



Migrate Tier 1 On-Premises SaaS Application to Azure with Azure SQL Database

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From Legacy to the Cloud!

Why would someone give up on-premises SaaS infrastructure for Azure?

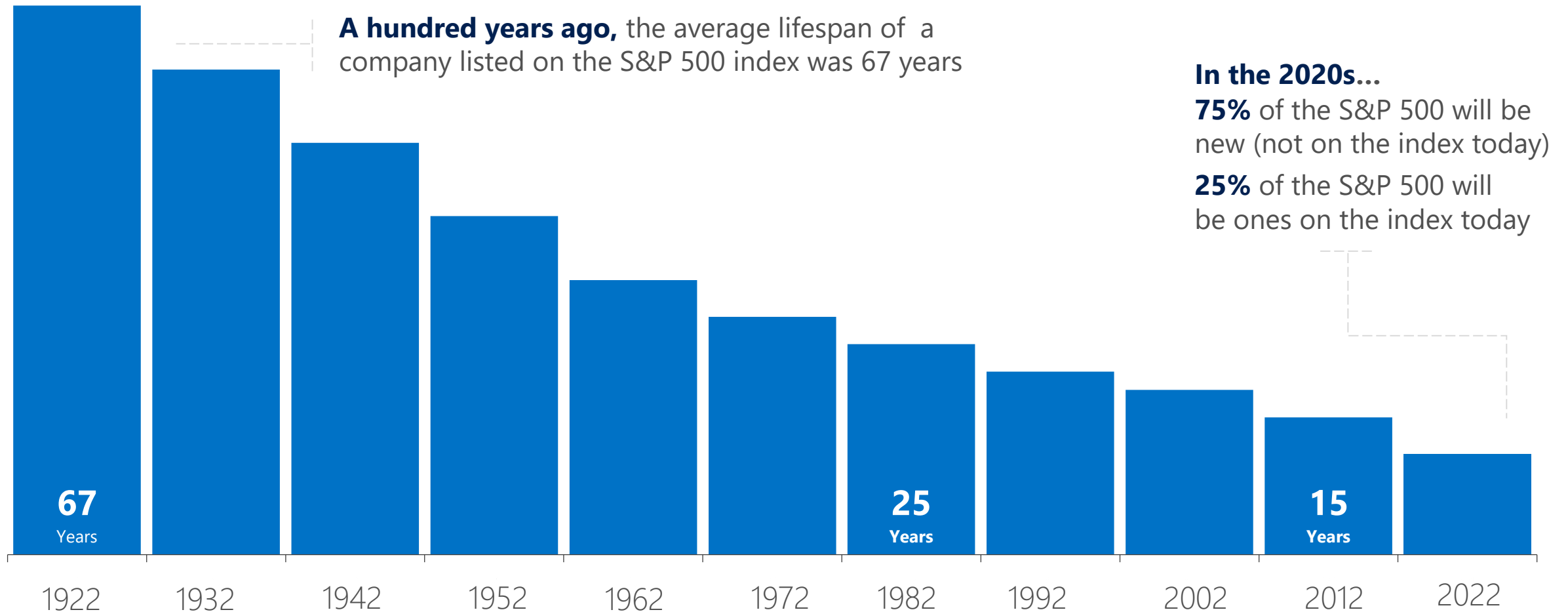
Technology decisions behind this conversion

Proposed Architecture

Changes to Azure during planning and rollout

Futures: Alternate architecture open discussion

The time to adapt to disruptions is shrinking



BBC, 2012, quoting Richard Foster, Yale University - <http://www.bbc.com/news/business-16611040>

How successful companies are staying ahead



Improving visibility and making accurate predictions with remote monitoring



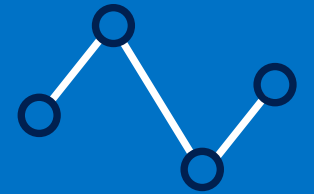
Getting the right products to the right places with inventory management



Offering customers exactly what they want, when they want it, with personalization



Fixing problems proactively before they start with predictive maintenance



Exploring new business opportunities with data-driven services

SUPPORT	+	\$
MOBILE BI	+	\$
ADVANCED ANALYTICS	+	\$
ETL	+	\$
DATACENTERS	+	\$

➤ Increasing performance demands

➤ Increasing CAPEX

➤ Increased tax on IT

➤ Prohibitively expensive upkeep

The customer stated (in 2013)

“We were told to buy No More SANs” – Money

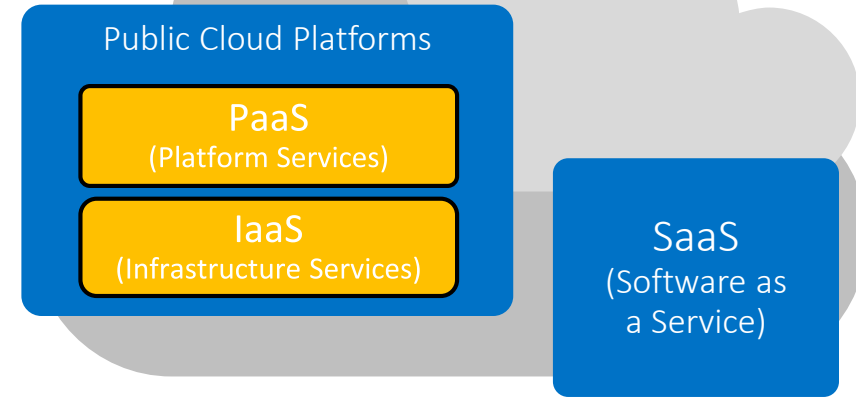
“We’re doing 80-hour work weeks just keeping the lights on” - Resources

