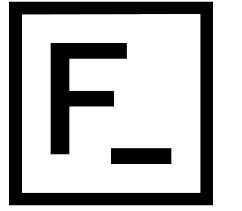




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PROSJEKT 2020

- Kunde: **ASKO**
Rolle: Arkitekt og Front-end lead
- Kunde: **Kværner**
Rolle: Arkitekt og Mobilspesialist
- Kunde: **COVID-19 Digital Feberpoliklinikk**
Rolle: Løsningsarkitekt

FOREDRAG 2020

Oslo Business Forum 2020, Relevans 2020, Global AI on Tour 2020, Women in Tech 2020, Lørn.Tech.

DIVERSE NTERESSER

Alpint, tennis, programmering, tegne, lese bøker

0.0	Recap: Storing data in Azure
1.0	Introduction to Azure virtual machines
2.0	Task: Create and Connect to a Windows VM
3.0	Secret Surprise 🧐🏆
-	-
4.0	Self Study

0.0 - Recap

Name the 3 first important steps when choosing the most appropriate storage-solution..

1.0

Introduction to Azure Virtual Machines.

Introduction

When we are dealing with a bunch of mixed on-premises servers which is starting to struggle when it comes to load and scaling-issues, with a range of different configurations, it often makes sense to look at trying to move servers ***one at a time*** into Azure using Azure Virtual Machines (VMs).

With VMs, you have **total control** over the configuration and can install anything you need to perform the work. No matter what our **hosting requirements** may be.

We're going to look at the **decisions made before creating** a VM, the **options to create and manage** the VM, and the **extensions and services** you use to manage your VM.

Compile a checklist for creating an Azure Virtual Machine

Performing a migration of on-premises servers to Azure requires planning and care. Before you create a single VM, you should sit down and **sketch out your current infrastructure** model and see how it might map to the cloud.

A checklist of things to think about.

- Start with the network
- Name the VM
- Decide the location for the VM
- Determine the size of the VM
- Understanding the pricing model
- Storage for the VM
- Select an operating system

Start with Network Configuration and Plan each VM deployment

Virtual networks (VNETs) are used in Azure to provide **private** connectivity between Azure Virtual Machines and other Azure services.

- VMs and services that are part of the [same virtual network](#) can access one another.
- By default, services [*outside the virtual network](#) cannot connect to services within the virtual network.
- You can create one or more subnets for your virtual network
- You can set up Network Security Groups (NSGs). NSGs act as software firewalls which allow you to apply custom rules to each inbound or outbound request.

**You can configure the network to allow access to the external service, including your on-premises servers.*

Select a server and take an inventory:

- What does the server communicate with?
- Which ports are open?
- Which OS is used?
- How much disk space is in use?
- What kind of data does this use?
Are there restrictions (legal or otherwise) with not having it on-premises?
- What sort of CPU, memory, and disk I/O load does the server have?
Is there burst traffic to account for?

These are all some of the questions Azure will have when creating a new virtual machine..

Name the VMs

You should choose names that are meaningful and consistent, so you can easily identify what the VM does. A good convention is to include the following information in the name:

Element	Example	Notes
Environment	dev, prod, QA	Identifies the environment for the resource
Location	uw (US West), ue (US East)	Identifies the region into which the resource is deployed
Instance	01, 02	For resources that have more than one named instance (web servers, etc.)
Product or Service	service	Identifies the product, application, or service that the resource supports
Role	sql, web, messaging	Identifies the role of the associated resource

Decide the location of your VM

When you create and deploy a virtual machine, you must select a region where you want the resources (CPU, storage, etc.) to be allocated. This lets you place your VMs as *close as possible to your users* to improve *performance* and to meet any *legal, compliance, or tax requirements*.

Two other things to think about regarding the location choice:

- First, the location can limit your **available options**. Each region has different hardware available and some configurations are not available in all regions.
- Second, there are **price differences** between locations.

If your workload isn't bound to a specific location, it can be very cost effective to check your required configuration in multiple regions to find the lowest price.

Determine the size of your VM

Azure provides a wide range of VM size options allowing you to select the appropriate mix of compute, memory, and storage for what you want to do. The size you choose **directly affects the cost** of your service.

The more CPU, memory, and GPU you need, the higher the price point.

You can upgrade or downgrade the VM at any point if the current size no longer meets your needs.

Workload classifications in Azure

Option	Description
General purpose	General-purpose VMs are designed to have a balanced CPU-to-memory ratio. Ideal for testing and development, small to medium databases, and low to medium traffic web servers.
Compute optimized	Compute optimized VMs are designed to have a high CPU-to-memory ratio. Suitable for medium traffic web servers, network appliances, batch processes, and application servers.
Memory optimized	Memory optimized VMs are designed to have a high memory-to-CPU ratio. Great for relational database servers, medium to large caches, and in-memory analytics.
Storage optimized	Storage optimized VMs are designed to have high disk throughput and IO. Ideal for VMs running databases.
GPU	GPU VMs are specialized virtual machines targeted for heavy graphics rendering and video editing. These VMs are ideal options for model training and inferencing with deep learning.
High performance computes	High performance compute is the fastest and most powerful CPU virtual machines with optional high-throughput network interfaces.

