

AZ-900 Microsoft Azure Fundamentals

Scott Duffy, Instructor

Microsoft Azure Fundamentals

“foundational level knowledge of cloud services and how those services are provided with Microsoft Azure”

Microsoft Azure Fundamentals

- Candidates with non-technical backgrounds
- Candidates with a technical background who have a need to validate their foundational level knowledge around cloud services

Microsoft Azure Fundamentals

- Understand cloud concepts
- Understand core Azure services
- Understand security, privacy, compliance and trust
 - Understand Azure pricing and support



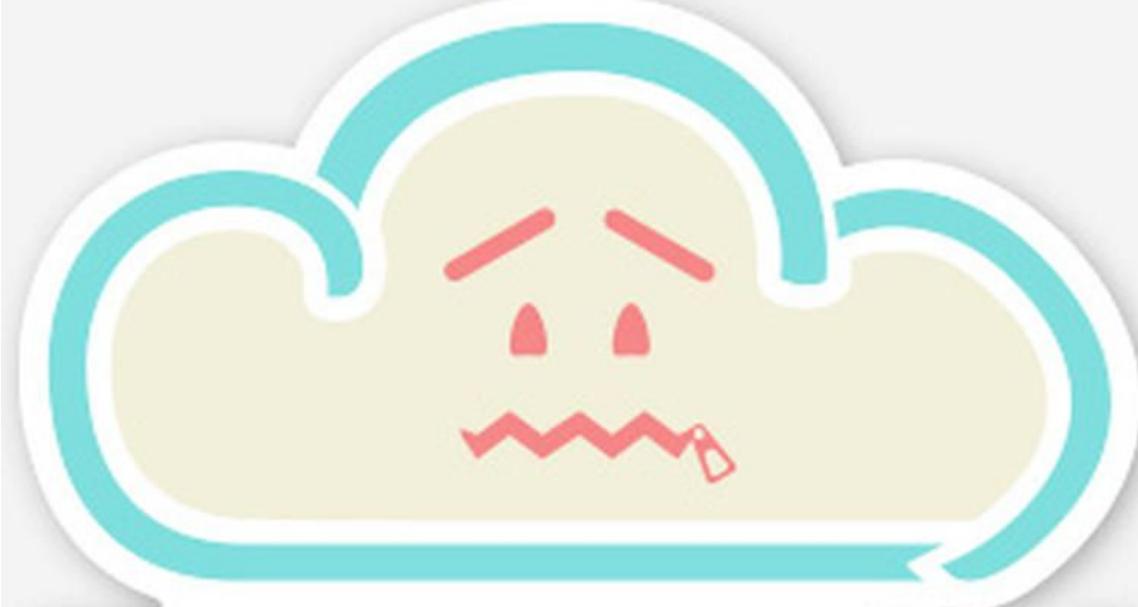
You'll be prepared
to take and pass the
AZ-900 exam



But you don't have
to, if you just want
to learn cloud
concepts



What is the Cloud?



There is no cloud
it's just someone else's computer



The ability to rent
computing
resources -
on demand

What Computing Resources?

Windows and Linux Servers

Unlimited Storage

Databases

Queues

Content Delivery Network

Batch Processing Jobs



What Computing Resources?

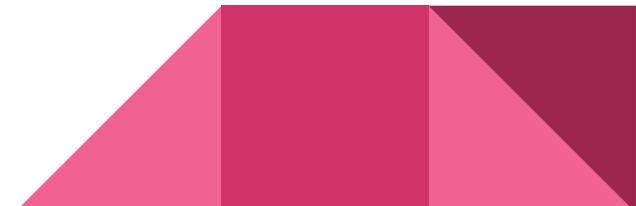
Big Data - Hadoop

Media Services

Machine Learning

Chat Bots

Cognitive Services





1 000+

Azure Service options

Exam AZ-900



Microsoft Azure Fundamentals

\$99.00 USD*

Not in United States?

Languages: English

Audiences: IT professionals

Technology: Microsoft Azure

[SCHEDULE EXAM >](#)



Fulfils requirements for Microsoft Certified Azure Fundamentals

With Microsoft Certification, technology professionals are more likely to get hired, demonstrate clear business impact, and advance their careers.

[ABOUT THE CERTIFICATION >](#)

This exam may be available in your country for online proctored delivery. [Learn more](#).

Convince your boss

Understand Cloud Concepts (15-20%)

Understand cloud concepts (15-20%)

Describe the benefits and considerations of using cloud services

- understand terms such as high availability, scalability, elasticity, agility, fault tolerance, and disaster recovery
- understand the principles of economies of scale
- understand the differences between Capital Expenditure (CapEx) and Operational Expenditure (OpEx)
- understand the consumption-based model

Describe the differences between Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS)

- describe Infrastructure-as-a-Service (IaaS)
- describe Platform-as-a-Service (PaaS)
- describe Software-as-a-Service (SaaS)
- compare and contrast the three different service type

Describe the differences between public, private and hybrid cloud models

- describe public cloud
- describe private cloud
- describe hybrid cloud
- compare and contrast the three different cloud models

High Availability



Expressed as a percentage,
it's the ability of a system to
respond to users

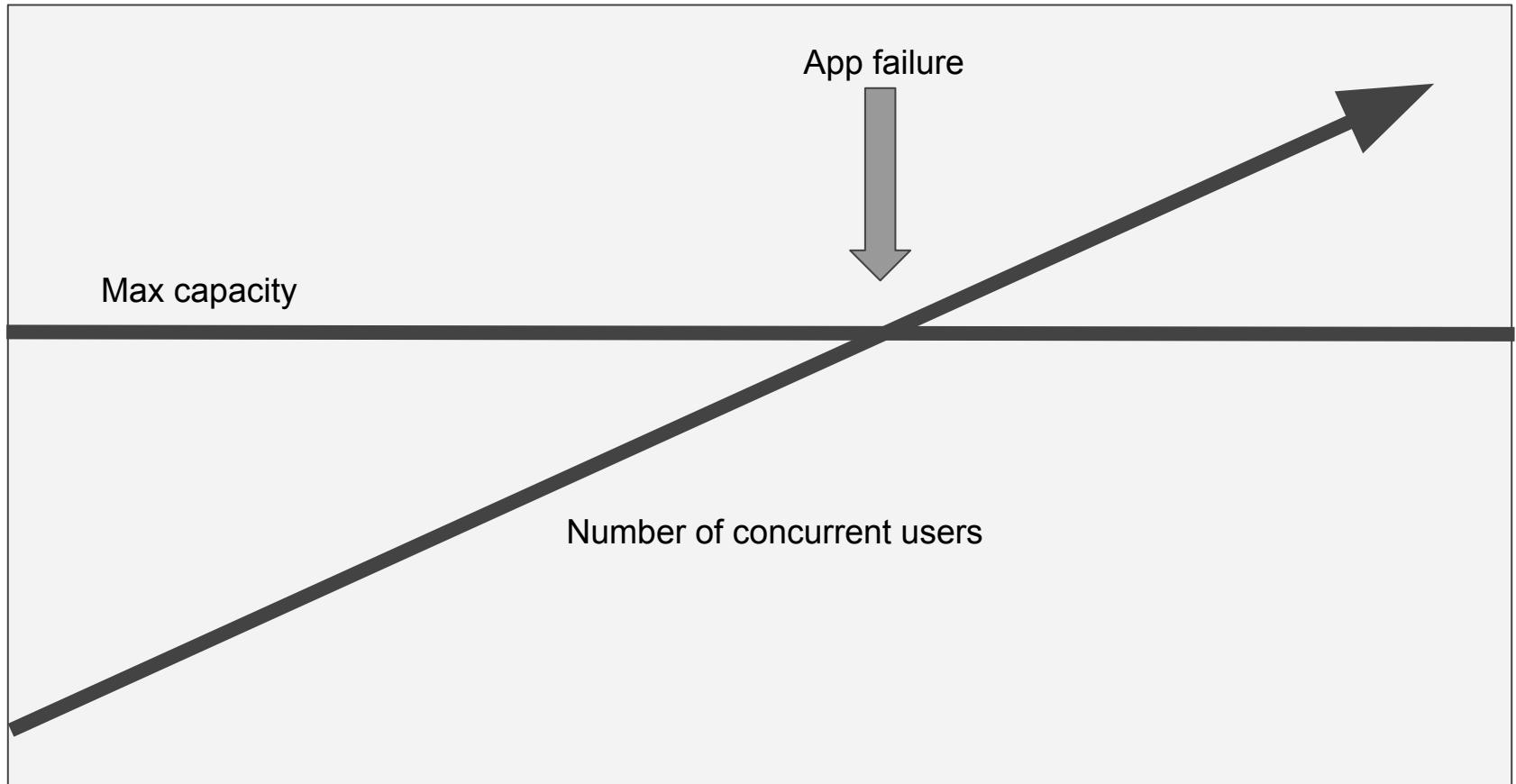
99.99%

Four nines, 4 minutes per month

Scalability



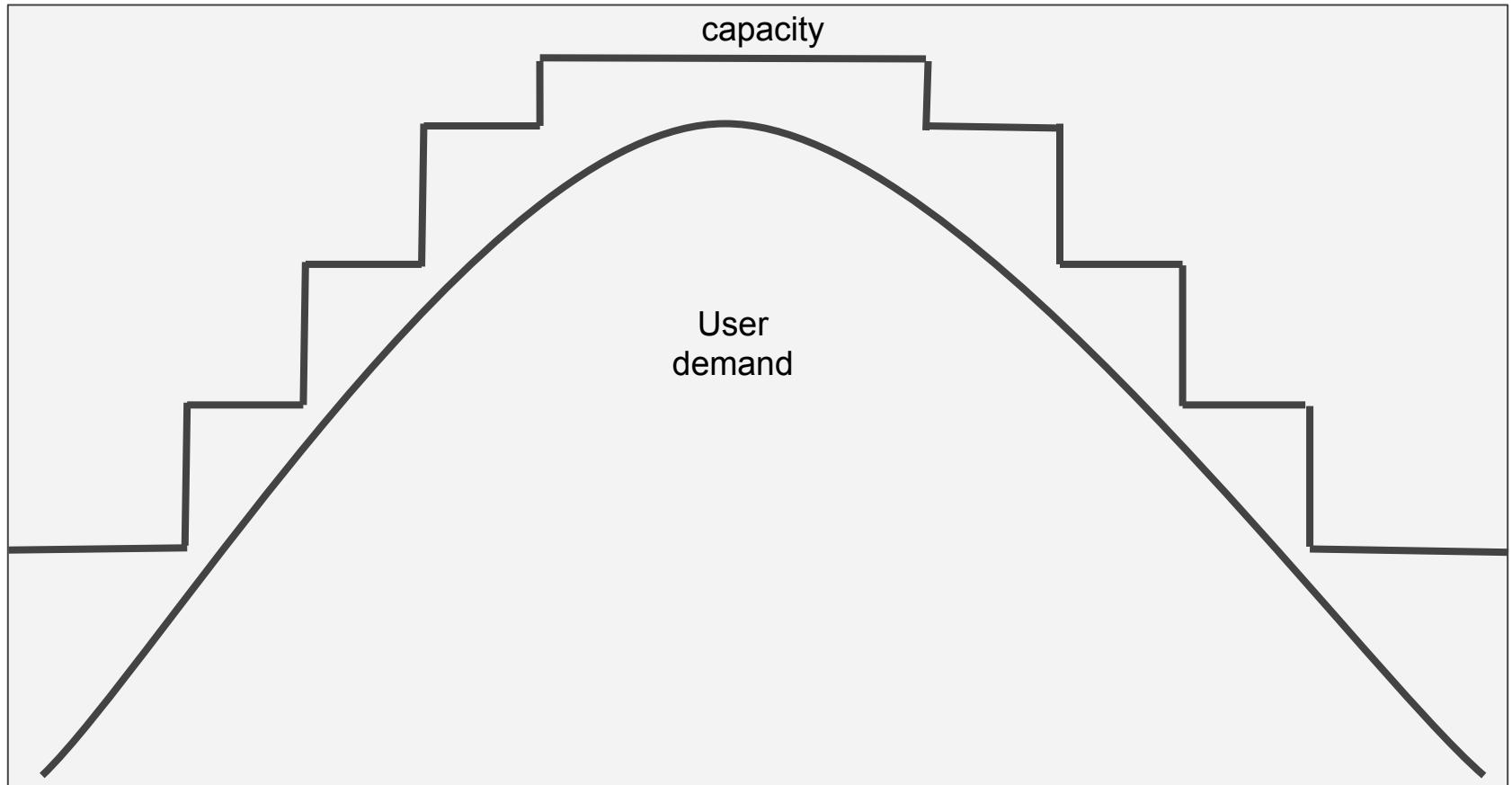
The ability of a system to handle growth of users or work



