PASS

Modernizing on SQL Server 2019

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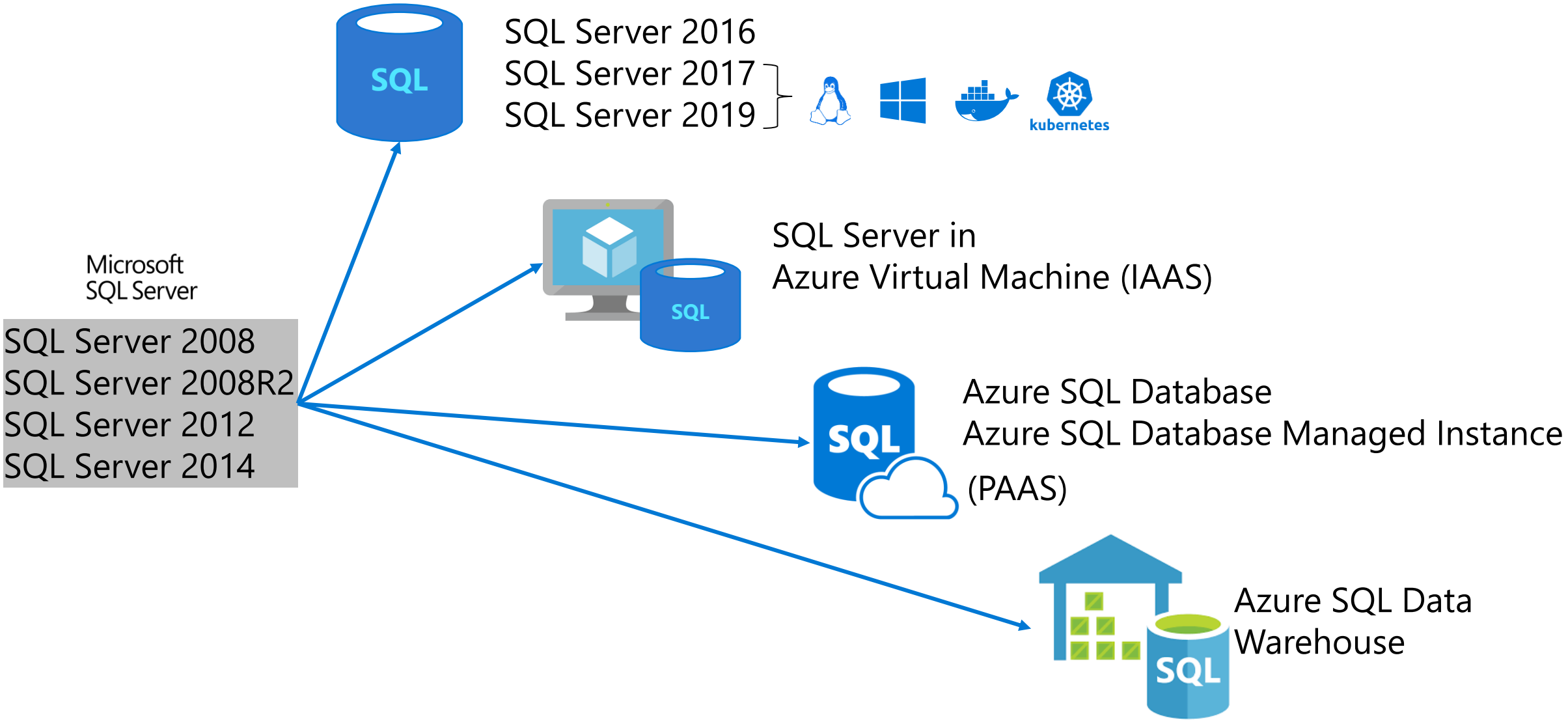
Modernizing the WideWorldImporters Company

- Mixture of SQL Server 2008, 2014, and 2016 servers
- Expensive ETL applications for data sources outside of SQL Server
- Should we use “Big Data” technologies?
- Query performance tuning expensive
- Some database applications suffer from I/O performance
- Need data secure end-to-end with classification and auditing
- Applications need better availability and less downtime
- Our company uses a mixture of different operating system platforms
- Popularity of containerized applications growing
- What, when, and how should I migrate to the cloud?
- Desire to build more intelligent applications with AI and Machine Learning

Azure Data Modernization Choices



Built on SQL Server 2016 and 2017

Performance

- Query Store
- Adaptive Query Processing
- Automatic Tuning
- Columnstore and In-Memory OLTP
- "It Just Runs Faster"

Security

- Always Encrypted
- Row Level Security
- Dynamic Data Masking

Availability

- *Clusterless* Availability Groups
- Distributed Transactions for Availability Groups
- Resumable Index Maintenance

Developer

- JSON
- Temporal Tables
- Graph Database

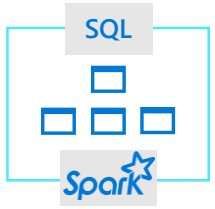
Modern Platform

- Linux and Containers
- Machine Learning Services with R and Python

Modernize with SQL Server 2019

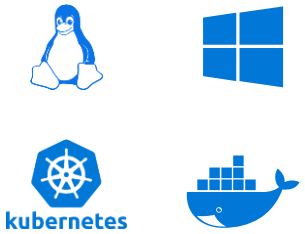
Now with big data clusters

Intelligence over any data



Analytics over structured and unstructured data with the power of SQL and Apache Spark

Choice of platform and language



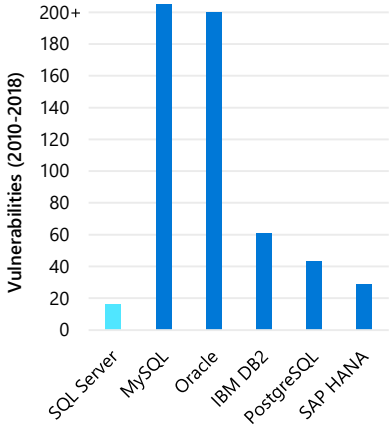
T-SQL	SCALA	Python
Java	Node.js	Ruby
C/C++	C#/VB.NET	.NET core

Industry-leading performance

#1 OLTP performance[1]

#1 DW performance on 1TB[2], 10TB[3], and 30TB[4]

Most secure over the last 8 years[5]



Insights in minutes and rich reports

The best of Power BI and SQL Server Reporting Services in Power BI Report Server

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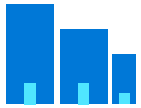


Private cloud

In-memory across all workloads

Most consistent data platform

1/10th the cost of Oracle

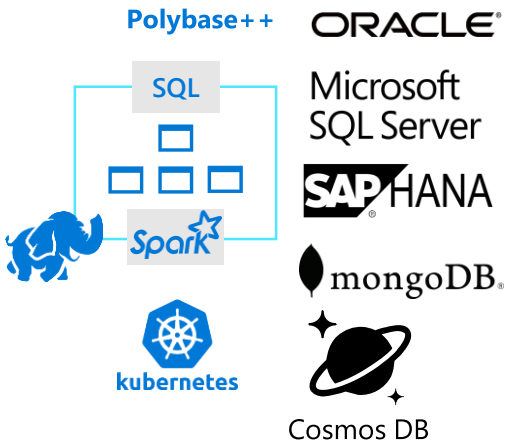
Public cloud

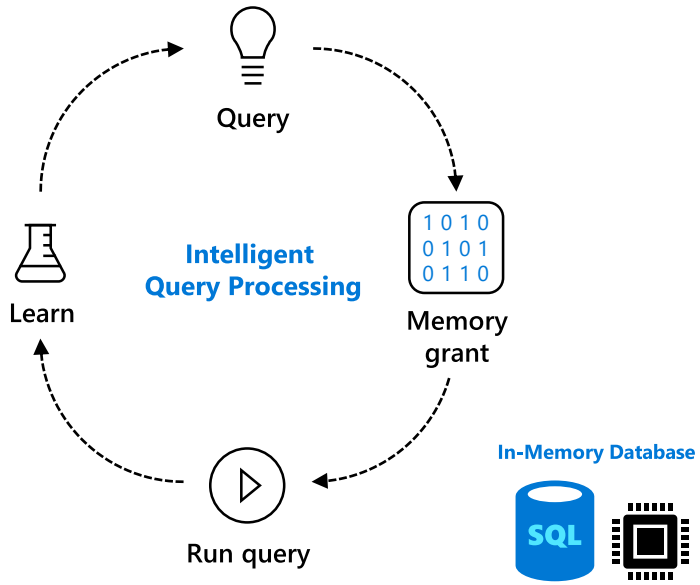
All TPC Claims as of 1/19/2018.

