Azure Dev Day

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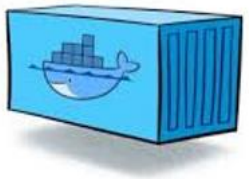
Microservice Solutions

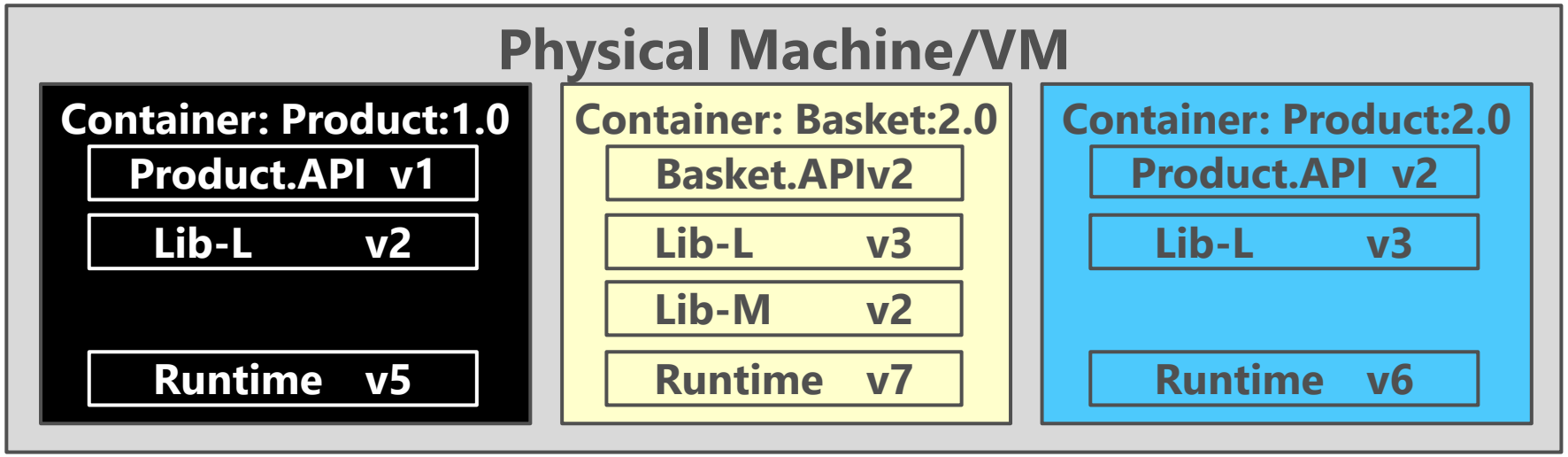
Develop and deploy microservices using Azure Kubernetes Service and Azure Container Registry

Overview of Containers

What is a Container?



- Portable unit of deployment
- Application code and dependencies compartmentalized
- Virtualization without the need of a VM overhead
- Best practice to organize one service/container



What Problems Do Containers Solve?

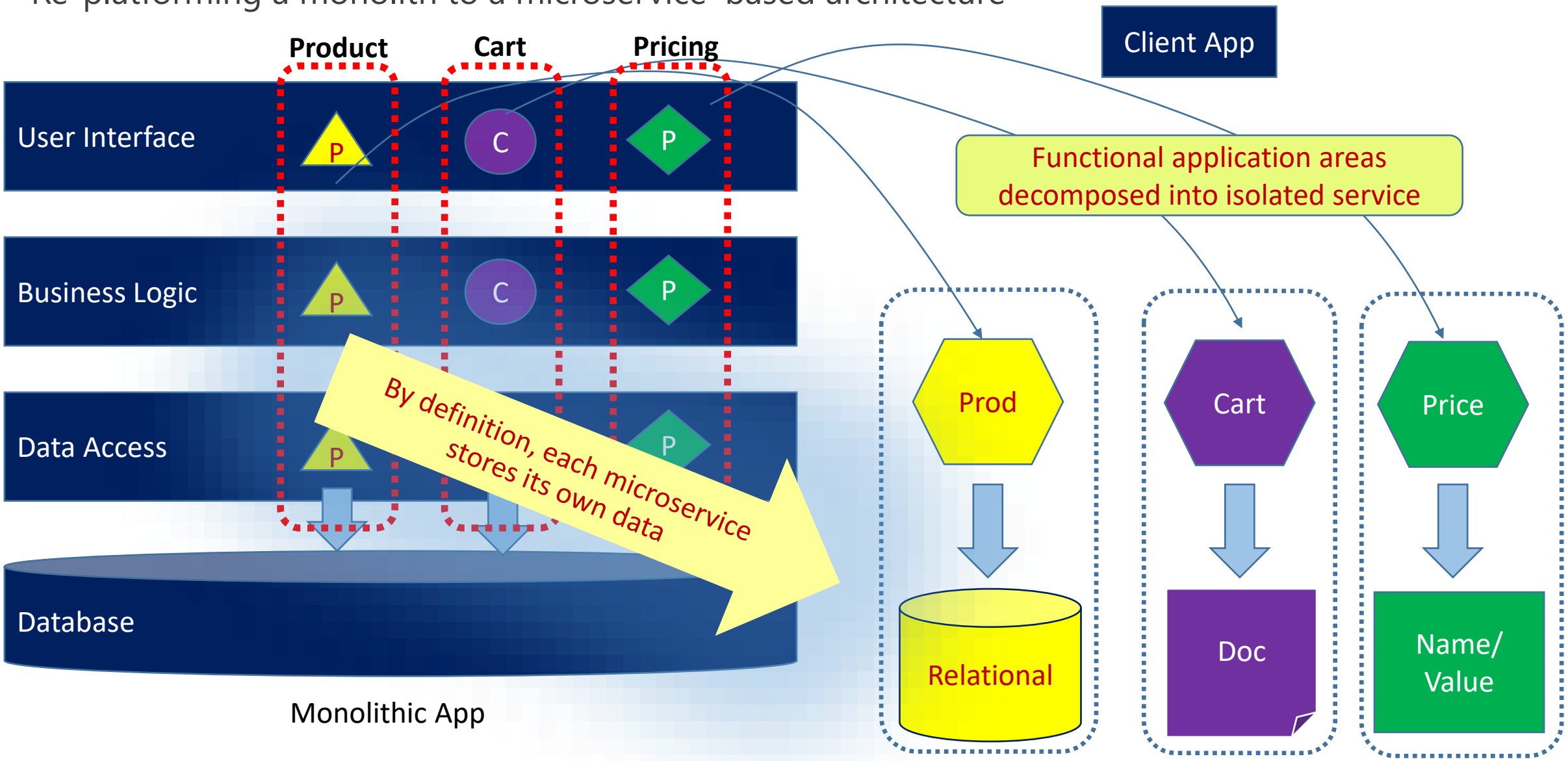
- Guarantees consistency across DEV, TEST and PROD
- Increases Productivity
- Isolation & Performance
- Smaller footprint than VMs

