


**SQLskills *presenting* for
Kansas City SQL Server User Group
21st September 2018**

**Azure SQL Database for the Production
DBA**

Tim Radney
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- Team of world-renowned SQL Server experts:
 - Paul S. Randal (@PaulRandal)
 - Glenn Berry (@GlennAlanBerry)
 - Jonathan Kehayias (@SQLPoolBoy)
 - Kimberly L. Tripp (@KimberlyLTripp)
 - Erin Stellato (@ErinStellato)
 - Tim Radney (@TRadney)
- Instructor-led training: Immersion Events (US, UK, and Ireland)
- Online training:  PLURALSIGHT <http://pluralsight.com/>
- Consulting: health checks, hardware, performance, upgrades
- Remote DBA: system monitoring and troubleshooting
- Conferences: PASS Summit, SQLintersection
- Become a SQLskills Insider
 - <http://www.sqlskills.com/Insider>



2018 Classes and Services

Training

- In-depth, instructor-led, technical training for SQL Server
 - Held in the US (Chicago, IL and Bellevue, WA), the UK, Ireland, and Australia
- Online, LIVE, Immersion Events through the year
 - Coming up in 2018 – in October:
 - IETLB: Immersion Event on Transactions, Locking, Blocking, Isolation, Versioning
 - IEQUERY: Immersion Event on Fixing Slow Queries, Inefficient Code, and Caching/Statistics Problems
 - US\$699 each or US\$1,749 combo
 - Always announced first, and with a special discount, in our Insider newsletter
 - <https://www.sqlskills.com/Insider>
- For more information: <https://www.sqlskills.com/training/>

Consulting

- New client discount: US\$2,995 flat rate on first single-instance health check
- For more information: <https://www.sqlskills.com/services/>

Our Fall SQLintersection Show

December 2-8, 2018 – in Las Vegas, NV

40+ SQL Sessions and 9 workshops:

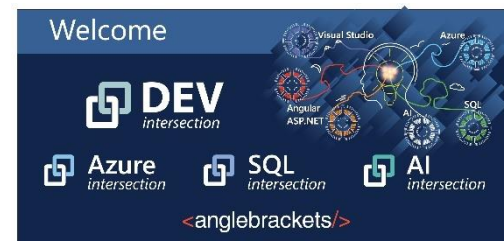
- **3 pre-conference workshops on Sunday, December 2, 2018**
 - **Due Data Diligence: Developing a Strategy for BI, Analytics, and Beyond** with Stacia Varga
 - **Developer's Guide to SQL Server Performance** with Brent Ozar
 - **Levelling up with PowerShell for the DBA** with Ben Miller
- **3 pre-conference workshops on Monday, December 3, 2018**
 - **Performance Troubleshooting using Waits and Latches** with Paul Randal
 - **Modernize Your Applications with Azure SQL Managed Instance** with Tim Radney and David Pless
 - **High Performance, Scalable, Asynchronous Processing using Service Broker** with Jonathan Kehayias
- **3 post-conference workshops on Friday, December 7, 2018**
 - **SQL Server 2016 / 2017 and Power BI Reporting Solutions** with David Pless
 - **Troubleshoot Like a Microsoft Engineer** with Tim Chapman
 - **Using Query Store to Easily Troubleshoot and Stabilize Your Workload** with Erin Stellato

Industry-experts and Microsoft speakers

Sessions on performance tuning, troubleshooting, coding / development, query tuning, architecture, new features + vNext, plus much more!

Learn real-world solutions and bring back immediate ROI!

See more information online at www.SQLintersection.com





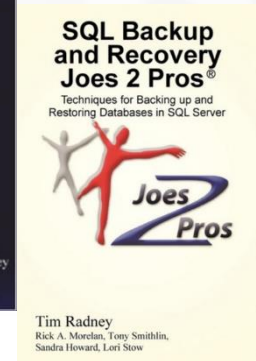
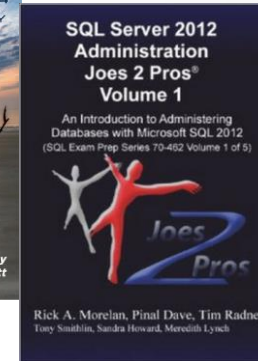
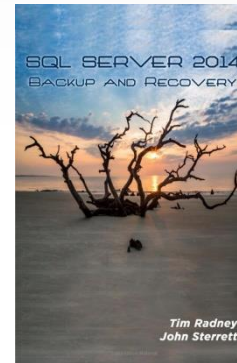
PLURALSIGHT