Understanding the pricing model

There are two separate costs the subscription will be charged for every VM: **compute and storage**.
By separating these costs, you scale them independently and only pay for what you need.

- **Compute cost:** *When the VM is “running”*. Priced on a per-hour basis but billed on a per-minute basis.
The hourly price varies based on the VM size and OS you select.
- **Storage cost:** Even if the VM is stopped/deallocated and you aren't billed for the running VM, you will be charged for the storage used by the disks.

Two payment options for compute costs: [Pay-as-you-go](#) & [Reserved Virtual Machine Instances](#) (*upfront commitment, one or three years in a specified region*)

Storing for the VM

Best practice is that all Azure virtual machines will have **at least two virtual hard disks**. The first disk stores the [operating system](#), and the second is used as [temporary storage](#). You can add additional disks to store application data; the maximum number is determined by the VM size selection.

The data for each VHD is held in **Azure Storage** as page blobs, which allows Azure to allocate space only for the storage you use. It's also how your storage cost is measured; you pay for the storage you are consuming.

Virtual disks can be backed by either **Standard** or **Premium** Storage accounts. Azure Premium Storage leverages solid-state drives (SSDs) to enable high performance and low latency for VMs running I/O-intensive workloads.

Two options for managing the relationship between the storage account and each VHD. You can choose either **unmanaged disks** or **managed disks**. Managed disks are the newer and recommended disk storage mode.

Selecting an Operating System

Azure provides a variety of OS images that you can install into the VM, including several versions of [Windows](#) and flavors of [Linux](#). As mentioned earlier, the choice of OS will influence your hourly compute pricing as Azure *bundles the cost of the OS license into the price*.

You can also leverage a **Marketplace image** and install your entire stack all at once. For example, if you needed a new WordPress site, the standard technology stack would consist of a Linux server, Apache web server, a MySQL database, and PHP.

If you can't find a suitable OS image, you can **create your own disk image** with what you need, upload it to Azure storage, and use it to create an Azure VM.

Demo:

Creating a Virtual Machine using
the Azure Portal

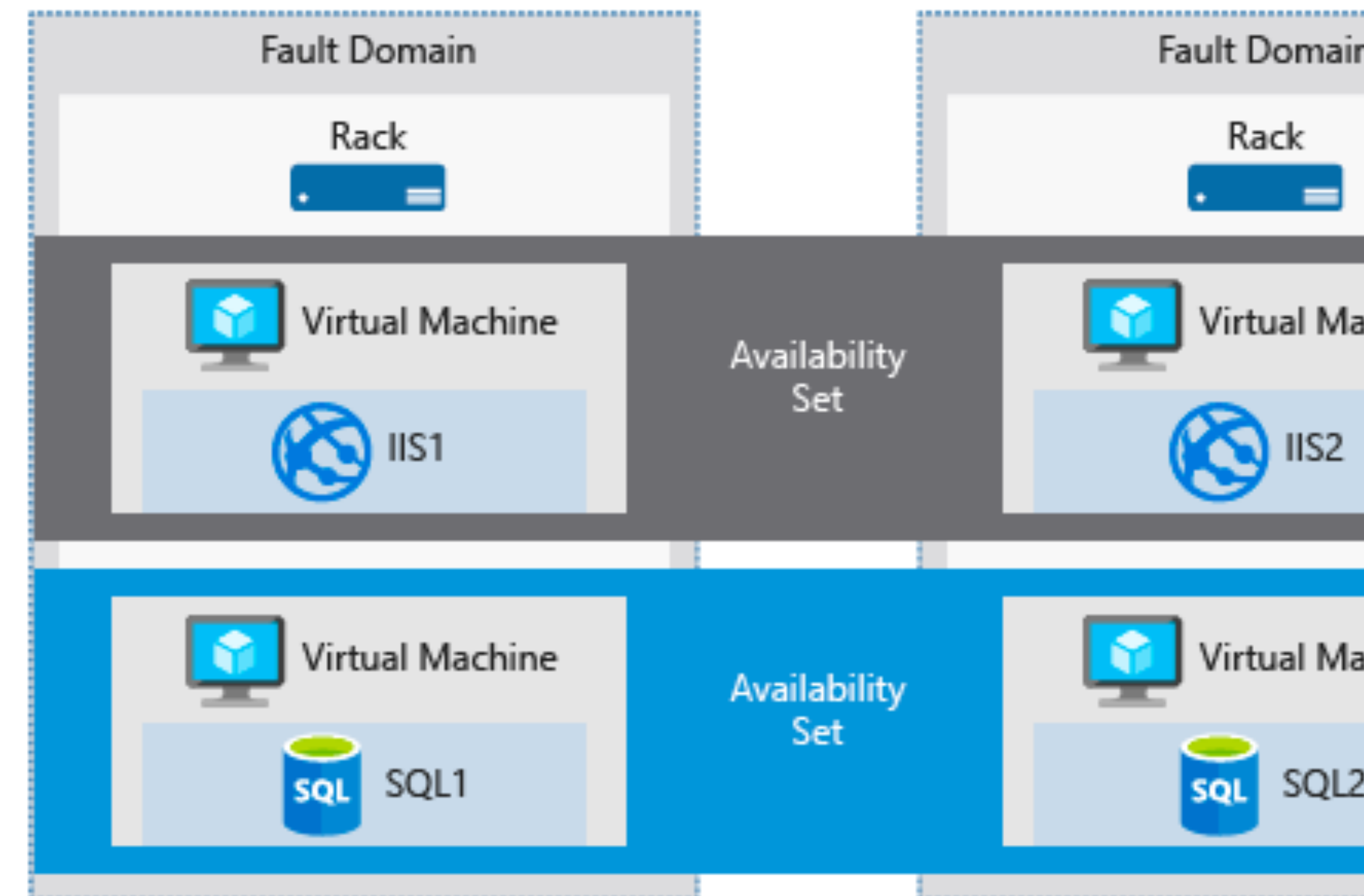
Manage the availability of your Azure VMs