Elasticity



The ability of a system to automatically grow and shrink based on application demand



Agility



The ability to change rapidly
based on changes to market
or environment

Fault Tolerance



The ability of a system to handle faults like power, networking, or hardware failures

Disaster Recovery



The ability of a system to recover from failure within a period of time, and how much data is lost

Economies of Scale



It's cheaper for Microsoft to
run a server than you can
ever achieve yourself

Capital Expenditure (CapEx) and Operational Expenditure (OpEx)



CapEx is money invested in assets (like computers) that return investment over time



OpEx is money spent every day on operating expenses

Consumption-Based Model



Pay per minute

Pay per hour

Pay per execution

Infrastructure-as-a- Service (IaaS)



Virtual machines, networking, load balancers, firewalls

Platform-as-a-Service (PaaS)



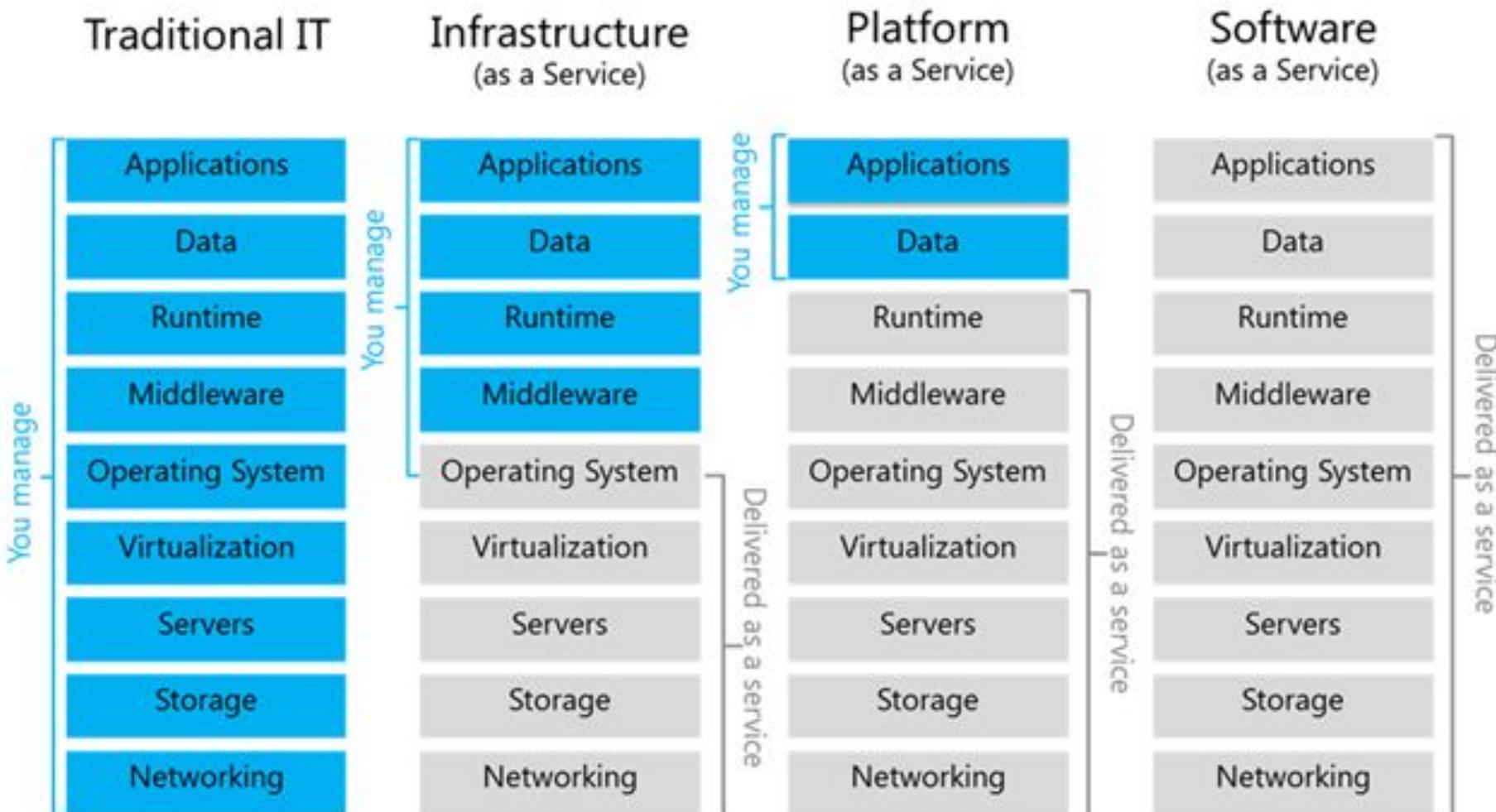
Upload code packages and
have them run, without access
to the hardware

Software-as-a-Service (SaaS)



Access to configuration only

Compare and Contrast



Public cloud



Computing services offered
over the public Internet;
anyone can sign up

Private cloud



Computing services offered to
only select users; internal or
corporate cloud

Hybrid cloud



Combination of public and private clouds; scale private infrastructure to the cloud

Compare and Contrast



Public vs private vs hybrid

AZ-900 Microsoft Azure Fundamentals

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Understand Core Azure Services (30-35%)

Understand the core Azure architectural components

- describe Regions
- describe Availability Zones
- describe Resource Groups
- describe Azure Resource Manager
- describe the benefits and usage of core Azure architectural components

Describe some of the core products available in Azure

- describe products available for Compute such as Virtual Machines, Virtual Machine Scale Sets, App Service Functions, Azure Container Instances (ACI) and Azure Kubernetes Service (AKS)
- describe products available for Networking such as Virtual Network, Load Balancer, VPN Gateway, Application Gateway and Content Delivery Network
- describe products available for Storage such as Blob Storage, Disk Storage, File Storage, and Archive Storage
- describe products available for Databases such as Cosmos DB, Azure SQL Database, Azure Database for MySQL, Azure Database for PostgreSQL, Azure Database Migration service
- describe the Azure Marketplace and its usage scenarios

Describe some of the solutions available on Azure

- describe Internet of Things (IoT) and products that are available for IoT on Azure such as IoT Hub and IoT Central
- describe Big Data and Analytics and products that are available for Big Data and Analytics such as SQL Data Warehouse, HDInsight, and Azure Databricks
- describe Artificial Intelligence (AI) and products that are available for AI such as Azure Machine Learning Service and Studio
- describe Serverless computing and Azure products that are available for serverless computing such as Azure Functions, Logic Apps, and Event Grid
- describe DevOps solutions available on Azure such as Azure DevOps and Azure DevTest Labs
- describe the benefits and outcomes of using Azure solutions

Understand Azure management tools

- understand Azure tools such as Azure Portal, Azure PowerShell, Azure CLI and Cloud Shell
- understand Azure Advisor

