Microsoft Azure: Compute Functions

Cloud Compting

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Content

1. Azure Compute: Introduction and Overview

About Azure Compute

- A suite of on-demand computing services in Microsoft Azure
- Users can run applications, deploy containers, and execute serverless functions in the cloud
- Central component of IaaS, PaaS, and serverless models

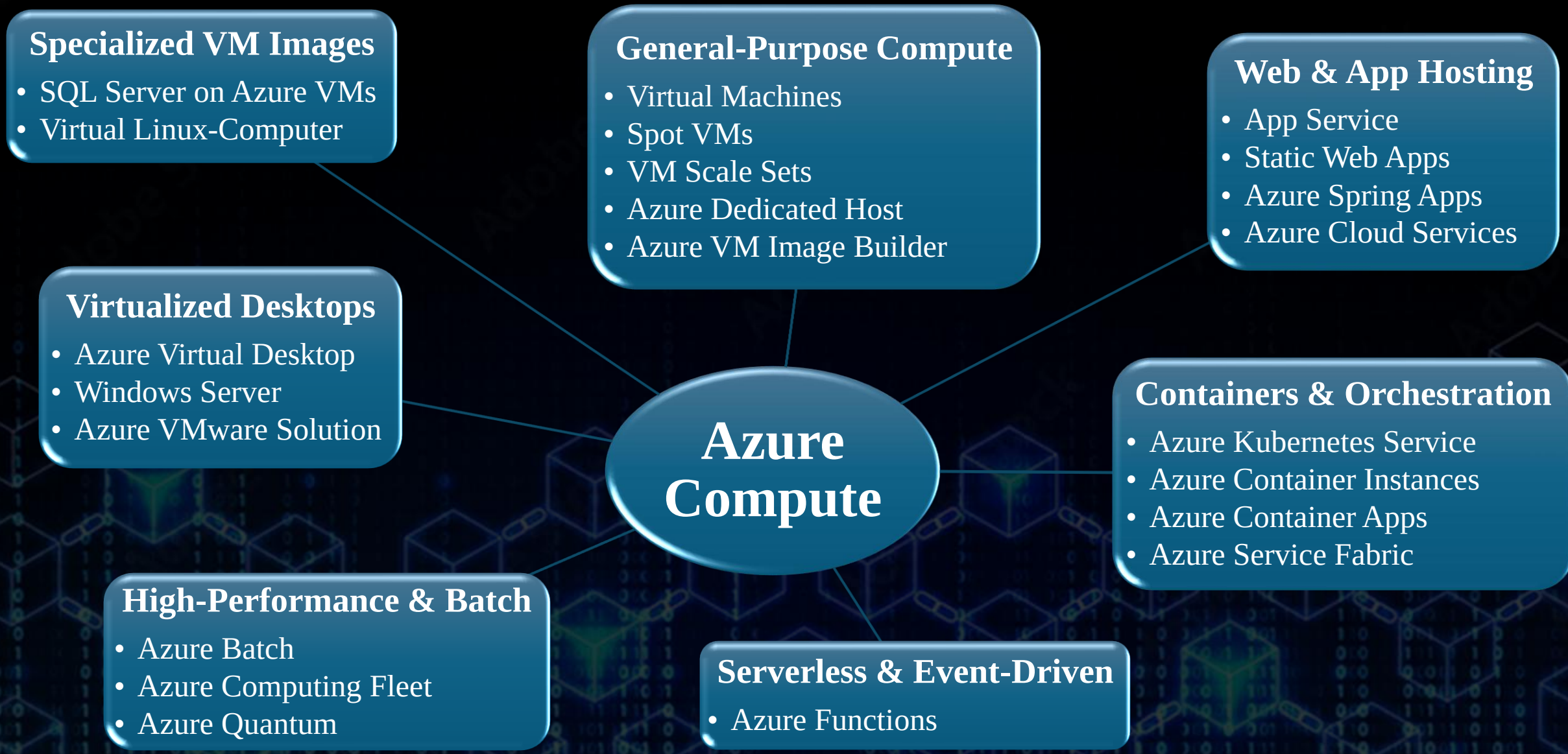
Deployment Models

- IaaS: Full control over VMs and networking (e.g., Azure Virtual Machines)
- PaaS: Simplified deployment and scaling of apps (e.g., App Service)
- Serverless Computing: Event-driven execution without managing servers (e.g., Azure Functions)

