



Masters Conference

SQL Server on Kubernetes:
The next frontier



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Experience

Microsoft Data Platform MVP
Friend of Redgate
+10 years of experience multi-platform
Solutions architect

Community

GTSSUG – Community Leader
Speaker, blogger & mentor
Simple Talk & SQL Server Central author

DBA Mastery

Tips, scripts, best practices & more



MAXDOP Calculator
Azure Data Studio wait stats widget
Azure Data Studio notebooks
PerfMon for DBAs - PowerShell

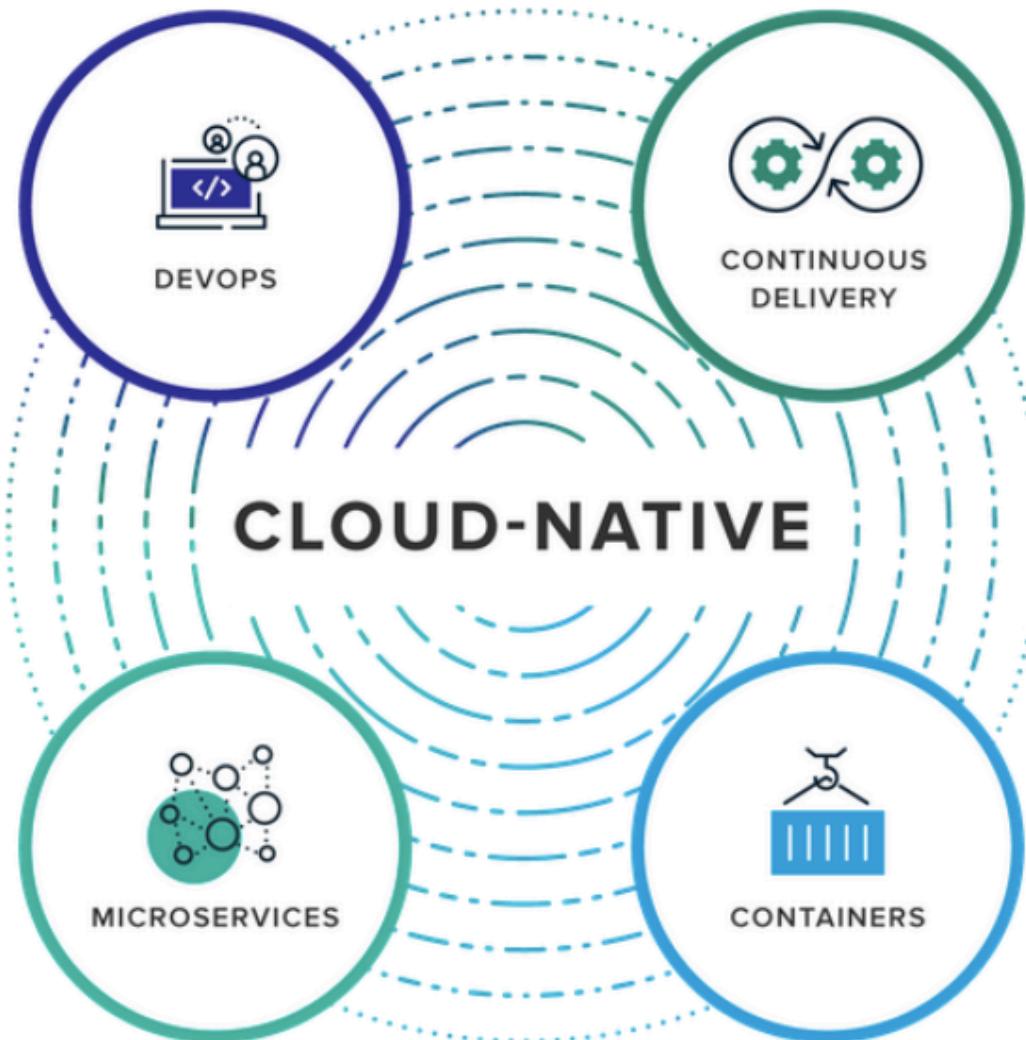
Agenda

- Cloud Native
- Kubernetes
- SQL Server and Linux
- Demos ...



