SQL Data Sync (Preview) Table of Contents

SQL Data Sync (Preview)

SQL Data Sync (Preview) is a service of SQL Database that enables you to synchronize the data you select across multiple SQL Server and SQL Database instances. To synchronize your data, you create sync groups which define the databases, tables and columns to synchronize as well as the synchronization schedule. Each sync group must have at least one SQL Database instance which serves as the sync group hub in a hub-and-spoke topology.

The Microsoft Azure SQL Data Sync service on the Microsoft Azure AUX portal will be decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync.

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You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

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Before you start	**How to create a sync group**
Before you begin to design and implement your synchronizations, you should be familiar with these topics.	There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links.
• System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices	1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database

	2. Create your sync group 3. Add your sync members 4. Install a SQL Data Sync Client Agent (optional) 5. Register a SQL Server database with a Client Agent (optional) 6. Configure your sync group (SDS)
	How to modify a sync group You can modify a sync group's schema by adding/removing tables or columns in the sync group; or by altering a column's width or data type. Details can be found by following the links. • Update a Sync Group Schema • Add a Database to your Sync Group • Add or remove a table in a sync group • Add or remove a column in a sync group • Change the width of a column in a sync group • Change a column's data type

Other Resources

Azure Management Portal

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What's New in SQL Data Sync

	This topic covers the progression of capabilities and improvements added to SQL Data Sync (Preview). Until further notice, the newer SQL Data Sync (Preview) and the Data Sync Service (Preview) are free. The only charges are for Azure and SQL Database usage. The Microsoft Azure SQL Data Sync service on the Microsoft Azure AUX portal will be

	decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync. You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

To upgrade to the current version and get the latest features see the topic How to Upgrade a Client Agent.

What's New in SQL Data Sync (Preview)?

Thank you for trying out SQL Data Sync (Preview) and sending suggestions and feedback. We continue to make improvements to SQL Data Sync (Preview) based upon your feedback.

June 2017 – Service update

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- New GUI experience on New Azure portal
- Enhanced monitoring & troubleshooting experience for self-diagnosis
- Programmability with PowerShell and REST APIs for efficient DevOps
- Better security, Better privacy and Better resilience

May 2015 – new SQL Azure Data Sync Agent release

The May 2015 version of the SQL Data Sync (Preview) client agent is now available on the Download Center. The update includes:

- Support for synchronizing tables that have column collations:
  - If the selected sync schema tables are not already in your hub or member databases, upon deploying the sync group, the service will auto create the corresponding tables and columns with the same collation settings as the selected in the empty database(s).
  - If the tables to-be-synced are already created in both of your hub and member databases, SQL Data Sync requires the primary key columns are set with the same collation between hub/member databases to successfully deploy the sync group. No collation restriction on the non-primary key columns.
- Improvements to data sync performance and resilience.
- Enhancements to logging.

Please upgrade your existing SQL Data Sync (Preview) client agent as described in How to Upgrade a Client Agent. Your existing agent will continue to work before it expires in 90 days.

December 2012 – Service Update

- Released SQL Data Sync (Preview) on the Azure portal.
  Improved synchronization performance across data centers.
- Improved overall performance on internal operations.

October 2012 – Service Update

- Added the ability to create multiple Sync Servers under a single Microsoft Azure subscription.
  Performance is improved if your SQL Data Sync (Preview) server and sync group hub is located in the same region (data center). Provision a SQL Data Sync (Preview) server in each data center that will host a sync group hub.

August 2012 – Service Update

- Improved performance when provisioning a sync group.
- Improved sync performance when synchronizing on-premises SQL Server databases to SQL databases.

June 2012 – Service Update

- Support for spatial data types.
  The Geometry and Geography data types are now supported, though they cannot be used to filter rows when filtering rows to synchronize.
  For a list of supported data types, see SQL Database Data Types supported by SQL Data Sync.
- Ability to cancel a synchronization task.

April 2012 – Service Update

- Ability to update a deployed sync group.
  You can now dynamically update a sync group.
- Added information in the portal that helps you more easily manage your sync groups.
  - The client agent version is shown with:
    - A recommendation to upgrade if your client agent is not the latest version.

    - A warning if support for your agent version expires soon.
    - An error if your agent version is no longer supported.
  - A warning for sync groups that are out-of-date due to changes failing to apply for 60 or more days.
- Fixed issues that affected ORM (Object Relational Model) frameworks such as Entity Framework and NHibernate working with SQL Data Sync (Preview).
- Improved error and status messages.

January 2012 - Major Service Update

- Localized in ten major world languages.
  - Chinese (simplified)
  - Chinese (traditional)
  - French
  - German
  - Italian
  - Japanese
  - Korean
  - Portuguese (Brazil)
  - Russian
  - Spanish
- Expanded location options.
  Users can create Data Sync servers in any of the Azure data centers.
  It is recommended that you locate your sync server and databases as close as possible to where your users are. SQL Data Sync (Preview) availability in all Azure data centers makes it easy to follow that best practice.
- A new client agent with fixes and security enhancements is available.
  The new client agent is not required for you to continue to use the SQL Data Sync (Preview) Preview, though we recommend upgrading.
  You can download the new client agent from the January 2012 download center.
- Synchronization progress and troubleshooting enhancements.
  - Logs progress of a sync once every 15 minutes (number of rows and total time) once the change application on the destination database starts.
  - More informative error messages to help with trouble shooting.
- Additional improvements enhancing the usability of the service

December 2011 – Minor Service Update

This service update provides better support of narrow tables with many rows.

November 2011 – Minor Service Update

- Logins with either *username@server* or just *username* are accepted.
- Column names with spaces are now supported.
- Columns with a NewSequentialID constraint are converted to NewID for SQL Databases in the sync group.
- Non-administrator service logon credentials are now accepted during the client agent installation.
- The November 2011 version of the SQL Data Sync (Preview) client agent is now available at the Download Center.
  Minor improvements in the new SQL Data Sync (Preview) agent. If you already have a Preview version of the SQL Data Sync (Preview) client agent, it will continue to work.

