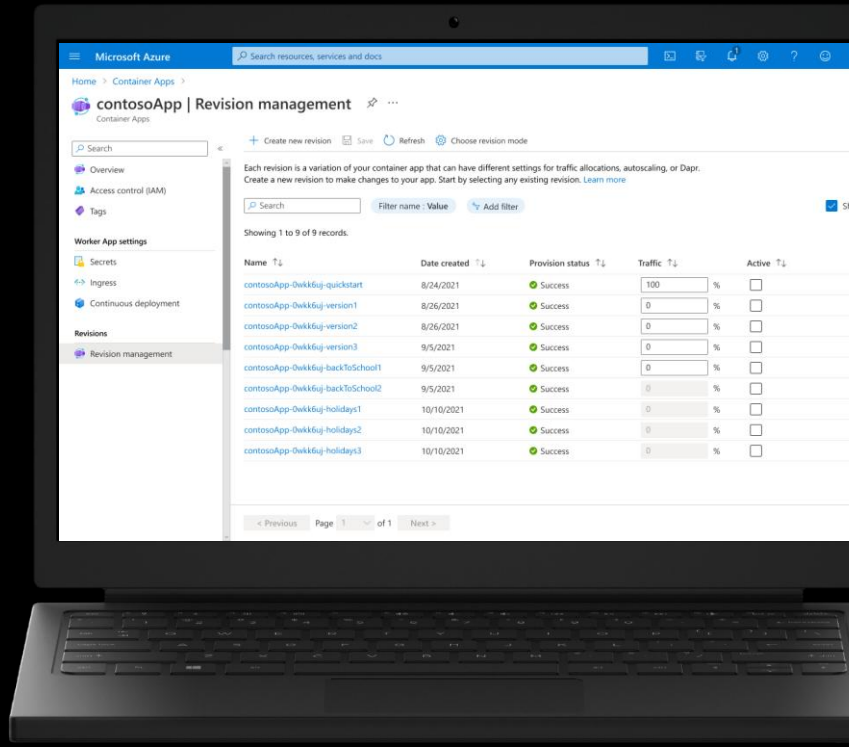
Focus on apps, not infrastructure

Scale dynamically based on events

Kubernetes KEDA dapr DAPR envoy Envoy

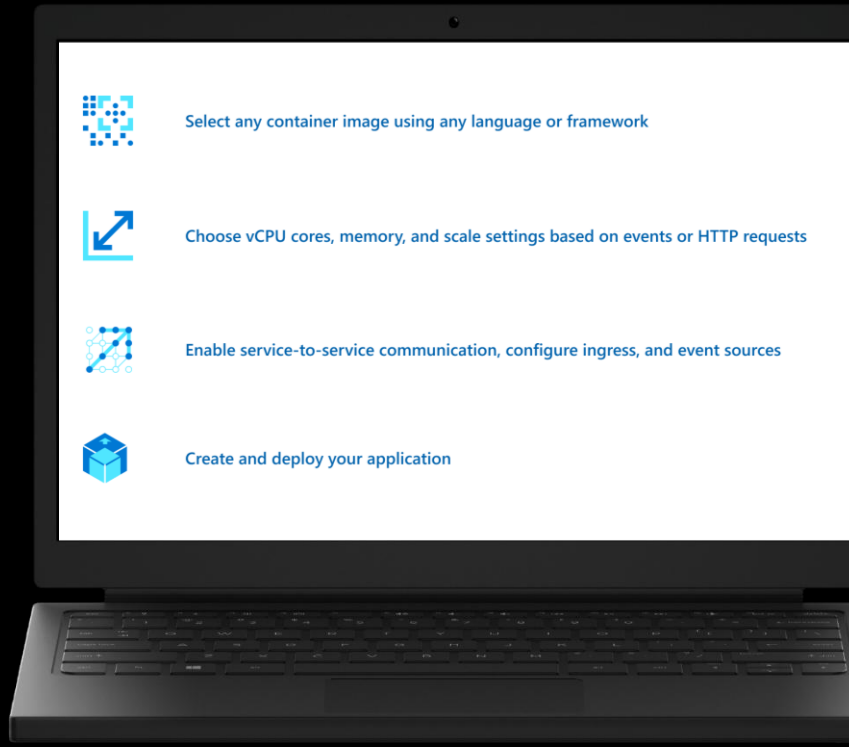
Build modern apps on open-source

- App portability powered by open standards and APIs
- App patterns and best practices encapsulated by products like Dapr
- Service capabilities influenced by OSS contributions
- Benefit from streamlined application lifecycle for upgrades and versioning, traffic shifting, service discovery, and monitoring.



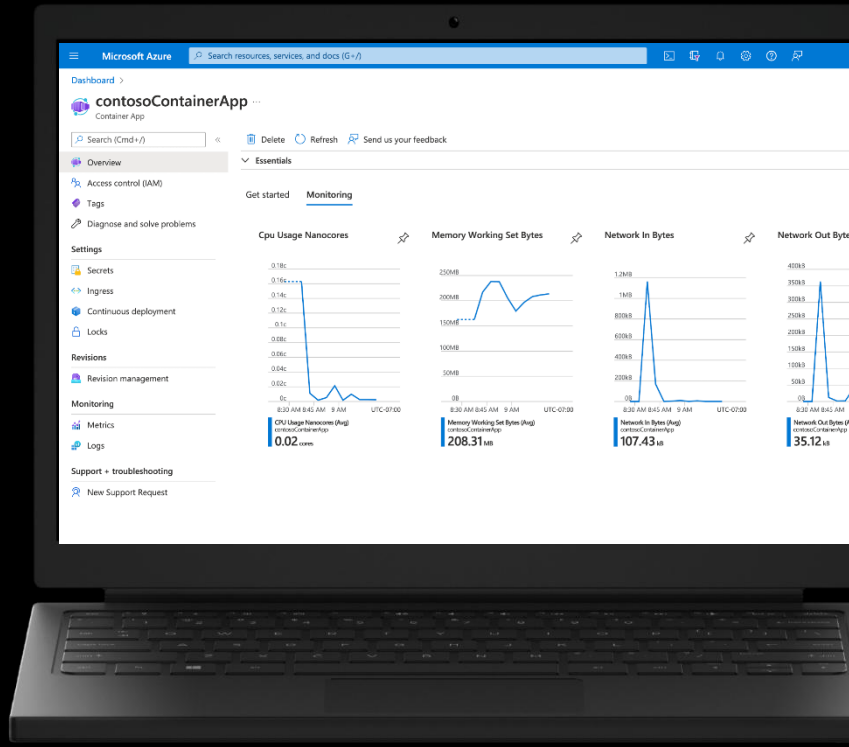
Focus on apps, not infrastructure

- Apps with any development stack, any Linux container image
- No opinionated programming model
- High productivity development experience
- Set up a code-to-cloud pipeline using GitHub Actions.



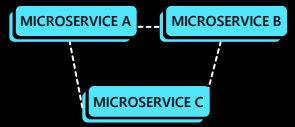
Scale dynamically based on events

- Serverless autoscale based on HTTP requests, KEDA event scale triggers, or CPU and Memory
- Declarative scaling rules eliminate the need to manage complex infrastructure
- Scale to 0 and pay per use by second



What can you build with Azure Container Apps?

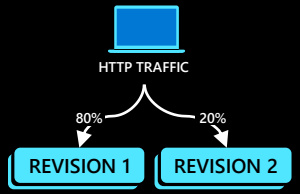
Microservices



Microservices architecture with the option to integrate with Dapr

Individual microservices can scale independently using any KEDA scale triggers

Public API endpoints



E.g., API app with HTTP requests split between two revisions of the app

Scaling is determined by the number of concurrent HTTP requests

Web Apps

E.g., Web app with custom domain, TLS certificates, and integrated authentication

