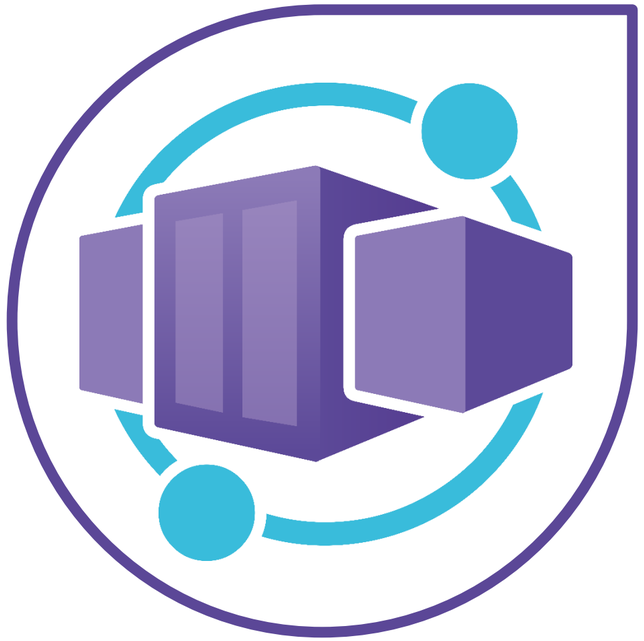
Microsoft

Reactor



# Kubernetes-Free Microservices

## The Azure Container Apps Advantage

**Kunal Das**

**April 2025**

# AGENDA

01 Microservices

02 Kubernetes

03 What is ACA?

04 Advantages

05 How to

06 Discussion


# KUNAL DAS

Sr DevOps Engineer @ Cyncly AI Innovation Center

Co organizer K8SUG-INDIA

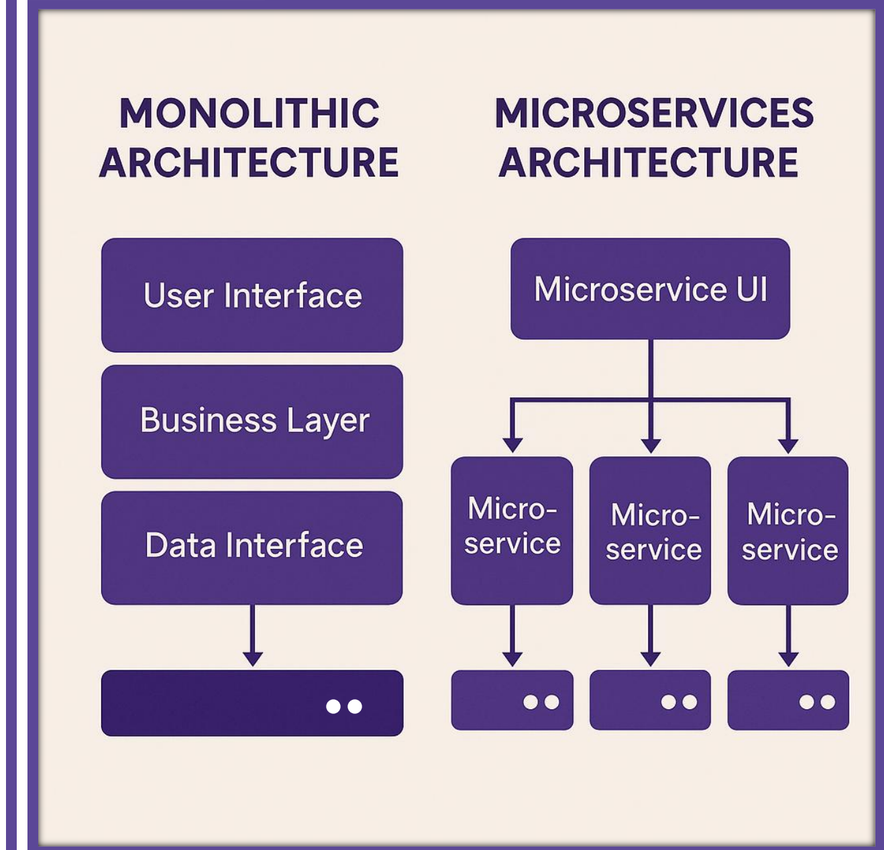
7X Azure Certified

# Microservices

Monolith to microservice journey

## MONOLITH

A monolithic application is a single, unified codebase where all functionality lives within one deployable unit. It typically contains all components of an application—UI, business logic, and data access—tightly integrated into a single program.