- Email paul@SQLskills.com with the subject line:
evvPASS Pluralsight code
Get a FREE (no catches / no credit card) 30-day trial of our **175+ hours** of SQLskills content on Pluralsight including 10+ hours on Optimizing Procedural Code!
- Check out courses like these:
 - [SQL Server: Why Physical Database Design Matters](#)
 - 4 hours on row structures, index structures, and why these things matter
 - [SQL Server: Optimizing Stored Procedure Performance](#) (Parts 1 and 2)
 - 11 hours on stored procedure performance tuning
 - [SQL Server: Understanding and Using Azure SQL Database](#)
 - 2 hours on Azure SQL Database
- See our full online library:
<https://www.sqlskills.com/sql-server-training/online-training/>

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 - Blog: <http://www.timradney.com>
 - Twitter: @TRadney
- Microsoft Data Platform MVP
- Chapter Leader "Columbus GA SQL Users Group"
- PASS Regional Mentor "South East USA"
- Outstanding PASS Volunteer
- Regular presenter at worldwide conferences on administration, disaster recovery, performance tuning, and Azure
- Friend of Red Gate
- (I also like electronics, aquaponics, farming chickens, crops, and tilapia)



SQL
intersection

Overview

- What is Azure SQL Database?
- Features
- Unsupported features
- Demo: creating an Azure SQL Database
- Demo: DTU Calculator
- Tuning differences
- Tuning options
- Demo: tuning options

What is Azure SQL Database?

- Azure SQL Database is a database-as-a-service
 - SQL Database is a cloud relational database service
 - Predictable performance and pricing
 - Elastic database pool for unpredictable workloads
 - 99.99% availability built-in
 - Geo-replication and restore services for data protection
 - Supports existing SQL Server tools, libraries, and APIs
 - Scalability with minimal effort
 - Secure and compliant for your sensitive data

Features

- Backups
 - They are handled for you; you handle restores
 - Point-in-time restores
 - Retention is based on tier
 - *Basic* = 7 days; *Standard* = 35 days; *Premium* 35 days
 - Restores are to a new database
 - <https://azure.microsoft.com/en-us/documentation/articles/sql-database-business-continuity/>

Features

- Dynamic Data Masking
 - Can limit access to sensitive data by controlling how the data appears
 - Masking rules can be defined on particular columns
 - No physical changes are made to the data
 - <https://azure.microsoft.com/en-us/documentation/articles/sql-database-dynamic-data-masking-get-started/>
- Row-Level Security
 - Can restrict row-level access based on a user's identity
 - Access restriction logic is located in the database tier
 - <https://msdn.microsoft.com/en-us/library/dn765131.aspx>

Features

- Always Encrypted
 - Allows clients to encrypt sensitive data inside client applications and not reveal the encryption keys to the Database Engine
 - Can ensure sensitive data never appears as plaintext inside the system
 - Only client applications or app servers that have access to the keys can access plaintext data
 - Encryption keys are stored in the Azure Key Vault
 - <https://msdn.microsoft.com/en-us/library/mt163865.aspx>

Features

- Transparent Data Encryption
 - Real-time encryption and decryption of the database, backups, and transaction log files at rest
 - Encrypts the storage of an entire database by using a symmetric key
 - <https://msdn.microsoft.com/en-us/library/dn948096.aspx>
- Geo-replication
 - Available in all tiers
 - Provides a replica database (secondary) in a different region
 - Estimated Recovery Time (ERT) <30s with a Recovery Point Objective (RPO) <5s
 - <http://bit.ly/1McsB0y>

Features

- Elastic database pools
 - Pool of resources (eDTUs) that individual databases can auto-scale within set parameters
 - Under heavy load, a database can consume more eDTUs to meet demand
 - Provisioning resources for an entire pool simplifies management tasks rather than for each database
 - <http://bit.ly/23fDp2d>
- In-memory support for Premium tier
 - A memory-optimized table is represented in active memory
 - <http://bit.ly/1WLQoDy>