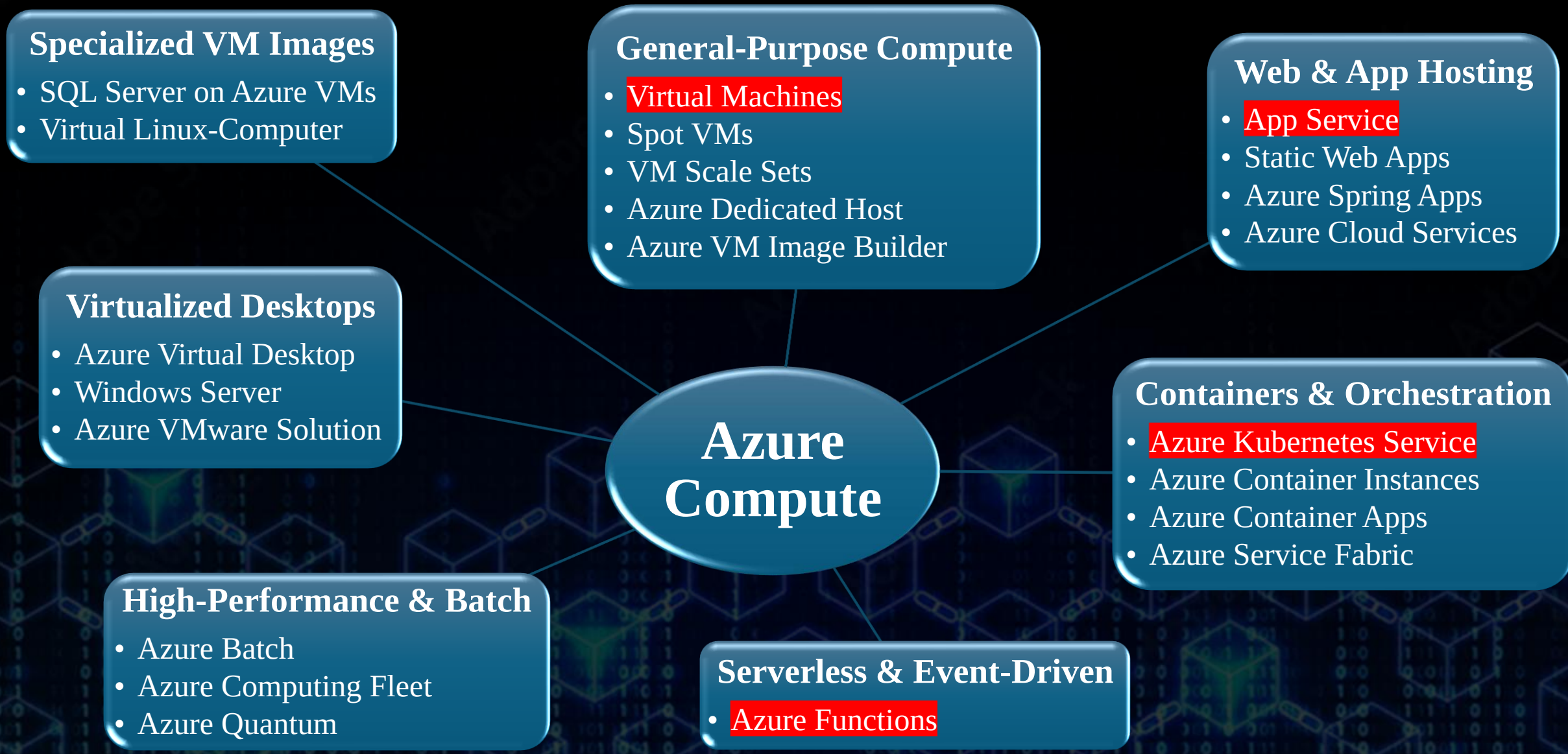
Key Benefits

- Scalability on demand
- High availability across global regions
- Integrated with networking, storage, and identity services
- Pay-as-you-go pricing