“We cannot deploy this application to the rest of our customer base” – Revenue

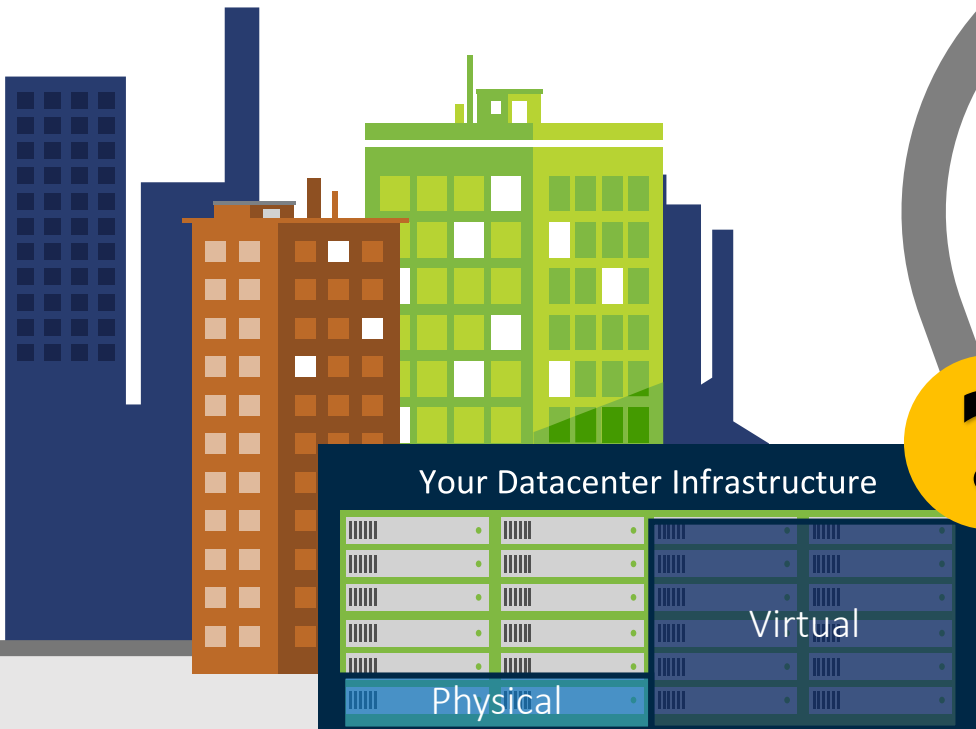
Wanted to get ahead of the competition

Cloud & IT Strategy

- Virtualization – there must be more..?
- It's cheaper – isn't it..?
- My DC is “constrained”..!
- My Business Groups are using it..!