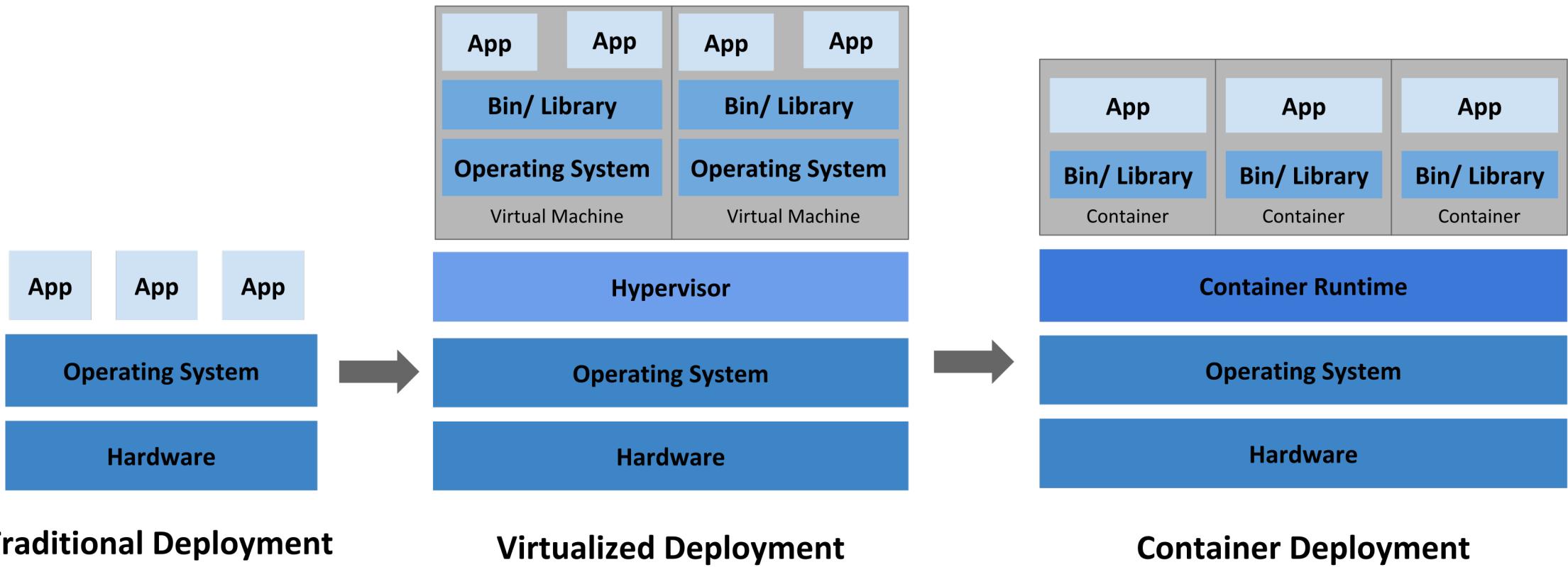
Cloud Native





- Cloud service model
- Modern design principles
- Microservices
- Containerization
- Backing services
- Automation





Kubernetes



What is Kubernetes?



kubernetes

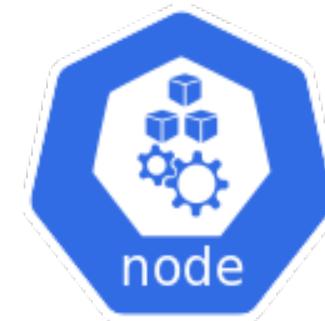
Kubernetes is a portable, extensible open-source platform for managing containerized workloads and services, that facilitates both declarative configuration and automation.

It also make possible the container orchestration for automating application deployment, scaling, and management.



The basics

- Master
 - Multiple moving parts \ processes
 - Runs on a single node in the cluster
 - Tells what to do – desired state
- Nodes
 - Do the work, runs applications
 - Aka “minions”
 - Reports the state back up to the master



- Pods
 - Containers runs inside of pods
 - Can have one or more pods within a node
- Services
 - Hiding multiple pods behind a service IP address
- Deployments
 - Declarative model
 - Desired state (number of POD's)
 - Manifest file (YAML, JSON)



Cloud providers



EKS

Amazon
Elastic Kubernetes Service



AKS

Azure
Kubernetes Service

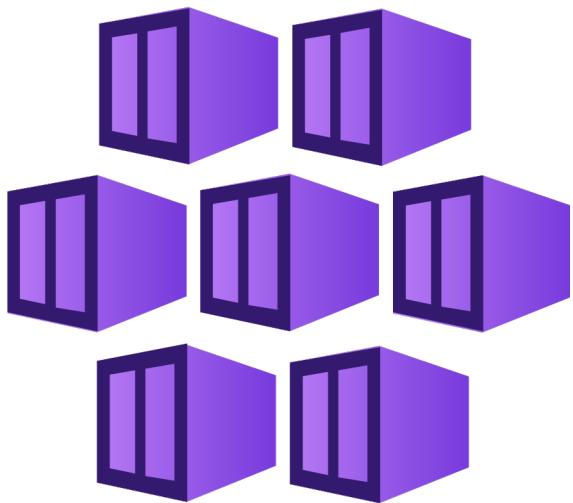


GKE

Google
Kubernetes Engine



Azure Kubernetes Services



- Focus on your apps, not infra
- Open-source APIs
- Scale and run
- Managed control pane
- Automated upgrades