Containers are a great environment for deploying Microservices

Moving to Microservices

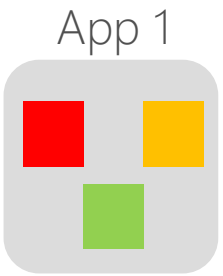
Moving to Microservices

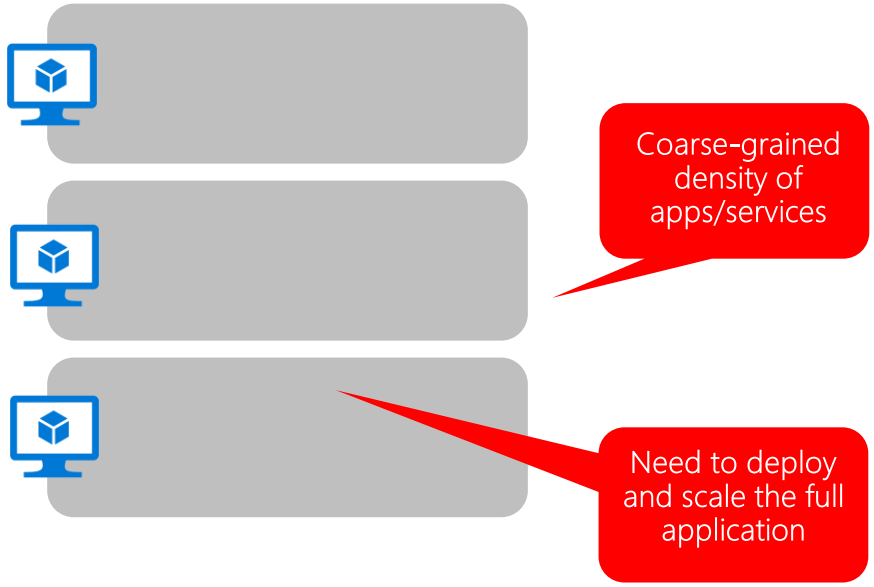
- Re-platforming a monolith to a microservice–based architecture



Traditional application approach

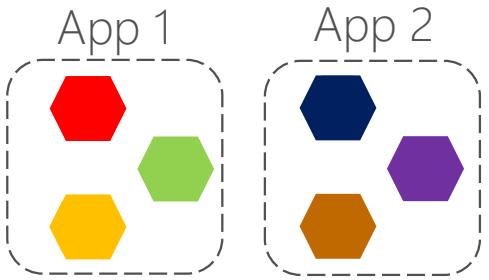
- A traditional application has most of its functionality within a few processes that are componentized with layers and libraries.
- Scales by cloning the app on multiple servers/VMs

