Welcome to Week 1

AWS & Azure Academy 2024

PLURALSIGHT

Hello

About me...

- 27+ years in the industry
- 23+ years in teaching
- Certified Cloud architect
- Passionate about learning
- Also, passionate about Reese's Cups!

Agenda

- Speaking the language of Cloud
- Survey of AWS vs. Azure Services (Compute, Networking, Storage, Database)
- Secure networking on the Cloud (AWS PrivateLink and Azure Private Endpoints)
- Infrastructure-as-Code (IaC) – The What and the Why

How we're going to work together

- Slides and words to highlight key concepts
- Demos to bring those concepts "to life"
- Lab work (which will take place in sandboxes provided by "A Cloud Guru") for hands-on reinforcement
- NOTE: I welcome being interrupted – if you need more info, or clarification, or anything else, just break in and ask. I am here to help you.

Speaking the Language of Cloud

Application Hosting

By Application Hosting, we mean the target infrastructure and runtime platform used for deployment and execution of an application or system; can include compute (CPU and server resources), storage, network, data and operating system

Application Hosting – An “Interesting” Example?

Here’s an example of someone thinking “outside-of-the-box” when it comes to application hosting!

https://mashable.com/article/pregnancy-test-doom/

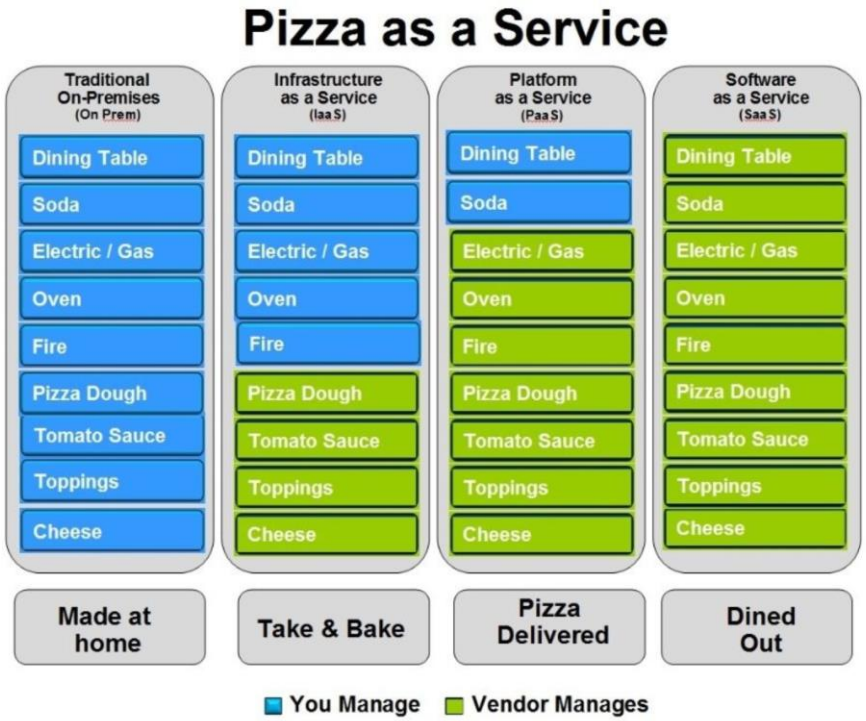
What Are the Hosting Options with Cloud?

- IaaS
- PaaS
- Serverless / FaaS
- SaaS
- Containers

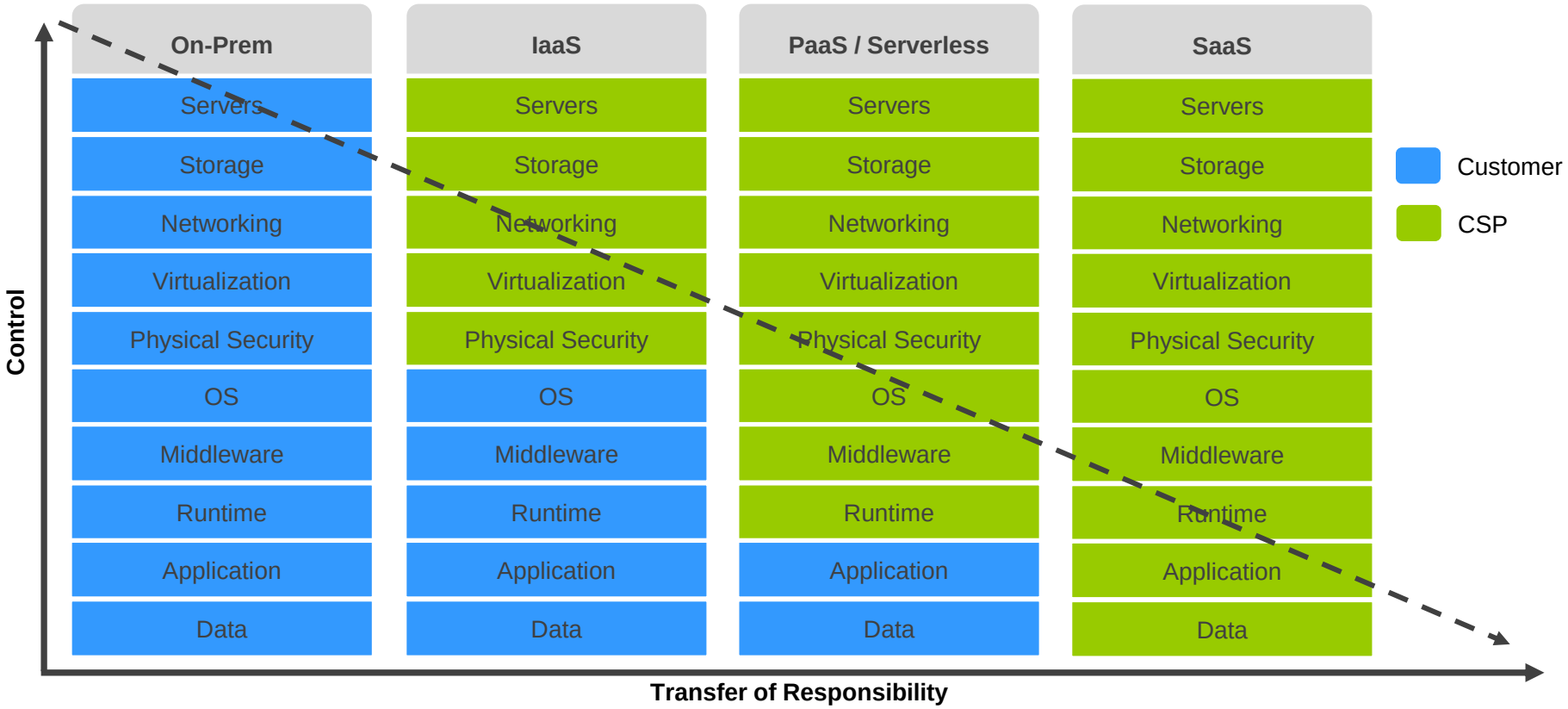
What do they all mean?