Features

- Query Store
 - Detailed historical information about all queries
 - Enables you to easily identify queries that are performing poorly
 - Keeps a history of each query, including its associated plans, run-time statistics, and information about resource consumption
 - Query Store is a database level feature, recently enabled by default
 - <https://msdn.microsoft.com/en-US/library/dn817826.aspx>
- Index Advisor
 - Provides index recommendations that have the potential to improve current query performance
 - <http://bit.ly/1HikabH>

Unsupported Features

- No SQL Server Agent
 - You can use an on-premises SQL Server Agent
 - You can use an Azure VM running SQL Server
 - PowerShell, Azure Automation, Elastic Jobs
- No Cross-Database queries
- Database Mail
- Events, event notifications, and query notifications
- SQL Server Trace / Profiler
- Trace flags
- SSIS and SSRS
- Log shipping, database mirroring, transactional replication
- And more ... <http://bit.ly/1f5VcUW>

Creating an Azure SQL Database

DEMO



DTU Calculator

DEMO



Tuning Differences

- Instance level settings you can't change
 - Tempdb
 - Cost threshold for parallelism
 - Max degree of parallelism
 - Min and max server memory
 - Optimize for ad hoc workloads
 - Anything requiring sp_configure and RECONFIGURE
- DBCC FREEPROCCACHE not supported

Tuning Options – Higher Tier

Basic 5 DTUs \$4.99 USD	Standard S0 10 DTUs \$15.00 USD	Standard S1 20 DTUs \$30.00 USD	Standard S2 50 DTUs \$75.02 USD
Standard S3 100 DTUs \$150.00 USD	Standard S4 200 DTUs \$150.01 USD	Standard S6 400 DTUs \$300.02 USD	Standard S7 800 DTUs \$600.04 USD
Standard S9 1600 DTUs \$1,200.07 USD	Standard S12 3000 DTUs \$2,250.14 USD	Standard storage 300GB \$ 4.25 400GB \$12.75 500GB \$21.25	Standard storage 750GB \$42.50 1,024GB \$65.79

S4 – S12 and storage increase pricing are preview pricing, prices will increase after GA

Tuning Options – Higher Tier

Premium P1
125 DTUs
\$465.00 USD

Premium P2
250 DTUs
\$930.00 USD

Premium P4
500 DTUs
\$1,860.00 USD

Premium P6
1000 DTUs
\$3,720.00 USD

Premium P11
1750 DTUs
\$7,000.11 USD

Premium P15
4000 DTUs
\$15,999.97 USD

In-Memory Support
Increases as you
scale

Tuning Options

- With minor changes, your existing workload scripts should work
 - File statistics
 - <http://www.sqlskills.com/blogs/paul/how-to-examine-io-subsystem-latencies-from-within-sql-server/>
 - sys.master_files does not exist, modified to use sys.databases
 - File statistics over time
 - <http://www.sqlskills.com/blogs/paul/capturing-io-latencies-period-time/>
 - sys.master_files does not exist, modified to use sys.databases

Tuning Options

- With minor changes, your existing workload scripts should work
 - Wait statistics
 - <http://www.sqlskills.com/blogs/paul/wait-statistics-or-please-tell-me-where-it-hurts/>
 - sys.dm_os_wait_stats contains wait statistics for the container your database is in, use sys.dm_db_wait_stats for database specific data
 - Waits over a period of time
 - <http://www.sqlskills.com/blogs/paul/capturing-wait-statistics-period-time/>
 - Change os to db,
- Getting started tuning performance in Azure SQL Database
 - <http://bit.ly/1pHB7dn>
- Glenn Berry DMVs – includes Azure SQL Database
 - <https://www.sqlskills.com/blogs/glenn/category/dmv-queries/>

Tuning Options

DEMO



Summary

- What we covered
 - What is Azure SQL Database?
 - Features
 - Unsupported features
 - Demo: creating an Azure SQL Database
 - Demo: DTU Calculator
 - Tuning differences
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 - Demo: tuning options

Thank you!

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