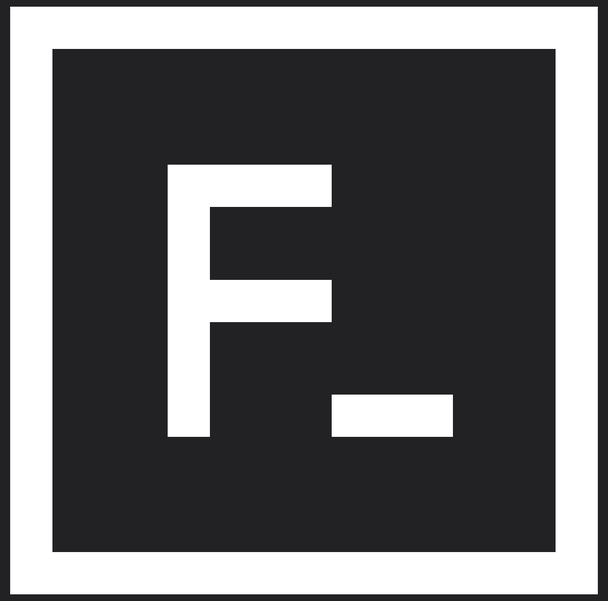
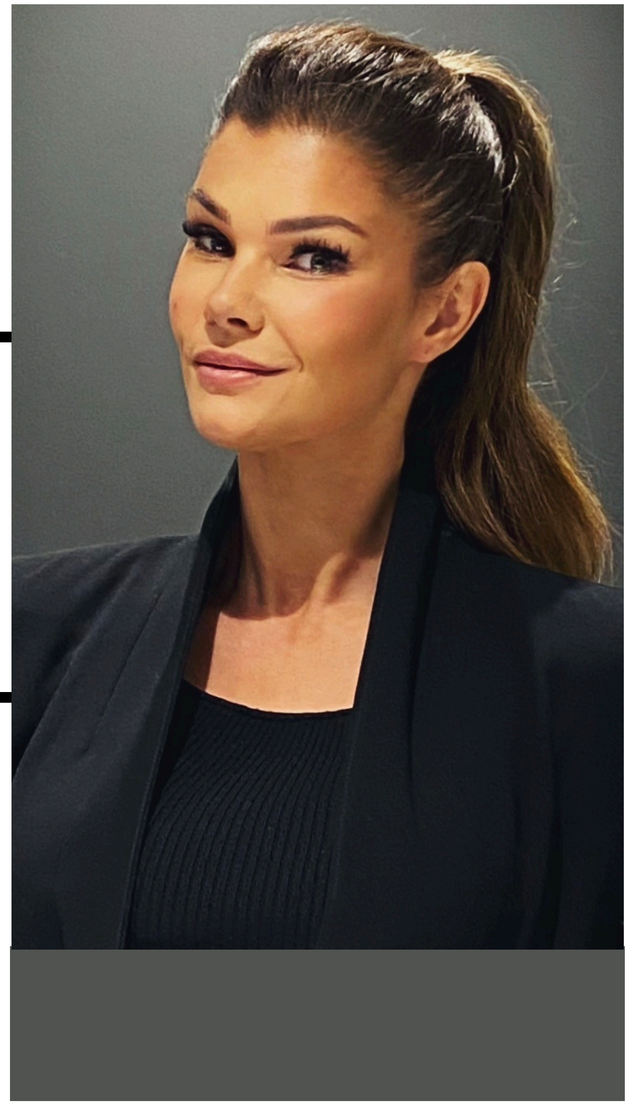
.NET & AZURE COMMUNITY - FORTE DIGITAL
PRESENTATION BY MONICA BEATE TVEDT, DIRECTOR OF TECHNOLOGY





Monica Beate Tvedt

Teknologidirektør

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TIDLIGERE

- Agency Director - Head of Microsoft Development, Mixed Reality & Microservices at Sopra Steria
- Head of UMS Innovation Center at Unified Messaging Systems
- Global Head of SaaS Development at Unified Messaging Systems
- Senior Software Engineer Consultant, Webstep @ Sparebanken Vest
- Software Engineer, CellVision
- Gründer

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

Azure Fundamentals Day 3

1.0	Secure access to your applications by using Azure identity services.
-	*5 min break*
2.0	Build a cloud governance strategy on Azure.
-	*10 min break*
3.0	Examine privacy, compliance, and data protection standards on Azure.
-	*5 min break*
4.0	Plan and manage your Azure costs.
5.0	Choose the right Azure services by examining SLAs and service lifecycle.

1.0
Secure access to your applications by using Azure identity services.

Azure Identity Services

Identity has become the new primary security boundary. Accurately proving that someone is a **valid user** of a system, with **an appropriate level of access**, is critical to maintaining control of your data.

This identity layer is now more often under attack than the network is.

Two fundamental concepts that you need to understand when talking about identity and access are *authentication* (AuthN) and *authorization* (AuthZ). They occur sequentially in the identity and access process.

What is authentication?

Authentication is the process of establishing the **identity of a person or service** that wants to access a resource. It involves the act of challenging a party for legitimate credentials and provides the basis for creating a security principal for identity and access control. It establishes whether the user is who they say they are.

What is authorization?

Authentication establishes the user's identity, but authorization is the process of establishing **what level of access** an authenticated person or service has. It specifies what data they're allowed to access and what they can do with it.

What is Azure Active Directory (Azure AD)?

Azure Active Directory (Azure AD) provides identity services that enable your users to sign in and access both Microsoft cloud applications and cloud applications that you develop.

External Resources

- Microsoft Office 365
- Azure Portal
- Other SaaS applications

Internal Resources

- Applications within your internal network
- Access to workstations on-premise

Also one can use Azure AD to implement Single-Sign On (SSO) which enables a user to sign in one time and use that credential to access multiple resources and applications from different providers.

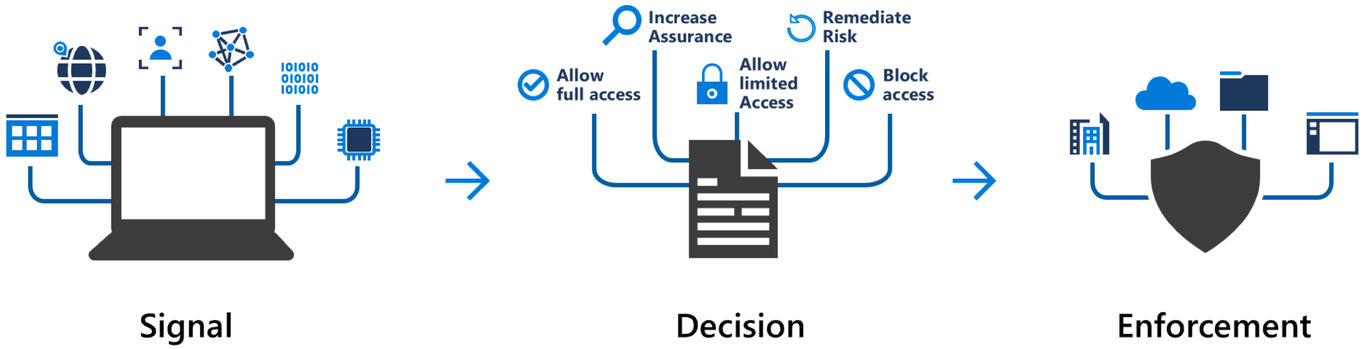
What are multi-factor authentication and Conditional Access?

Two processes that enable secure authentication:
Azure AD Multi-Factor Authentication and **Conditional Access**.

Multifactor authentication is a process where a user is prompted during the sign-in process for an additional form of identification. Examples include a code on their mobile phone or a fingerprint scan.

These elements fall into three categories:

- Something the user knows
- Something the user has
- Something the user is



And what's Conditional Access?

Conditional Access is a tool that Azure Active Directory uses to allow (or deny) access to resources based on identity signals. These signals include who the user is, where the user is, and what device the user is requesting access from.

Conditional Access also provides a more granular multifactor authentication experience for users. For example, a user might not be challenged for second authentication factor if they're at a known location. However, they might be challenged for a second authentication factor if their sign-in signals are unusual or they're at an unexpected location.

