DBA MASTERY

Azure fundamentals for the SQL Server DBA

Microsoft® Most Valuable Professional

Carlos Robles

Principal Consultant, DBA Mastery

/croblesdba

@dbamastery

crobles@dbamastery.com

Experience

Over 10 years of experience
Multi platform DBA
Microsoft Data Platform MVP
MCSE Data management and analytics

Community

Speaker, blogger, mentor, volunteer
Guatemala SQL community leader
MSSQL tips and SQL Server Central author

DBA Mastery

SQL Server tips, scripts, best practices and more.

MAXDOP Calculator
PerfMon for DBA's
MSDB tuning

AGENDA

- Introduction to Cloud computing
  - Service Models
  - Deployment models
- Microsoft Azure
  - Azure VM's
    - Demo
  - Azure SQL Database
    - Demo
  - Azure SQL Database Managed instance
- Hyperscale
- Start your Azure experience

INTRODUCTION TO CLOUD COMPUTING

- NIST defines cloud computing as:

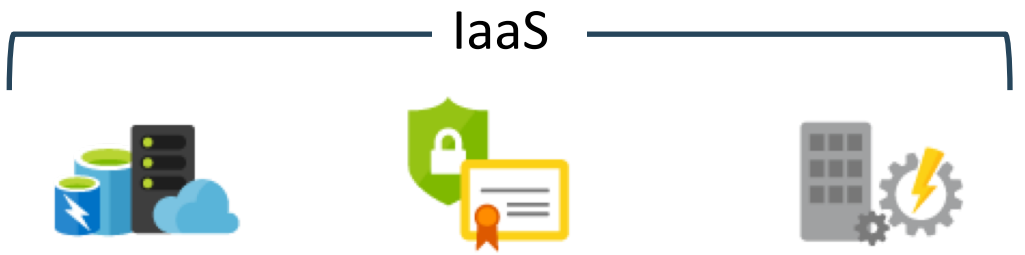
  A model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

CHARACTERISTICS

- On-demand self-service
- Broad network access
- Resource pooling
- Rapid Elasticity or expansion
- Measured service

