Microsoft

Activate Azure with DevOps

Microsoft Services

Microsoft

Activate Azure with DevOps

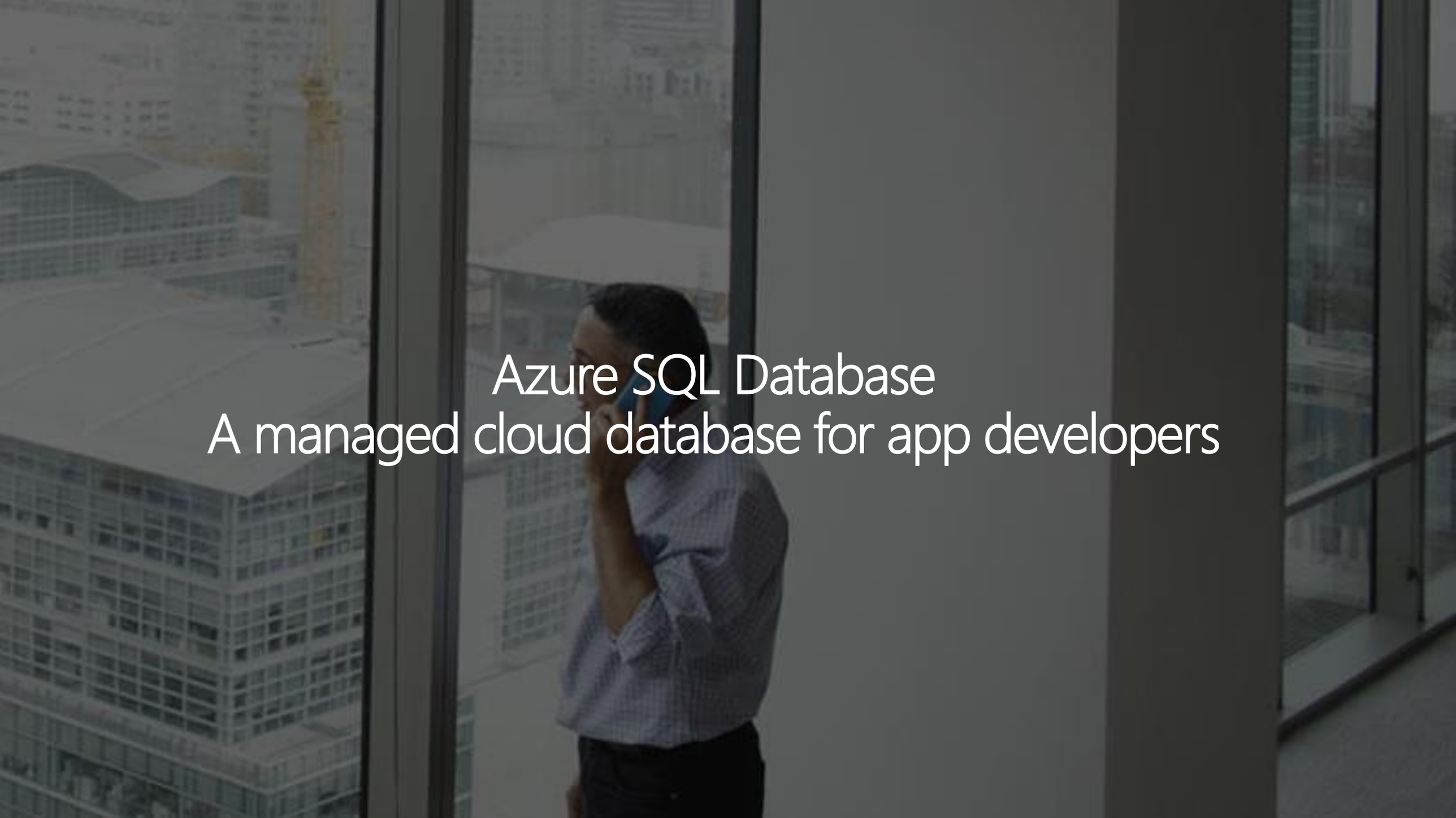
Section 3: Introduction to SQL Azure

Microsoft Services

Objectives

After completing this learning unit, you will understand:

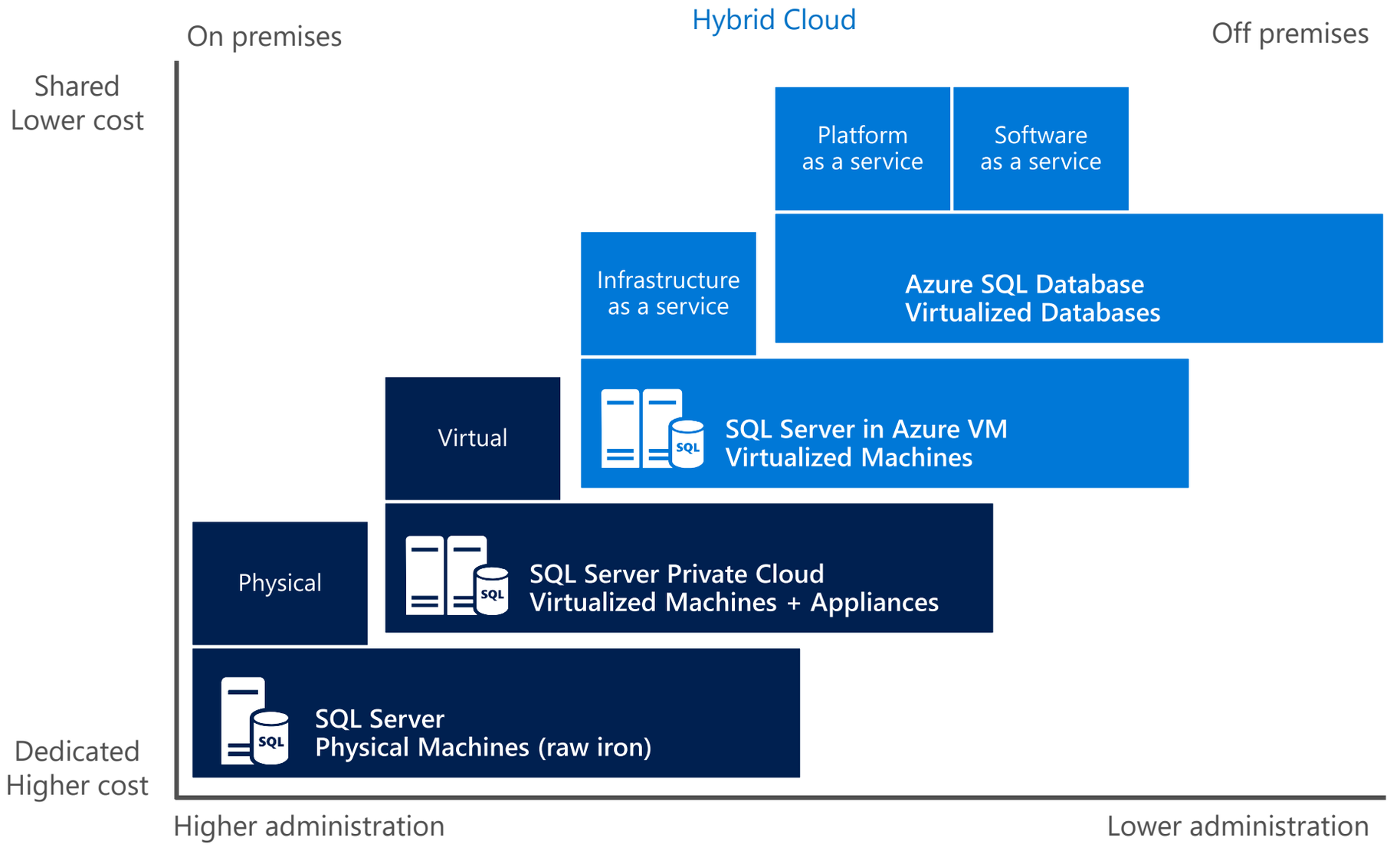
- SQL Database Basics
- Create and Deploy Databases
- Monitoring