Pizza-as-a-Service

From a LinkedIn post by Albert Barron from IBM (https://www.linkedin.com/pulse/20140730172610-9679881-pizza-as-a-service/**)**



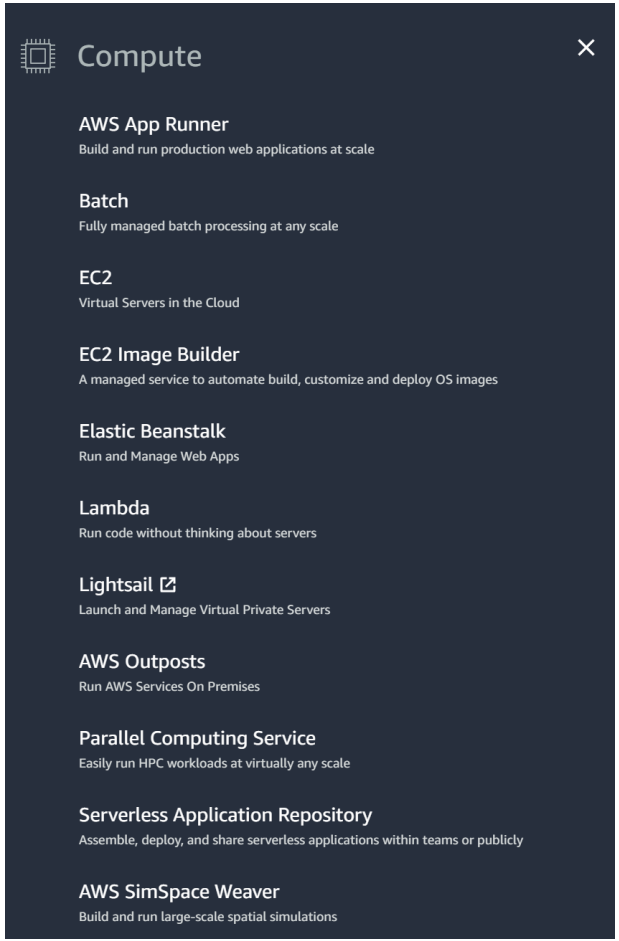
Side-by-Side Comparison



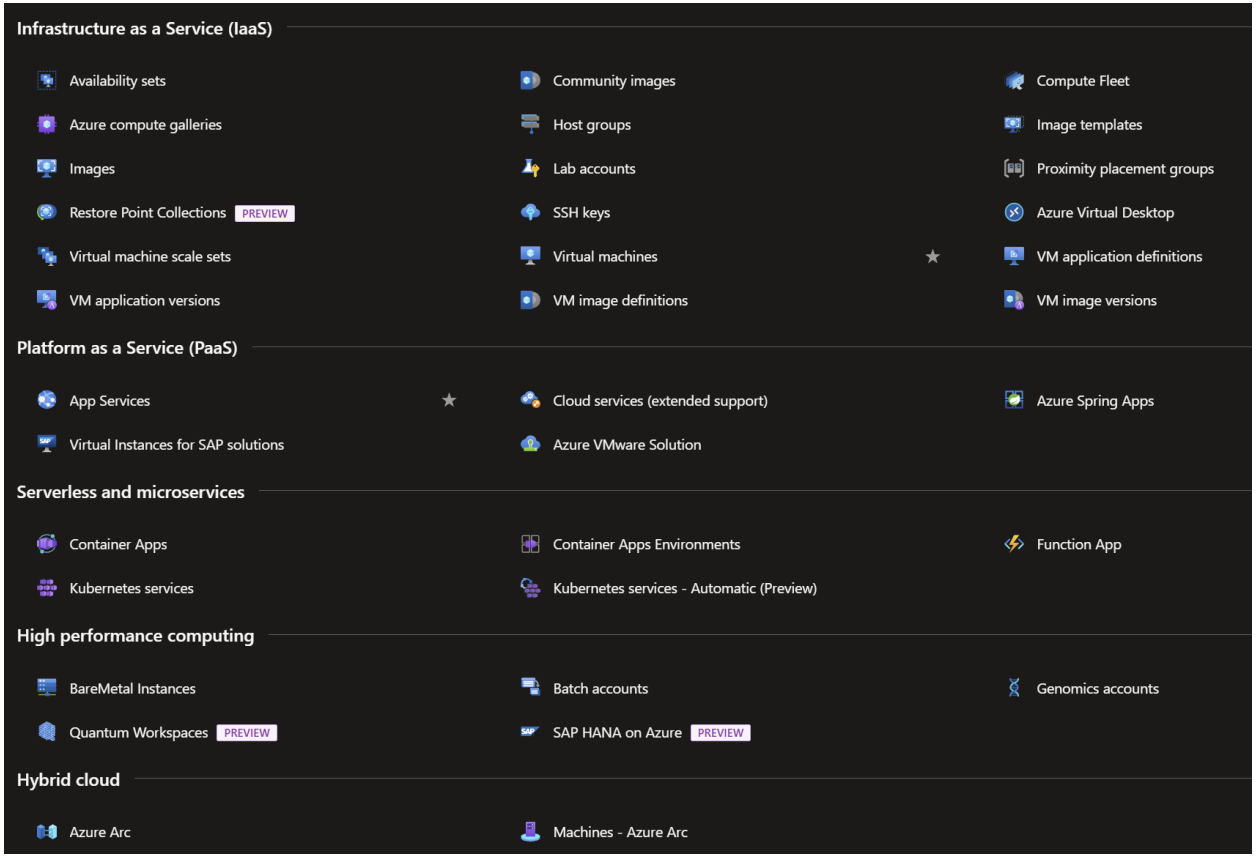
Survey of AWS vs. Azure Services

Compute

AWS


Compute
AWS App Runner
Build and run production web applications at scale
Batch
Fully managed batch processing at any scale
EC2
Virtual Servers in the Cloud
EC2 Image Builder
A managed service to automate build, customize and deploy OS images
Elastic Beanstalk
Run and Manage Web Apps
Lambda
Run code without thinking about servers
Lightsail
Launch and Manage Virtual Private Servers
AWS Outposts
Run AWS Services On Premises
Parallel Computing Service
Easily run HPC workloads at virtually any scale
Serverless Application Repository
Assemble, deploy, and share serverless applications within teams or publicly
AWS SimSpace Weaver
Build and run large-scale spatial simulations

Azure


Infrastructure as a Service (IaaS)
Availability sets
Community images
Compute Fleet
Azure compute galleries
Host groups
Image templates
Images
Lab accounts
Proximity placement groups
Restore Point Collections PREVIEW
SSH keys
Azure Virtual Desktop
Virtual machine scale sets
Virtual machines
VM application definitions
VM application versions
VM image definitions
VM image versions
Platform as a Service (PaaS)
App Services
Cloud services (extended support)
Azure Spring Apps
Virtual Instances for SAP solutions
Azure VMware Solution
Serverless and microservices
Container Apps
Container Apps Environments
Function App
Kubernetes services
Kubernetes services - Automatic (Preview)
High performance computing
BareMetal Instances
Batch accounts
Genomics accounts
Quantum Workspaces PREVIEW
SAP HANA on Azure PREVIEW
Hybrid cloud
Azure Arc
Machines - Azure Arc

DEMO/LAB:

AWS - EC2 Instance Bootstrapping

Execute the “Hands-On” lab available at https://github.com/KernelGamut32/aws_azure_academy_2024_public/tree/main/week01/labs/lab01

