

Microsoft Azure

Cloud Application Development – Day 2

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C E V i Z



Microsoft

Ajanda

1. Bölüm

- Blob Storage
- CDN
- SQL Database

2. Bölüm

- Redis
- Service Bus
- Azure Active Directory



Azure Storage

Azure Storage offerings

Blobs

"Highly scalable, REST based cloud object store"

Block Blobs: Sequential file I/O

Page Blobs: Random-write pattern data

Tables

"Massive auto-scaling NoSQL store"

Dynamic scaling based on load

Scale to PBs of table data

Fast key/value lookups

Queues

"Reliable messaging at scale for cloud services"

Decouple and scale components

Message visibility timeout and update message to protect against unreliable dequeuers

Disks

"Persistent disks for Azure IaaS VMs"

Built on page blobs

Premium Storage Disks: SSD based, high IOPS, low latency

Files

"SMB Access to Azure Storage"

Map to file share, standard file system semantics

"Lift and shift" legacy apps

Code against (REST API)

Use on Windows & Linux VMs

Azure Import/Export

Ship data in hard disk drives

AZCopy

High-performance data upload, download, & copy

Data transfer options

Developer-friendly experience

Blobs

Service APIs

- [List Containers](#)
- [Set/GET Blob Service Properties](#)
- [Preflight Blob Request](#)
- [Get Blob Service Stats](#)

Container APIs:

- [Create Container](#)
- [Get/Set Container Properties/Metadata](#)
- [Get/Set Container ACL](#)
- [Lease Container](#)
- [Delete Container](#)
- [List Blobs](#)

Blob APIs:

- [Put Blob](#)
- [Get Blob](#)
- [Get/Set Blob Properties](#)
- [Delete Blob](#)
- [Lease Blob](#)
- [Snapshot Blob](#)
- [Copy Blob](#)

Tables

Service APIs

- [Set/Get Table Service Properties](#)
- [Preflight Table Request](#)
- [Get Table Service Stats](#)
- [Query Tables](#)

Table APIs

- [Create Table](#)
- [Delete Table](#)
- [Set/Get Table ACL](#)

Entity APIs

- [Insert Entity](#)
- [Update Entity](#)
- [Merge Entity](#)
- [Insert Or Merge Entity](#)
- [Insert Or Replace Entity](#)
- [Query Entity](#)
- [Query Entities](#)
- [Entity Group Transactions](#)

Queues

Service APIs

- [Set/Get Queue Service Properties](#)
- [Preflight Queue Request](#)
- [Get Queue Service Stats](#)
- [List Queues](#)

Queue APIs

- [Create Queue](#)
- [Delete Queue](#)
- [Get/Set Queue Metadata](#)
- [Get/Set Queue ACL](#)

Message APIs

- [Put Message](#)
- [Get Messages](#)
- [Peek Messages](#)
- [Delete Message](#)
- [Update Message](#)
- [Clear Messages](#)

Types of Blobs

Block Blobs

Most object storage scenarios
Documents, images, video, etc.



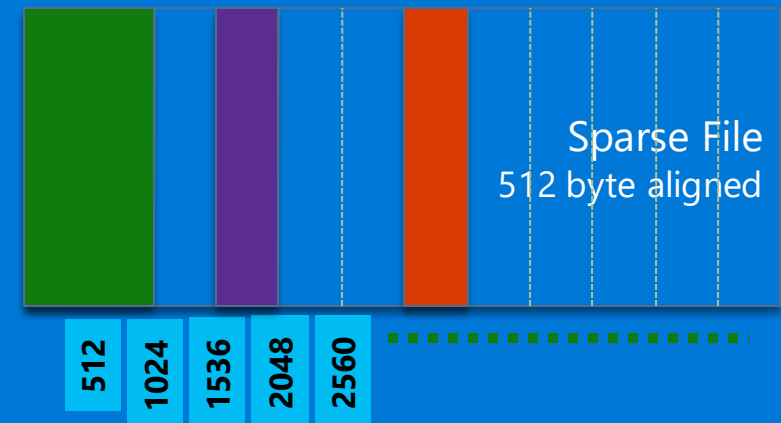
Append Blobs

Multi-writer append only scenarios
Logging, Big Data Analytics output



Page Blobs

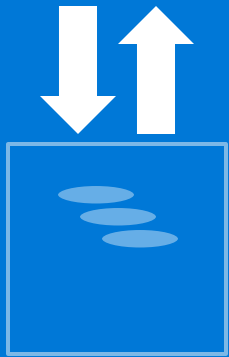
Page aligned random reads and writes
IaaS Disks, Event Hub, Block level backup



Industry-leading availability & reliability

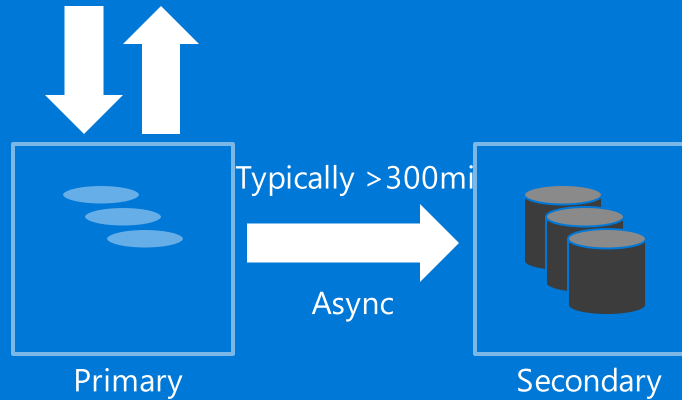
	LOCALLY REDUNDANT STORAGE (LRS)	ZONE REDUNDANT STORAGE (ZRS)	GEOGRAPHICALLY REDUNDANT STORAGE (GRS)	READ-ACCESS GEOGRAPHICALLY REDUNDANT STORAGE (RA-GRS)
How it works	Makes multiple synchronous copies of your data within a single datacenter	Stores three copies of data across multiple datacenters within or across regions. For block blobs only.	Same as LRS, plus multiple asynchronous copies to a second datacenter hundreds of miles away	Same as GRS, plus read access to the secondary datacenter
Total copies	3	3	6	6
Why use it	For economical local storage or data governance compliance	An economical, higher durability option for block blob storage	For protection against a major datacenter outage or disaster	Provides read access to data during an outage, for maximum data availability and durability
Availability SLA	99.9% read/write	99.9% read/write	99.9% read/write	99.9% write 99.99% read

Azure Storage Durability



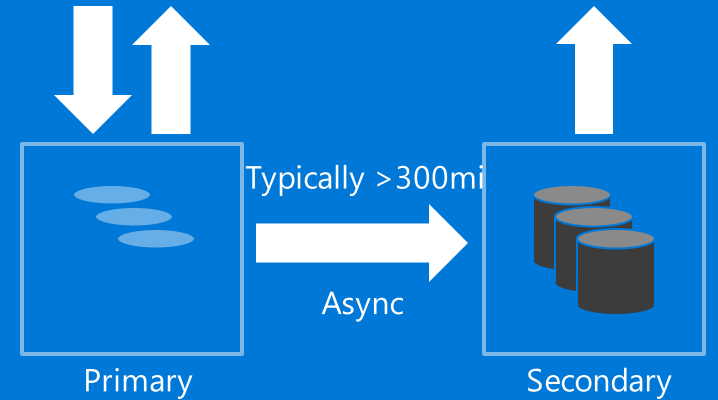
LRS

- 3 replicas, 1 region
- Protect against disk, node, rack failures
- Write is ack'd when all replicas are committed
- Superior to dual-parity RAID



GRS

- 6 replicas, 2 regions (3/region)
- Protects against major regional disasters
- Asynchronous to secondary



RA-GRS

- GRS + Read access to secondary
- Separate secondary endpoint
- RPO delay to secondary can be queried

Strong consistency, checksums/CRC and background scrubbing to preserve data integrity

What is the Blob Storage Service?

Object Storage: Store and serve unstructured data

App and Web scale data

Big Data from IoT, Genomics, etc.

Backups and Archive

Key Features

Store PBs of data

Durable – Choose level of durability: LRS, ZRS, GRS

Highly Available - 99.9% SLA, 99.99% for reads (RA-GRS)

Strongly consistent

Dynamically scale up on bandwidth and TPS

Cost Effective

Blob Storage: Ideal for PaaS

Why?

Limitless Scale

Globally accessible

Cost Efficient

Scenarios for application data:

Live Data Repository

Active or Deep Archive

Big Data Analytics

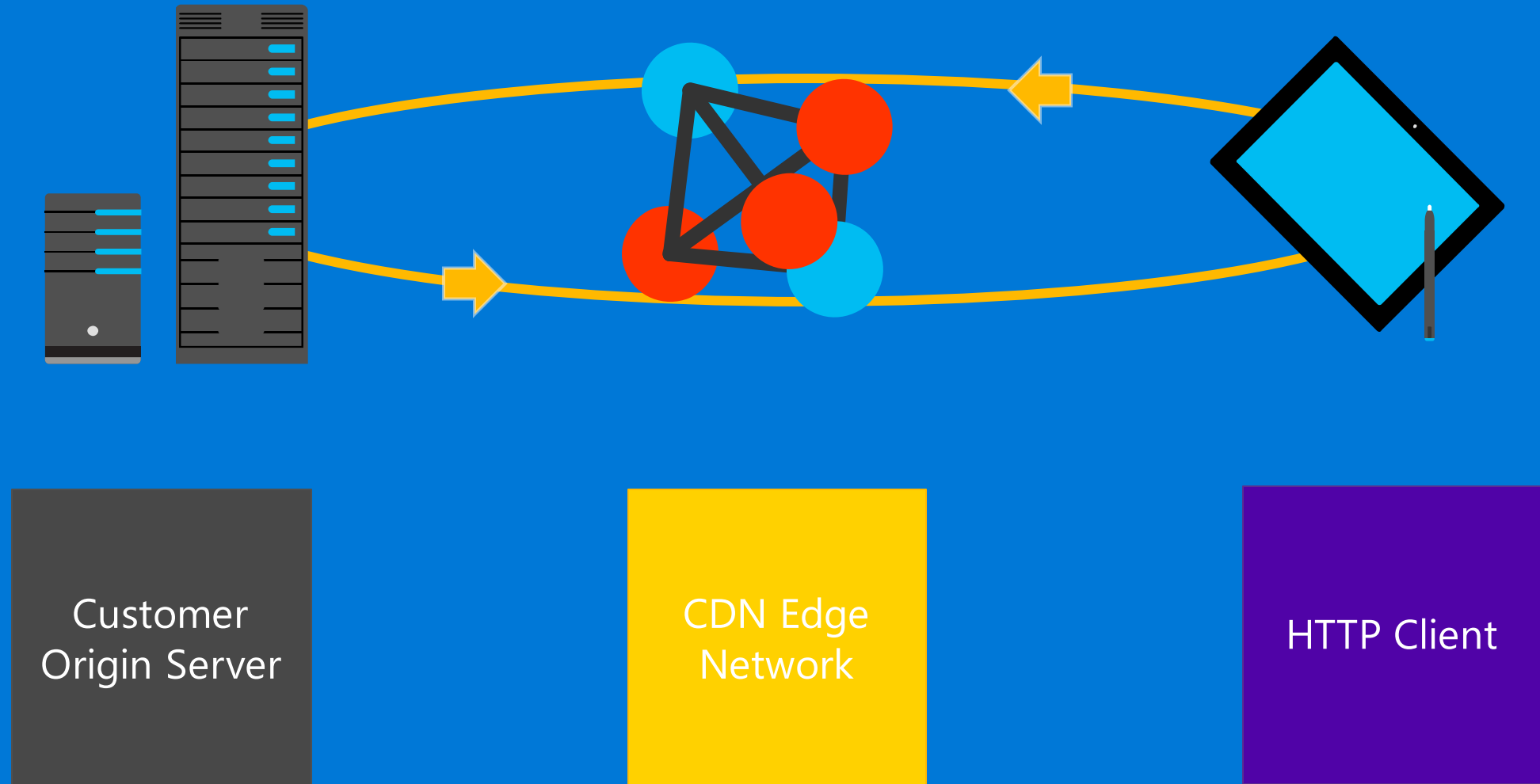
Hands On Lab

HOL 10 - Storage

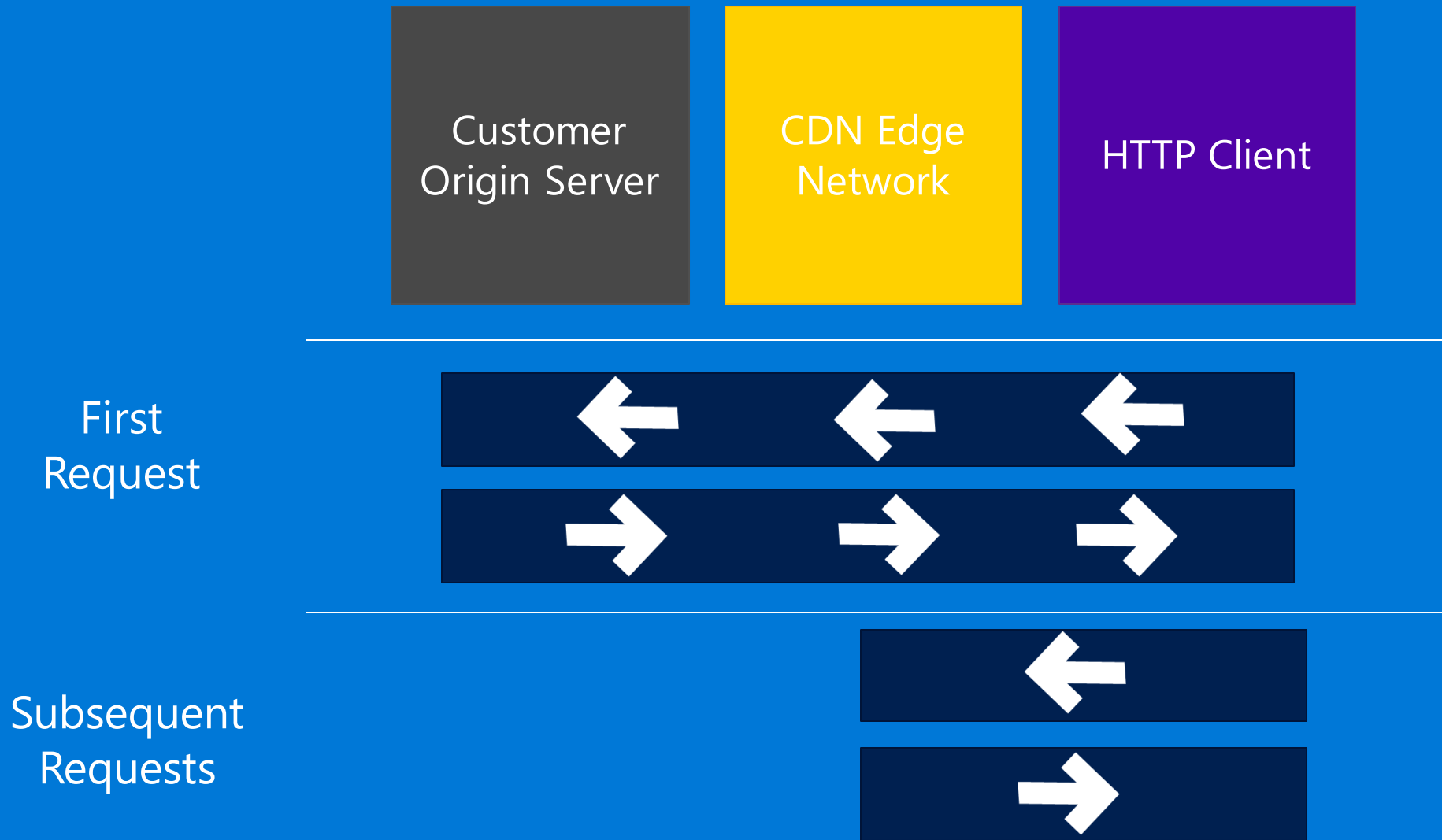
- Storage

Azure CDN

Core CDN Elements



Core CDN Traffic Flow



Content Delivery Networks

Network of servers
deployed in
multiple data
centers across
the Internet



Delivers web
content: text,
images, sound,
and videos



Moves content
from the host's
data center to
servers closer to
the end-user



Provides lower
latency, high
availability, and
better performance



Azure CDN Scenarios

Global delivery and acceleration of any http or https content to any device



- ✓ Streaming media
- ✓ Customer facing websites and apps
- ✓ Enterprise apps hosted in the cloud
- ✓ Software application downloads and updates
- ✓ Firmware updates (Smart TVs, consumer electronic appliances, etc.)
- ✓ Datacenter perimeter protection

