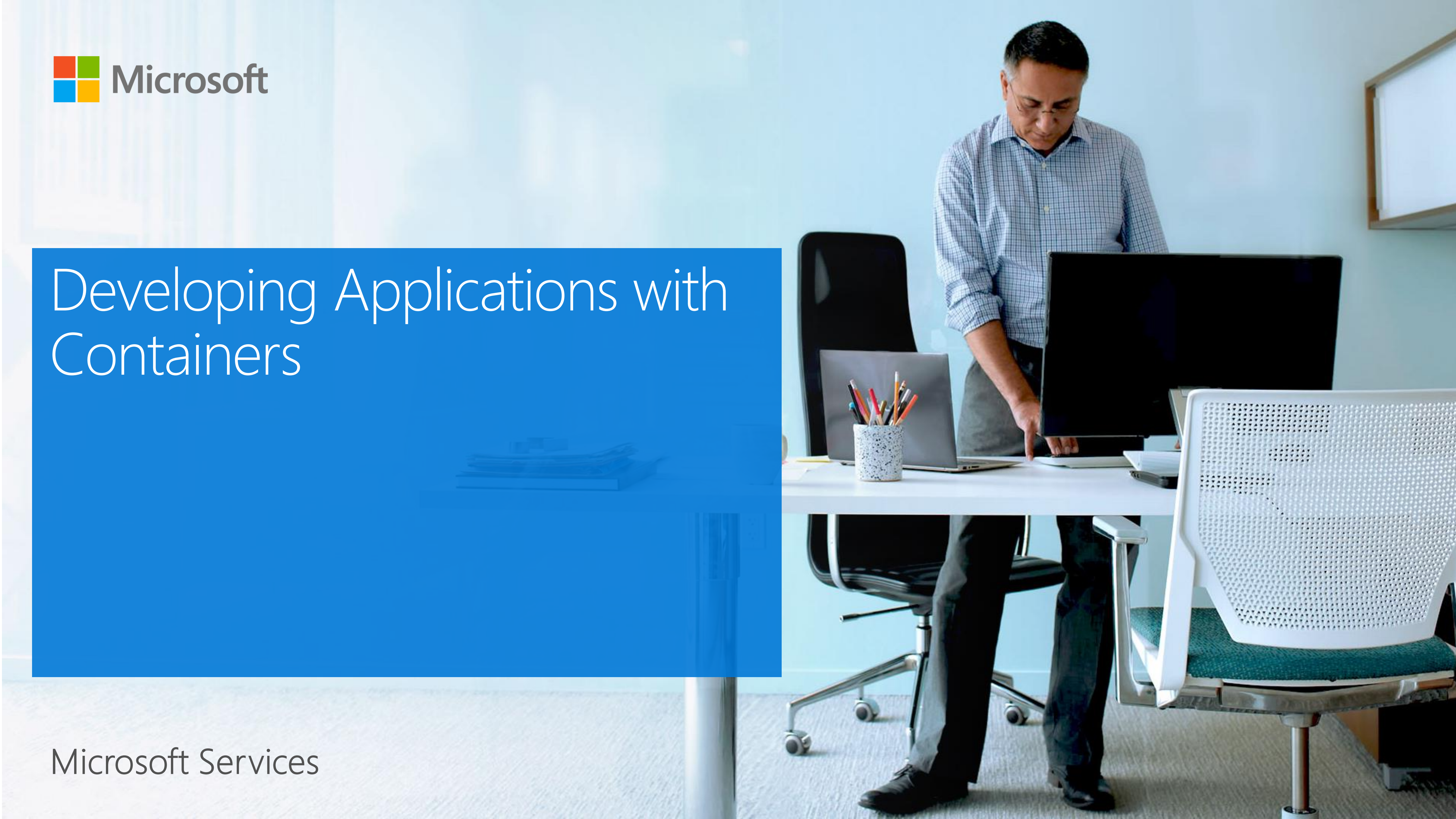
Microsoft

Developing Applications with Containers

Microsoft Services



Microsoft

Module 5 – Container Orchestrators

Microsoft Services

Agenda

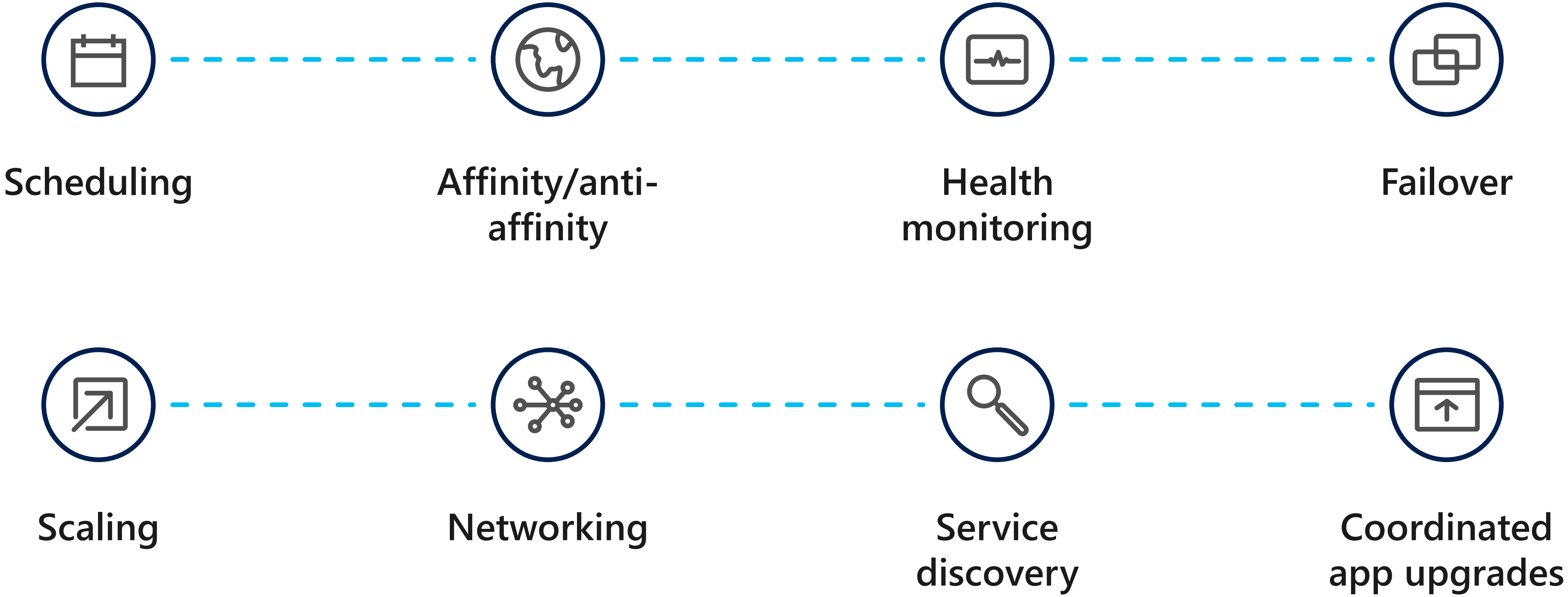
- What Is Orchestration?
- Microsoft Offerings For Containers
- Additional Options For Orchestration

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
  - Distributing traffic across containers at scale
- Naming and Discovery
  - How do containers or groups find one another?
- Logging and Monitoring
  - Keeping track of what containers are doing
- Debugging
  - Getting inside running containers
- Networking
  - Differentiating container networks from host networks at scale

The Elements Of Orchestration



Scheduling

Affinity/anti-affinity

Health monitoring

Failover

Scaling

Networking

Service discovery

Coordinated app upgrades

Clustering Versus Orchestration

Clustering

- Grouping “hosts”—either VMs or bare metal—and networking them together
- A cluster should feel like a single resource rather than a group of disparate machines

Orchestration

- Managing and monitoring of the workloads running in your cluster