Scaling is determined by the number of concurrent HTTP requests

Event-driven processing

E.g., Queue reader app that processes messages as they arrive in a queue

Scaling is determined by the number of messages in the queue

Background processing

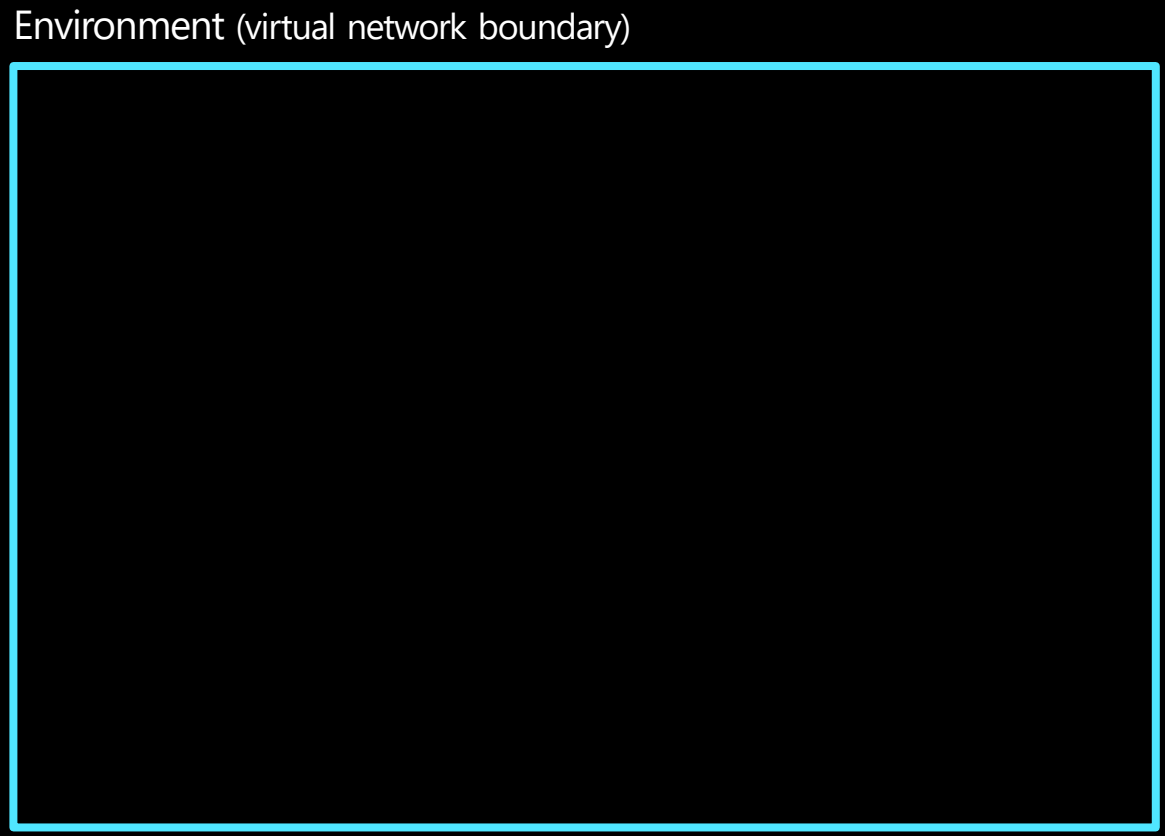
E.g., Continuously running background process transforms data in a database

Scaling is determined by the level of CPU or memory load

AUTO-SCALE CRITERIA

Environments

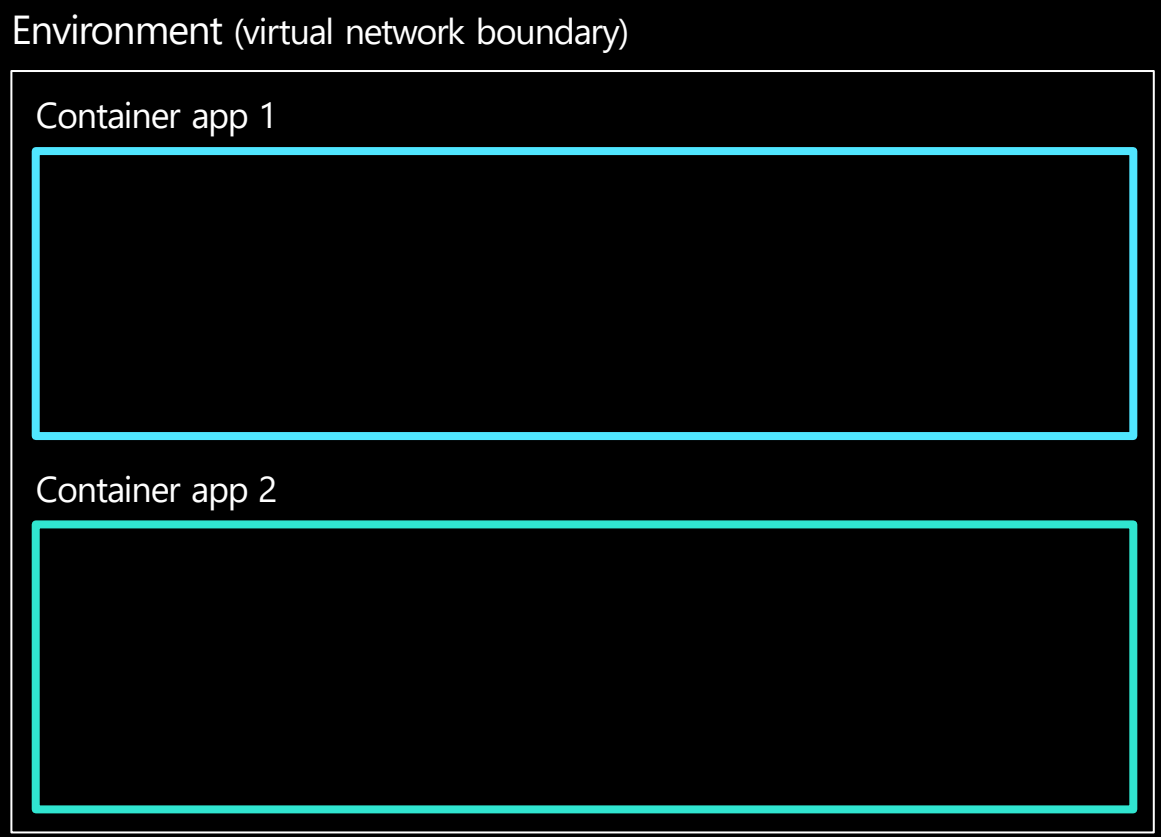
Environments define an isolation and observability boundary around a collection of container apps deployed in the same virtual network



Quota: Limit up to 15 environments per subscription, per region.

Container Apps

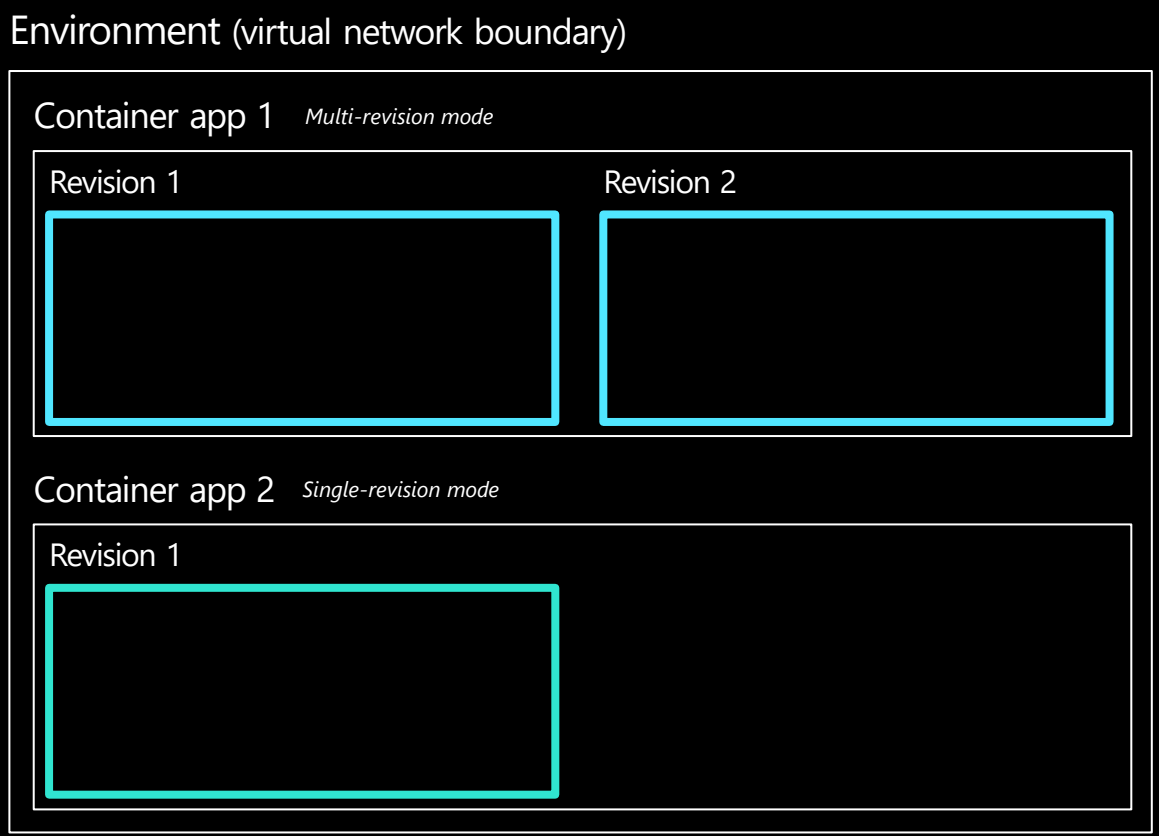
A Container App hosts a single, independent microservice and includes its desired state configuration



Quota: Unlimited per Environment.