SERVICE MODELS

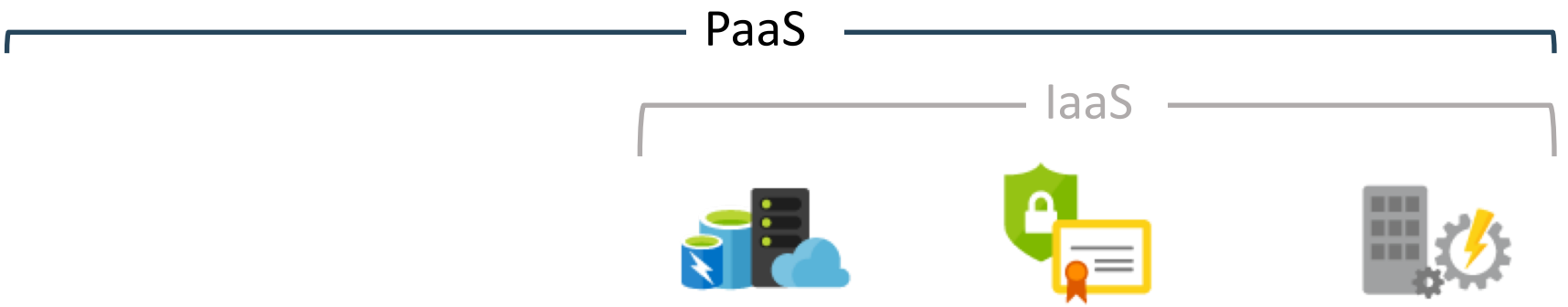
Infrastructure as a Service



SERVICE MODELS

Infrastructure as a Service

Platform as a Service

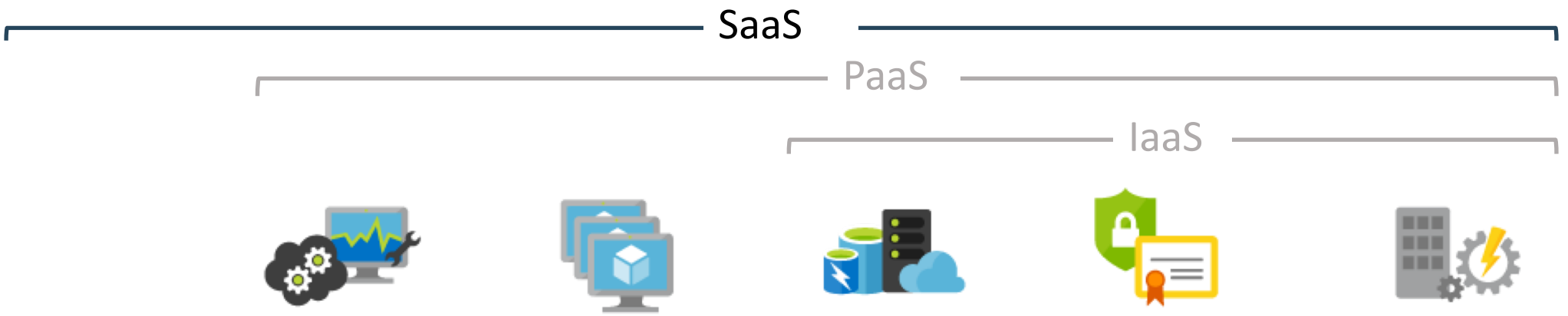


SERVICE MODELS

Infrastructure as a Service

Platform as a Service

Software as a Service



PIZZA AS A SERVICE

Managed by

- You
- Vendor

On-premises	Infrastructure as a service	Platform as a service	Software as a service
Dining table	Dining table	Dining table	Dining table
Soda	Soda	Soda	Soda
Electric \ Gas	Electric \ Gas	Electric \ Gas	Electric \ Gas
Oven	Oven	Oven	Oven
Fire	Fire	Fire	Fire
Pizza Dough	Pizza Dough	Pizza Dough	Pizza Dough
Tomato Sauce	Tomato Sauce	Tomato Sauce	Tomato Sauce
Toppings	Toppings	Toppings	Toppings
Cheese	Cheese	Cheese	Cheese

DEPLOYMENT MODELS

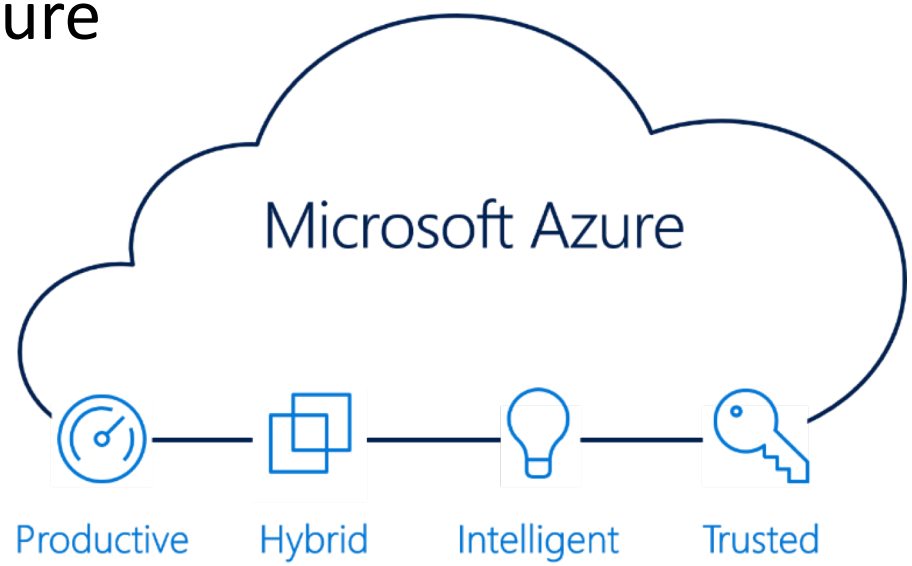
- Public Cloud
- Private Cloud
- Hybrid Cloud

