Module 4

Storing SQL Data in Azure

Module Overview

- Azure SQL Database Overview
- Managing SQL Databases in Azure
- Azure SQL Database Tools
- Securing and Recovering an Azure SQL Database Instance

Lesson 1: Azure SQL Database Overview

- Azure SQL Database
- Azure SQL Database Tiers
- Databases as a Service vs. SQL Server in a Virtual Machine

Azure SQL Database

- Fully managed database solution
- Highly compatible with existing management tools
- Built-in high availability and predictable performance as you scale out

Azure SQL Database Tiers

Tiers

Basic

Standard

Premium

Retired tiers

Web

Business

Databases as a Service vs. SQL Server in a Virtual Machine

SQL Database

- Standardized, interoperable, and scalable managed database solution
- Contains size limits for each standard edition
- Requires some re-architecture of existing applications
- Ideal for new cloud-based applications

SQL Server in an Azure VM

- Provides high compatibility with SQL on premise.
- Ideal for existing applications that require the SQL installation to be customized.
- Requires more maintenance and customization to achieve scalability

Databases as a Service vs. SQL Server in a Virtual Machine (cont.)

Azure SQL Databases

- Can be made available to any Azure service by selecting an option in the portal
- Can be made available to specific IP addresses through the portal

SQL Server in an Azure VM

- A port must be opened so you can connect to the SQL instance from outside of the VM
- Azure Services are treated like any other outside connection

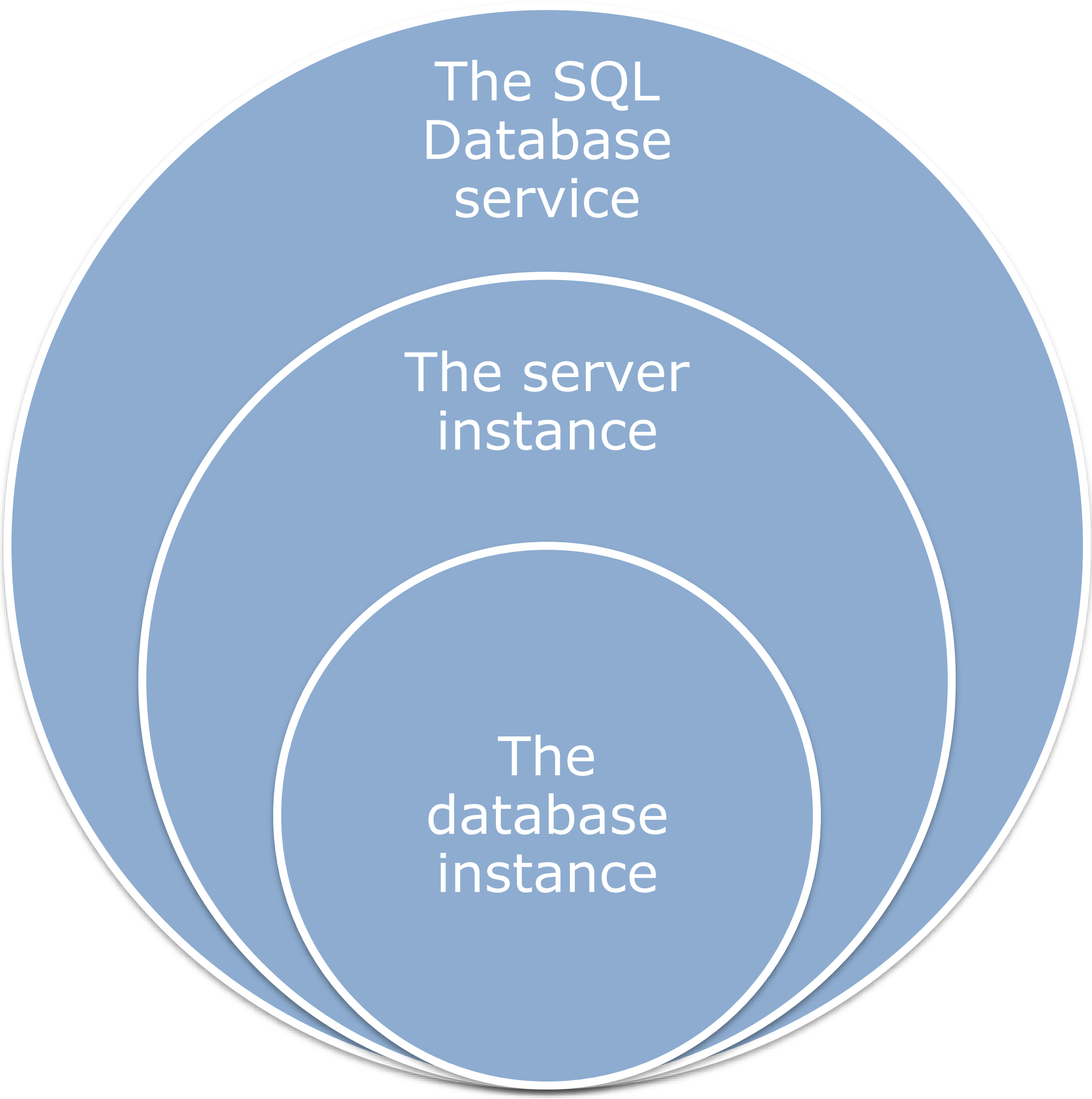
Discussion

What business requirements would you use to determine whether you should host SQL Standalone in an Azure VM or use Azure SQL Databases?

