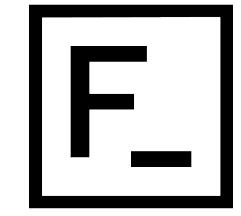




Monica Beate Tvedt **Teknologidirektør**



Forte_ Digital

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 INTERESSER

*Alpint, tennis, programmering, tegne,
lese bøker*

Azure Fundamentals Day 2

- 1.0 Choose the best AI service for your needs.
- 2.0 Choose the best tools to help organizations build better solutions.
- 3.0 Health and performance insights.
- 4.0 Azure management, administration, and reporting tools.
- 5.0 Azure Serverless technologies.
- 6.0 Azure IoT Services.
- 7.0 Protect against security threats on Azure.
- 8.0 Secure Network Connectivity on Azure.

1.0

Choose the best
AI service for your needs.

Artificial Intelligence

There are two basic approaches to AI:

The first is to employ a **deep learning system** that's modeled on the neural network of the human mind, enabling it to **discover, learn, and grow through experience**.

The second approach is **machine learning**, a data science technique that uses **existing data** to train a model, test it, and then apply the model to new data to **forecast future behaviors, outcomes, and trends**.

Azure AI Product options

Azure Machine Learning

When to use:

When your data scientists need complete control over the design and training of an algorithm using your own historical data for predicting future results.

Azure Cognitive Services

When to use:

Use this **prebuilt** machine learning service which can see, hear, speak, and understand, to solve general problems, such as analyzing text for emotional sentiment or analyzing images to recognize objects or faces.

Azure Bot Service

When to use:

When you need to create a virtual agent that can intelligently communicate with humans. ie. taking a dinner reservation.

Analyze the decision criteria

- Are you building a **virtual agent that interfaces with humans** via natural language?
[Bot Service]
- Do you need a service that can understand the content and meaning of **images, video, or audio**, or that can translate **text** into a different language?
[Azure cognitive services]
- Do you need to predict user behavior or provide users with **personalized recommendations** in your app?
[Azure cognitive services Personalizer service]
- Will your app **predict future outcomes** based on private historical data?
[Azure machine learning]
- Do you need to build a model by **using your own data** or perform a different task than those listed above?
[Azure machine learning]

Knowledge Check

You need to predict future behavior based on previous actions. Which product option should you select as a candidate?

- A. Azure Machine Learning.
- B. Azure Cognitive Services.
- C. Azure Bot Service.

Knowledge Check

You need to create a human-computer interface that uses natural language to answer customer questions. Which product option should you select as a candidate?

- A. Azure Machine Learning.
- B. Azure Cognitive Services.
- C. Azure Bot Service.

Knowledge Check

You need to identify the content of product images to automatically create alt tags for images formatted properly.
Which product option is the best candidate?

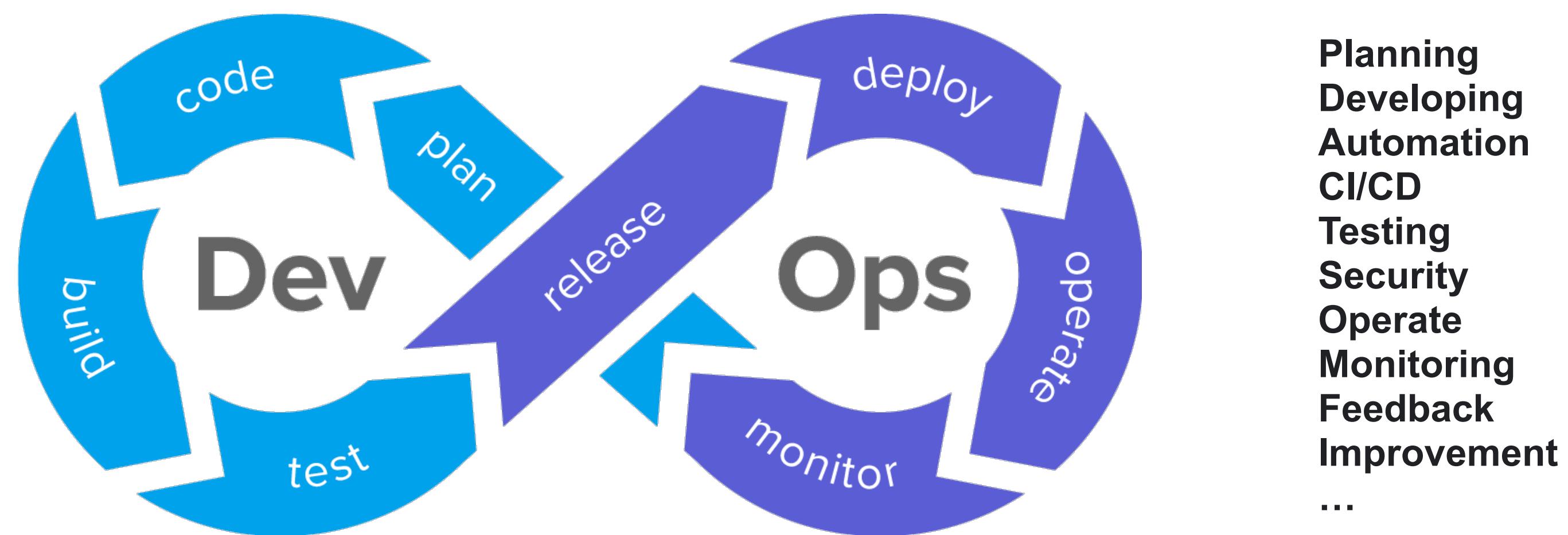
- A. Azure Machine Learning.
- B. Azure Cognitive Services.
- C. Azure Bot Service.

2.0

Choose the best tools to help
organizations build better
solutions.

DevOps

DevOps is a set of practices that combines software development (Dev) and IT operations (Ops). It aims to shorten the systems development life cycle and provide continuous delivery with high software quality.