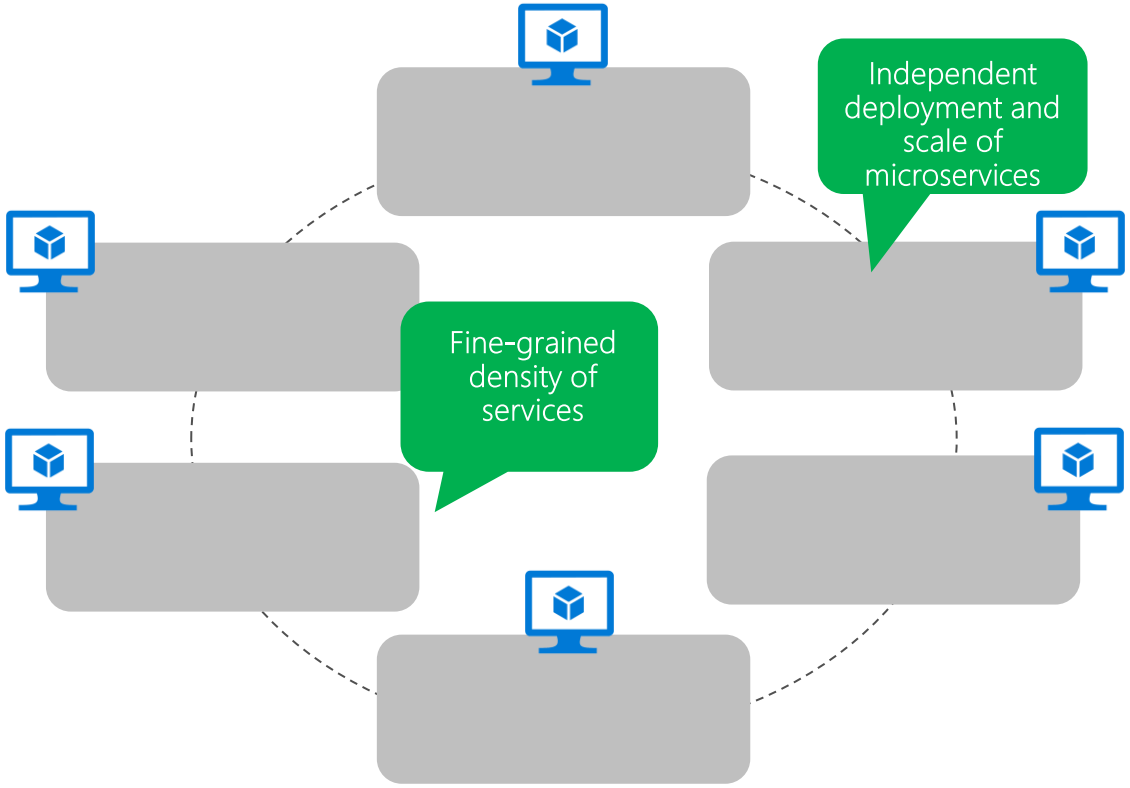




Microservices application approach

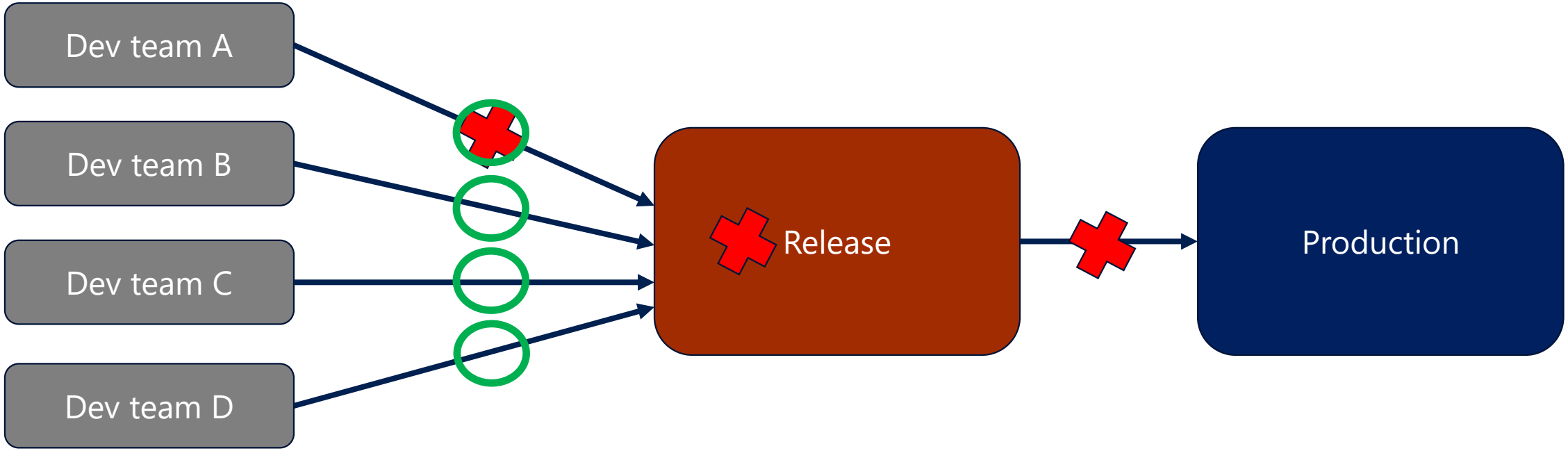
- A microservice application segregates functionality into separate smaller services.
- Scales out by **deploying each service independently** with multiple instances across servers/VMs





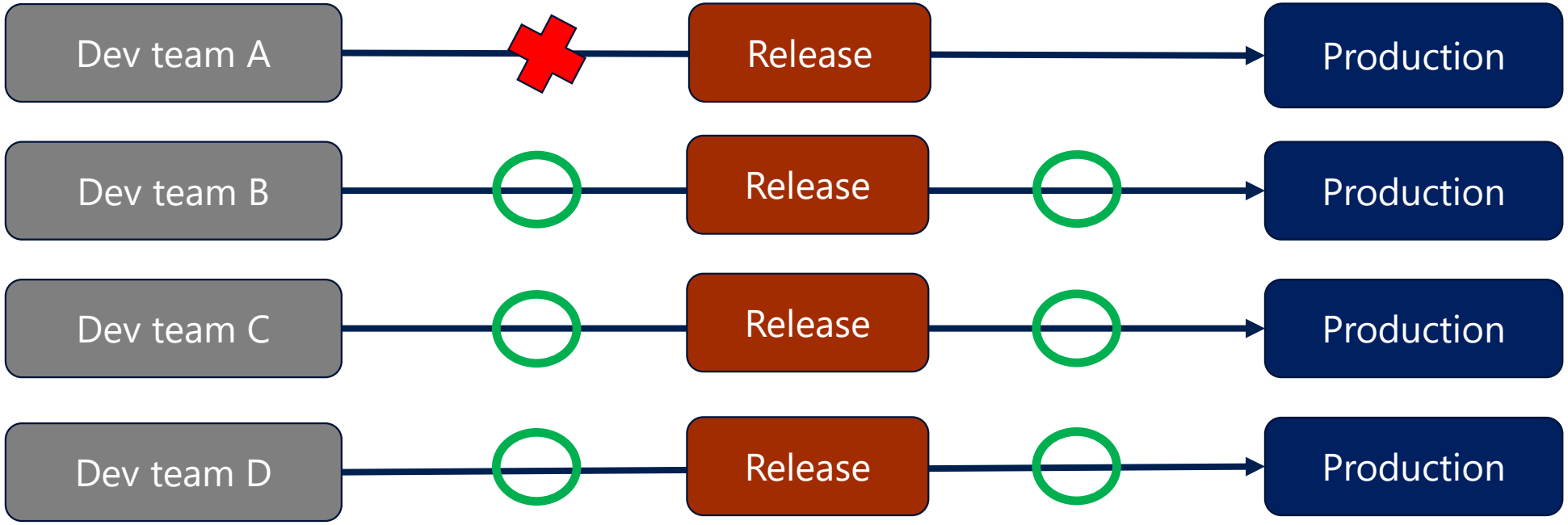
How Monoliths Diminish Agility

- Single codebase - singe release pipeline
  - All teams *share code base/dependencies* – tightly-coupled
  - All team *share same release cadence*
  - A defect in a dependency can block multiple teams and the release itself