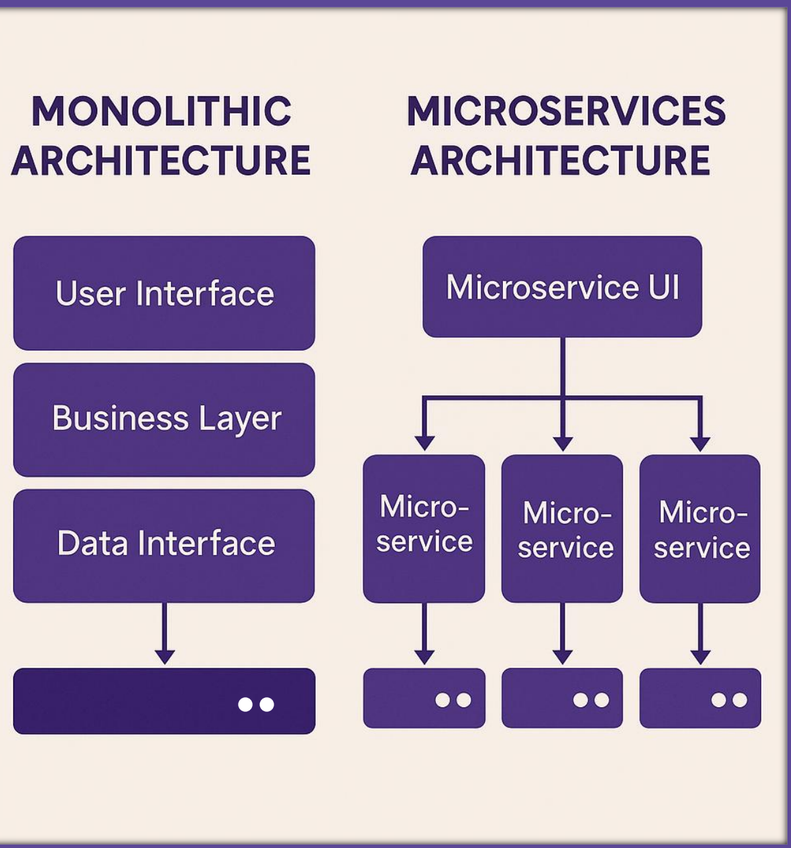


# Microservices

Monolith to microservice journey

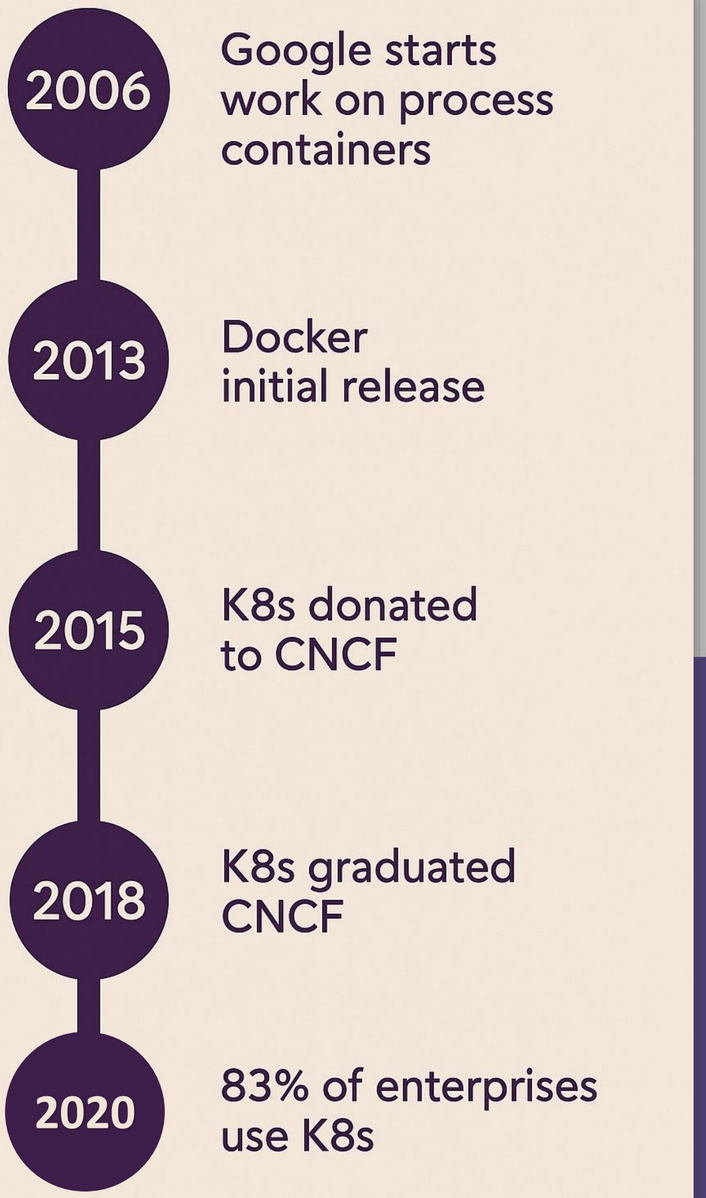
## MICROSERVICES

Microservices architecture breaks down an application into small, independent services that each handle a specific business function and can be developed, deployed, and scaled separately. Each microservice communicates with others via well-defined APIs, allowing teams to work