- Can we STOP doing some things?
- Reduce load on IT staff



Your Data Center

Microsoft Azure



Application innovation

Accelerate innovation with the cloud



Data and intelligence

Power decisions & apps with insights



Openness and flexibility

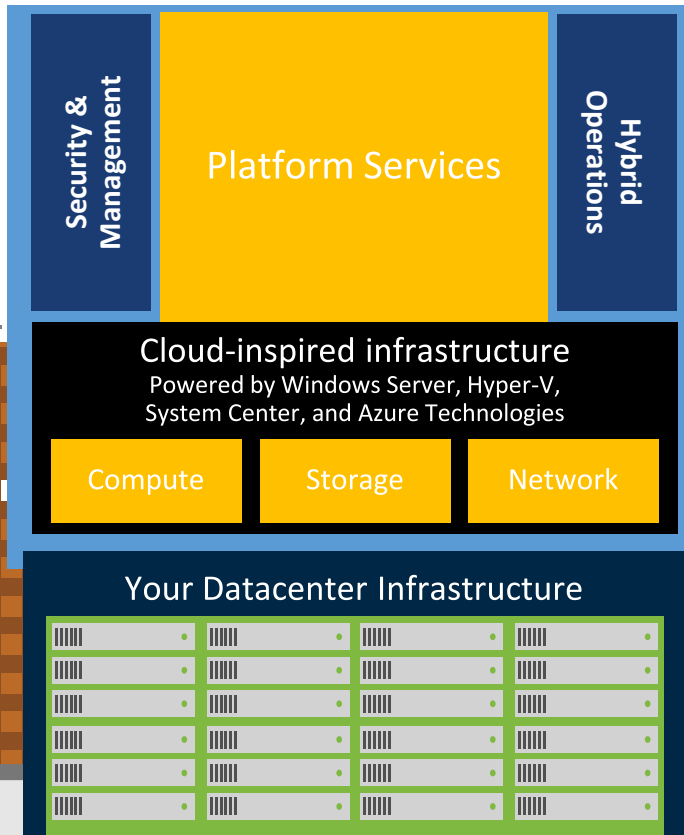
Build freely, deploy anywhere



Trust

Protect your business

The Azure Platform Strategy

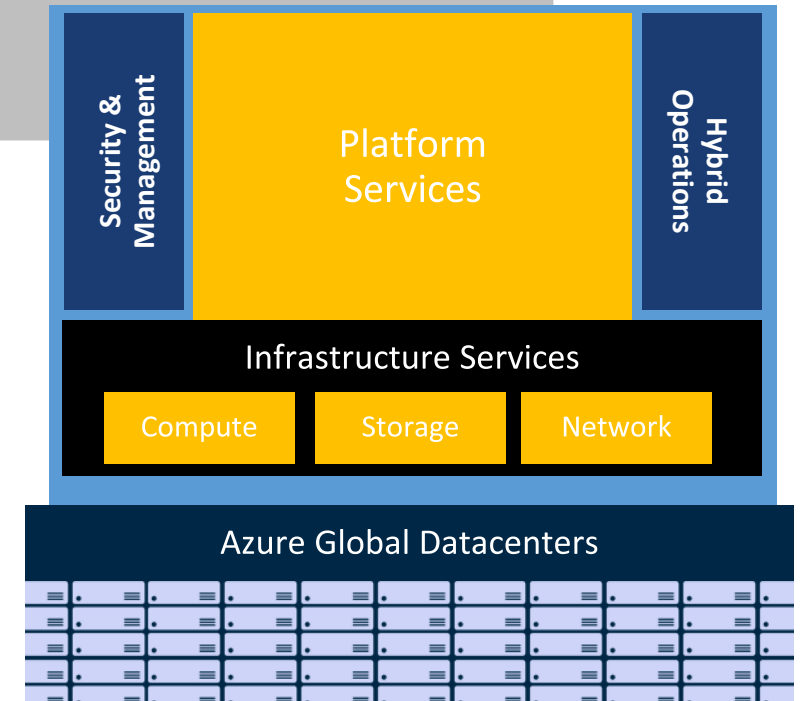


Microsoft Azure Stack
& Cloud Platform System

On-premises



Public
Cloud
Platform



Microsoft Azure

Public, Global, Shared Datacenters
54 regions!

54 Azure regions, more than any cloud provider



Microsoft Responded

Microsoft said:

Let's have a deep dive learning session

Let's allocate resources to review code in
Application

Let's have you spend money to lift and rework
and shift to Azure!

The agreed-upon actions became (2013):





- Code review and Proof of Concept of single strand – funded by Microsoft

- Compare finances of moving to Azure versus on-premises

- If the finances are comparable, it would be a win in terms of reduced maintenance, improved speed of deployment, etc.