Hands On Lab

HOL 9 - CDN

- CDN

Azure SQL DB

The developer's intelligent cloud-database service

Built for application developers

Gives you more time to innovate

Accelerates your time to market

Includes built-in advisors that quickly learn your apps' unique characteristics

Dynamically adapts to maximize performance, reliability, and data protection

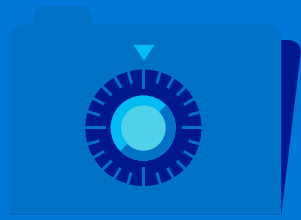
Helps you build secure apps and connect to your database by using the languages and platforms that you prefer



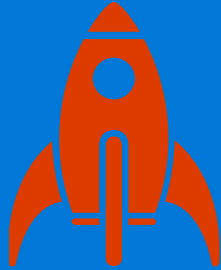
SQL Server is an industry leader



Industry leader
in Mission-Critical
OLTP



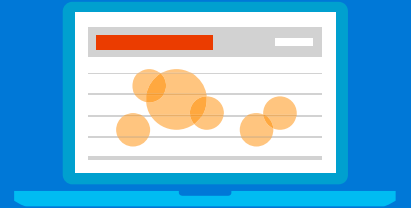
Most secure
database



Highest
performing data
warehouse



End-to-end
mobile BI on
any device



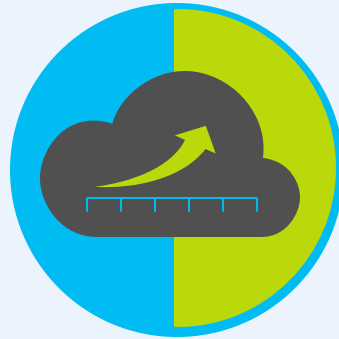
In-database
Advanced
analytics

Azure SQL Database

**Learns
& adapts**



**Scales
on the fly**



**Redefines
multi-tenancy**



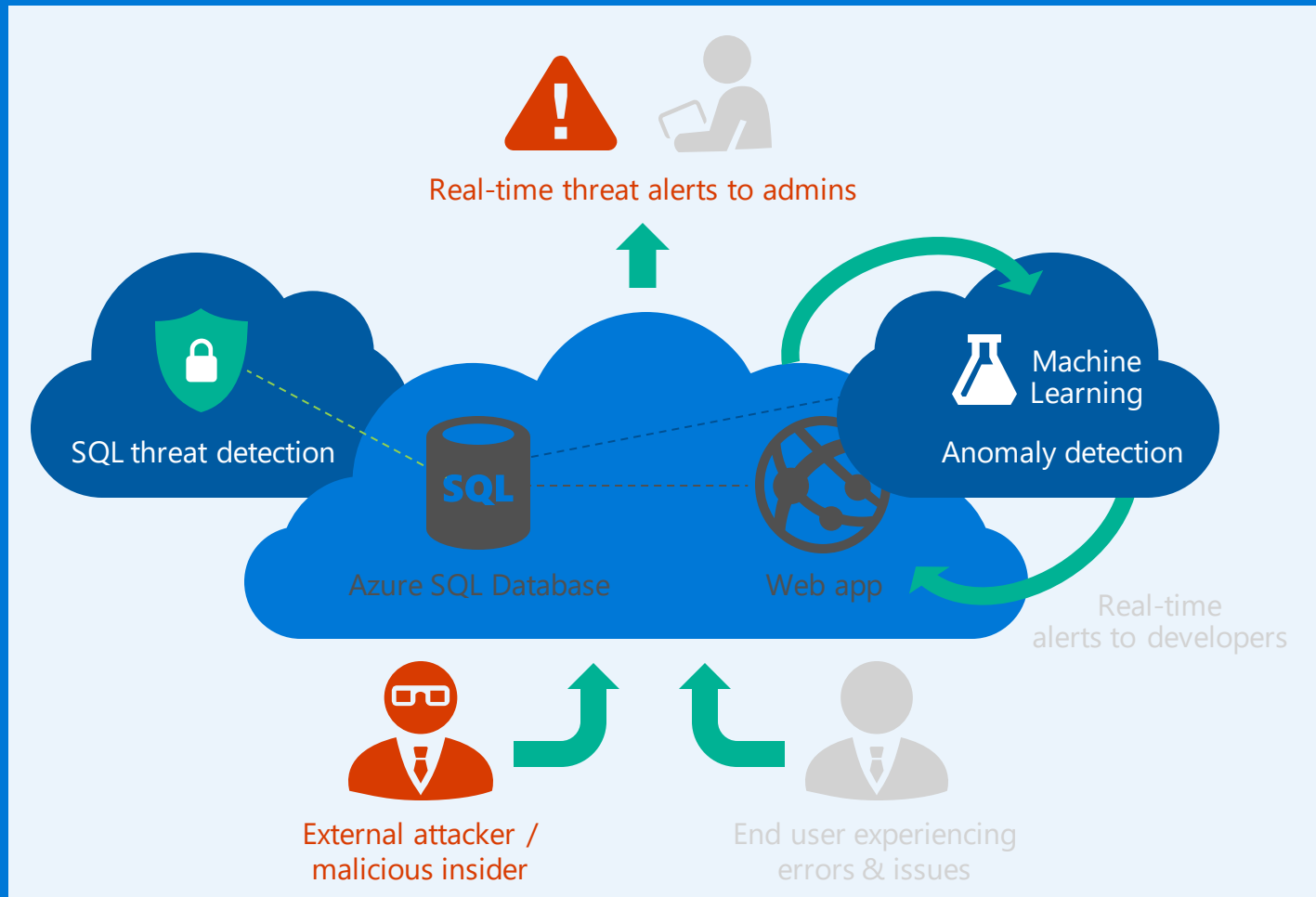
**Works in your
environment**



**Secures
& protects**

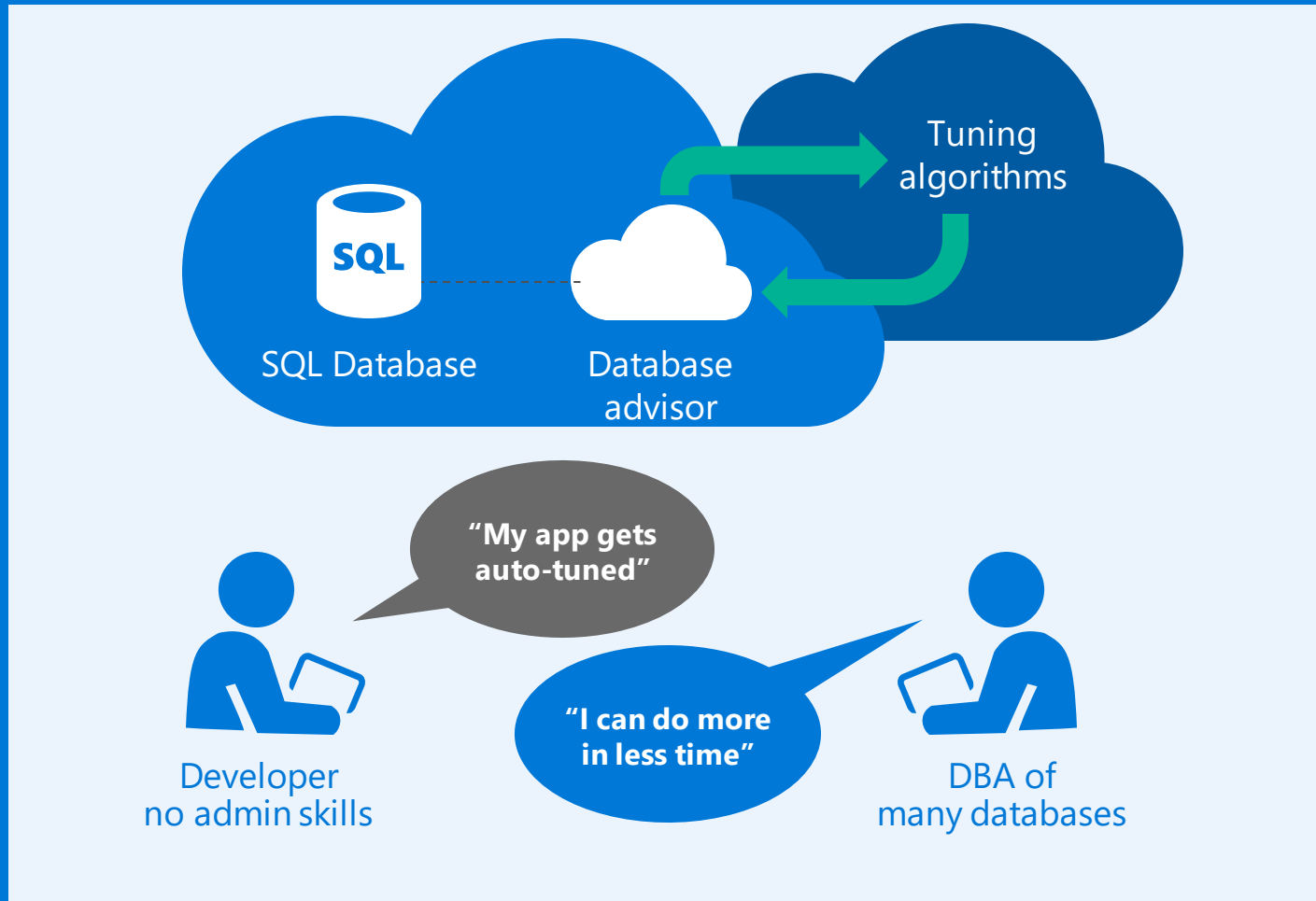


Threat and anomaly detection



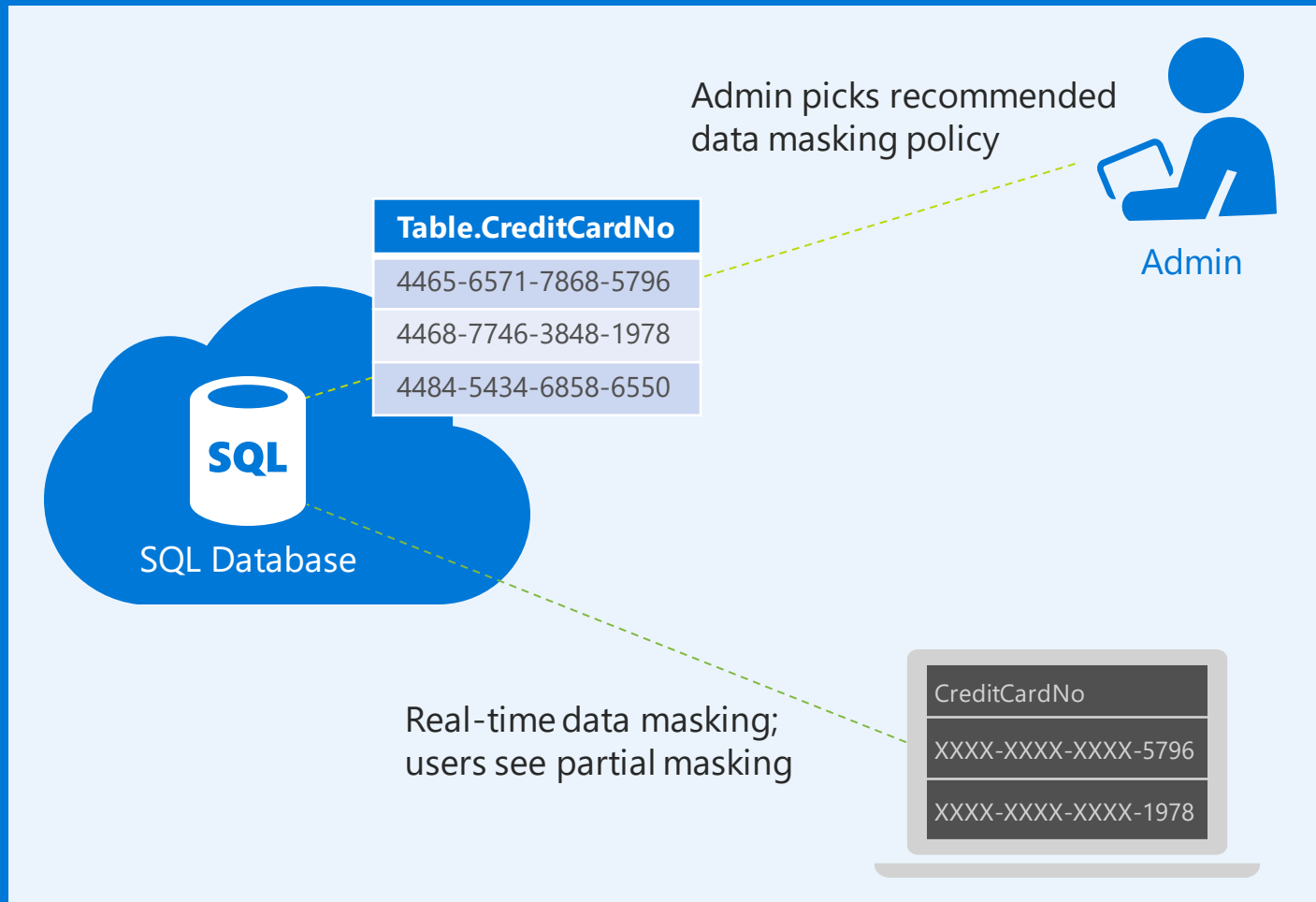
- Configurable threat detection policy
- Built-in behavioral analysis
- Real-time alerts
- Explorable audit log
- Unusual patterns are detected and fixed

Self-tuning performance



- Continuously monitors query patterns and performance
- Manages indexes, tailored to the specific workload
- Tests and validates actions, reverts if impact negative
- Runs in full auto-mode, or in recommend/review mode