- Starting containers on appropriate hosts and connecting them
- May also include support for scaling, automatic failover, and node rebalancing

Microsoft Offerings for Containers

IF YOU'RE LOOKING FOR THIS...	USE THIS
Scale and orchestrate containers using Kubernetes	Kubernetes Service
Easily run containers on Azure with a single command	Container Instances
Store and manage container images across all types of Azure deployments	Container Registry
Develop microservices and orchestrate containers on Windows or Linux	Service Fabric
Deploy web applications on Linux using containers	App Service
Run repetitive compute jobs using containers	Batch

Azure App Service

Easily deploy and run container-based web apps at scale

Accelerated outer loop

Tight integration w/ Docker
Hub, Azure Container Registry

Built-in CI/CD w/
Deployment Slots

Intelligent diagnostics &
troubleshooting, remote debugging

Fully managed platform

Automatic scaling
and load balancing

High availability
w/ auto-patching

Backup &
recovery

Flexibility & choices

From CLI, portal, or
ARM template

Single Docker image, multi
container w/ Docker Compose

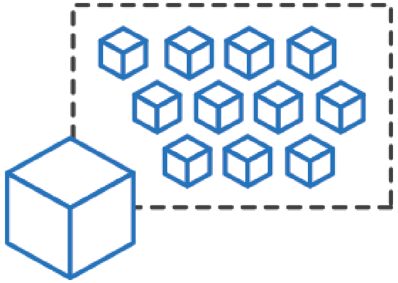
IntelliJ, , Jenkin, Maven
Visual Studio family