MAJOR PROVIDERS

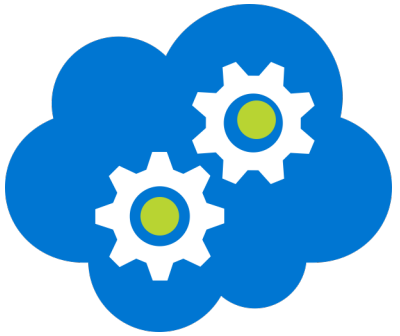
- Microsoft Azure
- AWS (Amazon Web Services)
- GCP (Google Cloud Platform)

MICROSOFT AZURE

- Launched in 2010
- 95% of Fortune 500 companies uses Azure
- Available in 140 countries
- 54 regions
- More than 92 services



- Product categories:
  - Compute
  - Storage
  - Databases
  - Analytics
  - Containers
  - DevOps
  - Integration
  - Developer Tools
  - Media
  - Internet of Things (IoT)
  - Azure Stack
  - Networking
  - Web
  - AI + Machine Learning
  - Mobile
  - Security
  - Identity
  - Management tools
  - Migration



AZURE VM'S

- Virtual machine hosted in Azure (IaaS)
- Provisioning takes around 15 minutes
- Accessible via RDP or PowerShell
- Pay as you go
  - BYOL
  - Only outgoing traffic
  - Only used capacity

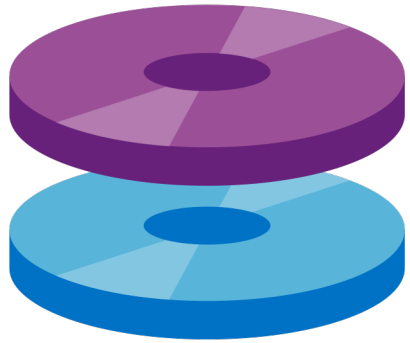
VM TYPE BY SIZE

- Number of Cores
- Memory in GBs
- Number of disks
- Auto scale
- Load balancing

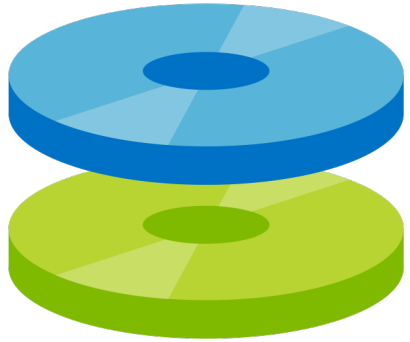
Type	Sizes
General purpose	B, Dsv3, Dv3, **DSv2**, Dv2, Av2, DC
Compute optimized	Fsv2, Fs, F
Memory optimized	Esv3, Ev3, M, **GS**, G, DSv2, Dv2
Storage optimized	Lsv2, Ls
GPU	NV, NVv2, NC, NCv2, NCv3, ND
High performance compute	H

BEST OPTIONS FOR SQL SERVER

- Storage
  - Premium for production
  - Standard for dev\test
  - Storage account in the same region
  - Disable geo-redundant storage



- Disks
  - Minimum of two P30 disks (one for log and one for data files)
    - More disks can be attached
    - The OS disk is always C:\

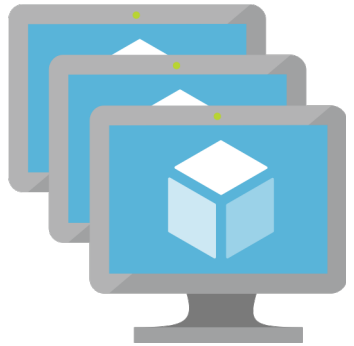


- Do not to use the temporary disk (D:\), regardless is SSD
- Enable read caching for data files (MDF, NDF)
- Disable read caching from log files (LDF)
- Stripe size of 64 KB for OLTP
- Stripe size of 256 KB for DW, OLAP

- I\O
  - Instant file initialization
  - Disable autogrow, autoshrink, etc.