Regions

54

Regions - not all accessible by everyone

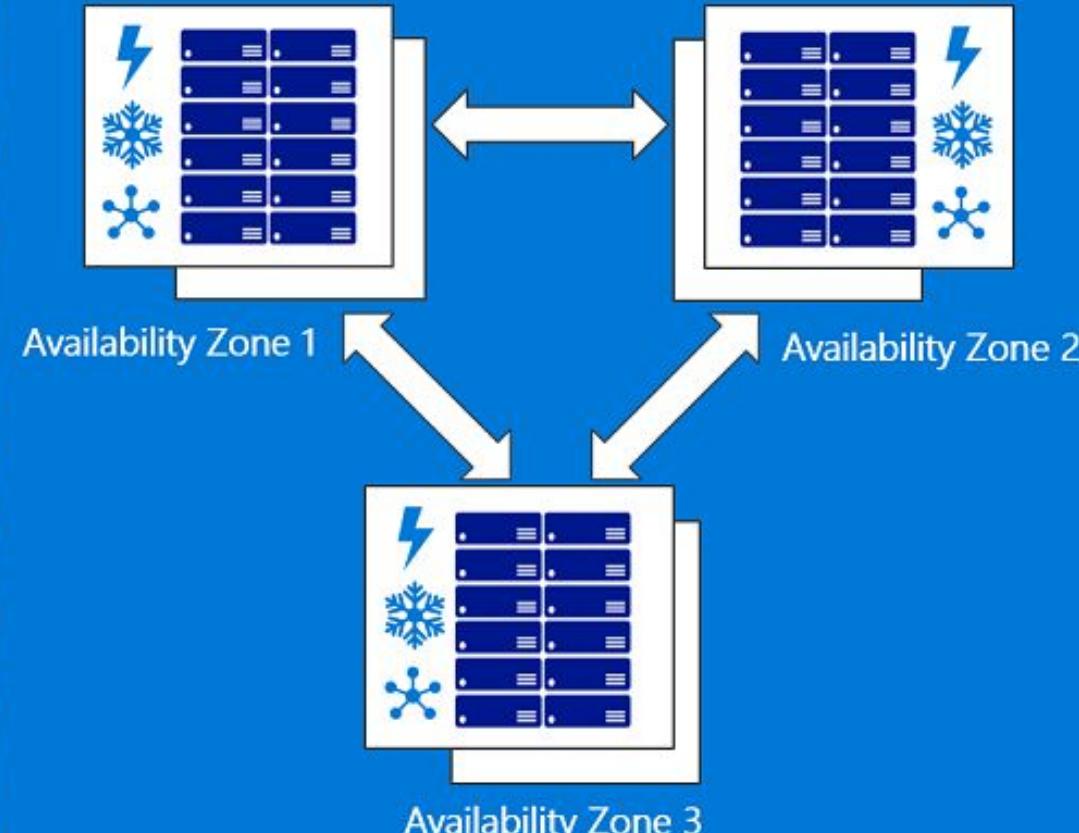
54 regions
worldwide

140 available in
140 countries

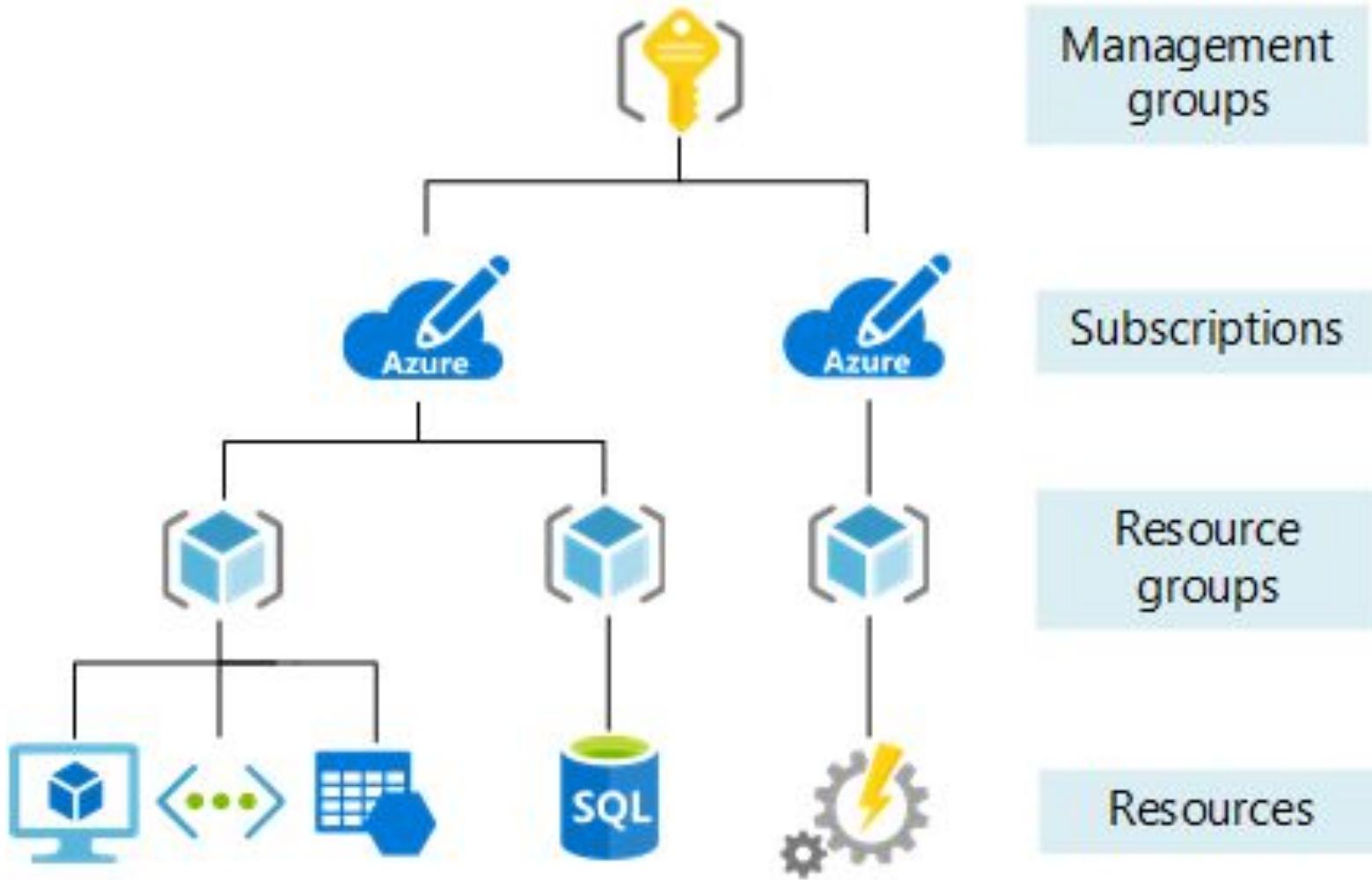


Availability Zones

Azure Region



Resource Groups



Azure Resource Manager (ARM)

Tools



AZURE RESOURCE MANAGER API

RESOURCE MANAGER



Cloud + On-Premises



ADFS
AAD

RESOURCE PROVIDER CONTRACT

Provider
REST Points



...

Core Azure architectural components

Compute

Virtual Machines

Virtual Machine Scale Sets

App Service

Functions

Azure Container Instances - ACI

Azure Kubernetes Services - AKS



Networking

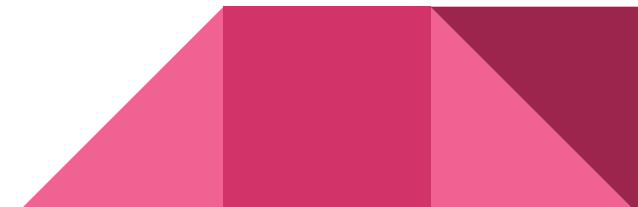
Virtual Network

Load Balancer

VPN Gateway

Application Gateway

Content Delivery Network



Storage

Azure Storage - Blob, File, Table, Queue

Managed Disk

Backup and Recovery Storage

Databases

Cosmos DB

Azure SQL Database

Azure Database for MySQL

Azure Database for PostgreSQL

Azure Database Migration service

Azure Synapse Analytics (formerly SQL Data Warehouse)

Azure Marketplace

Marketplace

My Saved List 0

Everything

Compute

Networking

Storage

Web

Mobile

Containers

Databases

Analytics

AI + Machine Learning

Internet of Things

Integration

Security

Identity

Everything

Search Everything

Pricing: All | Operating System: All | Publisher: All | [More](#)

What's new

 Azure Data Box Microsoft	 Red Hat Enterprise Linux 7.4 Red Hat	 Azure Databricks Microsoft	 Citrix Virtual Apps Essentials Citrix	 Barracuda WAF-as-a-Service Barracuda Networks, I	 Confidential Compute VM Microsoft Azure Comp
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Users interested in Function App also viewed

 Web App Microsoft	 Storage account - blob, file, table, Microsoft Microsoft	 Logic App Microsoft	 Azure Cosmos DB Microsoft	 SQL Database Microsoft	 Template deployment Microsoft
--------------------------	---	----------------------------	----------------------------------	-------------------------------	--------------------------------------

Internet of Things (IoT)

IoT Hub

IoT Central

Big Data and Analytics

Azure Synapse Analytics (formerly SQL Data Warehouse)

HDInsight

~~Data Lake Analytics~~

Azure Databricks

Artificial Intelligence (AI)

Azure Machine Learning Service

Studio

Serverless

Azure Functions

Logic Apps

~~App grid~~

Event grid

DevOps Solutions

Azure DevOps

Azure DevTest Labs

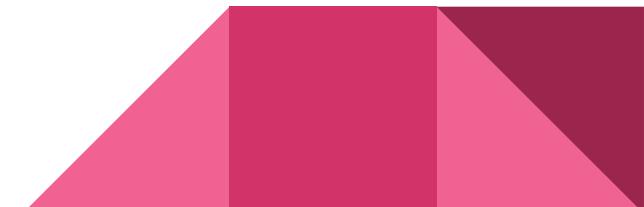
Azure Tools

Azure CLI

PowerShell

Azure Portal

Azure Cloud Shell



Azure Advisor

Advisor recommendations

[Download as CSV](#) [Download as PDF](#) [Configure](#)

Subscriptions: 2 of 24 selected – Don't see a subscription? Switch directories

2 subscriptions

All types

Active

No grouping

Overview

High Availability (8)

Security (21)

Performance (1)

Cost (2)

All (32)

High Availability

8 Recommendations

1 High impact, 7 Medium impact, 0 Low impact

25 impacted resources

Security

21 Recommendations

21 High impact, 0 Medium impact, 0 Low impact

63 impacted resources

Performance

1 Recommendation

1 High impact, 0 Medium impact, 0 Low impact

1 impacted resource

2,876 USD savings/mo *

Cost

2 Recommendations

2 High impact, 0 Medium impact, 0 Low impact

11 impacted resources

Tips & tricks

- You can customize Advisor to process recommendations for resources that matter to you the most.
- You can optimize underutilized virtual machines to reduce your monthly Azure spend.
- You can improve the performance of your SQL Azure databases.
- You can enable virtual machine backup to protect your data from corruption or accidental deletion.



Download recommendations as PDF



Download recommendations as CSV

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Understand Security, Privacy, Compliance, and Trust (25-30%)

Understand security, privacy, compliance, and trust (25-30%)

Understand securing network connectivity in Azure

- describe Network Security Groups (NSG)
- describe Application Security Groups (ASG)
- describe User Defined Rules (UDR)
- describe Azure Firewall
- describe Azure DDoS Protection
- choose an appropriate Azure security solution

Describe core Azure Identity services

- understand the difference between authentication and authorization
- describe Azure Active Directory
- describe Azure Multi-Factor Authentication

Describe security tools and features of Azure

- describe Azure Security Center
- understand Azure Security Center usage scenarios
- describe Key Vault
- describe Azure Information Protection (AIP)
- describe Azure Advanced Threat Protection (ATP)

Describe Azure governance methodologies

- describe policies and initiatives with Azure Policy
- describe Role-Based Access Control (RBAC)
- describe Locks
- describe Azure Advisor security assistance
- describe Azure Blueprints

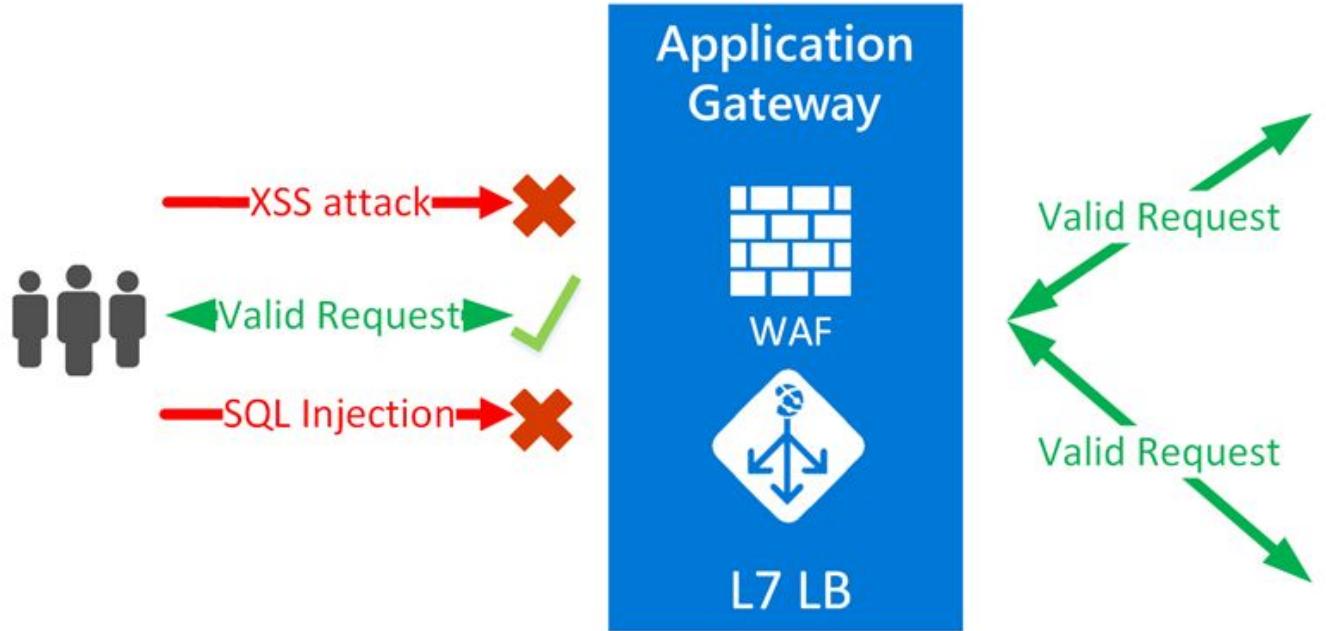
Understand monitoring and reporting options in Azure

- describe Azure Monitor
- describe Azure Service Health
- understand the use cases and benefits of Azure Monitor and Azure Service Health

Understand privacy, compliance and data protection standards in Azure

- understand industry compliance terms such as GDPR, ISO and NIST
- understand the Microsoft Privacy Statement
- describe the Trust center
- describe the Service Trust Portal
- describe Compliance Manager
- determine if Azure is compliant for a business need
- understand Azure Government cloud services
- describe Azure China cloud services