DEMO/LAB:

AWS - Lambda Using AWS Console

Execute the “Hands-On” lab available at https://github.com/KernelGamut32/aws_azure_academy_2024_public/tree/main/week01/labs/lab02

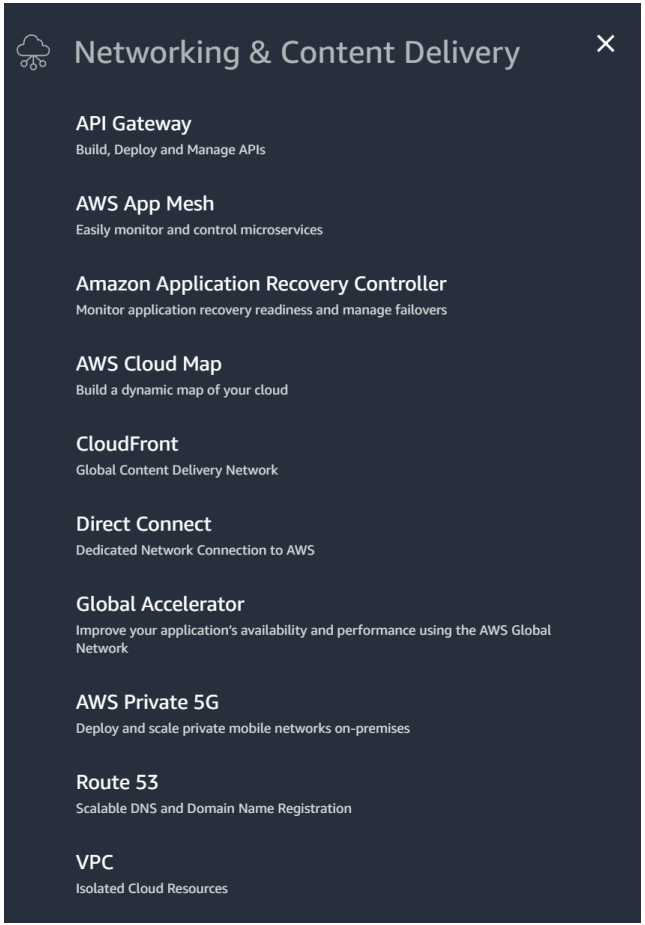
DEMO/LAB:

Azure - Function App in Azure Portal

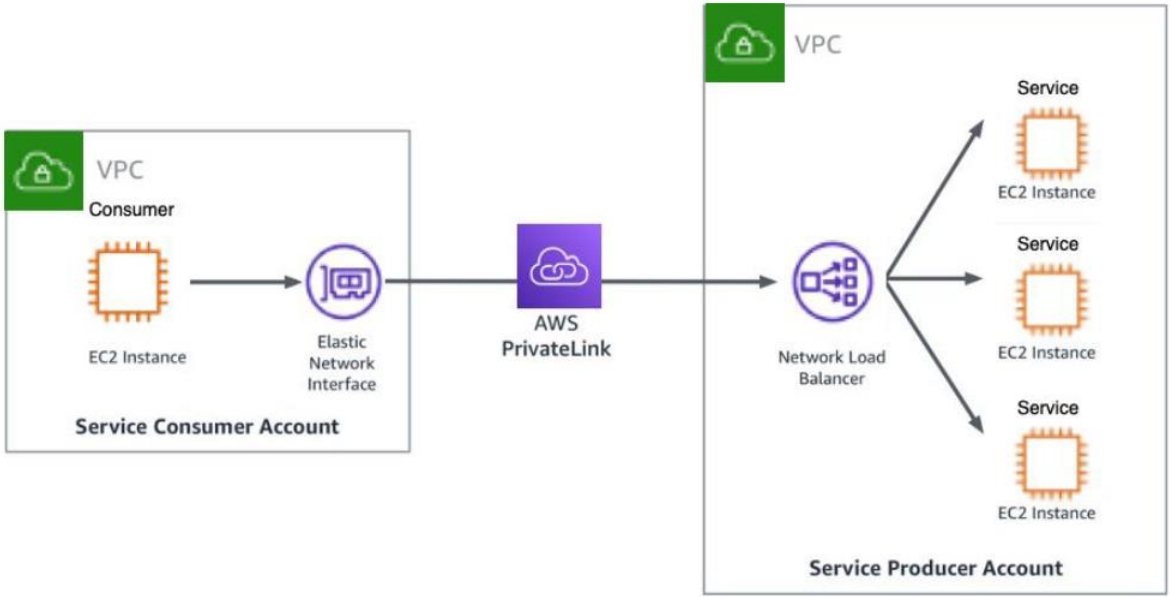
Execute the “Hands-On” lab available at https://github.com/KernelGamut32/aws_azure_academy_2024_public/tree/main/week01/labs/lab03

Networking

AWS


Networking & Content Delivery
API Gateway
Build, Deploy and Manage APIs
AWS App Mesh
Easily monitor and control microservices
Amazon Application Recovery Controller
Monitor application recovery readiness and manage failovers
AWS Cloud Map
Build a dynamic map of your cloud
CloudFront
Global Content Delivery Network
Direct Connect
Dedicated Network Connection to AWS
Global Accelerator
Improve your application's availability and performance using the AWS Global Network
AWS Private 5G
Deploy and scale private mobile networks on-premises
Route 53
Scalable DNS and Domain Name Registration
VPC
Isolated Cloud Resources

