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Similarities and Differences of SQL Azure and SQL Server

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**Applies to**SQL Azure

**Summary**SQL Azure Database is a cloud database service from Microsoft. SQL Azure provides web-facing database functionality as a utility service. Cloud-based database solutions such as SQL Azure can provide many benefits, including rapid provisioning, cost-effective scalability, high availability, and reduced management overhead. This paper provides an architectural overview of SQL Azure Database, and describes how you can use SQL Azure to augment your existing on-premises data infrastructure or as your complete database solution.

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Contents

[Similarities and Differences 4](#_Toc243924151)

[Logical Administration vs. Physical Administration 4](#_Toc243924152)

[Provisioning 4](#_Toc243924153)

[Transact-SQL Support 5](#_Toc243924154)

[Features and Types 5](#_Toc243924155)

[Key Benefits of the Service 5](#_Toc243924156)

[Self-Managing 5](#_Toc243924157)

[High Availability 5](#_Toc243924158)

[Scalability 5](#_Toc243924159)

[Familiar Development Model 5](#_Toc243924160)

[Relational Data Model 6](#_Toc243924161)

[Transact-SQL Support (SQL Azure Database) 7](#_Toc243924162)

# Similarities and Differences

Similar to an instance of SQL Server on your premises, SQL Azure exposes a tabular data stream (TDS) interface for Transact-SQL-based database access. This allows your database applications to use SQL Azure in the same way that they use SQL Server. Because SQL Azure is a service, administration in SQL Azure is slightly different.

Unlike administration for an on-premise instance of SQL Server, SQL Azure abstracts the logical administration from the physical administration; you continue to administer databases, logins, users, and roles, but Microsoft administers the physical hardware such as hard drives, servers, and storage. This approach helps SQL Azure provide a large-scale multi-tenant database service that offers enterprise-class availability, scalability, security, and self-healing.

Because Microsoft handles all of the physical administration, there are some differences between SQL Azure and an on-premise instance of SQL Server in terms of administration, provisioning, Transact-SQL support, programming model, and features. For more information, see [Guidelines and Limitations (SQL Azure Database)](http://msdn.microsoft.com/en-us/library/ee336245.aspx).

## Logical Administration vs. Physical Administration

Although SQL Azure plays an active role in managing the physical resources of the database, the DBA plays a very important role in administering SQL Azure-based database applications. Using SQL Azure, DBAs manage schema creation, statistics management, index tuning, query optimization, and security administration (logins, users, roles, etc.). For more information about security administration in SQL Azure, see [Managing Logins and Users in SQL Azure](http://msdn.microsoft.com/en-us/library/ee336235.aspx).

Database administration in SQL Azure differs most from SQL Server in terms of physical administration. SQL Azure automatically replicates all data to provide high availably. SQL Azure also manages load balancing and, in case of a server failure, transparent fail-over.

To provide this level of physical administration, you cannot control the physical resources of SQL Azure. For example, you cannot specify the physical hard drive or file group where a database or index will reside. Because the computer file system is not accessible and all data is automatically replicated, SQL Server backup and restore commands are not applicable to SQL Azure.

## Provisioning

When preparing an on-premises SQL Server deployment, it may be the role of the DBA or IT department to prepare and configure the required hardware and software. When using SQL Azure, these tasks are performed by the SQL Azure provisioning process.

You can begin provisioning your SQL Azure databases after you create a Windows Azure Platform account. This account allows you to access all the services, such as Windows Azure, .NET Services, and SQL Azure, and is used to set up and manage your subscriptions.

Each SQL Azure subscription is bound to one SQL Azure server at the Microsoft data center. Your SQL Azure server is an abstraction that defines a grouping of databases. To enable load-balancing and high availability, databases associated with your SQL Azure server may reside on separate physical computers at the Microsoft data center.

For more information about provisioning, see [SQL Azure Provisioning Model](http://msdn.microsoft.com/en-us/library/ee336227.aspx).

## Transact-SQL Support

Many SQL Server Transact-SQL statements have parameters that allow you to specify file groups or physical file paths. These types of parameters are not supported in SQL Azure because they have dependencies on the physical configuration. In such cases, the command is considered partially supported. For more information about Transact-SQL support, see [Transact-SQL Support (SQL Azure Database)](http://msdn.microsoft.com/en-us/library/ee336250.aspx).

## Features and Types

SQL Azure does not support all of the features and data types found in SQL Server. Analysis Services, Replication, Reporting Services, and Service Broker are not currently provided as services on the SQL Azure.

Because SQL Azure performs the physical administration, any statements and options that attempt to directly manipulate physical resources will be blocked, such as Resource Governor, file group references, and some physical server DDL statements. It is also not possible to set server options and SQL trace flags or use the SQL Server Profiler or the Database Tuning Advisor utilities.