October 2011 – Release of Public Preview

- The Preview client agent is not backwardly compatible with CTP2, therefore you must upgrade from your CTP2 SQL Data Sync (Preview) agent and sync groups. See the topic How to Upgrade a Client Agent.
-
- A new, task-oriented UI with integrated help, includes tutorials that walk you through creating and deploying a new sync group.
- The ability for you to set the synchronization direction for each database as you add it to the sync group, and thus minimize charges for data movement. Synchronization directions are: **bi-directional**, **from the hub** and **to the hub**.
- More specific dataset definitions than before.
  - Select the particular databases you want to synchronize.
  - Select specific tables to synchronize.
  - Select specific columns within each table to synchronize.
  - Define row filters so that only the rows that meet the filter requirements are synchronized.
- The ability for you to set the conflict resolution policy for the sync group.
  - **Hub Wins**
    In each synchronization job the first change written to the hub is the change that is kept. Changes to the row in subsequently polled databases are discarded.
  - **Client Wins**
    In each synchronization job every row with a change is written to the hub overwriting prior changes to the row. Thus the last change is kept and all prior changes are discarded.

See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Conflict Resolution when Synchronizing

Data Security in SQL Data Sync
SQL Data Sync Troubleshooting Guide
Glossary of SQL Data Sync Terms

Prerequisite Information

	Before you begin to design and implement your SQL Data Sync synchronizations, you should review the content in the following topics. • System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices

System Requirements for SQL Data Sync

	Welcome to SQL Data Sync (Preview). This topic is the first of five topics you should be familiar with before you design and implement a data synchronization plan. The five preparatory topics are: • **System Requirements for SQL Data Sync** - this topic • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

System Requirements

Because SQL Data Sync (Preview) is a feature of the Microsoft Azure SQL Database cloud service there are no bits for you to install on your computer beyond one of the versions of SQL Server and Windows listed in the minimum requirements below. There are .NET and subscription requirements as outlined below.

Minimum requirements for using SQL Data Sync (Preview)

- SQL Server 2005 SP2.
  SQL Data Sync (Preview) works best with SQL Server 2008 R2 and later as support for SQL Database was added to SQL Server Management Studio in SQL Server 2008 R2. If you do not have SQL Server you can download a free trial from SQL Server Evaluations.
  SQL Data Sync (Preview) currently supports only SQL Server and SQL Database. Express versions of SQL Server are not supported.
- A Microsoft Azure account and subscription.
- A SQL Database subscription.
  You need at least one SQL Database subscription. If you need to host SQL Database instances in multiple data centers you need a SQL Database subscription for each data center.
- Windows Server 2008 or later or Windows Vista or later operating systems.
- An x86 or x64 computer.

The following are additional requirements if you include a SQL Server database in any of your sync groups.

- The latest version of the client agent (a.k.a., Sync Agent).
  You are directed to the client agent download site when you select **New Agent** from the Azure management portal. For more information, see Install a SQL Data Sync Client Agent.
- .NET Framework 4.5 or above
  Download the .NET Framework 4.5.
- Microsoft SQL Server 2008 R2 SP1 System CLR Types (x86)
  You can download these at http://www.microsoft.com/download/en/details.aspx?id=26728.
- Microsoft SQL Server 2008 R2 SP1 Shared Management Objects (x86)
  You can download these at http://www.microsoft.com/download/en/details.aspx?id=26728.

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Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

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How to create a sync group	How to modify a sync group
There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these	You can modify a sync group's schema by adding/removing tables or columns in the sync group; or by altering a column's width or data

links. 1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 2. Create your sync group 3. Add your sync members 4. Install a SQL Data Sync Client Agent (optional) 5. Register a SQL Server database with a Client Agent (optional) 6. Configure your sync group (SDS)	type. Details can be found by following the links. • Update a Sync Group Schema • Add a Database to your Sync Group • Add or remove a table in a sync group • Add or remove a column in a sync group • Change the width of a column in a sync group • Change a column's data type

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See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Conflict Resolution when Synchronizing

Data Security in SQL Data Sync

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

Known SQL Data Sync Limits

	Welcome to SQL Data Sync (Preview). This topic is the second of five topics you should be familiar with before you design and implement a data synchronization plan. The five preparatory topics are: • System Requirements for SQL Data Sync • **Know SQL Data Sync Limits** - this topic • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

SQL Data Sync Limits

Limits per SQL Data Sync server

A:SQL Data Sync (Preview) Preview has the following limits per SQL Data Sync (Preview) Server:

Instance	Maximum
Maximum number of sync groups any database can belong to.	5
Maximum number of endpoints in a single sync group	30 **Note** There may be up to 30 endpoints in a single sync group if there is only one sync group. If there is more than one sync group, the total number of endpoints across all sync groups cannot exceed 30. **Note** If a database belongs to multiple sync groups it is counted as multiple endpoints, not one.
Maximum number of on-premises endpoints in a single sync group.	5
Filters per table	Due to SQL Server constraints and SQL Data Sync (Preview) overhead the number of column filters is limited. • Up to 12 column filters per table. • An optional 13th column filter if it is on the primary key column. **Warning** The SQL Data Sync (Preview) Preview UI permits any number of columns filters. Exceeding the above limits results in a provisioning failure when

Instance	Maximum
	you deploy the sync group.
Characters that cannot be used in object names	The names of objects (databases, tables, columns) cannot contain the printable characters period (.), left square bracket ([) or right square bracket (]).

Supported limits on database dimensions

Dimension	Limit
Database, table, schema, and column names	50 character per name
Tables in a sync group	500
Columns in a table in a sync group	1000
Data row size on a table	24Mb

Supported limits on database schema

SQL Data Sync (Preview) doesn't support synchronizing tables with same name in different schemas.

Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

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How to create a sync group	How to modify a sync group
There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links. 1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 2. Create your sync group	You can modify a sync group's schema by adding/removing tables or columns in the sync group; or by altering a column's width or data type. Details can be found by following the links. • Update a Sync Group Schema • Add a Database to your Sync Group • Add or remove a table in a sync group • Add or remove a column in a sync group • Change the width of a column in a sync

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3. Add your sync members 4. Install a SQL Data Sync Client Agent (optional) 5. Register a SQL Server database with a Client Agent (optional) 6. Configure your sync group (SDS)	group • Change a column's data type

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See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Conflict Resolution when Synchronizing

Data Security in SQL Data Sync

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

Plan for Optimization

Welcome to SQL Data Sync (Preview). This topic is the third of five topics you should be familiar with before you design and implement a data synchronization plan. The five preparatory topics are:

- System Requirements for SQL Data Sync
- Known SQL Data Sync Limits
- **Plan for Optimization** - this topic
- Understand and Avoid Synchronization Loops
- SQL Data Sync Best Practices

The Microsoft Azure SQL Data Sync service on the Microsoft Azure AUX portal will be decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync.

You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal. See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

Reduce Your Costs

You can reduce your costs by minimizing the data traffic leaving or entering a data center. The cost of moving data between data centers is greater than moving data within a data center.

- Locate your SQL Data Sync (Preview) server in the data center where you have the most data traffic.
- Locate your sync group hub in the data center to where you have the most data traffic.
- Synchronize only as often as is required by your business needs.

  This means some sync groups will synchronize often and others less frequently. For example, it is unlikely that you need your Payroll sync group to synchronize every five minutes. A weekly or monthly sync would likely be sufficient.

Improve Efficiency

Some of the same issues that impact your costs also impact the efficiency of your sync groups.

It is both cheaper and faster to keep as much of your data movements within a data center as you can. Throughput within a data center is about double what it is between data centers.

Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

How to create a sync group	How to modify a sync group
There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links. 1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 2. Create your sync group 3. Add your sync members 4. Install a SQL Data Sync Client Agent (optional) 5. Register a SQL Server database with a Client Agent (optional) 6. Configure your sync group (SDS)	You can modify a sync group's schema by adding/removing tables or columns in the sync group; or by altering a column's width or data type. Details can be found by following the links. • Update a Sync Group Schema • Add a Database to your Sync Group • Add or remove a table in a sync group • Add or remove a column in a sync group • Change the width of a column in a sync group • Change a column's data type

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See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Conflict Resolution when Synchronizing

Data Security in SQL Data Sync

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

Understand and Avoid Synchronization Loops

Welcome to SQL Data Sync (Preview). This topic is the fourth of five topics you should be familiar with before you design and implement a data synchronization plan. The five preparatory topics are:

- System Requirements for SQL Data Sync
- Known SQL Data Sync Limits
- Plan for Optimization
- **Understand and Avoid Synchronization Loops** - this topic
- SQL Data Sync Best Practices

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

Causes of Synchronization Loops

A synchronization loop results from an overlapping of databases in two or more sync groups such that a change in a database in one sync group is re-written to the same database by another sync group. Synchronization loops are self-perpetuating and can result in large amounts of data repeatedly overwriting identical data in two of more databases.

Any of the following can cause a synchronization loop.

- A circular reference within a database or table.
- A circular reference involving two or more sync groups.
- A single database registered with different agents and added to a sync group under two of more agents.

Sync Group Design

When you design your synchronization topologies it is perfectly fine to have a single database in multiple sync groups. Figure 1 is an illustration of this. Even though database A is shared by Sync Group 1 and Sync Group 2 there is no feedback loop that perpetuates the same data being written and re-written to the same database. It is also possible to share more than one database between two sync groups and not have a loop. We will discuss those configurations later in this topic.

How Figure 1 works

Let's walk through the sequence of events that take place when a change is made to any database in Figure 1. We'll assume the change is made to database C here.

1. Row 1 in database C is changed.
2. In database C's metadata a record is created indicating that row 1 was changed and where the change originated.
3. Sync Group 1 synchronizes.
    a. It notes that row 1 in database C is changed by someone other than SG1.
    b. Row 1 from Database C is written to SG1 Hub.
    c. A record is created in SG1's metadata indicating that row 1 was changed by SG1.
    d. Row 1 from SG1 is written to database A.
    e. A record is created in database A's metadata indicating that row 1 was changed by SG1. Sync Group 1 is finished synchronizing.

If no new changes are made to any of the databases, then the next time they sync no data is written to any of the databases.

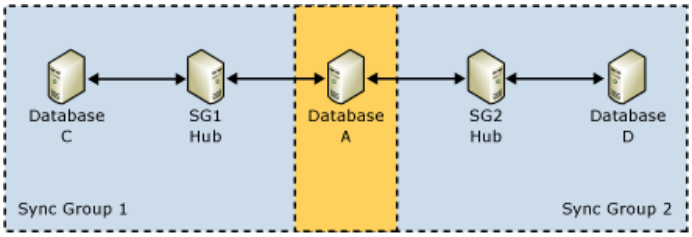

Figure 1: Two sync groups sharing a database. No synchronization loop

The same sequence takes place in the opposite direction (relative to Figure 1) if the change is initiated in database D.

How Figure 2 works (or does not work)

Let's walk through the sequence of events that take place when a change is made to any database in Figure 2. Again we'll assume the change is made to database C.

1. Row 1 in database C is changed.

2. In database C's metadata a record is created indicating that row 1 was changed and where the change originated.
3. Sync Group 1 synchronizes.
    a. It notes that row 1 in database C is changed by someone other than SG1.
    b. Row 1 from Database C is written to SG1 Hub.
    c. A record is created in SG1's metadata indicating that row 1 was changed by SG1.
    d. Row 1 from SG1 is written to databases A and B.
    e. A record is created in database A and B's metadata indicating that row 1 was changed by SG1.