AWS PrivateLink

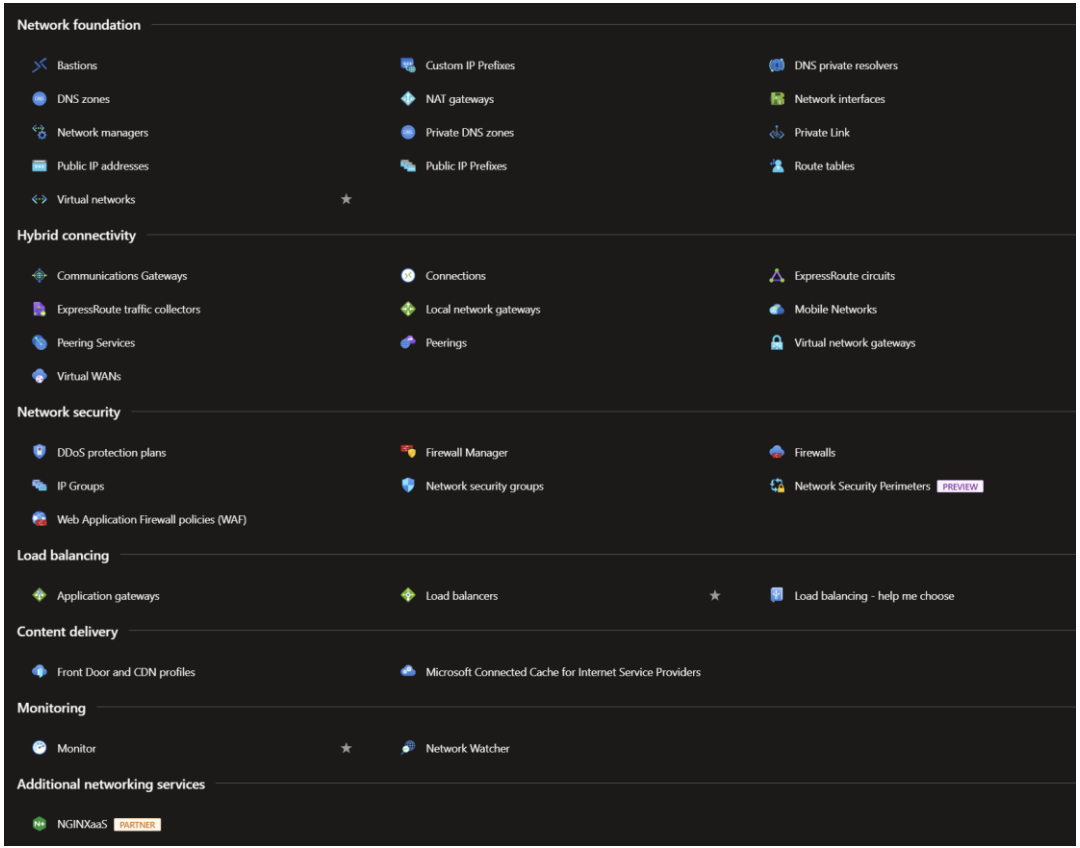


https://docs.aws.amazon.com/vpc/latest/privatelink/what-is-privatelink.html

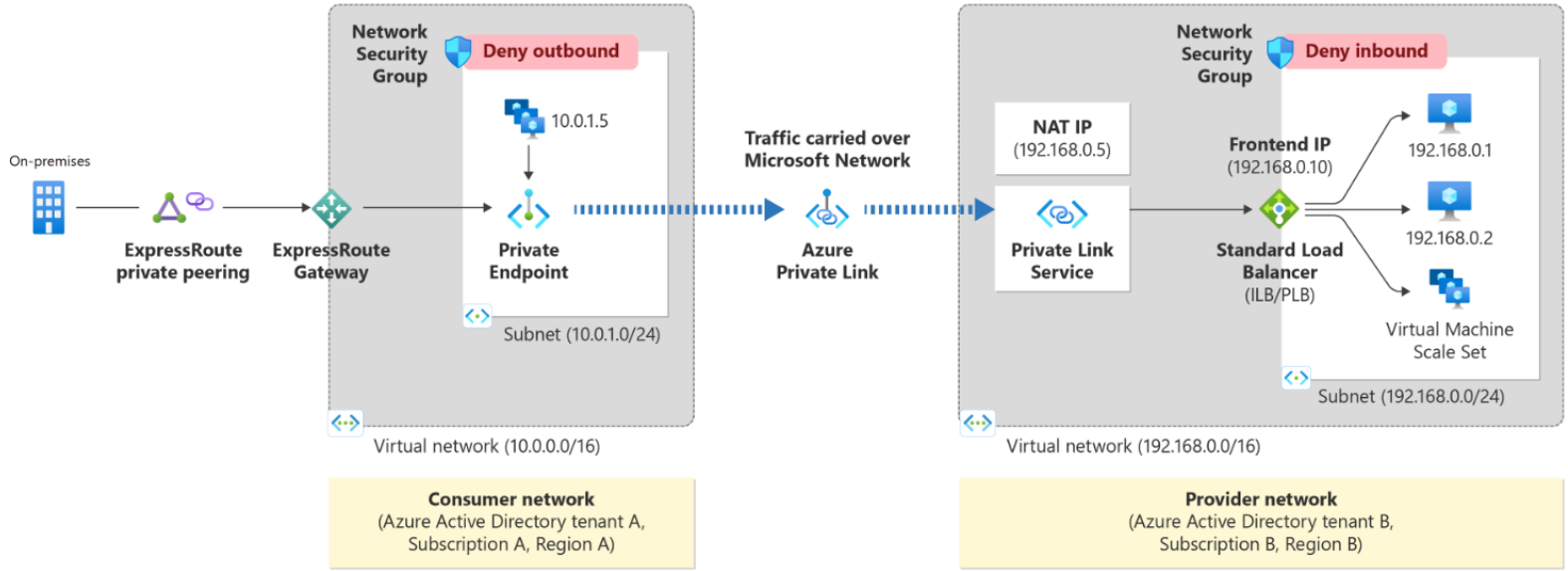
https://docs.aws.amazon.com/vpc/latest/privatelink/concepts.html

https://docs.aws.amazon.com/whitepapers/latest/aws-privatelink/aws-privatelink.html

Azure


Network foundation
Bastions
Custom IP Prefixes
DNS private resolvers
DNS zones
NAT gateways
Network interfaces
Network managers
Private DNS zones
Private Link
Public IP addresses
Public IP Prefixes
Route tables
Virtual networks
Hybrid connectivity
Communications Gateways
Connections
ExpressRoute circuits
ExpressRoute traffic collectors
Local network gateways
Mobile Networks
Peering Services
Peerings
Virtual network gateways
Virtual WANs
Network security
DDoS protection plans
Firewall Manager
Firewalls
IP Groups
Network security groups
Network Security Perimeters
PREVIEW
Web Application Firewall policies (WAF)
Load balancing
Application gateways
Load balancers
Load balancing - help me choose
Content delivery
Front Door and CDN profiles
Microsoft Connected Cache for Internet Service Providers
Monitoring
Monitor
Network Watcher
Additional networking services
NGINXaaS
PARTNER

Azure Private Link



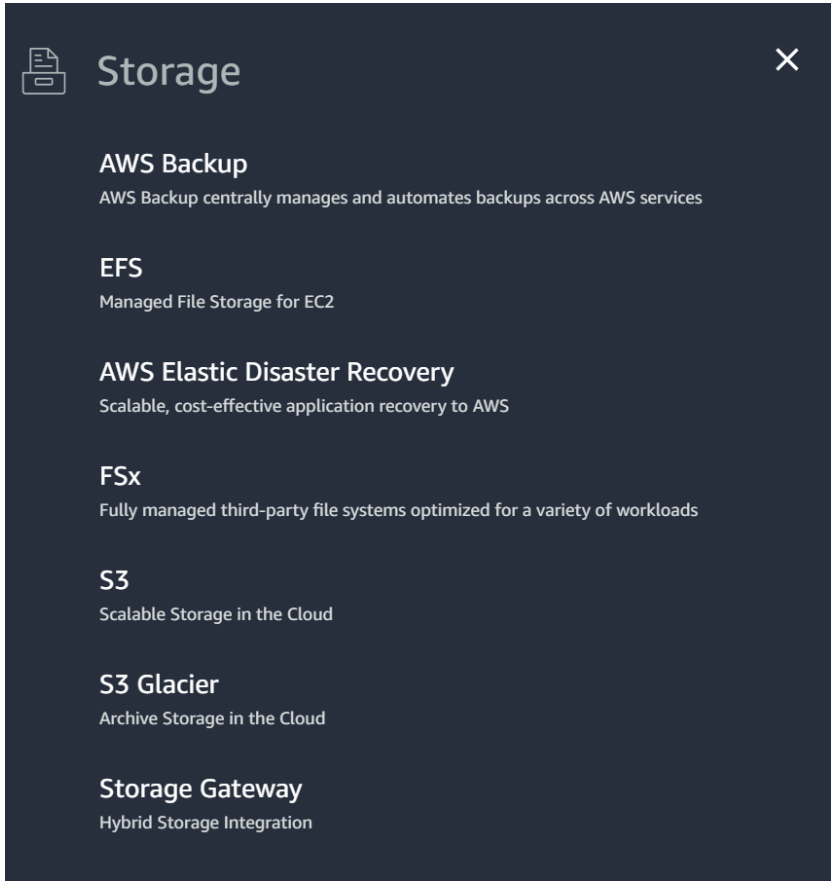
https://learn.microsoft.com/en-us/azure/private-link/private-link-overview

https://learn.microsoft.com/en-us/azure/private-link/private-link-service-overview