Azure Firewall



Site2



Site1



Azure DDoS Protection



Basic



Standard

Feature



Always on monitoring



Automatic mitigation for L3/L4 attacks



L7 Protection with Application Gateway Web application firewall



Globally deployed



Protection policies tuned to your VNet



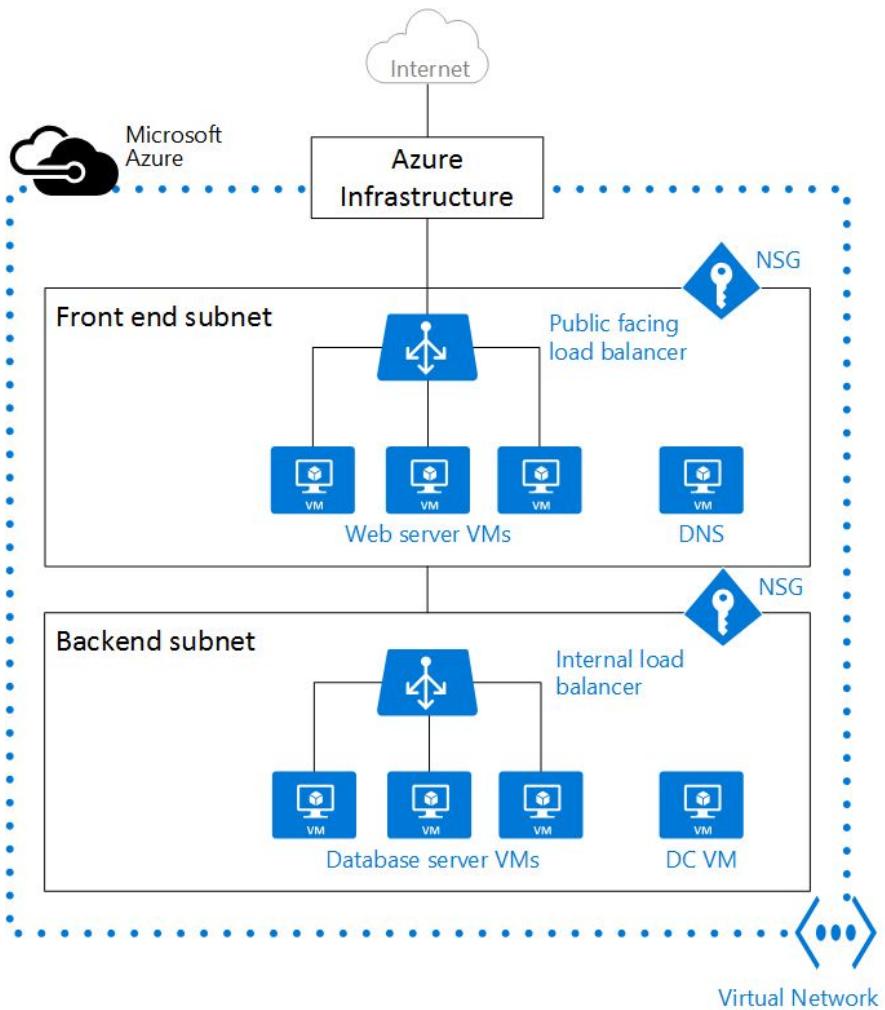
Logging, alerting, and telemetry



Resource cost scale protection



Network Security Group (NSG)



Application Security Groups



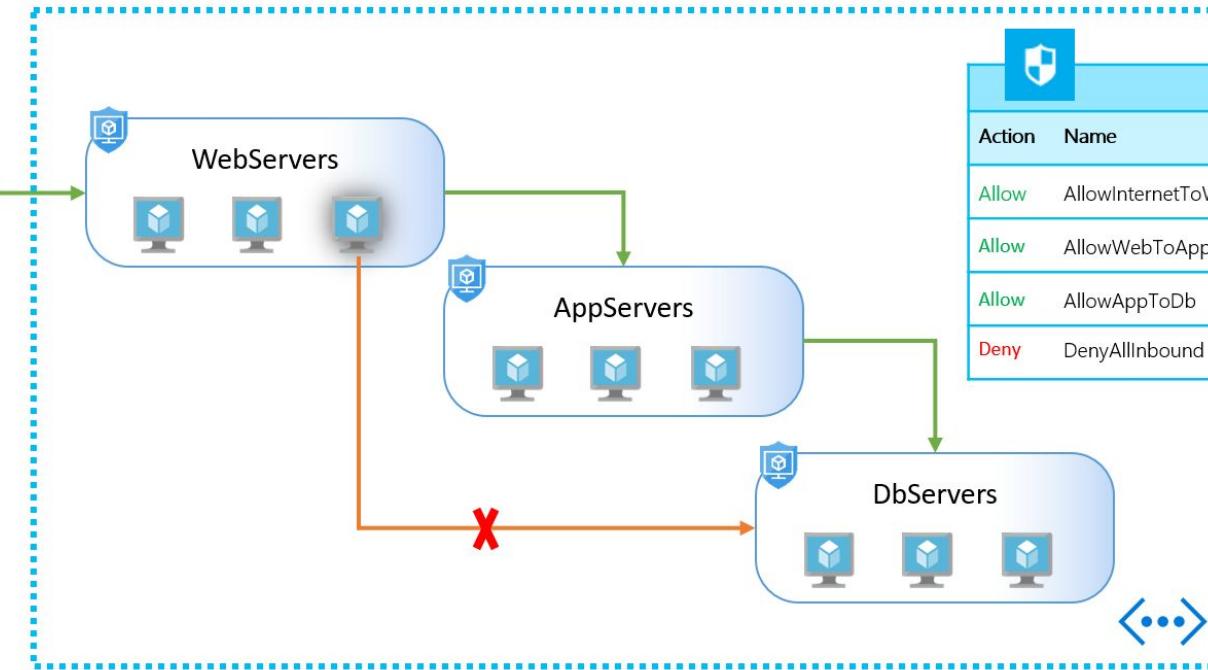
Inbound NSG rules
protect a
destination IP
address and port



ASG can group
resources by type
(i.e. “All VMs”)



Internet



Network Security Group (NSG)				
Action	Name	Source	Destination	Port
Allow	AllowInternetToWeb	Internet	WebServers	80,443 (HTTP/HTTPS)
Allow	AllowWebToApp	WebServers	AppServers	443 (HTTPS)
Allow	AllowAppToDb	AppServers	DbServers	1443 (MSSQL)
Deny	DenyAllInbound	Any	Any	Any

User Defined Routes (UDR)

Force traffic over a route



Force traffic
through a firewall,
or over a corporate
network



Choose an appropriate Azure security solution



All virtual network
subnets should use
NSG



It's a strong lock on
windows and doors
that you don't use



DDoS - as needed
or after attacked

Application Gateway with WAF

Security through layers





The difference between Authentication and Authorization



Authentication is a user proving who they are - user id and password



Authorization is ensuring
that a user is permitted to
perform an action



Move away from all
authenticated users
having admin
access

Azure Active Directory

Identity as a service (IDaaS)



Microsoft's preferred solution for identity management



Complete solution
for managing users,
groups, roles

Single-sign on



Synchronize with
your corporate AD

Azure Multi-Factor Authentication



First factor is your
user id - might be
easy to guess



Second factor is
your password -
hopefully hard to
guess



(Also hopefully
unique)



Third factor is that
you have your
phone on you

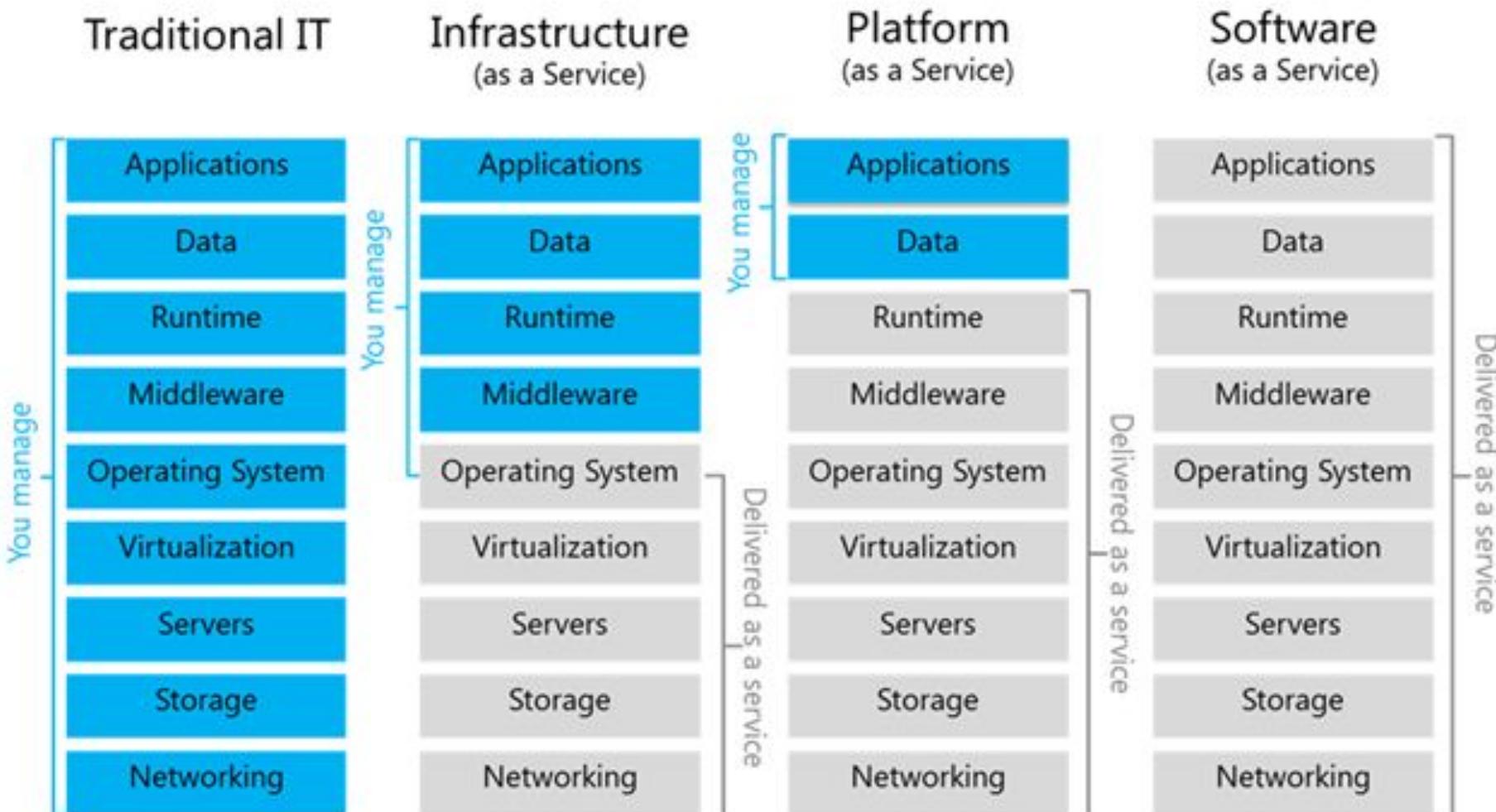


SMS, authenticator
app, phone call

Azure Security Center

Physical vs digital security

Shared security model



Azure AD

MFA

Role-Based Access Control (RBAC)

Layered approach

Security Layers

- Data - i.e. virtual network endpoint
- Application - i.e. API Management
- Compute - i.e. Limit Remote Desktop access, Windows Update
- Network - i.e. NSG, use of subnets, deny by default
- Perimeter - i.e. DDoS, firewalls
- Identity & access - i.e. Azure AD
- Physical - i.e. Door locks and key cards

Azure Security Center usage scenarios



Unified security management and advanced threat protection

Subscriptions

What's new

Policy & compliance

Secure score



[Review your secure score >](#)

Regulatory compliance

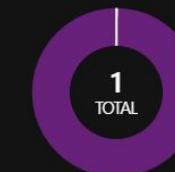
View and monitor your compliance posture relative to industry standards and regulations

[Enable Regulatory Compliance](#)

SOC TSP

12 of 12 passed controls

Subscription coverage



1 TOTAL

12 Covered resources

Fully covered	0
Partially covered	1
Not covered	0

Manage and govern your

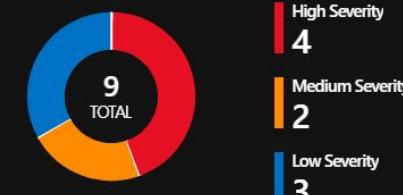


Define and assign Az
review and track com

[Learn more >](#)

Resource security hygiene

Recommendations



11 Unhealthy resources

Resource health monitoring



Top recommendations by s

Subnets should be ass

Resolve monitoring ag

Secure transfer to stor

Free tier and Standard tier

Key Vault



Central, secure repository for
your secrets, certificates and
keys

 Search (Ctrl+ /)

Generate/Import



Refresh



Restore Backup

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Settings

Keys

Secrets

Certificates

Access policies

NAME	TYPE	STATUS
A37CA50C-C519-4605-8A73-5F67...	Wrapped BEK	✓ Enabled
weather-service-api		✓ Enabled

Create a key

Options

Generate



* Name

Key Type

RSA EC

RSA Key Size

2048 3072 4096

Set activation date?