How Microservices Promote Agility

- Each team owns it own service and codebase…
  - Services are *isolated* and *do not directly share dependencies*
  - Each service has its *own release cadence*
  - Each *deploys independently*



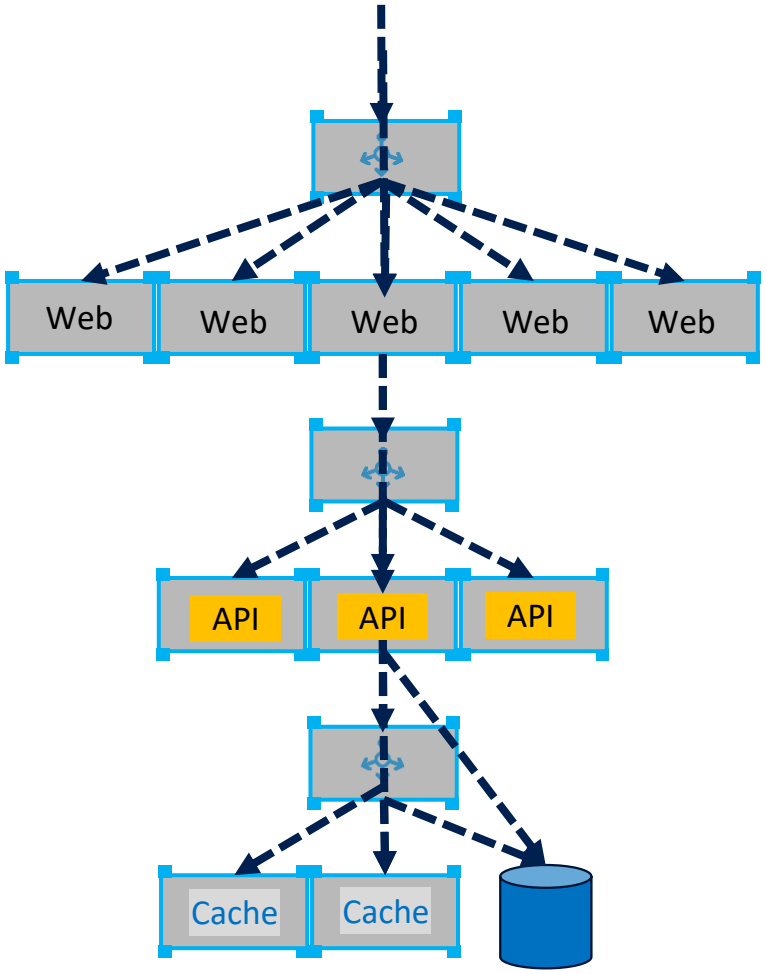
Kubernetes - Container Orchestrator

Challenges of a containerized world

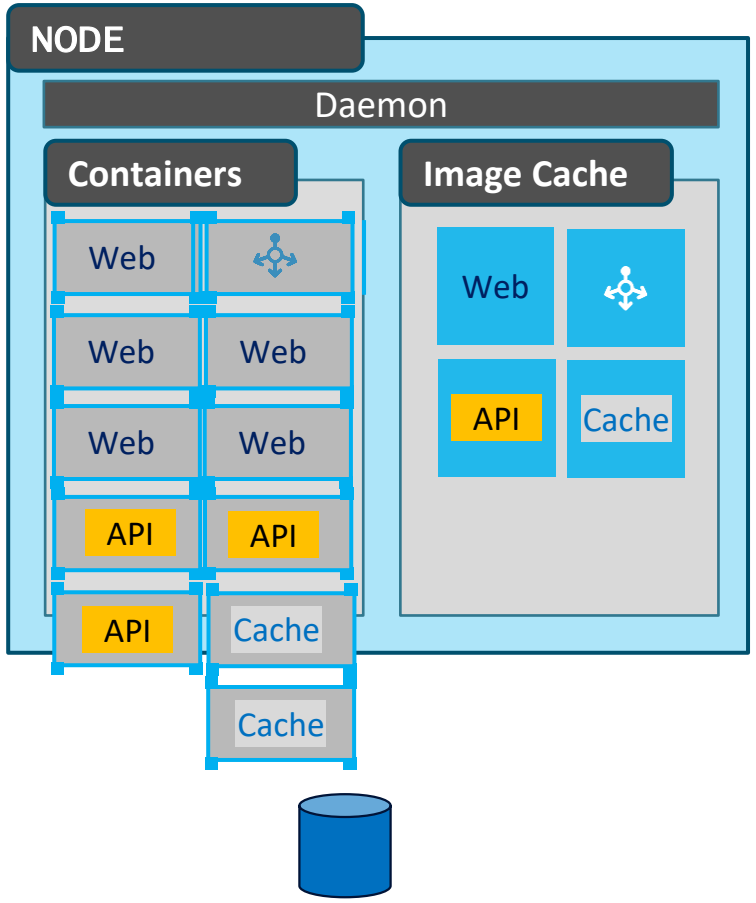
As application development has moved towards a container-based approach, the need to orchestrate and manage the inter-connected resources becomes important

- Load Balancing
- Naming and Discovery
- Logging and Monitoring
- Debugging and Introspection
- Networking