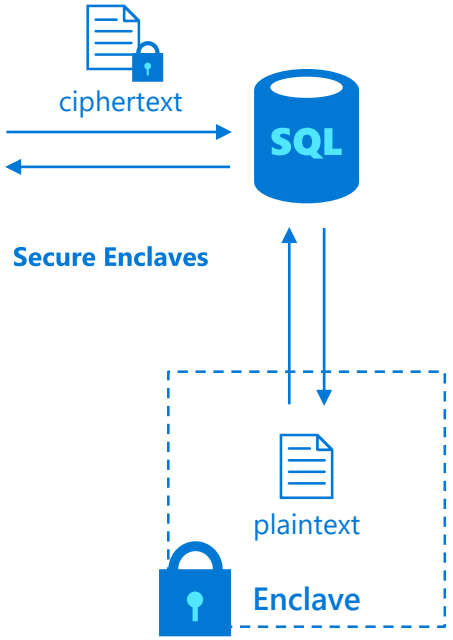
[1] http://www.tpc.org/4081; [2] http://www.tpc.org/3331; [3] http://www.tpc.org/3326; [4] http://www.tpc.org/3321; [5] National Institute of Standards and Technology Comprehensive Vulnerability Database

SQL Server 2019

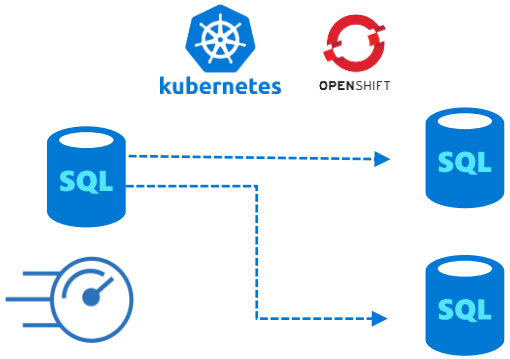
Key New Functionality



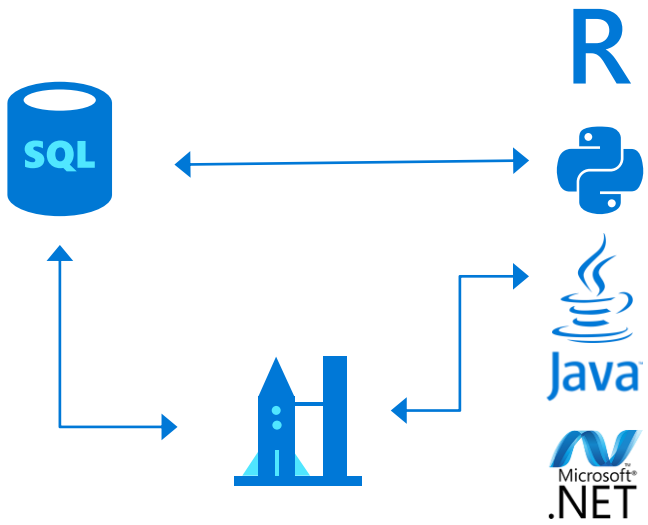




High Availability



Built-in Machine Learning and Extensibility



Modern Platforms with Compatibility

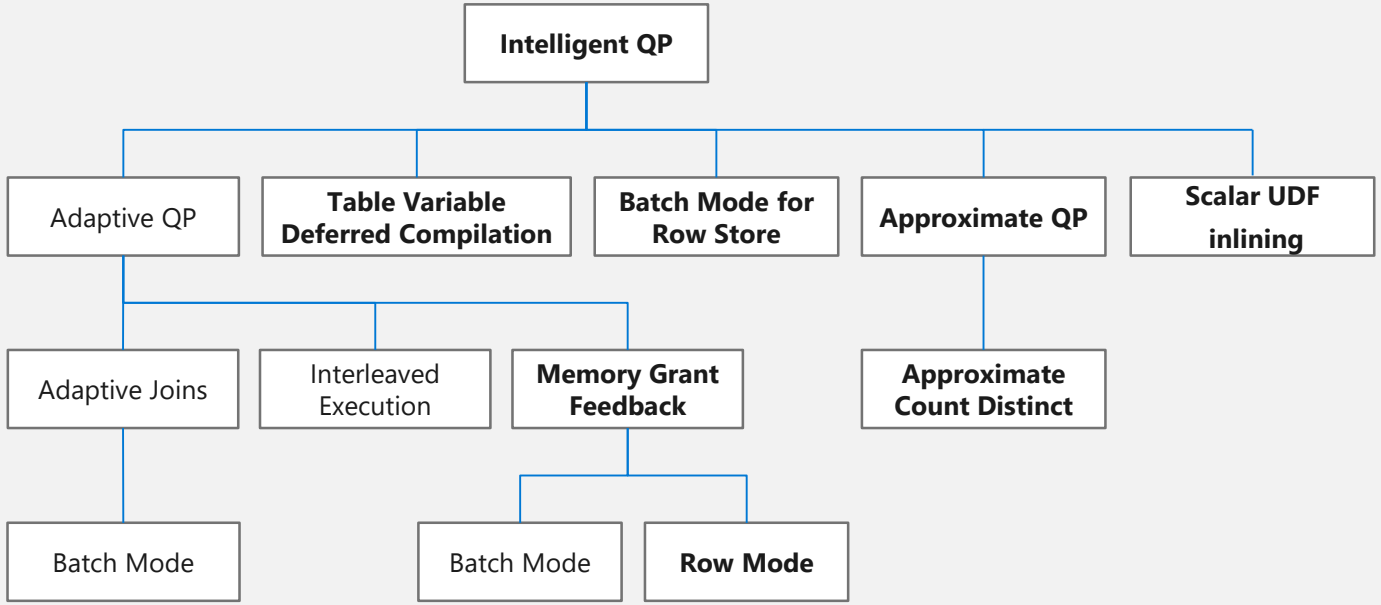
Arm64

Intelligent Performance with SQL Server

The intelligent database

- **Intelligent Query Processing**
- Performance insights anytime and anywhere with **Lightweight Query Profiling**
- **In-Memory Database**
  - **Hybrid Buffer Pool**
  - **Memory-Optimized TempDB Metadata**
  - **In-Memory OLTP**
  - **Persistent Memory Support**