RECOMMENDED SIZES

- D-series VMs feature fast CPUs, and optimal CPU-to-memory configuration
  - DS3_v2 or higher for Enterprise edition
  - DS2_v2 or higher for Standard and Web editions
- G-series VMs feature the Intel® Xeon® processor E5 v3 family, two times more memory, and four times more SSDs than the D-series
  - G3 or higher for Enterprise edition



FEATURED

- Automated updates
- Automated backups
- High availability
- High performance
- Pay as you go
- BYOL

DEMO

AZURE SQL DB

- PaaS
- No SQL Server Agent
- No DB mail
- No cross database queries
- No SSRS, SSIS, SSAS
- No Log shipping, Database mirroring
- No direct backup/restore

FEATURED

- Highly available and scalable
- Performance pools
- Cloud first
- 99.99% of availability SLA (all service tiers)
- Databases are highly isolated
- Managed backups
- Geo-replication

- Built-in IA
- Automatic tuning
- Extensive monitoring
- Advanced Security

PRICING

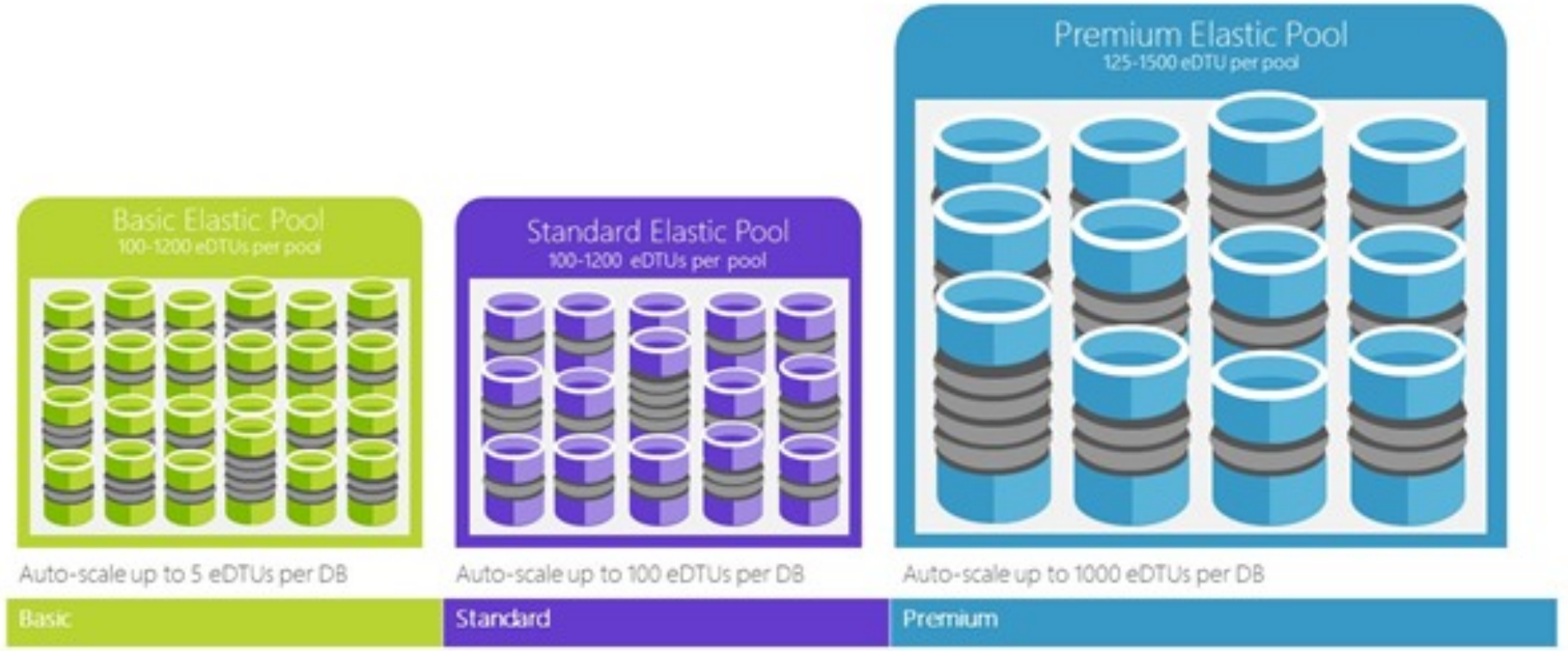
- DTU
  - Blended measure of CPU, memory and re-write rates
  - Basic, standard and premium
- eDTU
  - Elastic database pool, provides DTU's and storage
- vCore
  - General purpose
  - Business critical