Local development



K3S



docker



MicroK8s



minikube



MicroK8s

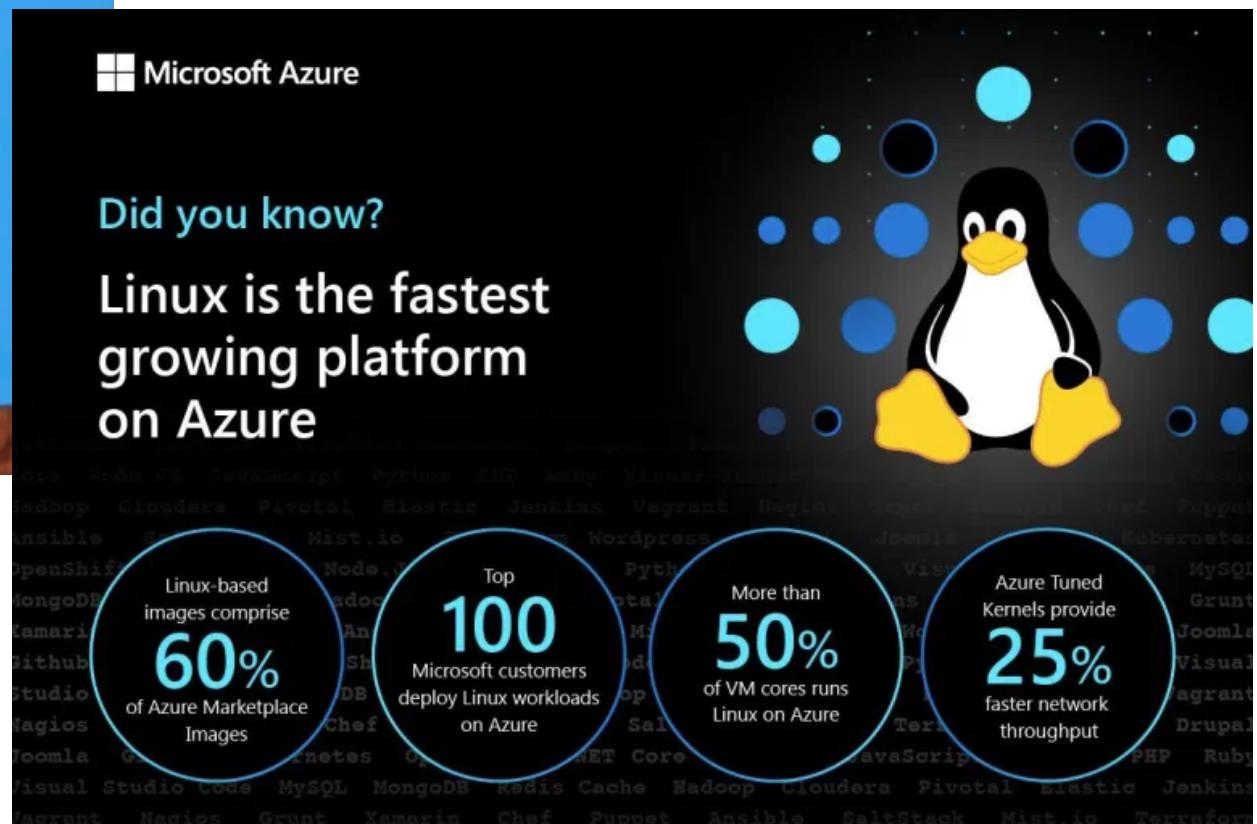


- Lightweight and simple
- Smallest and fastest Kubernetes
- Support from Canonical
- Zero-ops infrastructure
- IoT, Edge, CI/CD



SQL Server and Linux







Announcing SQL Server on Linux

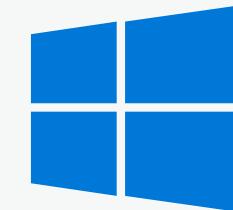
Mar 7, 2016 | Scott Guthrie - Executive Vice President, Cloud and Enterprise Group, Microsoft



It's been an incredible year for the data business at Microsoft and an incredible year for data across the industry. This Thursday at our [Data Driven](#) event in New York, we will kick off a wave of launch activities for SQL Server 2016 with general availability later this year. This is the most significant release of SQL Server that we have ever done, and brings with it some fantastic new capabilities. SQL Server 2016 delivers:

- Groundbreaking security encryption capabilities that enable data to always be encrypted at rest, in motion and in-memory to deliver maximum security protection
- In-memory database support for every workload with performance increases up to 30-100x
- Incredible Data Warehousing performance with the #1, #2 and #3 [TPC-H 10 Terabyte benchmarks for non-clustered performance](#), and as of March 7, the [#1 SAP SD Two-Tier performance benchmark](#) on Windows¹
- Business Intelligence for every employee on every device – including new mobile BI support for iOS, Android and Windows Phone devices
- Advanced analytics using our new R support that enables customers to do real-time predictive analytics on both operational and analytic data
- Unique cloud capabilities that enable customers to deploy hybrid architectures that partition data workloads across on-premises and cloud based systems to save costs and increase agility