Revisions

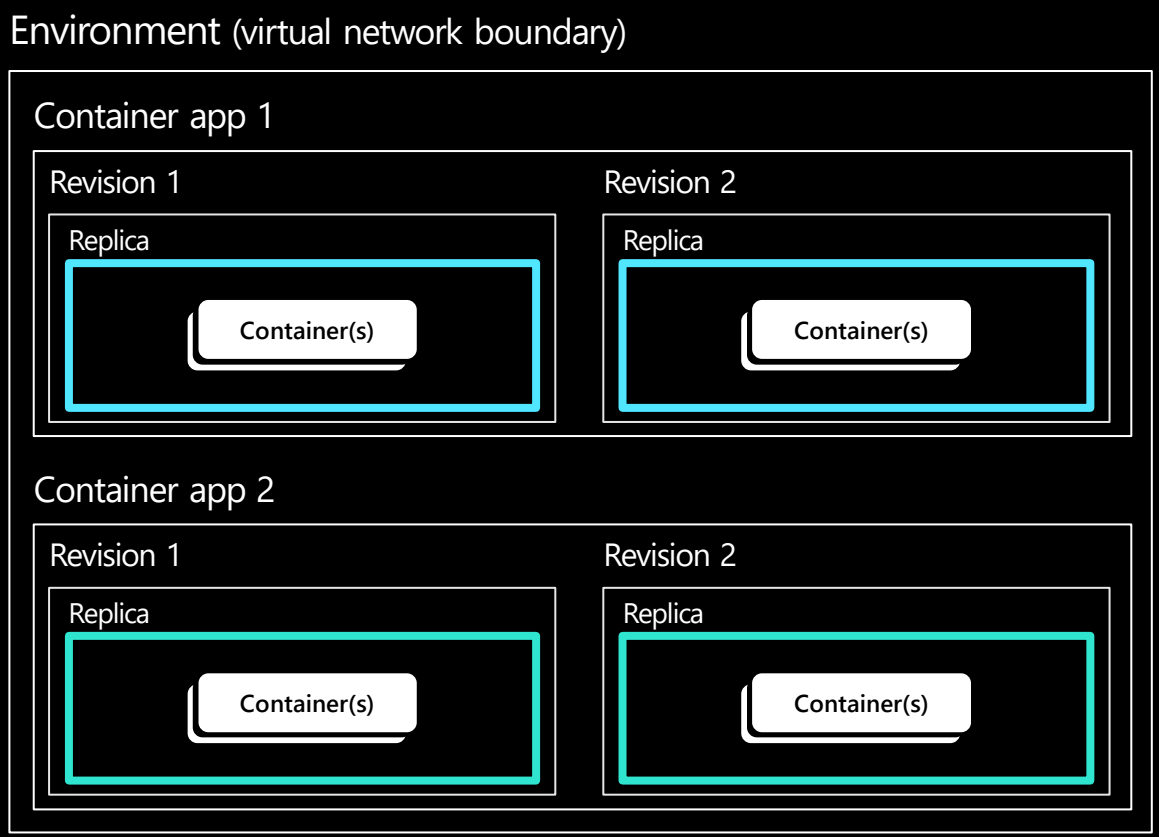
Revisions are immutable version snapshots of a container app



Quota: Up to 100 per Container app.

Replicas

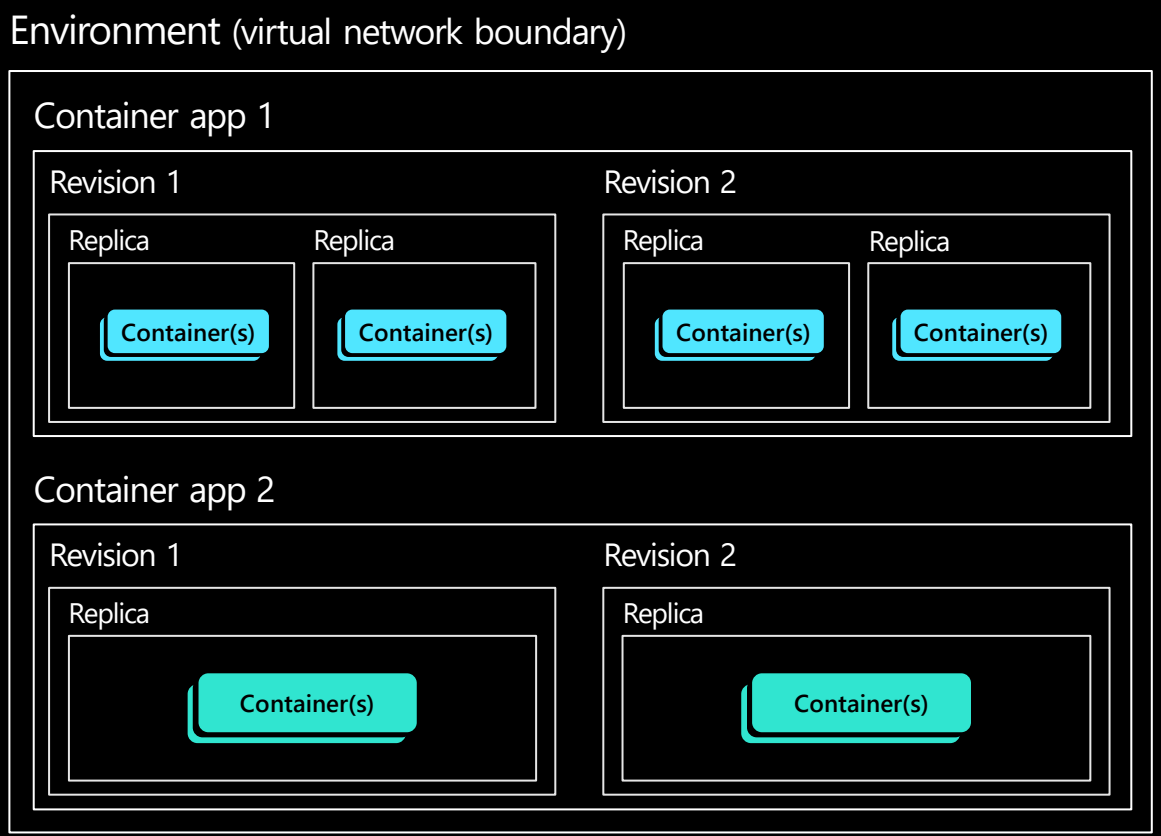
Replicas are the unit of scale in container apps, with the default replica count being 0



Quota: Up to 300 Replicas per Revision.

Containers

Containers in Azure Container Apps can use any development stack of your choice



Quota

[Quotas for Azure Container Apps | Microsoft Learn]

Consumption plan

Feature	Scope	Default	Is Configurable	Remarks
Cores	Replica	2	No	Maximum number of cores available to a revision replica.
Cores	Environment	100	Yes	Maximum number of cores an environment can accommodate. Calculated by the sum of cores requested by each active replica of all revisions in an environment.

Consumption + Dedicated plan structure

Consumption workload profile

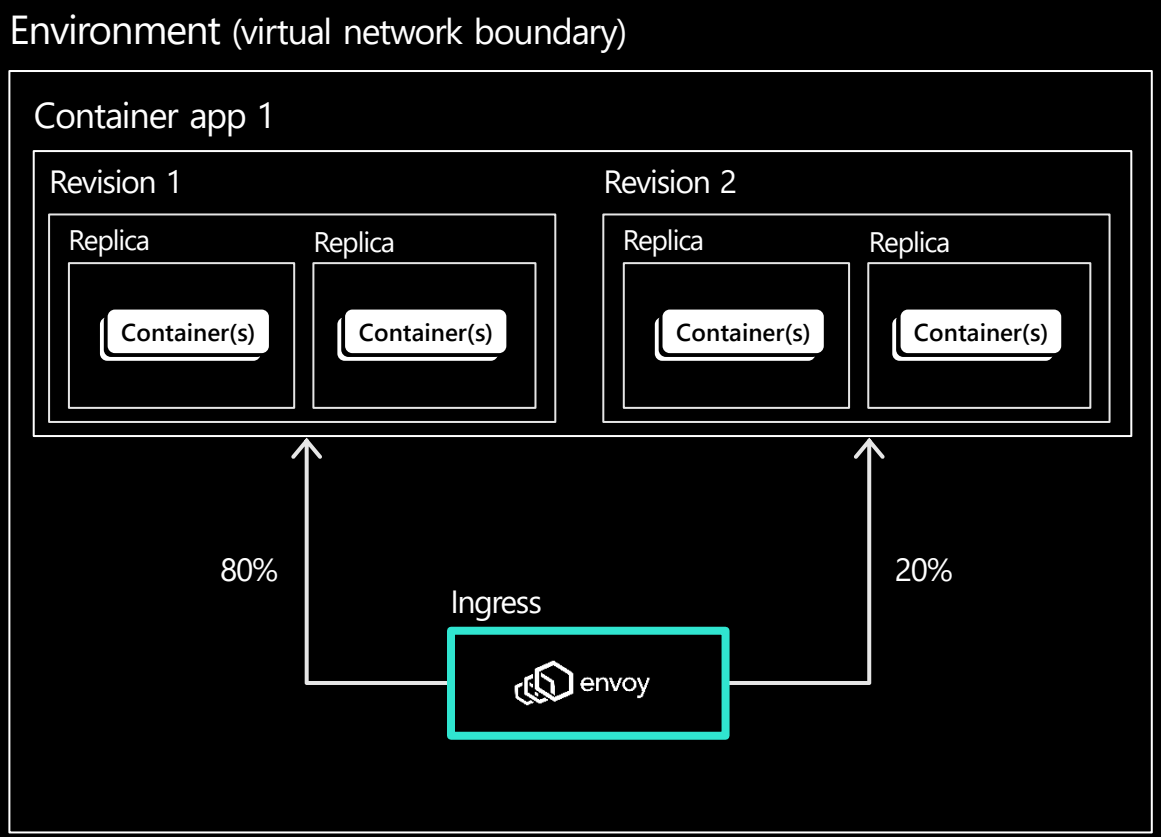
Feature	Scope	Default	Is Configurable	Remarks
Cores	Replica	4	No	Maximum number of cores available to a revision replica.
Cores	Environment	100	Yes	Maximum number of cores the Consumption workload profile in a Consumption + Dedicated plan structure environment can accommodate. Calculated by the sum of cores requested by each active replica of all revisions in an environment.