autonomously on different services using their preferred technologies.



# The Rise of Kubernetes

**Kubernetes Emerged as the Solution to Containerization Challenges**




## HISTORY

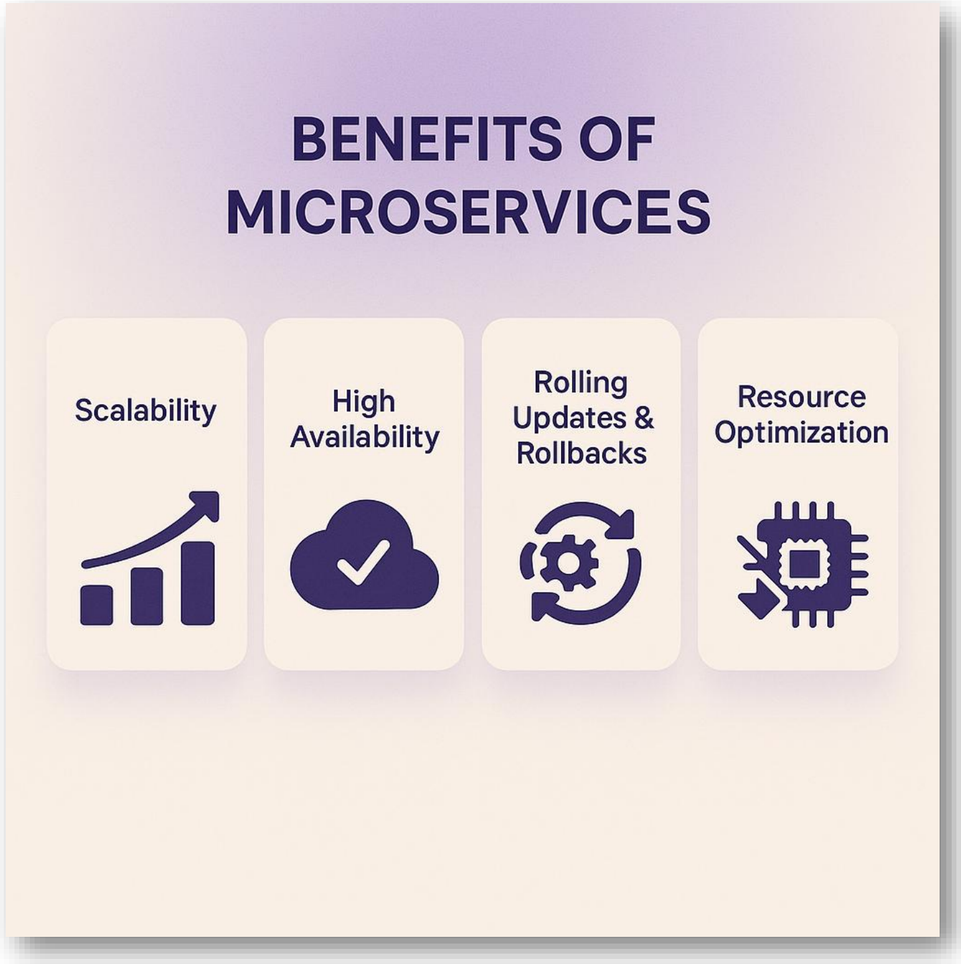
- Developed by Google based on their internal Borg system
- Open-sourced in 2014 and became the industry standard for container orchestration
- Provides tools for management of containerized applications