Windows

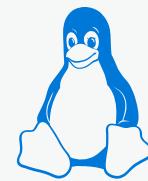


Docker containers and Kubernetes



kubernetes

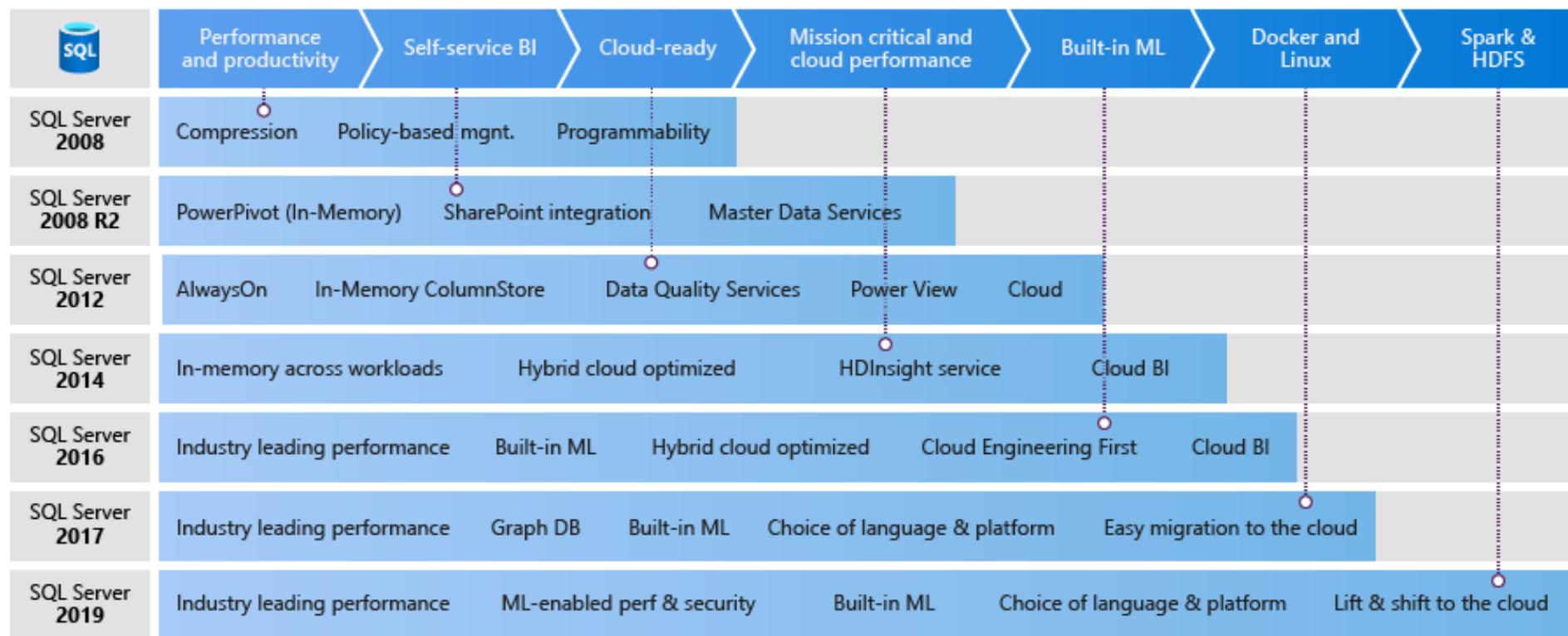
Linux



ubuntu

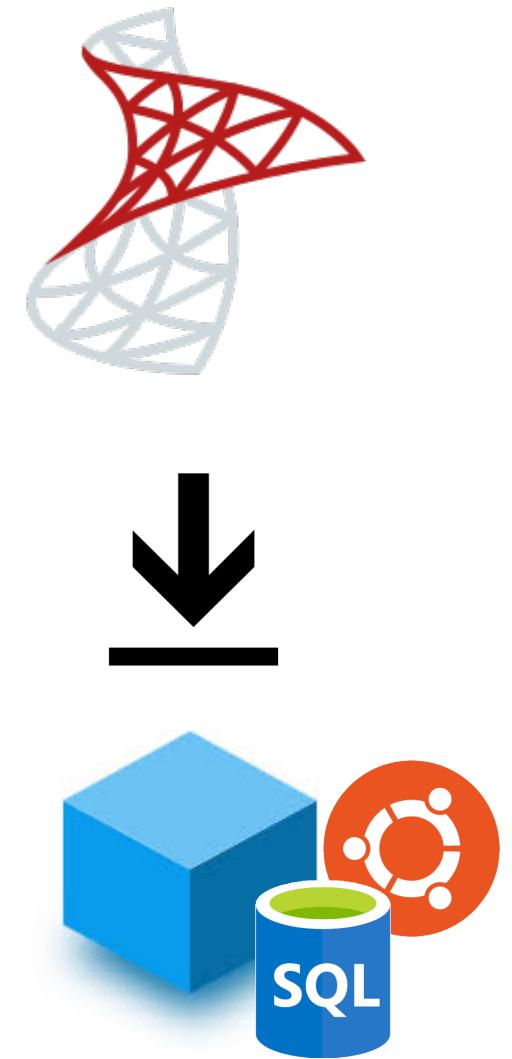


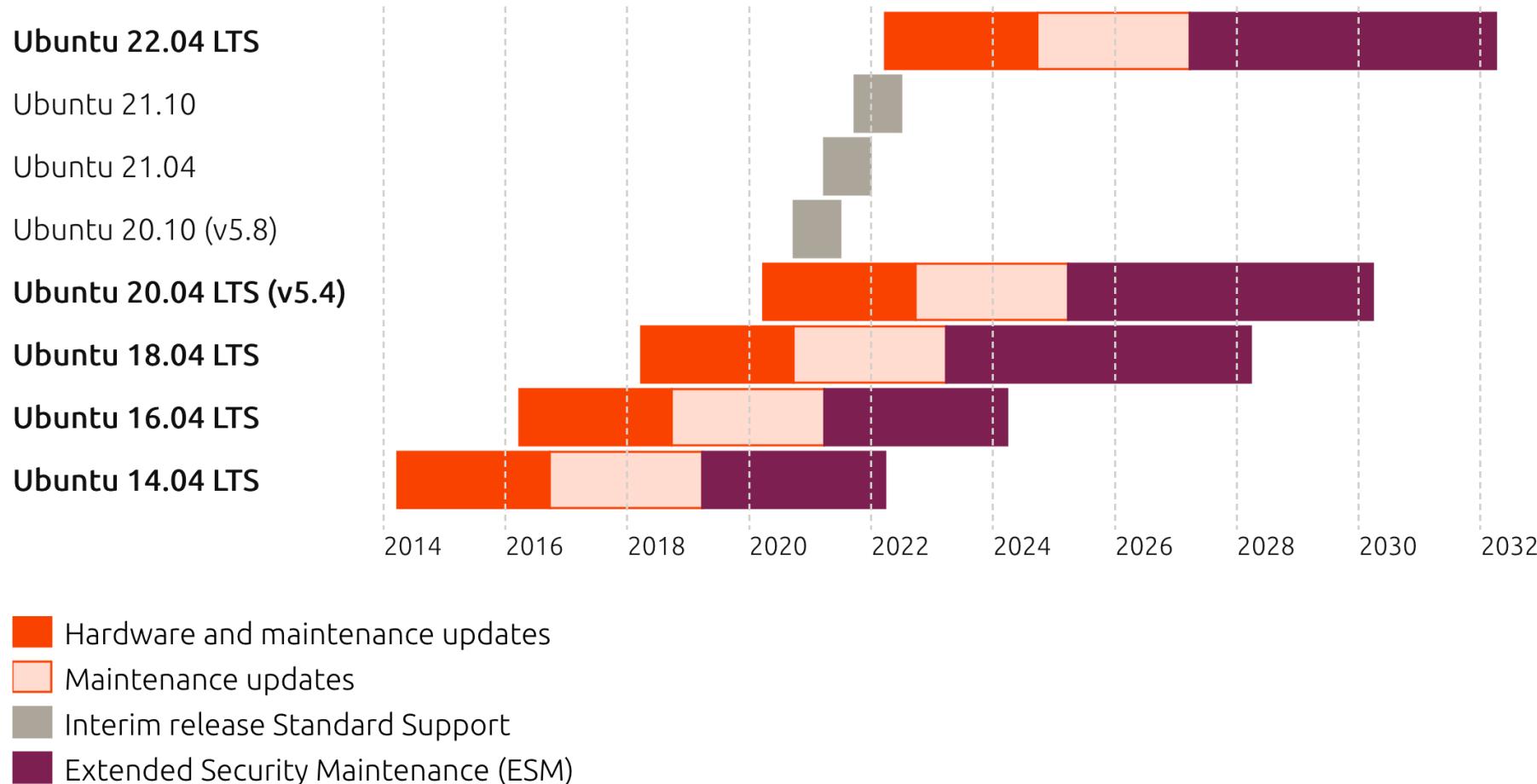
SQL Server journey



SQL Server image

- [Docker Hub – Complete list](#)
- SQL Server 2017