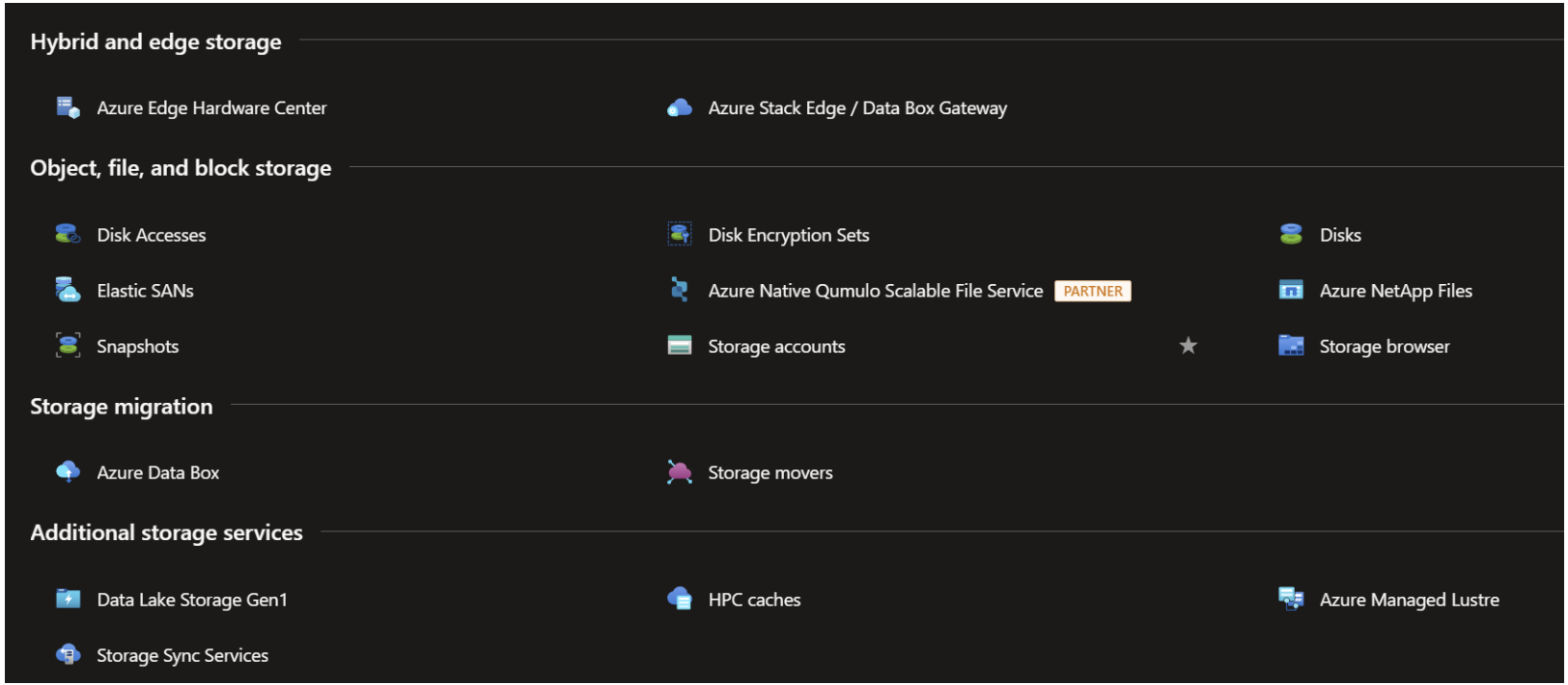
https://learn.microsoft.com/en-us/azure/private-link/private-endpoint-overview

Storage

AWS


Storage
AWS Backup
AWS Backup centrally manages and automates backups across AWS services
EFS
Managed File Storage for EC2
AWS Elastic Disaster Recovery
Scalable, cost-effective application recovery to AWS
FSx
Fully managed third-party file systems optimized for a variety of workloads
S3
Scalable Storage in the Cloud
S3 Glacier
Archive Storage in the Cloud
Storage Gateway
Hybrid Storage Integration

Azure


Hybrid and edge storage
Azure Edge Hardware Center
Azure Stack Edge / Data Box Gateway
Object, file, and block storage
Disk Accesses
Disk Encryption Sets
Disks
Elastic SANs
Azure Native Qumulo Scalable File Service
PARTNER
Azure NetApp Files
Snapshots
Storage accounts
Storage browser
Storage migration
Azure Data Box
Storage movers
Additional storage services
Data Lake Storage Gen1
HPC caches
Azure Managed Lustre
Storage Sync Services

DEMO/LAB:

AWS - S3 and VPC

Execute the “Hands-On” lab available at
https://github.com/KernelGamut32/aws_azure_academy_2024_public/tree/main/week01/labs/lab04

DEMO/LAB:

Azure - Private Link for Blob Storage

Execute the “Hands-On” lab available at https://github.com/KernelGamut32/aws_azure_academy_2024_public/tree/main/week01/labs/lab05

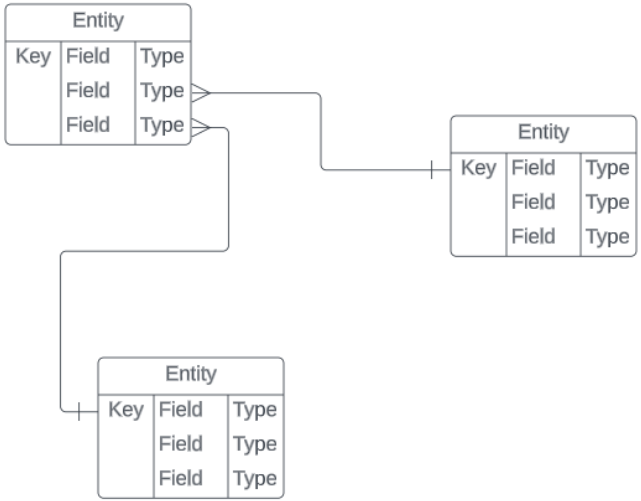
DEMO/LAB:

AWS - PrivateLink

Execute the “Hands-On” lab available at
https://github.com/KernelGamut32/aws_azure_academy_2024_public/tree/main/week01/labs/lab06