1. Azure Compute: Introduction and Overview



1. Azure Compute: Introduction and Overview



2. Azure Virtual Machines

About Azure VMs

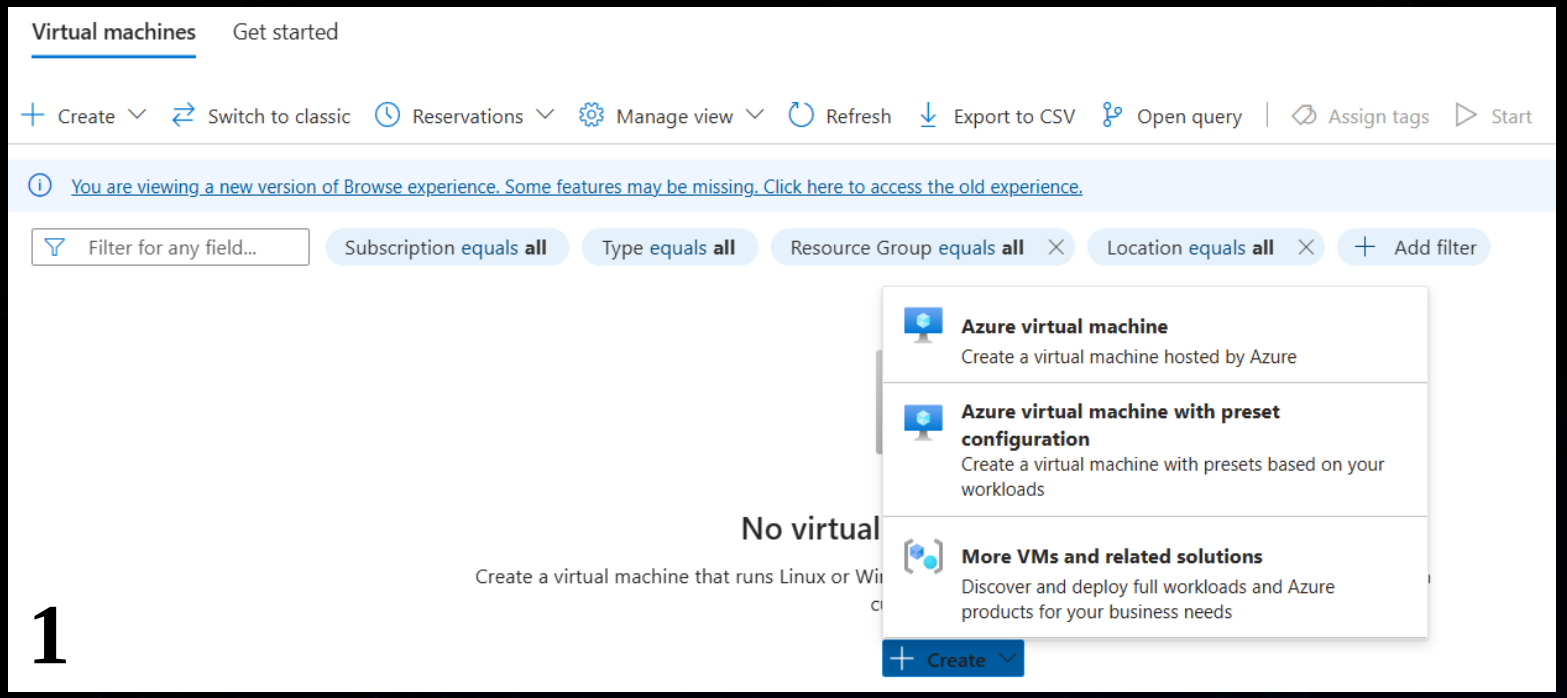
- Scalable, on-demand computing resources running Windows or Linux
- Offers full control over the OS, file system, and installed software

Key Features

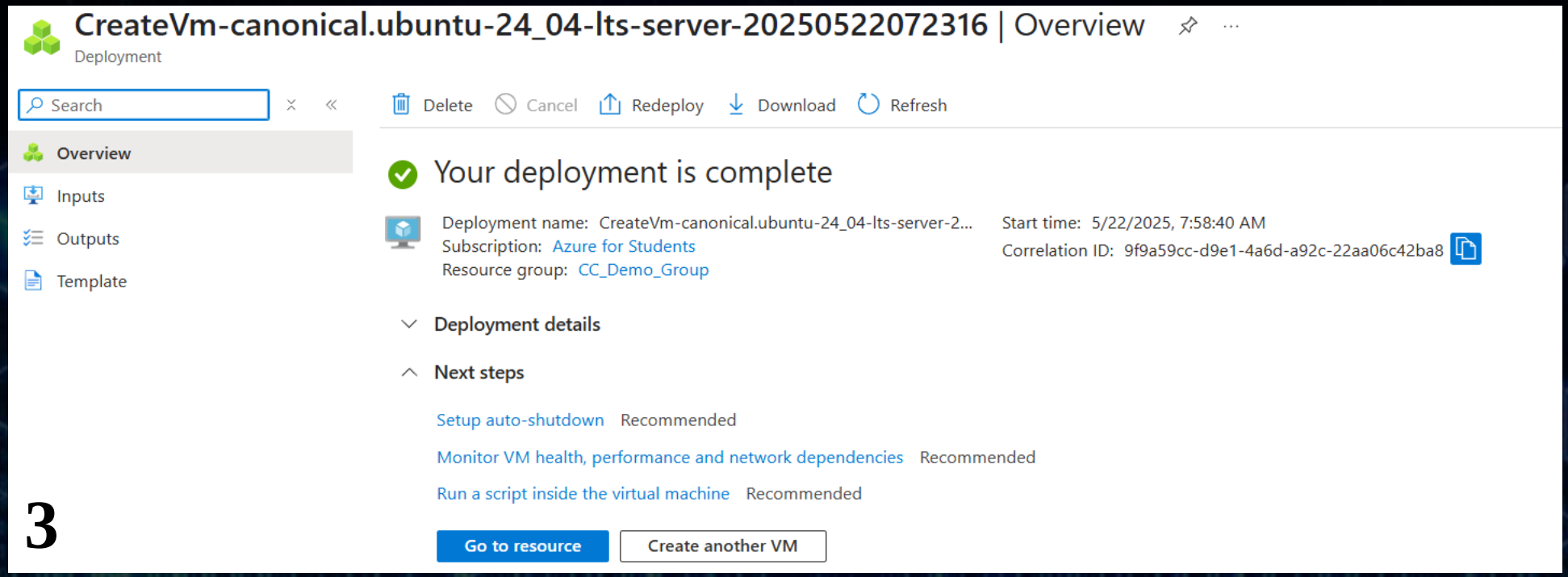
- Wide range of VM sizes (general purpose, compute-optimized, memory-optimized, etc.)
- Support for custom images and extensions
- Availability zones and auto-scaling
- Integration with Azure Load Balancer and Azure Disk Storage