- Customer would do majority of work

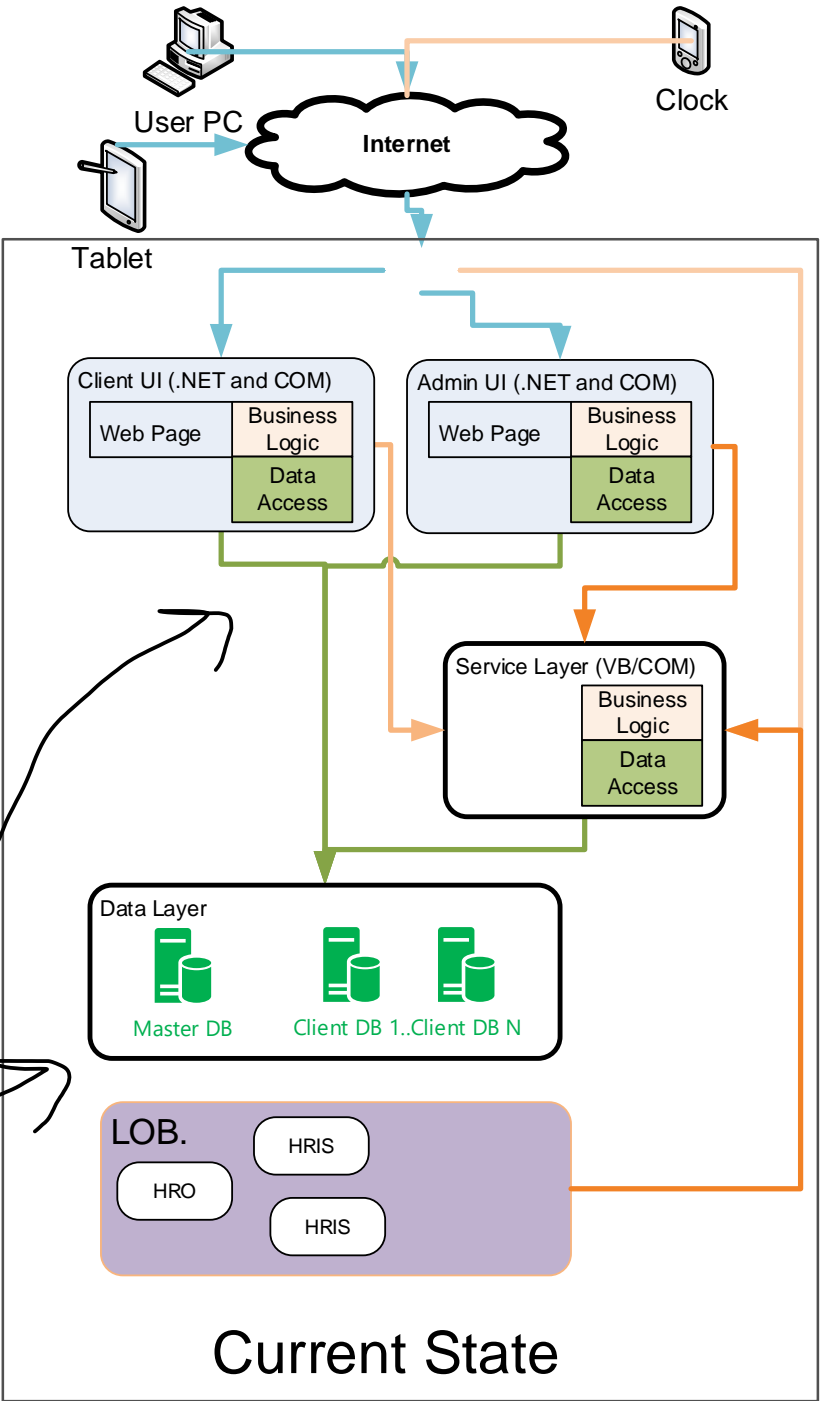
Summarizing cloud migration strategies

	Rehost	Refactor	Rearchitect	Rebuild
				
Description	Redeploy as-is to cloud	Minimally alter to take better advantage of cloud	Materially alter/decompose application to services	New code written with cloud native approach
Drivers	<ul style="list-style-type: none">• Reduce Capex• Free up datacenter space• Quick cloud ROI	<ul style="list-style-type: none">• Faster, shorter, updates• Code portability• Greater cloud efficiency (resources, speed, cost)	<ul style="list-style-type: none">• App scale and agility• Easier adoption of new cloud capabilities• Mix technology stacks	<ul style="list-style-type: none">• Accelerate innovation• Build apps faster• Reduce operational cost
Technologies	IaaS	Containers PaaS	PaaS Serverless Microservices	