Azure DevOps Product options

Azure DevOps Services

Features:

- Azure Boards
- Azure Repos
- Azure Pipelines
- Azure Test Plans
- Azure Artifacts
- Wiki

Azure GitHub /GitHub Actions

Features:

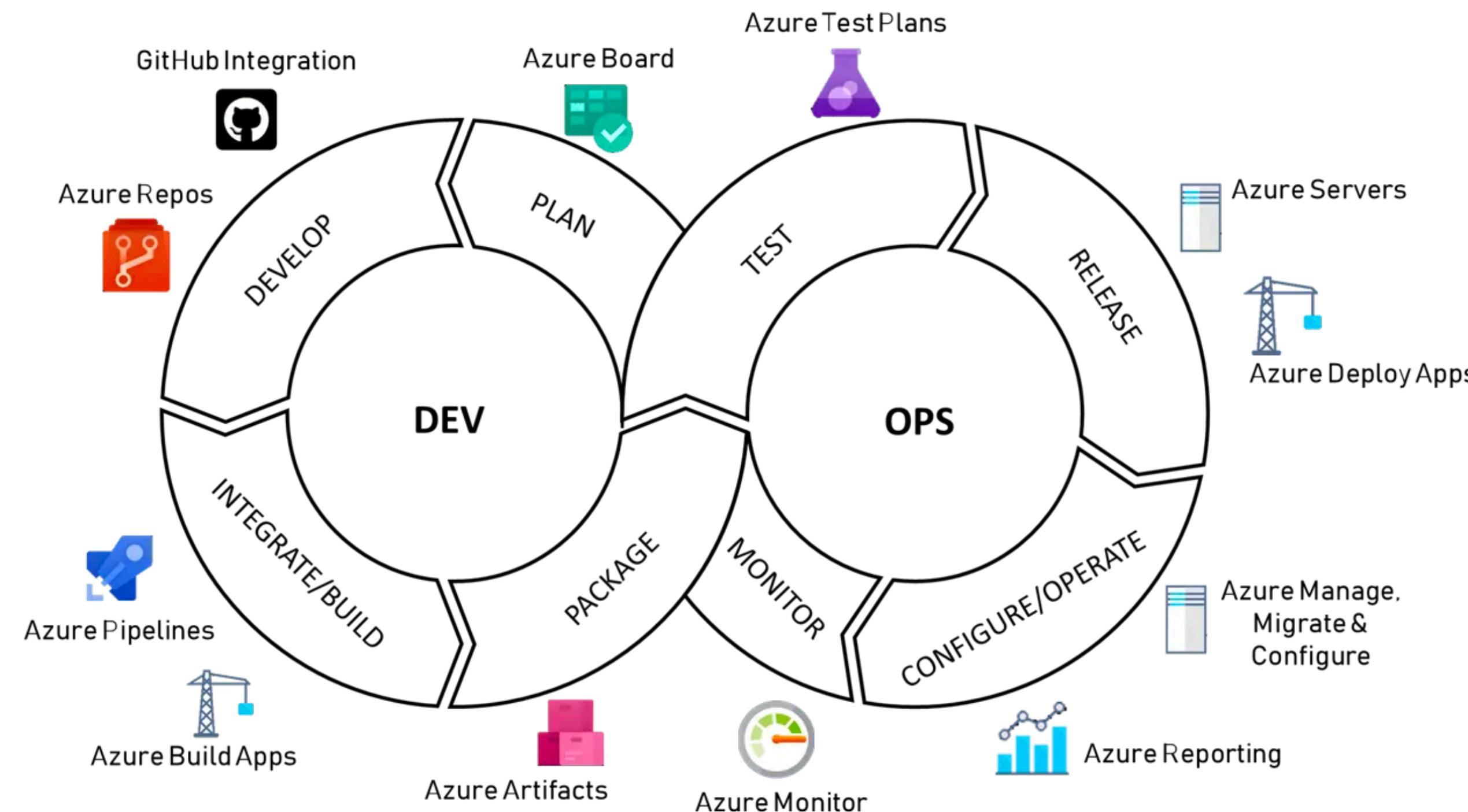
- GitHub Project Boards
- GitHub Repos
- GitHub Actions
- GitHub Workflow Artifacts
- Wiki

Azure DevTest Labs

Features:

provides an automated means of managing the process of building, setting up, and tearing down virtual machines (VMs) that contain builds of your software projects. ie. Test environments

Introduction To Azure DevOps



Analyze the decision criteria

- **Do you need to automate and manage test environments / VMs?**
[Azure DevTest Labs]
- **Are you building open-source software?**
[GitHub]
- **Regarding source-code management and DevOps tools, what level of granularity do you need for permissions?**
[GitHub for simple read/write permissions] [Azure DevOps for refined more granular permissions]
- **Regarding source-code management and DevOps tools, how sophisticated does your project management and reporting need to be?**
[Azure DevOps highly customizable] [GitHub for simple task management]
- **Regarding source-code management and DevOps tools, how tightly do you need to integrate with third-party tools?**
[Check integration support for Azure DevOps and GitHub]

Knowledge Check

Which of the following choices would not be used to automate a CI/CD process?

- A. Azure Pipelines.
- B. GitHub Actions.
- C. Azure Boards.

Knowledge Check

Which service could help you manage the VMs that your developers and testers need to ensure that your new app works across various operating systems?

- A. Azure DevTest Labs.
- B. Azure Test Labs.
- C. Azure Repos.

Knowledge Check

Which service lacks features to assign individual developers tasks to work on?

- A. Azure Boards.
- B. GitHub.
- C. Azure Pipelines.

3.0

Health and
performance insights.

Monitoring health, performance and usage

Modern software systems running in the cloud are complex, and gaining visibility into the health and performance of your application-hosting environment across all of its layers of services is challenging.

There are several solutions from Microsoft that can help you react quickly to outages, research intermittent issues, optimize your usage, and be proactive in handling future planned downtime.

- Are we using the cloud correctly? Can we squeeze more performance out of our cloud spend?
- Are we spending more than we need to?
- Do we have our systems properly secured?
- If we experience a regional outage, could we fail over to another region?
- How can we diagnose and fix issues that occur intermittently?
- How can we quickly determine the cause of an outage?
- How can we learn about planned downtime?