    Sync Group 1 is finished synchronizing.
4. Sync Group 2 Synchronizes.
    a. It notes that row 1 in database A (or B) is changed by someone other than SG2.
    b. Row 1 from Database A is written to SG2 Hub.
    c. A record is created in SG2's metadata indicating that row 1 was changed by SG2.
    d. Row 1 from SG2 is written to databases B (or A) and D.
    e. A record is created in database B (or A) and D's metadata indicating that row 1 was changed by SG2.

    Sync Group 2 is finished synchronizing.

If no new changes are made to any of the databases, the next time that SG1 synchronizes it notes a change in database A (or B) that it didn't make (it was made by SG2 in the last cycle). Even though the data is no different from what is in all the databases in both sync groups it is treated as changed data and the above synchronization cycle is run again, and again, and again without end.

It is worth noting that while our synchronization loop example involves only a single row, what is true for one row is true for any number of rows. Imagine a million-row database where 1% of the unchanged rows are changed in each synchronization cycle. After one cycle you are infinitely looping 10,000 rows. After two cycles you are looping that 10,000 plus an additional 9,900 rows for a total of 19,900 rows. And the number of rows in the loop continues to increase, never decrease.

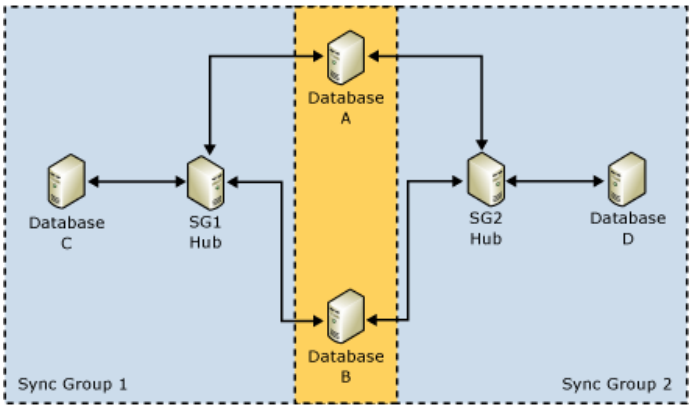

Figure 2: Two sync groups with a synchronization loop

How Figure 3 works (big loops are still loops)

Figure 3 illustrates a more complex situation where the loop may not be as easy to identify as in Figure 2.

In Figure 3 there are three sync groups. Each sync group has a hub and two other databases. Each database is shared by two sync groups but no pair of sync groups shares the same two databases.

- SG1: A and B
- SG2: B and C
- SG3: C and A

Let's walk through the sequence of events that take place when a change is made to any database in Figure 3. We'll assume the change is made to database A.

1. Row 1 in database A is changed.
2. In database A's metadata a record is created indicating that row 1 was changed and where the change originated.
3. Sync Group 1 synchronizes.
   a. It notes that row 1 in database A is changed by someone other than SG1.
   b. Row 1 from Database A is written to SG1 Hub.
   c. A record is created in SG1's metadata indicating that row 1 was changed by SG1.
   d. Row 1 from SG1 is written to database B.
   e. A record is created in database B's metadata indicating that row 1 was changed by SG1.

   Sync Group 1 is finished synchronizing.
4. Sync Group 2 Synchronizes.
   a. It notes that row 1 in database B is changed by someone other than SG2.

b. Row 1 from Database B is written to SG2 Hub.
c. A record is created in SG2's metadata indicating that row 1 was changed by SG2.
d. Row 1 from SG2 is written to database C.
e. A record is created in database C's metadata indicating that row 1 was changed by SG2.

Sync Group 2 is finished synchronizing.

5. Sync Group 3 Synchronizes.
   a. It notes that row 1 in database C is changed by someone other than SG3.
   b. Row 1 from Database C is written to SG3 Hub.
   c. A record is created in SG3's metadata indicating that row 1 was changed by SG3.
   d. Row 1 from SG3 is written to database A.
   e. A record is created in database A's metadata indicating that row 1 was changed by SG3.

   Sync Group 3 is finished synchronizing.

If no new changes are made in any of the databases, the next time SG1 synchronizes it notes that row 1 in database A was changed by someone other than SG1. This is treated by SG1 as a completely different change even though the data is identical to that in all the databases and hubs. Thus the entire synchronization cycle is repeated infinitely.

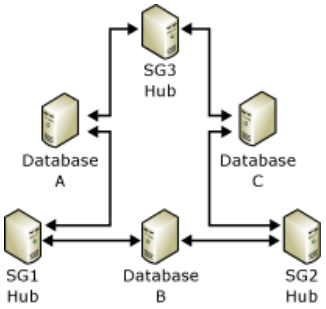

Figure 3: Three sync groups with a synchronization loop

How to avoid synchronization loops

The key to avoiding synchronization loops is to avoid having any path whereby a data change in one sync group is ultimately written back to the originating database by another sync group. There are three ways to accomplish this.

- **Design your synchronization system so the loops cannot exist.**

  For example:

  In Figure 2 you could remove either database A or B from the shared area.

  In Figure 3 you could remove any database from any sync group and you would break the loop.

- **Use row filtering.**

  If you create mutually exclusive filters when you configure each sync group, then no two sync groups will synchronize the same data.

  For example:

  In Figure 2 you could add the row filter `Area = "NA"` to one sync group and `Area = "EU"` to the other.

- **Use synchronization direction.**

  For example:

  If you set the sync directions as illustrated in Figure 4 you no longer have a loop.