Pricing Tier	Details
Basic	Works best for small databases
	2 GB database size limit
	DTU limit 5
	Point in time restore 0 to 7 days
	Geo-Restore
	Max concurrent requests 30
	Max concurrent logins 30
	Max sessions 300

Pricing Tier	Details
Basic	Works best for cloud applications
Standard	250 GB database size limit
	DTU 10 to 100
	Point in time restore 0 to 35 days
	Standard Geo-replication, offline replica
	Max concurrent requests 60 to 200
	Max concurrent logins 60 to 200
	Max sessions 600 to 2,400

Pricing Tier	Details
Basic	Works best for highly transactional applications
Standard	1 TB database size limit
Premium	DTU 125 to 4,000
	Point in time restore 0 to 35 days
	Active Geo-replication, 4 online readable replicas
	Max concurrent requests 200 to 6,400
	Max concurrent logins 200 to 6,400
	Max sessions 2,400 to 32,000

EDTU


Premium Elastic Pool
125-1500 eDTU per pool
Basic Elastic Pool
100-1200 eDTUs per pool
Standard Elastic Pool
100-1200 eDTUs per pool
Auto-scale up to 5 eDTUs per DB
Auto-scale up to 100 eDTUs per DB
Auto-scale up to 1000 eDTUs per DB
Basic
Standard
Premium

DEMO

DTU

	Basic	Standard				Premium				
		S0	S1	S2	S3	P1	P2	P4	P6/P3	P11
Maximum database size	2 GB	250 GB				500 GB				1 TB
DTUs	5	10	20	50	100	125	250	500	1,000	1,750
Point-in-time restore	Any point last 7 days	Any point last 14 days				Any point last 35 days				
Disaster recovery	Geo-Restore, restore to any Azure region	Standard Geo-Replication, offline secondary				Active Geo-Replication, up to 4 online (readable) secondary backups				
Max In-Memory OLTP storage	NA	NA	NA	NA	NA	1 GB	2 GB	3 GB*	8 GB	10 GB*
Max concurrent requests	30	60	90	120	200	200	400	800	1,600	2,400
Max concurrent logins	30	60	90	120	200	200	400	800	1,600	2,400
Max sessions	300	600	900	1,200	2,400	2,400	4,800	9,600	19,200	32,000

** In-Memory OLTP storage limits will soon adjust to 4 for P4 and 14 for P11.*

[Detailed information about DTUs]
[Detailed information about pricing]