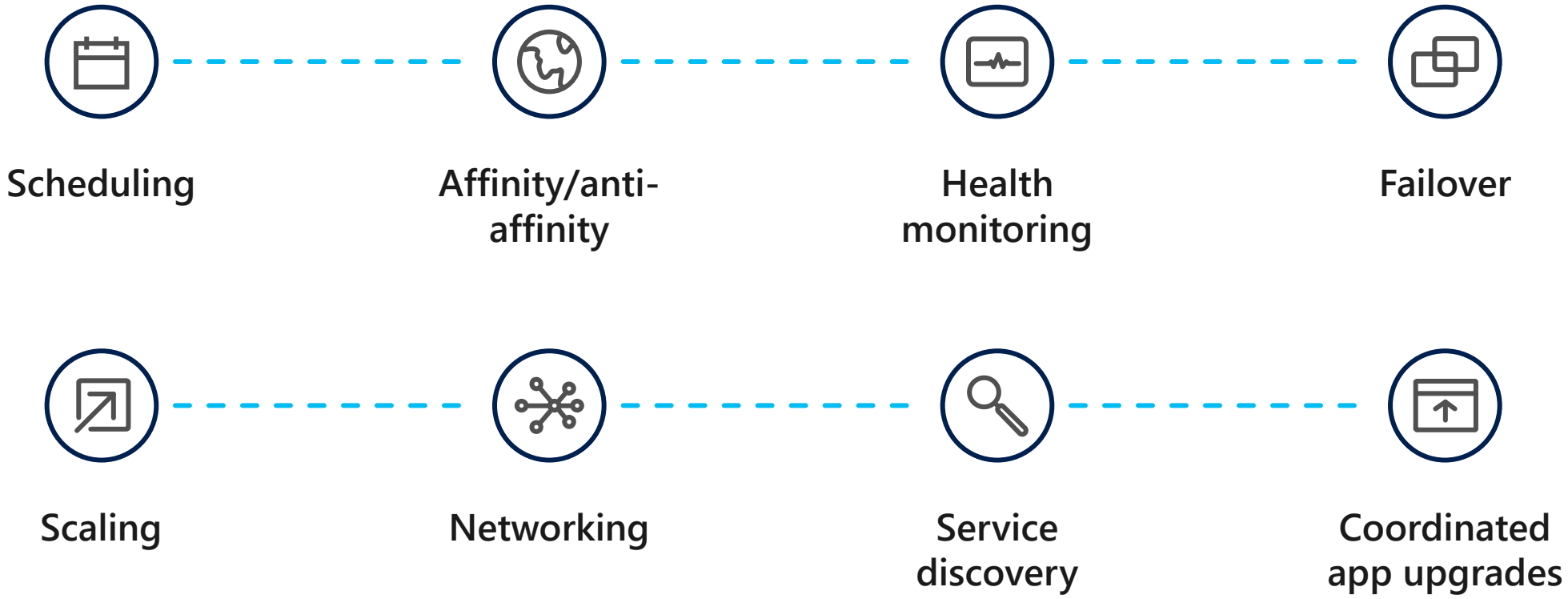
Application Scale



Load Balancing & Fault Tolerance



The elements of orchestration



Azure Kubernetes Service

Azure Kubernetes Service (AKS)

Fully-managed Kubernetes platform hosted in Azure as a PaaS service

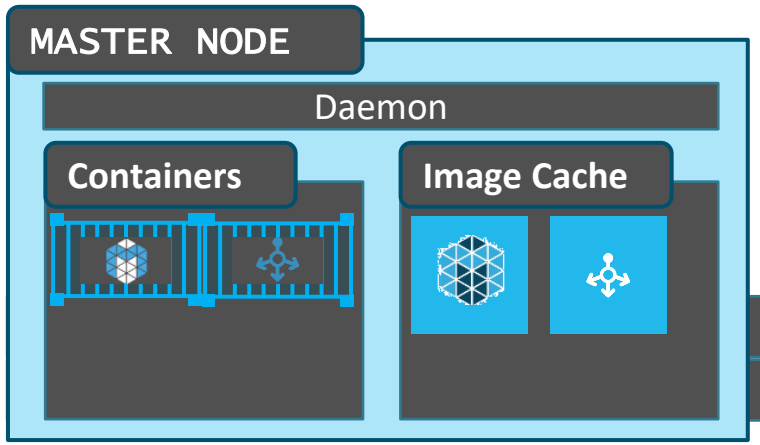
Deeply integrated with Azure dev tools and services

Abstracts the complexity and operational overhead of managing Kubernetes

- AKS implements K8s services, with a custom K8s config file optimized for Azure
- AKS is a K8s managed service w/in Azure

At no charge…

- Automated upgrades, patches
- High reliability, availability
- Automatic scaling
- Self-healing
- Monitoring