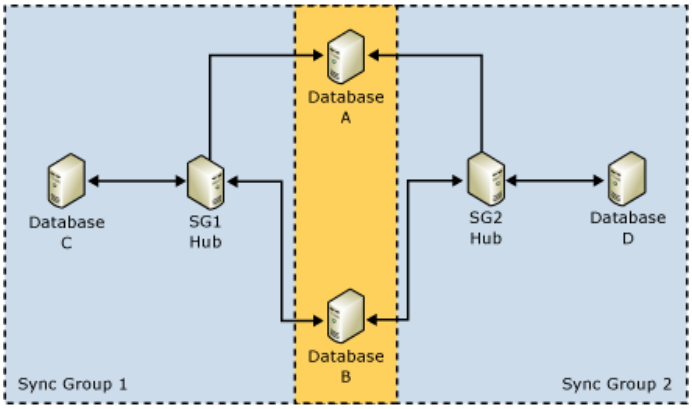

Figure 4: Use synchronization direction to prevent loops

Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

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How to create a sync group	How to modify a sync group
There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links. 1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database	You can modify a sync group's schema by adding/removing tables or columns in the sync group; or by altering a column's width or data type. Details can be found by following the links. • Update a Sync Group Schema • Add a Database to your Sync Group • Add or remove a table in a sync group • Add or remove a column in a sync group

2. Create your sync group 3. Add your sync members 4. Install a SQL Data Sync Client Agent (optional) 5. Register a SQL Server database with a Client Agent (optional) 6. Configure your sync group (SDS)	• Change the width of a column in a sync group • Change a column's data type

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See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Conflict Resolution when Synchronizing

Data Security in SQL Data Sync

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

SQL Data Sync Best Practices

	Welcome to SQL Data Sync (Preview). This topic is the fifth and final of five topics you should be familiar with before you design and implement a data synchronization plan. The five preparatory topics are: • System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • **SQL Data Sync Best Practices** - this topic

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

In this topic

Security and Reliability

Agent

- Install the client agent using the least privilege account with network service access.
- It is best if the client agent is installed on a computer separate from your on premises SQL Server computer.
- Do not register an on-premises DB with more than one agent.
  - Even if syncing different tables for different sync groups.
  - Registering an on-premises database with multiple client agent poses challenges when deleting one of the sync groups.

Database accounts with least privilege

- **For Sync Setup:**
  Create/Alter Table, Alter Database, Create Procedure, Select/ Alter Schema, Create User Defined Type.
- **For Ongoing Sync:**
  Select/ Insert/ Update/ Delete on tables selected for syncing and on sync metadata and tracking tables, Execute permission on stored procedures created by our service, Execute permission on user defined table types.
- **For de-provisioning:**
  Alter on tables part of sync, Select/ Delete on Sync Metadata tables, Control on sync tracking Sync Tracking tables, stored procedures and user defined types

What to do with this information because there is only one credential for a DB in the Sync Group?

- Change the credentials for different phases (e.g. cred1 for setup and cred2 for ongoing).
- Change the permission of the credentials (e.g. change permission after sync is setup).

Where to Locate Your Hub Database

Enterprise to Cloud Scenario:

Keep your Hub Database close to the greatest concentration of the sync group's database traffic to minimize latency.

Cloud to Cloud Scenario:

When all the databases in a sync group are in one data center the hub should be located in the same data center. This reduces latency and the cost of data transfer between data centers.

When the databases in a sync group are in multiple data centers the hub should be located in the same data center as most of the databases and database traffic.

Mixed Scenarios:

Apply the above principles to more complex sync group configurations.

Database Considerations and Constraints

- **SQL Database Instance Size**

  When you create a new SQL Database instance, set the maximum size so that it is always larger than the database you deploy. If you do not set the maximum size larger than your deployed database, synchronization fails. While there is no automatic growth - you can do an ALTER DATABASE to increase the size of the database after it has been created. Of course if you must stay within the SQL Database instance size limits.

  Important
  SQL Data Sync (Preview) stores additional metadata with your database. Be sure to account for this when you calculate space needed.
  The amount of added overhead is governed by the width of your tables (narrow tables require more overhead) and the amount of traffic.

- **Supported limits on database dimensions**

Dimension	Limit
Database, table, schema, and column names	50 characters per name
Tables in a sync group	500
Columns in a table in a sync group	1000
Data row size on a table	24Mb

Table Considerations and Constraints

- **Selecting Tables**

Not all tables in a database are required to be in a sync group. The selection of which tables to include in a sync group and which to exclude (or include in a different Sync Group) can impact efficiency and costs. Include only those tables in a Sync Group that business needs demand and the tables upon which they are dependent.

- **Primary Keys**

  Each table in a sync group must have a Primary Key. The SQL Data Sync (Preview) service is unable to synchronize any table that does not have a Primary Key.

Before rolling into production, test Initial and Ongoing Sync Performance for your scenario.

Provisioning Destination Databases

SQL Data Sync (Preview) Preview provides basic database auto-provisioning.

This section discusses the limitations of SQL Data Sync (Preview)'s provisioning.

Auto Provisioning Limitations

The following are limitations of SQL Data Sync (Preview) auto provisioning.

- Only the columns selected are created in the destination table.
  Thus, if some columns are not part of the sync group those columns are not provisioned in the destination tables.
- Indexes are created only for the selected columns.
  If the source table index has columns that are not part of the sync group those indexes are not provisioned in the destination tables.
- Indexes on XML type columns are not provisioned.
- CHECK constraints are not provisioned.
- Existing triggers on the source tables are not provisioned.
- Views and Stored Procedures are not created on the destination database.

Recommendations

- Use the auto-provisioning capability only for trying the service.
- For production, you should provision the database schema.

Avoid a slow and costly initial synchronization

This section discusses the initial synchronization of a sync group and what you can do to avoid an initial synchronization taking longer than necessary and costing more than it should.