Insights product options

Azure Advisor

Cloud optimization:

Evaluates your Azure resources and makes recommendations to help improve reliability, security, and performance, achieve operational excellence, and reduce costs

Azure Monitor

Maximize performance, availability, and usage of your web applications:

- Monitor your Applications
- Monitor your Infrastructure
- Monitor your Network

Azure Service Health

The health of the Azure services, regions, and resources you rely on:

- Planned maintenance
- Health advisories
- Service Issues

Analyze the decision criteria

- **Do you need to analyze how you're using Azure to reduce costs?
Improve resilience? Harden your security?
[Azure Advisor]**
- **Do you want to monitor Azure services or your usage of Azure?
[Azure Monitor for your specific usage, Azure Service Health for monitoring Azure Services in general]**
- **Do you want to measure custom events alongside other usage metrics?
[Azure Monitor]**
- **Do you need to set up alerts for outages or when autoscaling is about to deploy new instances?
[Azure Monitor]**

Knowledge Check

You want to be alerted when new recommendations to improve your cloud environment are available. Which service will do this?

- A. Azure Advisor.
- B. Azure Monitor.
- C. Azure Service Health.

Knowledge Check

Which service provides official outage root cause analyses (RCAs) for Azure incidents?

- A. Azure Advisor.
- B. Azure Monitor.
- C. Azure Service Health.

Knowledge Check

Which service is a platform that powers Application Insights, monitoring for VMs, containers, and Kubernetes?

- A. Azure Advisor.
- B. Azure Monitor.
- C. Azure Service Health.

4.0

Azure management,
administration, and
reporting tools.

How to manage your Azure Services

At a high level, there are two broad categories of management tools: visual tools and code-based tools. Code-based tools more for operations that you need to perform multiple times.

- **The Azure Portal (visual)**

A web-based user interface, you can access virtually every feature of Azure. The Azure portal provides a friendly, graphical UI to view all the services you're using, create new services, configure your services, and view reports.

- **Azure PowerShell (code)**

Azure PowerShell is a shell where you can execute commands called cmdlets (pronounced *command-lets*).
PowerShell uses a verb-noun pair for the names of cmdlets
ie. [Connect-AzAccount](#), [Remove-AzStorageAccount](#)

- **The Azure CLI (code)**

The Azure CLI command-line interface is an executable program where you can execute commands in Bash.
ie. [az login](#), [az storage account delete](#)

- **ARM templates (code)**

By using Azure Resource Manager templates (ARM templates), you can describe the resources you want to use in a declarative JSON format. Orchestrates the creation of resources in parallel with validation steps. That is, if you need 50 instances of the same resource, all 50 instances are created at the same time.

Analyze the decision criteria

- **Do you need to perform one-off management, administrative, or reporting actions?**
[Azure Portal] [On-off administrative task skilled developer: Azure CLI/PowerShell]
- **Do you need a way to repeatedly set up one or more resources and ensure that all the dependencies are created in the proper order?**
[ARM templates]
- **When you're scripting, do you come from a Windows administration or Linux administration background?**
[Windows: PowerShell] [Linux: Azure CLI]

Knowledge Check

As an administrator, you need to retrieve the IP address from a particular VM by using **Bash**. Which of the following tools should you use?

- A. ARM Templates.
- B. Azure PowerShell.
- C. The Azure Portal.
- D. The Azure CLI.

Knowledge Check

What is the best infrastructure-as-code option for quickly and reliably setting up your entire cloud infrastructure declaratively?

- A. ARM Templates.
- B. Azure PowerShell.
- C. The Azure Portal.
- D. The Azure CLI.

5.0

Azure Serverless technologies.

Serverless Services

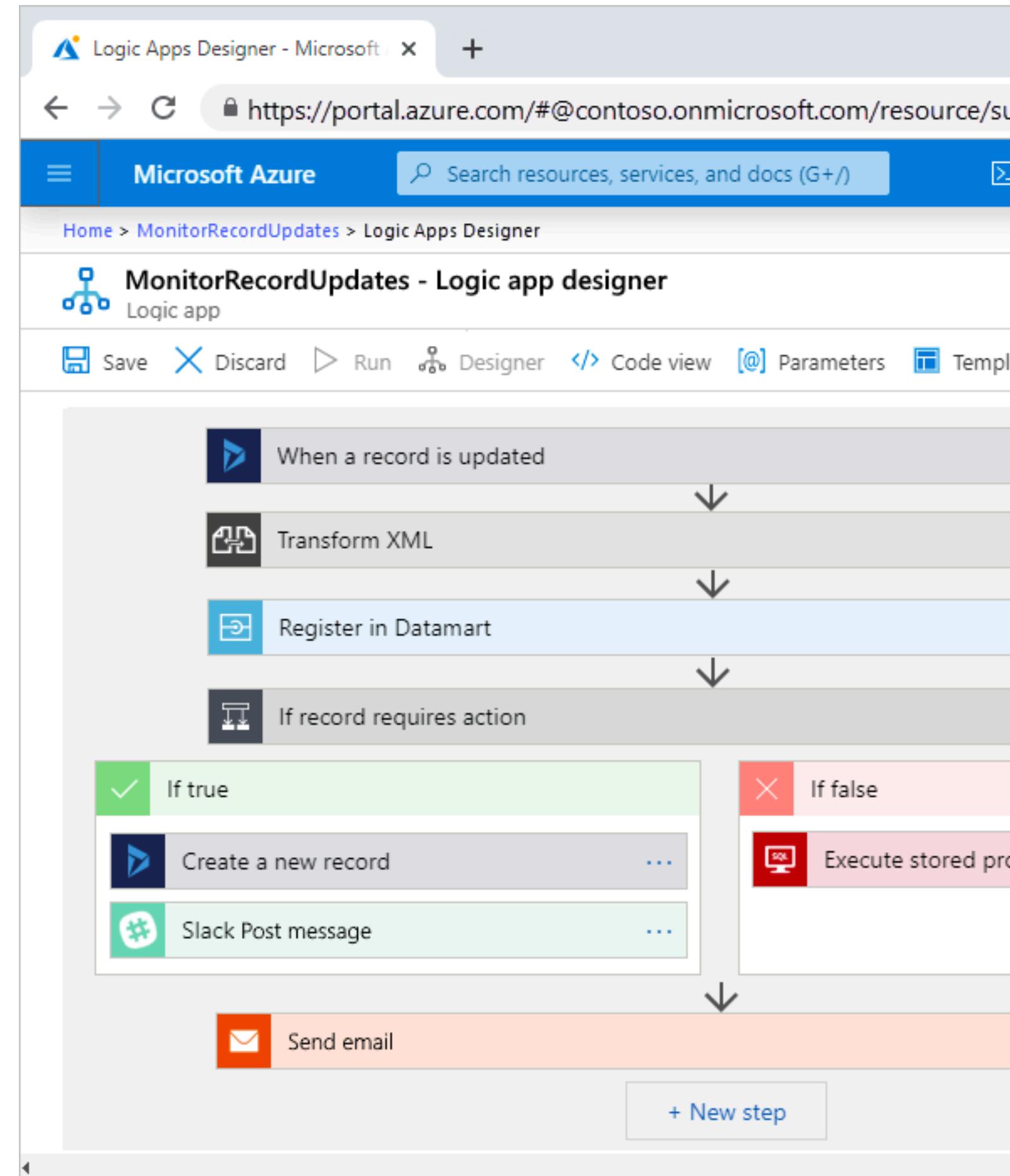
Serverless computing enables developers to build applications faster by eliminating the need for them to manage infrastructure. With serverless applications, the cloud service provider **automatically provisions, scales, and manages the infrastructure** required to run the code. You are **charged based on usage**, not number of servers.