Demonstration: *Azure App Service*

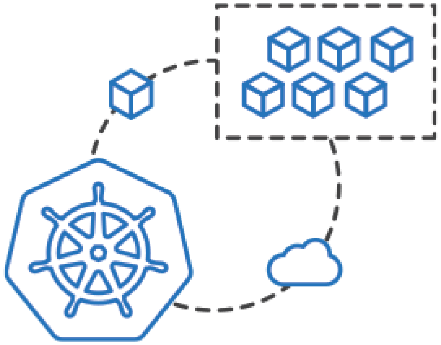
Deploy an Angular application into NGINX container hosted on Azure App Service

Azure Container Instances (ACI)

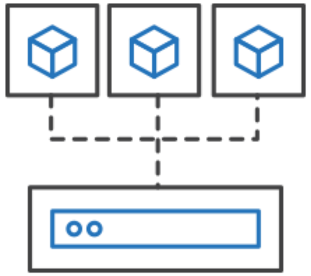
Easily run containers on Azure without managing servers



Run containers without managing servers



Increase agility with containers on demand



Secure applications with hypervisor isolation

Azure Container Instances

Great for:

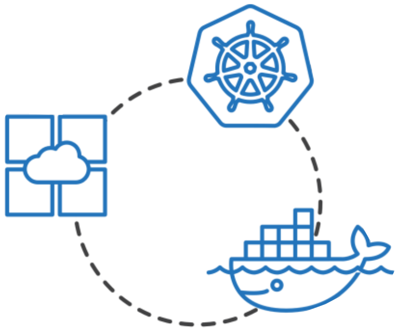
- Isolated Windows and Linux containers
- Simple applications
- Task automation
- Build jobs
- Hypervisor-level security
- Custom sizes for CPU cores and memory
- Public IP connectivity
- Persistent storage
- Co-scheduled groups

NOT great for:

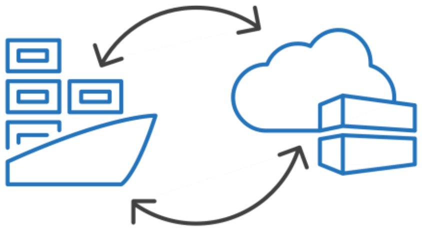
- Full container orchestration
- Service discovery across multiple containers
- Automatic scaling
- Coordinated application upgrades

Azure Container Registry

Manage a Docker private registry as a first-class Azure resource



Manage images for all types of containers



Use familiar, open-source Docker CLI tools

Azure Container Registry geo-replication

Kubernetes

- **Kubernetes** is "an open-source software for automating deployment, scaling, and management of containerized applications“
- **Kubernetes**, in Greek κυβερνήτης, means the Helmsman, or pilot of the ship
- Keeping with the maritime theme of **Docker** containers, **Kubernetes** is the pilot of a ship of containers

Kubernetes

The de-facto orchestrator

Portable
Public
Private
Hybrid
multi-cloud

Extensible
Modular
pluggable
Hookable
composable

Self-healing
Auto-placement
auto-restart
auto-replication
auto-scaling

Kubernetes

Empowering you to do more

Deploy your applications quickly and predictably

Scale your applications on the fly

Roll out new features seamlessly

Limit hardware usage to required resources only

Azure Kubernetes Engine

Open source: https://github.com/Azure/aks-engine

- Easiest way to provision a self-managed Kubernetes cluster on Azure
- Leverages Azure Resource Manager (ARM), to help you create, destroy and maintain clusters provisioned with basic IaaS resources in Azure
- Allows you to customize Deployments
  - Deploying into existing virtual networks
  - Utilizing multiple agent pools

Azure Kubernetes Service

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

Azure Kubernetes Service

Windows Support

- Windows support available in Preview on AKS
  => Only Windows Server 2019 agent nodes
- AKS cluster with Windows Server feature will be composed of a Windows node pool and a Linux node pool
- Use **Node Selector** to specify on which nodes the workloads have to be deployed

Demonstration: *Kubernetes Cluster in Azure Kubernetes Service*

Deploy Kubernetes clusters in Azure Kubernetes Service

Deploy NGINX container into Kubernetes cluster

Lab: Container Orchestration

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