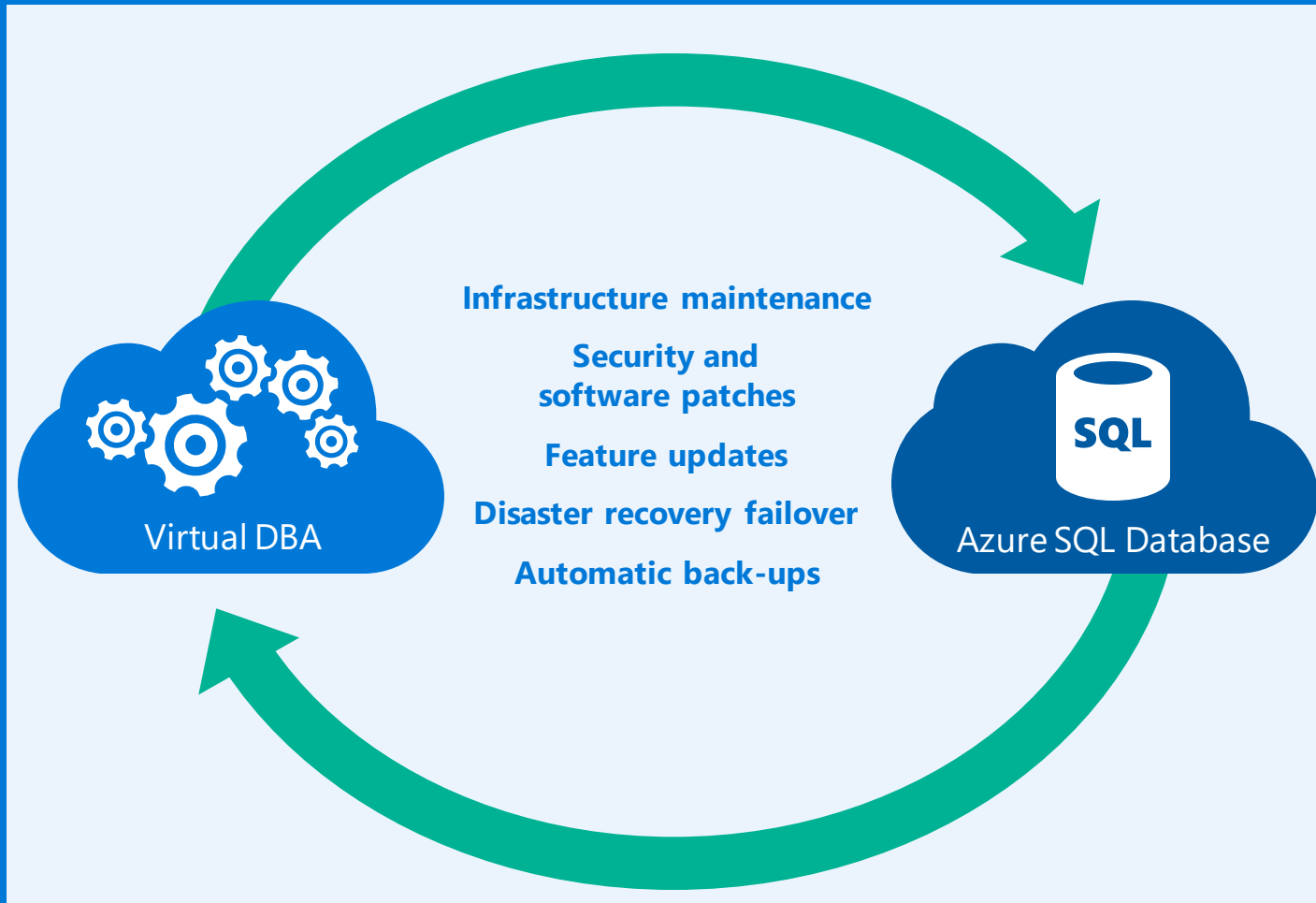
Actionable recommendations



- Get recommended actions for security policies and performance issues
- Built-in advisors provide one-click recommendations and save time

A virtual DBA

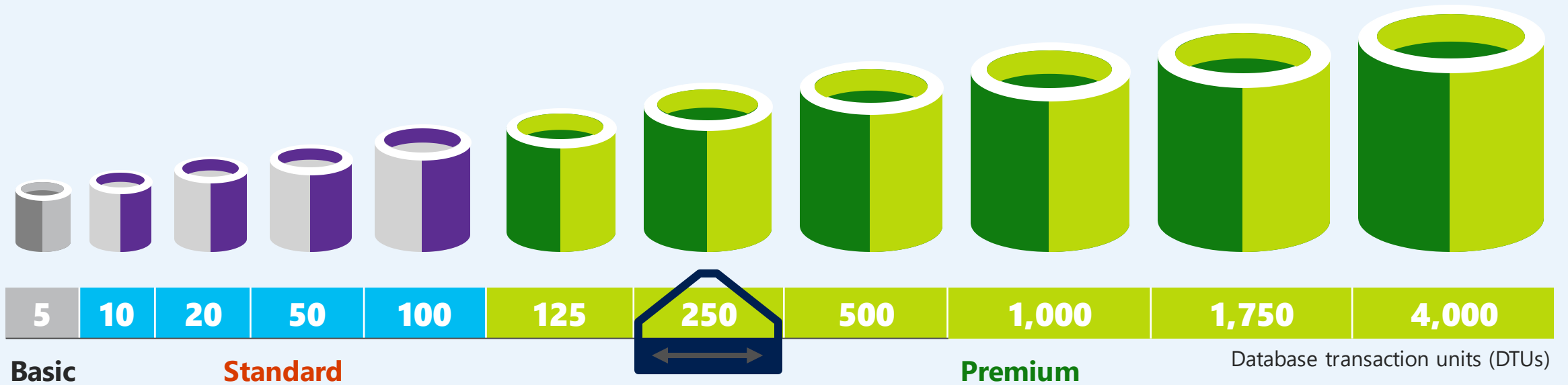
Built-in admin and data protection



- Leverage Azure as a virtual DBA
- Automatically manage activities like maintenance, security, updates, DR and back-ups
- No application downtime
- Save money, time and worry

Scale on the fly

- Scale up with one click
- Accommodate growth and peak workloads
- Pay for what you need, when you need it



Why PaaS for data stores?

If you host your database in an Azure VM,
you are responsible for...

App Optimization



Scaling



High Availability



Disaster Recovery



Backup



Database Patches



OS Patches



Why PaaS for data stores?

If you use a managed Data Service,
you are responsible for...

Focus on your app and your business. Achieve a 406% ROI.
Let Azure Data Services help you build, scale, and innovate.

App Optimization

Scaling



High Availability



Disaster Recovery



Backup



Database Patches



OS Patches



Hands On Lab

HOL 12.1 - SQL DB

HOL 12.2 - SQL DB

- Azure SQL DB

break;

Coming up:

Redis

Service Bus

Azure Active Directory

Redis

Azure Redis Cache

- Açık kaynak kodlu, gelişmiş bir key-value deposudur.
- Veriler bellekte tutulur, bu yüzden çok hızlıdır, belirli aralıklarla veriler dosyaya kaydedilebilir.
- String, hash (key-value pair), list, set (tekil liste), sorted set (sıralı tekil liste) gibi değişik veri yapılarını destekler.
- Twitter, GitHub, StackOverflow gibi büyük yük altında çalışan sitelerde kullanılan bir kaynaktır
- Bir çok dilde client kütüphaneleri vardır. (StackExchange.Redis)
- Web farm yapılarında data cache, session cache ve output cache kullanımı için tercih edilebilir.
- Monitor edilebilir, çeşitli metriclere göre bildirimler tanımlanabilir.
- Virtual Network tanımlanarak sadece Azure Virtual Network içerisinde bulunan clientlar için erişim kısıtlanabilir.
- Cluster yapısını destekler. 530 GB a kadar cluster yapısıyla veri tutulmasını destekler.
- Düşük latency (%50: < 3ms, %99 < 10ms) ve yüksek miktarda throughput a sahiptir.



Azure Redis service

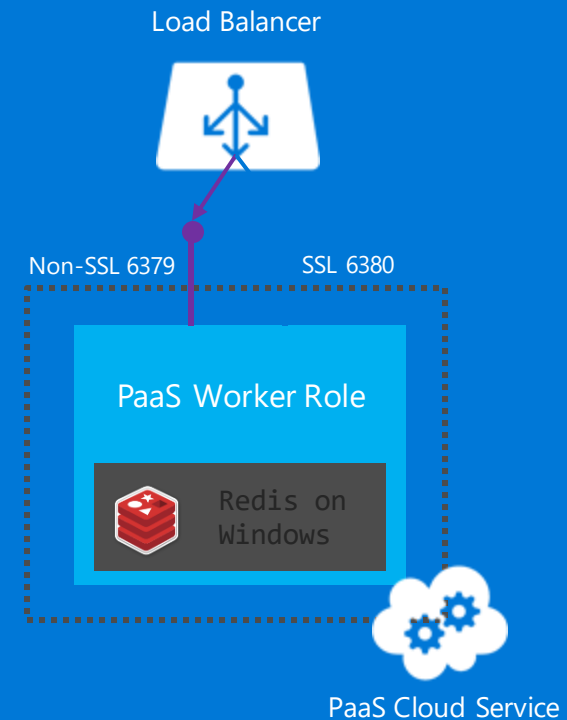
- A fully managed, ISO/SOC-compliant service
 - Windows port of Redis engine
 - Enhancements by leveraging Windows server OS (e.g., SSL) and Azure services and infrastructure (e.g., storage, virtual network, management, monitoring/diagnostics)
 - Dedicated instance(s) per cache: built on top of cloud services today; plan to move to VM
- Available in three service tiers and all Azure regions
 - Basic: single cache node
 - Standard: cache node + one replica (SLA 99.9%)
 - Premium: data persistence, cluster (up to 10 shards), Azure virtual network support, highest network performance and client connections
- Multiple client-side libraries, ASP.NET session & output cache providers, WordPress integration

Azure Redis tier comparison

	Basic	Standard	Premium
SLA	-	99.9%	99.9%
Replication and failover	-	Yes	Yes
Persistence	-	-	Yes
Cluster	-	-	Yes
Scale-out to multiple cache units	-	-	Yes
Enhanced security	-	-	Yes
Configure Redis (keyspace notifications, etc.)	-	Yes	Yes
Data import/export	-	-	Yes
Reboot	-	-	Yes
Scheduled update	-	-	Yes
Memory Size	250 MB - 53 GB	250 MB - 53 GB	6 GB - 530 GB *
Network Performance	Low - High	Low - High	Moderate - Highest
Maximum number of Client connections	Up to 20000	Up to 20000	Up to 40000

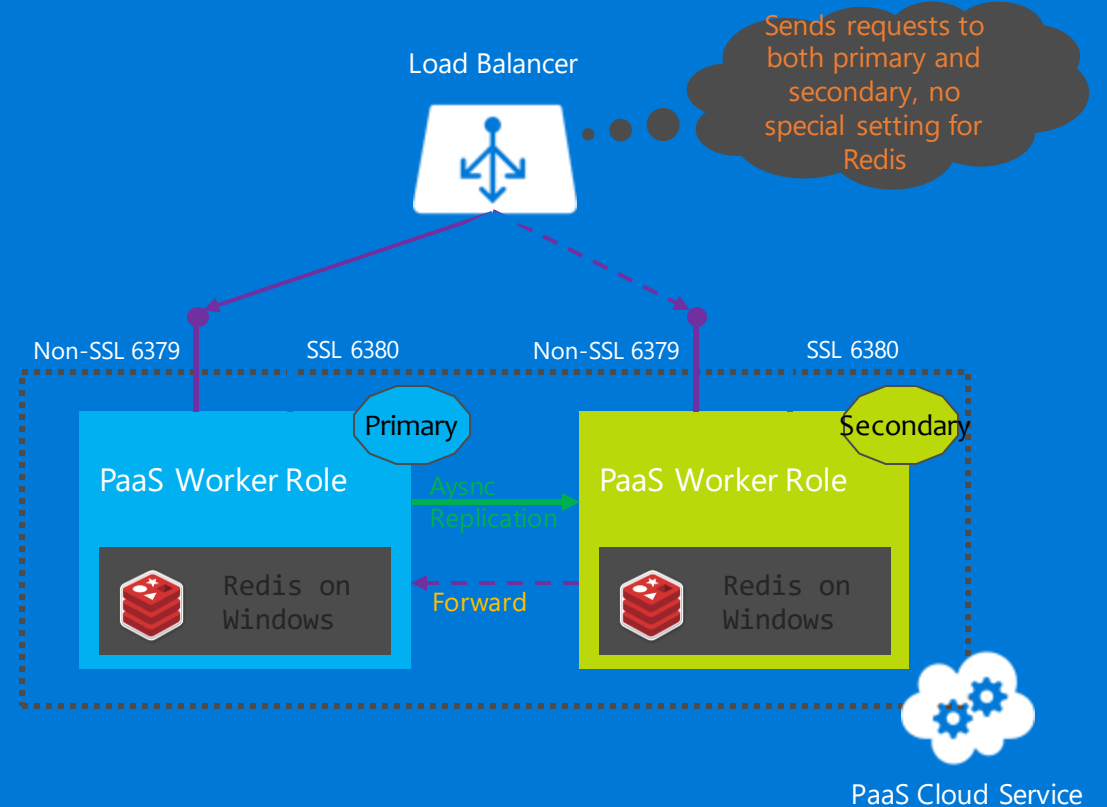
Inside | Basic

- Single node (PaaS cloud service with only one worker role instance) running “Redis on Windows”
- Non-SSL 6379 is disabled by default
- Data are not replicated
- Data loss will happen during patching or scaling
- No explicit SLA guarantee. Good for dev-test



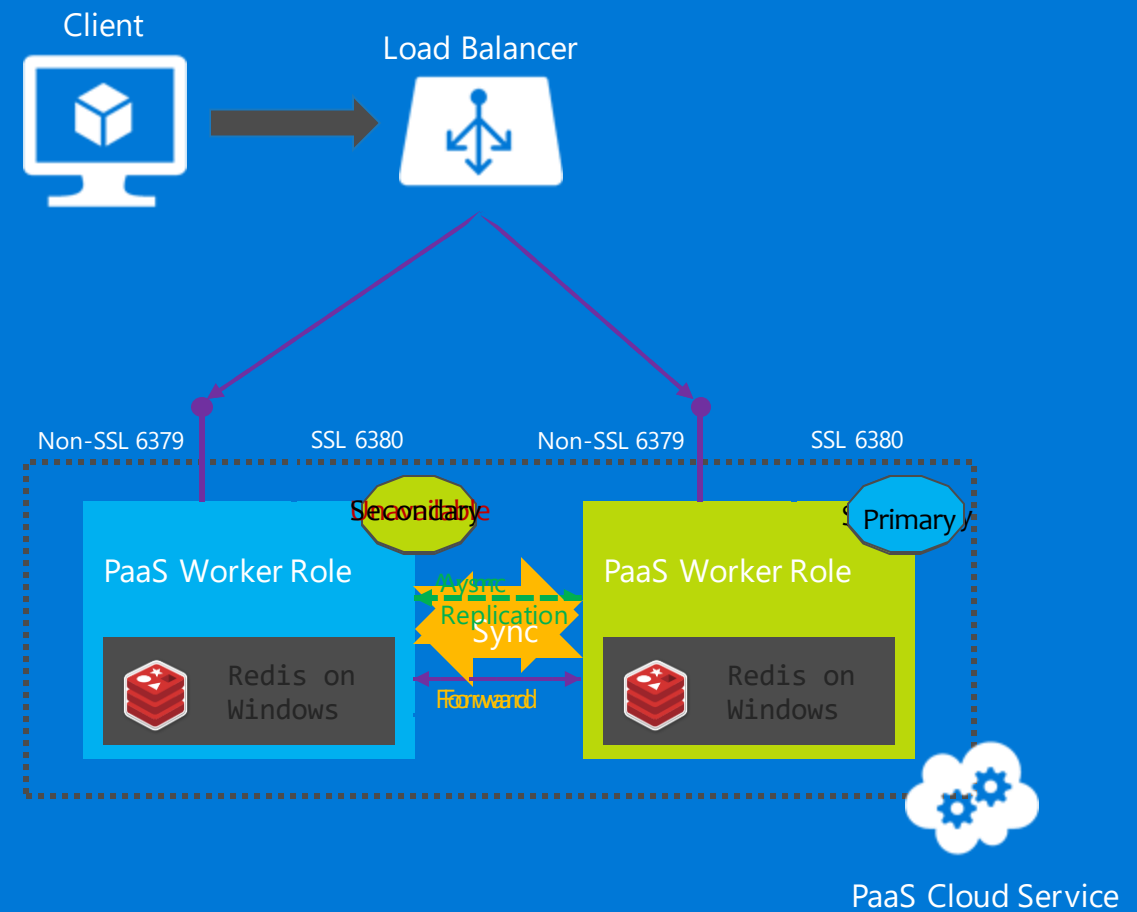
Inside | Standard

- Consists of two nodes: primary and secondary
- Load balancer distributes connections to both primary and secondary, but secondary then forwards to primary, so eventually only primary serves requests from client
- Master replicates asynchronously to secondary
- Replication is non-blocking on both primary and secondary nodes
- When primary is not available (crash or update), secondary will become primary automatically. 99.9% availability SLA is guaranteed via such mechanism