## K8S OFFERINGS

- Container orchestration
- Automated rollouts and rollbacks
- Self-healing
- Horizontal scaling

# Which feature of K8S do you like the most?

# BENIFITS




### Scalability

- Easily handle increased load by scaling individual services independently based on demand.

### High Availability

- Ensures minimal downtime by distributing services across multiple nodes or regions for fault tolerance.

### Updates & Rollbacks

- Deploy new features gradually without downtime and quickly revert if something goes wrong.

### Resource Optimization

- Allocate compute resources precisely to each service, reducing waste and improving performance.

# PROBLEMS

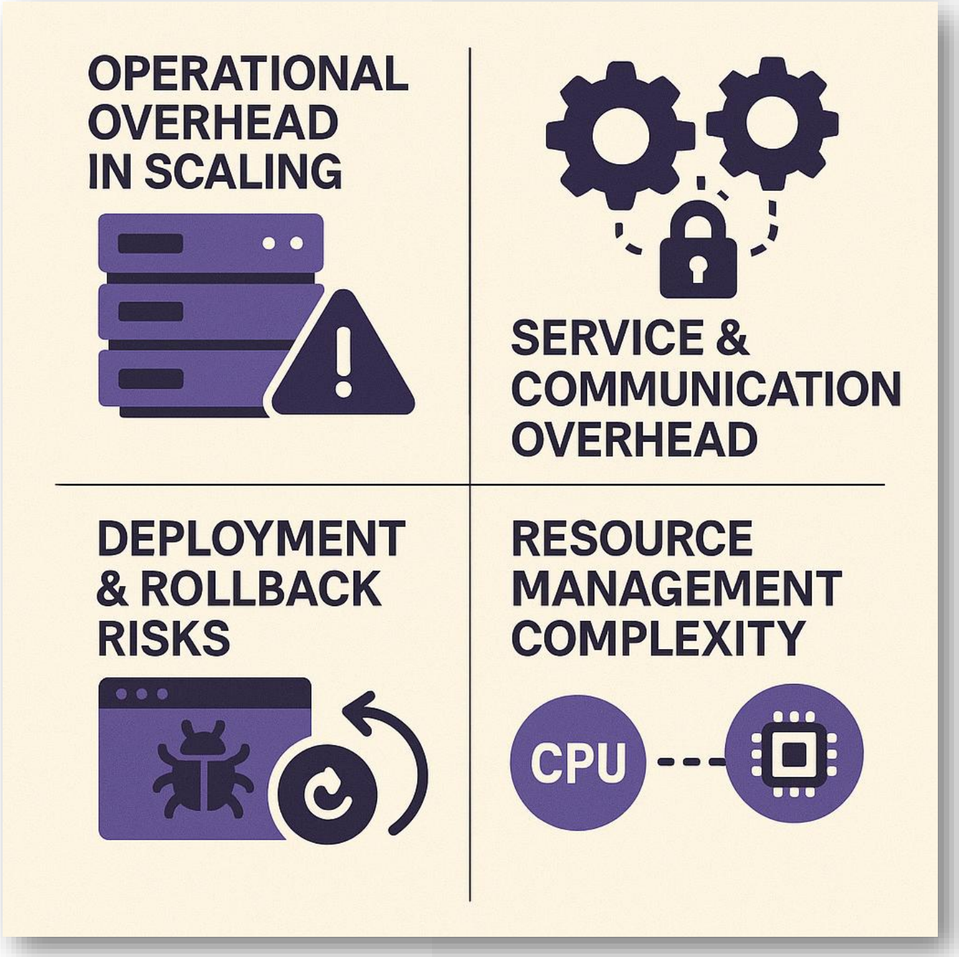
**WE WILL SOLVE THE PROBLEMS**

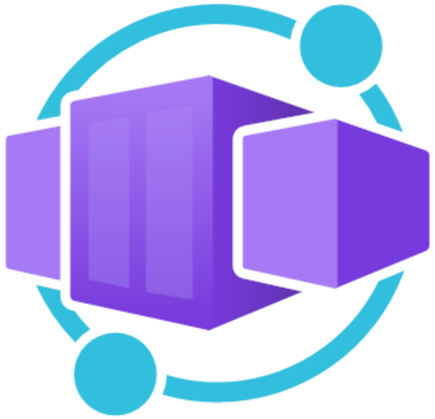
01 Operational Overhead in Scaling

02 Service & Communication Overhead

03 Deployment & Rollback Risks

04 Resource Management Complexity