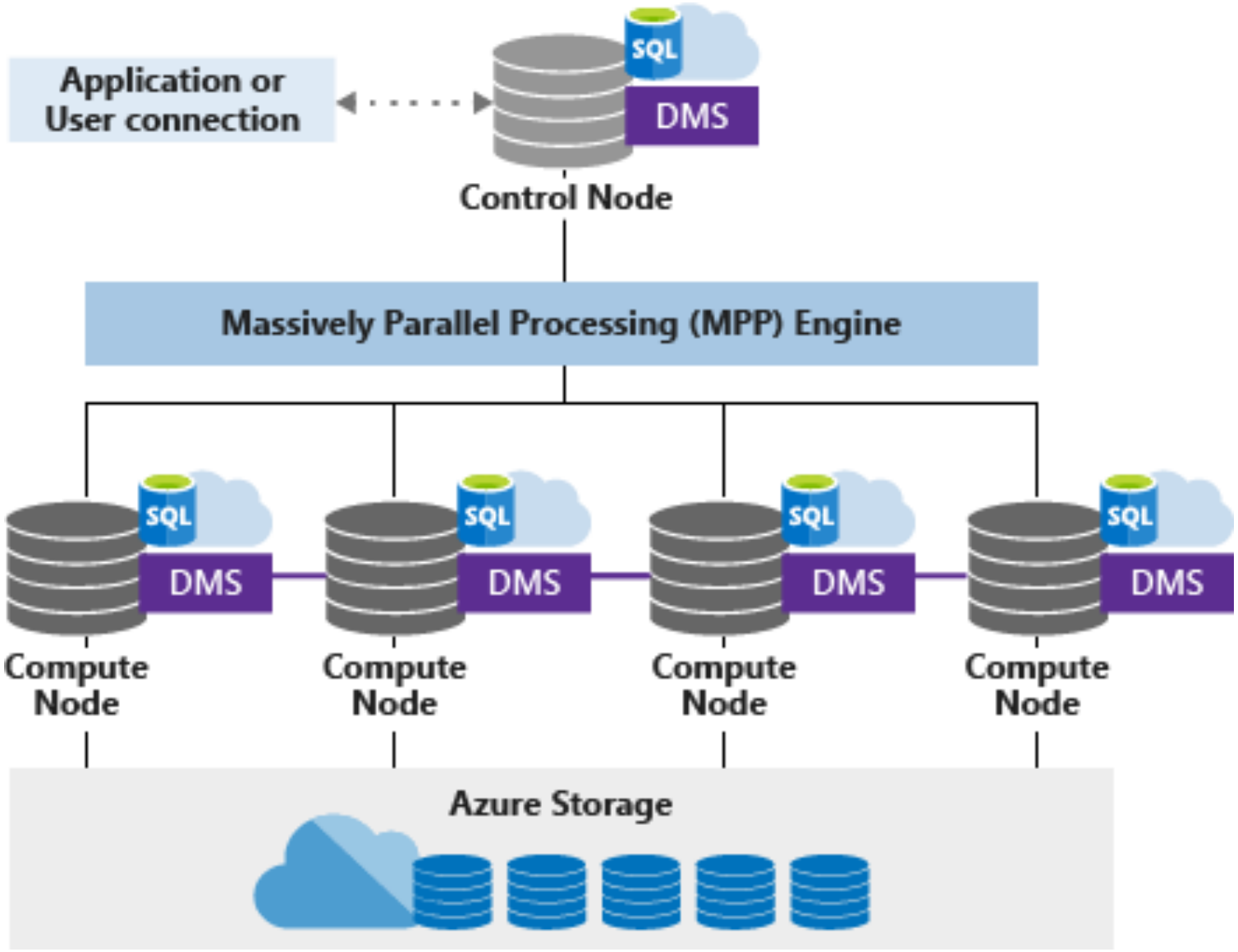
ADVANTAGES

- Backups fully automated and managed
- Multiple HA options
- Built-in performance monitoring
- Very secure
- Multiple management tools

