

# GROUPBY 2020 | OCT 27-28

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Free Online Training for Data Professionals.  
By the Community, for the Community.





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Azure SQL Database Administration for the On-prem DBA







Ahmad Osama

Technical Architect, Pitney Bowes India

<https://datapatformlabs.com>

[https://twitter.com/\\_ahmadosama](https://twitter.com/_ahmadosama)

Author – Professional Azure SQL Database Administration

Blog – <https://datapatformlabs.com>



# Mentor - Ben Weissman



LinkedIn - <https://www.linkedin.com/in/weissmanben/>

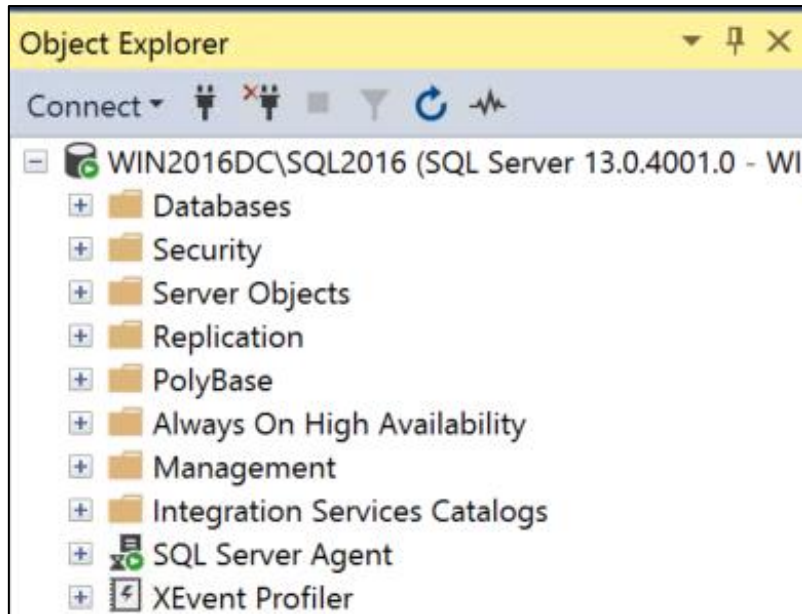
Twitter - <https://twitter.com/bweissman>

# Agenda

- Azure SQL Family
- Azure SQL Database difference with On-Prem
- Who manages What?
- Capacity Planning
- Migration
- Security
- Cost Optimization
- Monitoring
- HA & DR
- Scaling
- Database Maintenance