# WHAT IS ACA?

## Azure Container Apps Advantage

### What it is

Azure Container Apps is a serverless platform that allows you to maintain less infrastructure and save costs while running containerized applications. Instead of worrying about server configuration, container orchestration, and deployment details, Container Apps provides all the up-to-date server resources required to keep your applications stable and secure.

### Uses of Azure Container Apps

- Deploying API endpoints
- Hosting background processing jobs
- Handling event-driven processing
- Running microservices

# WHAT ACA OFFERS

### Serverless Container Hosting

- Automatically handles infrastructure, scaling, and load balancing for containerized applications without needing to manage Kubernetes or VMs.

### Built-in Autoscaling Supports

- scale to zero and KEDA-based event-driven scaling (e.g., based on CPU, memory, queue length, HTTP requests per second, etc.).

### Integrated Dapr Support

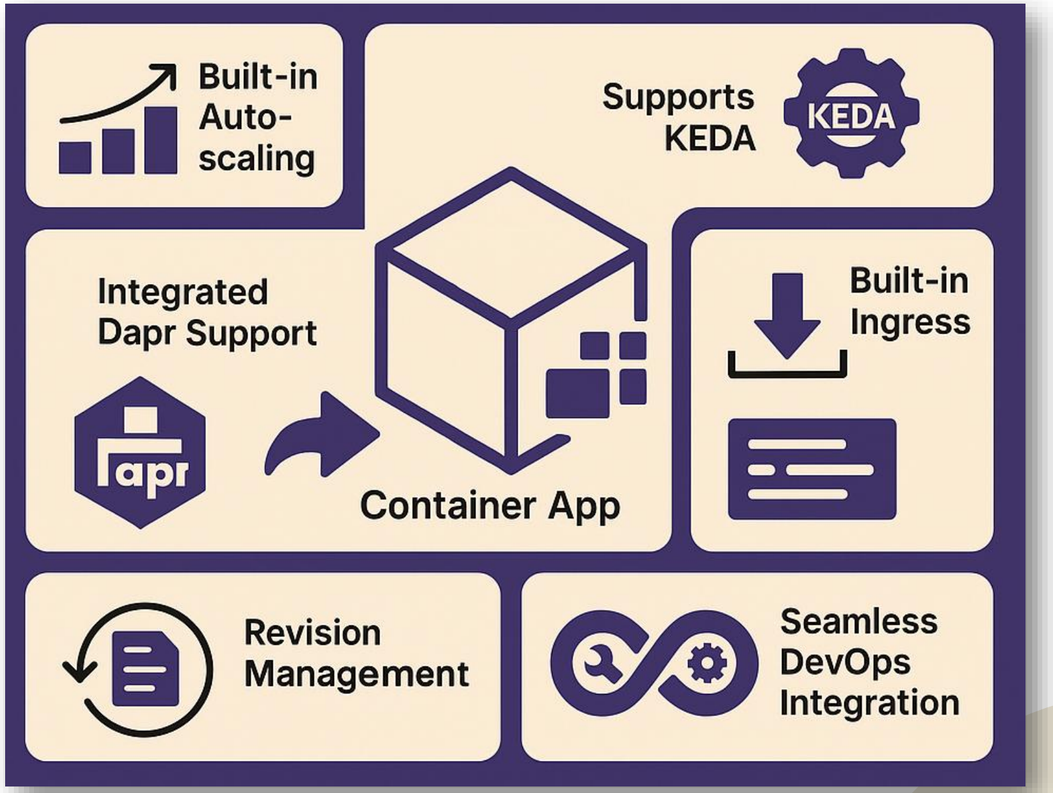
- Enables microservices features like service invocation, pub/sub messaging, secrets management, and state storage natively.

