Day 2

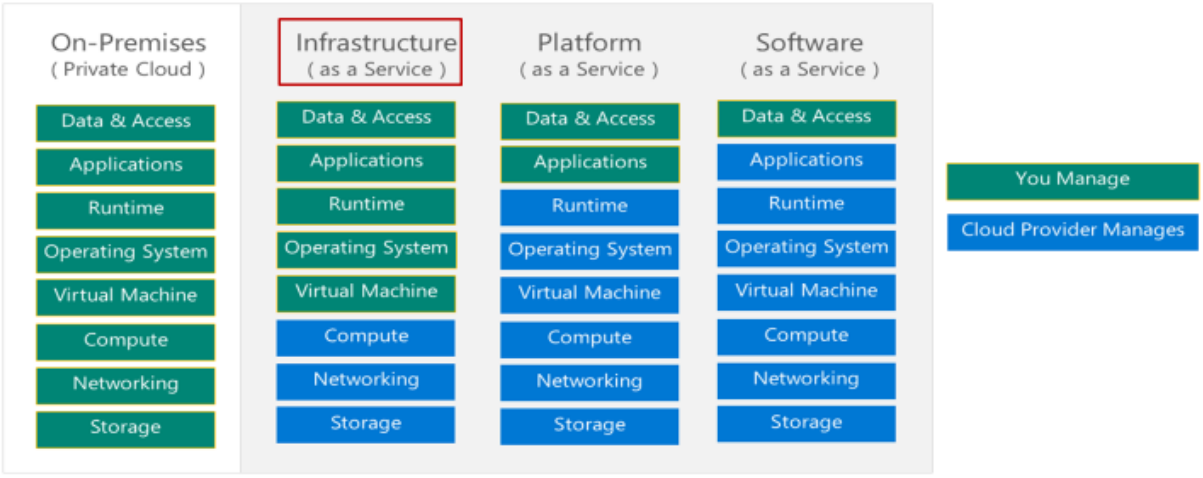
Module Overview

- Virtual Machine Planning
- Creating Virtual Machines
- Virtual Machine Availability
- Virtual Machine Extensions
- Lab and Review Questions

Virtual Machine Planning Overview

- IaaS Cloud Services
- Planning Checklist
- Location and Pricing
- Virtual Machine Sizing
- Virtual Machine Disks
- Storage Options
- Supported Operating Systems

IaaS Cloud Services



- Test and development, website hosting, storage, backup, recovery, high-performance computing, big data analysis, and extended data center

Planning Checklist

- Start with the network
- Name the VM
- Decide the location for the VM
- Determine the size of the VM
- Understand the pricing model
- Consider storage for the VM
- Select an operating system

Location and Pricing

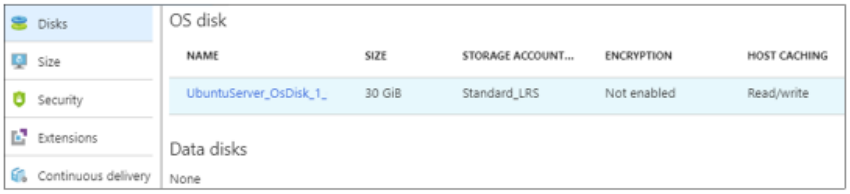
- Location
  - Each region has different hardware and service capabilities
  - Locate virtual machines as close as possible to your users
  - Locate virtual machines to ensure compliance and legal obligations
- Pricing
  - Compute costs
  - Storage costs (consumption-based and reserved instances)

54 Azure regions
Available in 140 countries

Virtual Machine Sizing

VM Type	Sizes	Purpose
General Purpose	B, Dsv3, Dv3, DSv2, Dv2, Av2, DC	Testing and development, small to medium databases, and low to medium traffic web servers.
Compute Optimized	Fsv2, Fs, F	Medium traffic web servers, network appliances, batch processes, and application servers.
Memory Optimized	Esv3, Ev3, M, GS, G, DSv2, Dv2	Relational database servers, medium to large caches, and in-memory analytics.
Storage Optimized	Lsv2, Ls	Ideal for VMs running databases.
GPU	NV, NVv2, NC, NCv2, NCv3, ND, NDv2 (Preview)	Ideal for model training and inferencing with deep learning.
High Performance Compute	H	Fastest and most powerful CPU virtual machines with optional high-throughput network interfaces.