Lesson 2: Managing SQL Databases in Azure

- Creating an Azure SQL Database Instance
- Demonstration: Creating a SQL Database

Creating an Azure SQL Database Instance



The SQL Database service

The server instance

The database instance

Demonstration: Creating a SQL Database

In this demonstration, you will learn how to:

- Create a SQL Database instance by using the Portal
- Create a logical server instance by using the Portal

Lesson 3: Azure SQL Database Tools

- SQL Server Management Studio
- Migration Tools

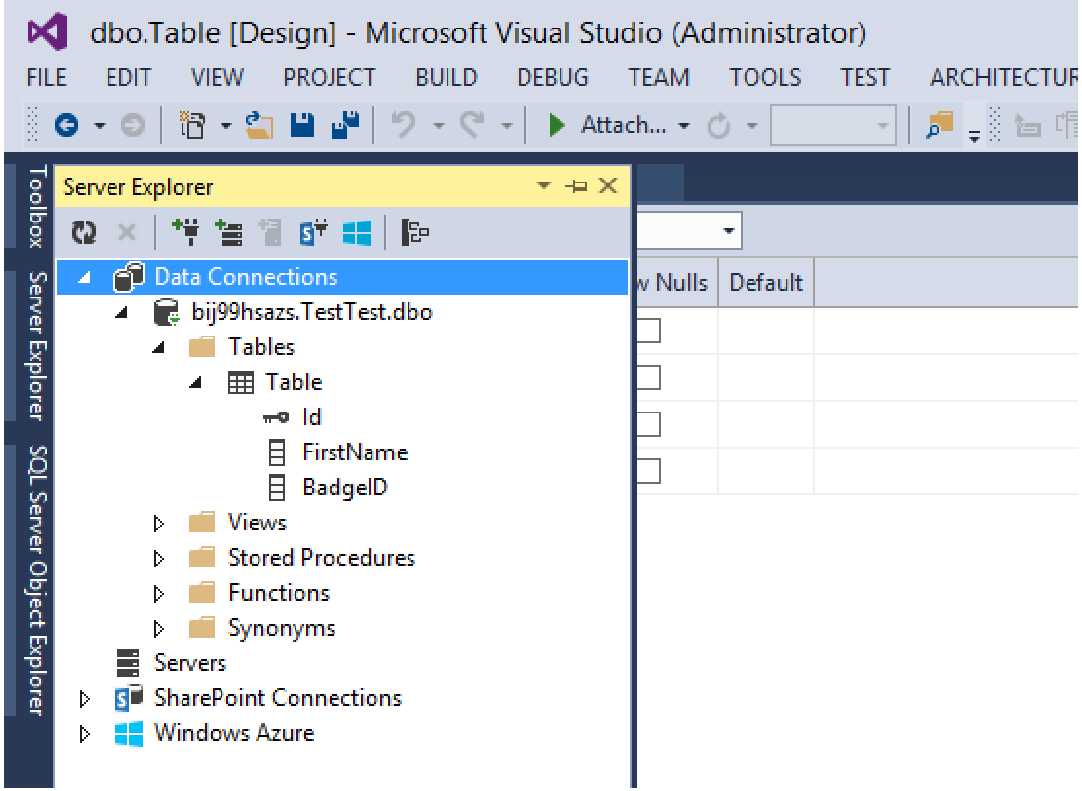
SQL Server Management Studio

- You can connect to an Azure SQL Database using many of the tools that you use right now such as SQL Server Management Studio
  - First, you must add your IP address to the firewall rules of allowed IP addresses. This is done in the configuration page for the server
  - The Server Name is viewable on the dashboard of the database or the server
  - Use SQL Server Authentication and the username/password you set up in the creation of the server

Visual Studio Server Explorer

You can use Server Explorer to manage SQL databases in the same way as you use SQL Server Management Studio