Inside | Replication

- Initial state
- Swap starts: sync data from primary to secondary
- Sync completes: secondary becomes primary
- Primary becomes unavailable
- Existing connections are dropped (client will receive failures) and client needs to reconnect with new primary; New connections will connect to new primary directly
- Eventually new secondary will get up and sync data from new primary
- New secondary gets ready to pair with new primary



Azure Redis performance

Pricing tier	Size	Bandwidth (Mbps)	RPS
Standard			
C0	250 MB	5	600
C1	1 GB	100	12200
C2	2.5 GB	200	24000
C3	6 GB	400	49000
C4	13 GB	500	61000
C5	26 GB	1000	115000
C6	53 GB	2000	150000
Premium			
P1	6 GB	1000	140000
P2	13 GB	2000	220000
P3	26 GB	2000	220000
P4	53 GB	4000	250000

- Throughput for Premium is higher than Standard tier. E.g., for a 6 GB Cache, throughput of P1 is 140K RPS as compared to 49K for C3
- With Redis clustering, throughput increases linearly as you increase the number of shards (nodes) in the cluster. E.g., if you create a P4 cluster of 10 shards, the available throughput is $250K \times 10 = 2.5$ Million RPS
- Throughput for bigger key sizes is higher in Premium tier as compared to Standard tier

Hands On Lab

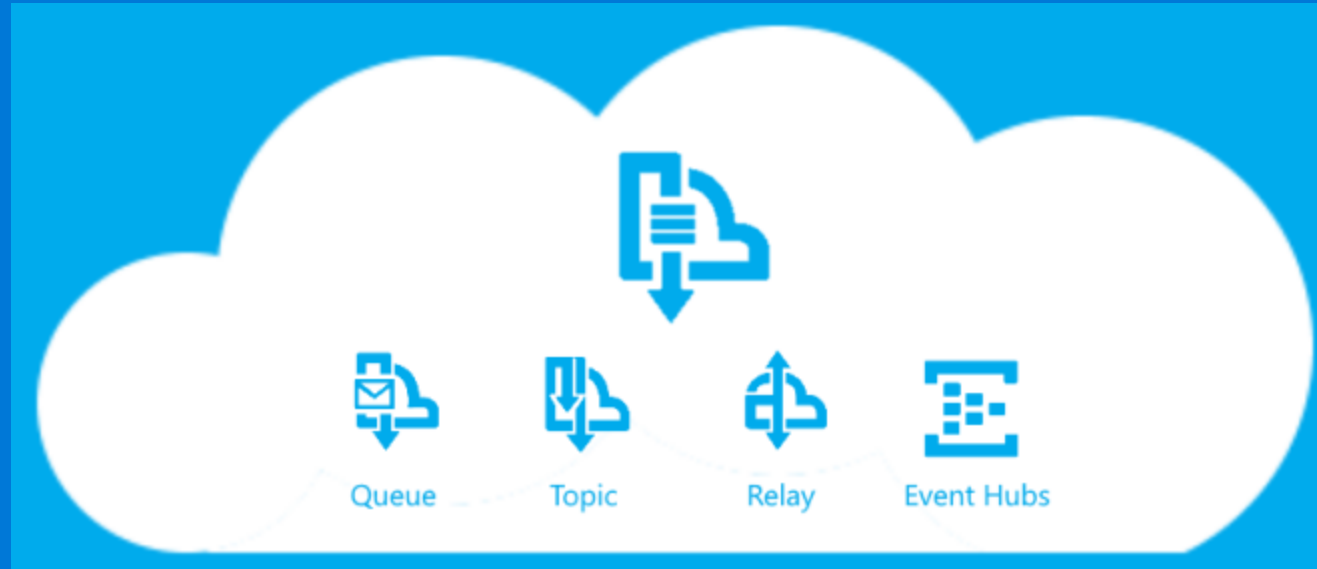
HOL 13 - Redis

- Redis

Service Bus

Azure Service Bus

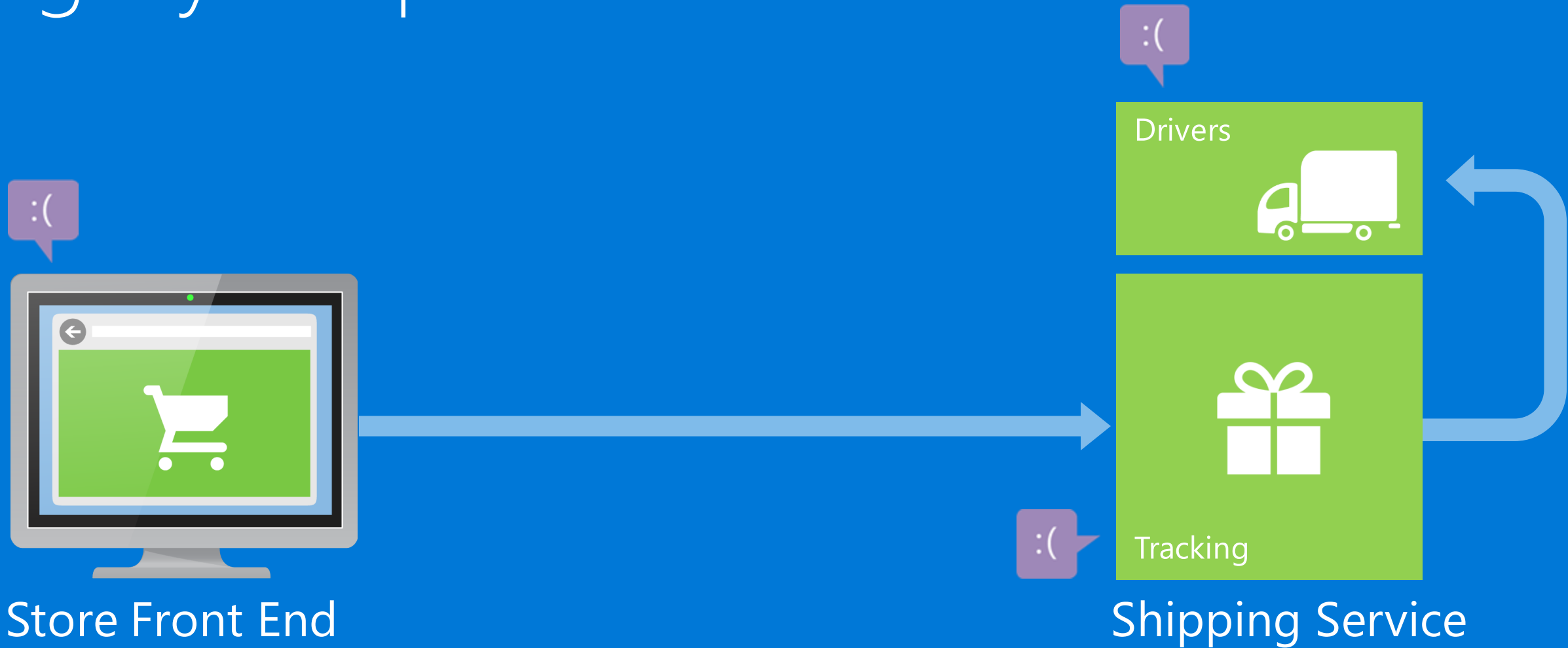
- Uygulamaların birbirleriyle iletişim kurabilmesini sağlayan bir altyapı mimarisidir.
- Uygulamaların zayıf bağlı (loosely coupled) olarak mesajlaşmasını sağlar.
- Service bus kullanılması durumunda uygulamaların aynı anda çalışıyor olmasına gerek yoktur.
- Uygulamaların birbirlerinden bağımsız olarak yatay genişleyebilmesine (scale out) olanak verir.