Service level agreements (SLA)

Azure VMs run on [physical servers](#) hosted within the [Azure Datacenter](#). As with most physical devices, there's a chance that there could be a failure. If the physical server fails, the virtual machines hosted on that server will also fail. If this happens, Azure will [move the VM to a healthy host server automatically](#). However, this self-healing migration could take several minutes, during which, the application(s) hosted on that VM will not be available.

To ensure your services aren't interrupted and avoid a single point of failure, it's recommended to deploy at least two instances of each VM. This feature is called an *availability set*. Also make sure to have a disaster recovery and backup strategy in place. Site Recovery could also be of value.

When you place VMs into an availability set, Azure guarantees to spread them across **Fault Domains** and **Update Domains**

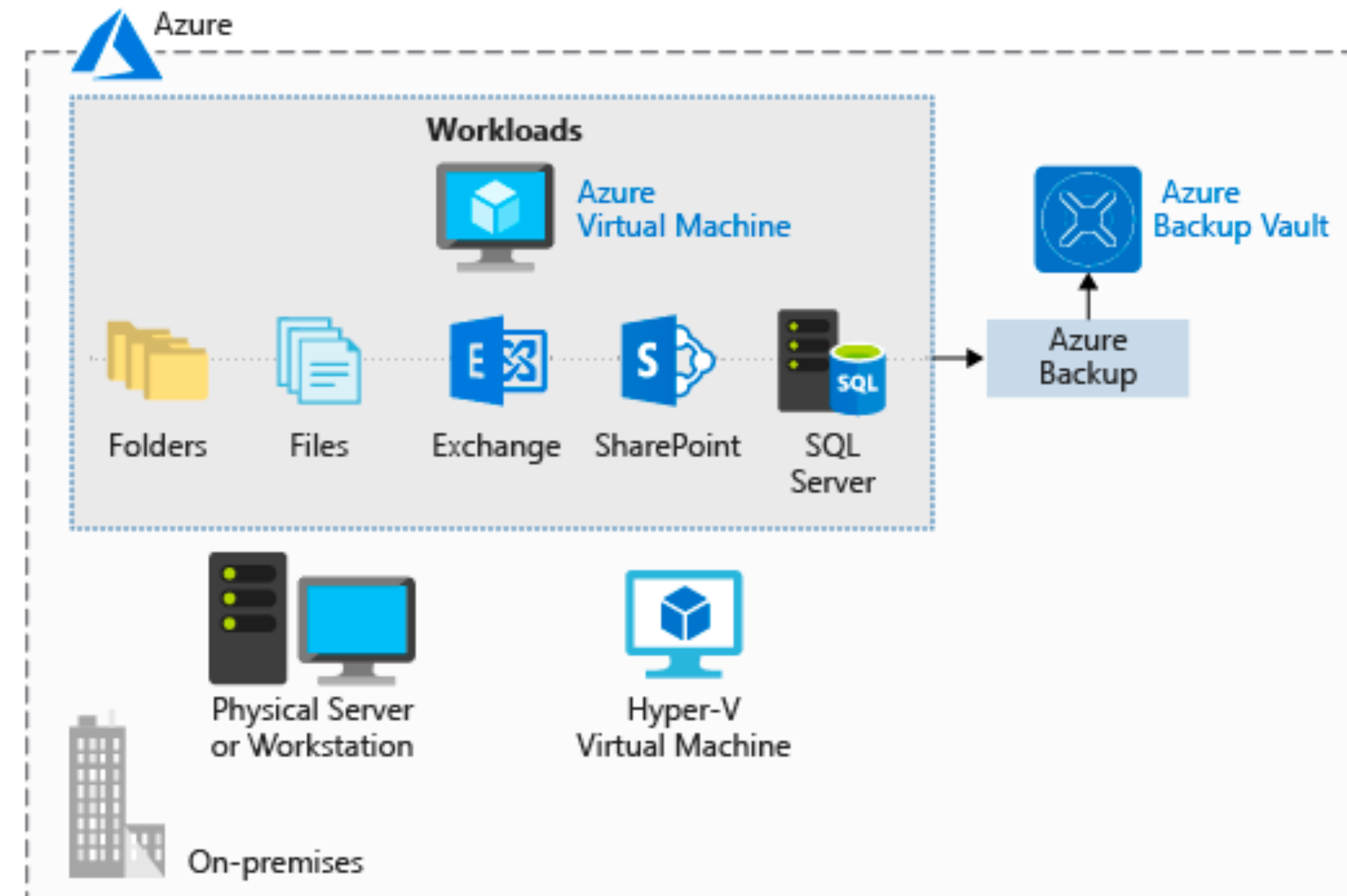


Azure Backup

Azure Backup is a *backup as a service* offering that protects physical or virtual machines no matter where they reside: on-premises or in the cloud.

Azure Backup can be used for a wide range of data backup scenarios, such as the following:

- Files and folders on Windows OS machines (physical or virtual, local or cloud)
- Application-aware snapshots (Volume Shadow Copy Service)
- Popular Microsoft server workloads such as Microsoft SQL Server, Microsoft SharePoint, and Microsoft Exchange
- Native support for Azure Virtual Machines, both Windows, and Linux
- Linux and Windows 10 client machines



Knowledge check:

Suppose you want to run a network appliance on a virtual machine. Which workload option should you choose?

- A. General purpose
- B. Compute optimized
- C. Memory optimized
- D. Storage optimized

Knowledge check:

True or false: Resource Manager templates are JSON files?

Video:

Create and connect to a VM
using the Azure Portal and RDP.

2.0 Task

Create a Windows VM in The Azure Portal.

Basics

Disks

Networking

Management

Advanced

Tags

Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image.
Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization.