Configuration & Use case

- Deploy via Azure Portal, CLI, or templates
- Choose OS, region, VM size, and storage type
- Select SSH or RDP access, as well as managed or unmanaged disks
- Example: Hosting a personal website using a basic web server like Apache on a Linux VM


Virtual machines
Get started
Create
Switch to classic
Reservations
Manage view
Refresh
Export to CSV
Open query
Assign tags
Start
You are viewing a new version of Browse experience. Some features may be missing. Click here to access the old experience.
Filter for any field...
Subscription equals all
Type equals all
Resource Group equals all
Location equals all
Add filter
Azure virtual machine
Create a virtual machine hosted by Azure
Azure virtual machine with preset configuration
Create a virtual machine with presets based on your workloads
More VMs and related solutions
Discover and deploy full workloads and Azure products for your business needs
Create
No virtual
Create a virtual machine that runs Linux or Wi
1


2
Generate new key pair
An SSH key pair contains both a public key and a private key. Azure doesn't store the private key. After the SSH key resource is created, you won't be able to download the private key again. Learn more
Download private key and create resource
Return to create a virtual machine


CreateVm-canonical.ubuntu-24_04-lts-server-20250522072316 | Overview
Deployment
Search
Overview
Inputs
Outputs
Template
Delete
Cancel
Redeploy
Download
Refresh
Your deployment is complete
Deployment name: CreateVm-canonical.ubuntu-24_04-lts-server-2...
Subscription: Azure for Students
Resource group: CC_Demo_Group
Start time: 5/22/2025, 7:58:40 AM
Correlation ID: 9f9a59cc-d9e1-4a6d-a92c-22aa06c42ba8
Deployment details
Next steps
Setup auto-shutdown Recommended
Monitor VM health, performance and network dependencies Recommended
Run a script inside the virtual machine Recommended
Go to resource
Create another VM
3

3. Azure App Services

About Azure App Services

- Fully managed platform for building, hosting, and scaling web apps, REST APIs, and backend services
- Broad open source support: .NET, Java, Node.js, Python, PHP, and more

Key Features

- Built-in support for custom domains, SSL, CI/CD, and authentication
- Auto-scaling and high availability across regions
- Deployment slots for zero-downtime releases
- Integrated monitoring with application insights

Configuration & Use case

- Deploy from local files, GitHub, Azure DevOps, or container registry
- Choose runtime stack (e.g., .NET, Node.js), region, and pricing tier
- Ideal for hosting dynamic websites or APIs without managing infrastructure
- Example: Hosting an internal tool for a small business, e.g. an employee timesheet app

App Services

student.fh-kiel.de

Create | Manage Deleted Apps | Manage view | Refresh | Export to CSV | Open query | Assign tags | Start | Restart

- Web App
- Static Web App
- Web App + Database
- WordPress on App Service

of Browse experience. Some features may be missing. Click here to access the old experience.