Dedicated workload profiles

Feature	Scope	Default	Is Configurable	Remarks
Cores	Replica	Up to maximum cores a workload profile supports	No	Maximum number of cores available to a revision replica.
Cores	Environment	100	Yes	Maximum number of cores all Dedicated workload profiles in a Consumption + Dedicated plan structure environment can accommodate. Calculated by the sum of cores available in each node of all workload profile in a Consumption + Dedicated plan structure environment.

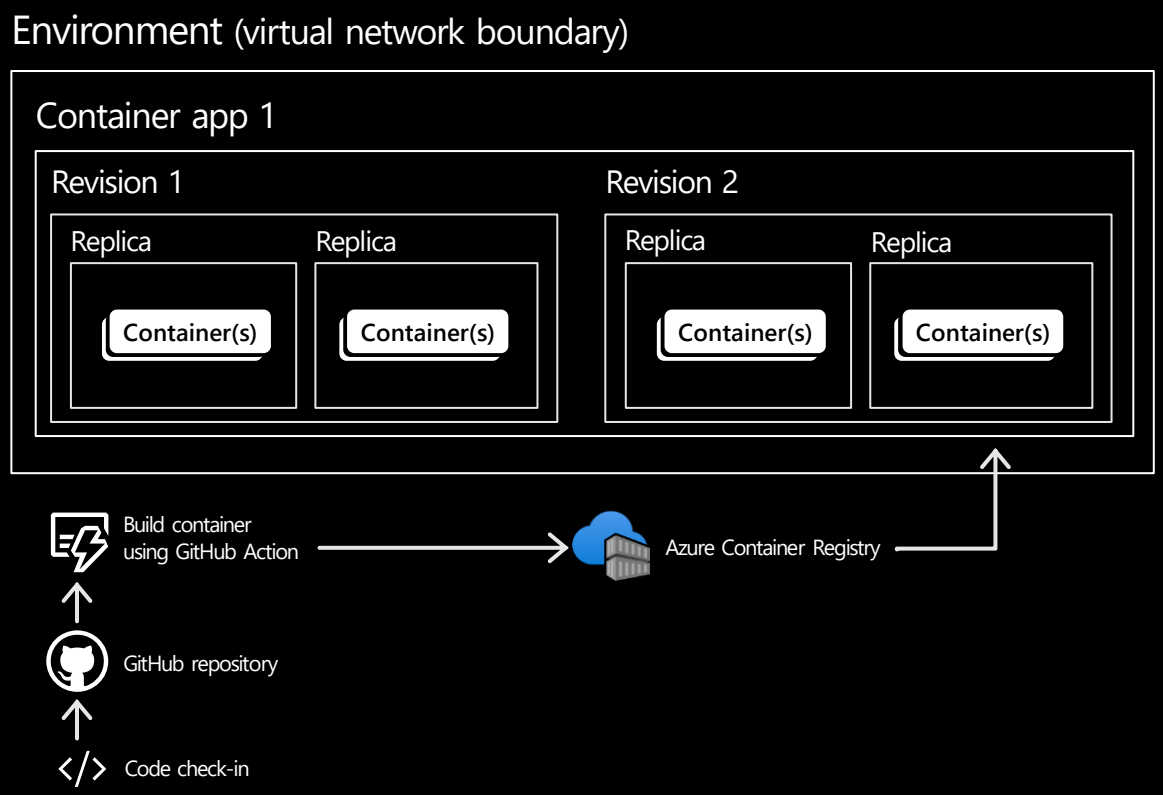
Ingress

Internal or external visibility with TLS termination and support for HTTP/1.1 and HTTP/2



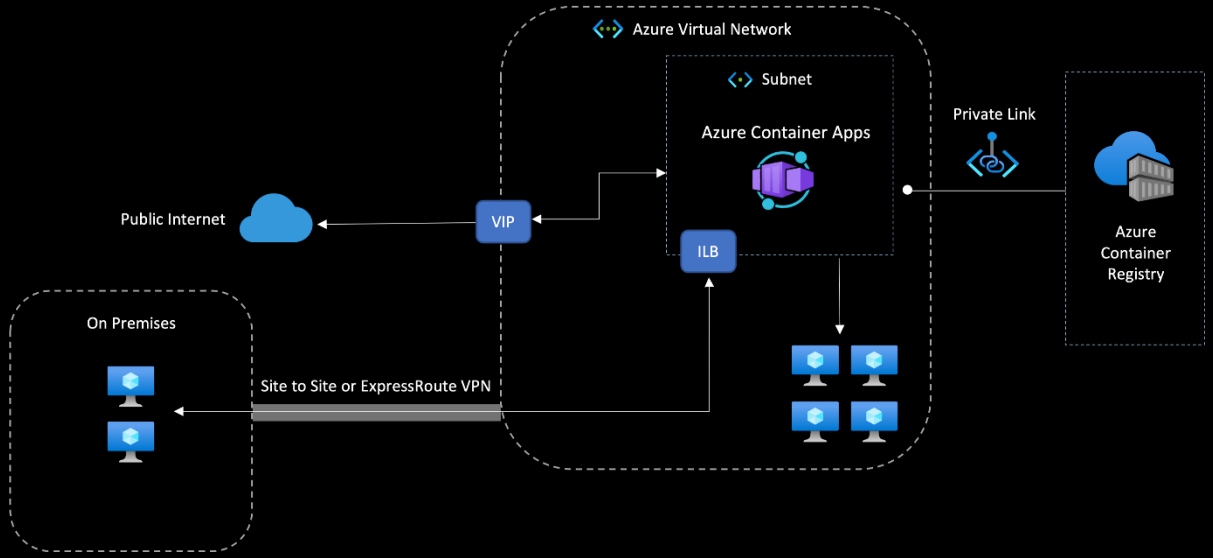
GitHub Actions integration

Publish revisions as commits are pushed to your GitHub repository by triggering a GitHub Action to build a new container image



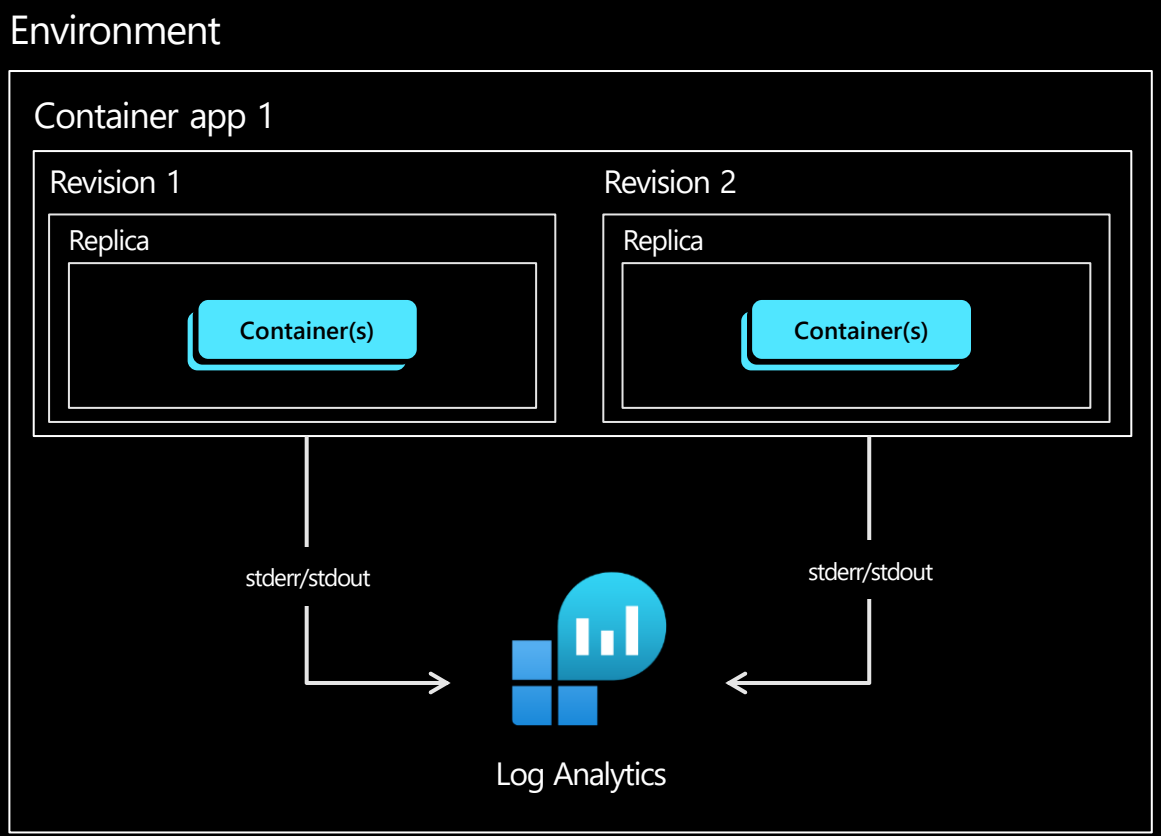
Bring your own Virtual Network

Deploy an environment using a custom virtual network and optionally without a public IP address