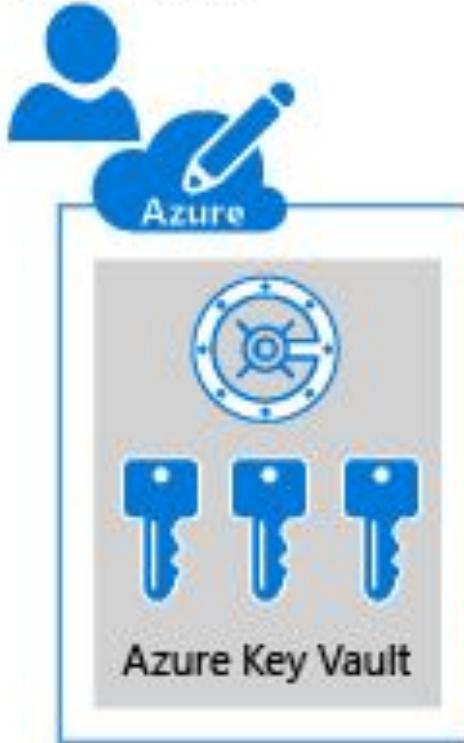
Set expiration date?

Enabled?

Yes No

NAME	THUMPRINT	STATUS	EXPIRATION DATE
COMPLETED			
azsjdsfc-cert	61D304B7D8692F0CDF120C2C940...	✓ Enabled	2/25/2020
newsfckey	395F068B7972B75D5F09C7C82D6...	✓ Enabled	2/25/2020
IN PROGRESS, FAILED OR CANCELLED			
There are no certificates available.			

Administrator with
Azure subscription
creates and manages
vault and keys



URIs for keys

Azure developer

Usage logging for keys

Security administrator

Azure Information Protection (AIP)



Apply labels to emails and documents



i.e. Confidential,
Super Confidential,
Top Secret

Used to protect
documents from
being viewed,
printed and/or
shared

Azure Advanced Threat Protection (ATP)



Monitor and profile
user behavior and
activities



Protect user
identities and
reduce the attack
surface



Identify suspicious
activities and
advanced attacks



Investigate alerts and user activities

Azure Policy

Governance



Create rules across
all of your Azure
resources



Evaluate
compliance to
those rules

Examples of Built-In Policies

- Require SQL Server 12.0
- Allowed Storage Account SKUs
- Allowed Locations
- Allowed Virtual Machine SKUs
- Apply tag and its default value
- Not allowed resource types



Can create custom
policies using JSON
definition

Policy Initiatives



A set of policies,
grouped together

“Every resource and
resource group
must have these
five tags.”



10 policies that need to be enforced



Grouped together
as a policy initiative

Role-Based Access Control (RBAC)



Microsoft
recommended
solution for access
control



Create roles that
represent the
common tasks of
the job



Accountant
Developer
Business Lead



Assign granular
permissions to that
role



Assign users to that role



Do not assign
granular
permissions to an
individual



Reader
Contributor
Owner

Locks



Read Only
Can Not Delete



Search (Ctrl+ /)



Add



Resource group



Subscription



Refresh

Extensions

Continuous delivery (Preview)

Availability set

Configuration

Identity

Properties

Locks

Export template

Operations

Add lock

Lock name

dontdeleteme

Lock type

Delete

Notes

This is needed for production processes

OK

Cancel



Using RBAC, you
can restrict who
has access to locks

Azure Advisor security assistance

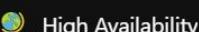
Search (Ctrl+ /)

«

 Feedback Download as CSV Download as PDF

Overview

Recommendations



High Availability

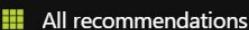


Security

Performance



Cost



All recommendations



Settings

Configuration

 Your recommendations have been loaded**Subscriptions:** Pay-As-You-Go (Azure Courses) – Don't see a subscription?[Open Directory + Subscription settings](#)

All types

Active

No grouping



Your security experience may be limited. Click here to learn more →



Total recommendations

6

Recommendations by impact



Impacted resources



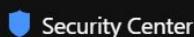
Security alerts

*Standard plan feature*[Learn more](#)[What is Security Center](#)[Explore Security Center Recommendations](#)

IMPACT	DESCRIPTION	IMPACTED RESOURCES	UPDATED
High	Enable Network Security Groups on subnets	1 Subnet	5/30/2023 1:34:20 PM
High	Require secure transfer to storage account	4 Storage accounts	5/30/2023 1:34:20 PM
Medium	Restrict access to App Services (Preview)	3 App services	5/30/2023 1:34:20 PM
Low	Enable diagnostic logs in Key Vault	2 Key vaults	5/30/2023 1:34:20 PM

Are these recommendations helpful?

Secure transfer to storage accounts should be enabled



^ Description

Secure transfer is an option that forces your storage account to accept requests only from secure connections (HTTPS). Use of HTTPS ensures authentication between the server and the service and protects data in transit from network layer attacks such as man-in-the-middle, eavesdropping, and session-hijacking.

^ General Information

Recommendation score i **0/20**

Recommendation impact +20

User impact Low

Implementation cost Low

^ Threats

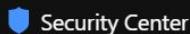
- Data exfiltration
- Data spillage
- Threat resistance

^ Remediation steps

To enable secure transfer required:

1. In your storage account, go to the 'Configuration' page.

Secure transfer to storage accounts should be enabled



Remediation steps

To enable secure transfer required:

1. In your storage account, go to the 'Configuration' page.
2. Enable 'Secure transfer required'.

Unhealthy resources

4

Healthy resources

0

[LEARN MORE](#)

[Learn more about recommendation](#)

[Learn how to disable the recomme](#)

Unhealthy resources (4)

Healthy resources (0)

Unscanned resources (0)

Search storage accounts

NAME

↑↓

SUBSCRIPTION

softwarearchitectca

Pay-As-You-Go (Azure Courses)

aazsjddevlab4658

Pay-As-You-Go (Azure Courses)

cs27ad168af6a9x4286xa21

Pay-As-You-Go (Azure Courses)

d6on4cg442sjgstorage

Pay-As-You-Go (Azure Courses)

Azure Blueprints



Azure Subscription templates with Roles and Policies already defined

Azure Monitor



Azure Monitor

Application

Operating System

Azure Resources

Azure Subscription

Azure Tenant

Custom Sources



Insights



Application



Container



VM



Monitoring
Solutions

Visualize



Dashboards



Views



Power BI



Workbooks

Analyze



Metric Analytics



Log Analytics

Respond



Alerts



Autoscale

Integrate



Logic Apps



Export APIs

Azure Service Health

Service Health - Service issues

Search (Ctrl+ /)

Select filter ...

Subscription

Pay-As-You-Go (Azure Courses)

Region

6 selected

Service

154 selected

ACTIVE EVENTS

Service issues

Planned maintenance

Health advisories

HISTORY

Health history

RESOURCE HEALTH

Resource health

ALERTS

Health alerts

Save filter

Delete filter

Pin filtered world map to dashboard

Create service health alert



No service issues found

See 1 resolved service issues in the last 24 hours, or see all past issues in the [health history](#).

Launch guided tour

Service Health - Health history

Subscription	Region	Health Event Type	Time Range			
Pay-As-You-Go (Azure Courses)	North Europe	Service issue	Last 24 hours			
Issue Name	Tracking ID	Event Type	Service(s)	Region(s)	Start Time	Update
Connectivity Issue - North Europe - RCA	V7KX-9BG	Incident	Network Infrastr...	North Europe	07:50 UTC, 05/22/2019	16 h ago

[Summary](#) [Issue updates](#) [Root cause analysis](#)

Last update (16 h ago)



[Download the issue summary](#)

Summary of impact: Between 07:50 and 08:36 UTC on 22 May 2019, a subset of customers may have experienced connectivity issues when accessing Azure services in North Europe.

Root Cause: During this incident, approximately 12% of the network flows in or out of a single row of servers in a data center in North Europe would have failed.

Each row of servers in an Azure data center (DC) is connected to the DC network spine by eight routers. During this incident, one of the eight routers in a single row of a DC in North Europe began dropping all packets that it was expected to forward. Flows are spread over the eight routers, so flows sent to this one router would have been

[Was this helpful?](#)

Azure Monitor vs Azure Service Health



Azure Monitor
collects all the data
for you to analyze
and create alerts on



Specific to your application, your actions



Azure Service
Health are general
alerts across all of
Azure



Compliance terms such as GDPR,
ISO and NIST



Many different
standards for
technology across
the world



Microsoft claims to
be in compliance
with many of them



And has tools to
help you be in
compliance with
others

General Data Protection Regulation (GDPR)

GDPR is a new set of rules designed to give EU citizens more control over their personal data

Affects companies outside of the EU that handle EU citizen's data

Data has to be collected legally under strict conditions

Data has to be protected from misuse

Reporting obligations if data is mishandled

ISO - International Organization for Standardization

Certification	Azure	Azure Government
CSA STAR Certification	✓	✓ (new)
ISO 27001:2013	✓	✓ (new)
ISO 27017:2015	✓	✓ (new)
ISO 27018:2014	✓	✓ (new)
ISO 20000-1:2011	✓ (new)	✓ (new)
ISO 22301:2012	✓	✓
ISO 9001:2015	✓	



ISO 9001:2015 is
for Quality
Management
Systems (QMS)



ISO/IEC
20000-1:2011 is for
Service
Management
Systems (SMS)

NIST Cybersecurity Framework (CSF)

National Institute of Standards and Technology (NIST)

Audited for compliance to security and privacy processes



NIST Cybersecurity Framework (CSF)

Microsoft Cloud Services meet the National Institute of Standards and Technology (NIST) Cybersecurity Framework (CSF).

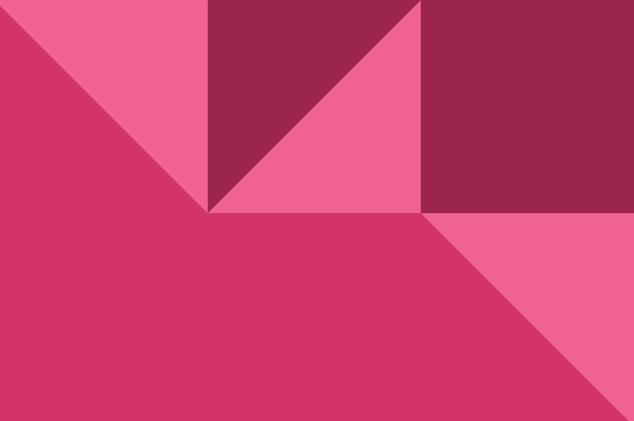
Microsoft and the NIST CSF

NIST Cybersecurity Framework (CSF) is a voluntary Framework that consists of standards, guidelines, and best practices to manage cybersecurity-related risks. Microsoft Cloud services have undergone independent, third-party FedRAMP Moderate and High Baseline audits and are certified according to the FedRAMP standards. Additionally, through a validated assessment performed by HITRUST, security and privacy standards development and accreditation organization, Office 365 is certified to the objectives specified in the NIST CSF.