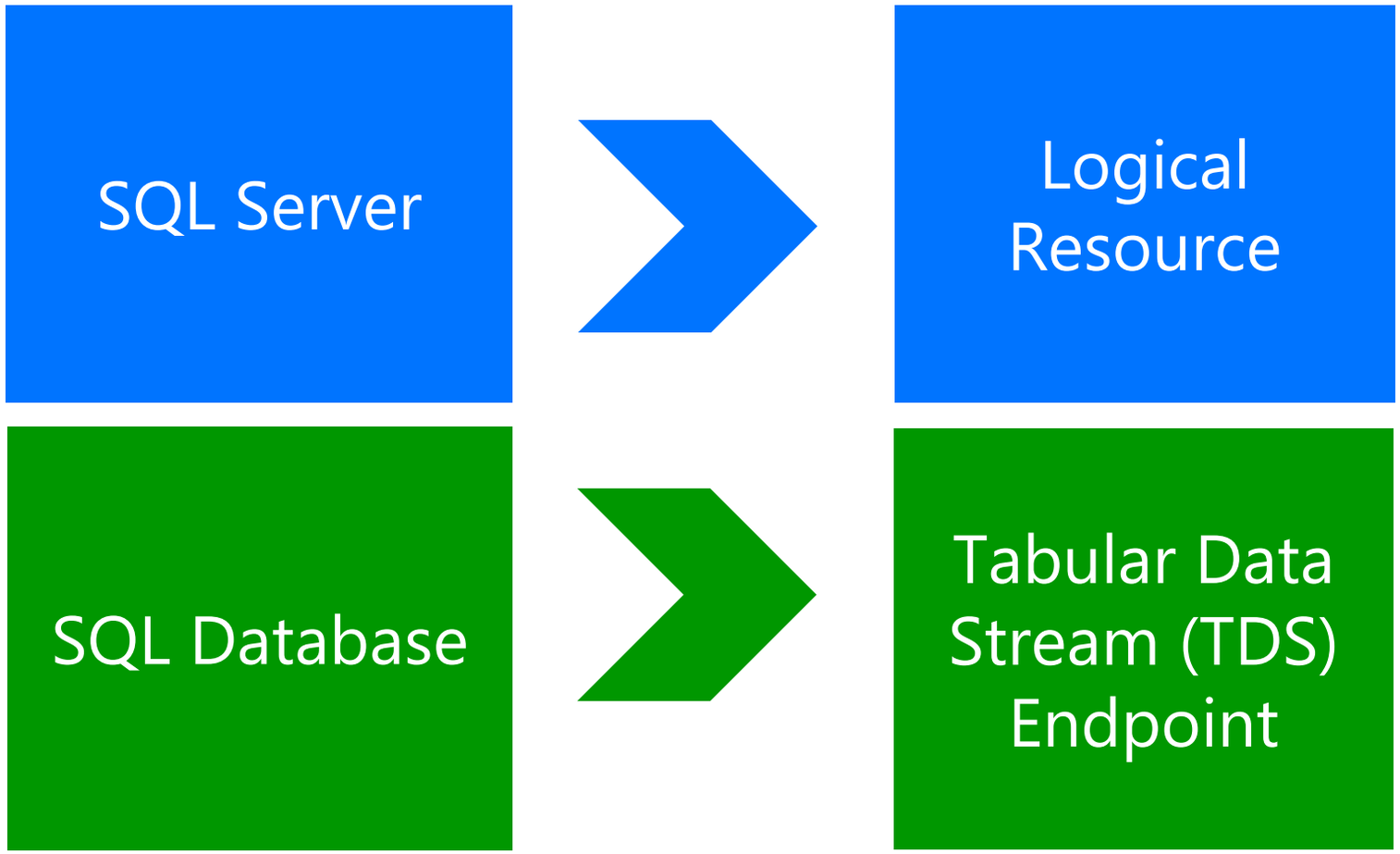
Azure SQL Database
A managed cloud database for app developers