The Intelligent Query Processing feature family



Bold indicates new and improved features in SQL Server 2019

Mission critical security

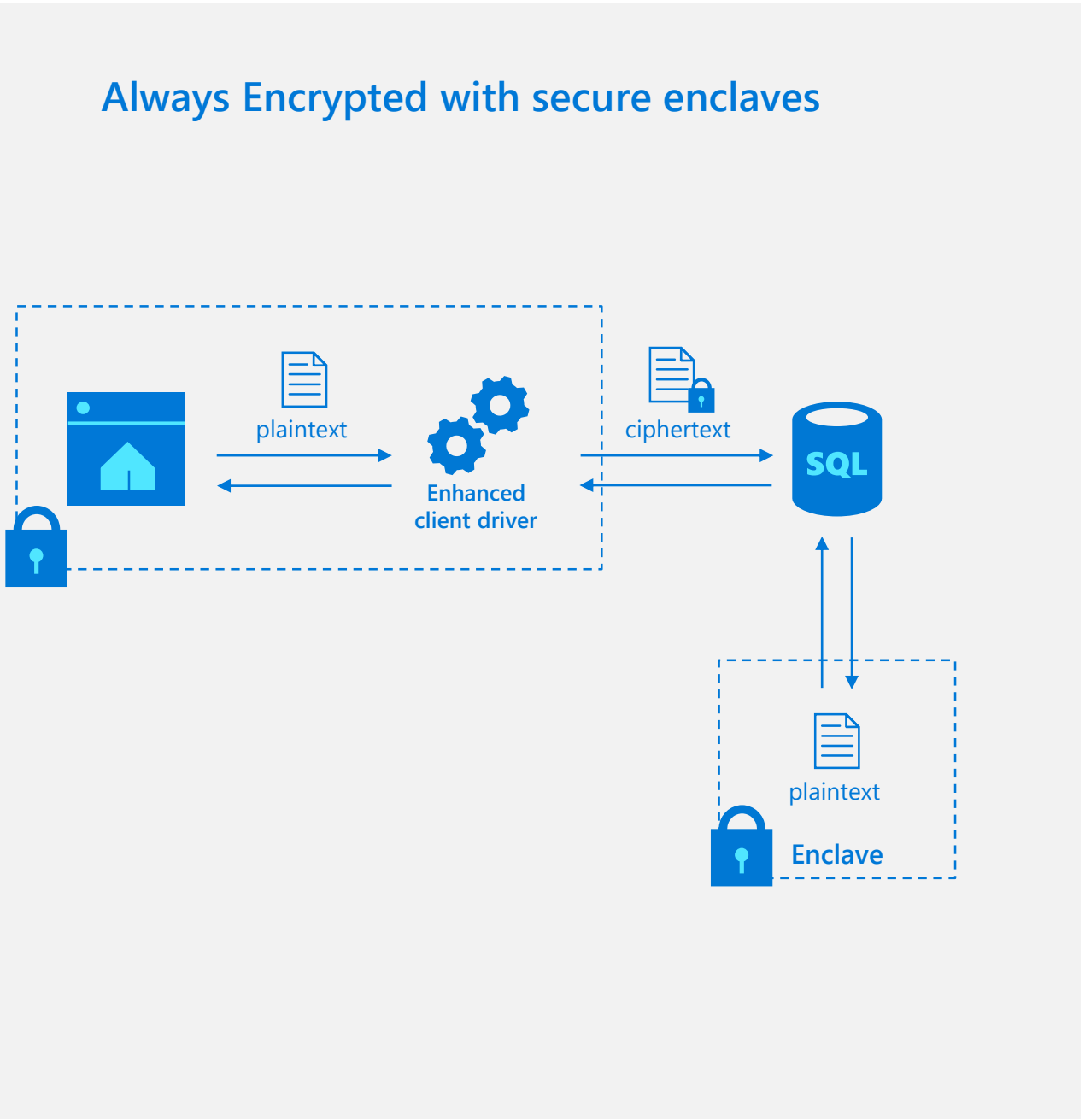
Confidential computing

Always Encrypted with secure enclaves

Data Classification and auditing built-in

TDE scan suspend and resume

Simplified certificate management



High Availability

Keep SQL Server running

Online Index Enhancements

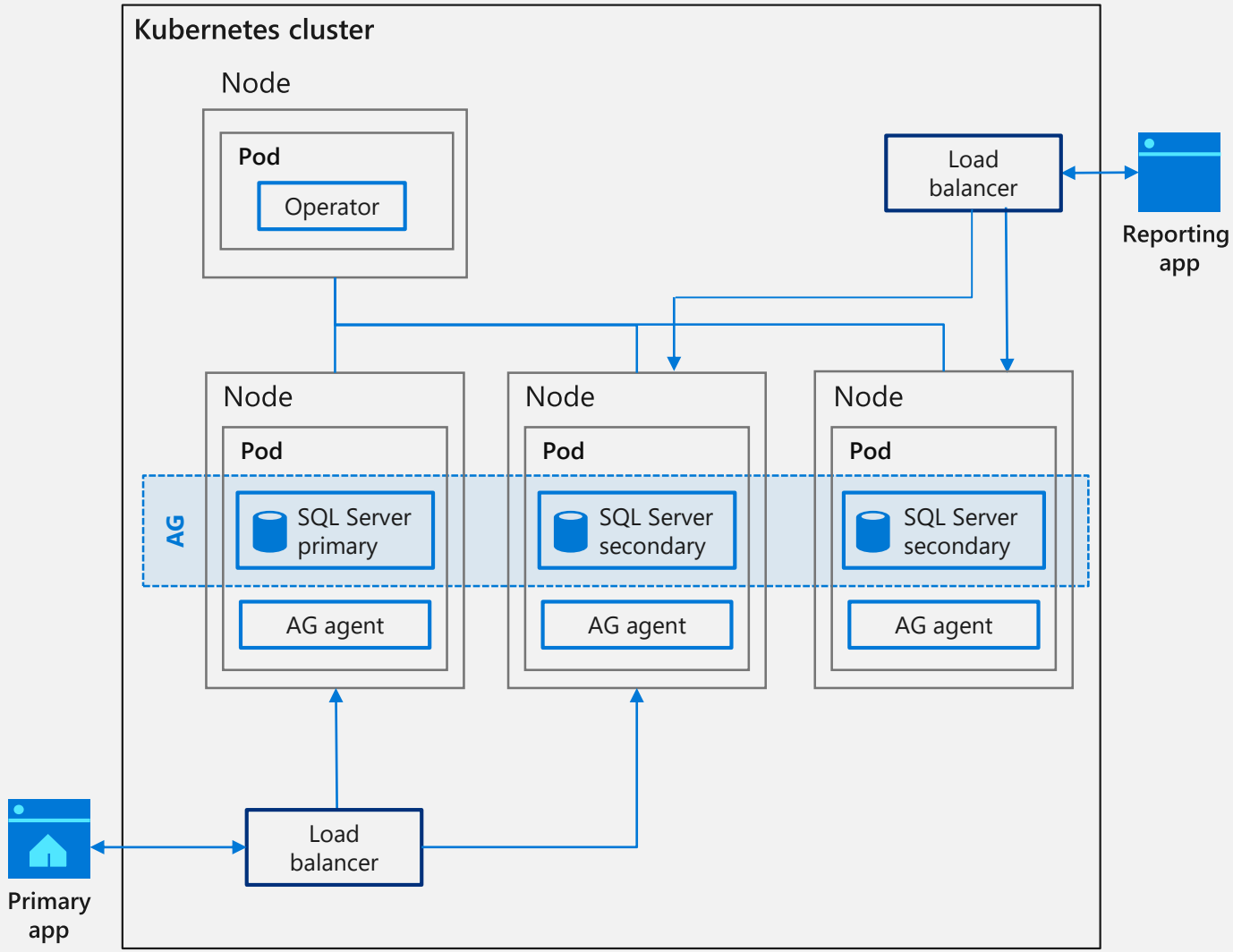
Availability Groups Enhancements

System Databases (Planned)