Database

Relational Databases

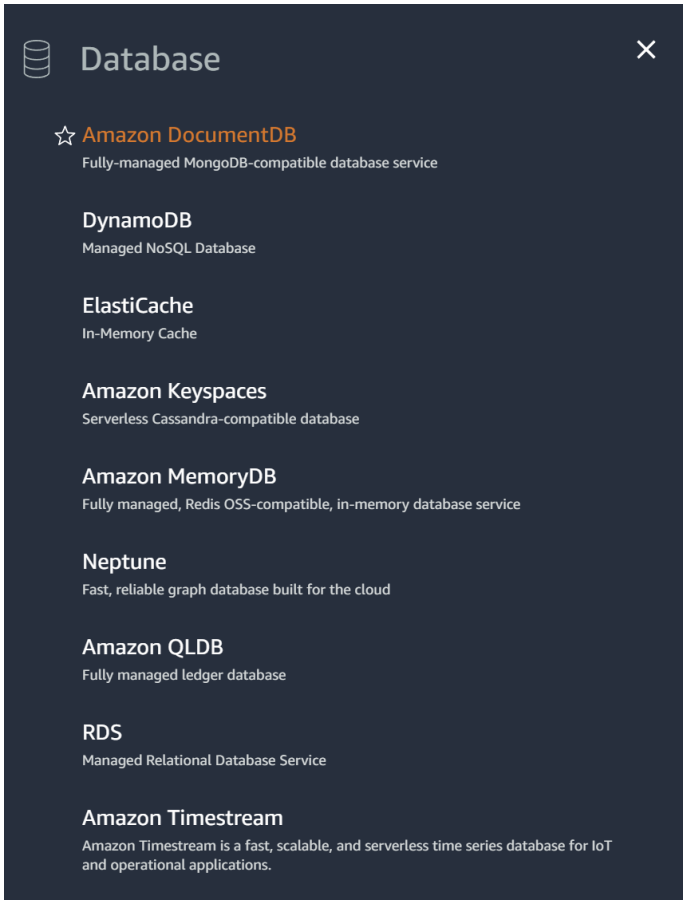


- Collection of related tables (representing entities) and fields (representing entity attributes)
- Supports identification of keys that can be used to quickly locate and uniquely identify entities
- Normalized relationships used to create hierarchies of connected entities and minimize data duplication
- Strict data design (schema)

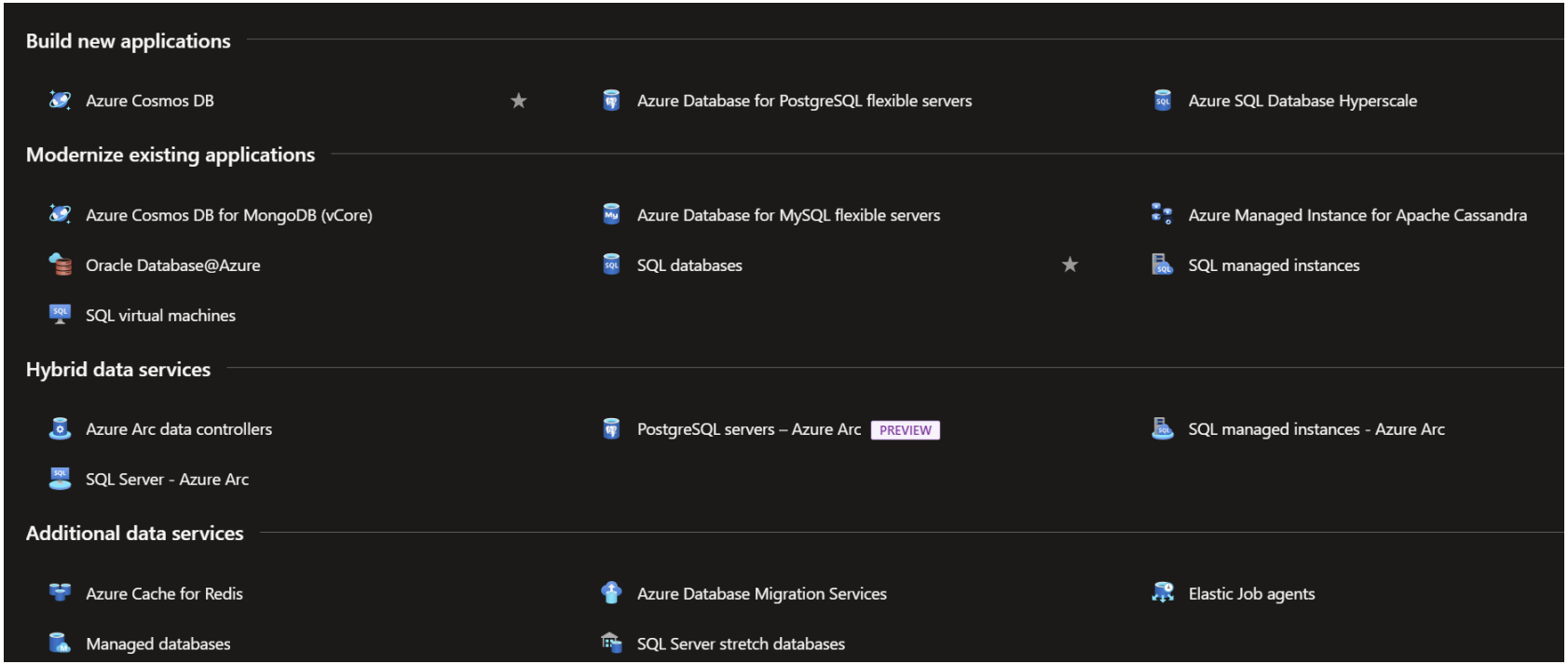
Document Databases

- Data represented as a logical grouping of attributes and relationships
- Captures entire hierarchy (parent and children) used to describe an entity (or “document”)
- Data is repeated (rather than normalized), fully encapsulating all detail about an entity in the system
- Fluid data design

AWS


Database
Amazon DocumentDB
Fully-managed MongoDB-compatible database service
DynamoDB
Managed NoSQL Database
ElastiCache
In-Memory Cache
Amazon Keyspaces
Serverless Cassandra-compatible database
Amazon MemoryDB
Fully managed, Redis OSS-compatible, in-memory database service
Neptune
Fast, reliable graph database built for the cloud
Amazon QLDB
Fully managed ledger database
RDS
Managed Relational Database Service
Amazon Timestream
Amazon Timestream is a fast, scalable, and serverless time series database for IoT and operational applications.

Azure


Build new applications
Azure Cosmos DB
Azure Database for PostgreSQL flexible servers
Azure SQL Database Hyperscale
Modernize existing applications
Azure Cosmos DB for MongoDB (vCore)
Azure Database for MySQL flexible servers
Azure Managed Instance for Apache Cassandra
Oracle Database@Azure
SQL databases
SQL managed instances
SQL virtual machines
Hybrid data services
Azure Arc data controllers
PostgreSQL servers – Azure Arc
PREVIEW
SQL managed instances - Azure Arc
SQL Server - Azure Arc
Additional data services
Azure Cache for Redis
Azure Database Migration Services
Elastic Job agents
Managed databases
SQL Server stretch databases

DEMO/LAB:

AWS - Serverless with DB

Execute the “Hands-On” lab available at
https://github.com/KernelGamut32/aws_azure_academy_2024_public/tree/main/week01/labs/lab07

DEMO/LAB:

Azure - MySQL Database

Execute the “Hands-On” lab available at
https://github.com/KernelGamut32/aws_azure_academy_2024_public/tree/main/week01/labs/lab08