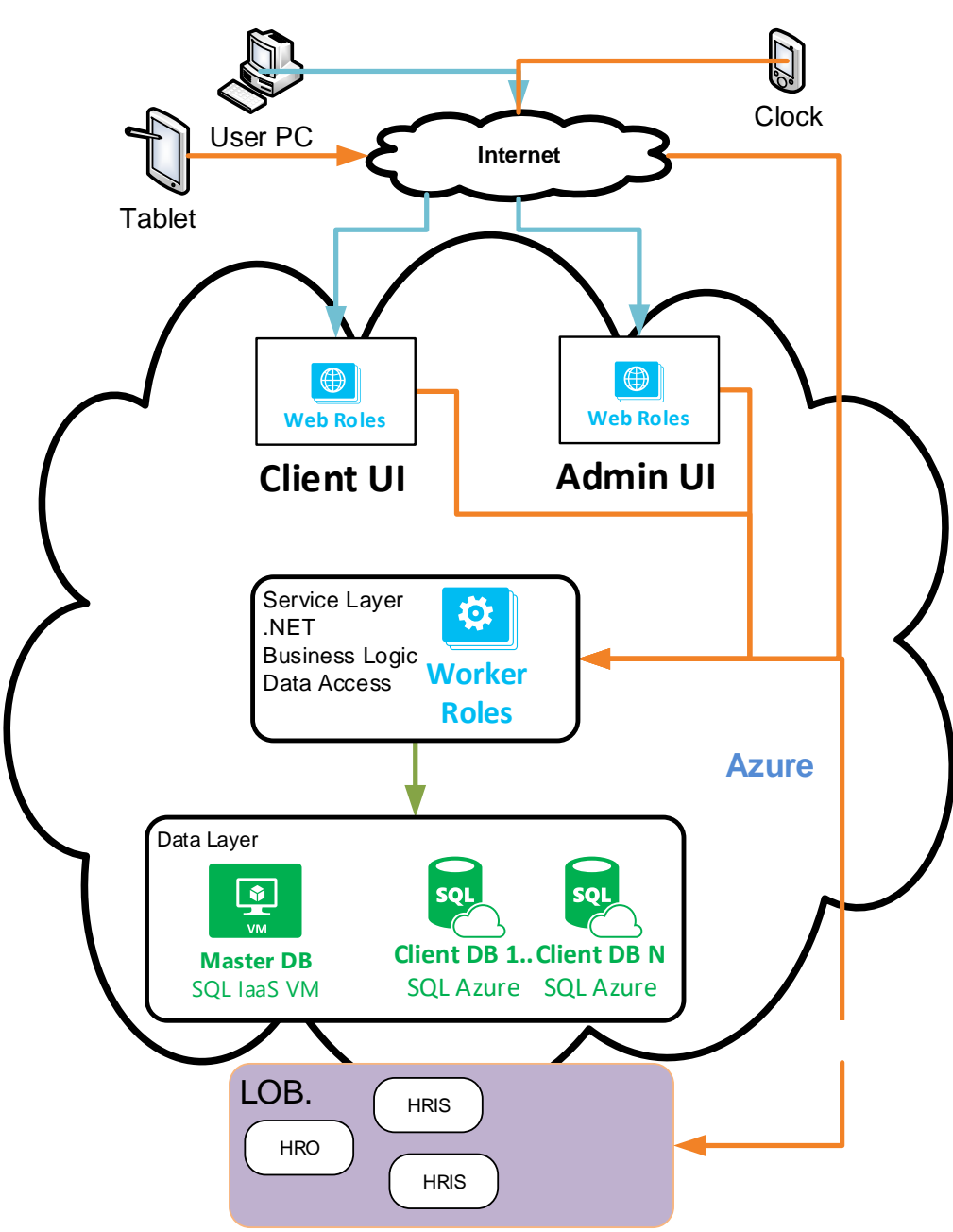
On-Premises To Azure

Application Architecture Changes

Racked and Stacked
On-Premises
SQL EE
SANs
Patching



Current State



Proposed Future Architecture¹⁷

What were the **recommendations** to migrate to Azure?

- Infrastructure as a Service limited
 - Less Maintenance!
- Platform as a Service maximized
 - Lower operational effort ongoing
- Faith in future features to be delivered
 - Remediation required
 - COM and Data Access
 - Rework priced at about 300,000 USD
 - Manual Auto-Scale initially for Web Tier

So what actually happened?

- Customer bought a newer version of their own SaaS product
 - Easier to migrate to Azure
- Called Microsoft back after they decided to do this
- Lots of manual labor on their part, and a slow migration
- Tightly coupled feedback to product group on timeline of features needed before rollout
 - Point in Time Backup and Restore
 - Elastic Pools
 - SQL Database V12 (99% compatibility with on-premises SQL database code)
 - Larger database sizes and throughputs
 - Estimating real throughput from on-premises to cloud

What happened, part 2

- Money Equation
 - Hardware plus license plus employee effort versus Azure
 - Creative licensing to help get to Elastic Pool
- Rework of interconnected systems
- Testing for each step before deployment
- New Deployment model
- Currently thousands of databases deployed in Azure!
- Moving goalposts: Azure Resource Manager versus Classic resource model. (easier management, different code to do so)

What is Azure Resource Manager, why to use it?

Resource Manager provides several benefits:

- You can deploy, manage, and monitor all of the resources for your solution as a group, rather than handling these resources individually.
- You can repeatedly deploy your solution throughout the development lifecycle and have confidence your resources are deployed in a consistent state.
- You can use declarative templates to define your deployment.
- You can define the dependencies between resources so they are deployed in the correct order.
- You can apply access control to all services in your resource group because Role-Based Access Control (RBAC) is natively integrated into the management platform.
- You can apply tags to resources to logically organize all of the resources in your subscription.
- You can clarify billing for your organization by viewing the rolled-up costs for the entire group or for a group of resources sharing the same tag.

In 2019, what would I do?

Can I do SaaS? Can I do PaaS? Can I do IaaS?

SCRIPT IT!

Lift and shift? -> Azure SQL Database Managed Instance or VMs

Refactor -> Azure SQL DB plus Web Apps

[Use Azure SQL DB DTU Calculator!](#)

Advanced Refactor -> CosmosDB! (Planet-scale multi-write auto-indexing)

Data Warehouse -> Azure SQL DB or Azure SQL DW

[Use Azure SQL DW DWU Calculator!](#)

Reporting -> Power BI

Embedded lets end-users see reports in iFrame without license

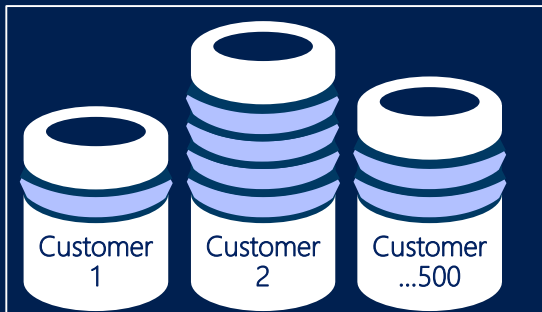
Cubes -> Azure Analysis Services

Azure SQL Database

Intelligent database service with infinite scale

Delivers 406% ROI and 71% fewer cases of downtime*

Manage thousands of DBs as one



47% staff hours reclaimed for other tasks

"Moving to Elastic Pools will save us a ½ million dollars this year alone."

Faster time to market



75% faster app deployment cycles

"We can get things out faster with Azure SQL Database"

Lower TCO



53% less expensive than on-prem/hosted

"To be able to do what we're doing in Azure, we'd need an investment of millions."

Greater security



Built-in security with AI-based Threat Detection

"We encrypt when data comes in and decrypt at the point of consumption."

SQL Database Service Tiers

	Basic	Standard	Premium
Intended Use	Light transactional workloads	Go-to option for most business applications	High throughput and business-critical databases
Workload Elasticity	Isolated databases and elastic database pools		
Performance	•	• •	• • •
Business Continuity	•	• •	• • •
Programming Surface	Fully compatible with SQL Server 2008-2017 databases		
Availability	99.99%*		

Azure SQL Database



Available premium performance

- In-memory Columnstore for Analytics
- Memory-optimized tables for OLTP
- SSD based IO

Support for large databases

- Table partitioning + parallel queries
- Online + large index rebuild
- No transaction size limit

Expanded programming surface area

- CLR, full-text search, change tracking, heaps, analytics...