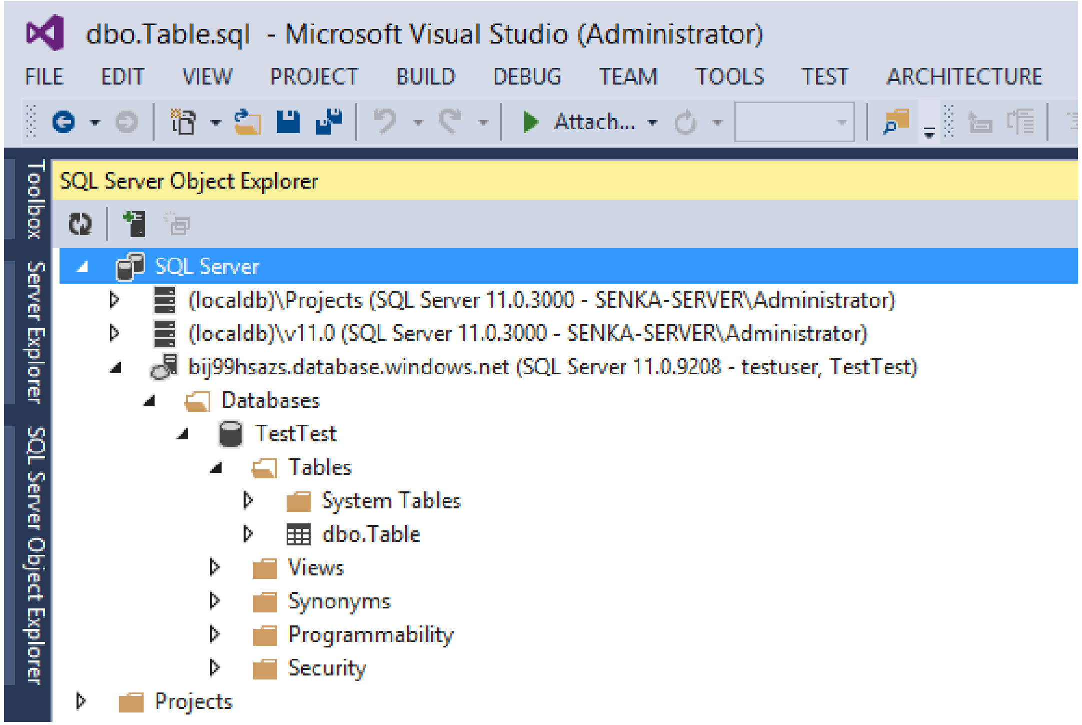
The improved query editor and updated preview tools can be helpful for determining the collateral of changes made through a SQL script



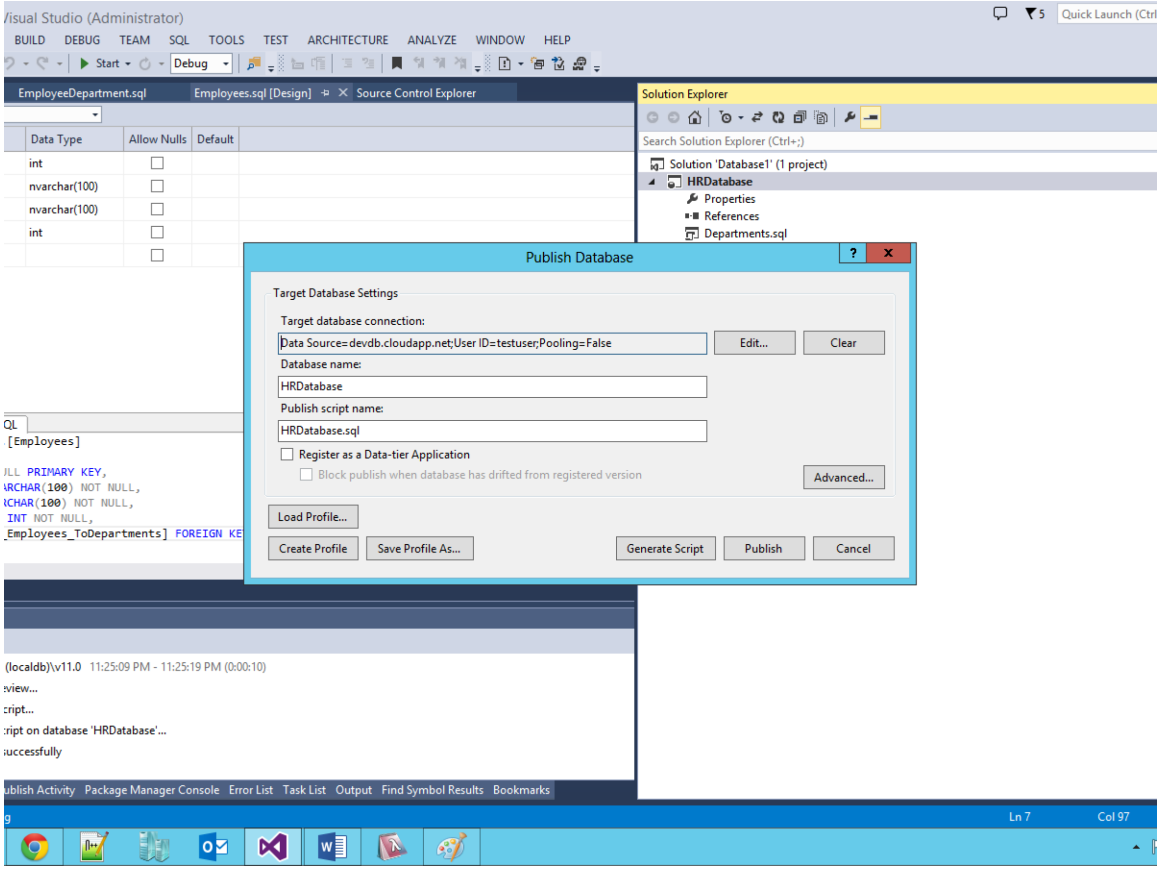
Visual Studio SQL Server Object Explorer