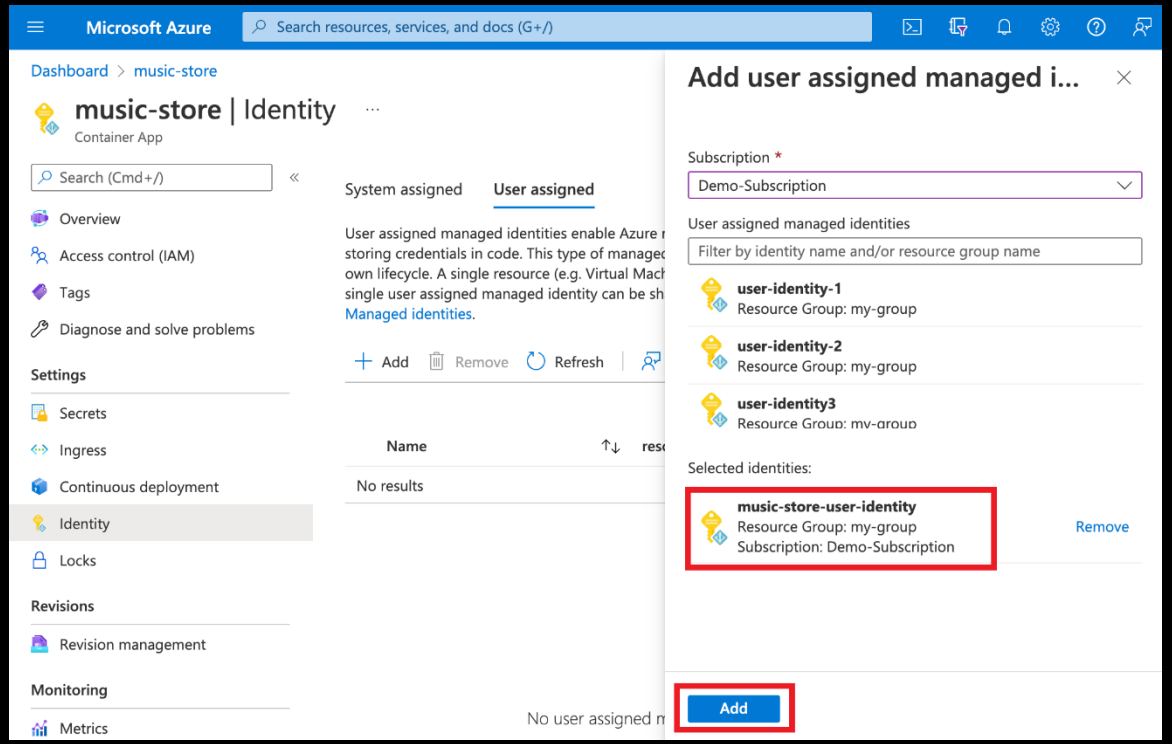
Logging

Containers write logs to standard output or standard error streams surfaced via Log Analytics



Managed identity

Access Azure resources without secrets



Secrets management

Securely store sensitive configuration elements that are then available to containers through environment variables, scale rules, and Dapr

```
"template": {
    "containers": [
        {
            "image": "myregistry/myQueueApp:v1",
            "name": "myQueueApp",
            "env": [
                {
                    "name": "QueueName",
                    "value": "myqueue"
                },
                {
                    "name": "ConnectionString",
                    "secretref": "queue-connection-string"
                }
            ]
        }
    ],
}
```

Scaling and using the Kubernetes Event Driven Autoscaling (KEDA)

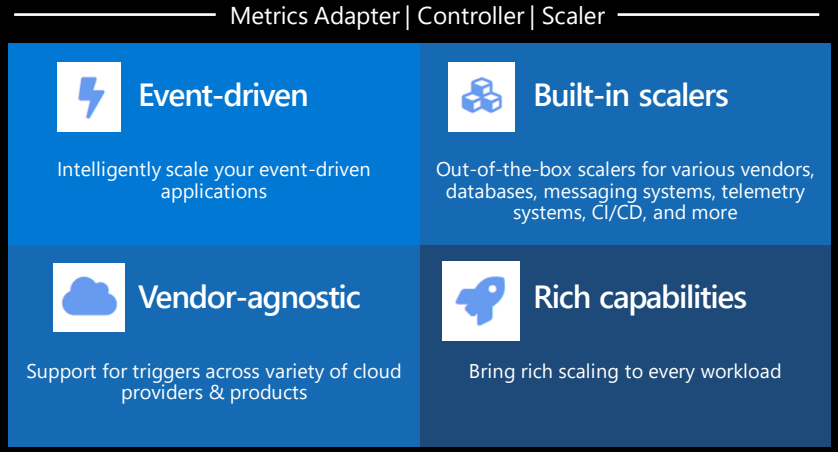
Application autoscaling made simple

Open-source, extensible, and vendor agnostic

KEDA

Kubernetes-based Event Driven Autoscaler

Drive the scaling of any container based on a growing list of 35+ event sources, known as: scalers



keda.sh

CLOUD NATIVE COMPUTING FOUNDATION

Scaling

KEDA

HTTP

```
{
 "name": "http-rule",
  "http": {
   "metadata": {
    "concurrentRequests": 50
   }
  }
}
```

Event-driven

artemis-queue, kafka, aws-cloudwatch, aws-kinesis-stream, aws-sqs-queue, azure-blob, azure-eventhub, azure-servicebus, azure-queue, cron, external, gcp-pubsub, huawei-cloudeye, ibmmq, influxdb, mongodb, mssql, mysql, postgresql, rabbitmq, redis, redis-streams, selenium-grid, solace-event-queue, ..

CPU

```
{
 "name": "cpu-rule",
  "custom": {
   "type": "cpu",
    "metadata": {
     "type": "Utilization",
      "value": "50"
   }
  }
}
```

Memory

```
{
 "name": "mem-rule",
  "custom": {
   "type": "memory",
    "metadata": {
     "type":
"AverageValue",
      "value": "512"
   }
  }
}
```

Support for scale to zero and specifying minimum/maximum replicas

Support for specifying minimum/maximum replicas

Using the Distributed Application Runtime (Dapr)

Microservice development challenges

- How do I **integrate with external systems** that my app has to react and respond to?
- How do I **create event driven apps** which reliably send events from one service to another?
- How do I create **long running, stateful services** that can recover from failures?
- How do I observe the calls and events between my services to **diagnose issues in production**?
- How do I **discover other services** and call methods on them?
- How do I **secure communication** between services?
- How do I **prevent committing to a technology** early and have the flexibility to swap out an alternative based on project or environment changes?


Service 1
Service 2
Service 3


Service 1
Service 2
Service 3

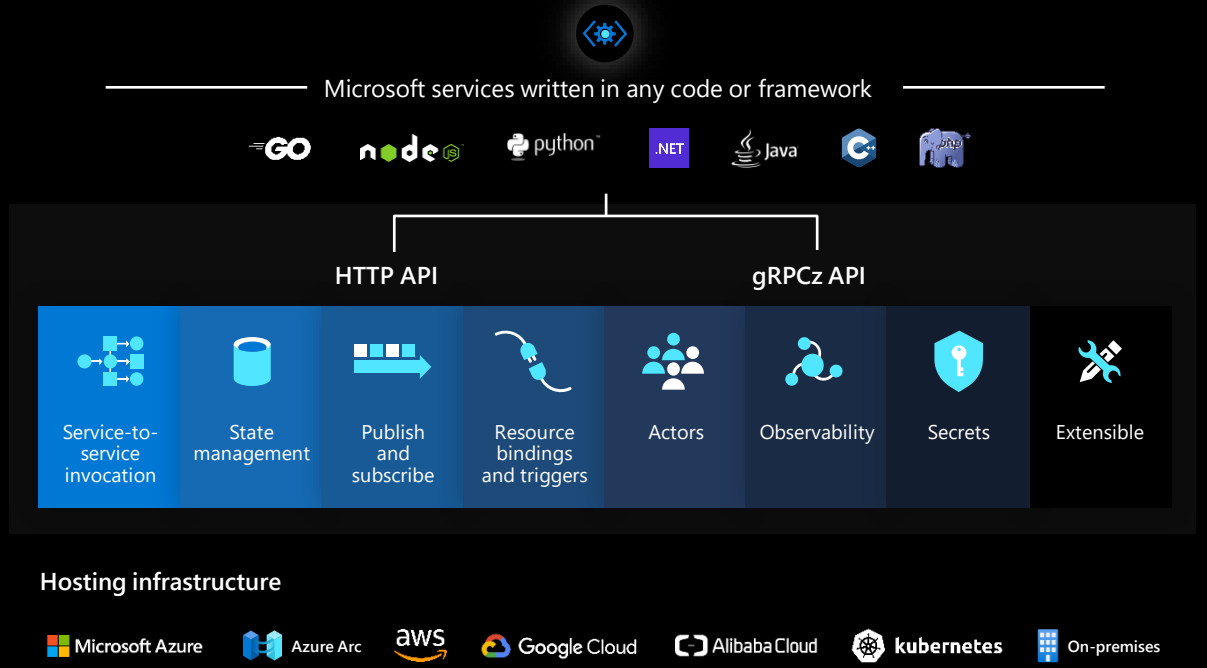
Microservices using any language or framework