Knowledge Check

How can a IT department ensure that employees can access company applications only from approved tablet devices?

A. SSO (Single-Sign On).

B. Conditional Access.

C. Multifactor authentication.

Knowledge Check

How can a IT department use biometric properties, such as facial recognition, to enable employees to prove their identities?

A. SSO (Single-Sign On).

B. Conditional Access.

C. Multifactor authentication.

Knowledge Check

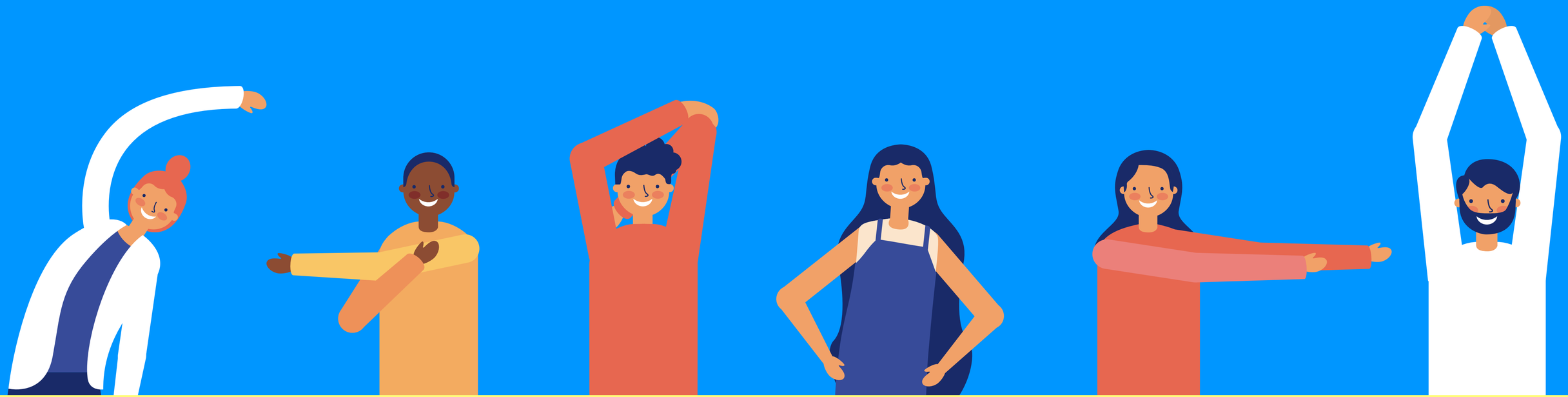
How can a IT department reduce the number of times users must authenticate to access multiple applications?

A. SSO (Single-Sign On).

B. Conditional Access.

C. Multifactor authentication.

5 min break..



2.0
Build a cloud governance strategy on Azure.

Create a subscription governance strategy

The term ***governance*** describes the general process of **establishing rules and policies** and ensuring that those rules and **policies are enforced**. Organizing structure for resources in Azure has four levels: management groups, subscriptions, resource groups, and resources.
We often start a cloud governance strategy at the subscription level,
where there are 3 aspects to consider:

1. **Access control**
   - Every subscription is associated with an Azure Active Directory tenant (your account). Each tenant provides administrators the ability to set granular access through defined roles by using Azure role-based access control.
   - For example, do you need separate subscriptions for development and for production environments? With separate subscriptions, you can control access to each one separately and isolate their resources from one another.

2. **Subscription limits**
   - When designing your subscription architecture, be sure to check which subscription limits there might be before finalizing your design.

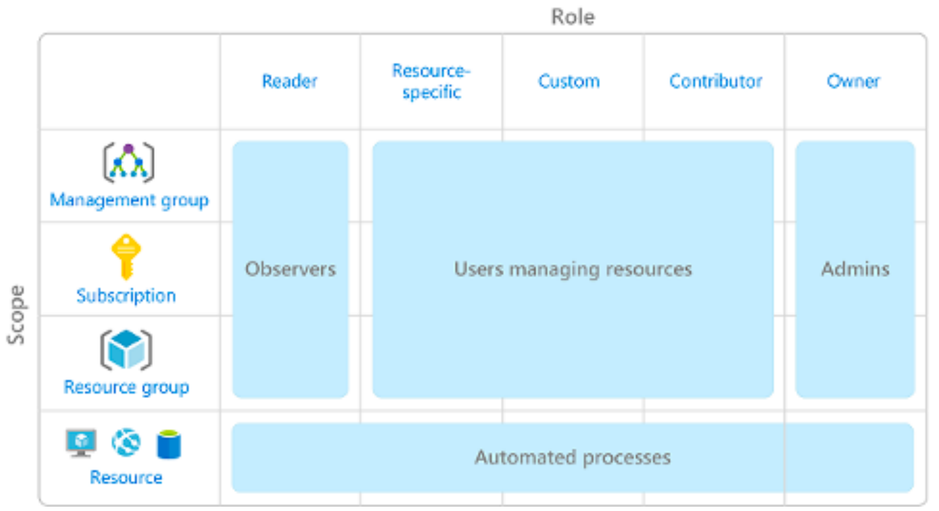
3. **Billing**
   - You can create *one billing report per subscription*. If you have multiple departments you can *organize subscriptions by department* or by projects.
   - Resource tags can also help to organize your resources using labels.

Control access to cloud resources by using Azure role-based access control

When you have multiple IT and engineering teams, how can you control what access they have to the resources in your cloud environment? It's a good security practice to grant users only the rights they need, known as **Least privilege,** to perform their job, and only to the relevant resources.

Azure provides built-in roles that describe common access rules for cloud resources. You can also define your own roles. Each role has an associated set of access permissions that relate to that role. When you assign individuals or groups to one or more roles, they receive all of the associated access permissions.

You can apply Azure RBAC to an individual person or to a group.



When should you use Azure RBAC?

Examples for when you should use Azure RBAC:

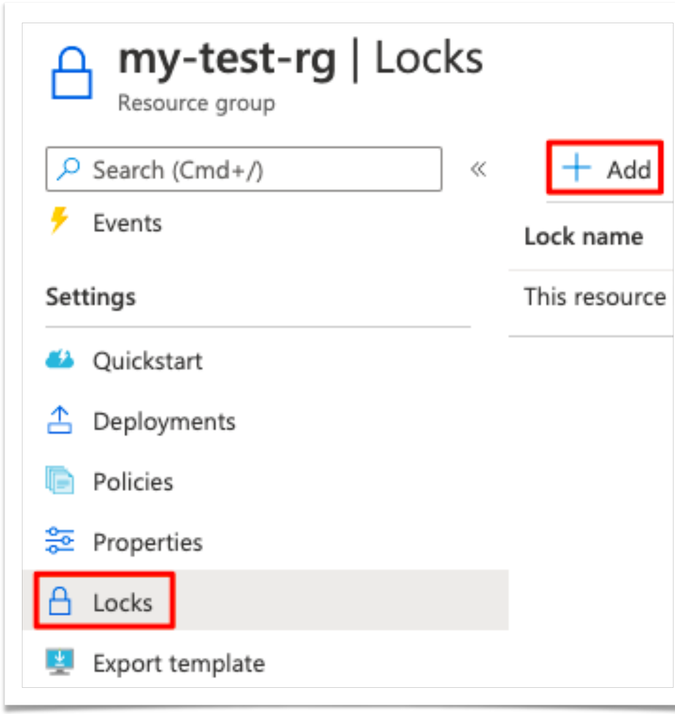
- Allow one user to manage VMs in a subscription and another user to manage virtual networks.
- Allow a database administrator group to manage SQL databases in a subscription.
- Allow a user to manage all resources in a resource group, such as virtual machines, websites, and subnets.
- Allow an application to access all resources in a resource group.

Prevent accidental changes by using resource locks

A resource lock **prevents** resources from being **accidentally deleted or changed**.

Even with Azure role-based access control (Azure RBAC) policies in place, there's still a risk that people with the right level of access could delete critical cloud resources. Think of a resource lock as a warning system that reminds you that a resource should not be deleted or changed.