Project details

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

Subscription * ⓘ

Concierge Subscription

Resource group * ⓘ

learn-fe285649-50e4-44a7-adfb-7873a157842e

Create new

Instance details

Virtual machine name * ⓘ

test-vp-vm2

Region * ⓘ

(US) South Central US

Availability options ⓘ

No infrastructure redundancy required

Image * ⓘ

[smalldisk] Windows Server 2019 Datacenter

Browse all public and private images

Azure Spot instance ⓘ

☐ Yes ☒ No

Size * ⓘ

Standard DS1 v2

1 vcpu, 3.5 GiB memory (US\$85,41/month)

Change size

Administrator account

Username * ⓘ

Password * ⓘ

Confirm password * ⓘ

Review + create

< Previous

Next : Disks >

Knowledge check:

True or false: for security reasons, you must use an image from the official Azure Marketplace when creating a new virtual machine.

Knowledge check:

What is the effect of the default network security settings for a new virtual machine?

- A. Neither outbound nor inbound requests are allowed.
- B. Outbound request are allowed. Inbound traffic is only allowed from within the virtual network.
- C. There are no restrictions: all outbound and inbound requests are allowed.

Knowledge check:

When creating a Windows virtual machine in Azure, which port would you open using the INBOUND PORT RULES in order to allow remote-desktop access?

- A. HTTPS.
- B. SSH (22).
- C. RDP (3389).

Knowledge check:

Suppose you have an application running on a Windows virtual machine in Azure. What is the best-practice guidance on where the app should store data files?

- A. The OS Disk (C:).
- B. The temporary disk (D:)
- C. An attached Data disk

Knowledge check:

What is the final rule that is applied in every Network Security Group?

- A. Allow All.
- B. Deny All.
- C. You configure the final rule to your needs.

3.0

And the Secret Surprise is...

drumroll.. 

4.0

Optional homework:
Build and run a web app with the
MEAN stack.

MongoDB, Express.js, AngularJS, and Node.js

5.0

Self Study

Microsoft Learn - Deploy Web Apps w/ VMs
<https://docs.microsoft.com/en-us/learn/paths/deploy-a-website-with-azure-virtual-machines/>

Thank you.