- **Azure Functions**

Run small amounts of code known as serverless functions in your favorite language: C#, Java, JavaScript, Python and PowerShell.
Runs in response to an **event**. An example of an event might be an HTTP request.

- **Logic apps**

Build serverless workflows built on top of Azure Functions.
A low-code/no-code development platform hosted as a cloud service. The service helps you **automate and orchestrate tasks, business processes, and workflows** when you need to **integrate apps, data, systems, and services** across enterprises or organizations.



Analyze the decision criteria

- **Do you need to perform an orchestration across well-known APIs?**
[Azure Logic Apps]
- **Do you need to execute custom algorithms or perform specialized data parsing and data lookups?**
[Azure Functions]
- **Do you have existing automated tasks written in an imperative programming language?**
[Azure Functions]
- **Do you prefer a visual (declarative) workflow or writing (imperative) code?**
[Azure Logic Apps: Visual] [Azure Functions: code]

Knowledge Check

You need to process messages from a queue, parse them by using some existing imperative logic written in Java, and then send them to a third-party API. Which serverless option should you choose?

- A. Azure Functions.
- B. Azure Logic Apps.

Knowledge Check

You want to orchestrate a workflow by using APIs from several well-known services. Which is the best option for this scenario?

- A. Azure Functions.
- B. Azure Logic Apps.

Knowledge Check

Your team has limited experience with writing custom code, but it sees tremendous value in automating several important business processes. Which of the following options is your team's best option?

- A. Azure Functions.
- B. Azure Logic Apps.

6.0

Azure IoT Services.

Internet of Things (IoT)

IoT enables devices to gather and then relay information for data analysis. Smart devices are equipped with sensors that collect data. ie. Drones, security cams, buttons, smart bulbs, temperature sensors.

- **Azure IoT Hub**

A highly secure and reliable service that's hosted in the cloud and that acts as a central message hub for bi-directional [communication between your IoT application and the devices it manages](#)

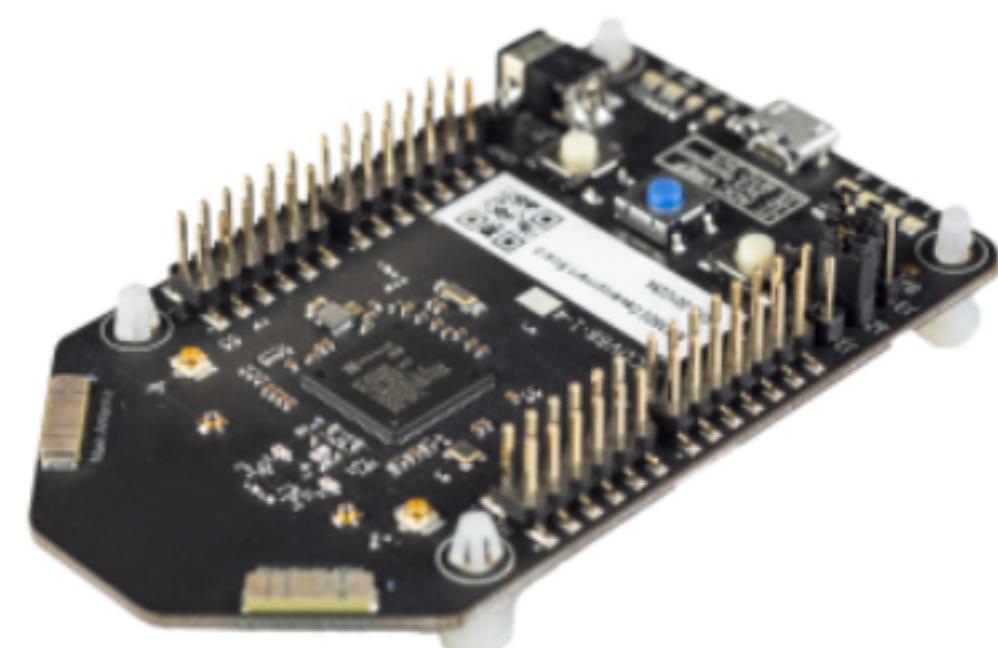
- **Azure IoT Central**

Builds on top of IoT Hub by adding a dashboard that allows you to connect, monitor, and [manage your IoT devices](#). You can watch the overall performance across all devices in aggregate, and you can set up alerts that send notifications when a specific device needs maintenance. Finally, you can push firmware updates to the device.

- **Azure Sphere**

An end-to-end, highly secure IoT solution for customers that encompasses everything from the hardware and operating system on the device to the secure method of [sending messages from the device to the message hub](#). Interacts with other Azure IoT services.

The screenshot shows the Azure IoT Central interface. On the left is a sidebar with 'Home', 'Build' (which is selected), and 'My apps'. Below the sidebar, there are four categories: 'Retail', 'Energy', 'Government', and 'Healthcare', with 'Retail' currently selected. Under 'Retail', there are two cards: 'Connected logistics' (Preview) and 'Digital distribution center' (Preview). Each card has a 'Create app' button and a 'Learn more' link.