Tightly Coupled



Tightly Coupled



Loosely Coupled



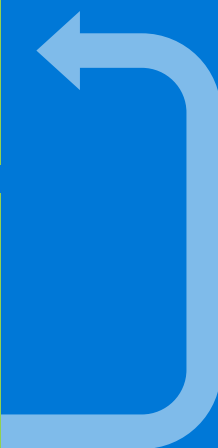
Store Front End



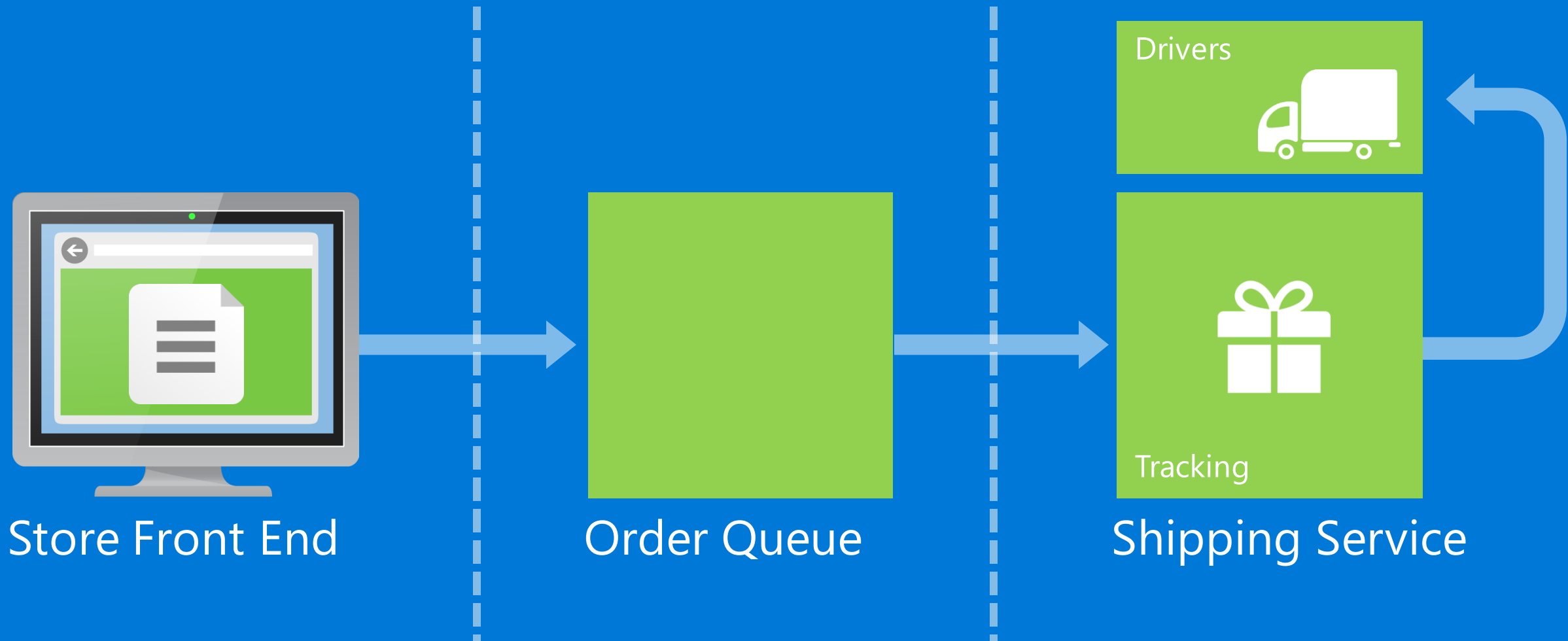
Order Queue



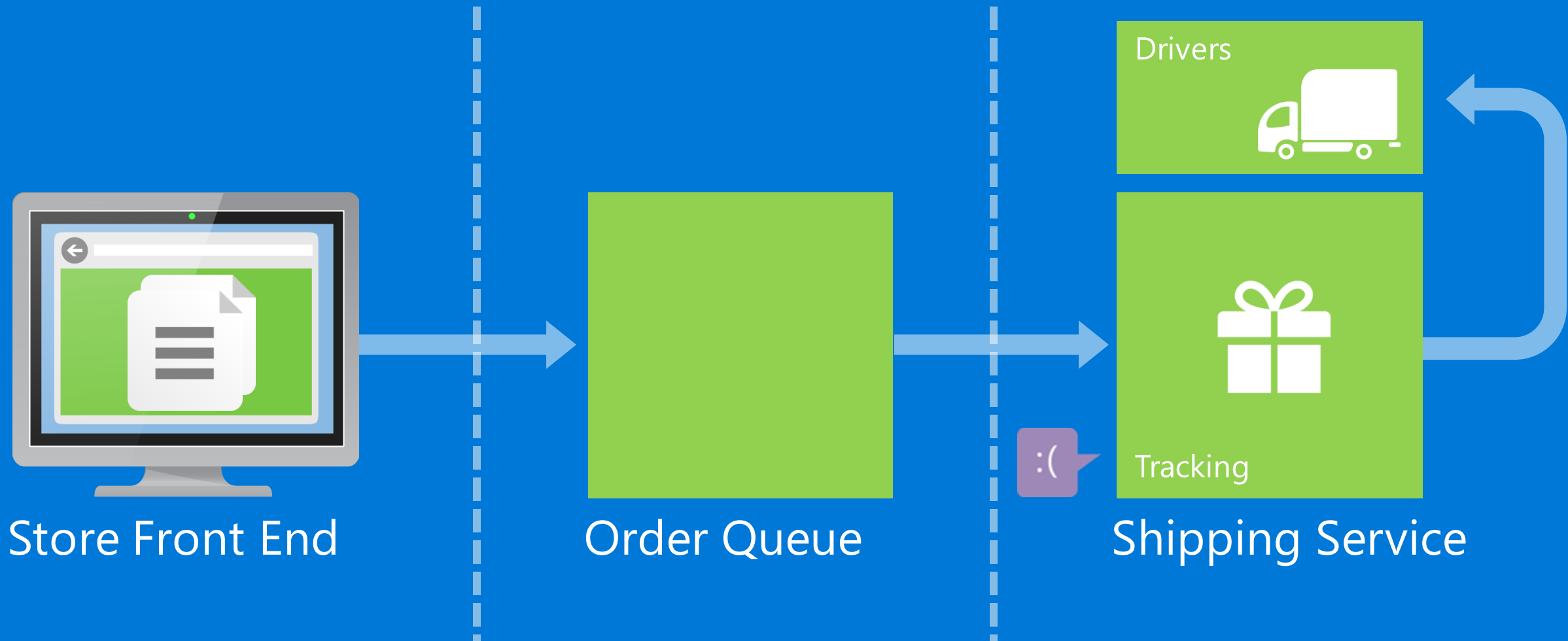
Shipping Service



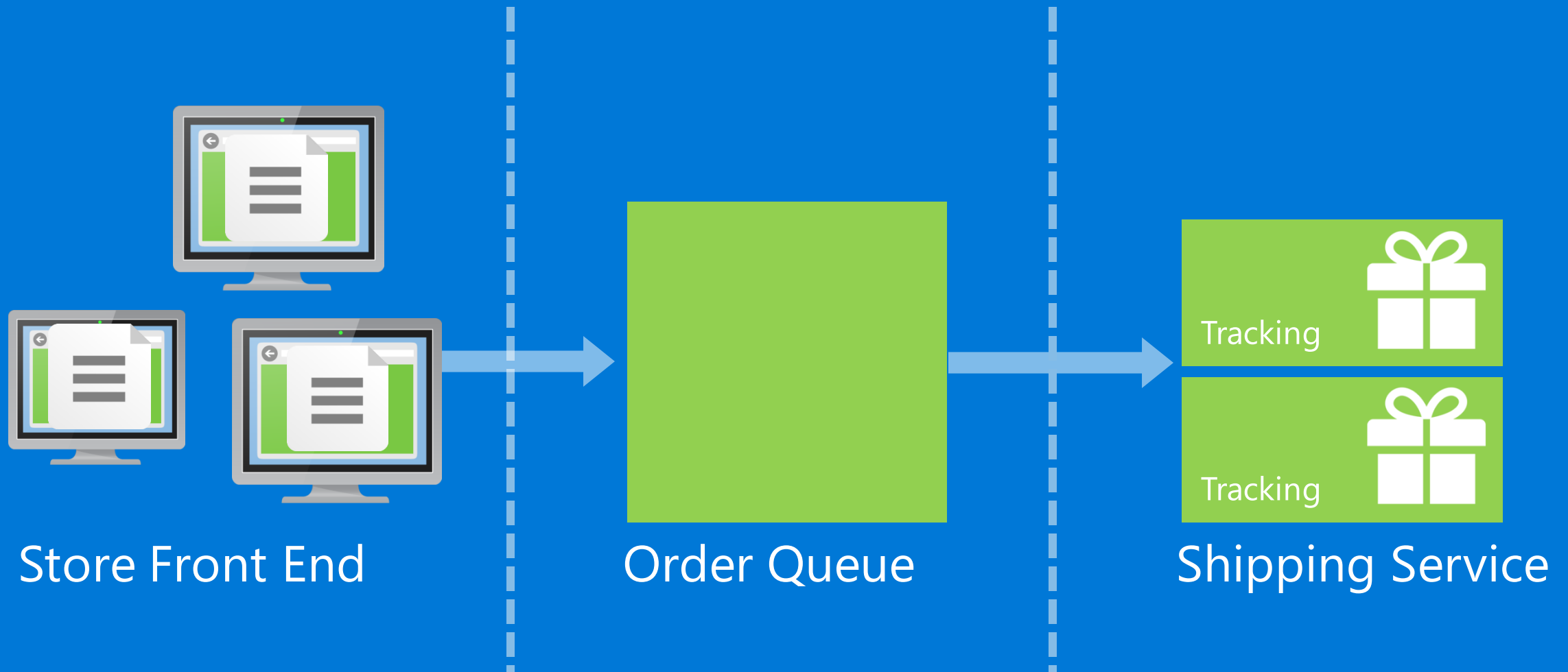
Loosely Coupled



Loosely Coupled

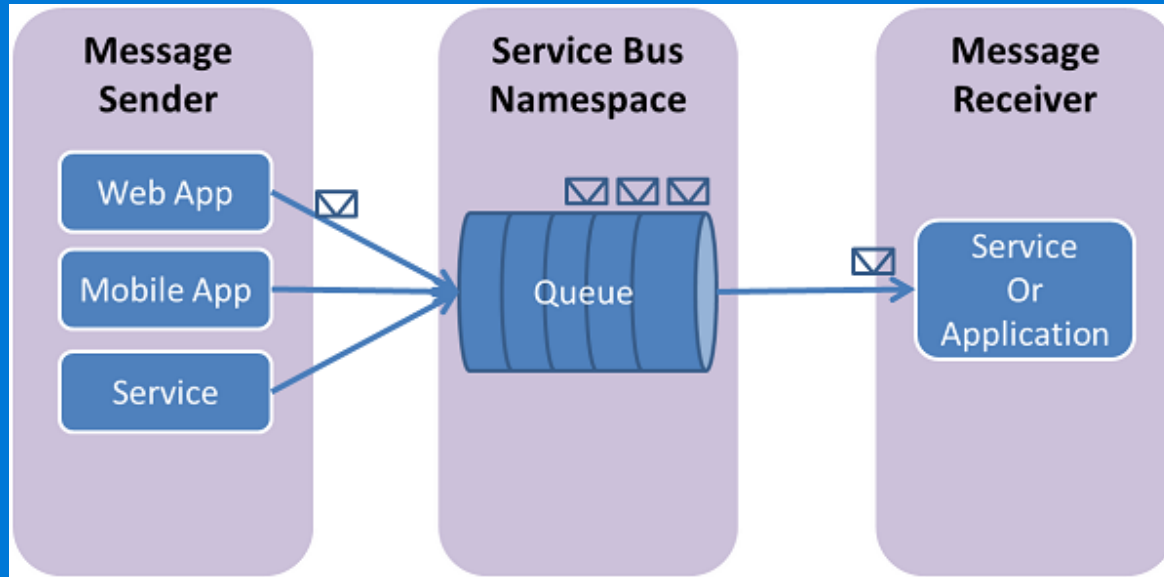


Loosely Coupled



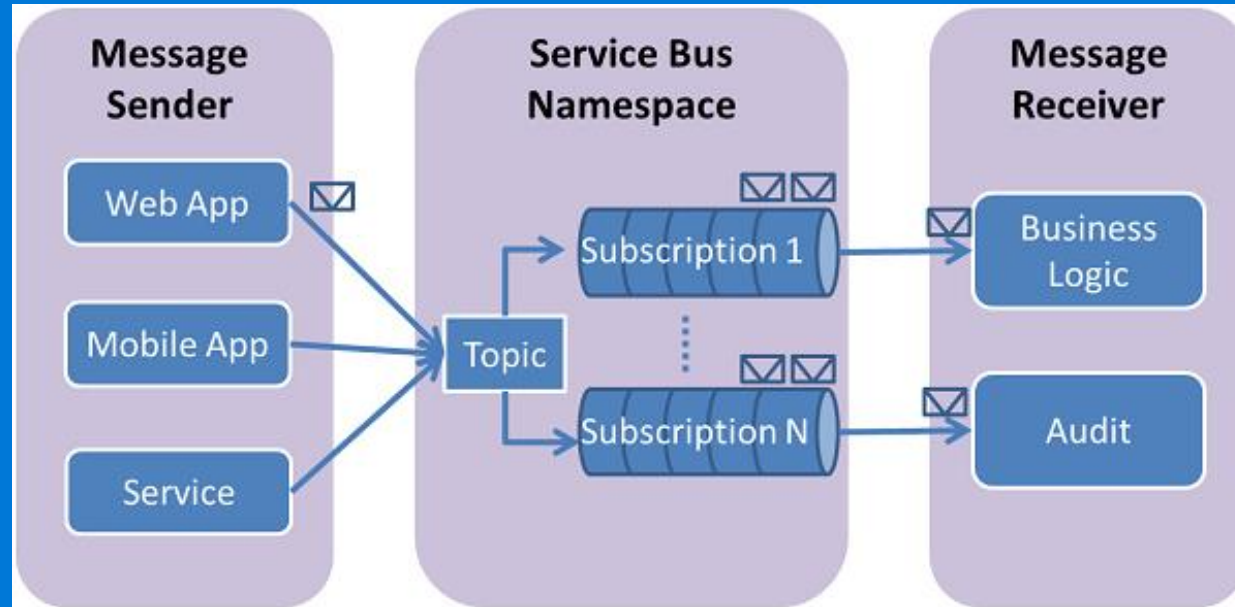
Azure Service Bus Queue

- Uygulamalar bir kuyruğa mesaj gönderir ve başka bir uygulama bu kuyruktan mesajları alır.
- İlk giren ilk çıkar yapısındadır (FIFO).
- Tek taraflı mesajlaşma vardır.



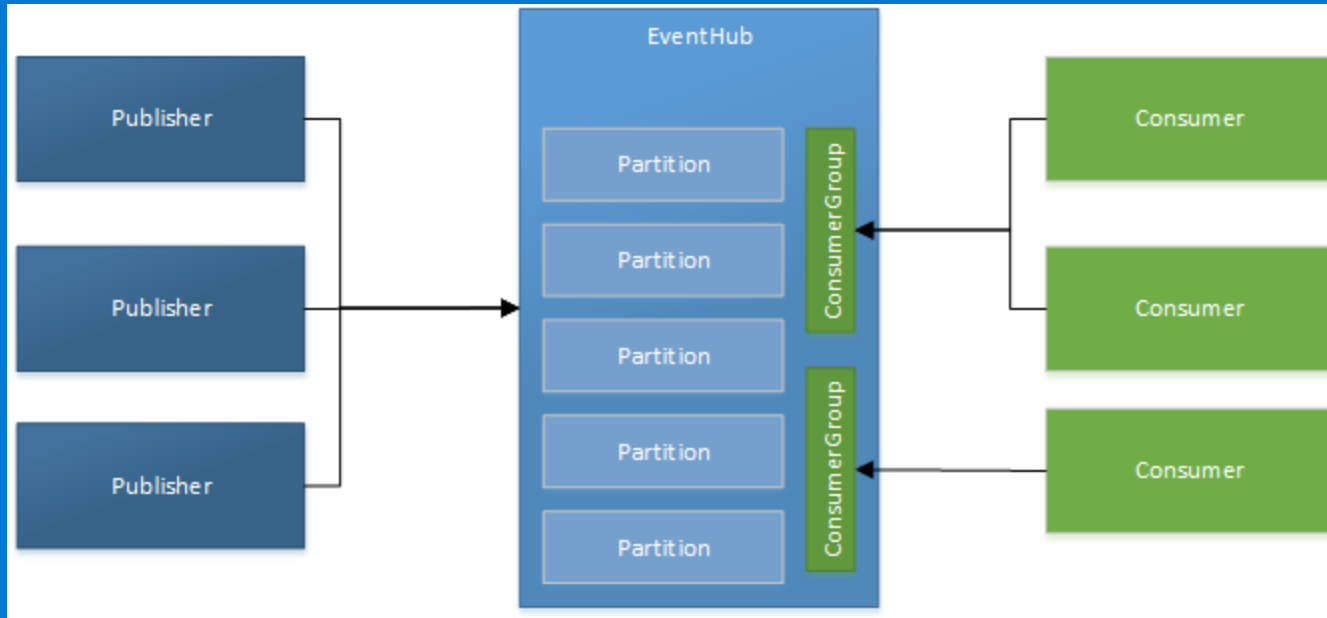
Azure Service Bus Topics

- Uygulamalar bir kuyruğa mesaj gönderir ve mesajlar farklı kurallara göre dağıtılır.
- Kuyruğu dinleyen uygulamalar bu kuyruktan kendileri ile ilgili olan mesajları alır.
- İlk giren ilk çıkar yapısındadır (FIFO).
- Tek taraflı mesajlaşma vardır.



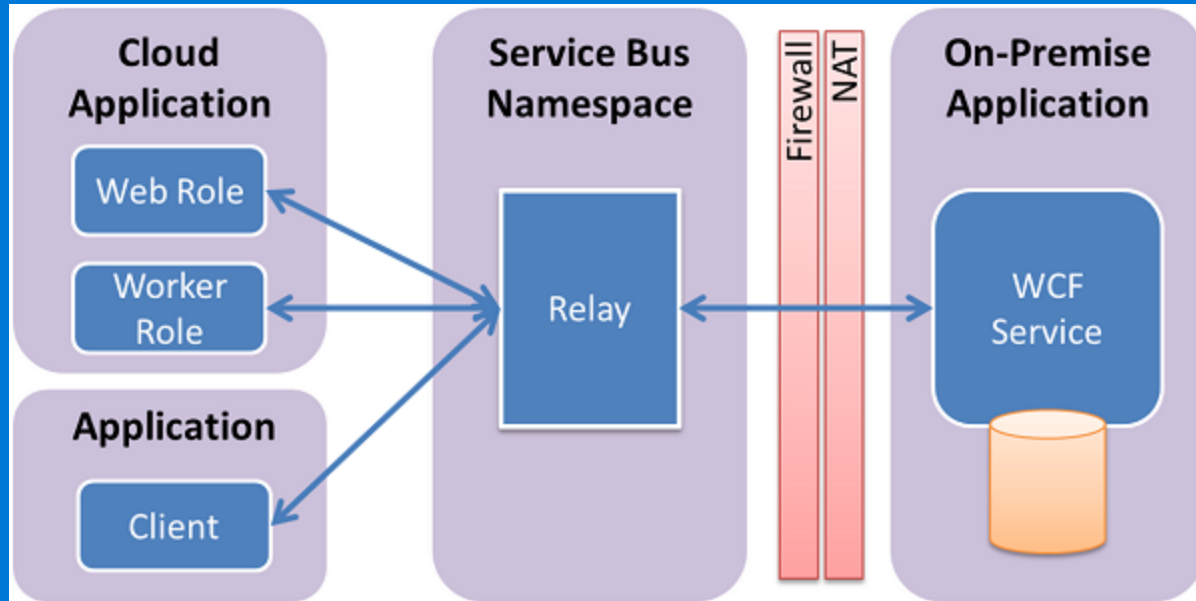
Azure Service Bus Event Hub

- Queue ve topiclere benzer, mesaj sayısının çok yüksek miktarlarda olduğu durumlarda kullanılır.
- Bir çok farklı kaynaktan toplanan verilerin canlı olarak işlenmesini sağlar.



Azure Service Bus Relay

- Şirket içerisinde bulunan servisler için şirket dışındaki uygulamalar için bir bağlantı noktası (endpoint) oluşturulması sağlar.
- Mesajlaşma çift taraflıdır.



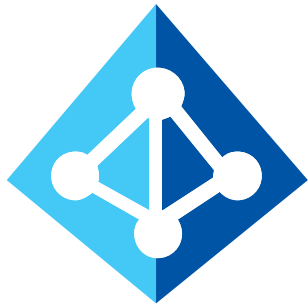
Hands On Lab

HOL 12 – Azure Service Bus

- Azure Service Bus

Azure Active Directory

What is Azure Active Directory?