SQL Data Sync (Preview)'s behavior

When you create a sync group, start with data in only one database. If you have data in multiple databases, SQL Data Sync (Preview) treats each row as a conflict that needs resolution. This

causes the initial synchronization to go very slow – taking several days to several months, depending on the database size.

Additionally, if the databases are in different data centers the cost of your initial synchronization will be higher than necessary since each row must travel between the different data centers.

Recommendation

Whenever possible start with data in only one of the sync group's databases.

Synchronization Schedule Considerations

- **Costs**

  Even though SQL Data Sync (Preview) service is currently offered without charge, SQL Database charges are applied to the data that is moved to and from SQL Database data centers. Therefore, you should synchronize tables that are stable or contain data that does not need to be refreshed frequently on a daily or weekly schedule. Tables that contain time sensitive data or data that is more volatile are better synchronized on a more frequent schedule. Analyze your business needs and create your Sync Group and schedules appropriately.

  As data passes into and out of a data center there may also be ingress and egress charges.

- **Frequency**

  If you attempt to synchronize a Sync Group that has not completed a synchronization the attempt does not even start. There is no visible indication that the synchronization did not take place. Therefore, it is good practice to schedule synchronizations so that each synchronization has time to complete prior to attempting another synchronization.

  For example:

  If you schedule your sync group to sync every five minutes, T0, T0+5, T0+10 ..., but it takes the group six minutes to complete a synchronization then your synchronizations take place at T0, T0+10, T0+20 and so on. T0+5 and T0+15 fail because synchronizations T0 and T0+10 haven't completed in time.

Design to Avoid Synchronization Loops

A synchronization loop results when there are circular references within a sync group so that each change in one database is replicated through the databases in the sync group circularly and endlessly. You want to avoid synchronization loops as they degrade performance and can significantly increase your costs.

For more detailed information on synchronization loops with examples of designs that result in them and how to redesign to avoid them see the topic Understand and Avoid Synchronization Loops.

Avoid Out-of-Date Databases and Sync Groups

A sync group or a database within a sync group can become out-of-date. When a sync group's status is "out-of-date" is stops functioning. When a database's status is "out-of-date" data can be lost. It is best to avoid these situations rather than have to recover from them.

Avoid Out-of-Date Databases

A database's status is set to out-of-date when it has been offline for 45 days or more. You avoid the out-of-date status on a database by ensuring that none of your databases are offline for 45 days or more. See the topic A database has an "Out-of-Date" status for how to recover from a database that has an out-of-date status.

Avoid Out-of-Date Sync Groups

A sync group's is set to out-of-date when any change within the sync group fails to propagate to the rest of the sync group for 45 days or more. You can avoid the out-of-date status on a sync group by regularly checking the sync group's history log and ensuring that all conflicts are resolved and changes successfully propagated throughout the sync group databases.

Reasons a sync group may fail to apply a change include:

- Schema incompatibility between tables.
- Data incompatibility between tables. See the topic SQL Database Data Types supported by SQL Data Sync.
- Inserting a row with a null value in a column that does not allow null values.
- Updating a row with a value that violates a foreign key constraint.

You can prevent out-of-date sync groups by:

- Update the schema to allow the values contained in the failed rows. See the topic Q: I just changed my schema. How do I get the change into my sync group?.
- Update the foreign key values to include the values contained in the failed rows.
- Update the data values in the failed row to be compatible with the schema or foreign keys in the target database.

See the topic A sync group has an "Out-of-Date" status for how to recover from a sync group that has an out-of-date status.

Avoid Deprovisioning Issues

Under certain circumstances unregistering a database with a client agent can cause synchronizations to fail.

Scenario:

1. Sync group A was created with an SQL Database instance and an on premise SQL Server database which is associated with local agent 1.
2. The same on-premises database is registered with local agent 2 (this agent is not associated with any sync group).

3. Unregistering the on-premises database from local agent 2 removes the tracking/meta tables for the sync group A for the on-premises database.
4. Now, the sync group A operations fail with the following error –
   "The current operation could not be completed because the database is not provisioned for sync or you do not have permissions to the sync configuration tables."

Solution:

- Avoid the situation entirely by never registering a database with more than one agent.
- To recover from thus situation:
  a. Remove the database from each sync group it belongs to.
  b. Add the database back into each sync group you just removed it from.
  c. Deploy each affected sync group (which provisions the database).

Handling Changes that Fail to Propagate

Reasons that changes fail to propagate

Changes can fail to propagate due to many reasons. Some causes would be:

- Schema/Datatype incompatibility.
- Trying to insert null in non-nullable columns.
- Violating foreign key constraints.

What happens when changes fail to propagate?

- Sync Group shows it is in a warning state.
- Details are in the Portal UI Log viewer.
- If the issue is not resolved for 45 days, your database becomes outofdate.

Note
Those changes will never propagate. The only way to recover is recreate your sync group.

Recommendation

Regularly monitor your Sync Group and Database health through the portal and Log UI.

Modifying your sync group

Do not attempt to remove a database from a sync group and then edit the sync group without first deploying one of the changes.

First, remove a database from a sync group. Then deploy the change and wait for de-provisioning to complete. Once this has completed, you may edit the sync group and deploy the changes.

If you attempt to remove a database and then edit a sync group without first deploying one of the changes, one or the other operation will fail and the UI may get into an inconsistent state. However, if this happens, you may refresh the UI to restore the correct state.

Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

How to create a sync group	How to modify a sync group
There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links. 1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 2. Create your sync group 3. Add your sync members 4. Install a SQL Data Sync Client Agent (optional) 5. Register a SQL Server database with a Client Agent (optional) 6. Configure your sync group (SDS)	You can modify a sync group's schema by adding/removing tables or columns in the sync group; or by altering a column's width or data type. Details can be found by following the links. • Update a Sync Group Schema • Add a Database to your Sync Group • Add or remove a table in a sync group • Add or remove a column in a sync group • Change the width of a column in a sync group • Change a column's data type

See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Conflict Resolution when Synchronizing

Data Security in SQL Data Sync

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

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Create a Sync Group

	SQL Data Sync (Preview) enables you to synchronize your data across on-premises and SQL Database instances. To synchronize your data across multiple databases you need to create a sync group. A sync group logically groups together two or more SQL Server or SQL Database instances. The topics in this section cover how to create sync groups. A sync group may be comprised of one or more SQL Database instances and zero or more SQL Server databases.