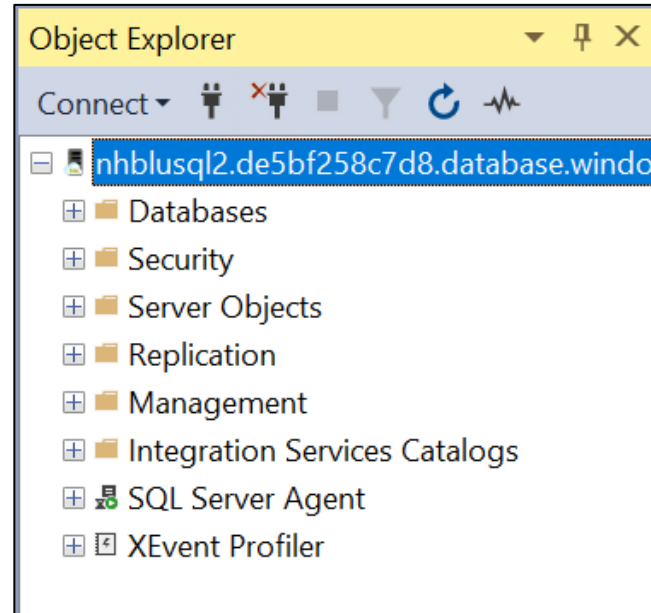
# Azure SQL Family

SQL Server on Azure VM



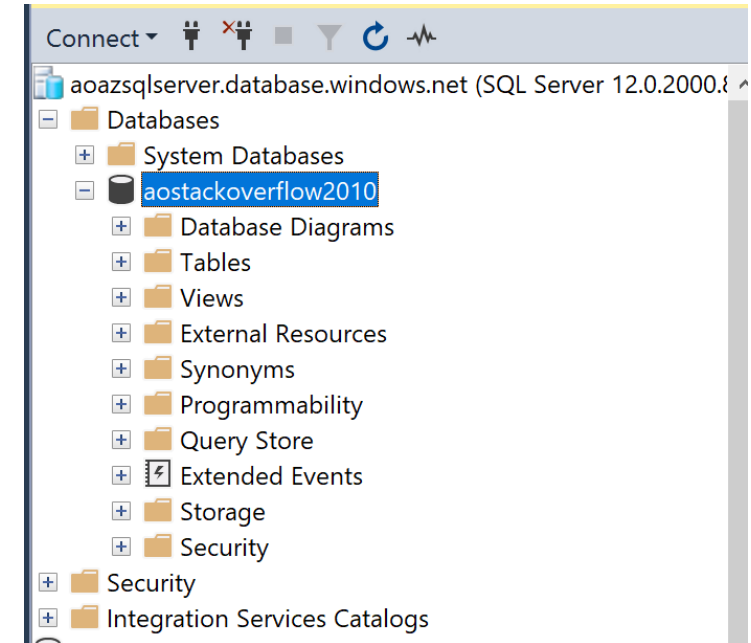
IaaS

Azure SQL Managed Instance



PaaS

Azure SQL Database



PaaS

# Azure SQL Database and On-Prem Differences

- Recovery Model
- SQL Server Agent
- Change Data Capture
- Database Mirroring
- Replication
- Multi-Part names & Cross Database Queries
- Filestream
- SQL CLR
- Table Partitioning
- Auditing
- Global Temporary Tables
- SQL Browser Service
- Database mail
- Resource Governor
- Log Shipping
- SQL Trace and Profiler
- Trace Flags

Complete list - <https://docs.microsoft.com/en-us/azure/azure-sql/database/features-comparison>



# Demo

Provision an Azure SQL Database

# Who Manages What?

## You

- Capacity Planning
- Migration
- Monitoring
- Performance tuning
- Database level configuration
- Database maintenance
- Fix outages
- Database design
- Automation
- Cost Optimization

## Microsoft

- Hardware, Data Centre, Virtualization
- Operating System
- SQL Installation, Configuration, Patches
- Backup & Restore
- HA & DR
- Security
- Scaling
- Auditing

# Capacity Planning

- Compute tiers
- Purchasing options
- Service tiers – Service Objectives



# Compute tiers

- Serverless
  - Automatically scale compute as required
  - Unpredictable workload with intermittent duration of pauses
- Provisioned
  - Fixed capacity, for predictable workload

# Purchasing Options

## Database Transaction Unit

- $fn(\text{CPU, Memory, Data I/O, Log I/O}) = x \text{ DTU}$
- More DTU – More Power – Better Performance
- Service tiers – Basic, Standard and Premium
- 1 DTU = ~ 1 transaction/sec

## vCore

- Provides flexibility when choosing compute and storage.
- Save licensing cost by using existing on-premise SQL Server licenses
- Service tiers – General Purpose, Hyperscale, Business Critical
- 100 DTU = ~ 1 vCore (Basic & Standard)
- 125 DTU = ~ 1 vCore (Premium tier)

<https://docs.microsoft.com/en-us/azure/azure-sql/database/migrate-dtu-to-vcore>

# Pricing Tier

## DTU

- Basic
- Standard
- Premium
- [Service tiers dtu](#)
- [DTU Resource limits](#)
- [Tempdb limit](#)

## vCore

- General Purpose
- Hyperscale
- Business critical
- Hardware Generation
- [Service tiers vCore](#)
- [Resource limit](#)



# Demo

Selecting an appropriate performance tier

# Migration

- Steps
  - Asses the compatibility issues
  - Select region and pricing tier
  - Provision the database
  - Migrate the database
- Tools
  - Data Migration Assistant
  - SQL Server Data Tools (SSDT) for Visual Studio
  - SQL Server Management Studio
  - SQLPackage.exe
  - SQL Azure Migration Wizard
  - Azure Database Migration Services
  - Transactional replication