Availability groups on **Kubernetes**

Accelerated Database Recovery

Availability groups on Kubernetes



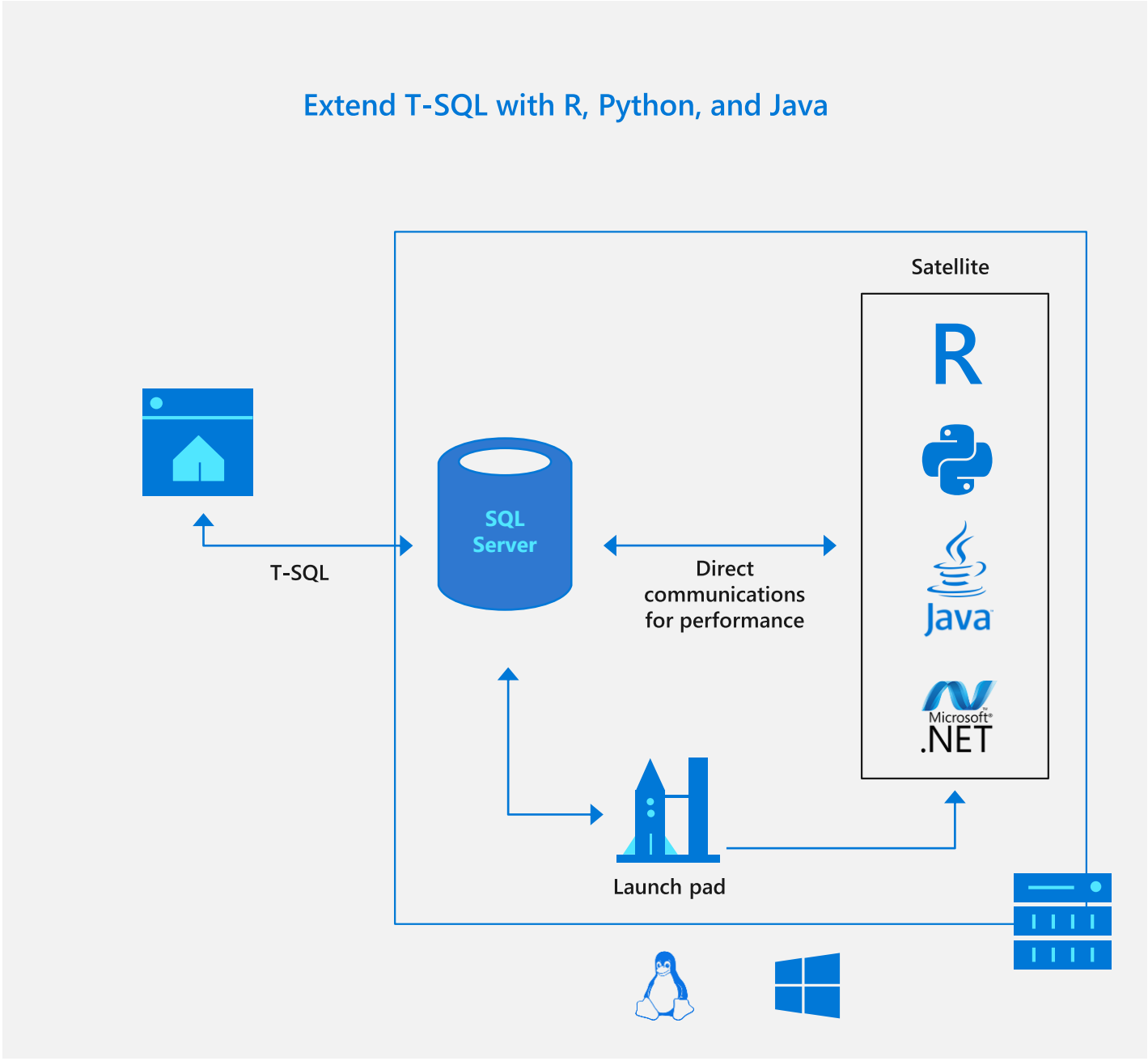
Enhancing the developer experience

SQL Graph enhancements

UTF-8 support

Machine Learning Services enhancements

Extensibility Framework **SQL Server Language Extensions**



SQL Server 2019 and Linux and Containers

New Features

- Replication
- Distributed transactions
- Machine Learning
- Polybase

The **Microsoft Container Registry**

Red Hat Images

Availability Groups on **Kubernetes**

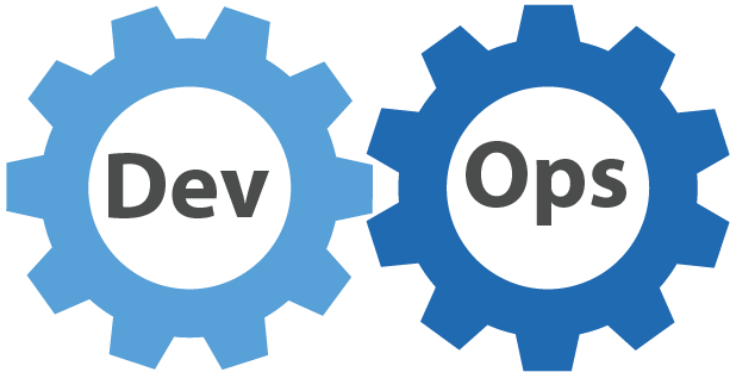
Why SQL Server and Containers?

Portable
Run anywhere Docker is supported

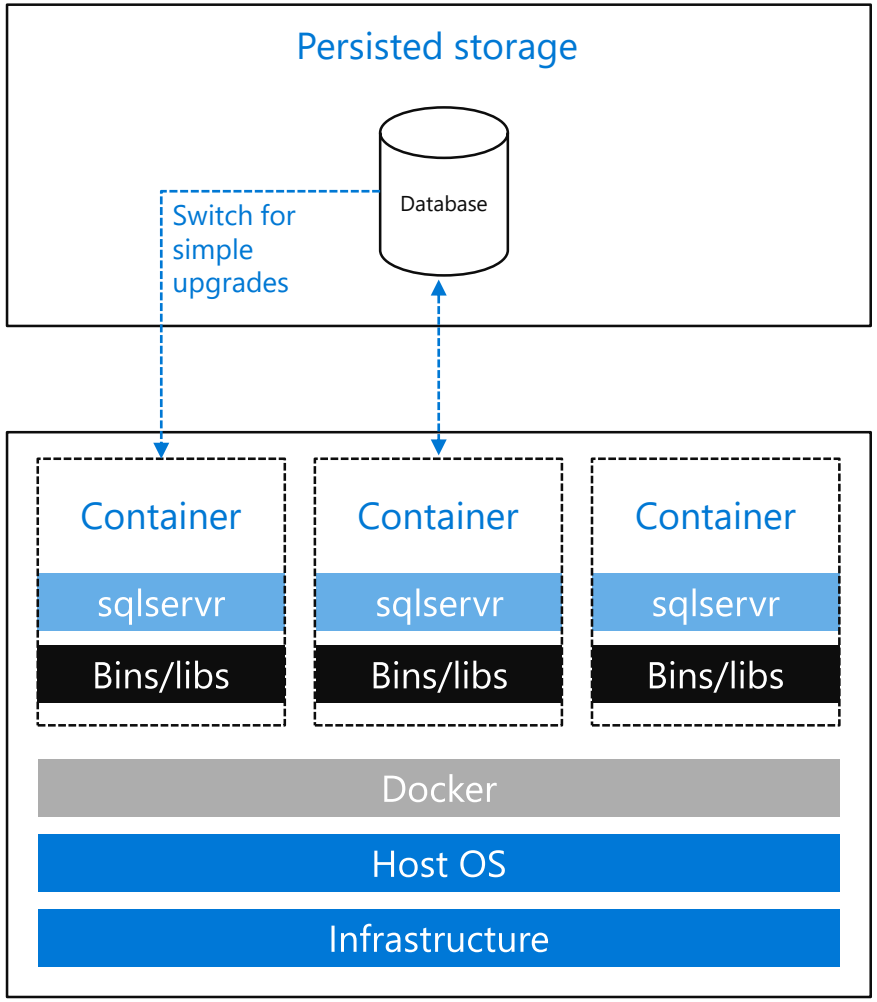
Lightweight
Reduced disk, CPU, and memory footprint