Subscription equals **all** | Resource Group equals **all** | Type equals **all** | Location equals **all** | Add filter

No app services to display

1

Create Web App

2

Project Details

Select a subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * : Azure for Students

Resource Group * : CC_Demo_Group

Create new

Instance Details

Name : App-Services-Demo .azurewebsites.net

Secure unique default hostname on. More about this update

Publish * : Code | Container

Runtime stack * : .NET 9 (STS)

Operating System * : Linux | Windows

Region * : Canada Central

Not finding your App Service Plan? Try a different region or select your App

Review + create | < Previous | Next : Database >

Microsoft Azure | Search resources, services, and docs (G+/) | Copilot

All services >

Microsoft.Web-WebApp-Portal-91b7916b-ab02 | Overview

Deployment

Search

- Overview
- Inputs
- Outputs
- Template

Delete | Cancel | Redeploy | Download | Refresh

Your deployment is complete

Deployment name : Microsoft.Web-WebApp-Portal-91b7916b-ab02
Subscription : Azure for Students
Resource group : CC_Demo_Group

Start time : 5/22/2025, 1:59:01 PM
Correlation ID : 3e9e8884-82f5-4ddc-a4e6-c0302c39b6fc

Deployment details

Resource	Type	Status	Operation details
App-Services-Demo/scm	Microsoft.Web/sites/basicPublis	OK	Operation details
App-Services-Demo/ftp	Microsoft.Web/sites/basicPublis	OK	Operation details
App-Services-Demo	Microsoft.Web/sites	OK	Operation details
ASP-CCDemoGroup-a0fe	Microsoft.Web/serverfarms	OK	Operation details

Next steps

3

4. Azure Functions

About Azure Functions

- Serverless compute service that lets you run small pieces of code in response to events

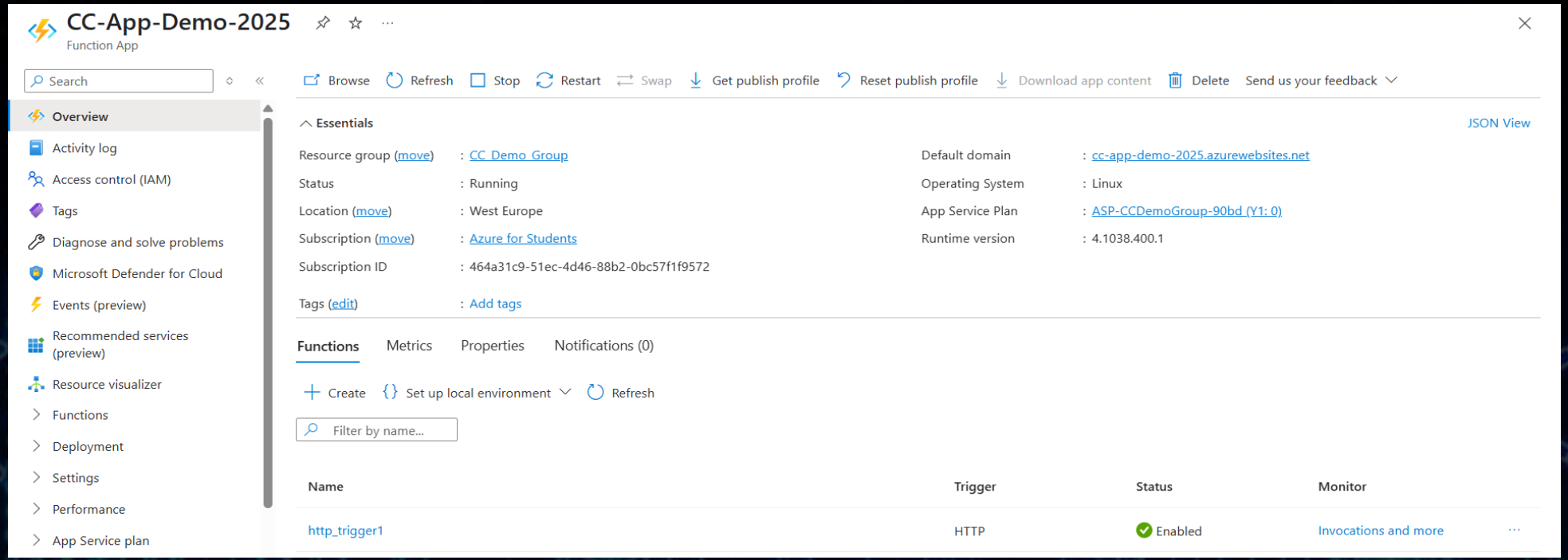
Key Features

- Event-driven: triggered by HTTP requests, storage uploads, timers, queues, etc.
- Automatic scaling: runs multiple instances as needed
- Supports multiple languages: C#, JavaScript, Python, PowerShell, more
- Integrates with other Azure services:, e.g Blob Storage, Cosmos DB, Logic Apps

Configuration & Use case

- Choose hosting plan, runtime, and trigger type (e.g., HTTP, Timer)
- Code directly in the portal or deploy from GitHub
- Ideal for automating lightweight tasks or building quick APIs
- Example: Automatically sending a confirmation email when someone submits a contact form on a website