### Built-in Ingress and Revision Management:

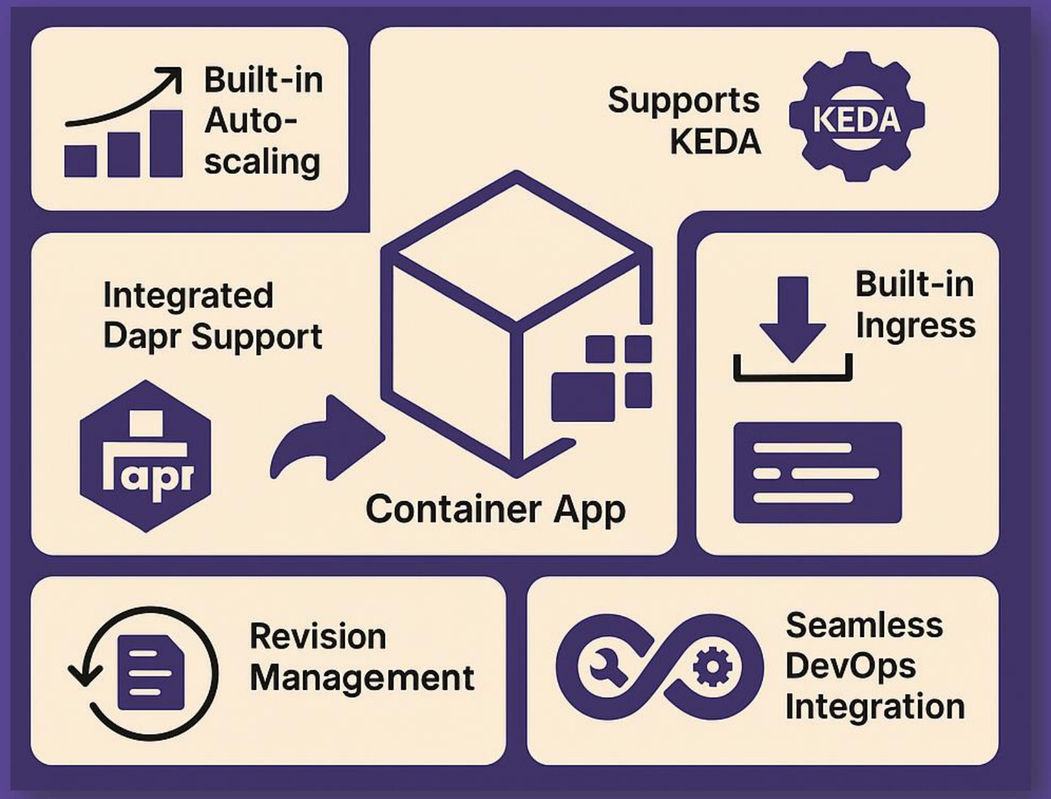
- Easily expose apps externally with TLS support, and use traffic splitting across revisions for safe rollouts, A/B testing, or blue-green deployments.

### Seamless DevOps Integration

- Compatible with GitHub Actions, Azure DevOps, and container registries, making CI/CD pipelines easy to implement.



# WHAT ACA OFFERS




# THE ACA ADVANTAGE

1. Operational Overhead in Scaling
2. Service & Communication Overhead
3. Deployment & Rollback Risks
4. Resource Management Complexity

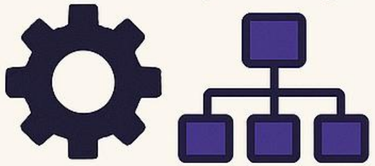
## KEY PROBLEMS ACA SOLVES

1. Operational Overhead in Scaling

2. Service & Communication Overhead

3. Deployment & Rollback Risks

4. Resource Management Complexity



# THE ACA ADVANTAGE

### Operational Overhead in Scaling

- ACA provides automatic scaling based on HTTP traffic, events, or CPU/memory usage
- Eliminates manual monitoring and infrastructure adjustments
- Scales to zero when not in use, reducing costs