Analyze the decision criteria

- **Is it critical to ensure that the device is not compromised?**
[Azure Sphere]
- **Do I need a dashboard for reporting and management?**
[Azure IoT Central] [Build it yourself: IoT Hub RESTful API]

Knowledge Check

A company wants to build a new voting kiosk for sales to governments around the world. Which IoT technologies should the company choose to ensure the highest degree of security?

- A. Azure Sphere.
- B. Azure IoT Hub.
- C. Azure IoT Central.

Knowledge Check

A company wants to quickly manage its individual IoT devices by using a web-based user interface. Which IoT technology should it choose?

- A. Azure Sphere.
- B. Azure IoT Hub.
- C. Azure IoT Central.

Knowledge Check

You want to send messages from the IoT device to the cloud and vice versa. Which IoT technology can send and receive messages?

- A. Azure Sphere.
- B. Azure IoT Hub.
- C. Azure IoT Central.

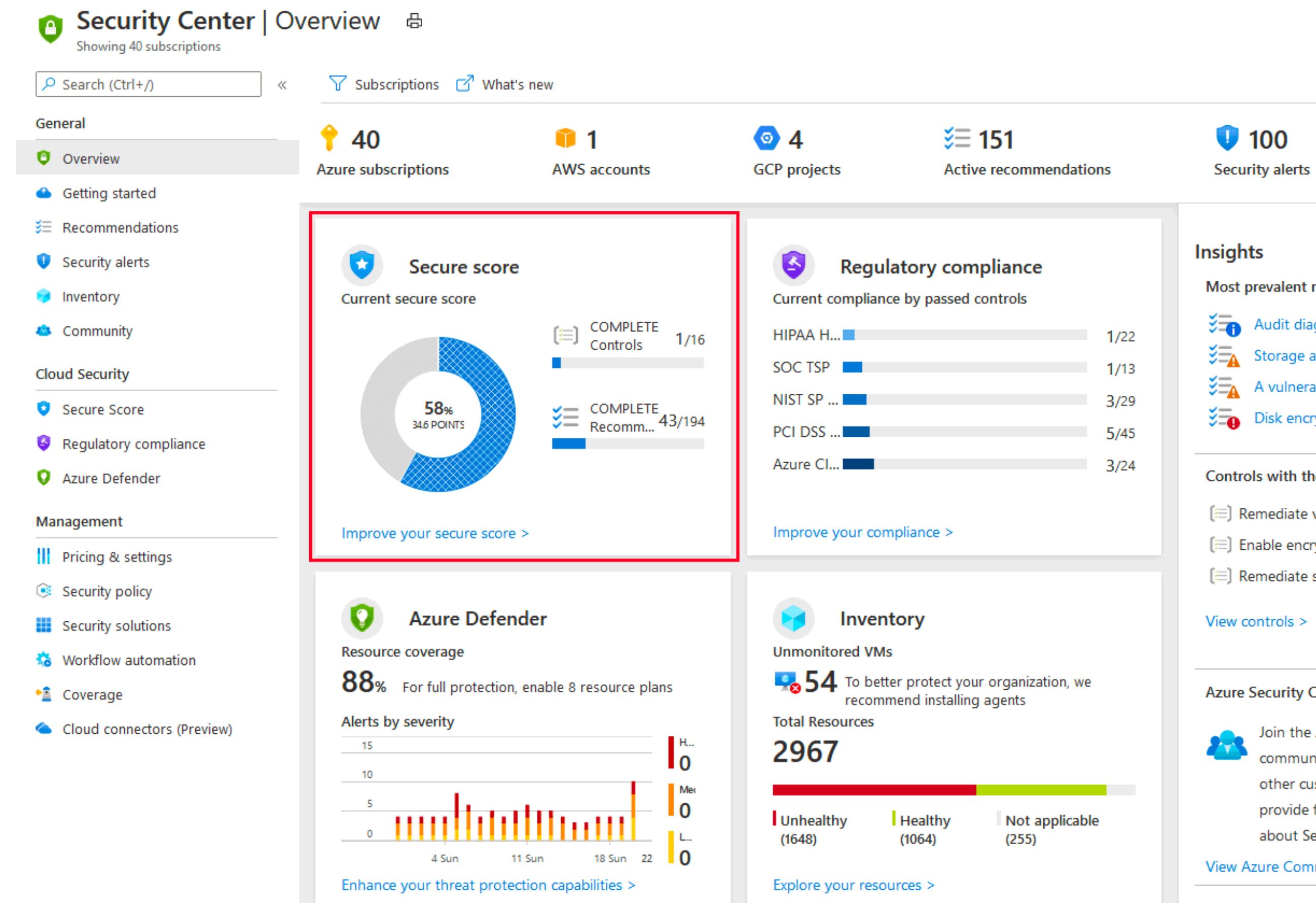