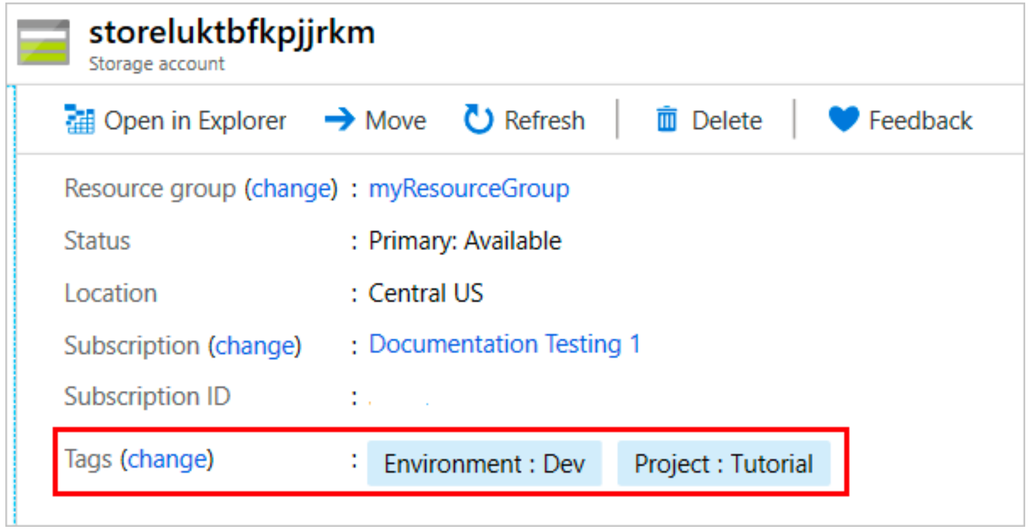
You can apply locks to a subscription, a resource group, or an individual resource. You can set the lock level to **CanNotDelete** or **ReadOnly**.



Organize your Azure resources
by using tags #testenvironment #confidential #hrdepartment

As your cloud usage grows, it's increasingly important to stay organized. A good organization strategy helps you understand your cloud usage and can help you manage costs.

1. One way to organize related resources is to **place them in their own subscriptions**. You can also use resource groups to manage related resources.
2. **Resource *tags* are another way to organize** resources. Tags provide extra information, or metadata, about your resources.



Tags can be useful for:

- **Resource management**
  Locate and act on resources that are associated with specific workloads, environments, business units, and owners.
- **Cost management and optimization**
  Group resources so that you can report on costs, allocate internal cost centers, track budgets, and forecast estimated cost.
- **Operations management**
  Group resources according to how critical their availability is to your business (SLAs)
- **Security**
  Classify data by its security level, such as *public* or *confidential*
- **Governance and regulatory compliance**
- **Workload optimization and automation**

Control and audit your resources by using Azure Policy

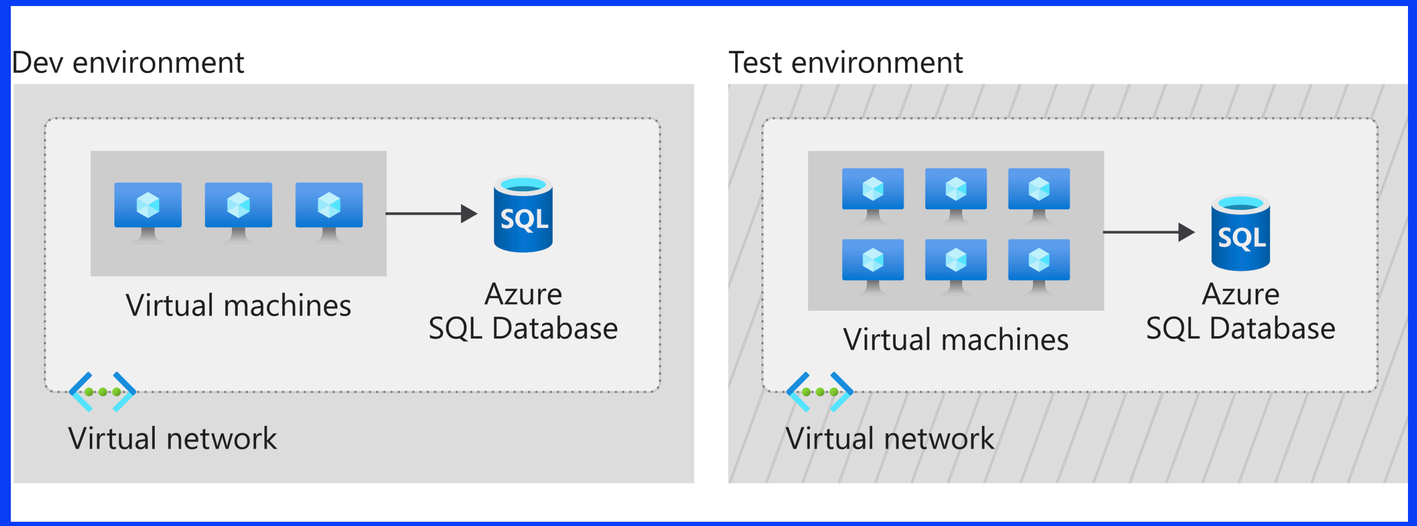
We've identified our governance and business requirements, how do we ensure that our resources *stay* compliant? How can we be alerted if a resource's configuration has changed?

Azure Policy is a service in Azure that enables you to create, assign, and manage policies that control or audit your resources. These policies enforce different rules and effects over your resource configurations so that those configurations stay compliant with corporate standards.

Examples

1. For example, say you define a policy that allows only a certain stock-keeping unit (SKU) size of virtual machines (VMs) to be used in your environment. After you enable this policy, that **policy is applied when you create new** VMs or **resize** existing VMs. Azure Policy also evaluates any current VMs in your environment.

2. Another example could be to restrict deployments to a specific location by using another Azure Policy.



Knowledge Check

How can a company allow some users to control the virtual machines in each environment but prevent them from modifying networking and other resources in the same resource group or Azure subscription?

A. Create a role assignment through Azure role-based access control (Azure RBAC).

B. Create a policy in Azure Policy that audits resource usage.

C. Split the environment into separate resource groups.

Knowledge Check

Which is the best way for a company to ensure that the team deploys only cost-effective virtual machine SKU sizes?

A. Create a policy in Azure Policy that specifies the allowed SKU sizes.

B. Periodically inspect the deployment manually to see which SKU sizes are used.

C. Create an Azure RBAC role that defines the allowed virtual machine SKU sizes.

Knowledge Check

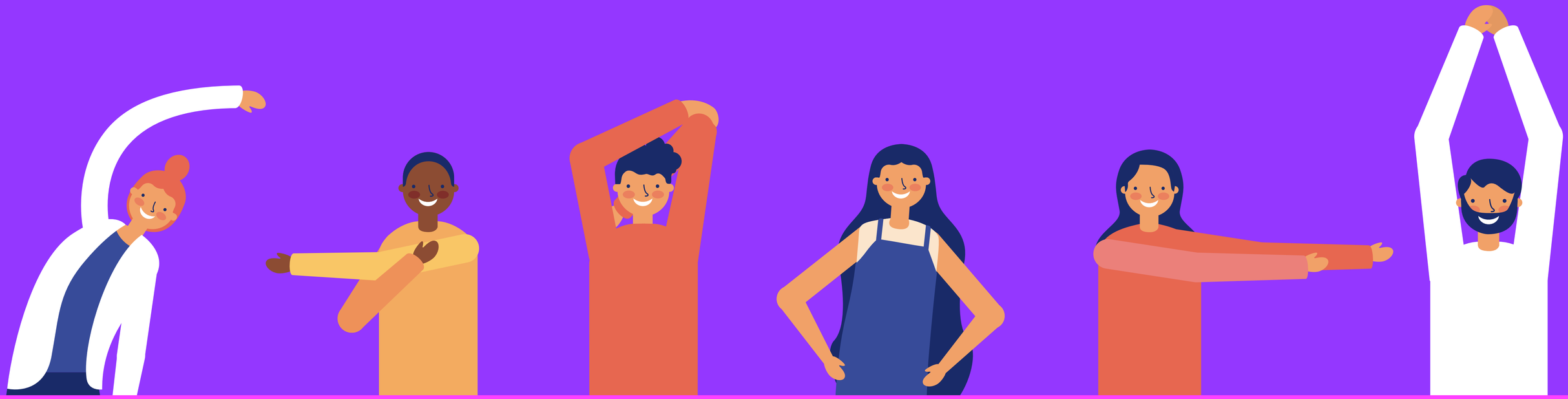
Which is likely the best way for a company which currently only has one subscription to identify which billing department each Azure resource belongs to?