SQL Database Basics

Data Platform Continuum



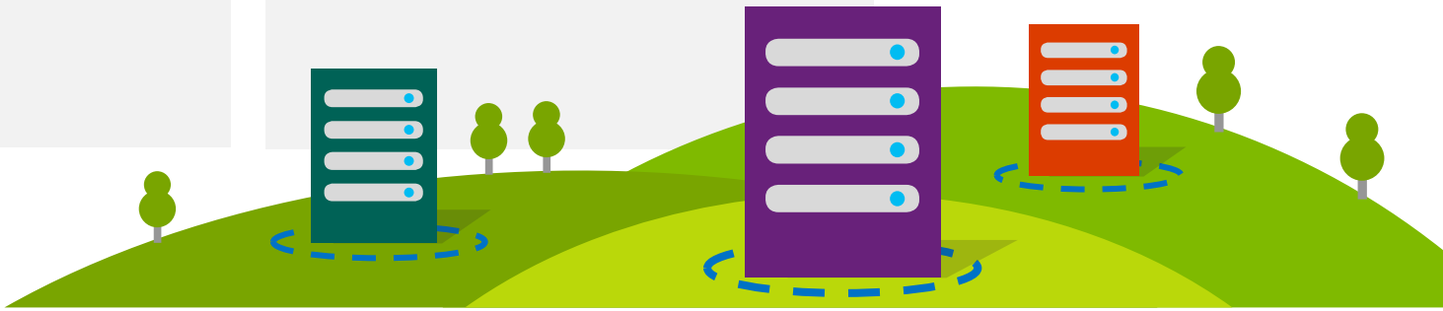
An Azure SQL Server (SQL Database) is not a Machine



SQL Database Service

- A relational **database as a service**, fully managed by Microsoft
- For cloud-designed apps when **near-zero administration** and **enterprise-grade** capabilities are key
- Perfect for cloud **architects and developers** looking for programmatic DBA-like functionality

Elastic Scale and performance	Business continuity and data protection	Familiar and self-managed
Predictable performance levels	Self-service restore	Familiar & compatible
Programmatic scale-out	Disaster recovery	Programmatic
Dashboard views of database metrics	Compliance-enabled	Self-managed



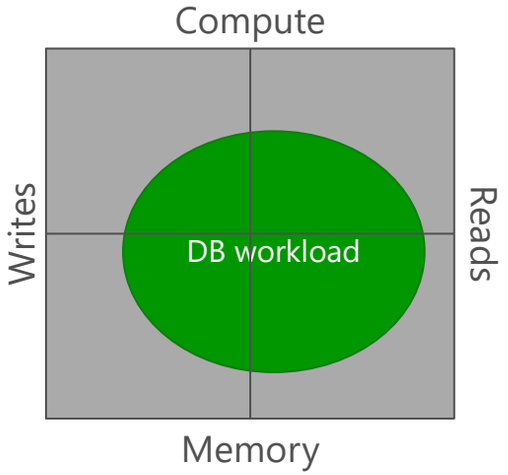
The Basics

SQL Database

- SQL Database technology as a service
- Fully managed
- Enterprise-ready with automatic support for High Availability
- Designed to scale-out elastically with demand
- Ideal for simple and complex applications
- Three copies of the database for the cost of one database—always in sync

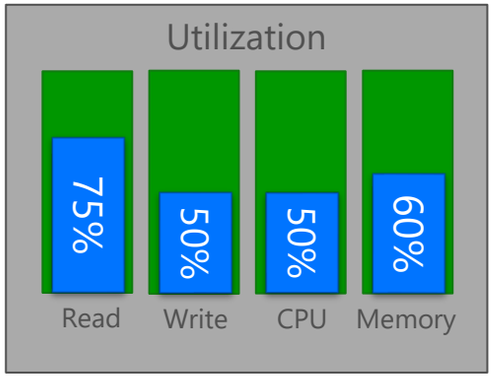
Database Throughput Unit – DTU

Bounding Box



Monitoring

% of current Performance Level



Benchmark vs. DTU

2x DTU
~
2x Throughput in Benchmark

- Abstraction from the underlying hardware
- Blended measure of CPU, memory, and read and write rates
- Represents the relative power (resources) assigned to the database
- Allows for comparison of the power across performance levels

Create and Deploy Databases

Server Provisioning

Server defined

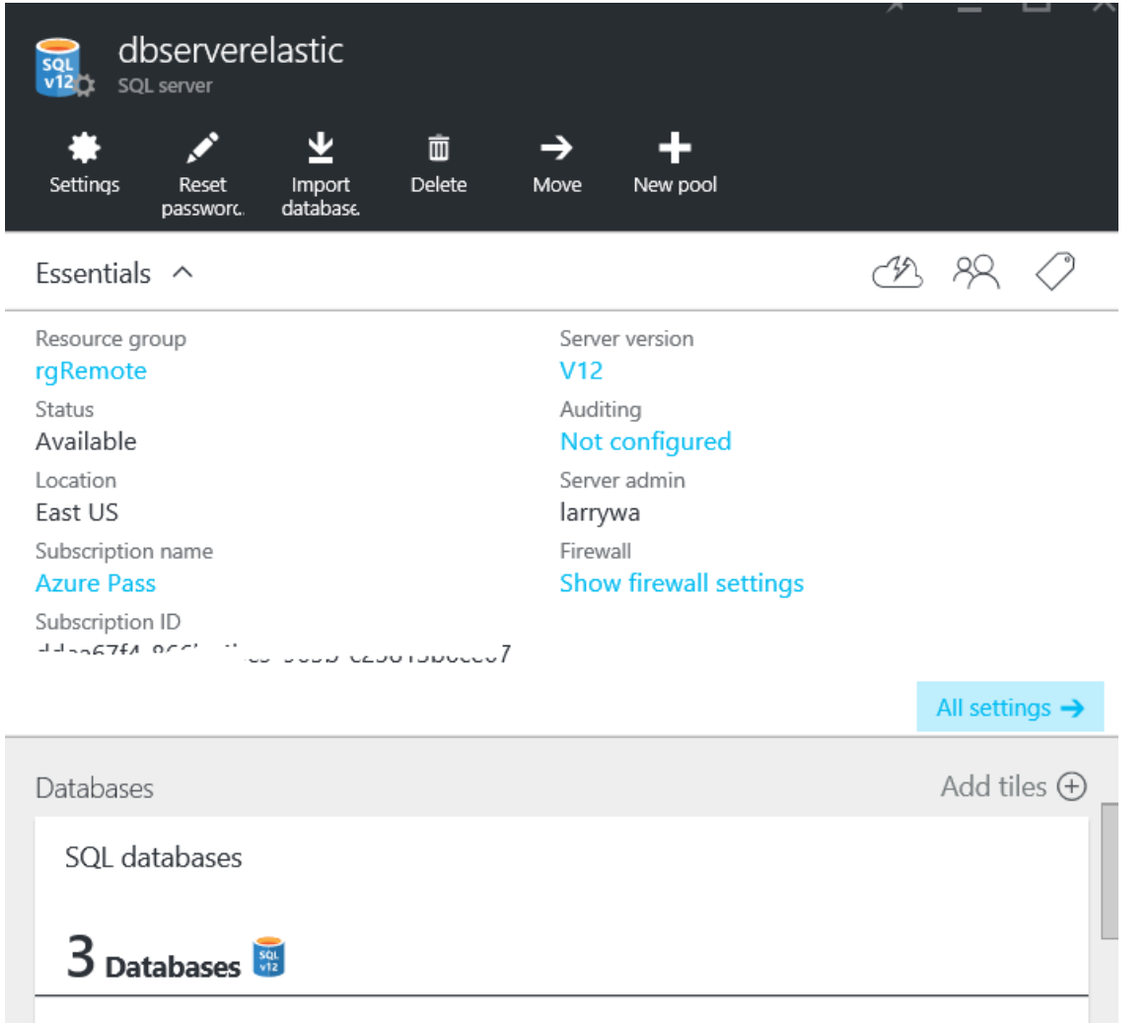
- Service head that contains databases
- Connect via automatically generated fully qualified domain name (FQDN) (xxx.database.windows.net)
- Initially, contains only a master database