Hosting plans	Flex Consumption	Consumption	Functions Premium	App Service	Container Apps environment
	Get high scalability with compute choices, virtual networking, and pay-as-you-go billing.	Pay for compute resources when your functions are running (pay-as-you-go).	Deploy multiple function apps on the same plan with event-driven scaling.	Run web apps and function apps on the same plan with more compute choices and pay for the instances of the plan.	Host function apps with other containerized microservices and pay for compute capacity.
Scale to zero	✓	✓	-	-	✓
Scale behavior	Fast event-driven	Event-driven	Event-driven	Metrics based	Event-driven with KEDA
Virtual networking	✓	-	✓	✓	✓
Dedicated compute and prevent cold start	Optional with Always Ready	-	Minimum of 1 instance required	Minimum of 1 instance required	Optional with minimum replicas
Max scale out (instances)	1000	200	100	30	300



https://cc-app-demo-2025.azurewebsites.net/api/http_trigger1?name=Hannes

5. Azure Kubernetes Service (AKS)

About Azure Kubernetes Services

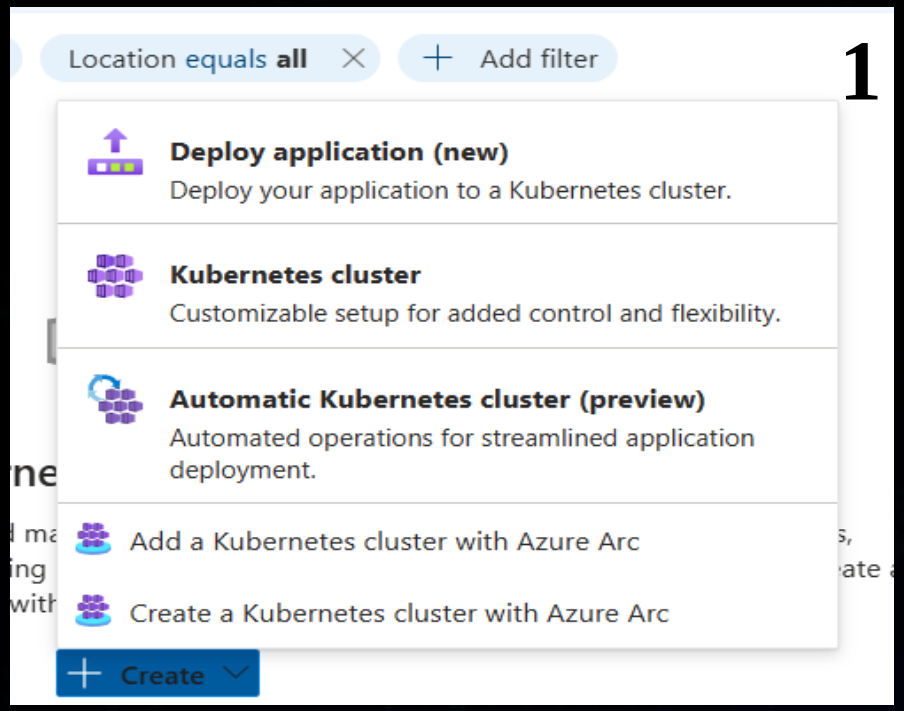
- Fully managed Kubernetes service
- Simplifies deploying, managing, and scaling containerized applications using Kubernetes