Virtual Machine Disks



- Operating System Disks are SATA drives, labeled as C:
- Temporary Disks provides short term storage
- Data Disks are SCSI drives and depend on your virtual machine type

Storage Options

- **Premium storage offers high-performance, low-latency SSD disk support**
- **Use premium storage for virtual machines with input/output (I/O)-intensive workloads**
- **Two types of disks: Unmanaged and Managed**
    - **Unmanaged disks require you to manage the storage accounts and VHDs**
    - **Managed disks are maintained by Azure (recommended)**

Supported Operating Systems

- Windows Server includes many common products, requires a license, doesn't support OS upgrades
- Linux distributions are supported, upgrade of the OS is supported

Virtual Machine Availability Overview

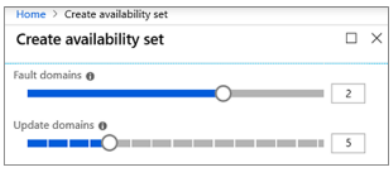
- Maintenance and Downtime
- Availability Sets
- Update and Fault Domains
- Availability Zones
- Scale Sets
- Implementing Scale Sets
- Autoscale
- Implementing Autoscale

Maintenance vs. Downtime

Unplanned Hardware Maintenance	Unexpected Downtime	Planned Maintenance

- When the platform predicts a failure, it will issue an **unplanned hardware maintenance** event. Action: Live migration.
- **Unexpected Downtime** is when a virtual machine fails unexpectedly. Action: Automatically migrate (heal).
- **Planned Maintenance** events are periodic updates made to the Azure platform. Action: No action.

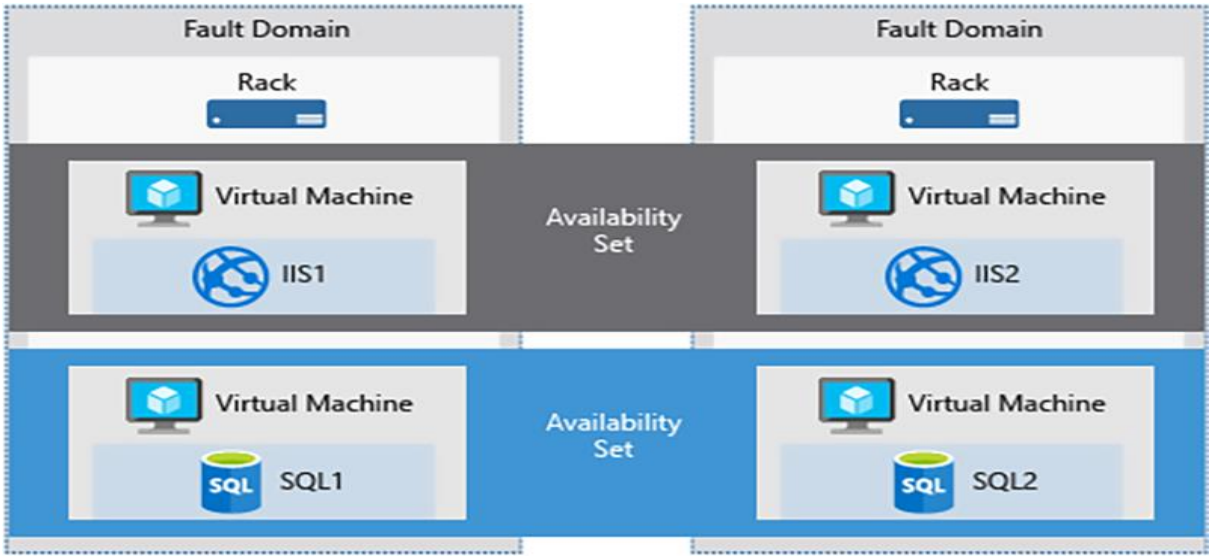
Availability Sets



Two or more instances in two or more availability zones = 99.99% uptime

- Configure multiple virtual machines in an Availability Set
- Configure each application tier into separate Availability Sets
- Combine a Load Balancer with Availability Sets
- Use managed disks with the virtual machines