Learn how to accelerate your NIST Cybersecurity Framework deployment with Compliance Manager and our Azure Security and Compliance Blueprint:

[Download the Azure Security and Compliance Blueprint - NIST CSF Risk Assessment Checklist](#) > [Learn more about the NIST CSF assessment for Office 365 in Compliance Manager](#) >

Microsoft Privacy Statement



privacy.microsoft.com

Microsoft Privacy Statement

[Expand All](#)[Print](#)

Last Updated: May 2019 [What's new?](#)

Your privacy is important to us. This privacy statement explains the personal data Microsoft processes, how Microsoft processes it and for what purposes.

Microsoft offers a wide range of products, including server products used to help operate enterprises worldwide, devices you use in your home, software that students use at school, and services developers use to create and host what's next. References to Microsoft products in this statement include Microsoft services, websites, apps, software, servers and devices.

Please read the product-specific details in this privacy statement, which provide additional relevant information. This statement applies to the interactions Microsoft has with you and the Microsoft products listed below, as well as other Microsoft products that display this statement.

Personal data we collect

How we use personal data

Reasons we share personal data

How to access and control your personal data

Cookies and similar technologies

Products provided by your organisation – notice to end users

Microsoft account

Other important privacy information 

Product-specific details:

Enterprise and developer products 

Productivity and communications products 

Search and artificial intelligence 

Windows 

Personal data we collect

Microsoft collects data from you, through our interactions with you and through our products. You provide some of this data directly, and we get some of it by collecting data about your interactions, use and experiences with our products. The data we collect depends on the context of your interactions with Microsoft and the choices that you make, including your privacy settings and the products and features that you use. We also obtain data about you from third parties.

If you represent an organisation, such as a business or educational institution, that utilises Enterprise and Developer Products from Microsoft, please see the [Enterprise and developer products](#) section of this privacy statement to learn how we process your data. If you are an end user of a Microsoft product or a Microsoft account provided by your organisation, please see the [Products provided by your organisation](#) and the [Microsoft account](#) sections for more information.

You have choices when it comes to the technology you use and the data you share. When we ask you to provide personal data, you can decline. Many of our products require some personal data to provide you with a service. If you choose not to provide data necessary to provide you with a product or feature, you cannot use that product or feature. Likewise, where we need to collect personal data by law or to enter into or carry out a contract with you, and you do not provide the data, we will not be able to enter into the contract; or if this

Trust center



[https://www.microsoft.com/en-us/trustcenter/c
loudservices/azure](https://www.microsoft.com/en-us/trustcenter/cloudservices/azure)

[Overview](#)[Security](#)[GDPR](#)

About Microsoft Azure

Microsoft Azure is a cloud computing platform that features a growing collection of integrated cloud services—analytics, computing, database, mobile, networking, storage, and web. Azure includes integrated tools, pre-built templates, and managed services that make it easier to build and manage enterprise, mobile, web, and Internet of Things (IoT) apps faster, using skills you have and technologies you already know.

We understand that some organizations are still wary about cloud computing; keeping data confidential is essential for any organization. That's why Microsoft has made an industry-leading commitment to the protection and privacy of your data. We were the first cloud provider recognized by the European Union's data protection authorities for our commitment to rigorous EU privacy laws. Microsoft was also the first major cloud provider to adopt the new international cloud privacy standard, [ISO 27018](#).

Azure safeguards customer data in the cloud and provides support for companies that are bound by extensive regulations regarding the use, transmission, and storage of customer data.

[Azure Security Documentation >](#)

Azure compliance



Privacy



Transparency



Azure Government



Azure industries



Get the information you need

Service Trust Portal



servicetrust.microsoft.com

Compliance Manager

Compliance Manager makes it easy to perform risk assessments of Microsoft's cloud services. Use Compliance Manager to manage your organization's compliance activities from implementation to reporting.



Pen Tests & Security Assessments

View reports from independent third-party penetration tests and security assessments of Microsoft's cloud services

White Papers, FAQs, & Compliance Guides

Review the wealth of available security implementation and design information with the goal of making it easier for you to meet regulatory compliance objectives by understanding how Microsoft Cloud services keep your data secure

Azure Blueprints

Define a repeatable set of Azure resources that implement and adhere to your organization's standards, patterns, and requirements and rapidly build new environments with a set of built-in components to speed up development and delivery

Compliance Manager



workflow-based risk
assessment tool ...
to help you manage
regulatory
compliance



Service Trust Portal

Compliance Manager ▾

Trust Documents ▾

In

Compliance Manager (classic)

Compliance Manager

Built upon a foundation of

Compliance Manager

[Assessments](#) Action Items

Default Group

Office 365 - GDPR

Actions▼

Created
3/26/2018

Modified
4/6/2018

Compliance Score

243
Of 568

Customer Managed Actions

0 of 61

Microsoft Managed Actions

48 of 48

Default Group

Office 365 - NIST 800-53

Actions▼

Created
3/26/2018

Modified
4/6/2018

Compliance Score

417
Of 562

Customer Managed Actions

0 of 215

Microsoft Managed Actions

760 of 760

Azure Government services

Separate account



For US government
agencies - federal,
state and local



Department of
Defence (DoD) has
its own too



Isolated data
centers separate
from the Azure
public cloud



Meets standards
specific to
government



FedRAMP, NIST
800.171 (DIB), ITAR,
IRS 1075, DoD L4,
and CJIS

portal.azure.us



Different URLs for
connecting to
storage, functions,
etc.

Azure Germany services

Separate account



Data remains in Germany



Strictest EU data protection

German Data trustee

Azure China

Separate account



Data remains in
China

AZ-900 Microsoft Azure Fundamentals

Scott Duffy, Instructor

Understand Azure Pricing and Support (20-25%)

(–) Understand Azure Pricing and Support (25-30%)

Understand Azure subscriptions

- Describe an Azure Subscription
- Understand the uses and options with Azure subscriptions

Understand planning and management of costs

- Understand options for purchasing Azure products and services
- Understand options around Azure Free account
- Understand the factors affecting costs such as resource types, services, locations, ingress and egress traffic
- Understand Zones for billing purposes
- Understand the Pricing calculator
- Understand the Total Cost of Ownership (TCO) calculator
- Understand best practices for minimizing Azure costs such as performing cost analysis, creating spending limits and quotas, and using tags to identify cost owners; use Azure reservations; use Azure Advisor recommendations
- Describe Azure Cost Management

Understand the support options available with Azure

- Understand support plans that are available such as Dev, Standard, Professional Direct and Premier
- Understand how to open a support ticket
- Understand available support channels outside of support plan channels
- Describe the Knowledge Center

Describe Azure Service Level Agreements (SLAs)

- Describe a Service Level Agreement (SLA)
- Determine SLA for a particular Azure product or service

Understand service lifecycle in Azure

- Understand Public and Private Preview features
- Understand how to access Preview features
- Understand the term General Availability (GA)
- Monitor feature updates

Azure Subscription



Subscription is a
billing unit



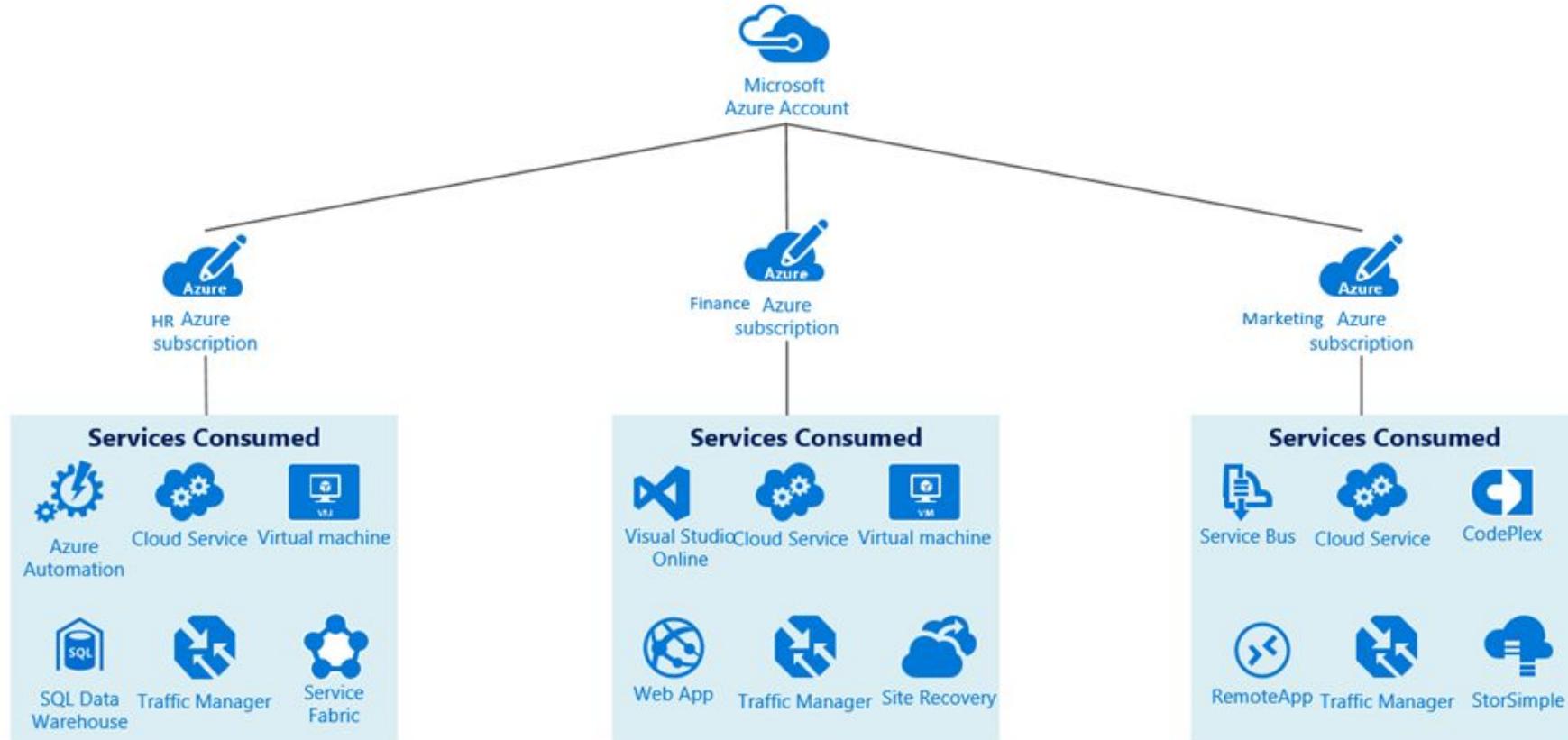
Users have access
to one or more
subscriptions, with
different roles