A. Track resource usage in a spreadsheet.

B. Split resources into separate Azure subscriptions, where each subscription belongs to its own billing department.

C. Apply a tag to each resource that includes the associated billing department.

10 min break..



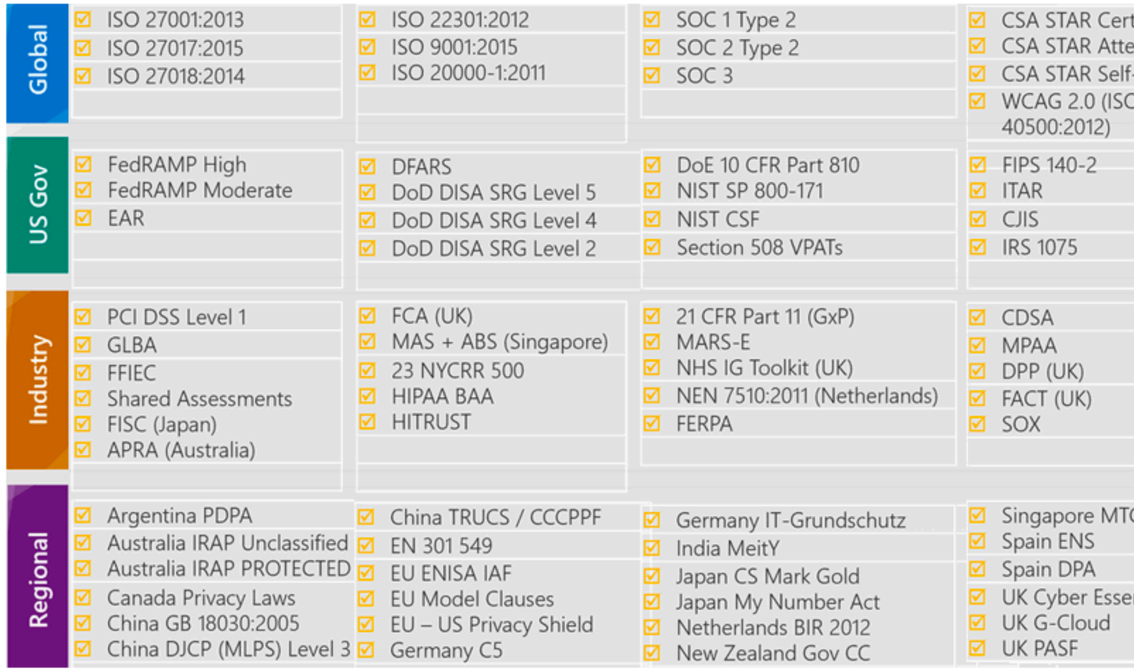
3.0
Examine privacy, compliance, and data protection standards on Azure.

Microsoft's commitment to privacy and how Azure adheres to common regulatory and compliance standards

In general, *compliance* means to adhere to a law, standard, or set of guidelines. *Regulatory compliance* refers to the discipline and process of ensuring that a company follows the laws that governing bodies enforce.

Compliance categories available in Azure:
Regional, Industry, US Gov, Global

Example - GDPR:
Azure offers 11 privacy-focused **compliance** offerings, more than any other cloud provider. Azure is the first to offer customers this level of **GDPR** functionality.



Microsoft Privacy Statement: details about the personal data Microsoft processes and how the company processes it.

Azure compliance documentation

The Azure compliance documentation provides you with detailed documentation about legal and regulatory standards and compliance on Azure.

Azure Government

Addresses the security and compliance needs of US federal agencies, state and local governments, and their solution providers. Azure Government offers physical isolation from non-US government deployments and provides screened US personnel.

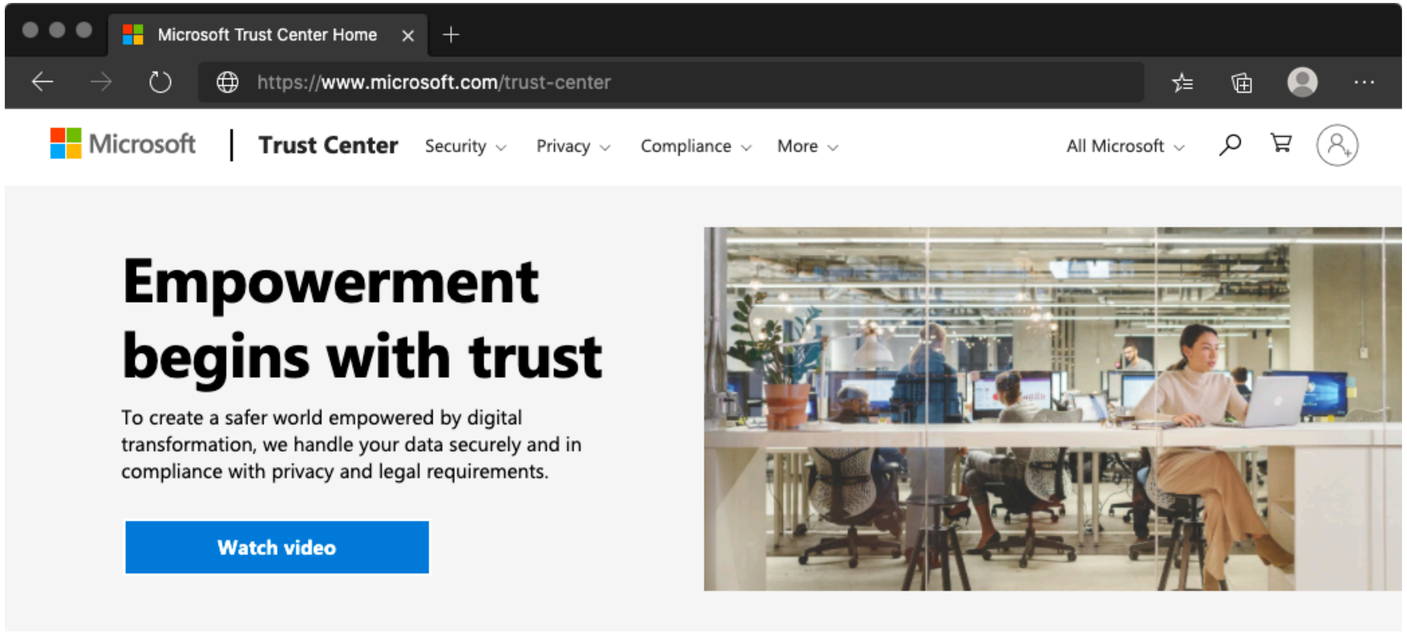
To provide the highest level of security and compliance, Azure Government uses physically isolated datacenters and networks located only in the US.

Azure Trust Center

The Trust Center showcases Microsoft's principles for maintaining data integrity in the cloud and how Microsoft implements and supports security, privacy, compliance, and transparency in all Microsoft cloud products and services.

Information around how the Microsoft cloud helps you secure sensitive data and comply with applicable laws and regulations.

https://docs.microsoft.com/en-us/compliance/regulatory/offering-home?view=o365-worldwide



“If we can’t protect people, then we don’t deserve their trust.”

—Brad Smith, President and Chief Legal Officer

Knowledge Check

Where can the team access details about the personal data Microsoft processes and how the company processes it?