Deeper database insights

- Full set of dynamic management views (DMV)
- Full audit capabilities

Predictable performance

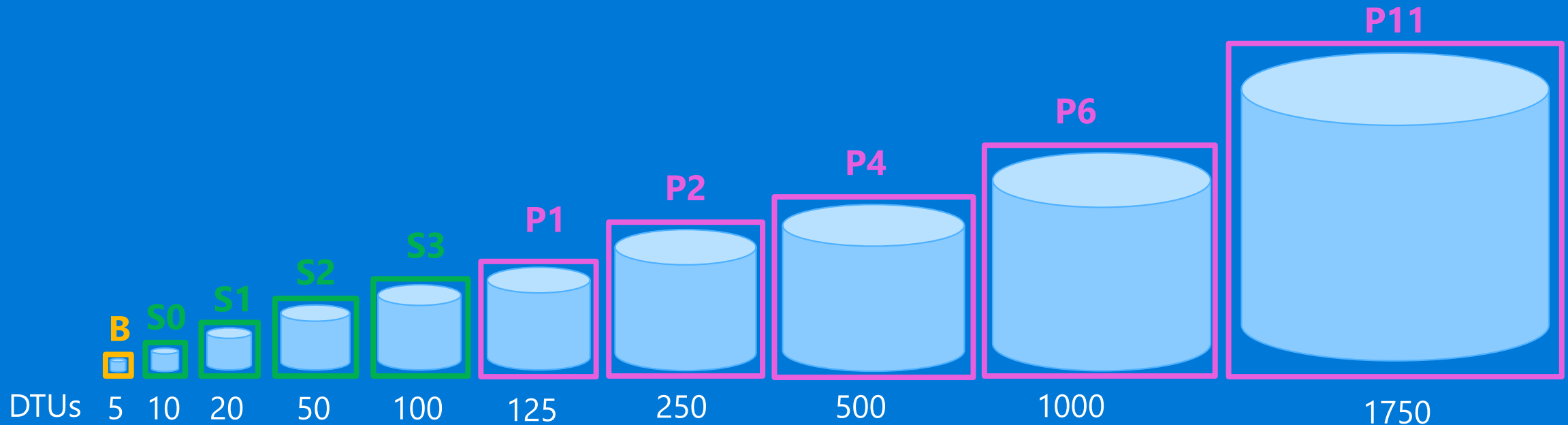
Isolated databases are allocated isolated resources

Basic, Standard, and Premium tiers provide increasing performance levels

Scale up/down in response to actual or predicted change in workload

Databases remain online while scaling

Hourly billing at highest rate that hour



Elastic database pools

Share resources dynamically among databases on the same server

Customer-managed over-provisioning makes pools cost-effective for unpredictable, sporadic workloads

Well-matched to many database-per-tenant SaaS workloads

Basic, Standard, and Premium tiers

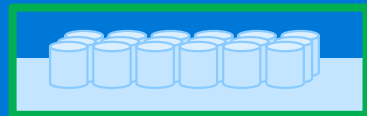
Databases can burst to the same level as isolated DBs in the same tier

Pool size is scaled to support aggregate workload

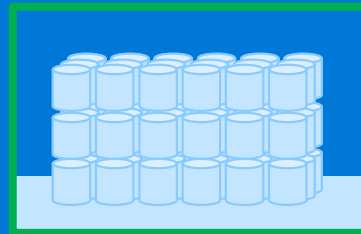
Hourly billing for the pool based on pool size and DB count

Max per-database burst level

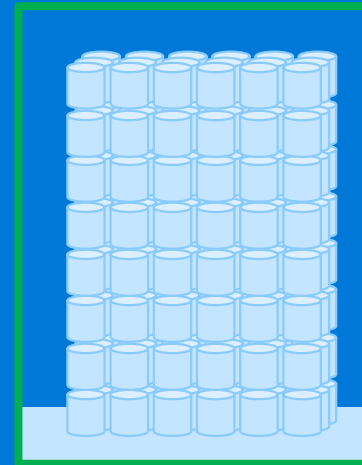
eDTUs



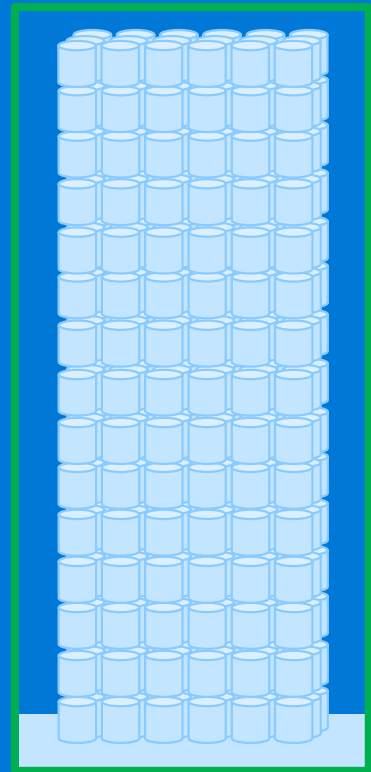
200



400



800



1200

Learn More

What happened lately?