Consistent
Consistent image of SQL Server, scripts, and tools

Efficient
Faster deployment, reduced patching, and less downtime

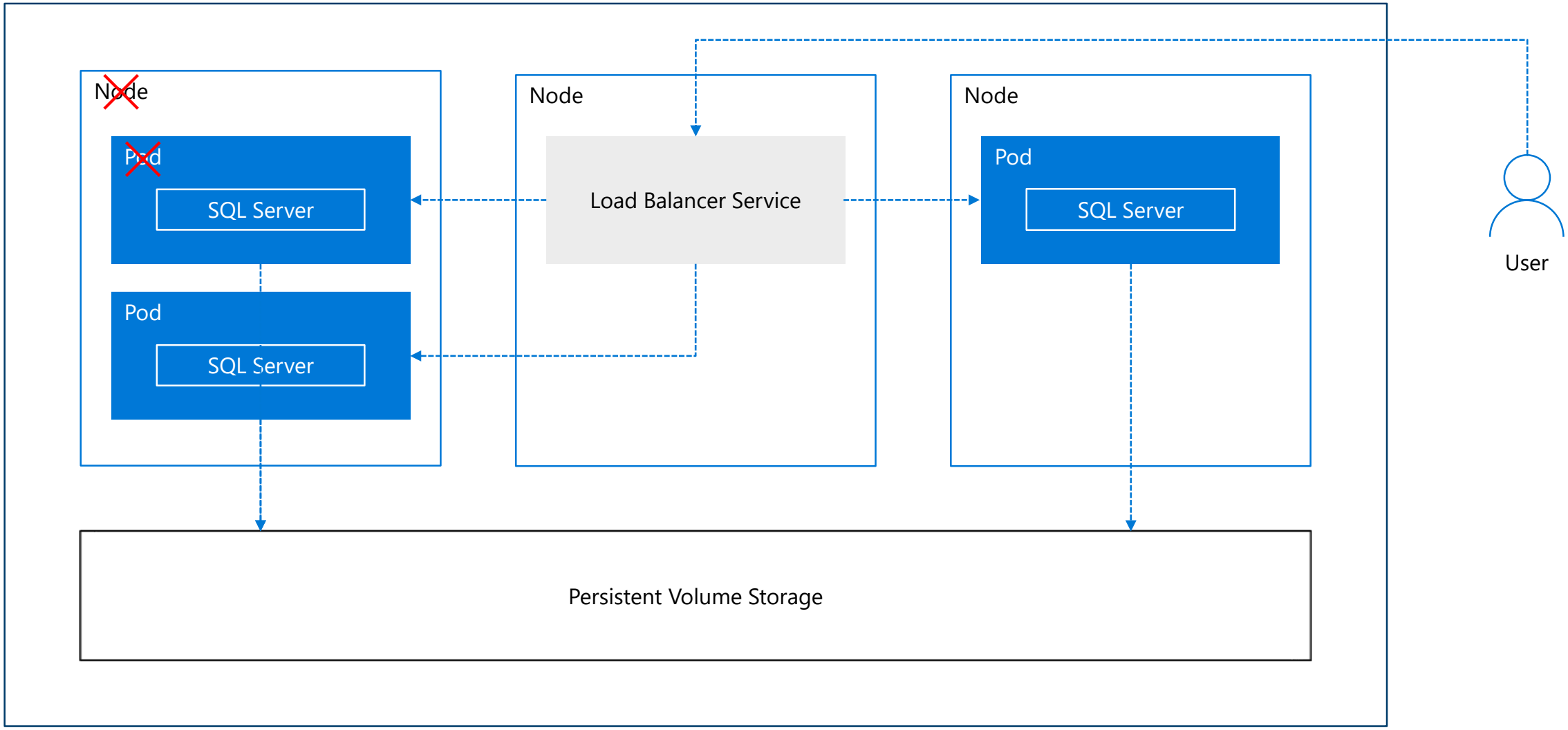


Container configuration



SQL Server - Shared storage HA in Kubernetes

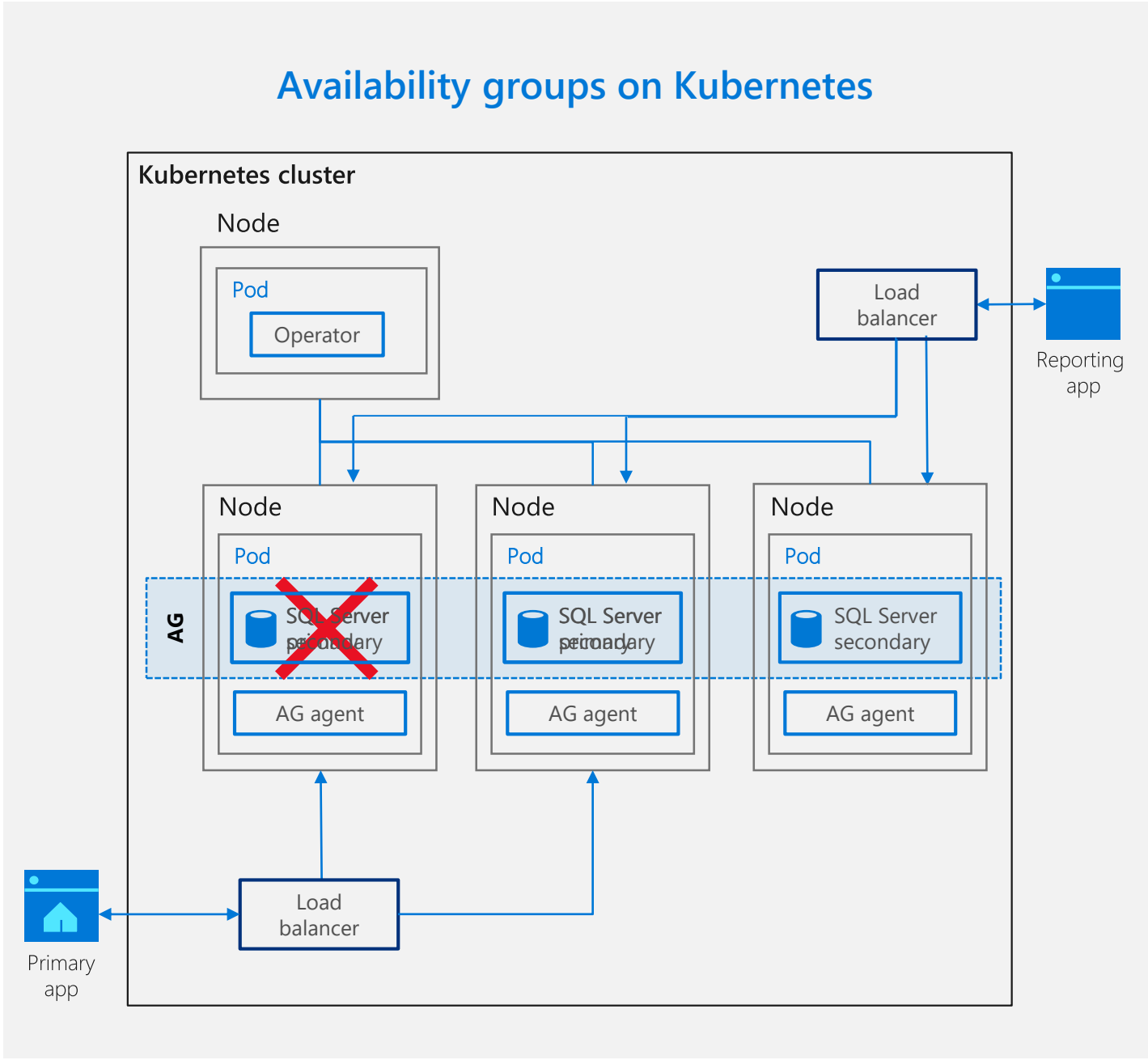
Built-in HADR orchestration with no clustering required