A. Microsoft Privacy Statement.

B. The Azure compliance documentation.

C. Microsoft compliance offerings.

Knowledge Check

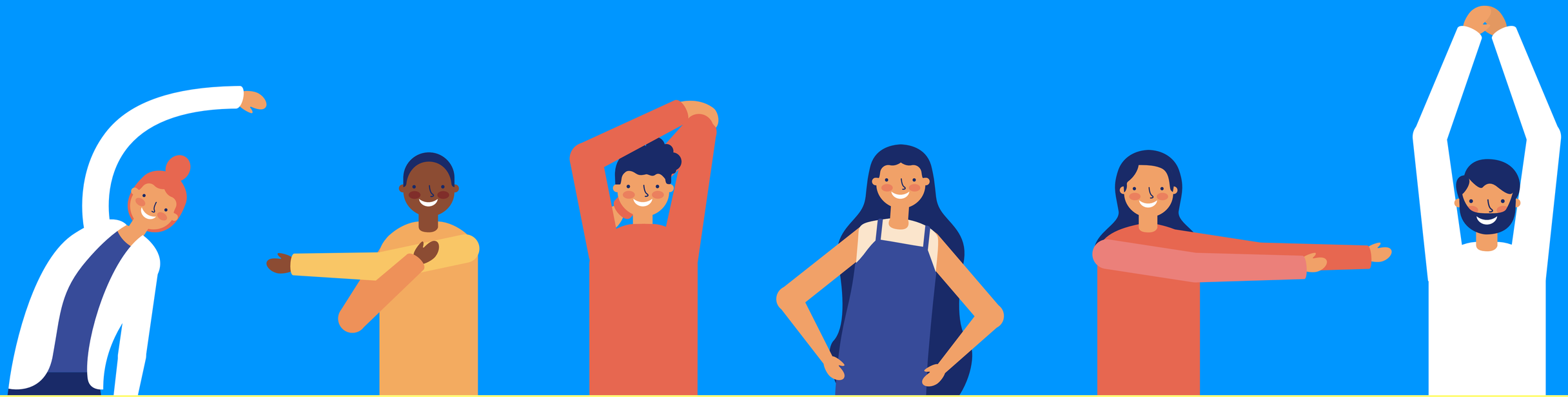
Where can the legal team access information around how the Microsoft cloud helps them secure sensitive data and comply with applicable laws and regulations?

A. Microsoft Privacy Statement.

B. Trust Center.

C. Online Services Terms.

5 min break..



4.0
Plan and manage your Azure costs.

Total Cost of Ownership (TCO) Calculator

The Total Cost of Ownership (TCO) Calculator can help you compare the cost of running in the datacenter versus running on Azure.

The term *total cost of ownership* is commonly used in finance. It can be hard to see all the hidden costs related to operating a technology capability on-premises. Software licenses and hardware are additional costs.

With the TCO Calculator, you enter the details of your on-premises workloads. Then you review the suggested industry average cost (which you can adjust) for related operational costs. These costs include electricity, network maintenance, and IT labor. You're then presented with a side-by-side report. Using the report, you can compare those costs with the same workloads running on Azure.

Microsoft Azure

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Total Cost of Ownership (TCO) Calculator

Estimate the cost savings you can realize by migrating your workloads to Azure

Help us improve. Is the TCO calculator helpful? Yes No

1 Define your workloads — 2 Adjust assumptions — 3 View report

View report

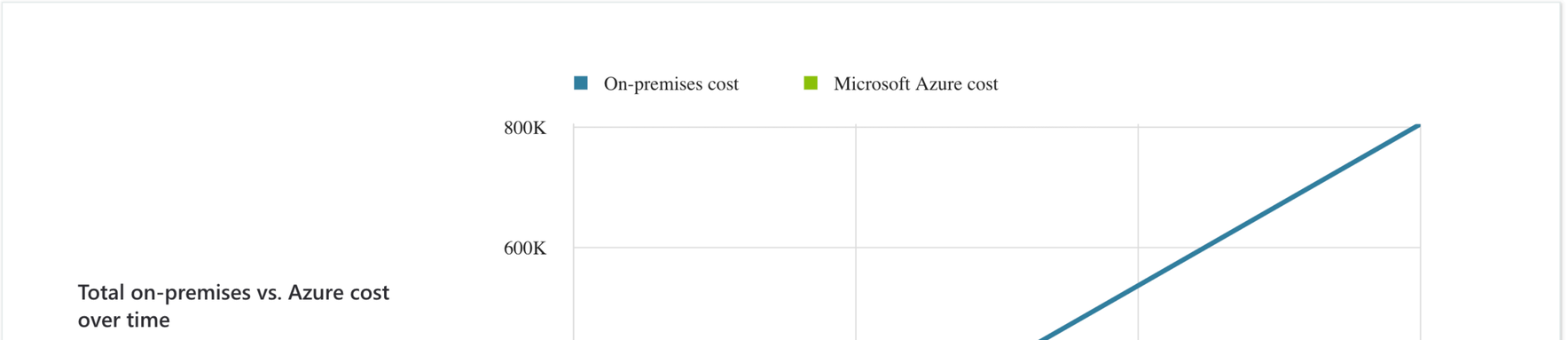
Timeframe: 3 Years

Region: North Europe

Licensing program: Microsoft Online Services Program

Show Dev/Test Pricing

Over 3 year(s) with Microsoft Azure, your estimated cost savings could be as much as $410,382



Total on-premises vs. Azure cost over time

Get the Report in 3 steps

Step 1: Define your workloads

- Servers, Databases, Storage (including any backup or archive storage), Networking bandwidth

Step 2: Adjust assumptions

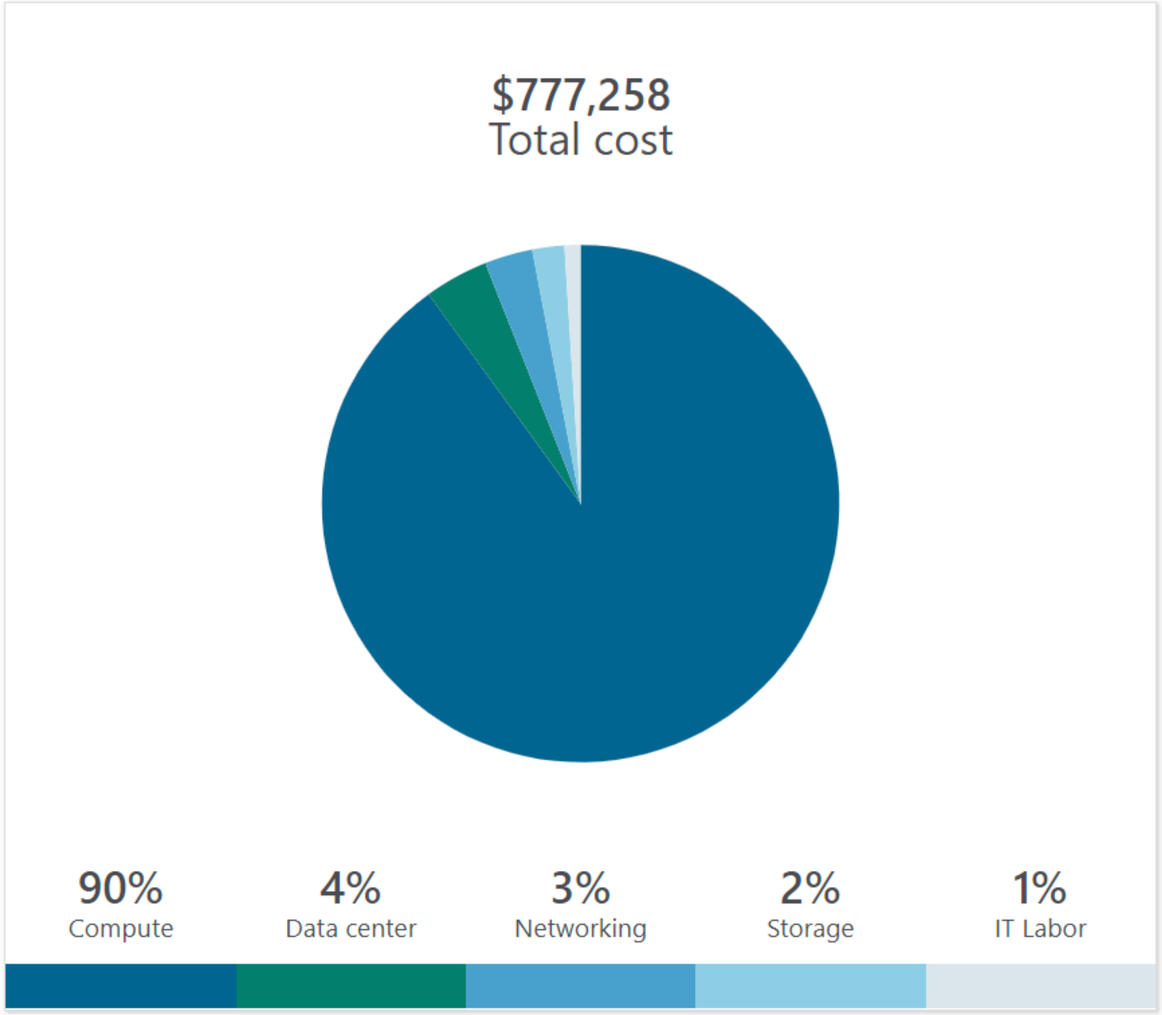
- Specify whether your current on-premises licenses are enrolled for Software Assurance
- Specify whether you need to replicate your storage to another Azure region for greater redundancy.
- Improve the accuracy of the TCO Calculator results by adjusting the values so that they match the costs of your current on-premises infrastructure.