<https://azure.microsoft.com/en-us/updates/?service=sql-database>

Azure SQL Database

Getting Started

Azure SQL Database documentation

GitHub Code Samples

Elastic Database Pools

The power of SQL Server: Everything built-in

Industry leader in
Mission Critical OLTP

Most secure
database

Highest performing
data warehouse

End-to-end mobile
BI on any device

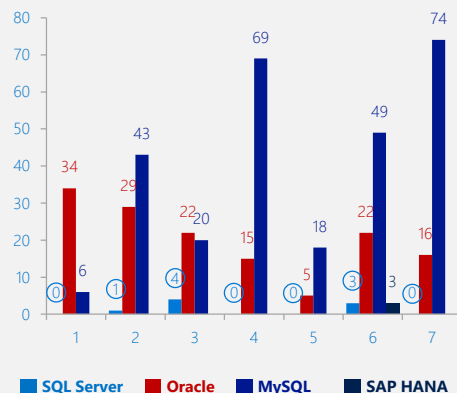
In-database
Advanced Analytics

Best price/performance

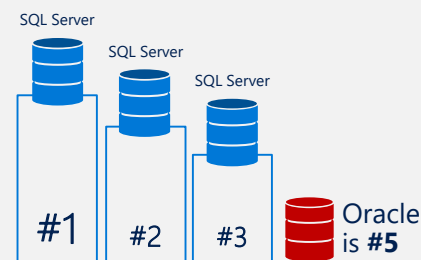


TPC-E

7 years in a row
least vulnerable

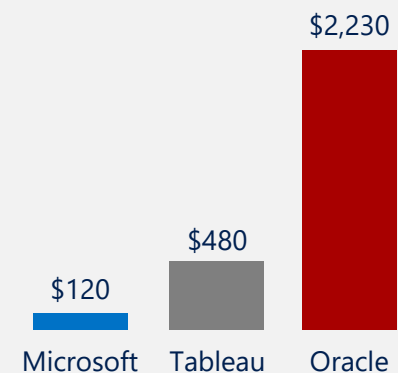


#1 performance



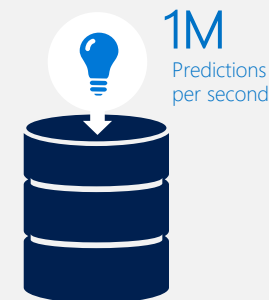
TPC-H

A fraction of the cost



Self-service BI per user

R + in-memory



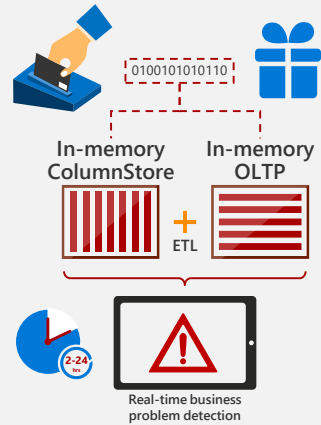
at massive scale



Most consistent experience from on-premises to cloud

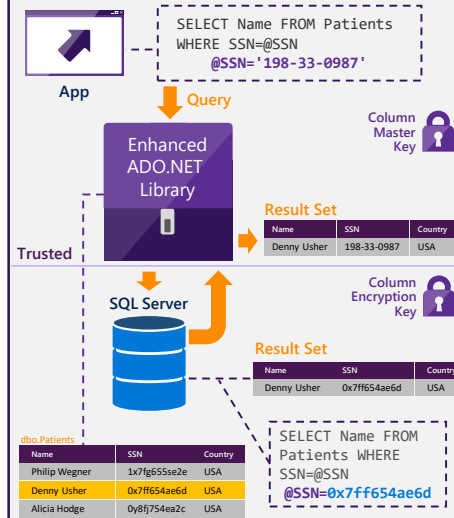


Real-time operational analytics



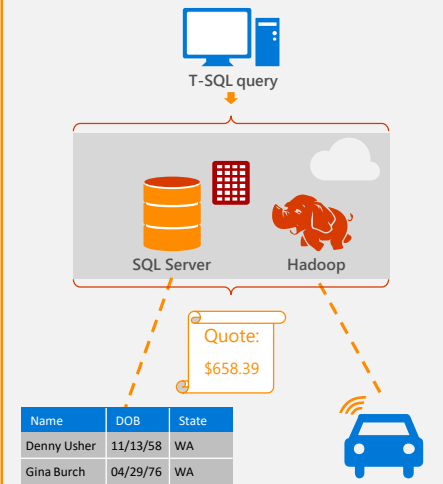
- Up to **30x** faster transactions with in-memory OLTP
- Queries from **minutes to seconds**