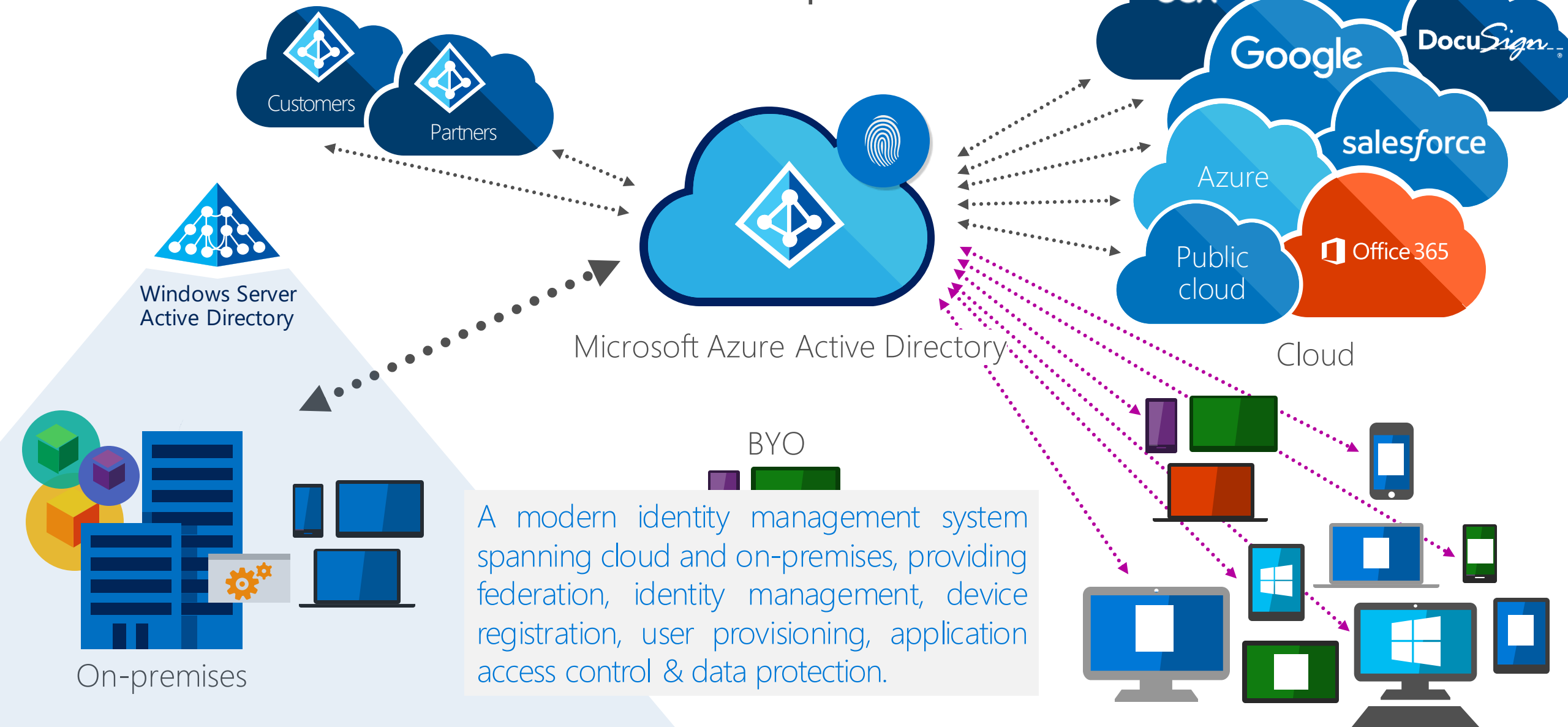


Identity management in the cloud.

Based on the Active Directory we all already know, but integrated with numerous first and third party cloud services.

Backbone of Office 365

Azure AD as the control plane



Azure Active Directory

- Microsoft's "Identity Management as a Service (IDaaS)" for organizations.
- Millions of **independent** identity systems **controlled** by enterprise and government "tenants."
- Information is **owned and used by the controlling organization**—not by Microsoft.
- Born-as-a-cloud directory for Office 365. Extended to manage across many clouds.
- Evolved to manage an organization's relationships with its customers/citizens and partners (B2C and B2B).

>85%

of Fortune 500 companies use Microsoft Cloud (Azure, O365, CRM Online, and PowerBI)

Azure AD
Directories
>10 M

More than
750 M
user accounts on
Azure AD

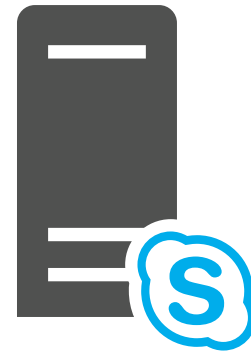
1 trillion

Azure AD
authentications
since the release of
the service

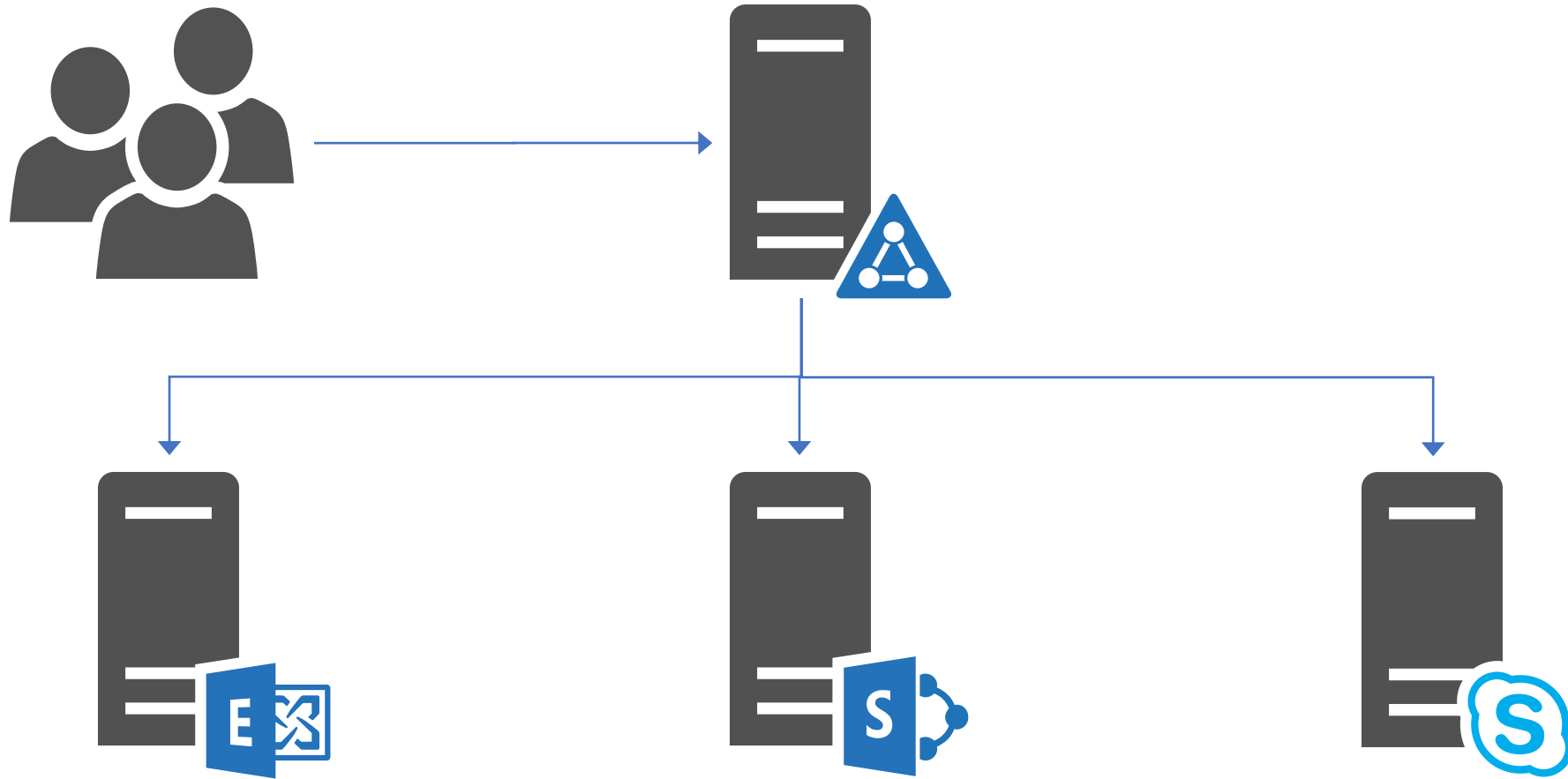
>110k
third-party
applications used
with Azure AD
each month

>1.3
billion
authentications every
day on Azure AD

The Office 365 and Azure AD Story



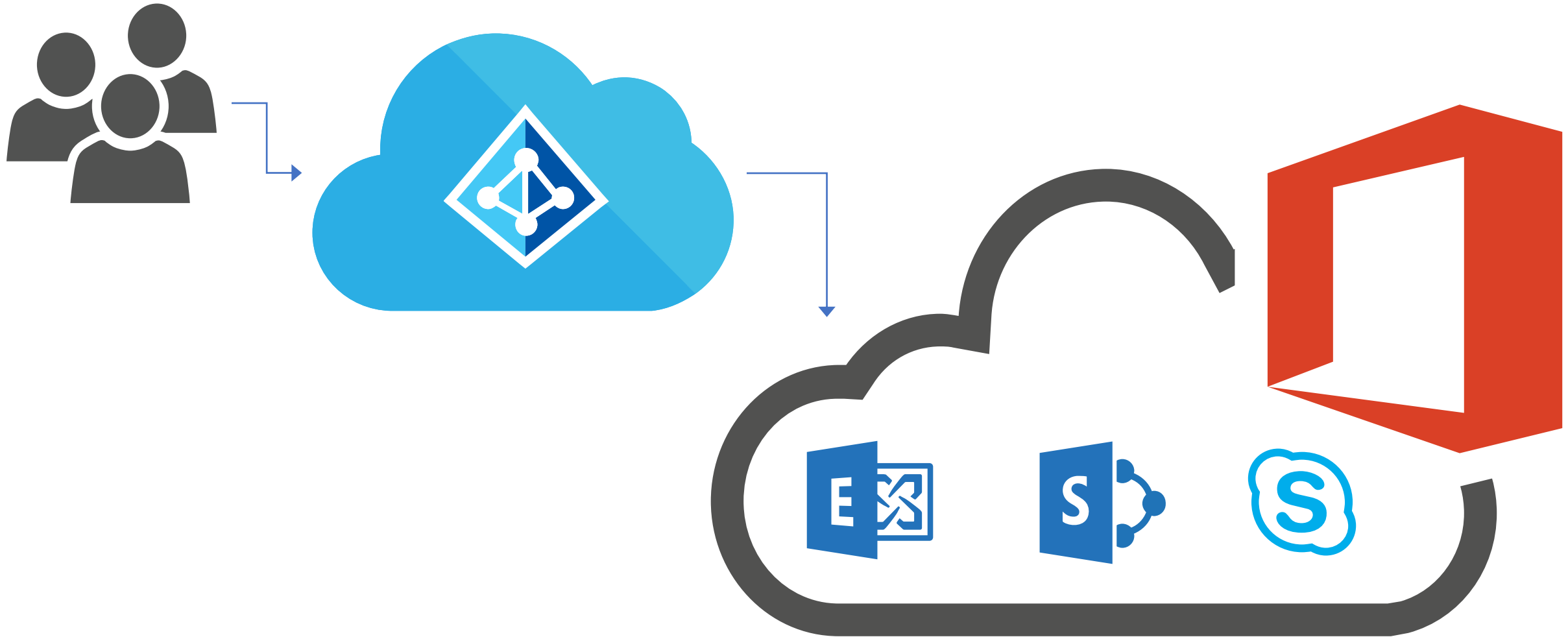
The Office 365 and Azure AD Story



The Office 365 and Azure AD Story



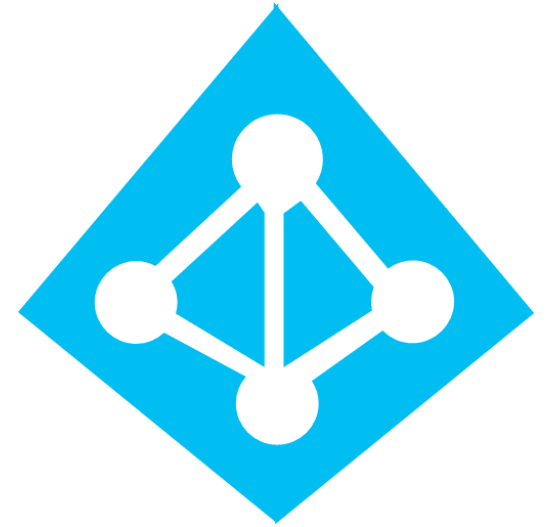
The Office 365 and Azure AD Story



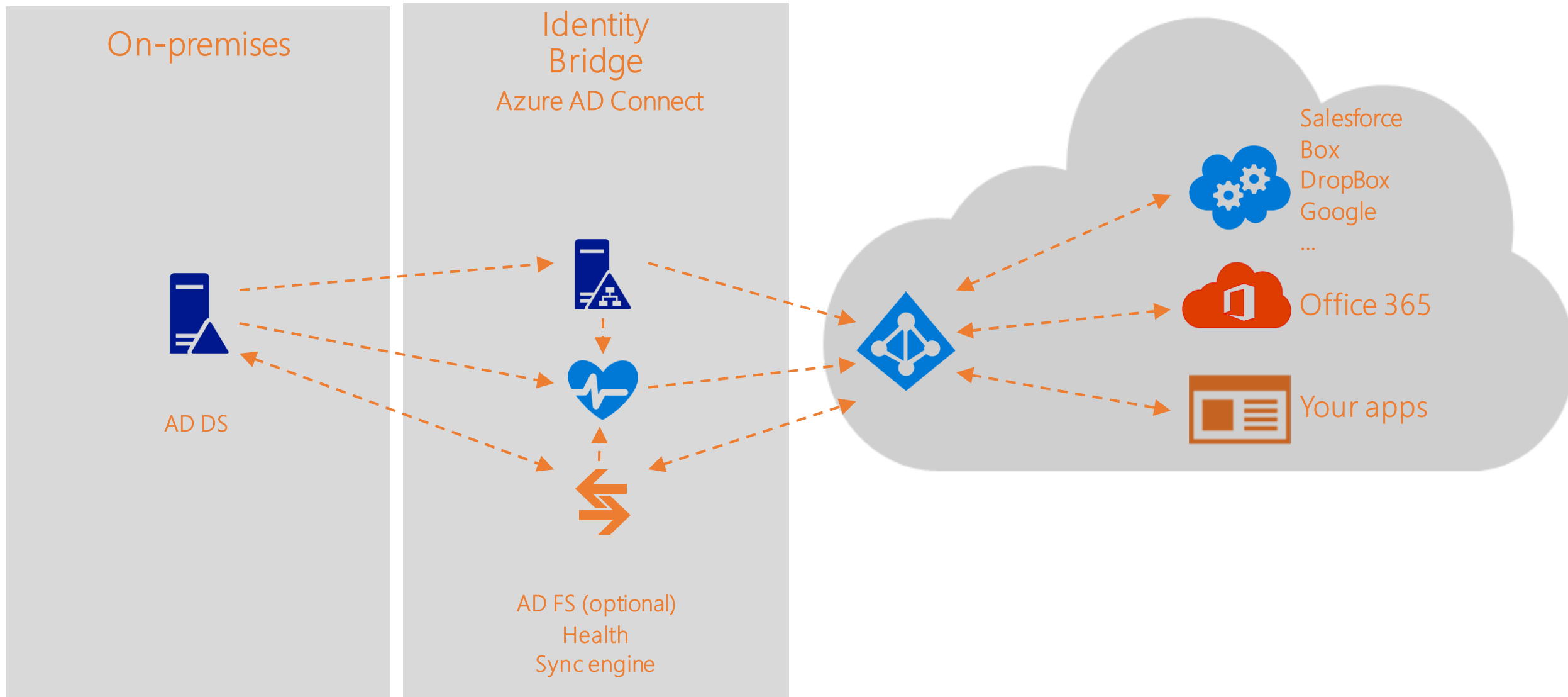
Synchronizing with Azure AD: Azure Active Directory Connect

Formerly known as "DirSync"

- Connects to Active Directory On Premise
- Synchronizes Users, Groups, and Contacts
- Allows for writes in both directions
- Uses SQL express to manage synchronization



Azure Active Directory Connect Functionality



How to get Azure AD

Feature/Plan	Basic (incl. with O365)	Premium P1	Premium P2
Directory Object Limit	Unlimited	Unlimited	Unlimited
Single Sign-On	10 per user	Unlimited	Unlimited
Reports	Basic	Advanced	Advanced
Self-Service	✗	✓	✓
Multi-Factor Auth.	✗	✓	✓
Cloud App Discovery	✗	✓	✓
Conditional Access*	✗	✓	✓
Identity Protection	✗	✗	✓
Privileged Identity Management	✗	✗	✓

There is a free tier as well not covered here

Accessing Azure AD Admin Controls



New Azure Portal

- portal.azure.com
- Azure Active Directory controls are in public preview
 - May not always work, and not everything is there

The Old Azure Portal displays a list of all items in the subscription, categorized by type. The table below shows the data presented in the screenshot:

NAME	TYPE	STATUS	SUBSCRIPTION	LOCATION
JABB-DC1	Cloud service	Stopped	Microsoft Partner Network	East US
expertit	Web app	Running	Microsoft Partner Network	East Asia
jabbysprodmvs	Storage Account	Online	Microsoft Partner Network	East US
paulschnack	Storage Account	Online	Microsoft Partner Network	Southeast Asia
portalvhds5jbgdv3hrzc	Storage Account	Online	Microsoft Partner Network	Australia Southeast
portalvhds7cm43qph7m1k	Storage Account	Online	Microsoft Partner Network	West US
portalvhdsxw04wbhgbf5	Storage Account	Online	Microsoft Partner Network	East Asia
JABB-ASR	Azure Site Recovery...	Active	Microsoft Partner Network	Australia East
jabbysprodbackup	Backup Vault	Active	Microsoft Partner Network	East US
Azure	Virtual Network	Created	Microsoft Partner Network	Southeast Asia
Group Group JABB8SysProd	Virtual Network	Created	Microsoft Partner Network	East US
Tenant1_Vnet	Virtual Network	Created	Microsoft Partner Network	East US
4Sysops	Directory	Active	Shared by all 4Sysops su...	Asia, Europe, United...
JABB Systems	Directory	Active	Shared by all JABB Syste...	United States
Default Directory	Directory	Active	Shared by all Default Dir...	Asia, Europe, United...
expertit8587-bts	Active Directory Acc...	Active	Microsoft Partner Network	East Asia
Sysops	Automation Account	Ready	Microsoft Partner Network	East US 2
az597066	CDN Endpoint	Enabled	Microsoft Partner Network	-
JABB-DC1	Virtual machine	Stopped (D...	Microsoft Partner Network	East US

Old Azure Portal

- manage.windowsazure.com
- Azure Active Directory controls are fully group functional
- Dated look to the portal, all other Azure items are in the new portal



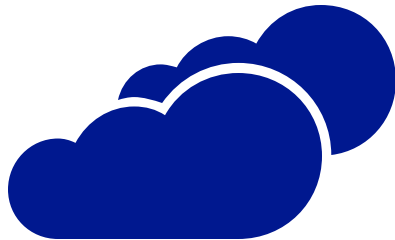
Azure AD Features

Azure Multi-Factor Authentication

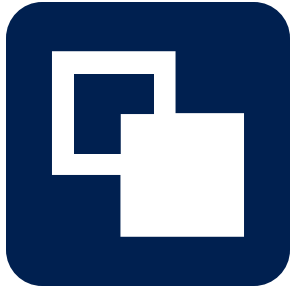
Prevents unauthorized access to Azure AD by providing an additional level of authentication

Prompts users for a second form of authentication (besides password) to verify identity

Free for users with admin privileges in Office 365 (use it!)



Azure Multifactor Authentication



Mobile
apps

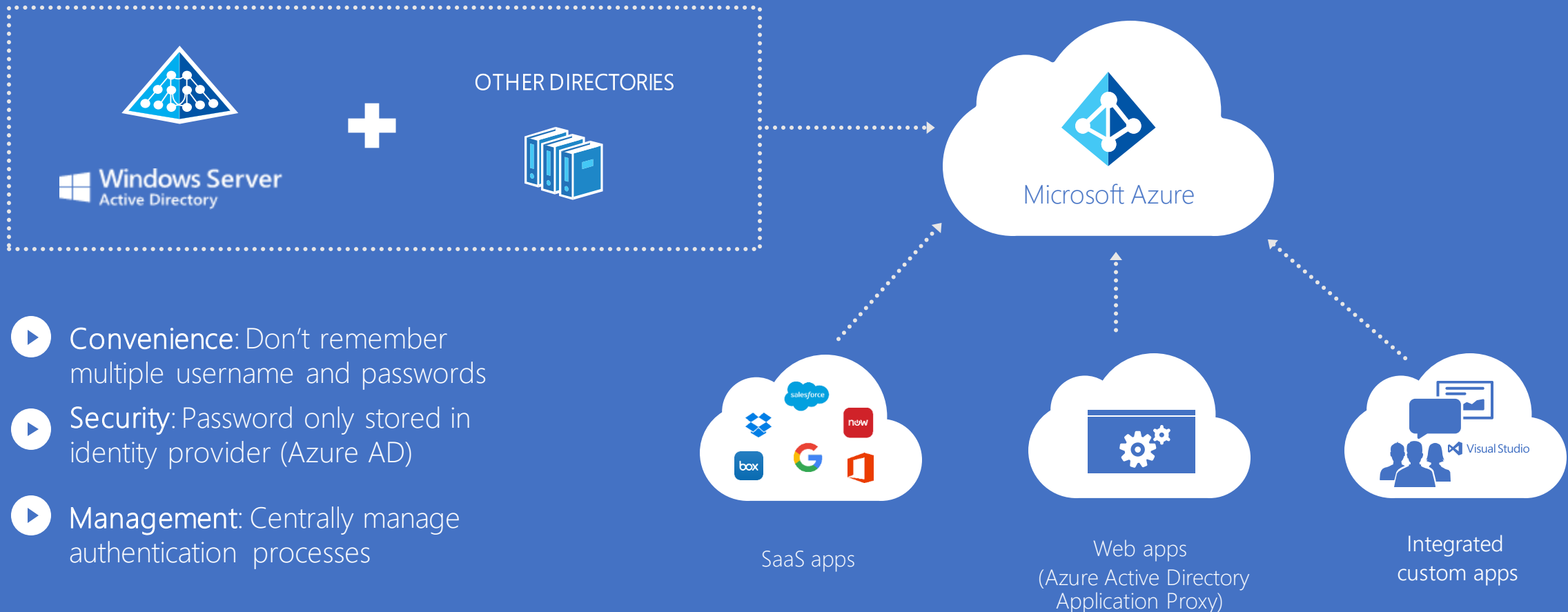


Phone
calls



Text
messages

Single sign-on to any app



Thousands of pre-integrated apps and growing!



Microsoft Bing Ads
By Microsoft Corporation



Microsoft Developer
Network (MSDN)
By Microsoft Corporation



Microsoft OneDrive
By Microsoft Corporation



Office 365 Exchange
Online
By Microsoft Corporation



Dynamics CRM
By Microsoft Corporation



Microsoft Account
(Windows Live)
By Microsoft Corporation



Skype
By Microsoft Corporation



Yammer
By Microsoft Corporation



ServiceNow
By ServiceNow



Box
By Box



Salesforce
Salesforce.com



Citrix GoToMeeting
By Citrix



NASDAQ Online
By The NASDAQ OMX Group,
Inc.



SAP BusinessObjects BI
OnDemand
By SAP



Concur
By Concur



Concur TripIt
By TripIt



DocuSign
By DocuSign Inc.



Red Hat OpenShift
By Red Hat, Inc.



Egnyte
By Egnyte, Inc.



Evernote
By Evernote Corporation



MarcomCentral
By PTI Marketing Technologies



McKesson InterQual
Online Learning
By McKesson



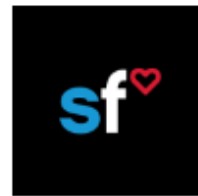
Oracle SRM
By Oracle Corporation



Oracle Taleo
By Oracle Corporation



ClearDB
By SuccessBricks, Inc.



SuccessFactors
By SuccessFactors, Inc. A SAP
Company



American Express
OPEN Small Business
By American Express
Company.



IBM Kenexa
By IBM Corp



IBM SmartCloud for
Social Business
By IBM Corp



Workday
By Workday



Blogger
By Google



Google
By Google



Google App Engine
By Google



DreamBox Learning
By DreamBox Learning, Inc.



Dropbox for Business
By Dropbox



Facebook
By Facebook



AT&T Business Direct
By AT&T



Twitter
By Twitter



Amazon Web Services
(AWS)
By Amazon

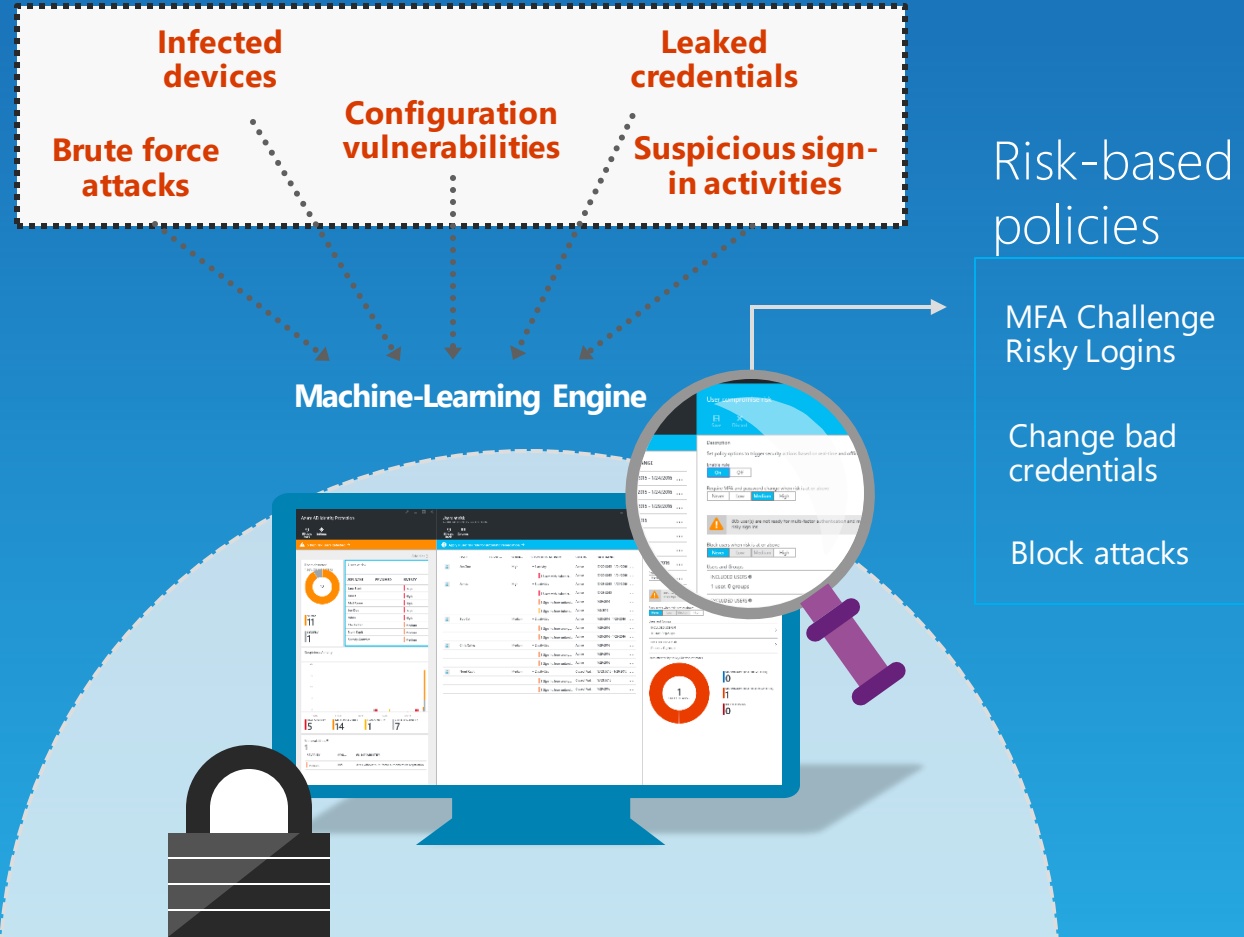


Netflix
By Netflix, Inc.

Azure Active Directory Identity Protection

Identity Protection at its best

- ▶ Gain insights from a consolidated view of machine learning based threat detection
- ▶ Remediation recommendations
- ▶ Risk severity calculation
- ▶ Risk-based conditional access automatically protects against suspicious logins and compromised credentials

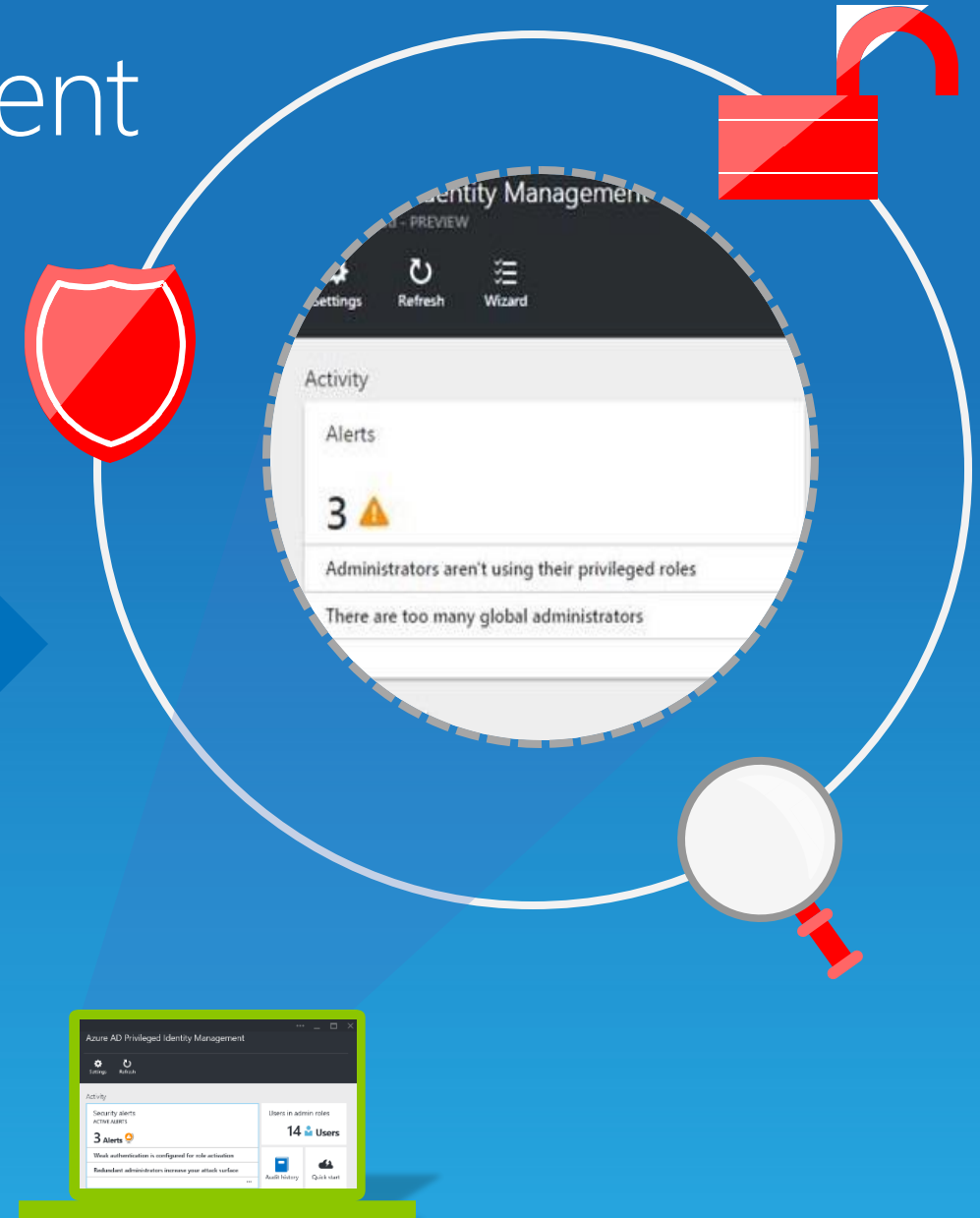
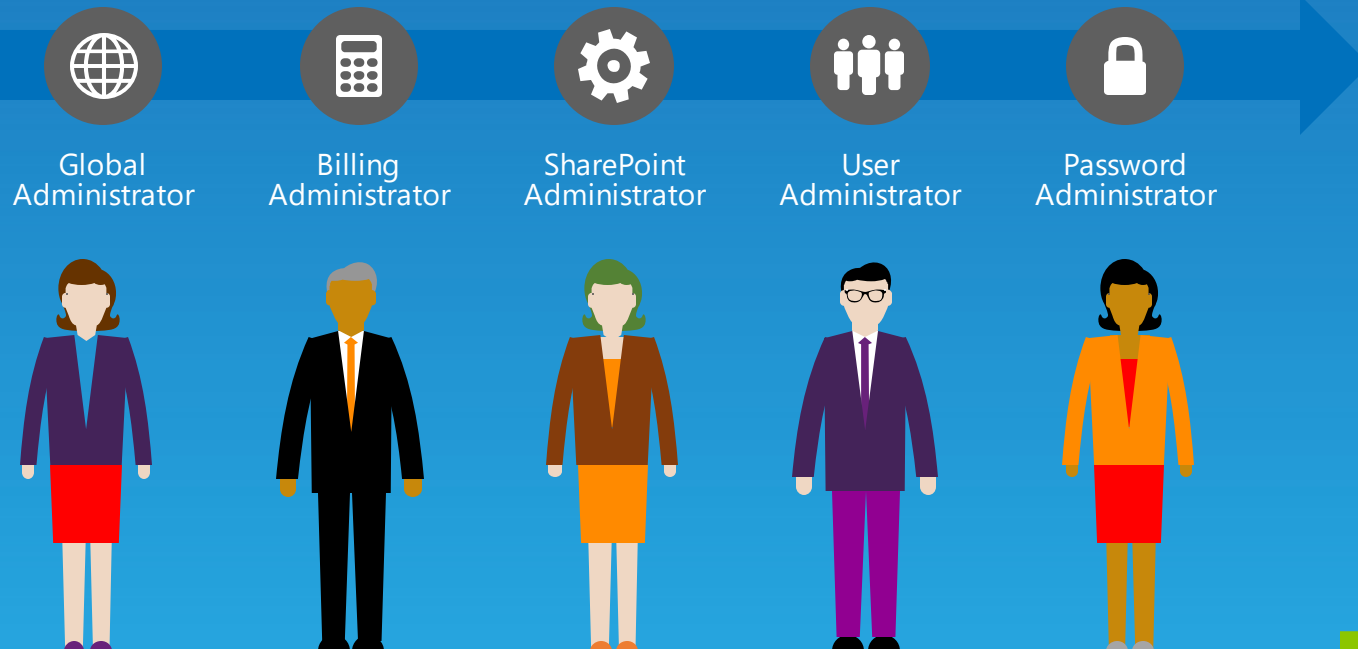