SQL Server 2019

Always On Availability Groups on Kubernetes

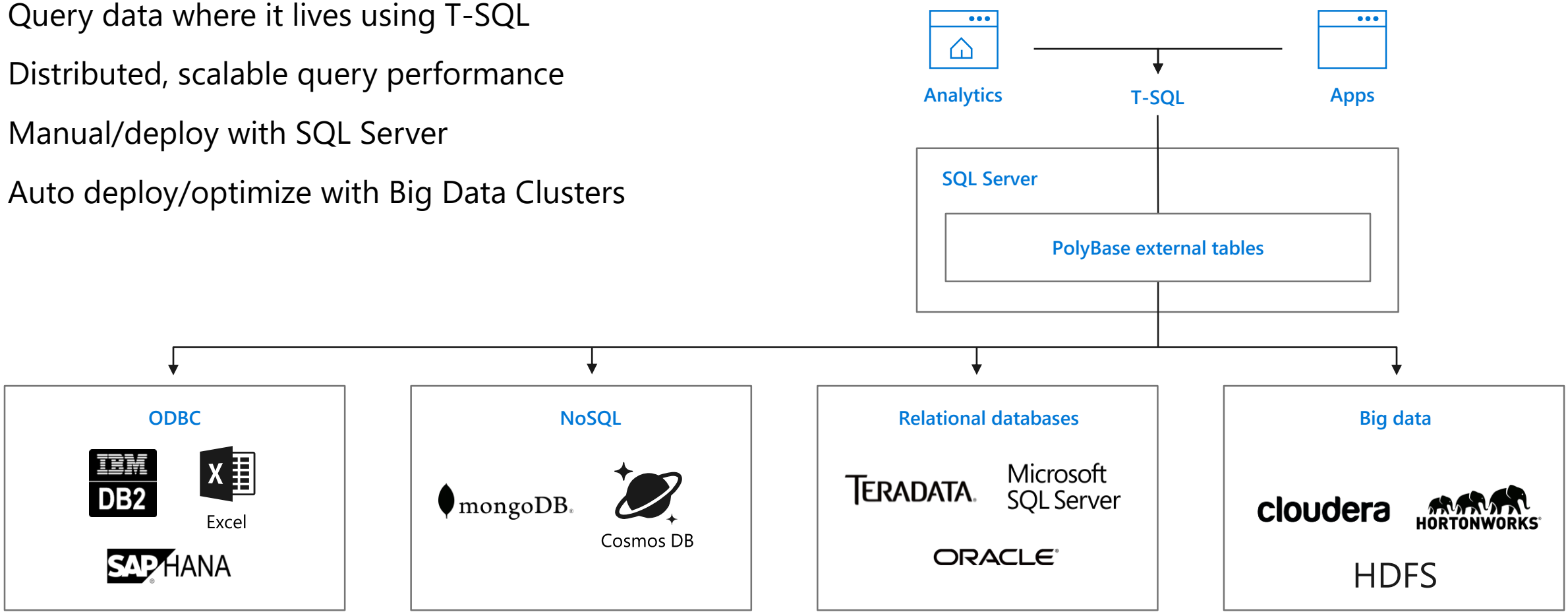
- SQL Server/k8s failover integration
- Operator deployment
- AG concepts all apply
- Load Balancer for Primary App
- Load Balancer for Secondary Replica Readers



What is SQL Server Polybase?

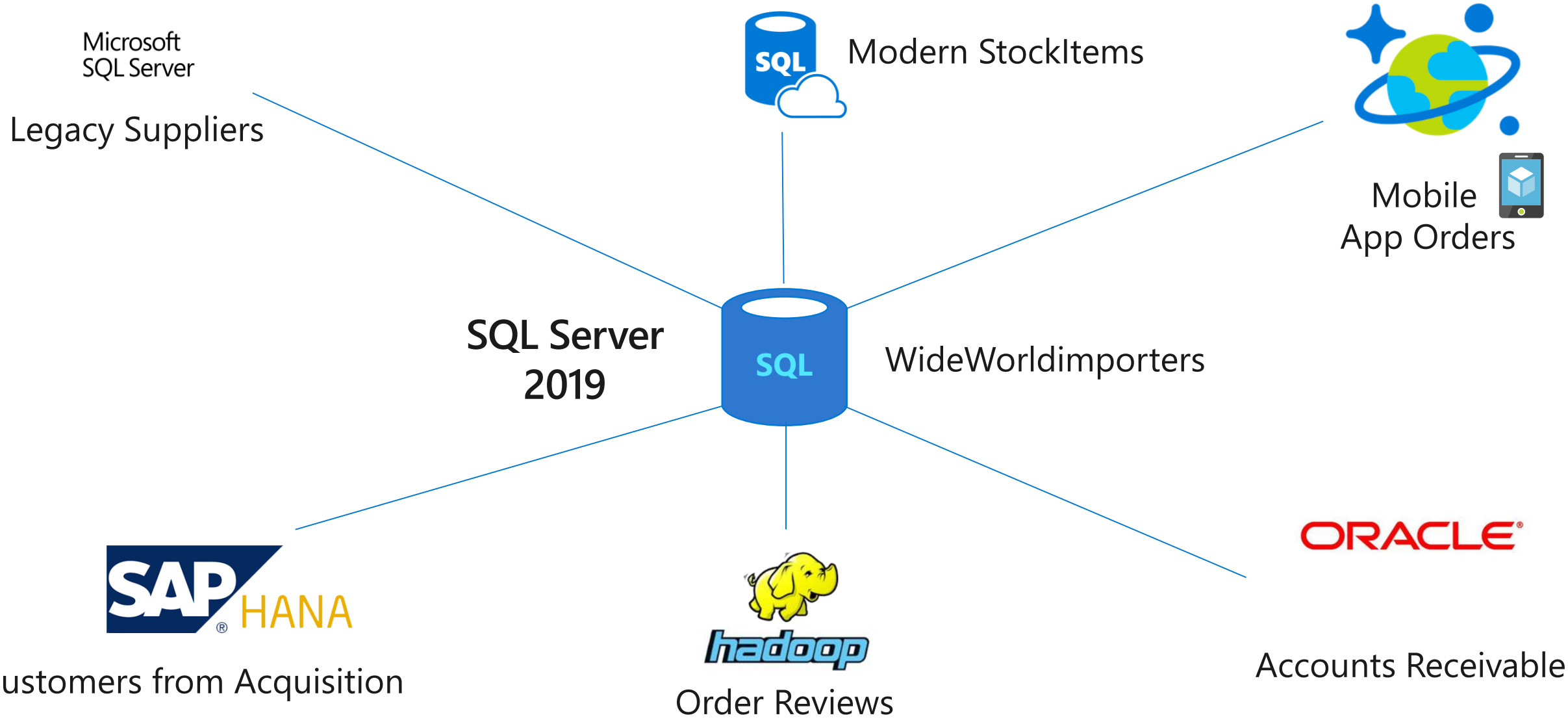
"It's all about Data Virtualization"