 - Ubuntu 16.04 for all CU versions
- SQL Server 2019
 - Ubuntu 16.04 for all CU versions
 - Ubuntu 18.04 starting from CU3





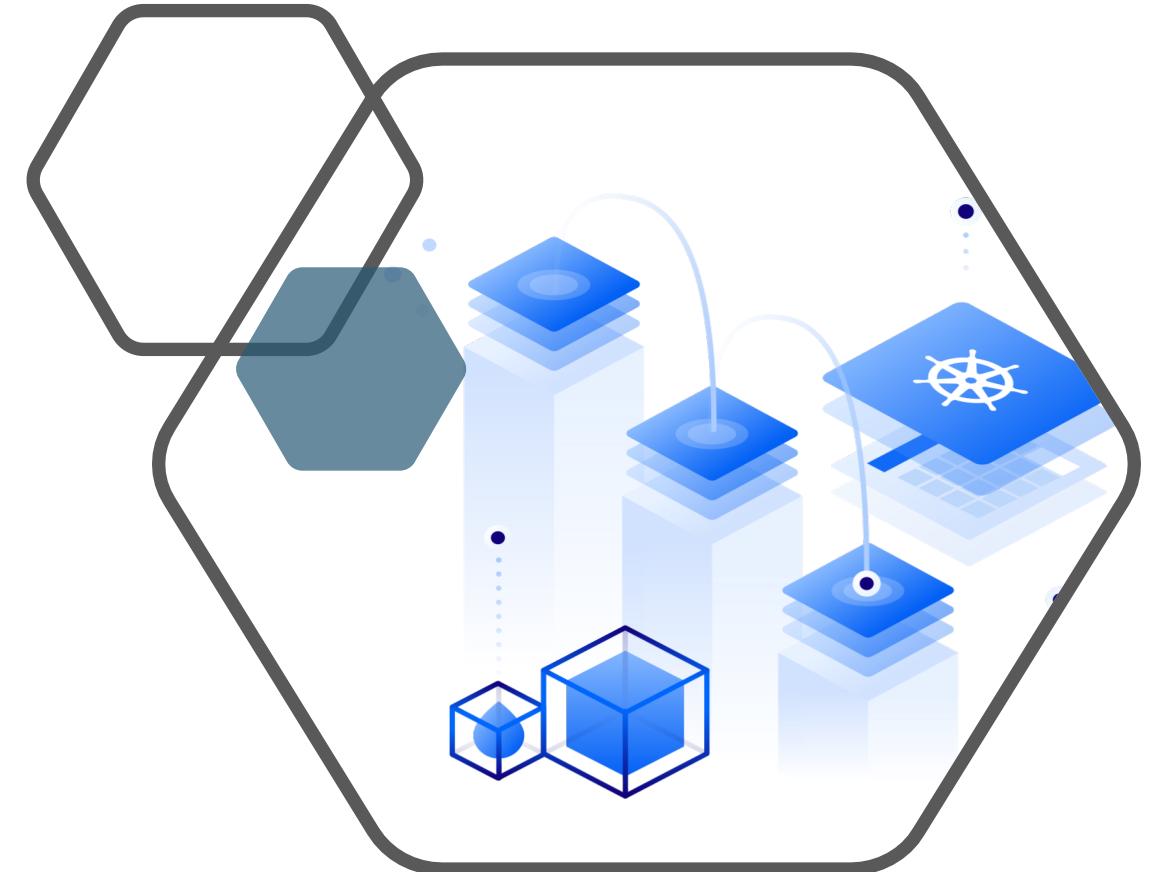
SQL Server + Kubernetes

- Create namespace
- Create secret for SA password
- Create volumes (PVCs)
- Create service
- Create deployment
- Connect to SQL Server