Control Plane

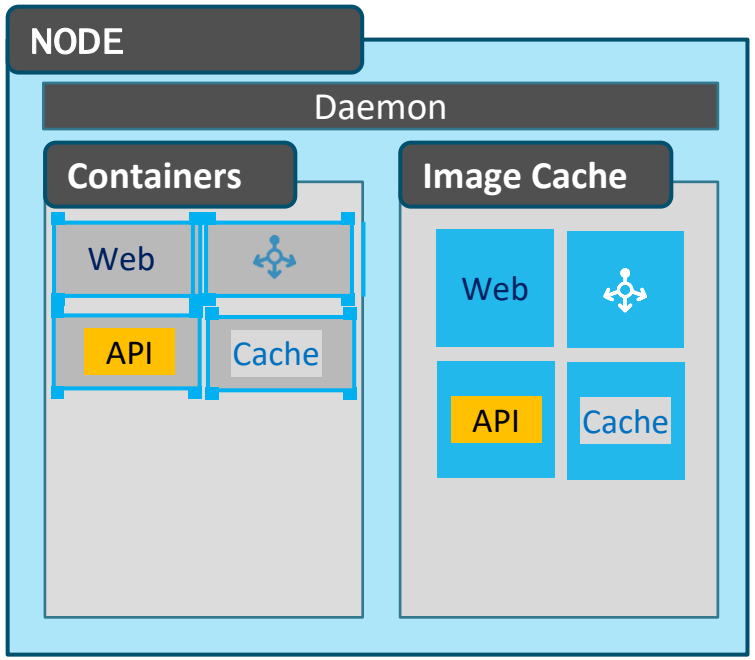
NO CHARGE

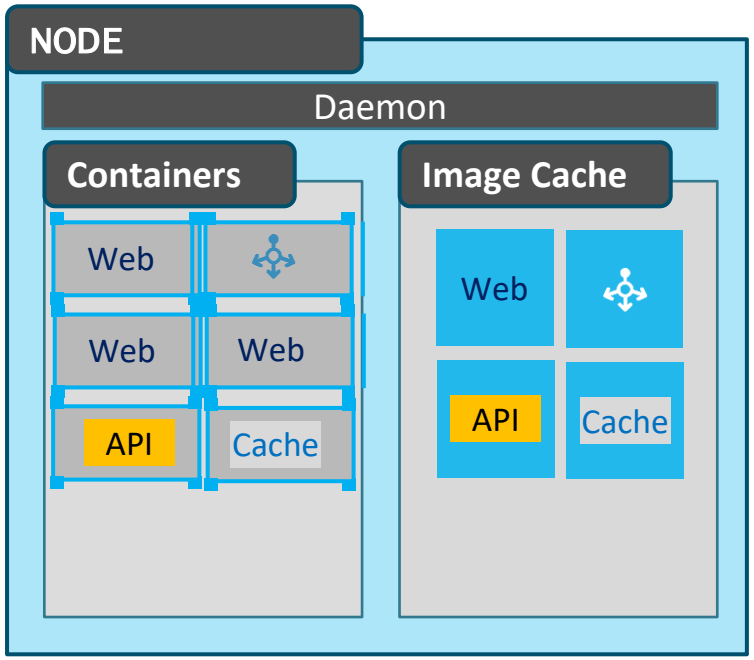
Container Scheduling

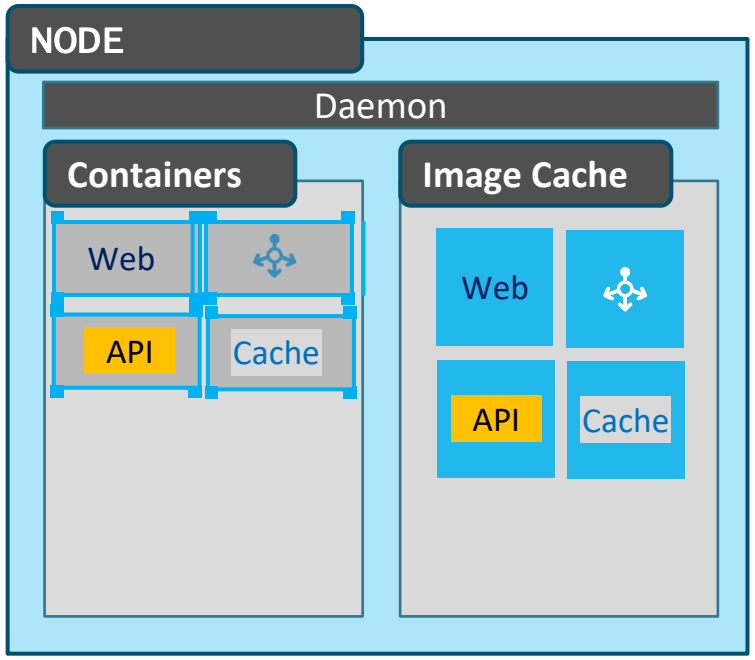
Container Orchestration

At no charge…

- Automated upgrades, patches
- High reliability, availability
- Automatic cluster scaling
- Self-healing
- Monitoring