- ✓ Distributed compute engine integrated with SQL Server
- ✓ Query data where it lives using T-SQL
- ✓ Distributed, scalable query performance
- ✓ Manual/deploy with SQL Server
- ✓ Auto deploy/optimize with Big Data Clusters



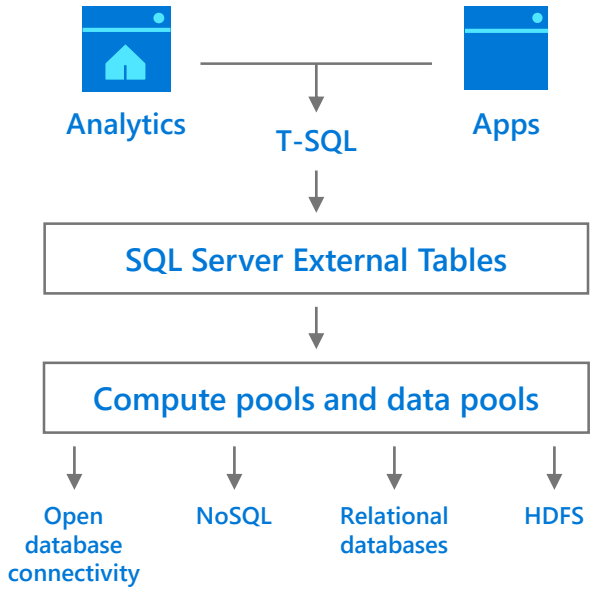
Intelligence over all data

SQL Server 2019: Data Virtualization



SQL Server 2019 Big Data Clusters

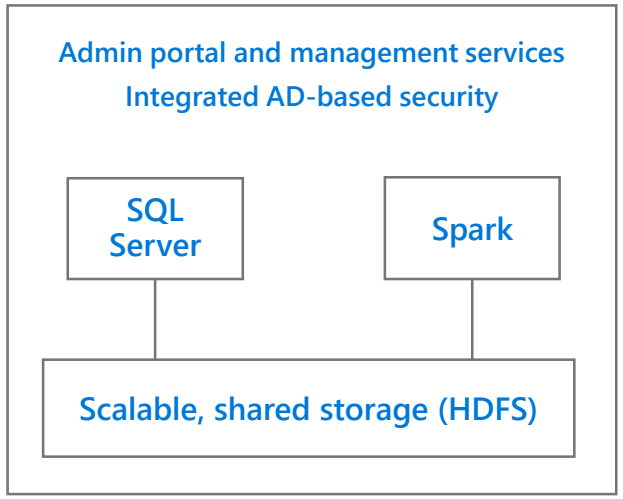
Data virtualization



Combine data from many sources without moving or replicating it

Scale out compute and caching to boost performance

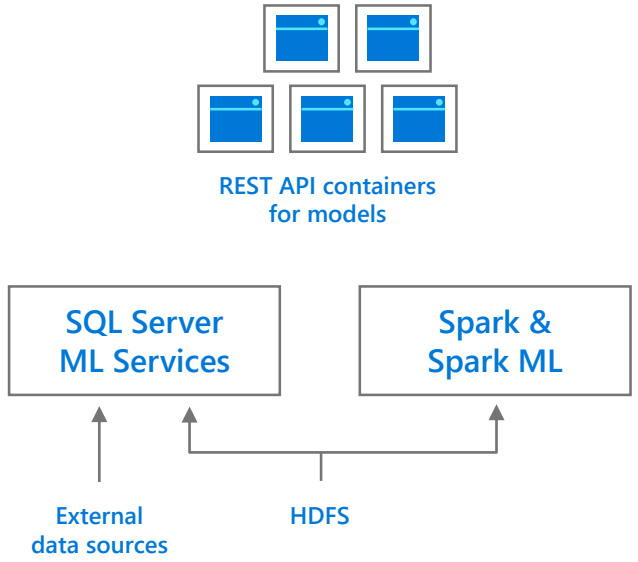
Managed SQL Server, Spark, and data lake



Store high volume data in a data lake and access it easily using either SQL or Spark

Management services, admin portal, and integrated security make it all easy to manage