Requirements

- When you create a sync group, be sure that only one of the databases contains data prior to the first synchronization. If multiple databases contain data, each common row is treated as a data conflict, even if the data is identical. Data conflicts significantly slow down a synchronization. Depending on the size of your database, if multiple databases are populated with data, the first synchronization can take days or weeks. Conflict resolution also requires multiple round trips between the databases. If your databases are in different data centers, these round trips can add significantly to your ingress and egress charges.

Create a Sync Group There are six steps to create a sync group:	
Sign in to Azure	Sign in to the Azure SQL Database Management portal.
Create your sync group	Walk through the wizard to create a sync group. After the sync group is created you can add other databases to it – see Add a Database to your Sync Group.
Add your data sync members	Define the databases and sync directions to be synchronized by this sync group.
Install a SQL Data Sync Client Agent (optional)	In order for you to include SQL Server databases in a sync group, you need an installed client agent. The client agent handles encrypted communications between the sync

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	service and your on-premises SQL Server databases. This topic walks you through the steps to install a client agent.
Register a SQL Server database with a Client Agent (optional)	Every on-premises database must be registered with an installed client agent before it can be added to a sync group. This topic walks you through the steps to register a SQL Server database with an installed client agent.
Configure your sync group (SDS)	Set the tables and columns for the databases you want to sync in the sync group.

See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Data Security in SQL Data Sync

Conflict Resolution when Synchronizing

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

Create your sync group

	A sync group is a logical grouping of SQL Database instances and optional SQL Server databases. This grouping defines which databases, tables and columns are synchronized together. This topic walks you through the add-a-sync-group wizard that is part of the Azure Management portal. The Microsoft Azure SQL Data Sync service on the Microsoft Azure AUX portal will be decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync. You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the

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	Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

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How To: Create your Sync Group

This section walks you through the steps to create a sync group.

Given that Data Sync Service can sync databases for both azure SQL databases and on-premises SQL databases. If any of the sync members in sync group are on-premises SQL databases during the sync group creation, some additional steps at Install a SQL Data Sync Client Agent and Register a SQL Server database with a Client Agent are required. If all the sync members in Sync group are azure SQL databases during the Sync Group creation, then no Sync Agent related steps are required during the sync group creation.

Whenever possible, a sync group should have only one database that contains data prior to the first synchronization. If more than one database contains data, then the first time the group is synchronized, every row is treated as a data conflict (even if the data is identical). Conflict resolutions can, depending on the database size, cause the initial synchronization to take days, weeks, or in some cases, months.

If the databases are in different data centers, the cost of your initial synchronization will be higher than necessary. The additional round trips required to resolve each conflict result in unnecessary ingress and egress.

The client agent and the sync group must be in the same data center. SQL Server databases registered with the agent can be in any data center.

Each region requires an additional Azure SQL Database from you to store sync metadata for the data synchronization. (Go to Sync Metadata Database for more information)

1. Navigate your browser to the Azure SQL Database Management portal and sign in.
2. After the portal finishes loading, click **SQL DATABASES** in the left pane.
3. Choose one database you want to sync data with. (This database must be Hub Database within the sync group you are creating, go to Hub Database if you want to know more)
4. Go to the **SETTINGS** group for the database, select **Sync to other databases.**
5. You can see the existing sync groups and sync agents are there if you have already created some previously. Go to the top of the pane, click **New Sync Group.**
6. You can see a new pane with 3 major steps for creating sync group. Go with the step 1 and you will see a new pane. Set the following configurations:
    - Give a meaningful **Name** for sync group,

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- Create a new or select an existing database as your **sync metadata database**. (This database can be any Azure SQL Database in the same region of Hub Database under your subscription, go to Sync Metadata Database for more information.)
- Select **Automatic Sync**
  Click **ON** to configure this sync group to synchronize on the schedule you define.
  Click **OFF** to configure this sync group to synchronize only when you click **SYNC**.
- If you select **ON** for **Automatic Sync,** input **Sync Frequency**
  Set the frequency of synchronizations. The frequency must be between 5 minutes and 1 month. This value is applicable only if Automatic Sync is ON.
- Select the **Conflict Resolution** policy for this sync group.
  Once the sync group is deployed, you cannot change the conflict resolution policy. For more information on SQL Data Sync conflict resolution, see the topic Conflict Resolution when Synchronizing.

7. Click **OK**.

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Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Azure SQL Database Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

Before you start Before you begin to design and implement your synchronizations, you should be familiar with these topics.	**How to create a sync group** There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links.
• System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices	1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 2. Create your sync group 3. Add your sync members 4. Install a SQL Data Sync Client Agent (optional) 5. Register a SQL Server database with a Client Agent (optional) 6. Configure your sync group (SDS)
	How to modify a sync group

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	You can modify a sync group's schema by adding/removing tables or columns in the sync group; or by altering a column's width or data type. Details can be found by following the links. • Update a Sync Group Schema • Add a Database to your Sync Group • Add or remove a table in a sync group • Add or remove a column in a sync group • Change the width of a column in a sync group • Change a column's data type

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See Also

SQL Data Sync
SQL Database Data Types supported by SQL Data Sync
Data Security in SQL Data Sync
Conflict Resolution when Synchronizing
SQL Data Sync Troubleshooting Guide
Glossary of SQL Data Sync Terms

Add your data sync members

	A sync group is a logical grouping of SQL Database instances and optional SQL Server databases. This grouping defines which databases, tables and columns are synchronized together. This topic walks you through defining the databases and tables that belong to this sync group. The Microsoft Azure SQL Data Sync service on the Microsoft Azure AUX portal will be decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure

	SQL Data Sync. You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

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How To: Add your Sync Members

The database you start with will be the Hub Database by default in a sync group. If you want to change the Hub Database in your sync group, you have to create a new sync group via the SETTINGS page from the Hub Database you designed in sync group at the Microsoft Azure Management portal.