7.0

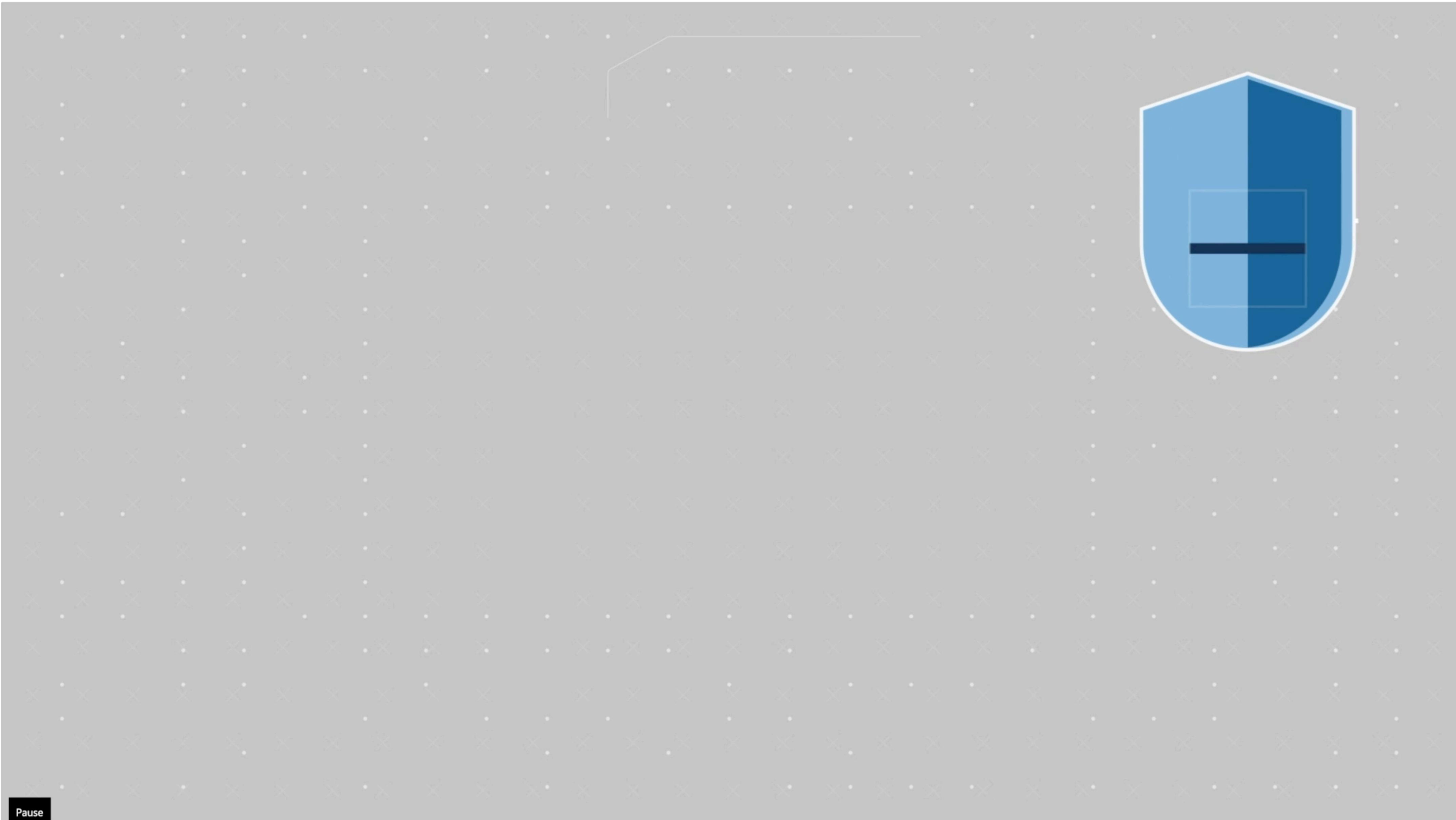
Protect against security
threats on Azure.

Azure Security Center

Azure Security Center is a unified infrastructure security monitoring service that provides visibility of your security posture across all of your services, both on Azure and on-premises.

The term *security posture* refers to cybersecurity policies and controls, as well as how well you can predict, prevent, and respond to security threats.



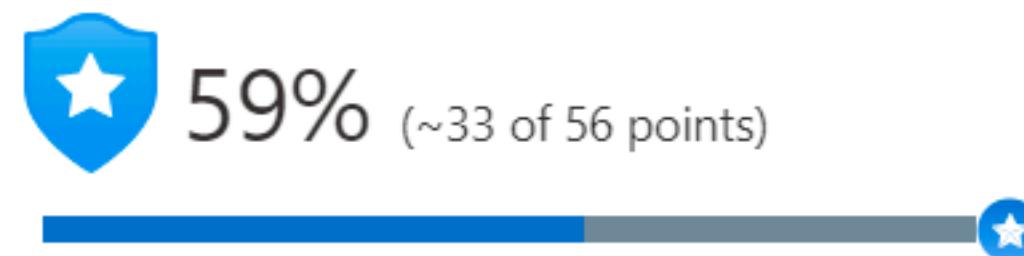


Policy & Compliance

Let's say your company must comply with the [Payment Card Industry's Data Security Standard \(PCI DSS\)](#). This report shows that the company has resources that it needs to remediate.

Policy & compliance

Overall Secure Score

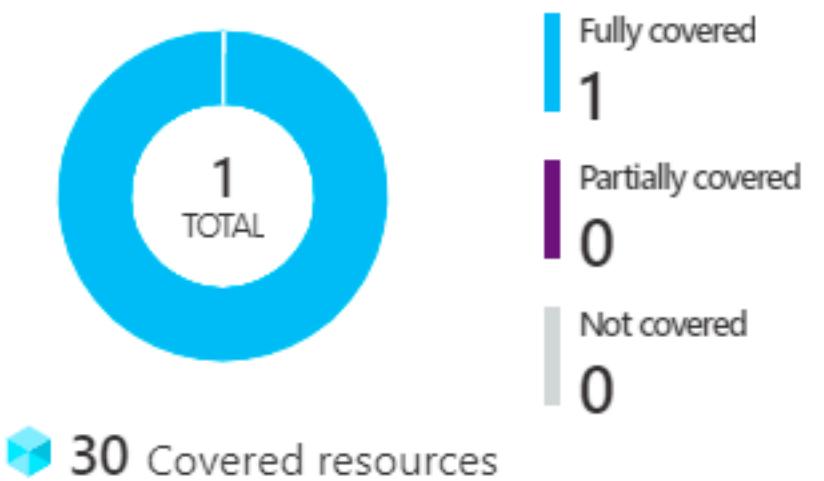


[Review your Secure Score >](#)

Regulatory compliance

PCI DSS 3.2.1	34 of 45 passed controls
Azure CIS 1.1.0	20 of 24 passed controls
SOC TSP	12 of 13 passed controls