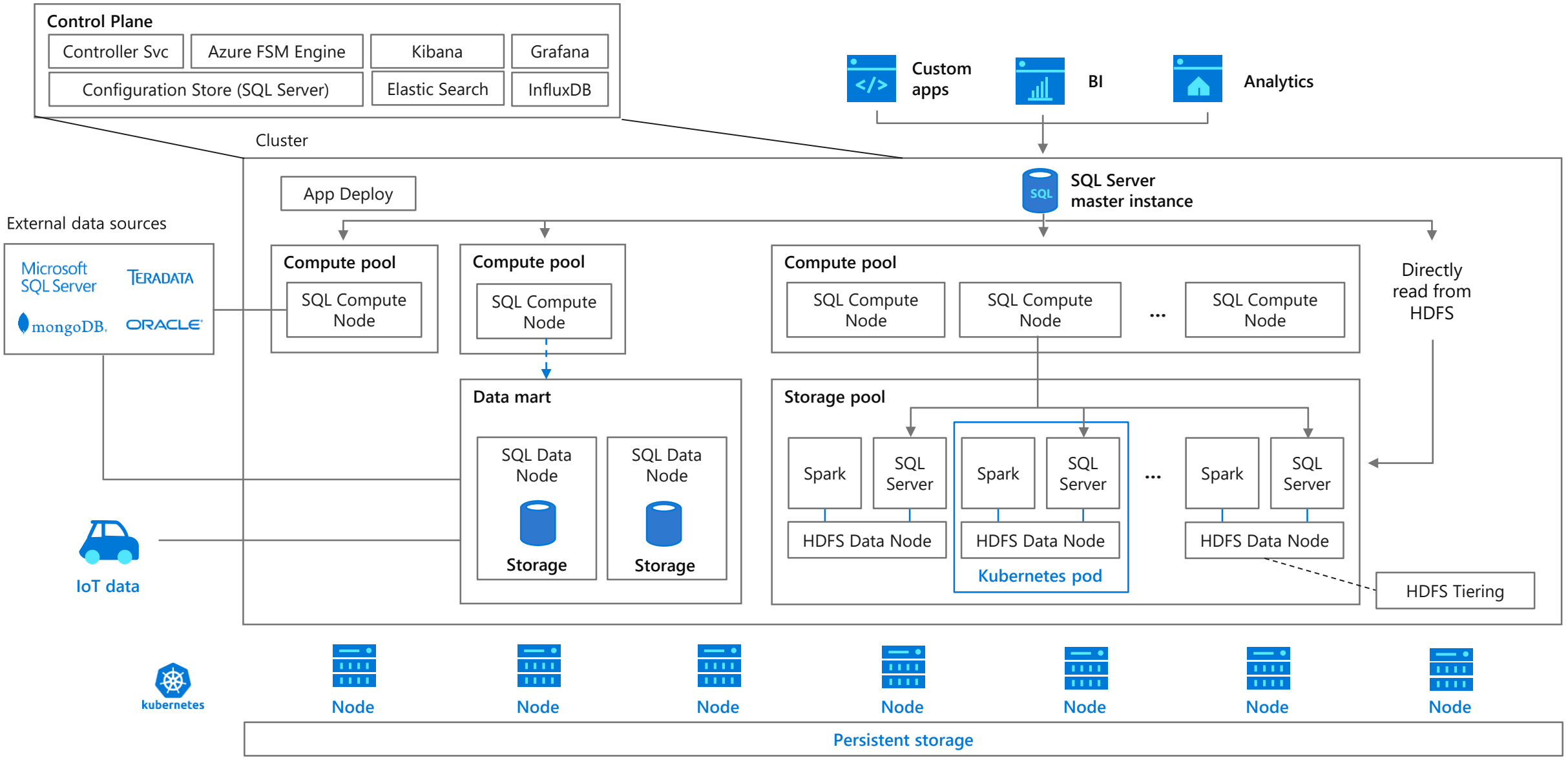
Complete AI platform



Easily feed integrated data from many sources to your model training

Ingest and prep data and then train, store, and operationalize your models all in one system

SQL Server Big Data Cluster Architecture



The Customer Voice

- Columnstore stats in DBCC CLONEDATABASE
- Estimate compression for Columnstore indexes
- Diagnostics for auto stats blocking
- The #1 voted customer feedback item of all time: String Truncation (1000+ votes)
- Troubleshoot page resource waits with new built-in T-SQL
- Custom capture policy for the Query Store

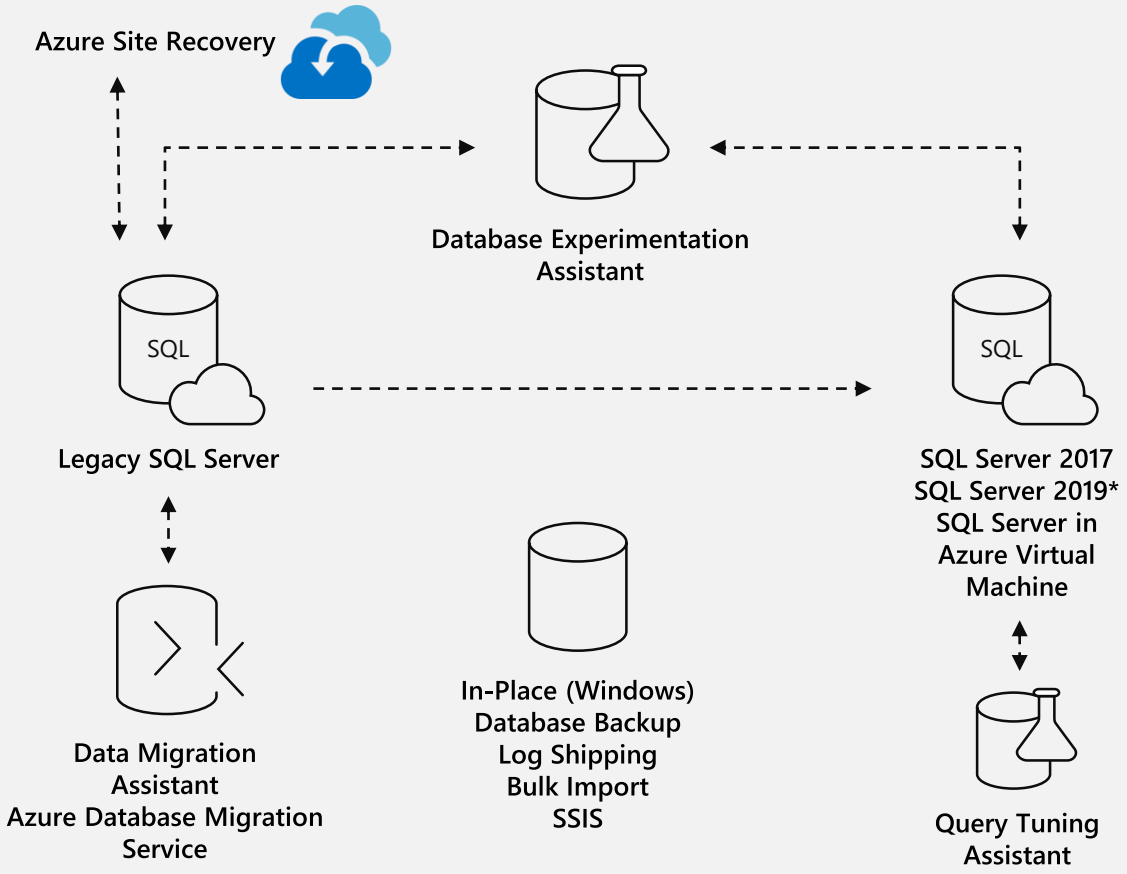
```
String or binary data would be truncated
```

```
String or binary data would be truncated
in table '%.*ls', column '%.*ls'.
Truncated value: '%.*ls'
```

```
SELECT page_info.*
FROM sys.dm_exec_requests AS d
  CROSS APPLY
sys.fn_PageResCracker(d.page_resource) AS r
  CROSS APPLY sys.dm_db_page_info(r.db_id,
r.file_id, r.page_id,'DETAILED')
    AS page_info;
```

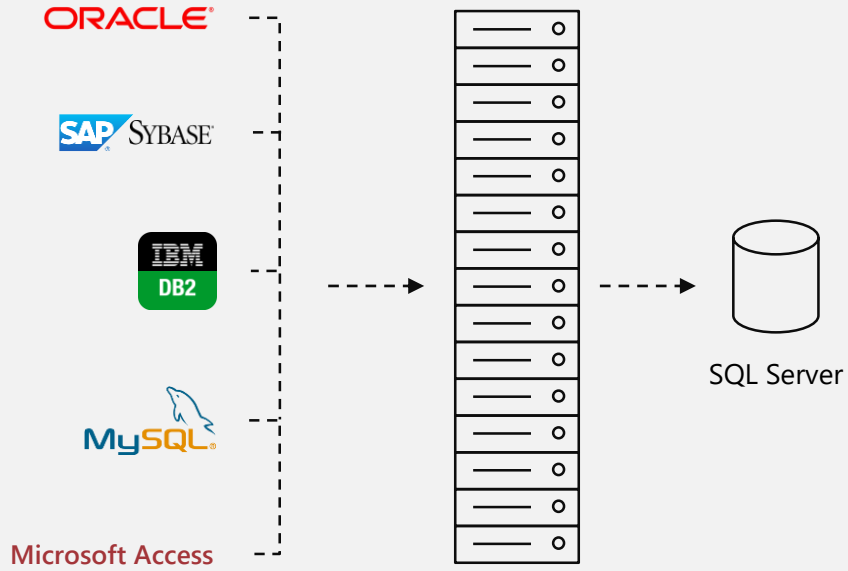
Migrate to the Modern SQL Server

Migration from legacy SQL Server



* Coming by GA

Migration from external databases



SQL Server Migration Assistant (SSMA)

Learn more

http://aka.ms/bobwardms
http://aka.ms/bobsqldemos
http://aka.ms/sqllinuxbook

Use our free training at https://aka.ms/sqlworkshops

Learn from videos and demos at https://aka.ms/sqlchannel

Download and try it at http://aka.ms/ss19

What's new for SQL 2019 documentation

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Thank You

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