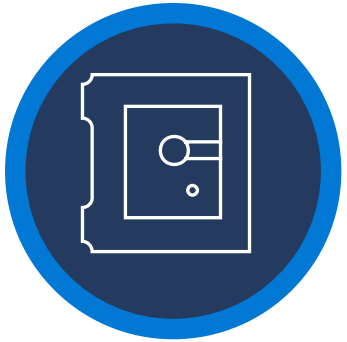






AKS Features

High Availability
High Reliability

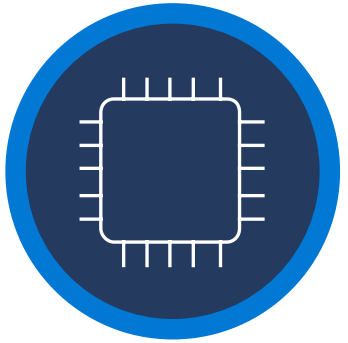


Availability Zones
99.95% SLA
Self-Healing

Cluster
Autoscaler

Node Autoscaler
Virtual Nodes

Security



Azure Key Vault
Azure Active Directory
Private Clusters

Monitoring

Azure Log analytics
with Container
Insights

AKS – References

Documentation, learn, best practices, industry use cases

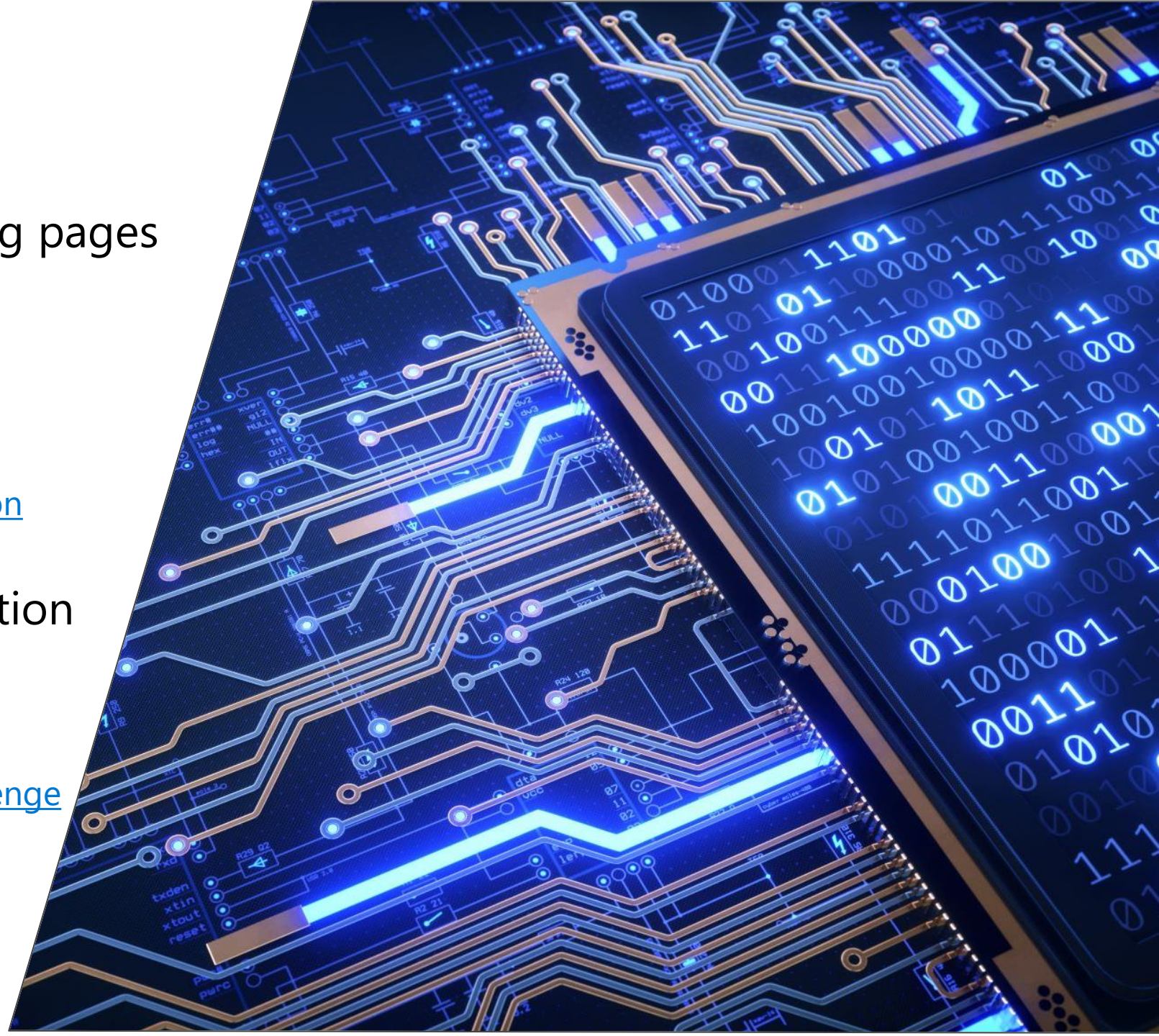
AKS References

Azure Kubernetes Service landing pages

- Azure Kubernetes Service portal
- Azure Kubernetes Service pricing
- Azure Kubernetes Service documentation

Azure Kubernetes Service education

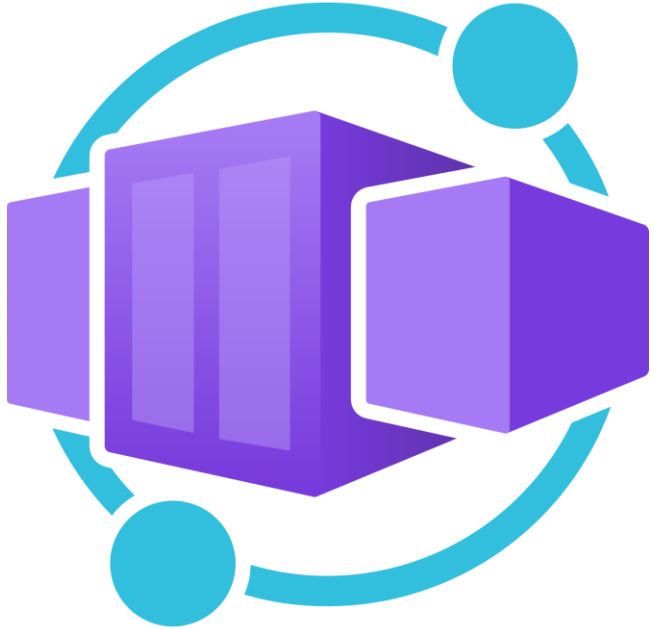
- Azure Kubernetes Service learning path
- Azure Kubernetes Service 50 days challenge
- Azure Developer Cloud Skills Challenge