Always Encrypted



- Protect data **at rest and in motion**
- **Without impacting**

PolyBase



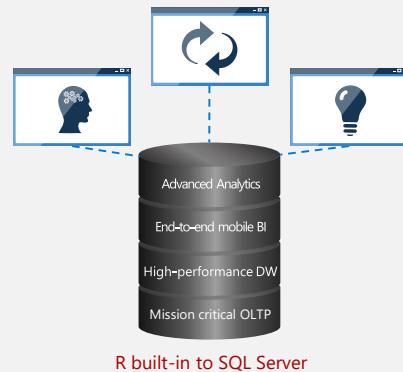
- Manage structured & unstructured data
- **Simple T-SQL** to query Hadoop (HDFS)
- **JSON support**

End-to-end mobile BI



- **In-memory** built-in
- **Real-time** with direct query capabilities
- **Powerful modeling** with 250+ built-in analytical functions
- **Mobile reports** with online & offline access
- **Modern data visualizations** with Reporting Services or Power BI

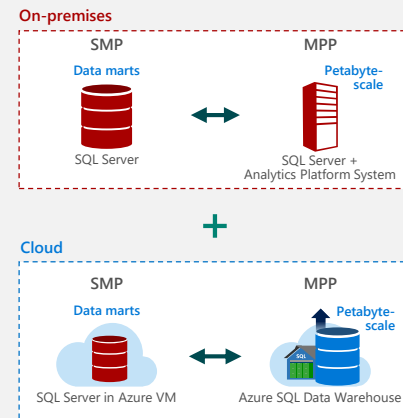
In-database Advanced Analytics



- **R built-in** to your T-SQL
- **Real-time operational analytics** without moving the data
- **Open source R** with in-memory & massive scale – multi-threading and massive parallel processing

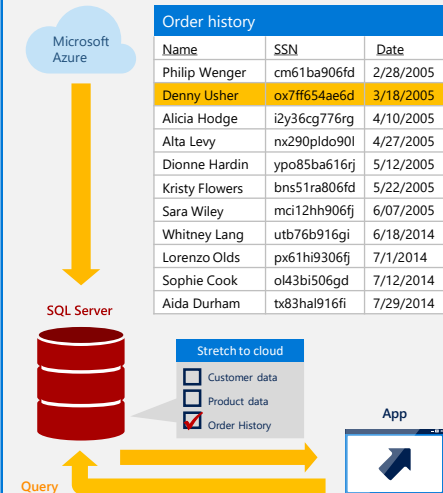
<http://www.bbc.com/news/business-16611040>

data warehouse



- **Scale to MPP** on-premises & in the cloud
- **Simple T-SQL** to manage structured and unstructured data
- **½ the cost** of Oracle Exadata

Stretch Database



- **Data is encrypted & queryable**
- **Save money** & improve customer experience
- **No application changes**

Learn more!

www.microsoft.com/SQLServer2016

Top 10 reasons to choose SQL Server 2019

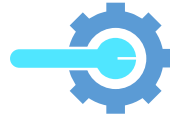
Bring the industry-leading performance and security of SQL Server to your choice of language, platform, and data—structured and unstructured

1. Harness the power of big data



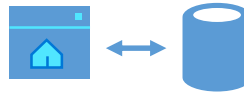
Big data clusters with scalable compute and storage composed of SQL Server, Spark, and HDFS. Cache data in scale-out data marts.

2. Bring AI to your workloads



A complete AI platform to train and operationalize models in SQL Server ML Services or Spark ML using Azure Data Studio notebooks.

3. Eliminate the need for data movement



Data virtualization allows queries across relational and non-relational data without movement or replication.

4. Explore and interact with visual data



Visual data exploration and interactive analysis using SQL Server BI tools and Power BI Report Server.

5. Run real-time analytics on operational data



In-memory technologies for analytics on operational data using HTAP. Higher concurrency and scale through persistent memory.

6. Automatically tune SQL Server



Intelligent Query Processing improves scaling of queries and Automatic Plan Correction resolves performance problems.

7. Reduce database maintenance and increase business uptime



Greater uptime with more online indexing operations. Now run Always On availability groups on containers using Kubernetes.

8. Boost security and protect data in use



SQL Server enables layers of security including protection of computations in Always Encrypted secure enclaves.

9. Track compliance with sophisticated resources



Data Discovery & Classification labeling for GDPR and Vulnerability Assessment tool to track compliance.

10. Optimize with choice and flexibility








Support for your choice of Windows, Linux, and containers. Run Java code on SQL Server and store and analyze graph data.



Apply to join the SQL Server Early Adoption Program

<https://aka.ms/eapsignup>

Microsoft Azure Data Services

SQL Server in a VM	SQL Database	CosmosDB	Tables	Blobs
				
fully featured RDBMS				
transactional processing				
rich query				
	managed as a service			
	elastic scale			
	schema-free data model			
	Internet accessible http/rest			
			arbitrary data formats	



Thank you!

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Resources:

Microsoft Documentation (Pretty good nowadays!) <https://docs.microsoft.com/en-us/>

Learning via docs: <https://docs.microsoft.com/en-us/learn/>

Hands-on labs: <https://www.microsoft.com/handsonlabs>

In-Person events: <https://events.microsoft.com/>

SQL Saturday (Centered around Microsoft data platform): <http://www.sqlsaturday.com>

Microsoft virtual academy: <https://mva.microsoft.com/>

EdX has tons of material: https://www.edx.org/course?search_query=microsoft



Microsoft



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