Step 3: View the report

- Choose a time frame between one and five years. the TCO Calculator generates a report that's based on the information you've entered.

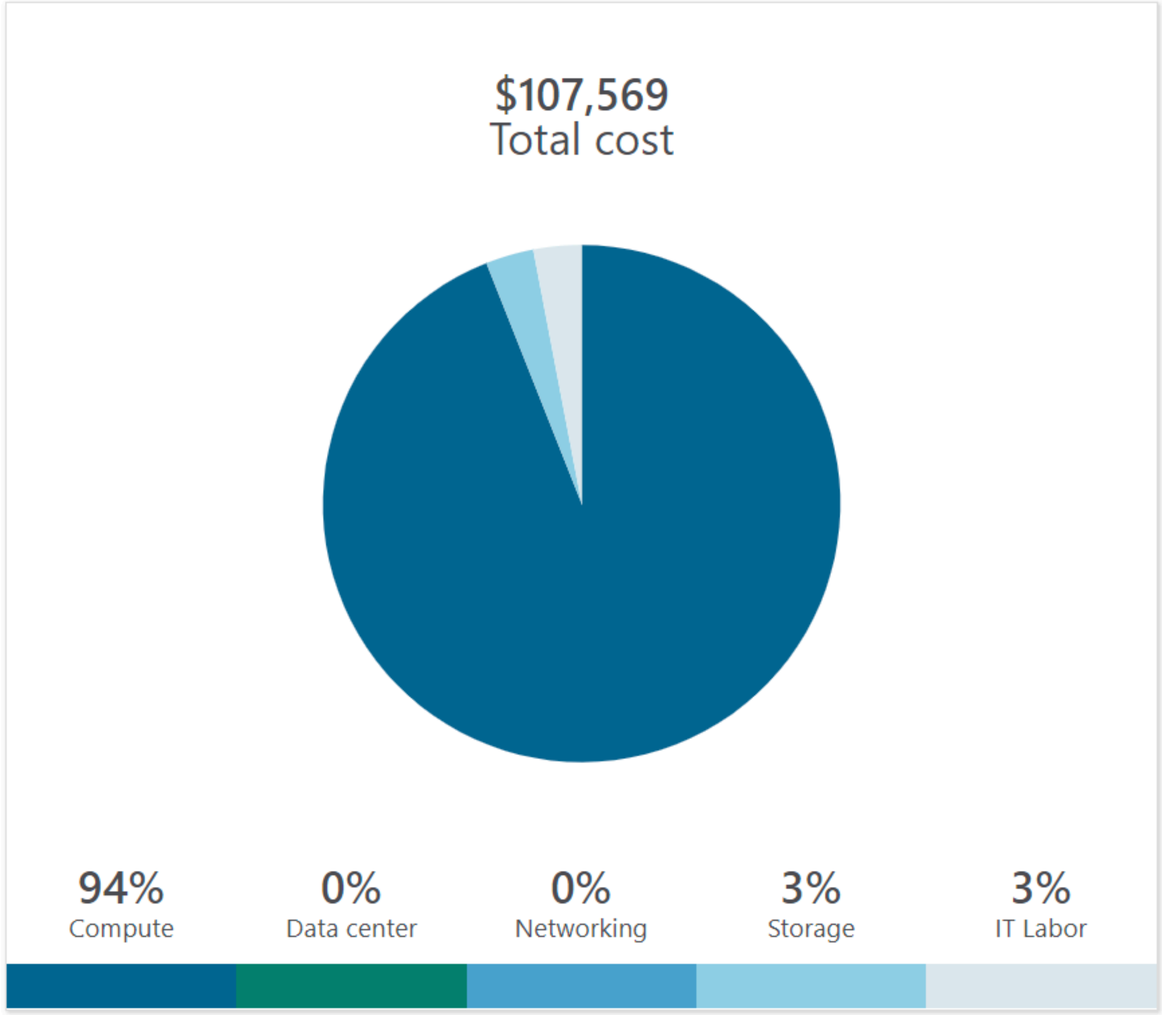
Total on-premises over 2 year(s)

TCO of on-premises environments tends to be driven by compute and data center costs.



Total Azure cost over 2 year(s)

In Azure, certain cost categories decrease or go away completely.



Estimated on-premises cost (2 year(s))

Compute cost

Data center cost

Networking cost

Storage cost

Hardware

Local Disk/SAN-HDD	
Cost per GB	$1.69
Storage (RAID 10 configuration) volume in GB	3,072
Total storage procurement cost	**$5,191.68**

Estimated Azure cost (2 year(s))