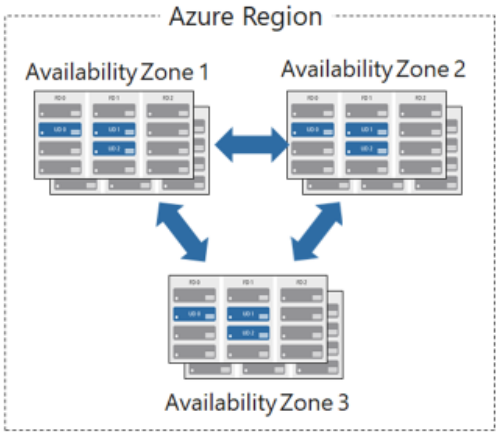
Update and Fault Domains



- **Update domains** lets Azure to perform incremental or rolling upgrades across a deployment. During planned maintenance, only one update domain is rebooted at a time.
- **Fault Domains** are a group of virtual machines that share a common set of hardware, switches, that share a single point of failure. VMs in an availability set are placed in at least two fault domains.

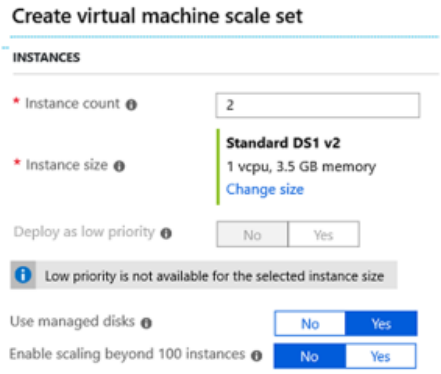
Availability Zones

- Unique physical locations in a region
- Includes datacenters with independent power, cooling, and networking
- Protects from datacenter failures
- Combines update and fault domains



Implementing Scale Sets

- **Instance count.** Number of VMs in the scale set (0 to 1000)
- **Instance size.** The size of each virtual machine in the scale set
- **Deploy as low priority.** Can save up to 80%
- **Use managed disks**
- **Enable scaling beyond 100 instances**

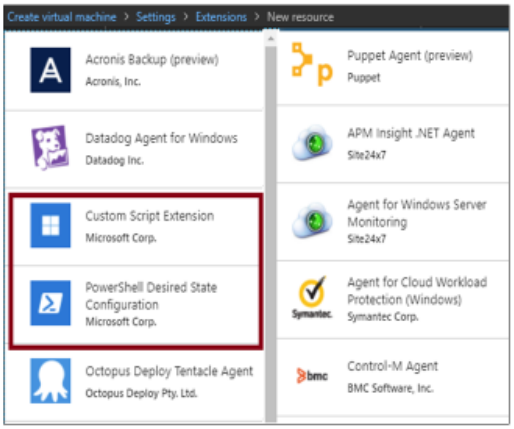


Autoscale

- Define rules to automatically adjust capacity
- Scale out (increase) the number of VMs in the set
- Scale in (reduce) the number of VMs in the set
- Schedule events to increase or decrease at a fixed time
- Reduces monitoring and optimizes performance

Virtual Machine Extensions

- Extensions are small applications that provide post-deployment VM configuration and automation tasks
- Managed with Azure CLI, PowerShell, Azure Resource Manager templates, and the Azure portal
- Bundled with a new VM deployment or run against any existing system
- Different for Windows and Linux machines.



For more information, you can see:

Virtual machine extensions and features for Windows - https://docs.microsoft.com/en-us/azure/virtual-machines/extensions/features-windows?toc=%2Fazure%2Fvirtual-machines%2Fwindows%2Ftoc.json

Virtual machine extensions and features for Linux - https://docs.microsoft.com/en-us/azure/virtual-machines/extensions/features-linux