DEMO

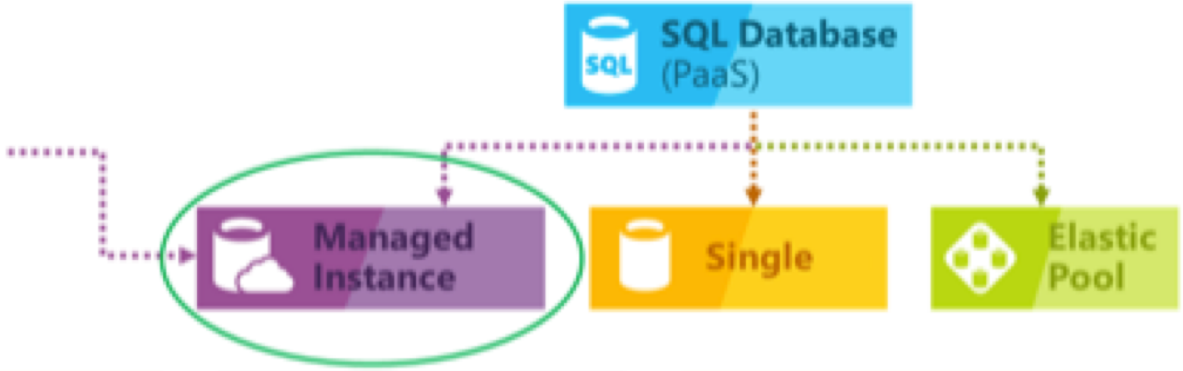
AZURE SQL DATA WAREHOUSE

- PaaS
- Massive parallel processing
  - Control node
  - Compute node
- DMS
- Decoupled storage and compute
- Can be paused


Application or
User connection
SQL
DMS
Control Node
Massively Parallel Processing (MPP) Engine
SQL
DMS
Compute
Node
SQL
DMS
Compute
Node
SQL
DMS
Compute
Node
SQL
DMS
Compute
Node
Azure Storage

SQL DATABASE MANAGED INSTANCE

New deployment option that enables frictionless migration for SQL apps and modernization in a fully managed service



Easy lift and shift	Fully managed PaaS	Full isolation and security	New business model
• Fully-fledged SQL instance with nearly 100% compat with on-prem	• Built on the same PaaS service infrastructure • All PaaS features	• Native VNET implementation • Private IP addresses	• Competitive • Transparent • Frictionless

Easy migration: nearly 100% like SQL Server

Data migration

- Native backup/restore
- Configurable DB file layout
- DMS (migrations at scale)

Security

- Integrated Auth (Azure AD)
- Encryption (TDE, AE)
- SQL Audit
- Row-Level Security
- Dynamic Data Masking

Programmability

- Global temp tables
- Cross-database queries and transactions
- Linked servers
- CLR modules

Operational

- DMVs & XEvents
- Query Store
- SQL Agent
- DB Mail (external SMTP)