Subscription coverage



Resource Security Hygiene

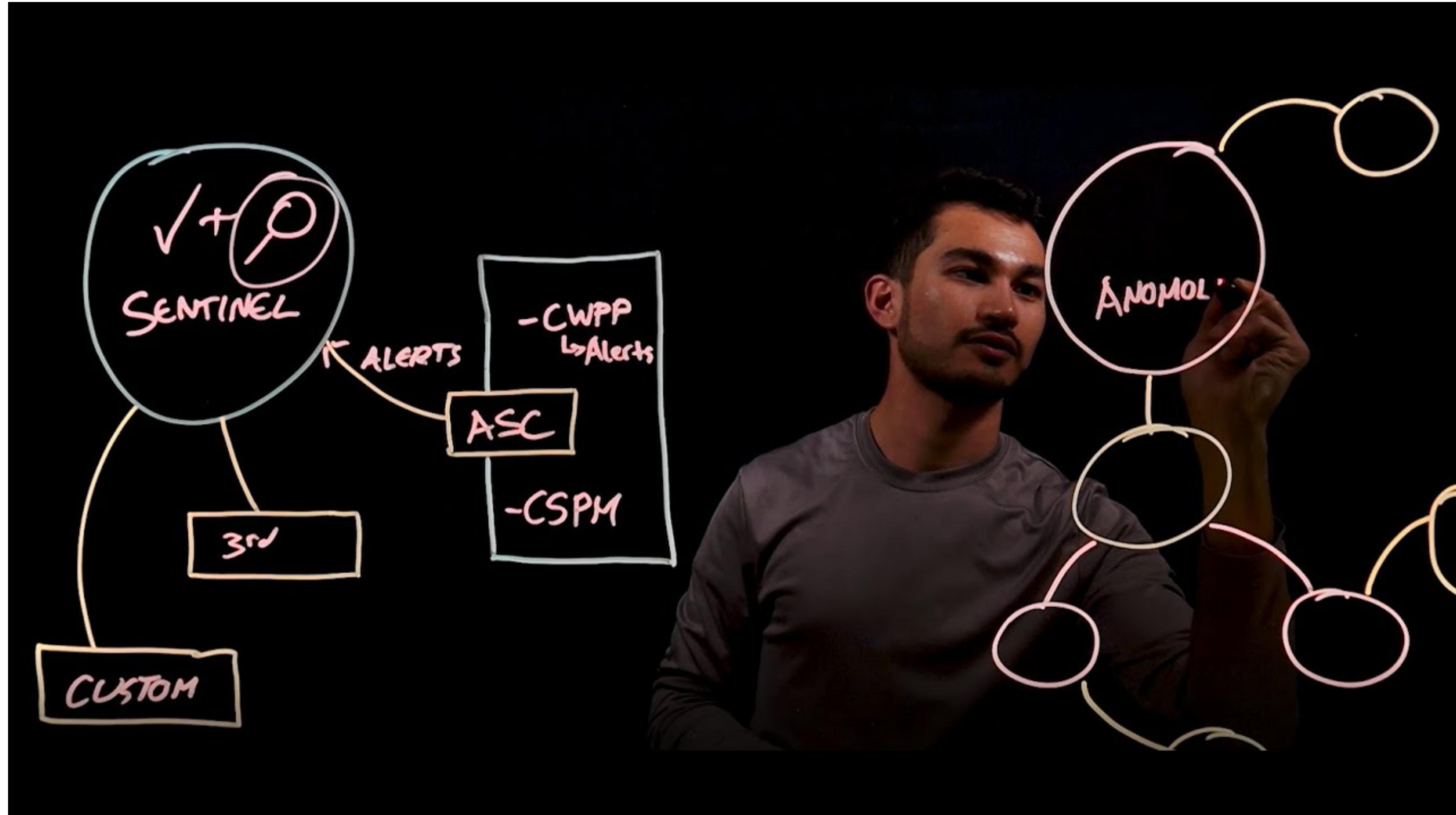
Or your company wants to check the health of its resources from a security perspective. To help prioritize remediation actions. Your **Secure score** is based on the percentage of security controls that you satisfy. The more security controls you satisfy, the higher the score you receive. Your score improves when you remediate all of the recommendations for a single resource within a control.



Detect and respond to security threats by using Azure Sentinel

Azure Sentinel aggregates security data from many different sources and provides additional capabilities for threat detection and response.

But what's the difference between Sentinel and Security Center?



Azure Key Vault

Helps you safeguard cryptographic keys and other secrets used by cloud apps and services.

Secrets Management

Store and tightly control access to tokens, passwords, certificates, API keys, and other secrets.

Key Management

Create and control the encryption keys used to encrypt your data

Certificate Management

Easily provision, manage, and deploy public and private SSL Certificates for use with Azure and internal connected resources.

Hardware Security Module

Secrets and keys can be protected either by software or FIPS 140-2 Level 2 validated HSMs. HSM is a piece of hardware designed to store encryption keys. Keys are stored in-Memory not on disk.

The screenshot shows the Azure Key Vault interface for managing certificates. The title bar reads 'keyvaulttest6876 | Certificates'. On the left, there's a sidebar with icons for Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, and Events (preview). The main area has a search bar and buttons for Generate/Import, Refresh, Restore Backup, and Certificate Contacts. A table lists certificates, showing one entry: 'Completed' TestCACert with thumbprint '88D24EFCF38AE6ACDA8B...' and status 'Enabled'.

Name	Thumbprint	Status
TestCACert	88D24EFCF38AE6ACDA8B...	✓ Enabled

In progress, failed or cancelled
There are no certificates available.



Knowledge Check

How can your company enforce having only certain applications run on its VMs?

- A. Connect your VMs to Azure Sentinel
- B. Create an application control rule in Azure Security Center.
- C. Periodically run a script that lists the running processes on each VM. The IT manager can then shut down any applications that shouldn't be running.

Knowledge Check

What's the easiest way for your company to combine security data from all of its monitoring tools into a single report that it can take action on?

- A. Collect security data in Azure Sentinel.
- B. Build a custom tool that collects security data and displays a report through a web application.
- C. Look through each security log daily and email a summary to your team.

Knowledge Check

Which is the best way for Tailwind Traders to safely store its certificates so that they're accessible to cloud VMs?

- A. Place the certificates on a network share.
- B. Store them on a VM that's protected by a password.
- C. Store the certificates in Azure Key Vault.

8.0

Secure Network Connectivity on Azure.

Protect from DDoS attacks by using Azure DDoS Protection

What is a DDoS (Distributed Denial of Service) Attack?

A malicious attempt to disrupt normal traffic by flooding a website with large amounts of fake traffic, making the application slow or unresponsive to legitimate users.