### Service & Communication Overhead

- Built-in service discovery and simplified communication between microservices
- Managed Dapr integration for standardized communication patterns
- Reduces configuration complexity and security risks

### Deployment & Rollback Risks

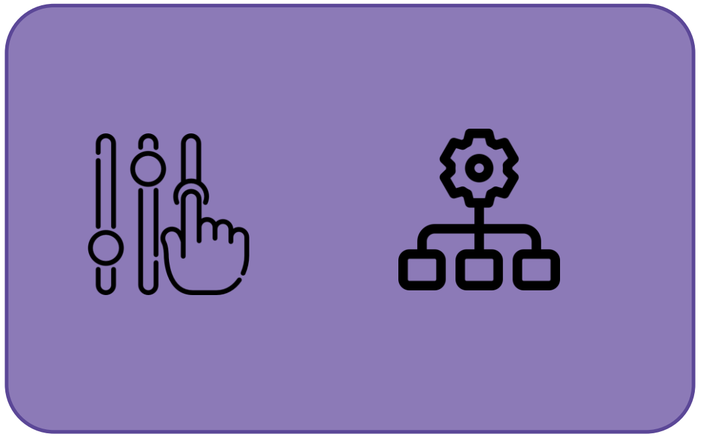
- Simplified CI/CD integration with versioned revisions
- One-click or automated rollbacks to previous stable versions
- Blue/green and canary deployment strategies built-in

### Resource Management Complexity

- Automated resource allocation based on actual needs
- Granular control over CPU/memory limits per container
- Cost optimization through efficient resource utilization and scale-to-zero capabilities

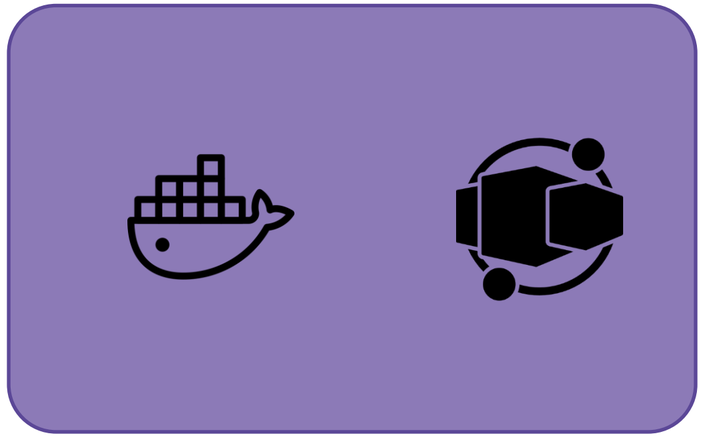
# HOW TO

## THE GET STARTED GUIDE



### Set Up Environment

- Create Resource Groups
- Create ContainerApp environment



### Create Your Container App

- Create Dockerfile
- Create ContainerApp

### Access and Scale Your App

- Get the URL of your App
- Setup Scaling rules

Azure Container Apps consumption plan is billed based on per-second resource allocation and requests. The first 180,000 vCPU-seconds, 360,000 GiB-seconds, and 2 million requests each month are free. Beyond that, you pay for what you use on a per second basis based on the number of vCPU-s and GiB-s your applications are allocated.

# ADVANCED FEATURES

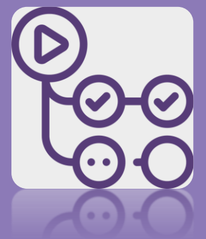
Azure Container Apps offers seamless integration with Azure File Share for persistent storage needs.

Volume Mounting

Container Apps integrates natively with Azure Entra ID and other authentication providers through EasyAuth for simplified security. It also seamlessly connects with Key Vault for secrets management and Log Analytics for comprehensive monitoring and logging capabilities.

Azure Integration

The platform provides direct integration with GitHub Actions, enabling automated CI/CD pipelines.



GitHub Actions

# Audience Q&A

# THANK YOU

FOR YOUR NICE ATTENTION


**Kunal Das**

**Website**
www.kunaldas.dev

**April 2025**