Provision servers interactively

- Log on to Microsoft Azure Management Portal
- Create a SQL Database
- Specify admin login credentials
- Add firewall rules and enable service access

Automate server provisioning

- Use Microsoft Azure module for Windows PowerShell cmdlets (or use Representational State Transfer (REST) API directly)
- https://www.windowsazure.com/en-us/downloads

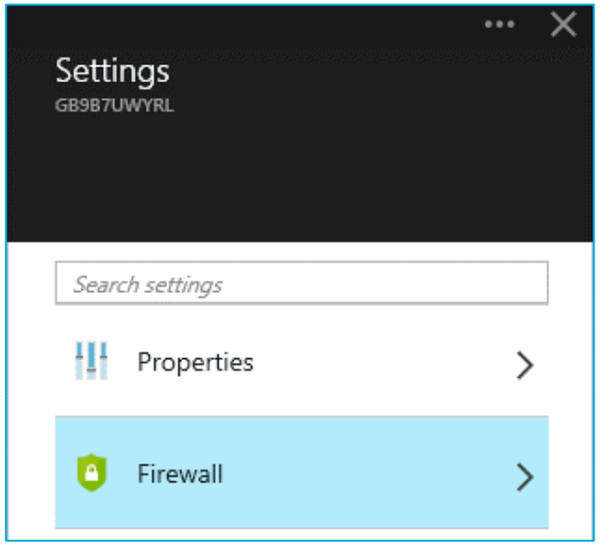


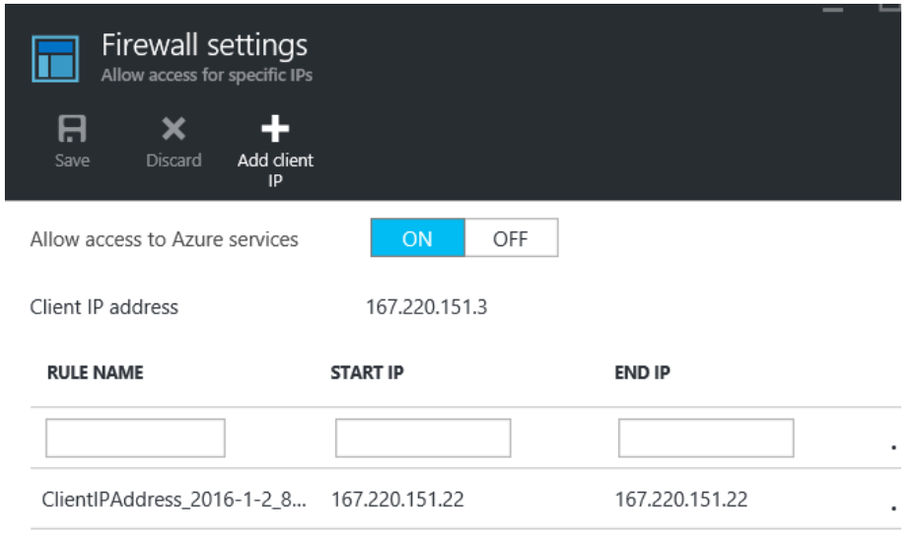
Firewall Configuration using Portals

By default, Azure blocks all external connections to port 1433

Enabled in the following ways:

- Classic portal: Server level – **configure** page
- **New** portal: Server **settings** – **firewall** – **firewall settings** blade





Demonstration:
Creating a Database Server

Create a Database Server
and configure firewall rules

Azure SQL Database

- Uses familiar technologies
- Transact-SQL
- Languages
  - .NET Framework (C#, Microsoft Visual Basic, F#) via ADO.NET
  - .NET Core
  - C / C++ via ODBC
  - Java via Microsoft JDBC provider
  - PHP via Microsoft PHP provider
- Connect & Query (Additional Language support)
  - Go
  - Python
  - Ruby
  - Node.js

Azure SQL Database

Frameworks

- OData, Entity Framework, WCF Data Services, NHibernate

Tools

- Visual Studio
- Visual Studio Code
- SQL Server Management Studio (SQL Server 2008 R2 and later)
- SQL Server command-line utilities (SQLCMD, BCP)
- SQL Operations Studio (preview)
- CA Erwin Data Modeler
- Embarcadero Technologies DBArtisan®