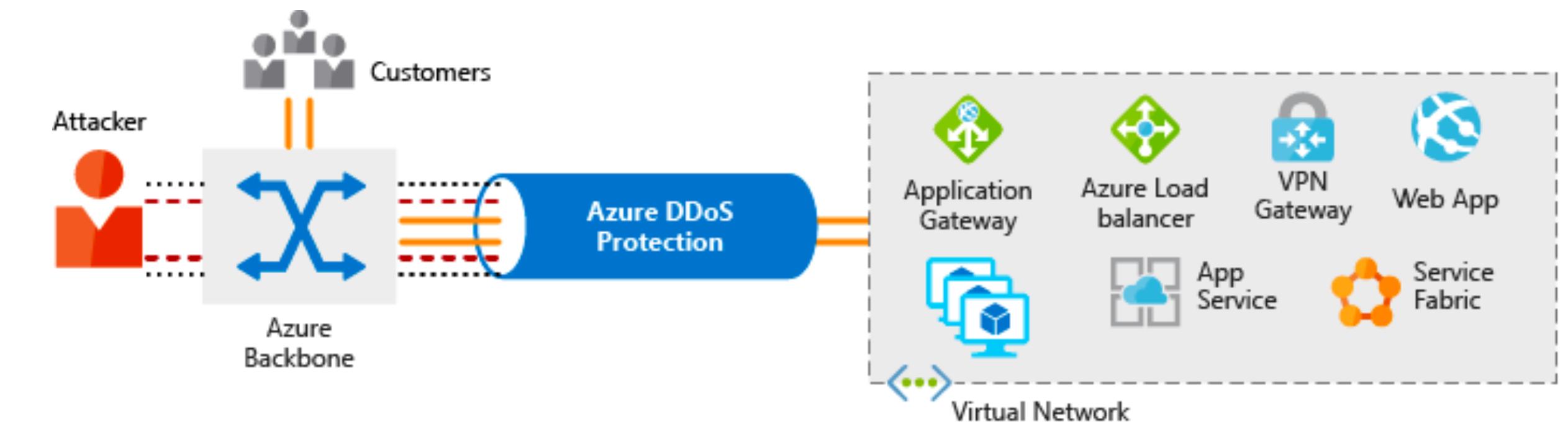
Azure offers **two tiers** of DDoS Protection:

1. DDoS Protection Basic

- It's Free.
- Already turned on and protects Azures global network.

2. DDoS Protection Standard

- Metrics, Alerts, Reporting
- DDoS Expert Support
- Starting at \$2,994 a month
- Application and cost protection SLAs

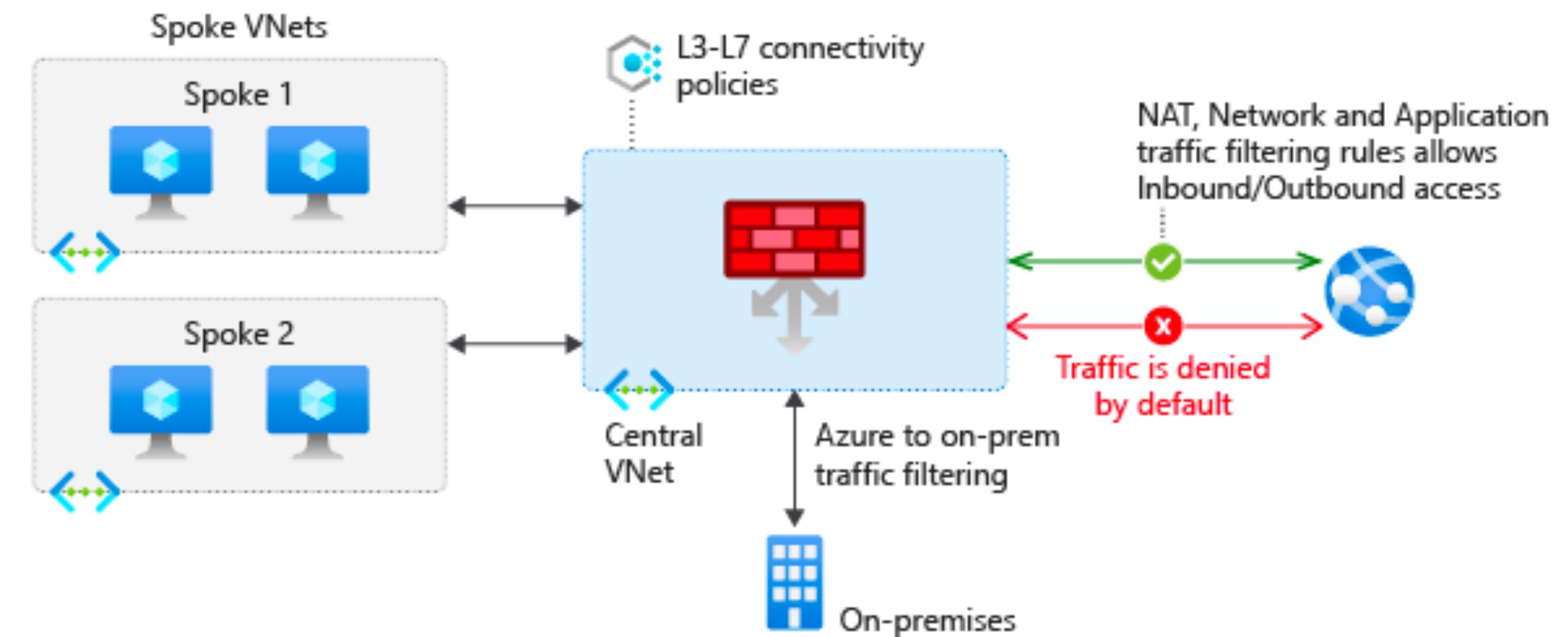


Azure Firewall

Azure Firewall is a managed, cloud-based network security service that protects your Azure Virtual Network resources.

How it works:

- Centrally create, enforce, and log application and network connectivity policies across subscriptions and virtual networks.
- Uses a static public IP address for your virtual network resources allowing outside firewalls to identify traffic originating from your virtual network.
- High availability is built in, no additional load balancers needed.
- Azure Monitor integration to enable logging and analytics



Homework Assignment

Complete Azure Learn Modules Part 3 and Part 4 online with knowledge checks.

Make sure all modules are marked as completed.

1. <https://docs.microsoft.com/en-us/learn/parts/az-900-describe-core-solutions-management-tools-azure/>
2. <https://docs.microsoft.com/en-us/learn/parts/az-900-describe-general-security-network-security-features/>

Thank you.