Any cloud or edge infrastructure

dapr

Distributed Application Runtime

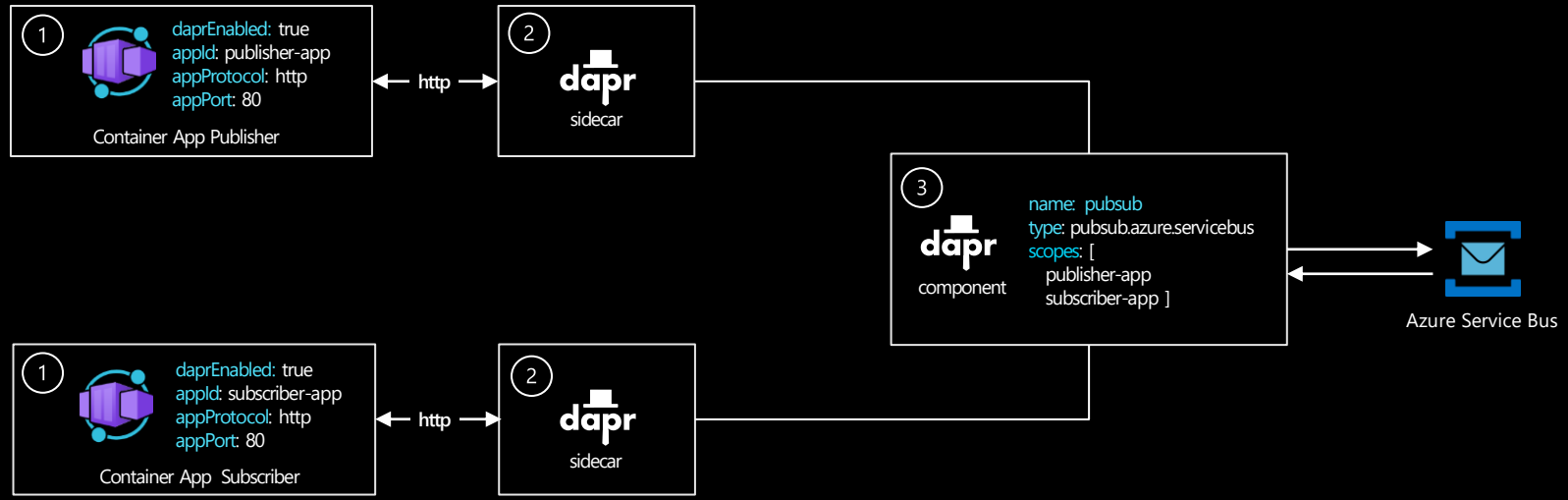
Portable, event-driven, runtime for building distributed applications across cloud and edge



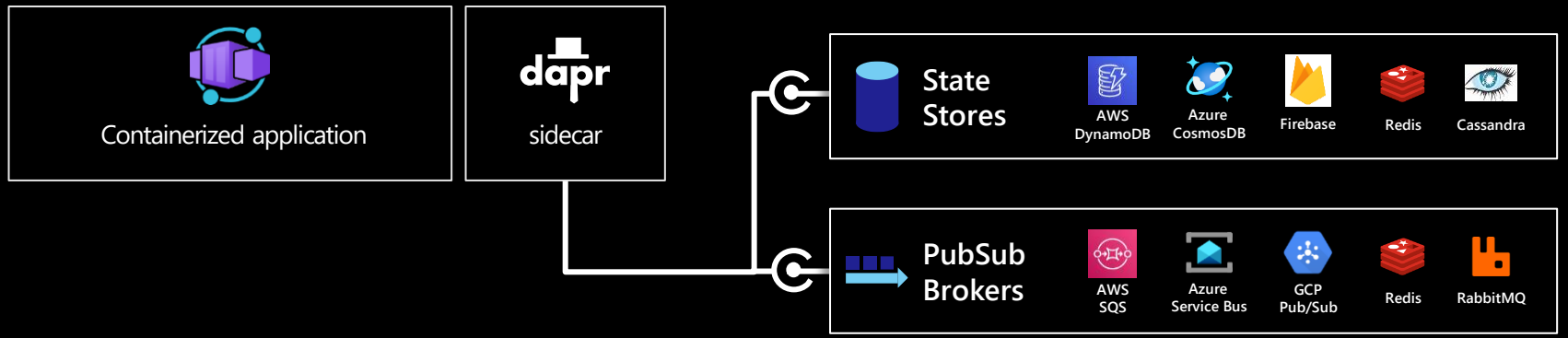
dapr.io

CLOUD NATIVE COMPUTING FOUNDATION

Fully managed Dapr APIs



Dapr components



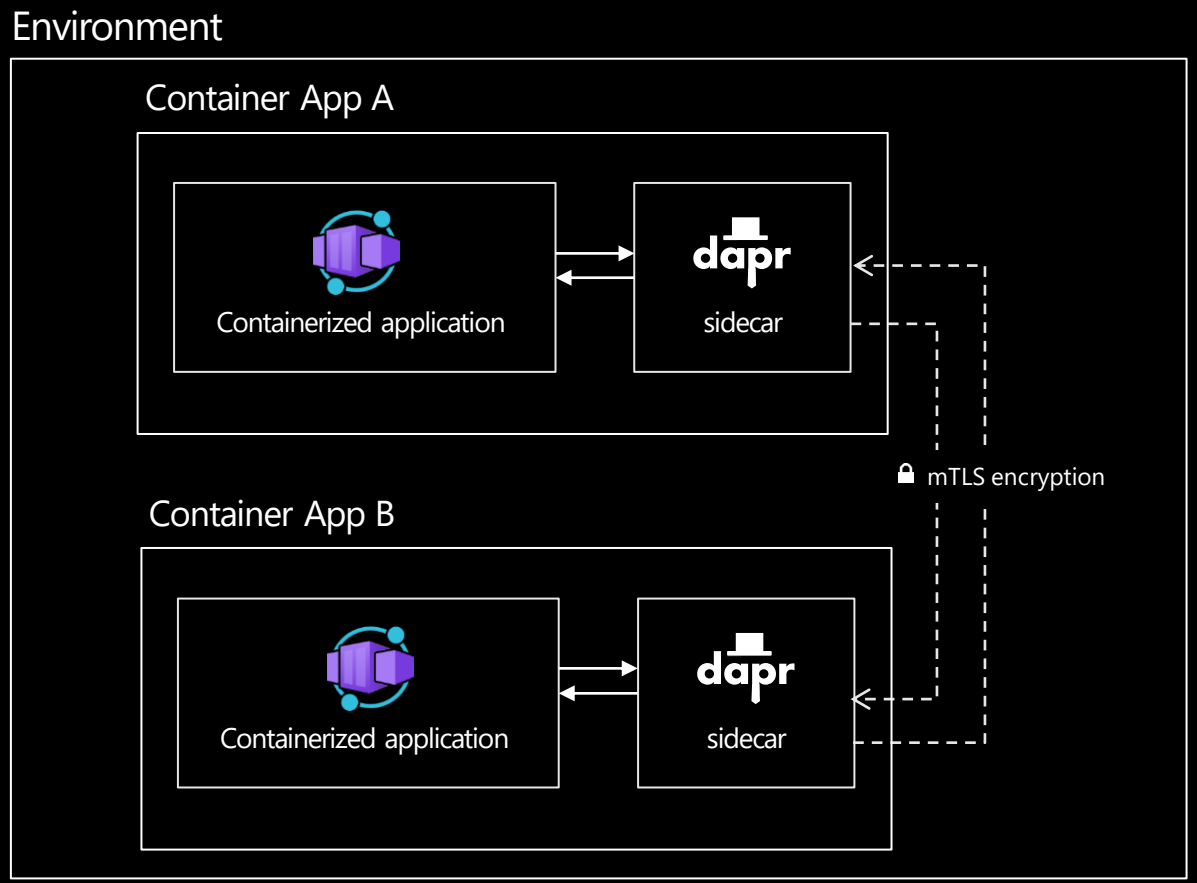
Specific implementations of a given building block