Azure compute cost

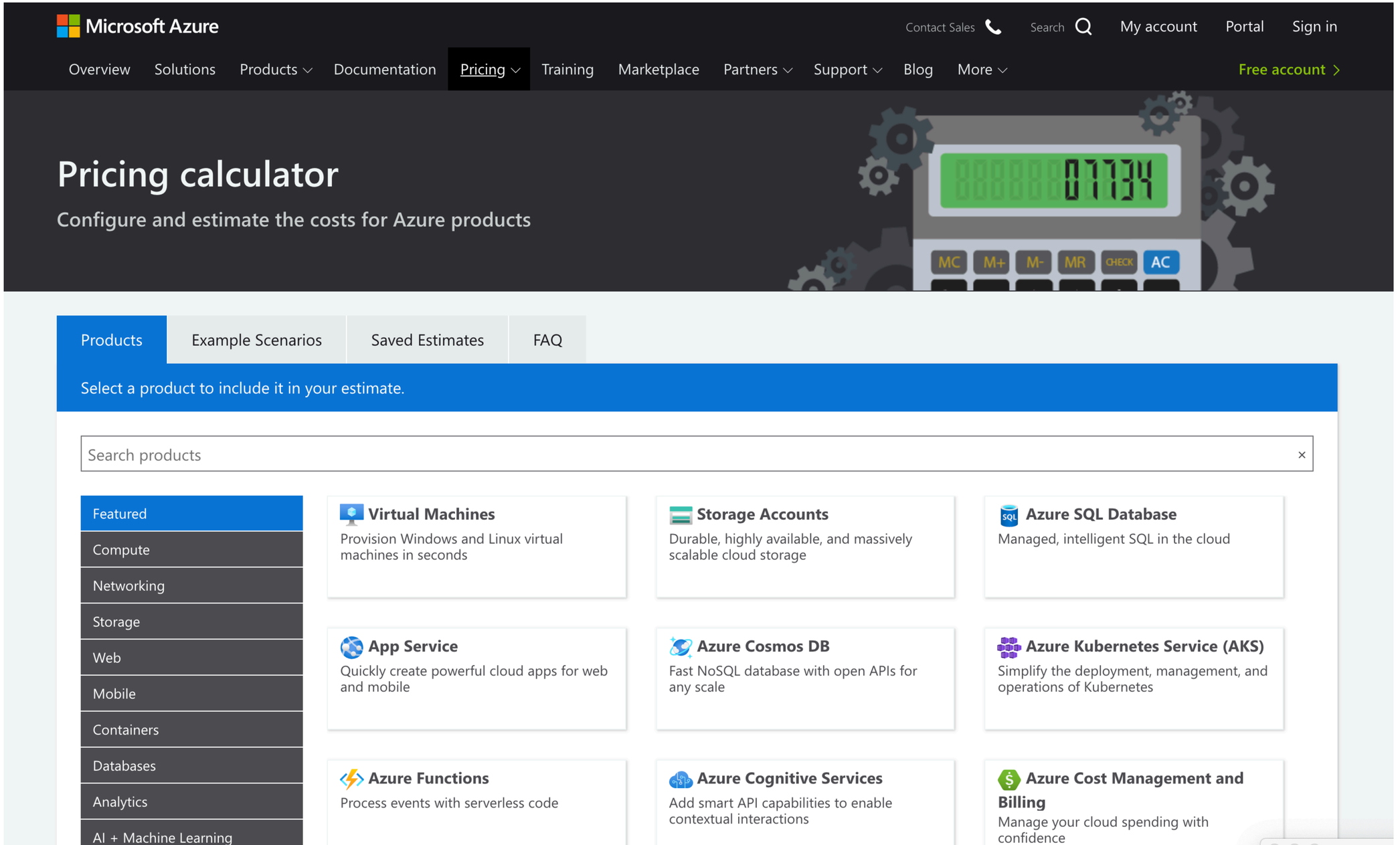
Azure data center cost

Azure networking cost

Azure storage cost

Page Blob storage

Usable storage volume in GB	1,024
Storage cost per GB/month	$0.045
Annual storage cost per usable volume	$552.96
Total Page Blob LRS storage maintenance cost over two year(s)	**$1,105.92**

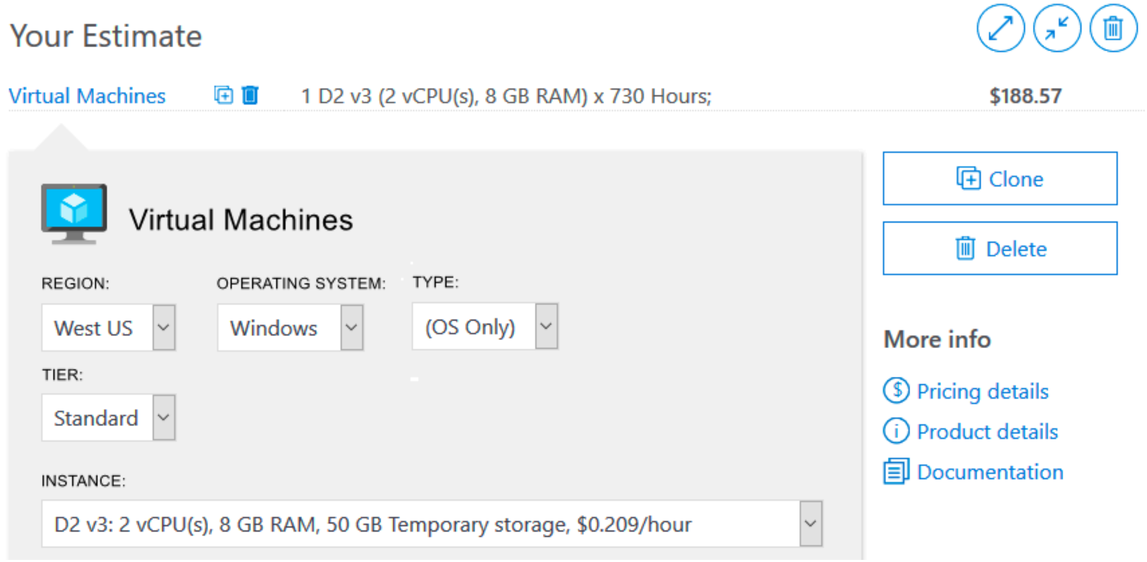

Microsoft Azure
Contact Sales
Search
My account
Portal
Sign in
Overview
Solutions
Products
Documentation
Pricing
Training
Marketplace
Partners
Support
Blog
More
Free account
Pricing calculator
Configure and estimate the costs for Azure products
MC
M+
M-
MR
CHECK
AC
Products
Example Scenarios
Saved Estimates
FAQ
Select a product to include it in your estimate.
Search products
Featured
Compute
Networking
Storage
Web
Mobile
Containers
Databases
Analytics
AI + Machine Learning
Virtual Machines
Provision Windows and Linux virtual machines in seconds
Storage Accounts
Durable, highly available, and massively scalable cloud storage
Azure SQL Database
Managed, intelligent SQL in the cloud
App Service
Quickly create powerful cloud apps for web and mobile
Azure Cosmos DB
Fast NoSQL database with open APIs for any scale
Azure Kubernetes Service (AKS)
Simplify the deployment, management, and operations of Kubernetes
Azure Functions
Process events with serverless code
Azure Cognitive Services
Add smart API capabilities to enable contextual interactions
Azure Cost Management and Billing
Manage your cloud spending with confidence

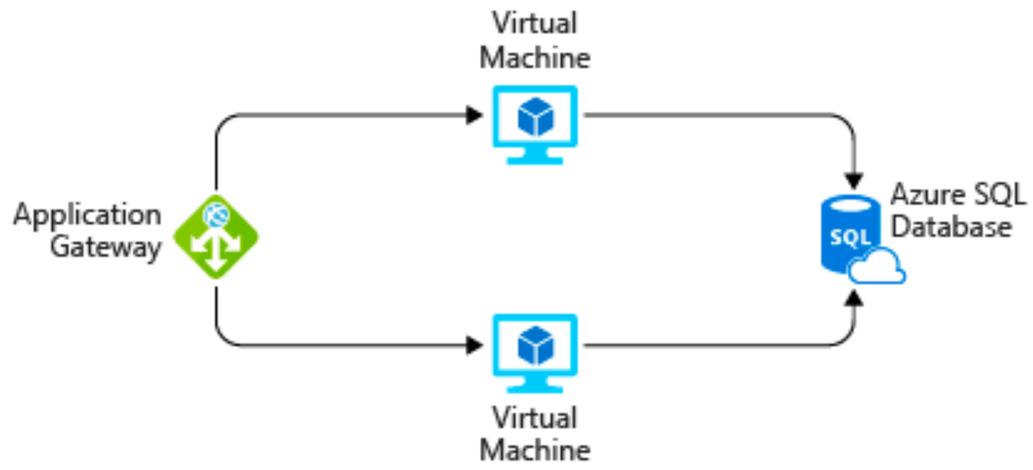
Calculate the Total Cost

The Azure Pricing calculator displays
Azure products in categories.
You add these categories to your estimate
and configure according to your specific requirements.

You then receive a consolidated estimated price, with a detailed breakdown of the costs associated with each resource you added to your solution.