Containerization

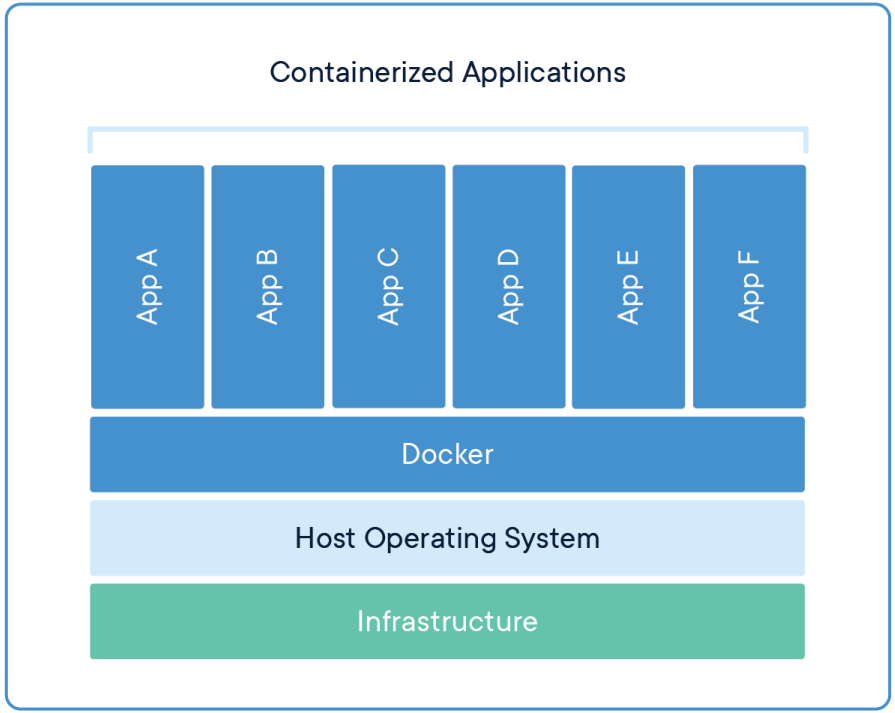
So, What Are Containers?

- Form of virtualization at the app packaging level (like virtual machines at the server level)
- Isolated from one another at the OS process layer (vs VM’s which are isolated at the hardware abstraction layer)
- Images represent the packaging up of an application and its dependencies as a complete, deployable unit of execution (code, runtime and configuration)

So, What Are Containers?

- A platform (e.g., Docker) running on a system can be used to dynamically create containers (executable instances of the app) from the defined image
- Typically, much, much smaller than a VM which makes them lightweight, quickly deployable and quick to “boot up”
- An orchestration engine (e.g., Kubernetes) might be used to coordinate multiple instances of the same container (or a “pod” of containers) to enable the servicing of more concurrent requests (scalability)

So, What Are Containers?



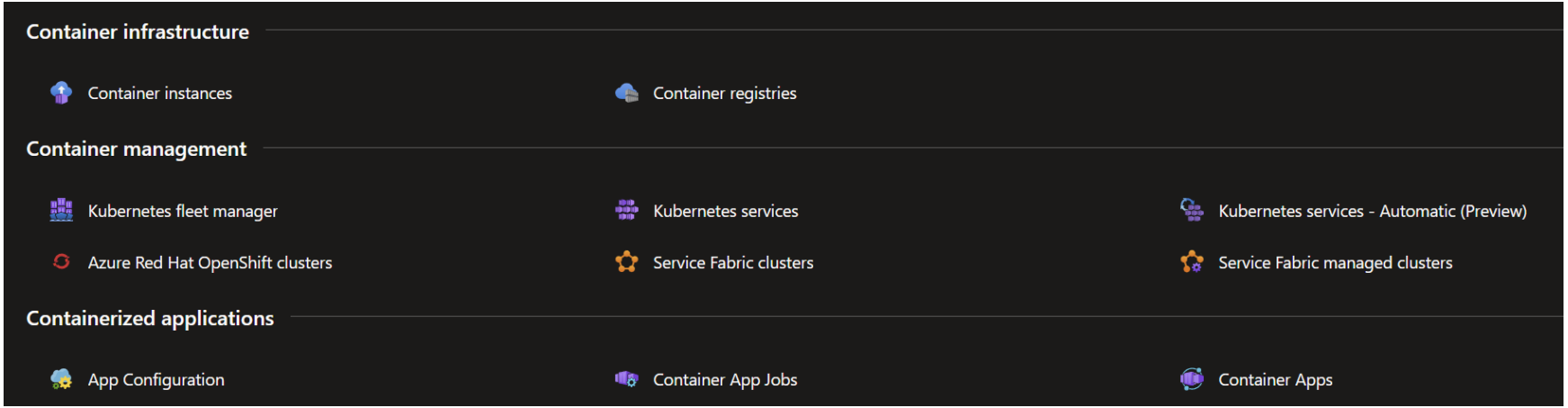
So, How Do Containers & Microservices Fit Together?

- Microservices – with their smaller size, independently-deployable and independently-scalable profile, and encapsulated business domain boundary – are a great fit for containers
- Using Kubernetes, sophisticated systems of integrated microservices can be built, tested and deployed
- Leveraging the scheduling and scalability benefits of Kubernetes can help an organization target scaling across a complex workflow in very granular ways
- This helps with cost management as you can toggle individual parts of the system for optimized performance

AWS


Containers
Elastic Container Registry
Fully-managed Docker container registry : Share and deploy container software, publicly or privately
Elastic Container Service
Highly secure, reliable, and scalable way to run containers
Elastic Kubernetes Service
The most trusted way to start, run, and scale Kubernetes
Red Hat OpenShift Service on AWS
Fully managed Red Hat OpenShift service on AWS

Azure


Container infrastructure
Container instances
Container registries
Container management
Kubernetes fleet manager
Kubernetes services
Kubernetes services - Automatic (Preview)
Azure Red Hat OpenShift clusters
Service Fabric clusters
Service Fabric managed clusters
Containerized applications
App Configuration
Container App Jobs
Container Apps

Infrastructure-as-Code (IaC)

The What and the Why

IaC – What is it?

- As the name implies, the definition & configuration of our infrastructure IN code
- Instead of manually creating (inefficient) → automated in scripts that run “at the push of a button”

IaC – Why is it valuable?

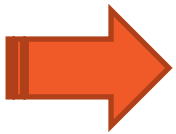
- If only creating a handful of resources, manual is (probably) fine
- Creating hundreds (or even thousands), not so much!
- Modern DevOps is built around automation – quickly tearing down and rebuilding entire sets of infrastructure as and when required

IaC – Advantages?