Pluggable, with over 70+ components available

Remove the need for instrumenting your business logic with plumbing code

Service to service invocation

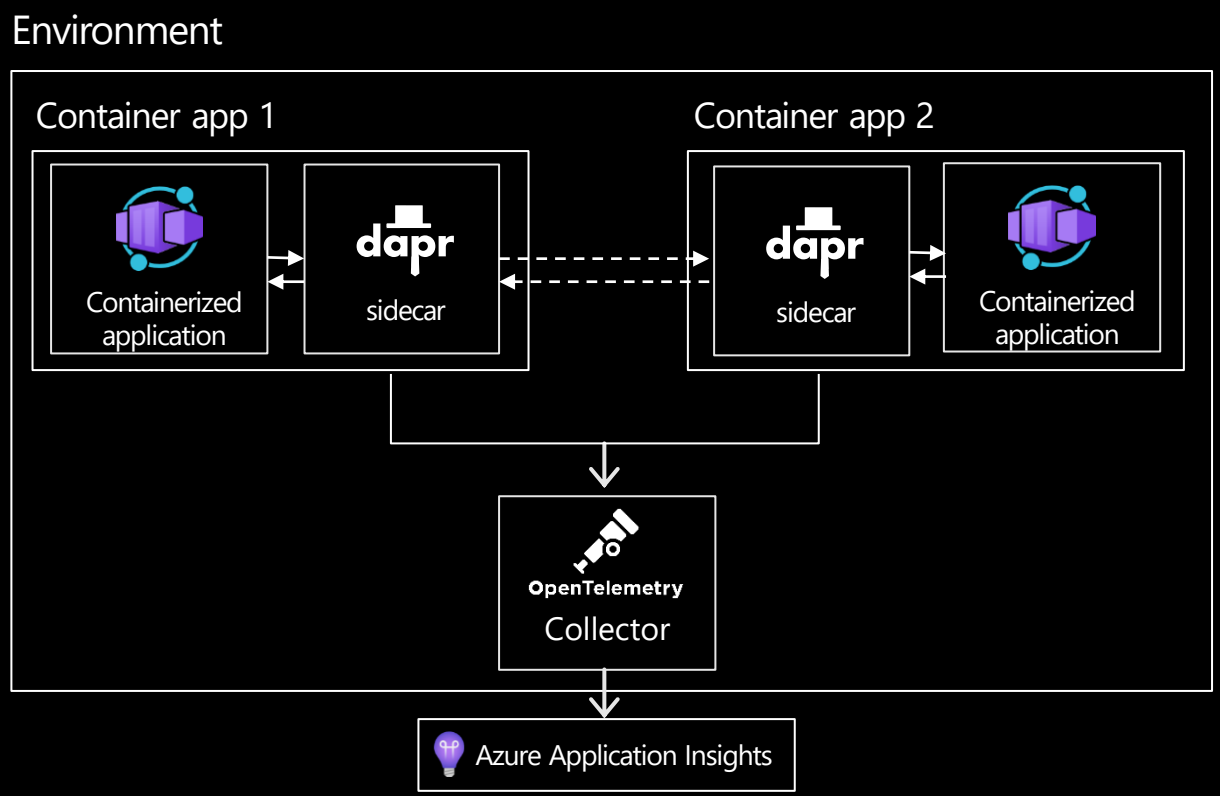
Discover services and perform reliable, direct service-to-service calls with automatic mTLS authentication and encryption.




```
POST http://localhost:3500/v1.0/invoke/service-
     b/method/neworder
```

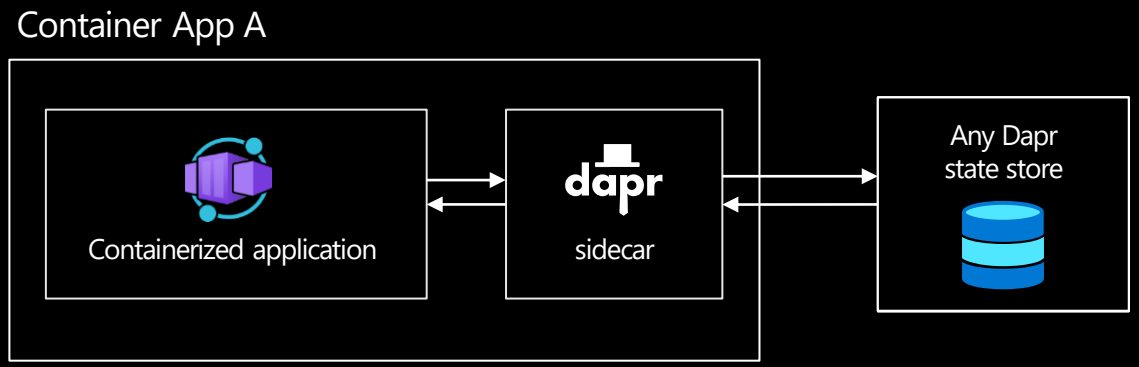
Observability

Intercept traffic and extract tracing, metrics, and logging information and visualize with App Insights



State management

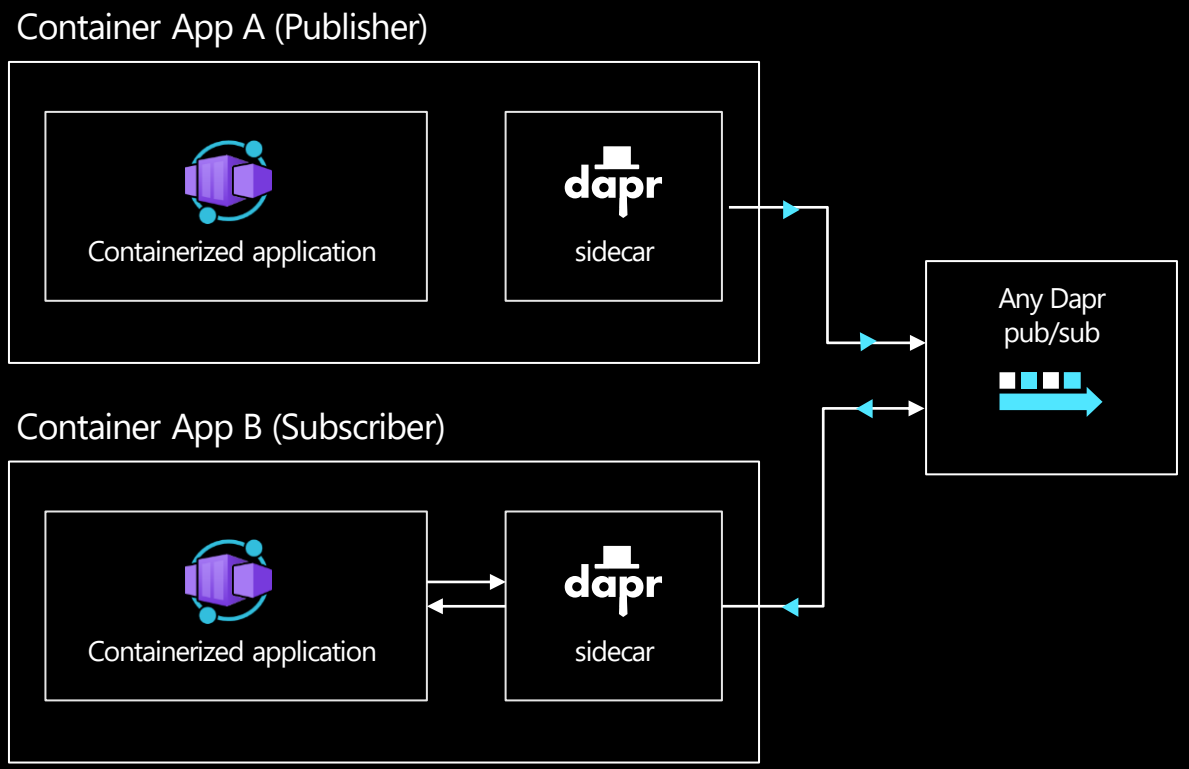
Dapr provide apps with state management capabilities for CRUD operations, transactions and more




```
POST http://localhost:3500/v1.0/state/orders
```

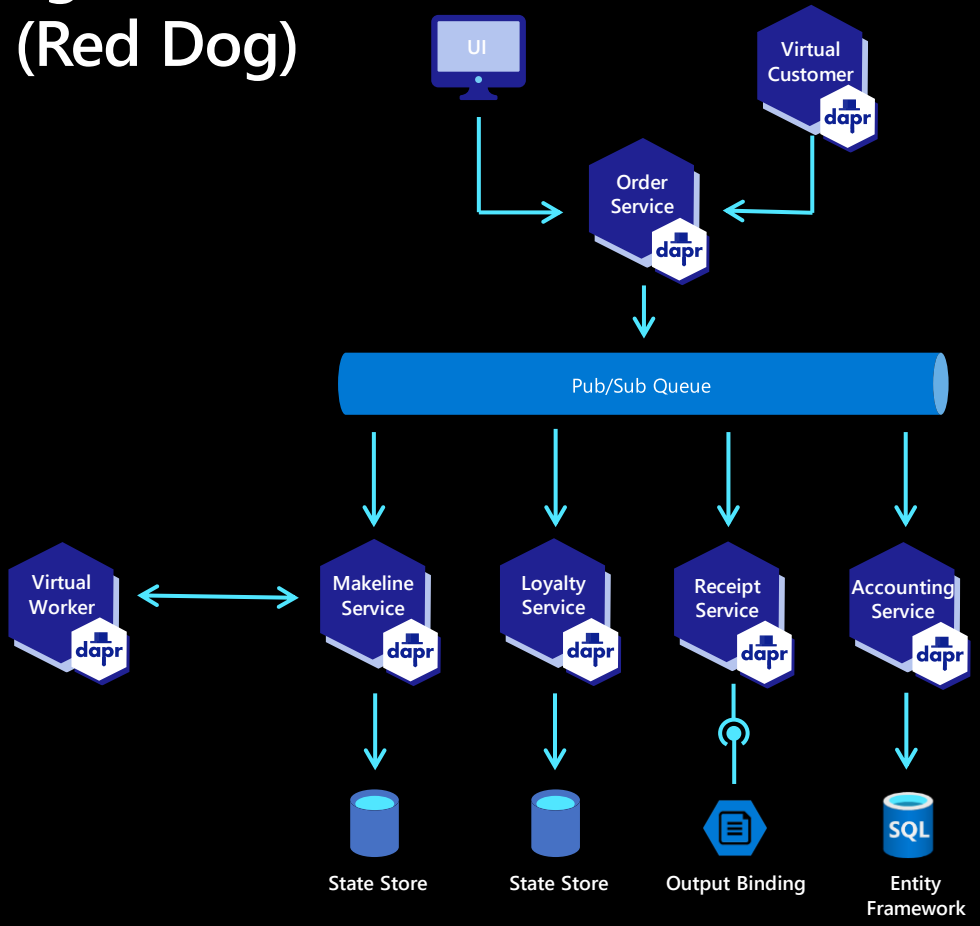
Publish and subscribe

Create event-driven, loosely coupled architectures where producers send events to consumers via topics.