Scenario enablers

- Service Broker
- Change Data Capture
- Transactional Replication

FEATURED

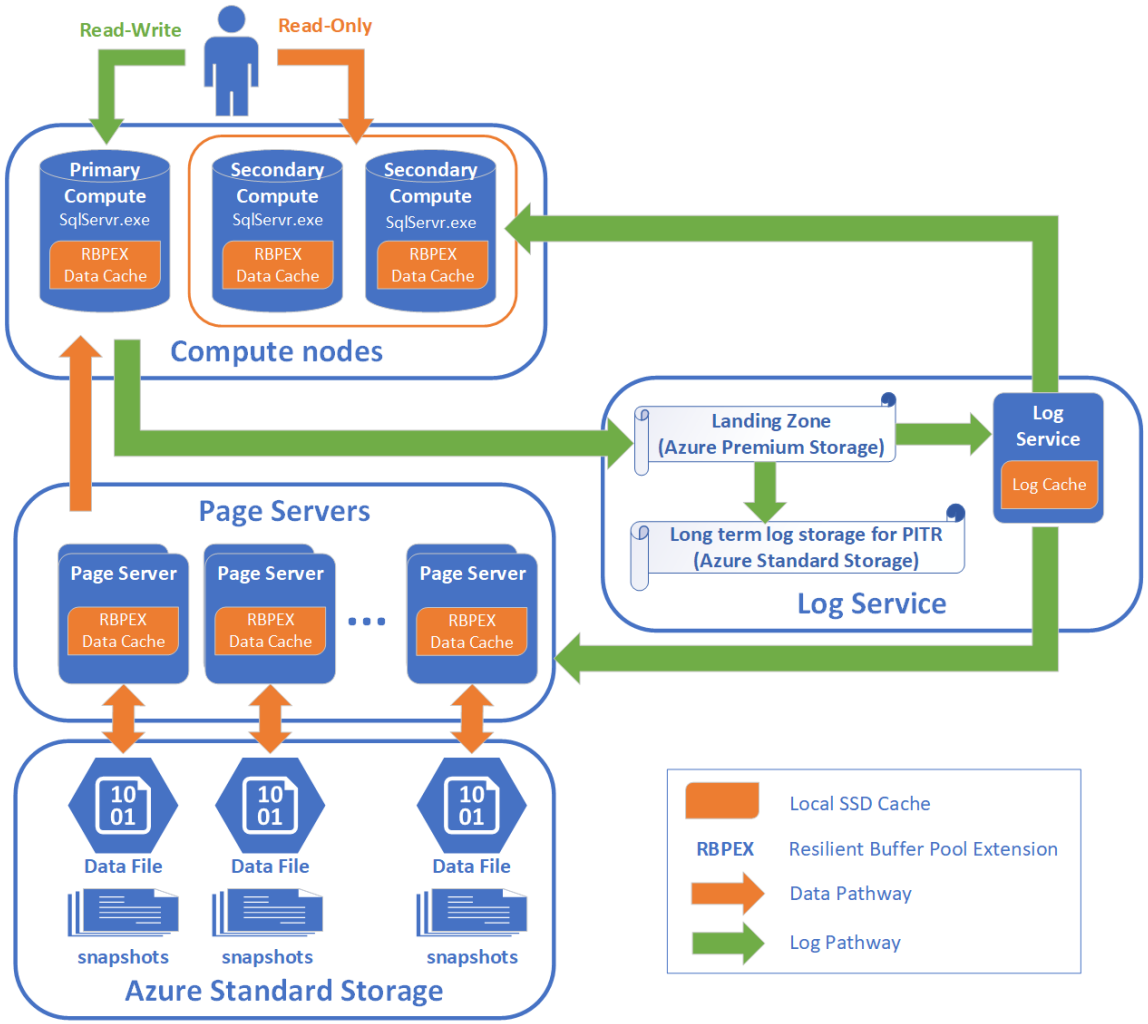
- Less migration issues
- Backward compatibility (from 2008)
- Cross database queries supported
- 99.99% of availability SLA (all service tiers)
- Managed backups
  - Can restore from SQL Server on premise
- TDE - Bring your own keys
- SSIS supported
- DB mail supported
- Service broker supported
- CDC supported
- CLR supported

PRICING – VCORE MODEL

- General purpose
  - Ideal for typical performance and IO latency requirements
  - High-performance Azure Premium storage (8 TB)
  - Built-in High-availability based on reliable Azure Premium Storage and Azure Service Fabric
- Business critical
  - Ideal for highest performance and HA requirements
  - Super fast SSD storage (up to 1 TB on Gen 4 and up to 4 TB on Gen 5)
  - Built-in High availability based on Always On Availability Groups and Azure Service Fabric
  - Built-in additional Read-only database replica for reporting and other read-only workloads

HYPERSCALE

- Up to 100 TB of database size
- Instantaneous backups
- Fast database restore
- Higher over performance
- Rapid scale out
- Rapid scale up



START YOUR AZURE EXPERIENCE

- Azure free trial
  - $200 of credit
  - 30 days until subscription is exhausted
- Microsoft hands-on labs
  - Self-paced
  - More than 25 Azure related labs
- Microsoft learn
  - 101 series
  - Learning paths

QUESTIONS ?

- For more information
  - Azure SQL DB
  - Azure SQL Data warehouse
  - Azure SQL Database managed instance
  - Microsoft Hands-on Labs
  - Microsoft Learn

DBA MASTERY

/croblesdba

@dbamastery

dbamastery@gmail.com

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THANKS !!!