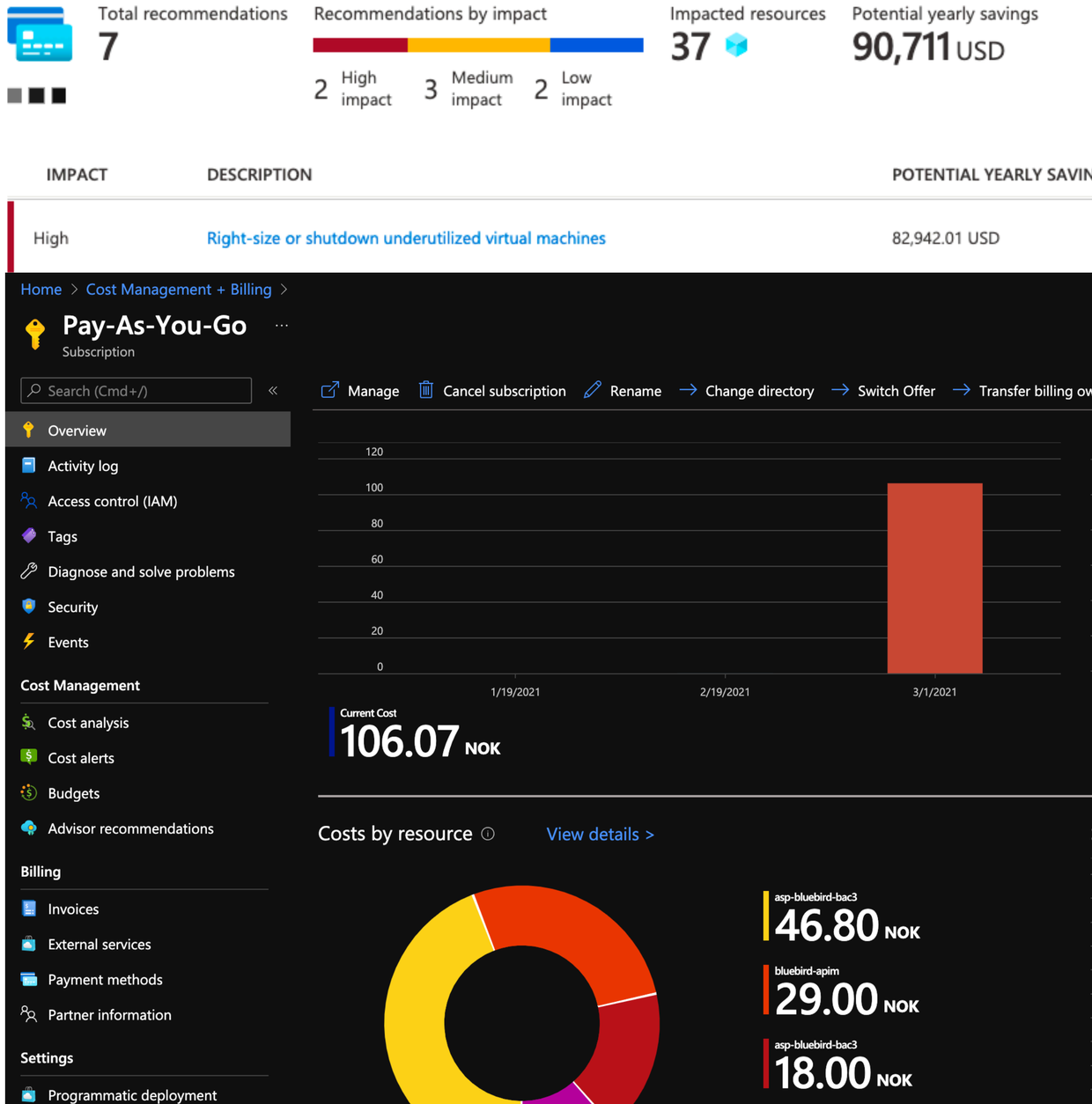
You also can access pricing details, product details, and documentation for each product from within the Pricing calculator.





Manage and minimize total cost on Azure

- Use the Azure **Pricing Calculator.**
- Use the **Total Cost of Ownership** (TCO) Calculator
- Only add the products, services, and resources that you need for your solution.
- Use **Azure Advisor** to monitor your usage:
  Azure Advisor identifies unused or underutilized resources and recommends unused resources that you can remove
- Use **spending limits** to restrict your spending
- Use **Azure Reservations** to prepay - can save you up to 72 percent as compared to pay-as-you-go prices.
- Choose low-cost *locations* and *regions*
- Use **Azure Cost Management + Billing** to control spending
- Migrate from IaaS to PaaS services



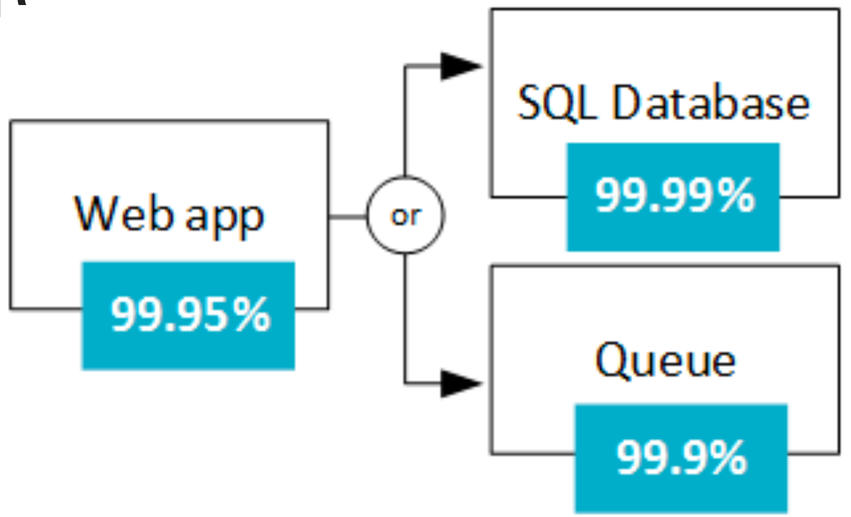
5.0
Choose the right Azure services by examining SLAs and service lifecycle.

Service-level agreements (SLAs) in Azure

SLA describes Azure's commitments for uptime and connectivity.
SLA's are individualized per Azure Service.

A good place to start is to have a discussion with your team about how **important the availability of each application is to your business:**

- **Business impact**
  What if our app goes down. How does that affect our business?
- **Effect on other business operations**
  If a system stops functioning, will that impact other business operations or stop other parts of our business?
- **Usage patterns**
  Usage patterns define when and how users access your application. One question to consider is whether the availability requirement differs between critical and non-critical time periods. For example, a tax-filing application can't fail during a filing deadline.



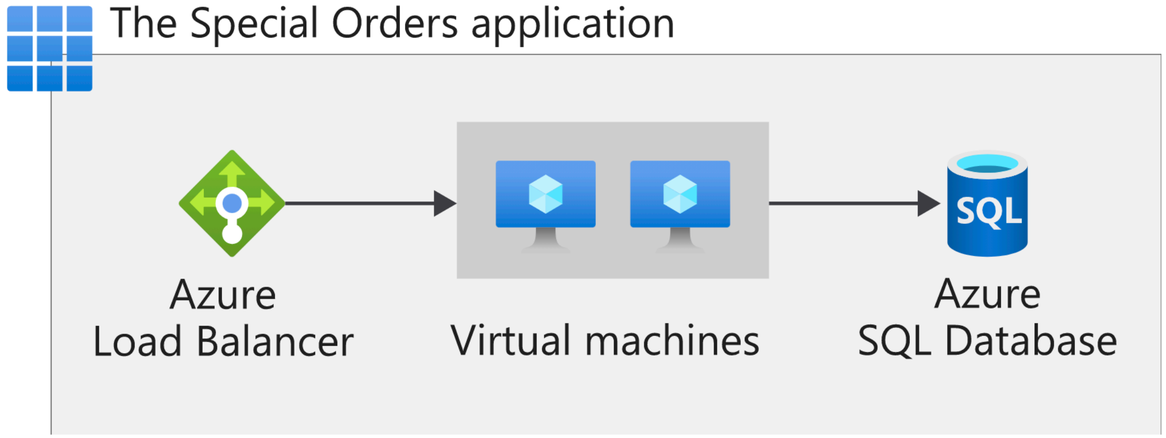
Performance Targets:

99% (Two-nines)
99.9% (Three-nines)
99.99% (Four-nines)
99.999% (Five-nines)

Compute SLAs

To compute the composite SLA for a set of services, you **multiply the SLA of each individual service**.

99.9% * 99.9% * 99.99% * 99.99% = 99.78% SLA



Our spec / List of resources:	Service SLAs:
2 Virtual Machines	Virtual Machines - 99.9%
1 Azure Load Balancer	Azure Load Balancer - 99.99%
1 Azure SQL Database	Azure SQL Database - 99-99%

Homework Assignment

Complete Azure Learn Modules Part 5 and Part 6
online with knowledge checks.
Make sure all modules are marked as completed.

1. https://docs.microsoft.com/en-us/learn/paths/az-900-describe-identity-governance-privacy-compliance-features/
2. https://docs.microsoft.com/en-us/learn/paths/az-900-describe-azure-cost-management-service-level-agreements/

Thank you.