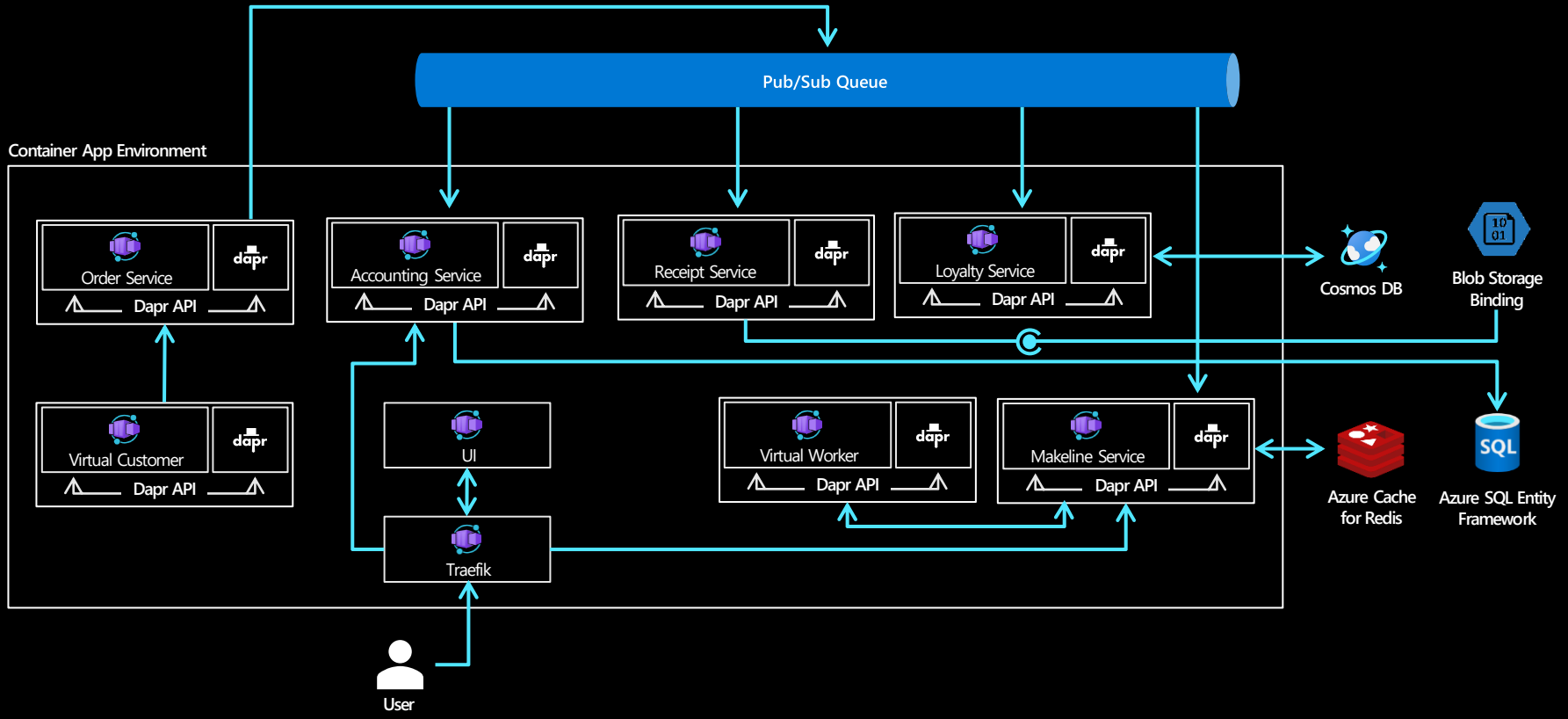
Demo

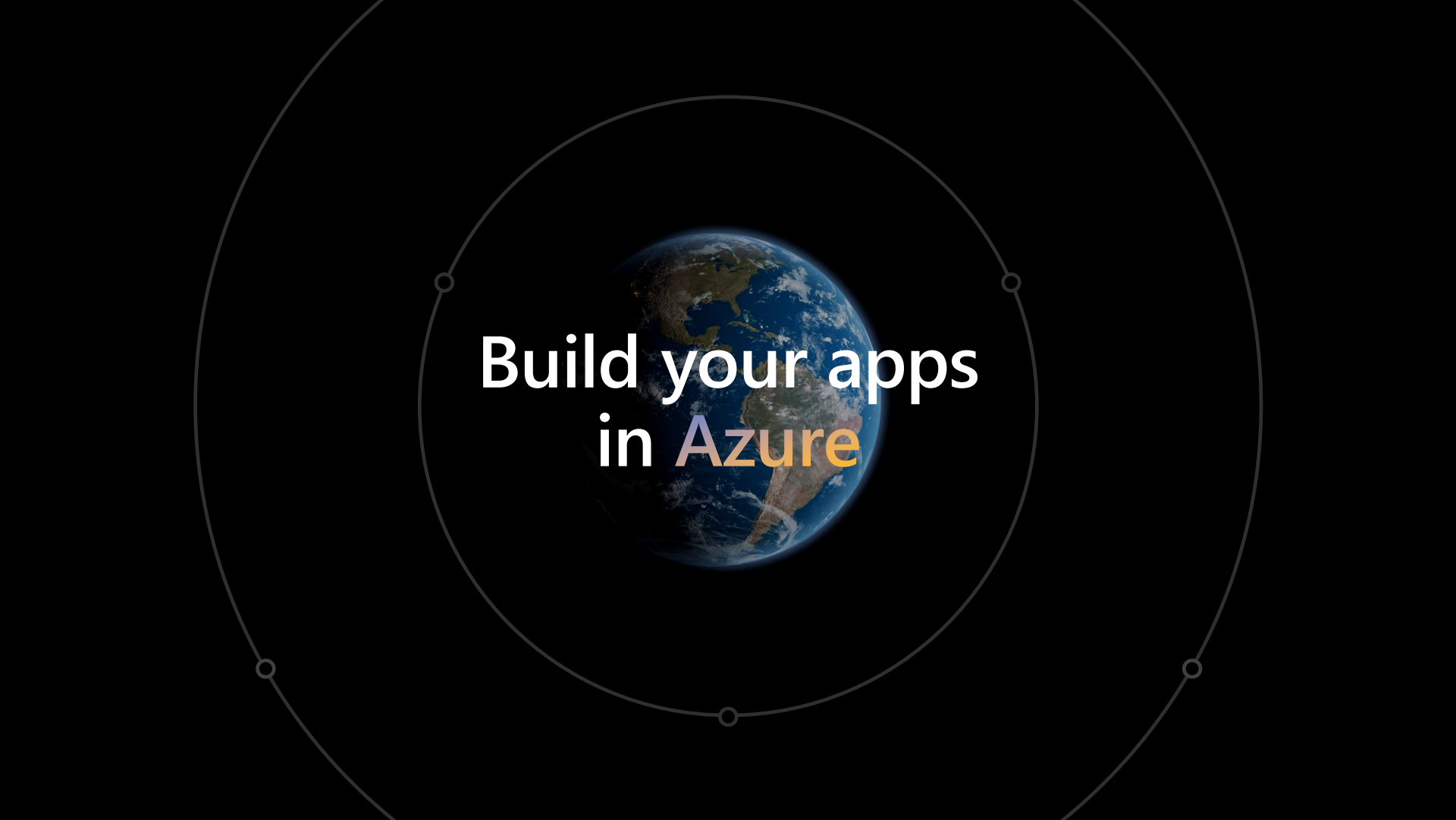
Demo App Logical Architecture (Red Dog)



https://github.com/Azure/reddog-code

Container Apps Architecture



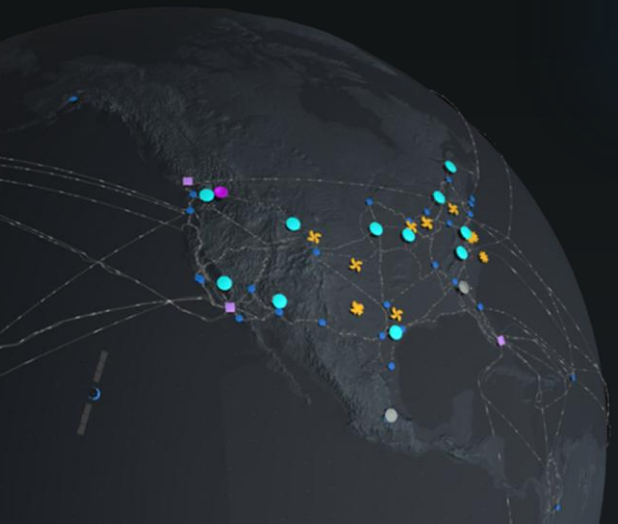

Build your apps
in Azure

Microsoft Azure

Single control plane with Azure Arc

Azure Arc-enabled infrastructure
Connect and operate hybrid resources as native Azure resources

Azure Arc-enabled services
Deploy and run Azure services outside of Azure while still operating from Azure



Multi-cloud

Datacenter

Edge

Next Session 13:00

5 easy steps to screw up Microsoft Azure

Experts Live Austria