Additional Container Options

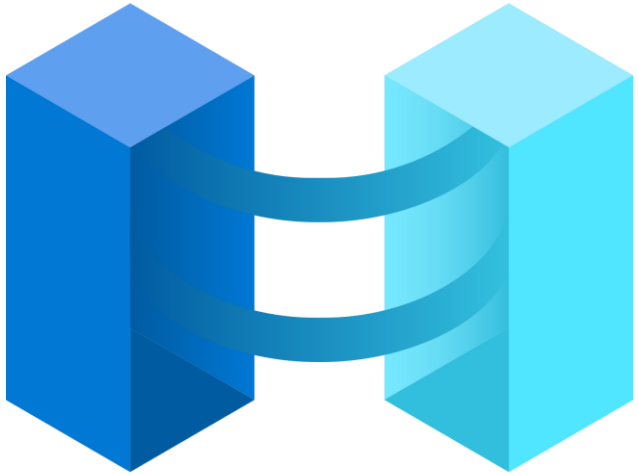
Azure Container Apps

- Run your container app on a serverless platform
- Used to build Kubernetes style applications without access to native Kubernetes APIs
- Dynamically scale based on
  - Http Traffic
  - Event-driven processing
  - CPU or memory load
  - Any KEDA-supported scaler
- https://docs.microsoft.com/en-us/azure/container-apps/overview



Azure Arc-enabled Kubernetes

- Attach Kubernetes clusters running anywhere (on-premises or other Cloud vendors)
- Your cluster will show up in Azure Resource Manager
- Your cluster will be placed in an Azure subscription and resource group
- Your cluster will receive tags like any other Azure resource
- https://docs.microsoft.com/en-us/azure/azure-arc/kubernetes/overview



Application hosting continuum

IaaS	CaaS	PaaS	FaaS	Low Code
Infrastructure Platform	Container Orchestration Platform	Application Platform	Serverless Platform	App and Orchestration Platform

Virtual Machines

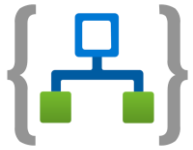
Azure Kubernetes Service

Azure Container Apps

Azure Spring Apps

Azure App Service

Azure Functions



Azure Logic Apps

Power Apps

More Control of execution environment

Less Control of execution environment

Less Agile development & deployment

More Agile development & deployment

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Learn what you want, when you want, how you want. Resources include in-person hands-on workshops, free, interactive online training and sandbox environments.

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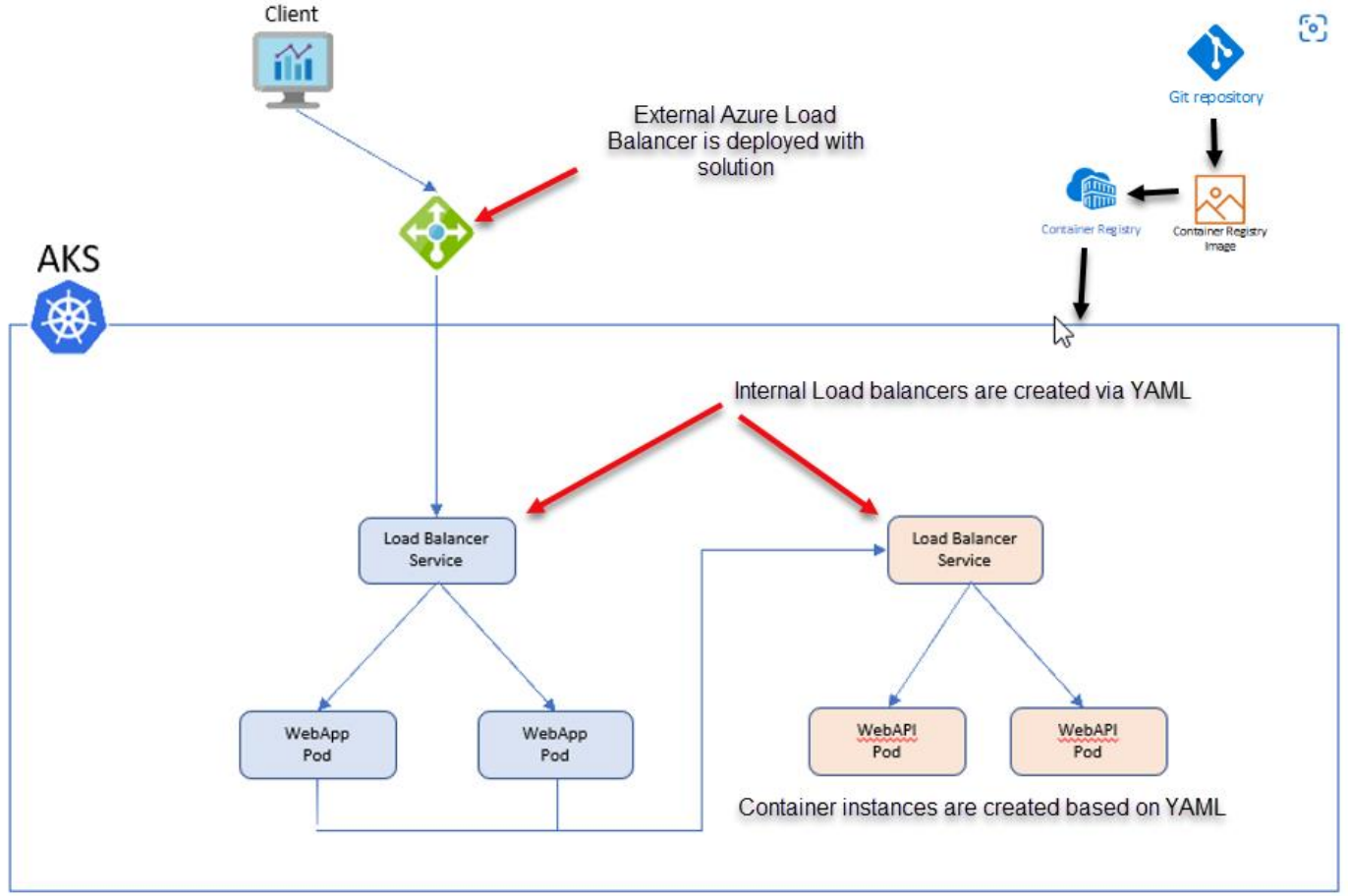
Deploy containers to AKS



aka.ms/azuredevdaylabs/microservices