Demo

Local development with MicroK8s



Advantages

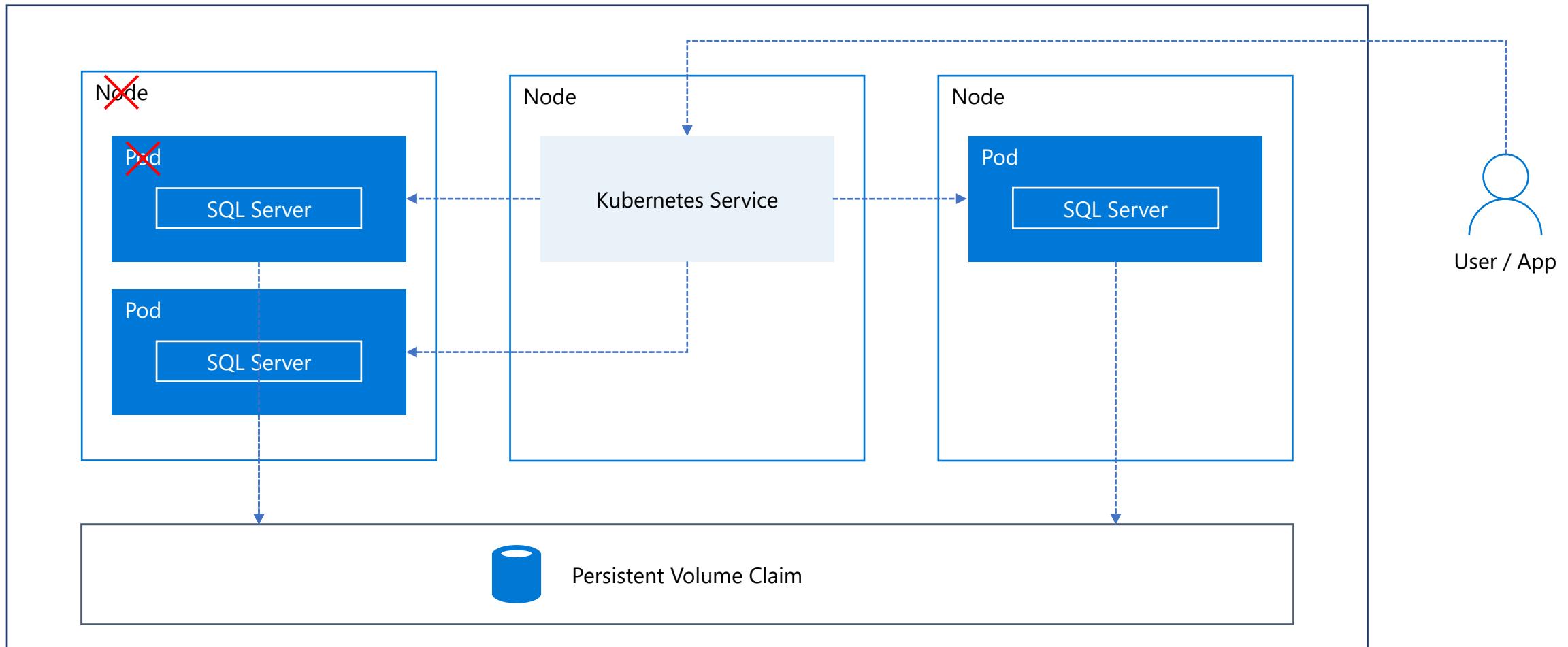
- Storage orchestration
- Platform agnostic
- Secret & configuration management
- Self healing (built-in HA)
- Automated rollouts & rollbacks