# Key Benefits of the Service

The benefits of using SQL Azure are manifold. These include manageability, high availability, scalability, a familiar development model, and a relational data model.

## Self-Managing

SQL Azure offers the scale and functionality of an enterprise data center without the administrative overheads that are associated with on-premise instances of SQL Server. This self-managing capability enables organizations to provision data services for applications throughout the enterprise without adding to the support burden of the central IT department or distracting technology-savvy employees from their core tasks in order to maintain a departmental database application.

With SQL Azure, you can provision your data storage in minutes. This reduces the initial costs of data services by enabling you to provision only what you need. When your needs change, you can easily extend your cloud-based data storage to meet those needs.

## High Availability

SQL Azure is built on proven Windows Server and SQL Server technologies, and is flexible enough to cope with any variations in usage and load. The service replicates multiple redundant copies of your data to multiple physical servers to maintain data availability and business continuity. In the case of a hardware failure, SQL Azure provides automatic failover to optimize availability for your application.

## Scalability

A key advantage of SQL Azure is the ease with which you can scale your solution. After partitioning your data, the service scales as your data grows. A pay-as-you-grow pricing model makes sure that you only pay for the storage that you use, so that you can also scale down the service when you do not need it.

## Familiar Development Model

When developers create on-premise applications that use SQL Server, they use client libraries that use the tabular data stream (TDS) protocol to communicate between client and server. SQL Azure provides the same TDS interface as SQL Server so that you can use the same tools and libraries to build client applications for data that is stored in SQL Azure. For more about TDS, see [Network Protocols and TDS Endpoints](http://go.microsoft.com/fwlink/?LinkId=155243).

## Relational Data Model

SQL Azure will seem very familiar to developers and administrators because data is stored in SQL Azure just like it is stored in SQL Server, by using Transact-SQL. Conceptually similar to an on-premise instance of SQL Server, a SQL Azure server is logical group of databases that acts as an authorization boundary.

Within each SQL Azure server, you can create multiple databases that have tables, views, stored procedures, indices, and other familiar database objects. This data model makes good use of your existing relational database design and Transact-SQL programming skills, and simplifies the process of migrating existing on-premise database applications to SQL Azure. For more about Transact-SQL and its relationship to SQL Azure, see [Transact-SQL Support (SQL Azure Database)](http://msdn.microsoft.com/en-us/library/ee336250.aspx).

SQL Azure servers and databases are virtual objects that do not correspond to physical servers and databases. By insulating you from the physical implementation, SQL Azure enables you to spend time on your database design.

|  |  |
| --- | --- |
| Transact-SQL Support (SQL Azure Database) |  |
|  |  |

SQL Azure

**Transact-SQL Support (SQL Azure Database)**

Transact-SQL is a language that contains commands used to administer instances of SQL Server including creating and managing all objects in an instance of SQL Server, and inserting, retrieving, modifying, and deleting all data in tables. Applications can communicate with an instance of SQL Server by sending Transact-SQL statements to the server.

Microsoft SQL Azure Database supports a subset of Transact-SQL for SQL Server 2008.

The support for Transact-SQL reference in SQL Azure can be described in three main categories:

The following table summarizes the Transact-SQL support provided by SQL Azure Database at PDC 2009:

|  |  |
| --- | --- |
| **Transact-SQL Features Supported** | **Transact-SQL Features Unsupported** |
| * Constants * Constraints * Cursors * Index management and rebuilding indexes * Local temporary tables * Reserved keywords * Stored procedures * Statistics management * Transactions * Triggers * Tables, joins, and table variables * Transact-SQL language elements such as   + Create/drop databases   + Create/alter/drop tables   + Create/alter/drop users and logins   + and so on. * User-defined functions * Views, including sys.synonyms view | * Common Language Runtime (CLR) * Database file placement * Database mirroring * Distributed queries * Distributed transactions * Filegroup management * Global temporary tables * Spatial data and indexes * SQL Server configuration options * SQL Server Service Broker * System tables * Trace Flags |

For more information about the Transact-SQL support in SQL Azure, see [Transact-SQL Reference (SQL Azure Database)](http://msdn.microsoft.com/en-us/library/ee336281(lightweight).aspx).

For more information, please visit:

* SQL Azure Portal  
  <http://www.microsoft.com/azure/sql.mspx>
* SQL Azure Developer Center  
  <http://msdn.microsoft.com/en-us/sqlserver/dataservices/default.aspx>
* SQL Azure Documentation  
  <http://msdn.microsoft.com/en-us/library/cc512417.aspx>microsoft_logo.eps