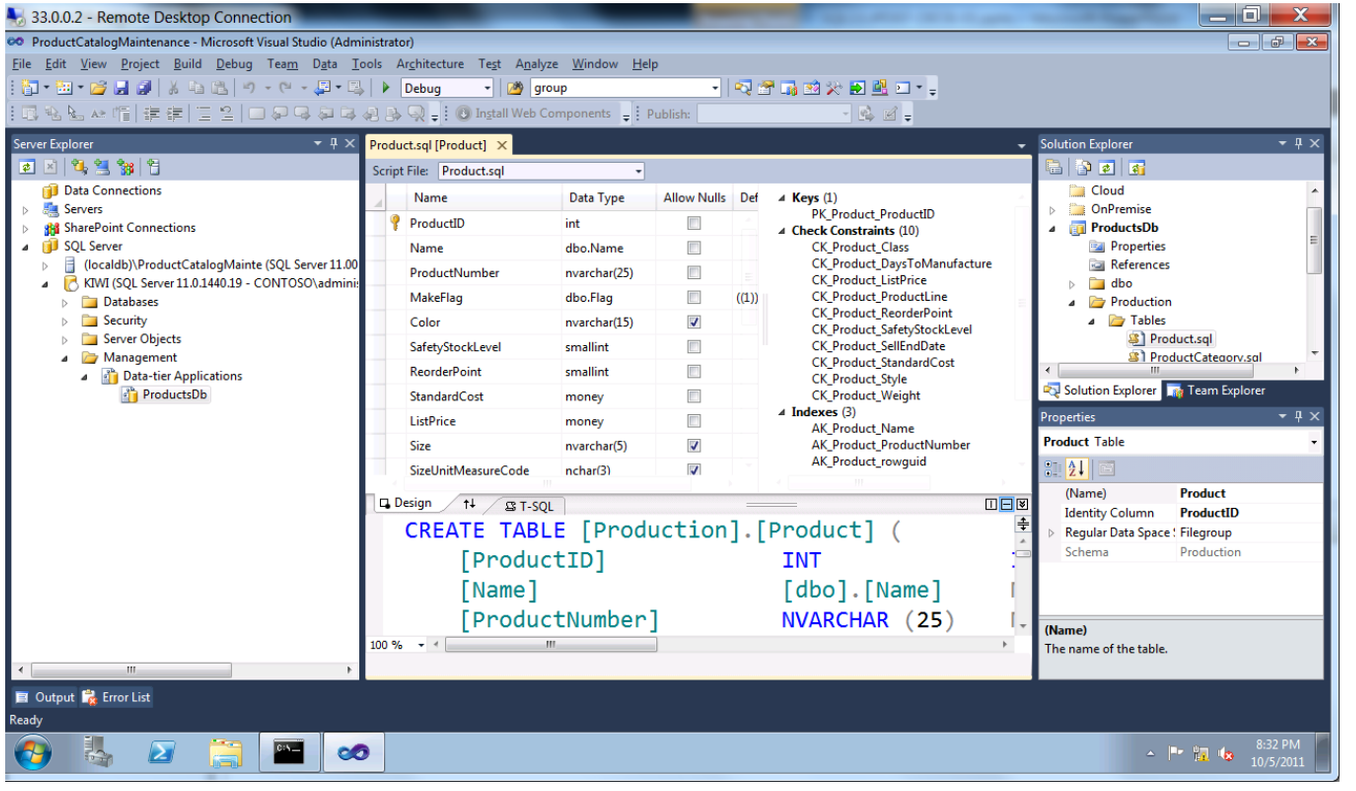
Demonstration:
Creating a Database

Create an empty Database

Enhanced Tooling

SQL Server Data Tools (SSDT)

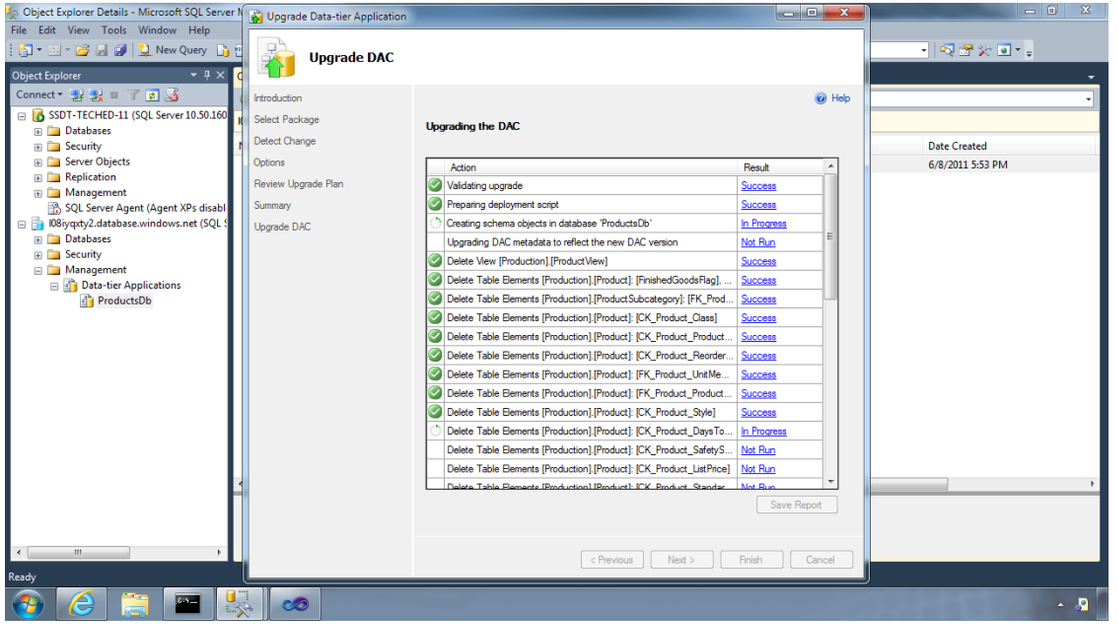
- Visual Studio Integrated Development Environment (IDE) for database development
- Includes modern designers and projects with declarative, model-driven development
- Develop and test in both connected and disconnected states
- Platform targeting for both SQL Server (SQL Server 2005 and above) and SQL Database
- Get it free with Web Platform Installer (PI), with SQL Server 2014 and with Microsoft Visual Studio 2015



Database Deployment

Data-Tier Application Framework (DAC Fx)