You can use the SQL Server Object Explorer to manage your local databases or SQL databases in Azure.

You can access the SQL Server Object Explorer by right-clicking a database in Server Explorer.


dbo.Table.sql - Microsoft Visual Studio (Administrator)
FILE
EDIT
VIEW
PROJECT
BUILD
DEBUG
TEAM
TOOLS
TEST
ARCHITECTURE
Attach...
Toolbox
Server Explorer
SQL Server Object Explorer
SQL Server Object Explorer
SQL Server
(localdb)\Projects (SQL Server 11.0.3000 - SENKA-SERVER\Administrator)
(localdb)\v11.0 (SQL Server 11.0.3000 - SENKA-SERVER\Administrator)
bij99hsazs.database.windows.net (SQL Server 11.0.9208 - testuser, TestTest)
Databases
TestTest
Tables
System Tables
dbo.Table
Views
Synonyms
Programmability
Security
Projects

Visual Studio Database Projects



Data Type	Allow Nulls	Default
int	□	
nvarchar(100)	□	
nvarchar(100)	□	
int	□	
	□	

```
 [Employees]

LL PRIMARY KEY,
RCHAR(100) NOT NULL,
CHAR(100) NOT NULL,
 INT NOT NULL,
_Employees_ToDepartments] FOREIGN KE
```

Publish Database

Target Database Settings

Target database connection: Data Source=devdb.cloudapp.net;User ID=testuser;Pooling=False

Database name: HRDatabase

Publish script name: HRDatabase.sql

□ Register as a Data-tier Application

□ Block publish when database has drifted from registered version

```
(localdb)\v11.0   11:25:09 PM - 11:25:19 PM (0:00:10)
view...
ript...
ript on database 'HRDatabase'...
uccessfully
```

Database projects in Visual Studio allow you to:

Place the schema of a database in-development within source control

Publish the database to a SQL Database instance

Migration Tools

- You can use SQL Server Integration Services to define a migration plan for on-premises databases
- SQL Database Migration Wizard analyzes your existing database and generates a script (and bulk copy files) to migrate your database
- Azure Websites Migration Assistant uses SQL Management Objects to analyze your existing database and migrate it

Lesson 4: Securing and Recovering an Azure SQL Database Instance

- Recovery Options for Azure SQL Database
- Azure SQL Databases Geo-Replication

Recovery Options for Azure SQL Database

- You can count on infrastructure redundancy in the Azure data centers for the most basic scenarios
- SQL Database also provides it’s own set of options for HADR
    - Built-in replicas
        - Transactions are not considered committed to the database until they are written to the target DB, one primary replica, and two secondary replicas
    - Backup and restore
        - Allows you to protect against errant transactions
        - Database is backed up as a whole and can be recovered through the portal
        - The retention period (in days) of your backup is based on your selected service tier

High Availability for Azure SQL Databases (cont.)

- Database copy
  - You can create a one-time copy of the database within the same region
  - The copy is disconnected from the source database so any future transactions will not be applied to the copy
- The import and export service
  - You can import and export BACPACK files from a database instance either automatically or manually
  - You can use this service to offer a minimum HADR option for web and business databases that do not support the point-in-time recovery option
  - You also can use this service for custom backup and recovery scenarios

Azure SQL Databases Geo-Replication

- Active geo-replication is available for Premium SQL Database instances
  - This feature is asynchronous by default and guarantees that replicas will be eventually consistent
  - You can replicate transactions to as many as four copies of the database
  - Replicas can exist in different regions for geo-redundancy
- You can use the replica of the database as a read-only data source in load-balancing scenarios
  - Example: An application uses the primary database for line-of-business functionality and the replica for reports

Module Review and Takeaways

- Review Question(s)
- Best Practice
  - https://docs.microsoft.com/en-us/azure/sql-database/sql-database-what-is-a-dtu