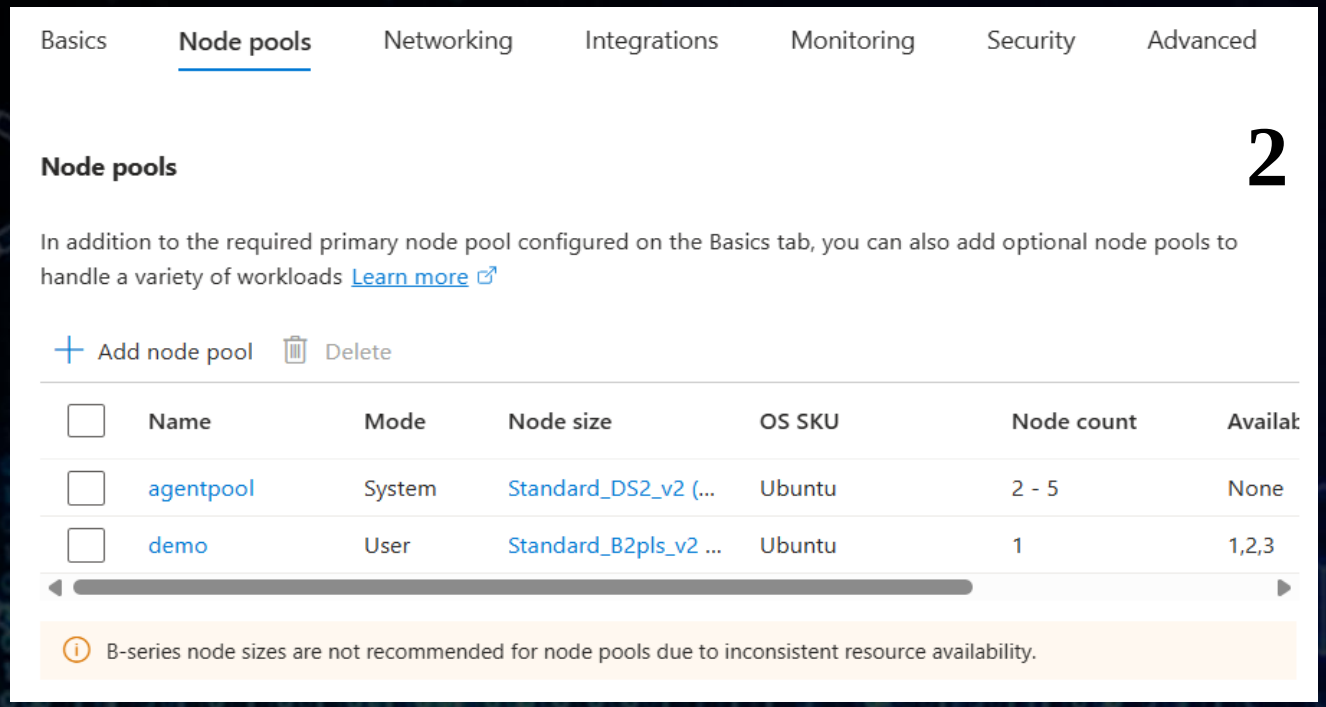
Key Features

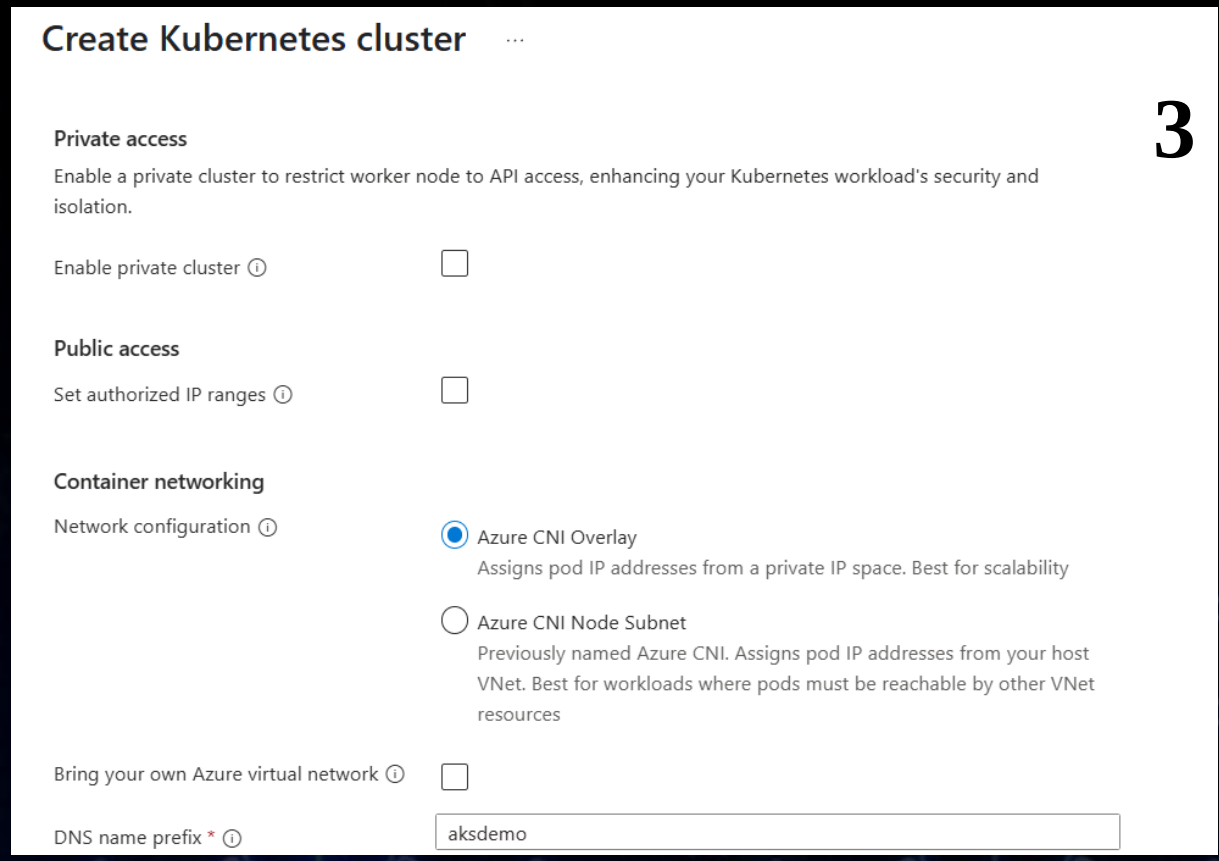
- Handles complex container orchestration (deployment, scaling, load balancing)
- Integrated monitoring, auto-scaling, and rolling updates
- Supports both Linux and Windows containers
- Connects easily to services like Azure Load Balancer and Azure Container Registry