- Alternative to traditional script-based approach
- Dramatically simplifies deployment, migration and versioning of databases
- Provides a single unit of deployment for schema (dacpac) or for schema + data (bacpac)
- Supports automatic versioning of database schemas
- Supports platform targeting for both SQL Server (SQL Server 2005 and above) and SQL Database
- Build from scratch or extract from existing database



How to get the latest DAC Fx

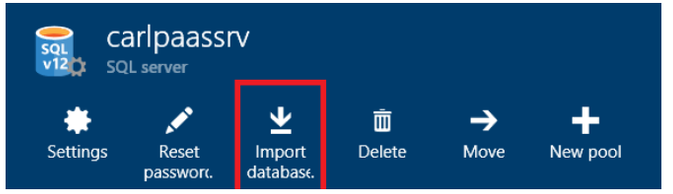
- With SQL Server Data Tools (SSDTs)
- With SQL Server 2014 and greater Management Studio
- With SQL Database Import/Export Service
- Via sqldacexamples.codeplex.com

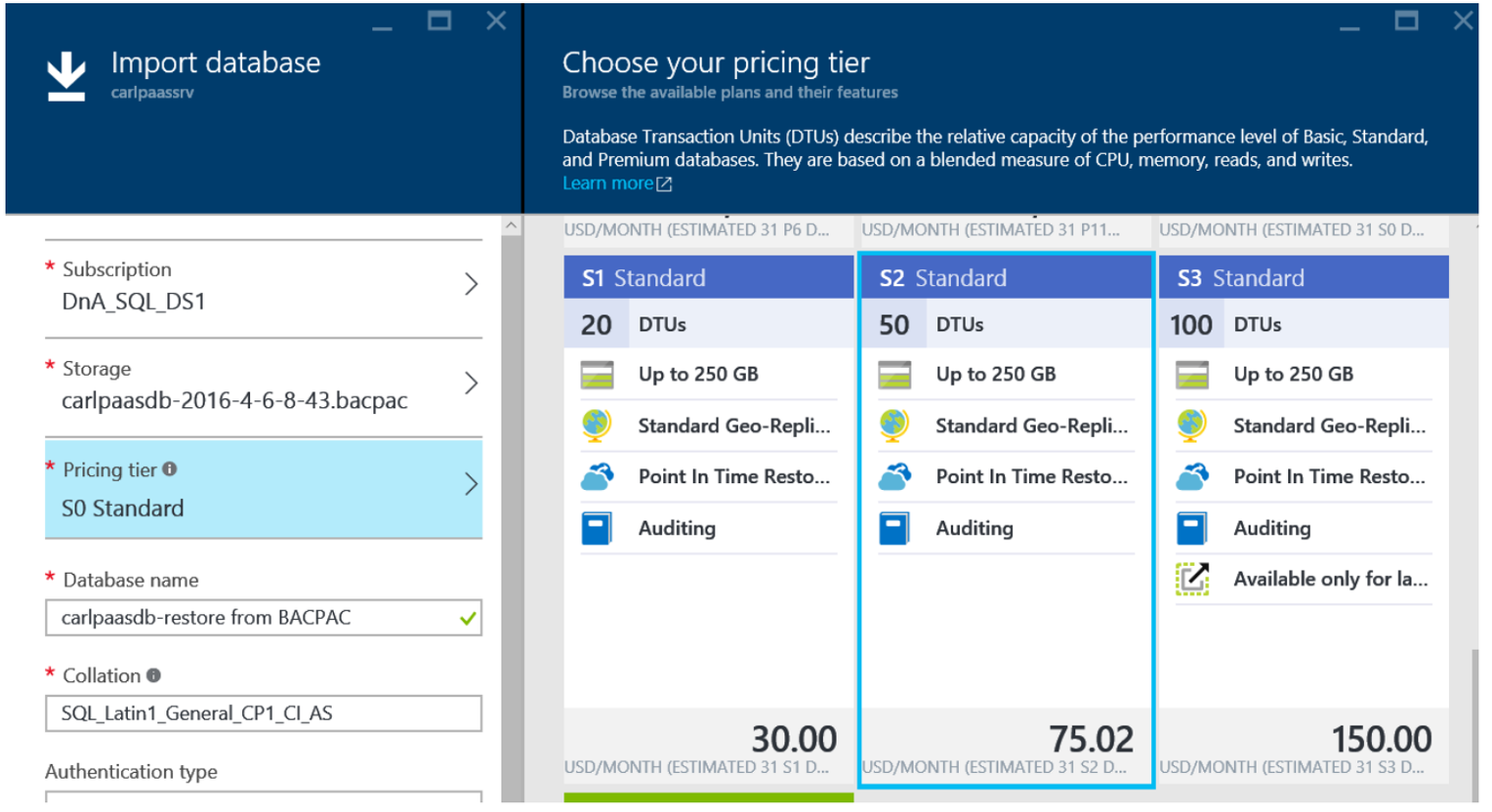
Tools for Migration Testing

SQL Server Data Tools for Visual Studio (SSDT)	http://msdn.microsoft.com/en-us/library/azure/ee730904.aspx
SQLPackage	https://azure.microsoft.com/en-us/documentation/articles/sql-database-cloud-migrate-determine-compatibility-sqlpackage/
Export Data Tier application wizard in SQL Server Management Studio	https://azure.microsoft.com/en-us/documentation/articles/sql-database-cloud-migrate-determine-compatibility-ssms/
Microsoft SQL Server 2015 Upgrade Advisor Preview	https://www.microsoft.com/en-us/download/details.aspx?id=48119
SQL Azure Migration Wizard (SAMW)	https://azure.microsoft.com/en-us/documentation/articles/sql-database-cloud-migrate-fix-compatibility-issues/