# Demo

Migrate an on-prem SQL Server to an Azure SQL Database



# Security

- Firewall rules
- Service endpoints
- Private endpoints
- Authentication
- Authorization

# Demo

Secure an Azure SQL Database

# Monitoring

- Azure Portal
  - Performance Overview
  - Performance recommendations
  - Query Performance Insight
  - Diagnostic logs
  - Alerts
- T-SQL – DMVs
- Third party

<https://github.com/denzilribeiro/sqlldbmonitoring>

<https://sqlwatch.io/>

# Demo

Monitoring an Azure SQL Database using Azure Portal  
Configure Alerts



# Data Movement

- Sync to other databases (Azure Data Sync)
  - Eventual consistency
  - Use of triggers to track changes and therefore affects the performance of source database
  - Minimum sync interval is 5 minutes
  - Identity column as primary key
  - Same name different schema tables aren't supported
  - Schema changes are not synced
  - Use case – offload read workload, migrating data from on-premise to cloud.
- Azure Data Factory
  - SSIS on cloud
  - Compatibility with on-premise SSIS packages
  - SSIS catalog in Azure SQL Database

# HA & DR

- Zone redundant configuration
  - Supported in premium service tier within 1 TB size
  - Database replica in another availability zone
- Active Geo-replication
  - Async AlwaysOn AG replica
  - Maximum 4 readable secondary replica in same or different region
  - Single database
  - Manual failover
- Auto-failover groups
  - Failover one or more database in a one Azure SQL Server.
  - Automatic failover
  - Replica can't be in same region
  - Single replica

# Demo

Configure Geo-replication

Configure Auto-failover groups

# Scaling

- Vertical scaling
  - Configure alerts to auto-scale as per threshold
  - Minor service interruption
  - Scaling depends on database size
- Horizontal scaling
  - Shard single database into multiple individual database
  - Elastic jobs to query across shards



# Demo

Automate vertical scaling

# Database Maintenance task

- Index maintenance
  - Elastic Database Job (preview), Azure Automation
- CHECK DB
  - Optional - <https://azure.microsoft.com/en-gb/blog/data-integrity-in-azure-sql-database/>

# Demo

Schedule index maintenance on an Azure SQL Database

# Cost Optimization

- Choosing an appropriate initial database performance tier
- Scale-up or scale-down based on performance to save cost
- Using existing license to avail Azure Hybrid Benefit
- Dev/Test pricing
- Data movement from on-premise to Azure
- Consider cost when using a PaaS feature such as Geo-Replication, Restore, data sync and others.

# Summary

## You

- Capacity Planning
- Migration
- Monitoring
- Performance tuning
- Database level security
- Database level configuration
- Database maintenance
- Troubleshooting outages
- Database design
- Automation

## New Skills

- Understand Azure Architecture
- Learn supporting Azure services such as Azure Storage, Azure Networking , Azure Data Factory and more!!!
- DevOps – PowerShell/Python, Azure Automation, terraform
- New Monitoring tools  
and more!!!



# Further reading

Azure SQL Bootcamp

[https://www.youtube.com/playlist?list=PLlrXD0HtieHjveswk8\\_gkPD42Te48X4zG&WT.mc\\_id=learnlive-video-learn](https://www.youtube.com/playlist?list=PLlrXD0HtieHjveswk8_gkPD42Te48X4zG&WT.mc_id=learnlive-video-learn)

Professional Azure SQL Database Administration (Second Edition)- eBook

<https://azure.microsoft.com/en-in/resources/professional-azure-sql-database-administration/>

Azure SQL Workshop

<https://github.com/microsoft/sqlworkshops-azuresqlworkshop>

Monitor Azure SQL DB – Open source

<https://techcommunity.microsoft.com/t5/azure-sql/monitoring-azure-sql-database-with-telegraf/ba-p/882790>

<https://sqlwatch.io/>