Configuration & Use case

- Choose cluster size (number of nodes), region, node VM type, and Kubernetes version
- Use the Azure Portal, CLI, or Infrastructure-as-Code (e.g., Bicep, Terraform)
- Suitable for running microservices apps or containerized enterprise platforms
- Example: Deploying a containerized e-commerce web app with frontend, backend, and database services across pods


Location equals all
Add filter
1
Deploy application (new)
Deploy your application to a Kubernetes cluster.
Kubernetes cluster
Customizable setup for added control and flexibility.
Automatic Kubernetes cluster (preview)
Automated operations for streamlined application deployment.
Add a Kubernetes cluster with Azure Arc
Create a Kubernetes cluster with Azure Arc
Create


Basics
Node pools
Networking
Integrations
Monitoring
Security
Advanced
2
Node pools
In addition to the required primary node pool configured on the Basics tab, you can also add optional node pools to handle a variety of workloads Learn more
Add node pool
Delete
Name
Mode
Node size
OS SKU
Node count
Availab
agentpool
System
Standard_DS2_v2 (...
Ubuntu
2 - 5
None
demo
User
Standard_B2pls_v2 ...
Ubuntu
1
1,2,3
B-series node sizes are not recommended for node pools due to inconsistent resource availability.


Create Kubernetes cluster
3
Private access
Enable a private cluster to restrict worker node to API access, enhancing your Kubernetes workload's security and isolation.
Enable private cluster
Public access
Set authorized IP ranges
Container networking
Network configuration
Azure CNI Overlay
Assigns pod IP addresses from a private IP space. Best for scalability
Azure CNI Node Subnet
Previously named Azure CNI. Assigns pod IP addresses from your host VNet. Best for workloads where pods must be reachable by other VNet resources
Bring your own Azure virtual network
DNS name prefix *
aksdemo

6. Pricing Models

Service	Pricing Model(s)	Free Tier Available	Main Billing Unit	Notes
Azure VMs	Pay-as-you-go, Reserved	750 hrs/month (B1s)	Per second (CPU/memory)	Varies by VM size and region
App Service	Tier-based (F1, B1, etc.)	F1 (1 GB RAM, 60 mins/day)	Per App Service Plan	Upgrades offer scaling, SSL, staging
Azure Functions	Consumption Plan	1M requests + 400k GB-s	Per execution + memory	Costs may vary depending on trigger type
AKS	Pay for Infrastructure (Nodes, Storage, …)	Free control plane	VM node usage (per second)	Pay for VMs and related storage

7. Use Cases & Solutions

Web Application Deployment

- Use **Azure App Service** to host the frontend
- Connect to **Azure SQL** or **Cosmos DB** for data
- Use **Azure Functions** for background tasks like sending emails or image processing

E-commerce Platform (Microservices)

- Deploy microservices (product catalog, shopping cart, payment service) on **AKS**
- Use **Azure Load Balancer** to distribute incoming traffic across services running in AKS cluster
- Add **Azure Functions** for lightweight services like order confirmations, inventory updates, etc.

Academic Research Workflow Automation

- Azure VMs to run simulations or data analysis with custom software environments (R, Python,...)
- Azure Functions to automate data preprocessing or file conversion when results are uploaded
- Azure App Service to host a simple web interface to submit jobs and download results

8. Summary & Takeaways

Azure Compute

- Offers a broad range of services to run workloads of any size and type
- Allows various customer groups to build smart, scalable solutions without managing hardware

We explored 4 Services

- Virtual Machines: Full control for flexible compute
- App Service: Simplified web app hosting
- Functions: Lightweight, event-driven automation
- AKS: Powerful container orchestration at scale

Combine different services depending on needs and use cases

Pricing Models

- Pay-as-you-go for most services, but free tiers available (750 VM hours, 1M Function executions)
- Costs based on resource usage (time, memory, compute), so you only pay for what you use

Thanks for your attention!