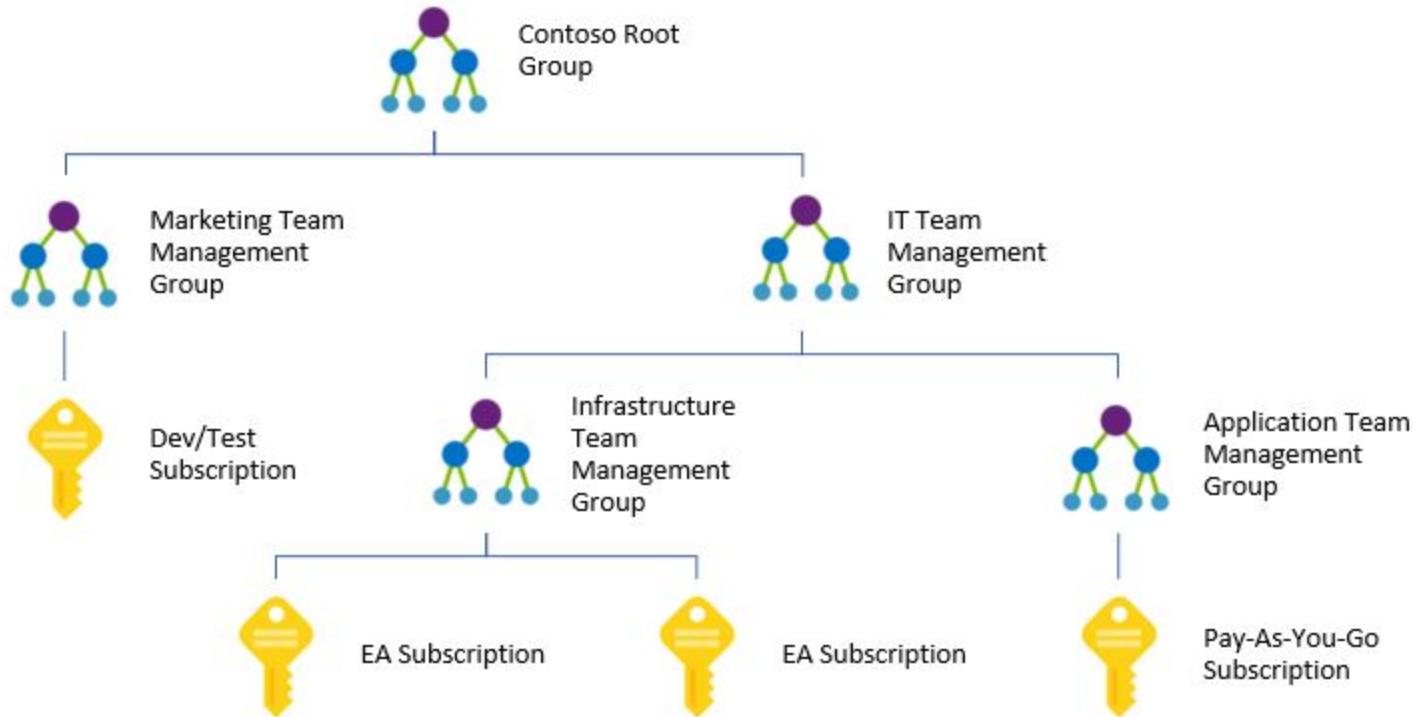
All resources
consumed by a
subscription will be
billed to the owner



Can be used to
organize resources
into completely
distinct accounts



Management groups



Purchasing Azure products and services

Purchase from Microsoft

- Pay as you go
- Enterprise Agreement



Negotiated
Minimum Spend
Annual
Custom Prices

Purchase from a Microsoft Partner

- Microsoft Cloud Solution Provider (CSP)

Azure Free account



<http://azure.microsoft.com/free>



US \$200 credit for
the first 30 days



12 months of free
services



Some services are
always free

Factors affecting costs



Different services
are billed based on
different factors



Free services

Free services

Resource groups

Virtual network (up to 50)

Load balancer (basic)

Azure Active Directory (basic)

Network security groups

Free-tier web apps (up to 10)



kWh



KILOWATT HOURS

68775-3

FM
TA 2S CL 200 240 V
30 Kh 7.2 3W 60Hz Type **MX**

76 548 902 0906

S ALL ADJ. F

FL

-546

Pay per usage (consumption model)

Opportunity for cost savings

Azure Functions:

- 1 million executions free per month
- \$0.20 per million executions
- Cheapest virtual machine is \$20 per month

Pay per usage services

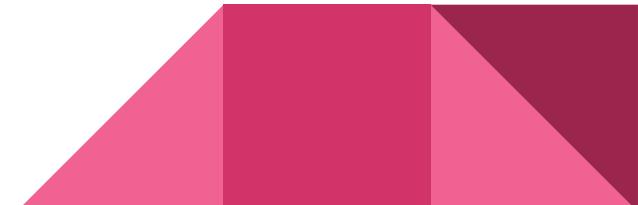
Functions

Logic Apps

Storage (pay per GB)

Outbound bandwidth

Cognitive Services API





Pay for time (per second)



Per second billing
means billing stops
when the VM is
stopped *

Stability in pricing

Pay a fixed price per month for computing power or storage capacity

Whether you use it or not

Discounts for 1-year or 3-year commitment in VM (Reserved Instances)

Multi-tenant or isolated environment



Pay for bandwidth



First 5 GB is free



Inbound data is free

Bandwidth costs

Outbound data, \$0.05 to \$0.087 / GB for Zone 1 (NA and EU w/o Germany)

Outbound data, \$0.057 to \$0.10 / GB for DE Zone 1 (Germany)

Outbound data, \$0.08 to \$0.12 / GB for Zone 2 (Asia, Africa and Oceania)

Outbound data, \$0.16 to \$0.181 / GB for Zone 3 (Brazil)

(Availability zone pricing is different)



1 PB of data
transfer = \$52,000

Zones for billing purposes



Zone is a
geographical
grouping of Azure
Regions for billing
purpose

Zone 1

United States, Europe, Canada, UK, France



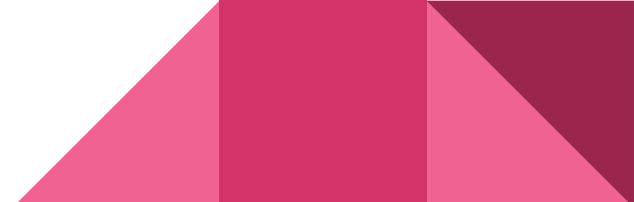
Zone 2

Asia Pacific, Japan, Australia, India, Korea



Zone 3

Brazil South



DE Zone 1

Germany Central, Germany Northeast



Pricing calculator

<https://azure.microsoft.com/en-ca/pricing/calculator/>



Estimates are hard
to make 100%
accurate

Configurable Options

Region

Tier

Subscription Type

Support Options

Dev/Test Pricing





Export and share
the estimate

Total Cost of Ownership (TCO) calculator



The cost of a server
is more than just
the cost of the
hardware

Other costs

- Electricity
- Cooling
- Internet connectivity
- Rack space
- Setup labor
- Maintenance labor
- Backup

<https://azure.microsoft.com/en-ca/pricing/tco/calculator/>



Best practices for minimizing Azure costs

Azure Advisor cost tab



Auto shutdown on dev/qa resources



Utilize cool/archive
storage where
possible

Reserved instances



Configure alerts
when billing
exceeds an
expected level



Use Policy to
restrict access to
certain expensive
resources

Auto scaling resources



Downsize when
resources
over-provisioned



Ensure every
resource has an
owner (tags)

Azure Cost Management

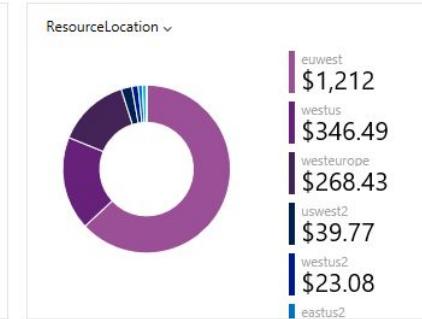
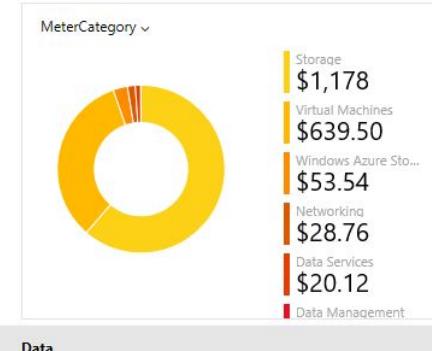
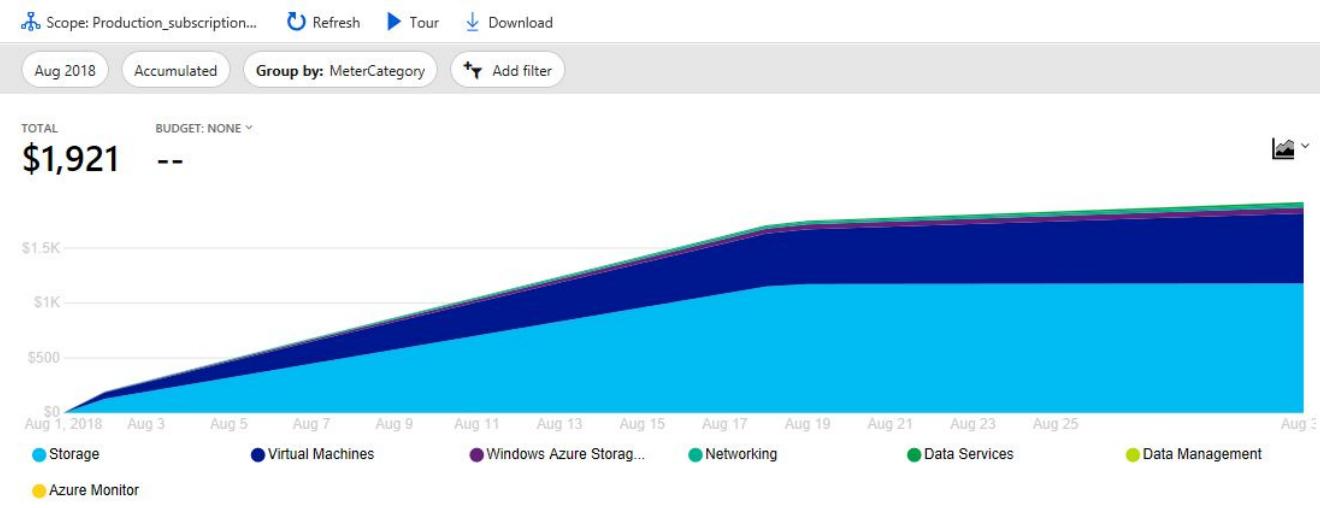


Another free tool
inside Azure to
analyze spending

Cost Management - Cost analysis

Scope: Production_subscription1 (subscription)

- [!\[\]\(d63a0562a520caf2c9989b4af8c8167f_img.jpg\) Search \(Ctrl+.\)](#)
- [!\[\]\(671e5d30a89562bfec04300c881629f2_img.jpg\) Access control](#)
- [!\[\]\(d30e978e8317b436004ccb91685a5239_img.jpg\) Quickstart](#)
- [!\[\]\(7cf5c586d57ae5fcdc6653697d3a101b_img.jpg\) Cost Management](#)
- [!\[\]\(bf11ee8dd4d0706b8216ae21e0e3f487_img.jpg\) Cost analysis](#)
- [!\[\]\(230c923affca4eeb0e0b371c00a7c414_img.jpg\) Budgets](#)
- [!\[\]\(114854f619cfa184b8e21df8eddc39eb_img.jpg\) Advisor recommendations](#)
- [!\[\]\(4efe980ee58b3e0baee1f52275f99b7f_img.jpg\) Cloudyn](#)





Analyze spending over time

Tracking against budgets

Schedule reports

Support plans

Levels of Azure Support

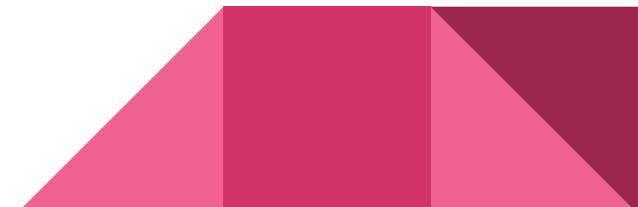
Basic - free and included in all plans

Developer - non-production environments

Standard - production environments

Professional Direct - business critical

Premier - multiple products, including Azure



Basic Support

Self-help support

Documentation

Azure Advisor recommendations

Service Health dashboard and Health API

Developer Support

Business hours access to support engineers via email

Unlimited contacts / cases

Sev C - Non-business critical

One day response time (< 8 hours)

General architectural guidance

\$29 / month

Standard Support

24 x 7 access to support engineers by phone and email

Unlimited contacts / cases

Sev C support (< 8 hours), Sev B (< 4 hours), and Sev A (< 1 hour)

General architectural guidance

\$100 / month

Professional Direct Support

24 x 7 access to support engineers by phone and email

Unlimited contacts / cases

Sev C support (< 8 hours), Sev B (< 4 hours), and Sev A (< 1 hour)

Architectural guidance on best practices

Onboarding and consultations

Delivery Manager

\$1,000 / month

Premier Support

24 x 7 access to support engineers by phone and email

Unlimited contacts / cases

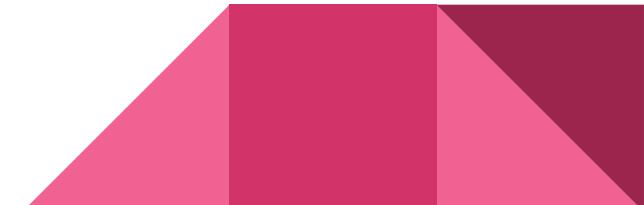
Sev C support (< 8 hours), Sev B (< 4 hours), and Sev A (< 1 hour, < 15 minutes)

Specific architectural support such as design reviews, performance tuning, etc

Technical account manager, including service reviews, reporting

On demand training

“Contact us”





scottscourse@outloo...
SCOTTSOURCEOUTLOOK (DE...)