Privileged Identity Management

Discover, restrict, and monitor privileged identities

Enforce on-demand, just-in-time administrative access when needed

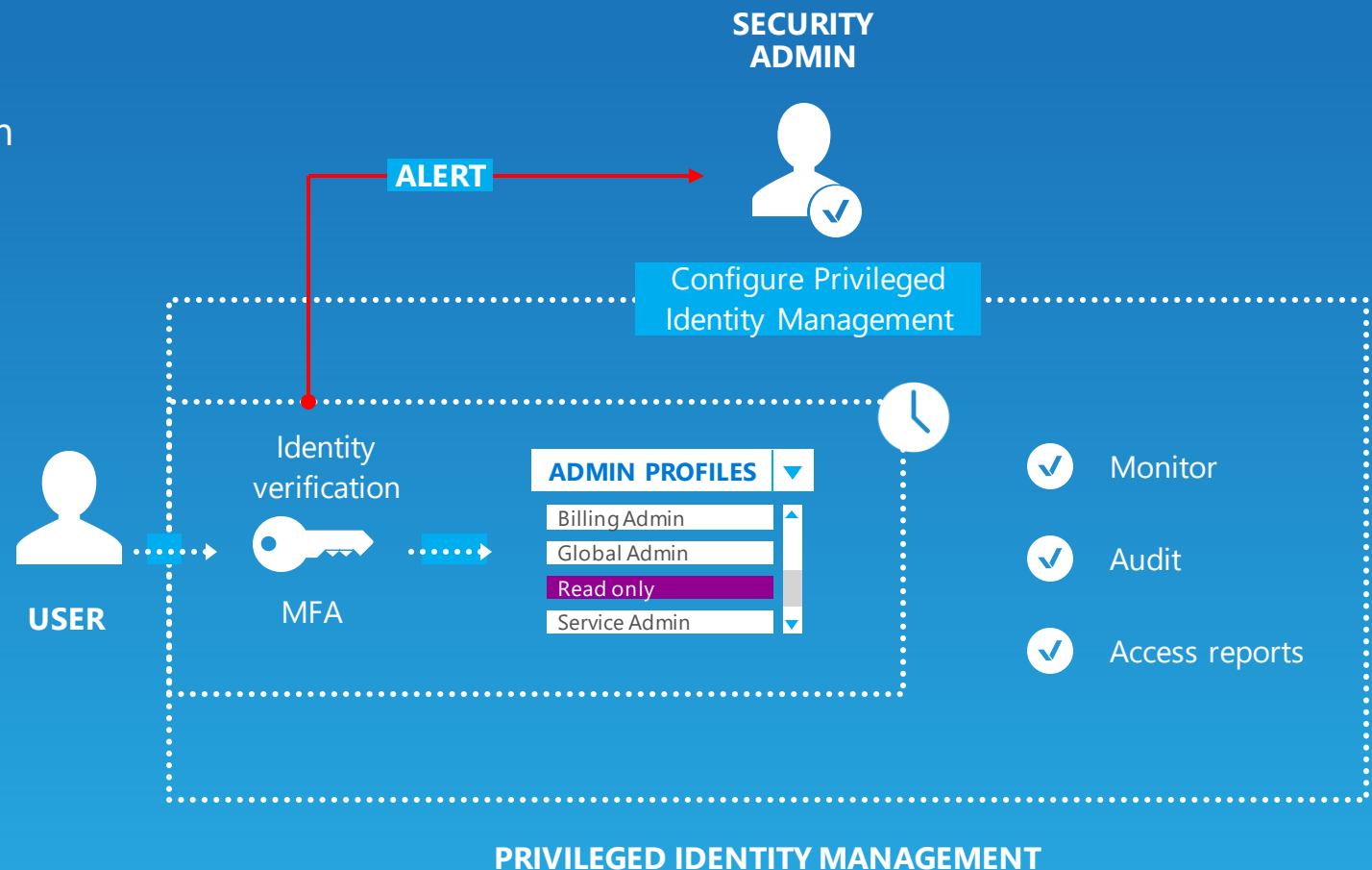
Provides more visibility through alerts, audit reports and access reviews



Privileged Identity Management

How time-limited activation of privileged roles works

- ▶ Users need to activate their privileges to perform a task
- ▶ MFA is enforced during the activation process
- ▶ Alerts inform administrators about out-of-band changes
- ▶ Users will retain their privileges for a pre-configured amount of time
- ▶ Security admins can discover all privileged identities, view audit reports and review everyone who is eligible to activate via access reviews



2 simple things you
can improve Azure
AD experience.



1

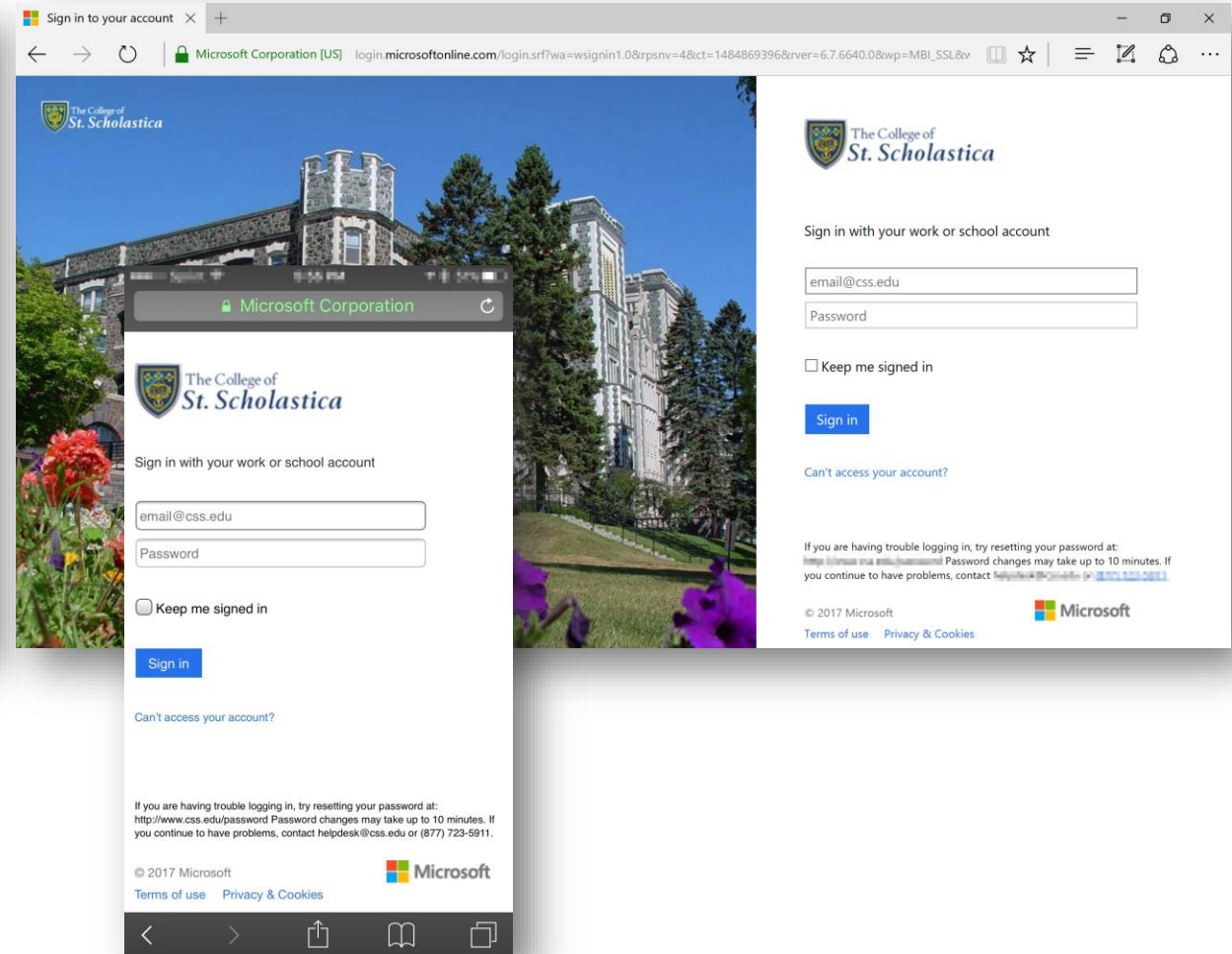
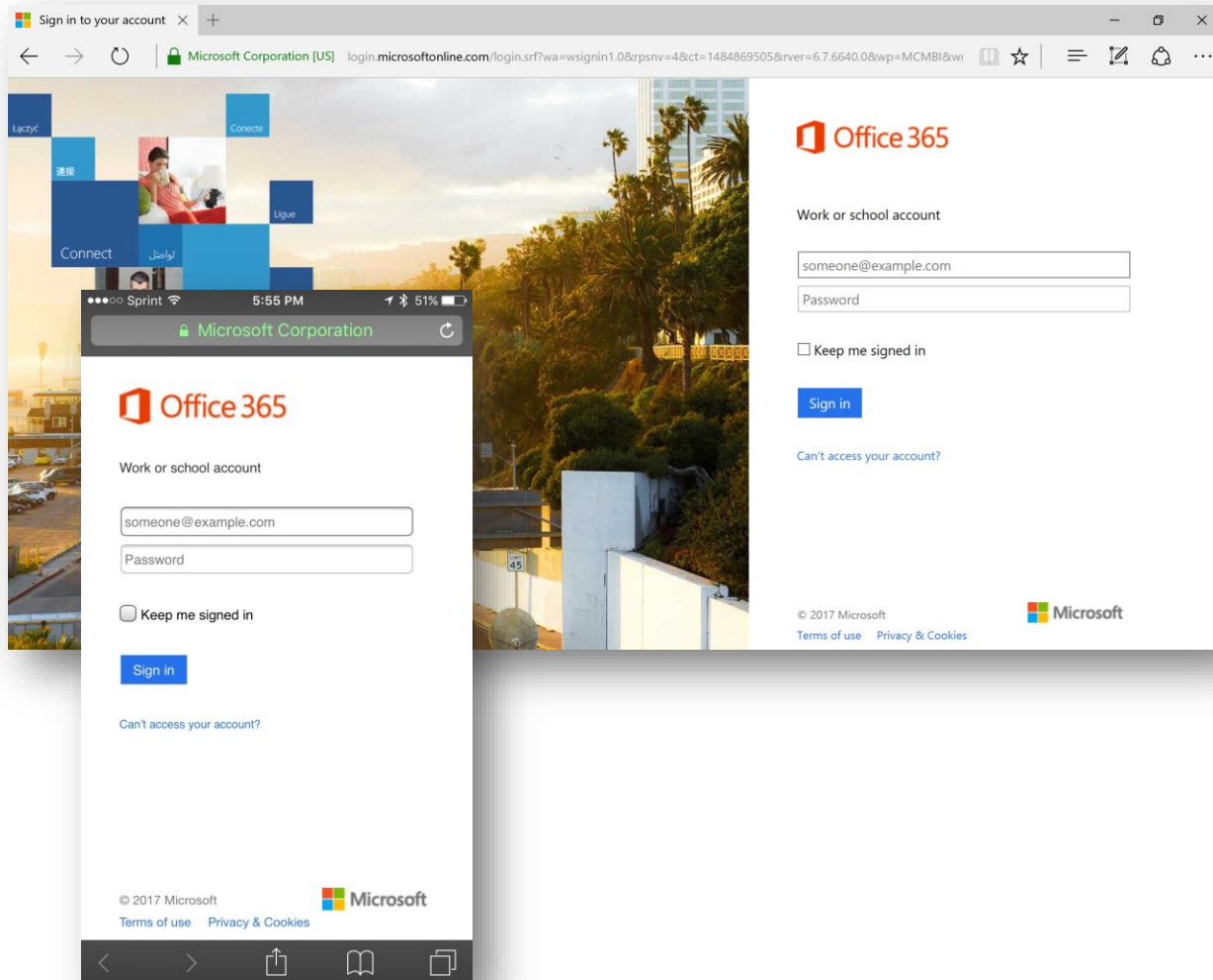
Organizational Sign-in Branding

- Affects any Azure AD or Office 365 Sign in:
 - portal.azure.com
 - Mobile Apps
 - Office365
 - Etc...
- Different from the branding within the Office 365 portal and SharePoint branding
- Great way to make AAD your own
- Help provide sign in instructions to users
- Reassure your users that they are signing into the right page
- Make your marketing department happy 😊

Organizational Sign-in Branding

Before

After



2

Setup Multi-Factor Authentication for Admins

- As mentioned, this is free for Office 365 Admins
- Admin accounts are a huge security vulnerability
 - If an admin account is breached, your entire organization can be considered breached
- Only downside:
 - SharePoint Online PowerShell does not support MFA
- Recommendation:
 - Enable MFA anyways, and temporarily disable when using SharePoint PowerShell

Hands On Lab

HOL 13 - Azure Active Directory

- Azure Active Directory

Teşekkürler.