Demo

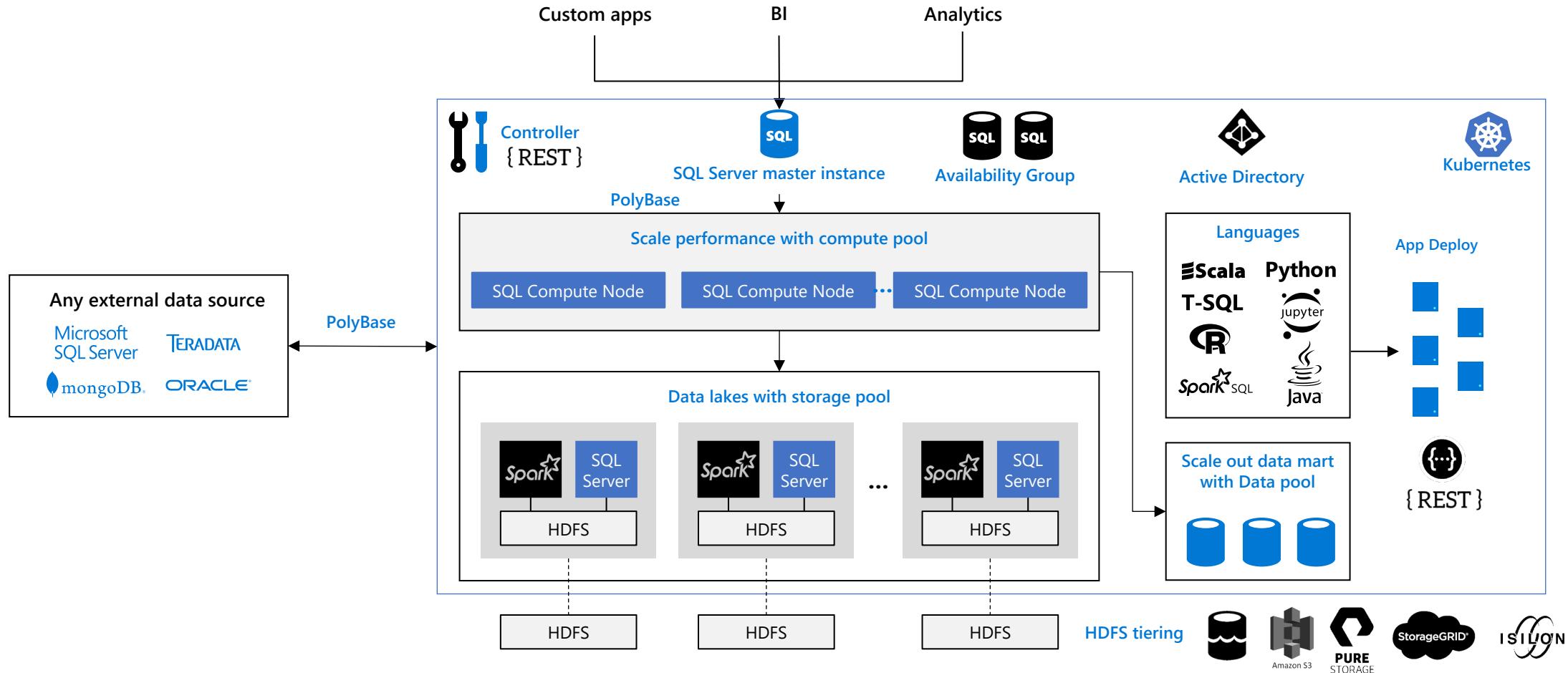
AKS as your Kubernetes platform



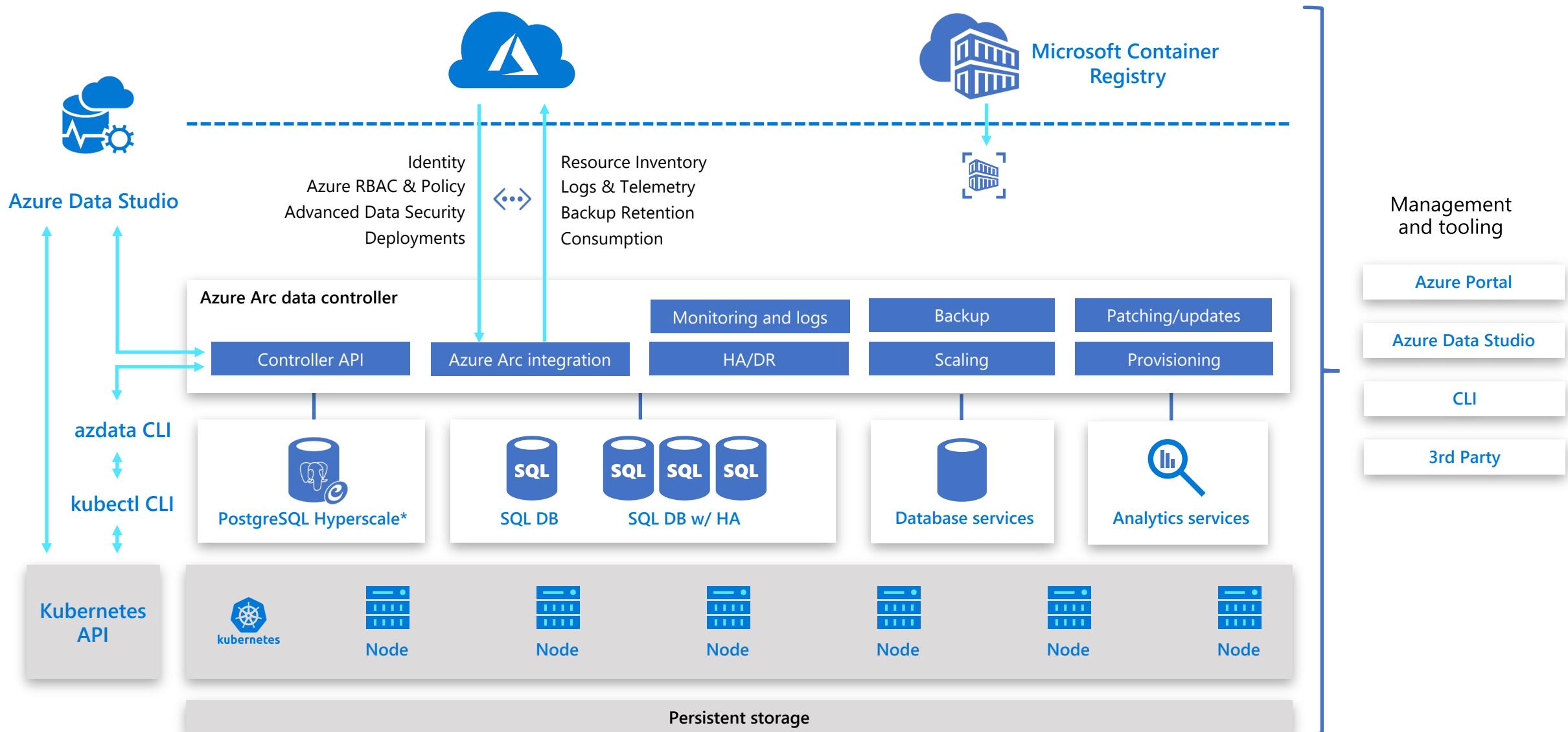


SQL Server 2019 Big Data Clusters

The combination of SQL Server, Polybase, HDFS, Spark, and Machine Learning in one solution



Azure Arc data services anywhere architecture

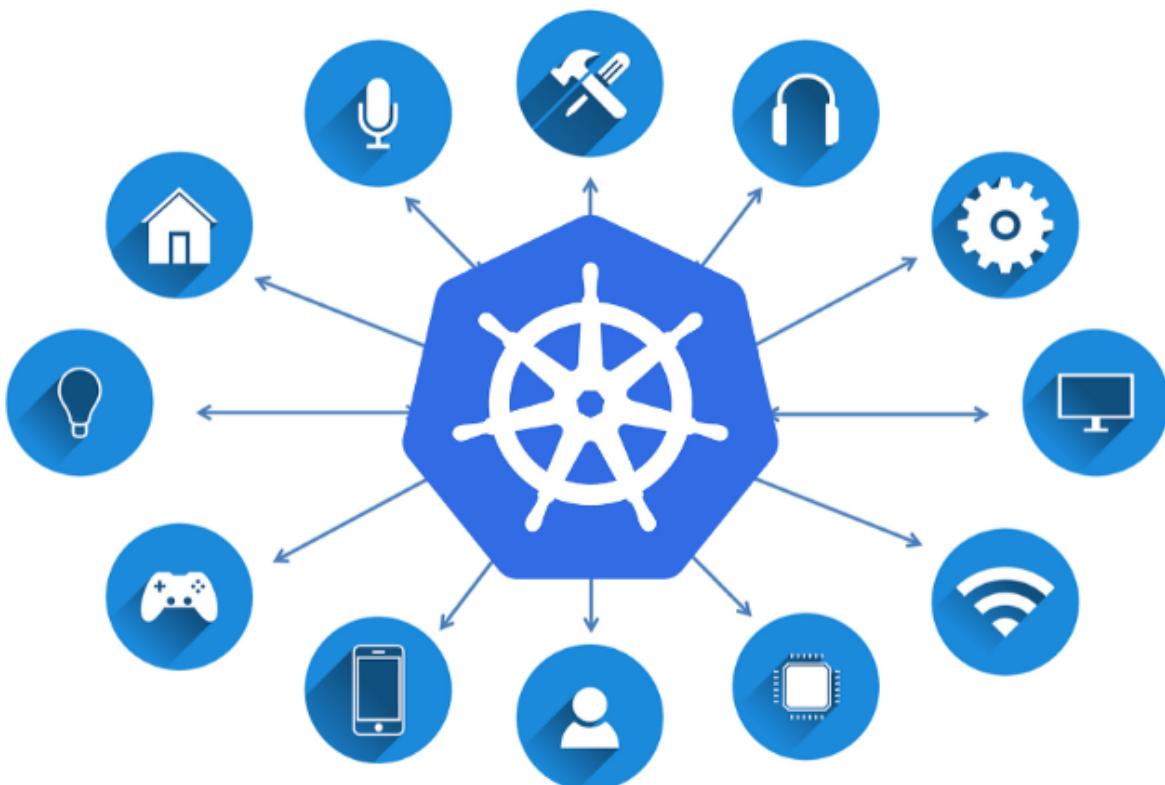


Recap

- SQL Server on Linux
- Kubernetes
- Ubuntu
- MicroK8s
- Azure Kubernetes Services



What's next?



- Compute
- Networking
- Storage



References

- **Official documentation**
 - [Kubernetes](#)
 - [MicroK8s](#)
- **SQL Server**
 - [SQL Server workshops](#)
- **Books**
 - [The Phoenix / Unicorn Project](#)
 - [The DevOps Handbook](#)
 - [Kubernetes: Up and Running](#)
 - [Designing Distributed Systems](#)
 - [Pro SQL Server On Linux by Bob Ward](#)
- **Pluralsight**
 - [Getting Started with Docker](#)
 - [Docker Deep Dive](#)
 - [Docker and Kubernetes: The big picture](#)
 - [Kubernetes Installation and Configuration fundamentals](#)
- **Microsoft Learning**
 - [Kubernetes Learning Path](#)
 - [Containers in Azure](#)
- **Labs**
 - [Katacoda](#)
 - [Play with K8s](#)



More about SQL Containers?

- Published articles
 - [Redgate - Simple Talk](#)
 - [SQL Server Central](#)
 - [MSQL Tips](#)



redgate





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Thanks!