Help

Help + support

Visit the help and support center to create or track a support ticket and monitor health.

What's new

Azure roadmap

Launch guided tour

Keyboard shortcuts

Show diagnostics

US

Refresh

Service Health

Service Health



Help + support - Support Plans

[Link support benefits](#)

Overview

Support

New support request

All support requests

Support Plans

Service Health

Advisor

Get started with Azure

[Azure](#) [Marketplace](#)

Subscription

Pay-As-You-Go (Azure Courses) (7ad168af-d6a9-4286-a218-afc72... [▼](#)
Can't find your subscription? [Show more](#) **BASIC****DEVELOPER**[Upgrade](#)**STANDARD**[Upgrade](#)**PROFESSIONAL DIRECT**[Upgrade](#)

Scope	Microsoft Azure: Billing and subscription support; online self-help	Microsoft Azure: Trial and non- production environments	Microsoft Azure: Production workload environments	Microsoft Azure: Business- critical dependence
Customer Service and Communities	24x7 access to customer service, documentation, whitepapers, and support forums			
Best Practices	Access to full set of Azure Advisor recommendations			
Health Status and Notifications	Access to personalized Service Health Dashboard & Health API	Access to personalized Service Health Dashboard & Health API	Access to personalized Service Health Dashboard & Health API	Access to personalized Service Health Dashboard & Health API



Open a support ticket



scottscourse@outloo...
SCOTTSOURCEOUTLOOK (DE...)



Help

Help + support

Visit the help and support center to create or track a support ticket and monitor health.

What's new

Azure roadmap

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Show diagnostics

US

Refresh

Service Health

Service Health



Help + support - New support request

 Search (Ctrl+ '/')



Basics

Solutions

Details

Review + create

 Overview

Support

 New support request

 All support requests

 Support Plans

 Service Health

 Advisor

 Get started with Azure

Create a new support request to get assistance with billing, subscription, technical or quota management issues. Complete the Basics tab by selecting the options that best describe your problem. Providing detailed, accurate information can help to solve your issues faster. Looking for the old experience? Click [here](#)

* Issue type

Select an issue type



Billing

Service and subscription limits (quotas)

Subscription management

Technical

Available support channels



Phone
Email

Knowledge Center

<https://azure.microsoft.com/en-ca/resources/knowledge-center/>

Knowledge Center

Get answers to common questions.

Search

 x

Filter by product

Browse ▾

Popular questions

A SQL database query is slow or unresponsive

[Learn More](#)[Learn more >](#)

About ASP.NET Web Deployment using Visual Studio

This tutorial series shows you how to deploy (publish) an ASP.NET web application to Azure App Service Web Apps or a third-party hosting provider.

[Learn more >](#)

About Azure AD Connect and federation

[Learn More](#)[Learn more >](#)

Am I billed separately for local disk storage?

No. All new virtual machines have an operating system disk and a local disk (or "resource disk"). We don't charge for local disk storage. The operating system disk is charged at the regular rate for disks.
[See all virtual machines configurations.](#)

Related questions and answers

- + [How can I troubleshoot issues with a new VM deployment?](#)
- + [How do I diagnose and recover my Virtual Machines from boot failures?](#)
- + [How do I migrate IaaS resources from classic to Azure Resource Manager?](#)
- + [How do I plan for migration of IaaS resources from classic to Azure Resource Manager?](#)

Service Level Agreement (SLA)

<https://azure.microsoft.com/en-ca/support/legal/sla/>

Service Level Agreements

Read the SLAs to learn about our uptime guarantees and downtime credit policies

The Service Level Agreement (SLA) describes Microsoft's commitments for uptime and connectivity. The SLA for individual Azure services are listed below.

 Search all products 

AI + Machine Learning	Internet of Things
Analytics	Management
Blockchain	Media
Compute	Migration
Containers	Mobile
Databases	Networking
Developer Tools	Storage

AI + Machine Learning

Create the next generation of applications using artificial intelligence capabilities for any developer and any scenario

Azure Bot Service
Intelligent, serverless bot service that scales on demand

Machine Learning Studio
Easily build, deploy, and manage predictive analytics solutions

Cognitive Services
Add smart API capabilities to enable contextual interactions

Microsoft Genomics
Power genome sequencing & research insights

Azure Machine Learning service
Bring AI to everyone with an end-to-end, scalable, trusted platform with experimentation and model management

SLA for Virtual Machines

Last updated: March 2018

- For all Virtual Machines that have two or more instances deployed across two or more Availability Zones in the same Azure region, we guarantee you will have Virtual Machine Connectivity to at least one instance at least 99.99% of the time.
- For all Virtual Machines that have two or more instances deployed in the same Availability Set, we guarantee you will have Virtual Machine Connectivity to at least one instance at least 99.95% of the time.
- For any Single Instance Virtual Machine using premium storage for all Operating System Disks and Data Disks, we guarantee you will have Virtual Machine Connectivity of at least 99.9%.

Introduction

General Terms

SLA details

Additional Definitions

"**Availability Set**" refers to two or more Virtual Machines deployed across different Fault Domains to avoid a single point of failure.

"**Availability Zone**" is a fault-isolated area within an Azure region, providing redundant power, cooling, and networking.

Composite SLAs

Multiple SLAs covering a solution

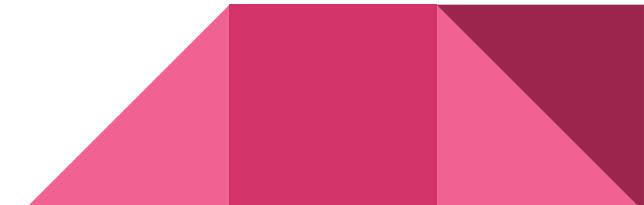
Composite SLAs

Azure Active Directory, Premium - 99.9%

2 Virtual Machines, In Availability Set - 99.95%

Azure SQL Database, Basic Tier - 99.99%

Azure Storage, LRS storage reads - 99.9%



Calculating Composite SLA

Assuming no redundancy, the composite SLA of that solution is:

$$99.9\% \times 99.95\% \times 99.99\% \times 99.9\% = \mathbf{99.74\% \text{ SLA}}$$

Introducing Redundancy

Assuming that the Storage Account is fully replicated in another region, and can fallback to reading from a second location.

Storage account SLA becomes:

$$1.0 - (0.001\% \times 0.001\%) = 99.9999\%$$

$$99.9\% \times 99.95\% \times 99.99\% \times 99.9999\% = \mathbf{99.84\% SLA}$$

Preview features



Preview features
are for “testing” and
not production use



Could change
significantly before
it goes live



May not go live

Public and Private Preview



Public preview
available to
everyone



Private Preview
requires registration

Announcing private preview of Azure VM Image Builder

Posted on 26 September, 2018



Daniel Sol, Program Manager, Azure Compute

Today I am excited to announce the private preview of Azure VM Image Builder, a service which allows users to have an image building pipeline in Azure. Creating standardized virtual machine (VM) images allow organizations to migrate to the cloud and ensure consistency in the deployments. Users commonly want VMs to include predefined security and configuration settings as well as application software they own. However, setting up your own image build pipeline would require infrastructure and setup. With Azure VM Image Builder, you can take an ISO or Azure Marketplace image and start creating your own golden images in a few steps.

How it works

Azure VM Image Builder lets you start with either a Linux-based Azure Marketplace VM or Red Hat Enterprise Linux (RHEL) ISO and begin to add your own customizations. Your customizations can be added in the form of a shell script, and because the VM Image Builder is built on [HashiCorp Packer](#), you can also import your existing [Packer shell provisioner scripts](#). As the last step, you specify where you would like your images hosted, either in the [Azure Shared Image Gallery](#) or as an Azure Managed Image. See below for a quick video on how to create a custom image using the VM Image Builder.



Azure VM Image Builder – Private Preview Signup

Thank you for your interest in the Azure VM Image Builder. Please sign up for the private preview and we will get back to you.

* Required

1. Name *

Enter your answer

General Availability (GA)

Web Application Firewall (WAF) for Azure Front Door service is now generally available

Posted on May 31, 2019

Web Application Firewall (WAF) for Azure Front Door service is now generally available. Customers can use WAF to define security policies that allow, block, forward or rate limit access to their web applications delivered through Azure Front Door.

- A WAF security policy may consist of an ordered list of custom rules and Azure managed pre-configured rulesets.
- Custom rules are based on a combination of client IP addresses, geolocation, http parameters, request methods and size constraints.
- The pre-configured default rule set can be enabled to protect your applications from OWASP top 10 threats.
- New or updated WAF configurations are deployed globally within minutes, letting you respond quickly to changing attack patterns.
- WAF for Azure Front Door is integrated with Azure Monitor and the logs can be accessed through an Azure storage account, Azure Event Hub or Azure Log Analytics.

Along with the general availability of the service, we are also adding in preview a new Azure managed pre-configured ruleset, Bot Protection Ruleset, that can be enabled to block requests coming from malicious IPs based on Microsoft's threats intelligence data feeds.

For more details, see [WAF overview](#). To get started, follow [WAF configuration guide](#).

Related products



Azure Front Door Service

Monitor feature updates

<https://azure.microsoft.com/en-ca/updates/>

All Now available In preview In development

Products

Browse ▾ Search for a product 🔍

Update type

All ▼

 RSS feed

June 2019

- 1 Jun [Azure Monitor for Containers - Updates on Windows AKS Support, UI enhancement, and Node Storage Capacity](#)

New features updates for Azure Monitor for Containers for Node Storage, Windows AKS support, and UI enhancements

Azure Kubernetes Service (AKS) Azure Monitor Management

Explore

Read the Azure blog for the latest news.

[Blog >](#)

Tell us what you think of Azure and what you want to see in the future.

[Provide feedback >](#)

Azure is available in more regions than any other cloud provider.

[Check product availability in your region >](#)

May 2019

- 31 May [Web Application Firewall \(WAF\) for Azure Front Door service is now generally available](#)

Web Application Firewall (WAF) for Azure Front Door service is now generally available. Customers can use WAF to define security policies that allow, block, forward or rate limit access to their web applications delivered through Azure Front Door.

Azure Front Door Service Features Security Services

AZ-900 Microsoft Azure Fundamentals

Scott Duffy, Instructor

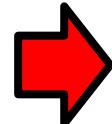


Thank you and best of luck!

Grab Your Free Resources

Located at the end of the course:

- Free PDF Study Guide
- Download the slides and MP3 audio if you like to study offline
- 50 question practice test



Section 6: Thank You!
2 / 5 | 1min ^

- 23. Thank you!
 1min
- Practice Test 1: 50 Question Practice Test
- 24. Other Exam Resources
 1min
- 25. Course Resources - Study Guide, Slides, Audio
 1min
- 26. BONUS Lecture - Discounts
 1min

Resources ▾