http://msdn.microsoft.com/en-us/library/azure/ee730904.aspx

Importing a BACPAC





Demonstration:
Migrating a Database

Export an existing database using SSMS and load it into Azure

Monitoring

Resource Monitoring

Percentages relative to performance level

master.sys.resource_stats

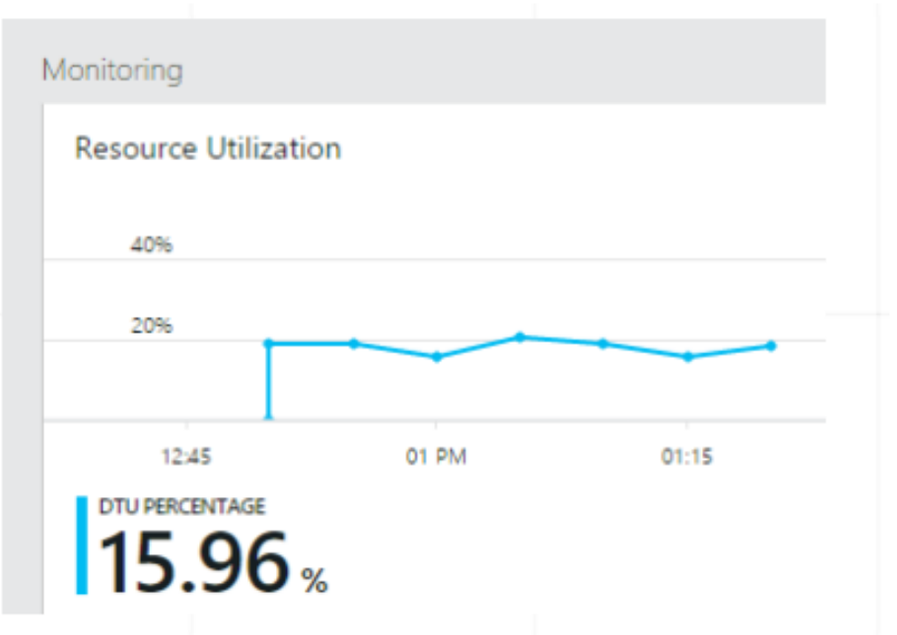
- **Averages over 5 minutes**
- All editions

userdb.sys.dm_db_resource_stats

- **Averages over 15 seconds**
- Only Basic/Standard/Premium

Accessible though Azure Portal

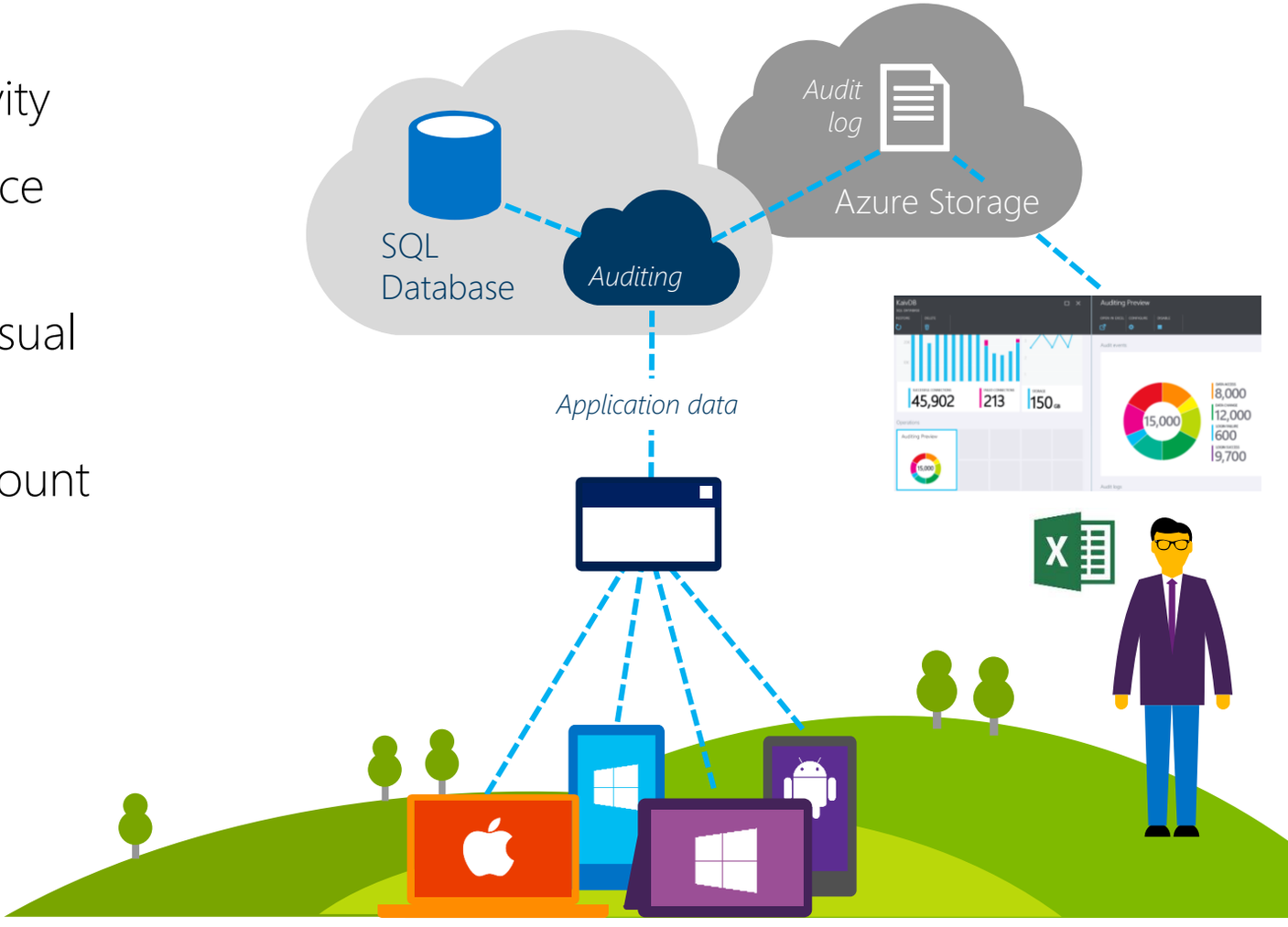
- Allows to configure alerting!