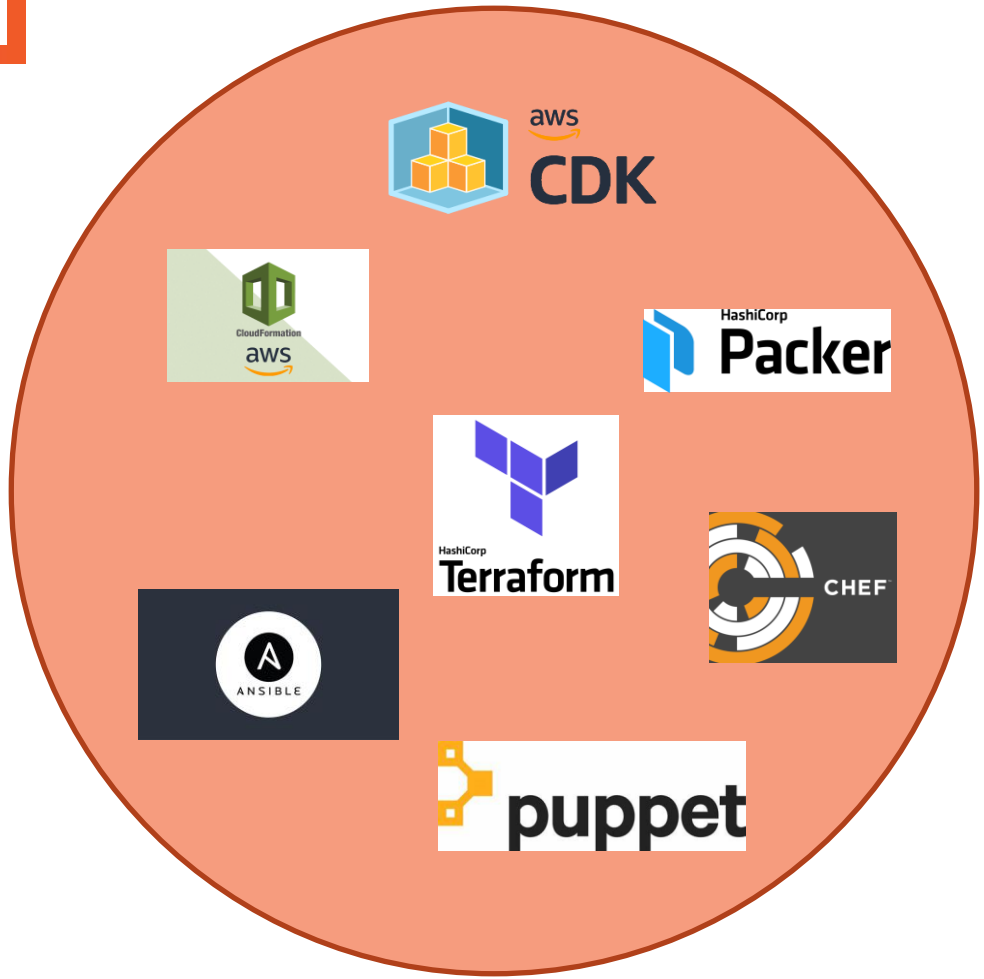
Testable

Repeatable

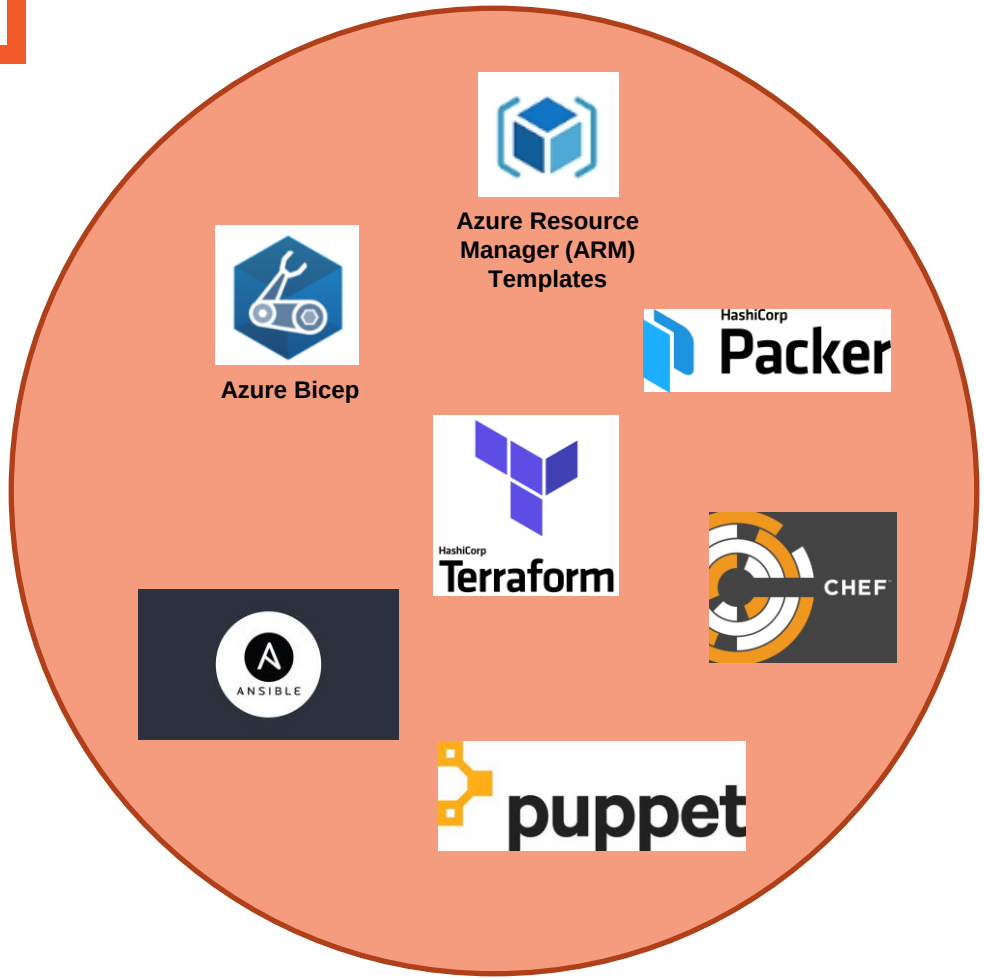
Auditable



IaC – AWS


aws
CDK
CloudFormation
aws
HashiCorp
Packer
HashiCorp
Terraform
CHEF
ANSIBLE
puppet

IaC – Azure


Azure Resource Manager (ARM) Templates
Azure Bicep
HashiCorp Packer
HashiCorp Terraform
CHEF
ANSIBLE
puppet

Knowledge Check

Question #1

Q: This hosting option provides a “function” hosted in the Cloud that can be used to expose functionality using multiple languages, can be triggered in multiple ways, and provides a consumption-based costing model. Your choice?

1. IaaS
2. PaaS
3. Serverless
4. SaaS

Enter your answer in the chat…

Question #2

Q: This hosting option requires a higher degree of operational management on the part of the organization that chooses to use it for hosting resources in the Cloud. Your choice?

1. IaaS
2. PaaS
3. Serverless
4. SaaS

Enter your answer in the chat…

Question #3

Q: Which of the following is one of the Compute options available to you in AWS?

1. Function App
2. EC2
3. VPC
4. DynamoDB

Enter your answer in the chat…

Question #4

Q: Which of the following is NOT one of the Database options available to you in Azure?

1. Azure Cosmos DB
2. SQL Databases
3. SQL managed instances
4. Storage accounts

Enter your answer in the chat…

Question #5

Q: Which of the following is an advantage of IaC (Infrastructure-as-Code)?

1. Testability
2. Repeatability
3. Auditability
4. All of the above

Enter your answer in the chat…

Thank you!

If you have additional questions, please reach out to me at:
asanders@gamuttechnologysvcs.com

PLURALSIGHT