Auditing

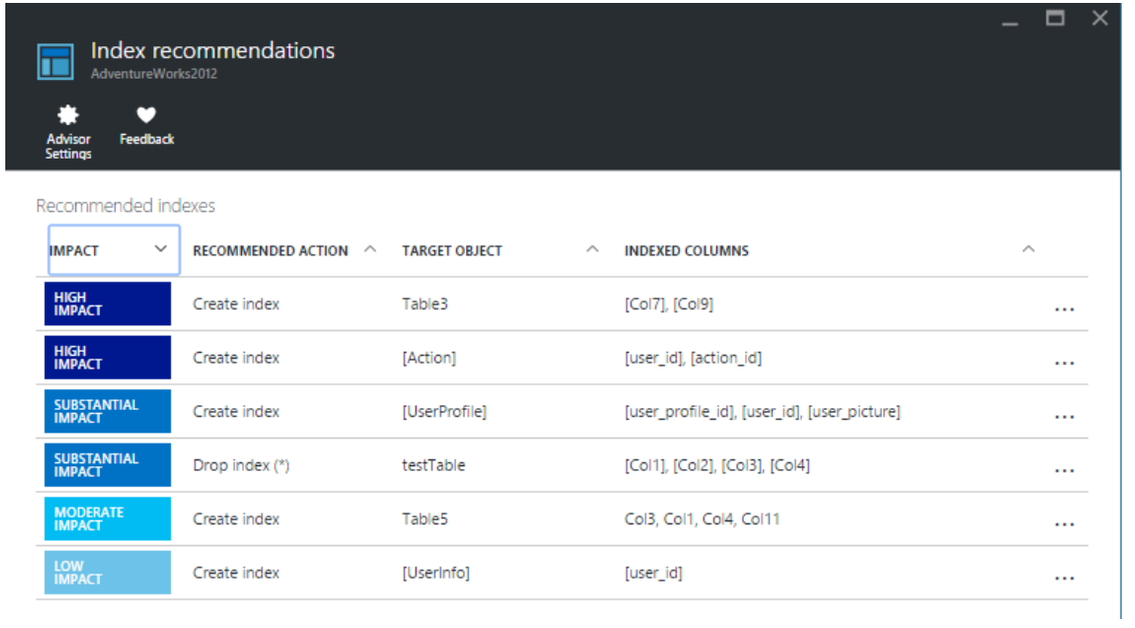
Gain insight into database events and streamline compliance-related tasks

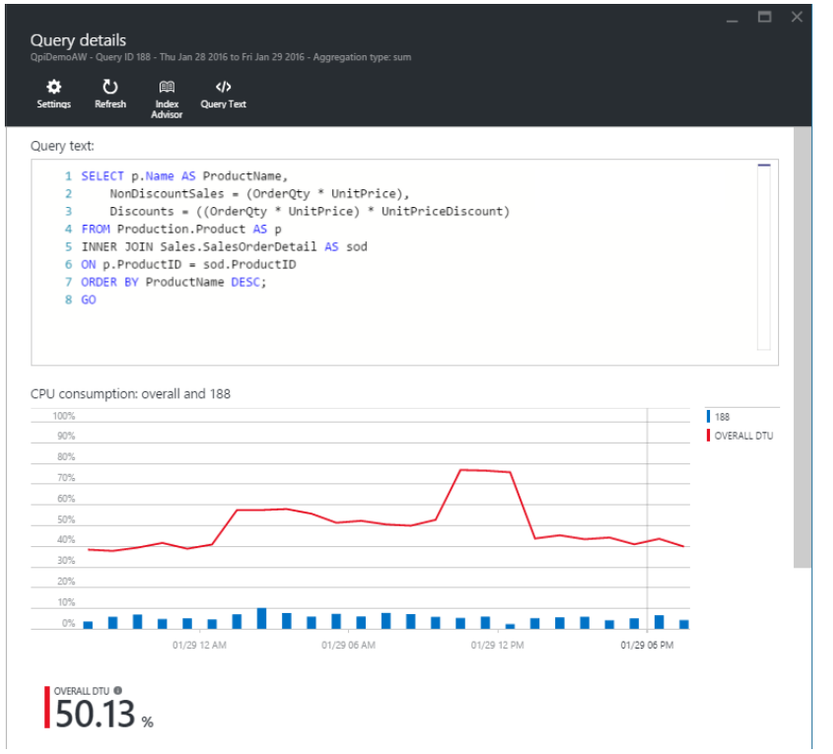
- Configurable to track and log database activity
- Dashboard views in the portal for at-a-glance insights
- Pre-defined Power View reports for deep visual analysis on Audit log data
- Audit logs reside in your Azure Storage account
- Available in Basic, Standard, and Premium
- Access via the Azure portal (https://portal.azure.com)

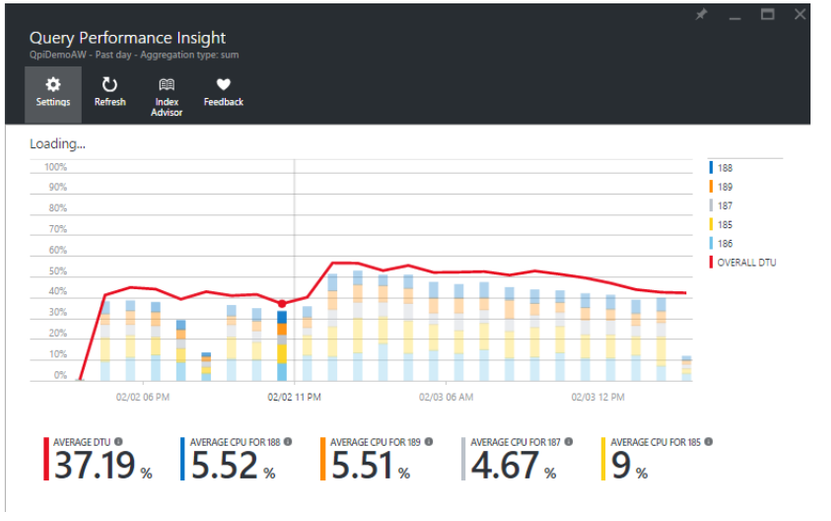


Advanced Features

- Index Advisory
- Query Performance Insight
- Threat Detection
- Automatic Tuning







Demonstration:
Monitor and Learn

Configure auditing and threat detection

Lab: SQL Azure

Provision an Azure SQL database to store application data

https://docs.microsoft.com/en-us/learn/modules/provision-azure-sql-db/index