1. Navigate to the Step 2 on **New sync group** pane and you will see a new pane.
2. Input the **Username** and **Password** of the Hub Database.
3. Add other sync member database, you can add either Azure SQL database or on-premises SQL server database as members in sync group:

Add Azure SQL databases

1. Click **Add an Azure SQL Database**
2. Provide a reasonable **Name** to the sync member.
3. Select the **subscription** which the database belongs to.
4. Select the **Azure SQL Server**.
5. Select the **Azure SQL database**.
6. Select the **Sync Directions** for this database.
   Valid sync directions are:
   - **Bi-directional** – data changes in either this database or the Hub Database are written to the other database.
   - **To the Hub** – data changes in this database are written to the Hub Database, but changes in the Hub Database are not written to this database.
   - **From the Hub** – data changes in the Hub Database are written to this database, but changes to this database are not written to the Hub.
7. Input the **user name & password** to get access on the Azure SQL Database

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8. Click **OK**

Add on-premises SQL Server Database

1. Click **Add an on-premises SQL Database**
2. Click **Choose the Sync Agent Gateway**, you will see a new pane. You can either choose an existing sync agent or create new sync agent through check box:

   Check **Existing agents:**

   a. From the dropdown, select the sync agent name if you had already installed the sync agent in your on-prem server.

   Check **New agent:**

   b. Go to Install a SQL Data Sync Client Agent (optional)

   c. Go to Register a SQL Server database with a Client Agent (optional)
3. Click **Select the database**

   a. Provide a reasonable **Name** to the sync member.

   b. Select the right on-premises SQL databases connected to this sync agents. (The local SQL Server database has been registered in the agent through Register a SQL Server database with a Client Agent (optional))

   c. Select the **Sync Directions** for this database.
   Valid sync directions are:

   - **Bi-directional** – data changes in either this database or the Hub Database are written to the other database.
   - **To the Hub** – data changes in this database are written to the Hub Database, but changes in the Hub Database are not written to this database.
   - **From the Hub** – data changes in the Hub Database are written to this database, but changes to this database are not written to the Hub.
4. Click **OK**

Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Microsoft Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

Before you start	**How to create a sync group**
Before you begin to design and implement your synchronizations, you should be familiar with these topics.	There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these

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	links.
• System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices	1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 2. Create your sync group 3. Add your sync members 4. Install a SQL Data Sync Client Agent (optional) 5. Register a SQL Server database with a Client Agent (optional) 6. Configure your sync group (SDS)
	How to modify a sync group You can modify a sync group's schema by adding/removing tables or columns in the sync group; or by altering a column's width or data type. Details can be found by following the links. • Update a Sync Group Schema • Add a Database to your Sync Group • Add or remove a table in a sync group • Add or remove a column in a sync group • Change the width of a column in a sync group • Change a column's data type

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See Also

Microsoft Azure Management portal SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Data Security in SQL Data Sync

Conflict Resolution when Synchronizing

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

Install a SQL Data Sync Client Agent

SQL Data Sync (Preview) synchronization groups that include one or more on-premises SQL Server databases need a client agent to manage communications between SQL Data Sync (Preview) and SQL Server databases without compromising your firewall. You do not need an agent for SQL Database (formerly SQL Azure) instances that are included in the sync group and should not attempt to register any SQL Database instances with an agent.

This topic walks you through the steps of installing a client agent.

If you already have a client agent installed, see the topic section A. Determine your client agent version to determine whether or not you need to upgrade to a newer version. The current client agent version is 4.2.5658.

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How To: Install a SQL Data Sync Client Agent

You need to install a client agent for each Data Sync server that hosts a sync group which includes one or more SQL Server databases. A client agent can connect to multiple SQL Server instances. For specific limitations see the topic Known SQL Data Sync Limits.

You can add a SQL Server database that is on a different computer than the client agent. However, the agent must be able to connect to the SQL Server instance.

Prerequisites to installing a client agent

Before you install the client agent make sure the following are installed in the order listed below.

1. .NET Framework 4.5
   Download the .NET Framework 4.5.
2. Microsoft SQL Server 2008 R2 SP1 System CLR Types (x86)
   You can download these at http://www.microsoft.com/download/en/details.aspx?id=26728.
3. Microsoft SQL Server 2008 R2 SP1 Shared Management Objects (x86)
   You can download these at http://www.microsoft.com/download/en/details.aspx?id=26728.

Note
A client agent that belongs to one subscription is not visible to other subscriptions.

Note

Administrators and non-Administrators alike are able to install the client agent. However, only an Administrator can repair the client agent. If you perform the repair as a non-Administrator, the UI will become unresponsive.

Steps to install a client agent

You need a client agent if any of the databases in your sync group are SQL Server databases. You do not need an agent if all the databases in the sync group are Azure SQL Database instances.

1. Navigate your browser to the SETTINGS pane for your SQL Database at the Microsoft Azure Management portal; go to create sync group following the directions in Create your sync group until you start to "**Create a new agent**".
2. Click **Download**.
3. On the download page, locate and click the .msi file.
4. Click **Run** when asked whether to run or save the file.
5. At the Welcome to the Microsoft SQL Data Sync Preview Setup Wizard, click **Next**.
6. Carefully read the License Agreement and click the I agree radio button if you agree with it. (Figure 1:1)
7. Click **Next**. (Figure 1:2)

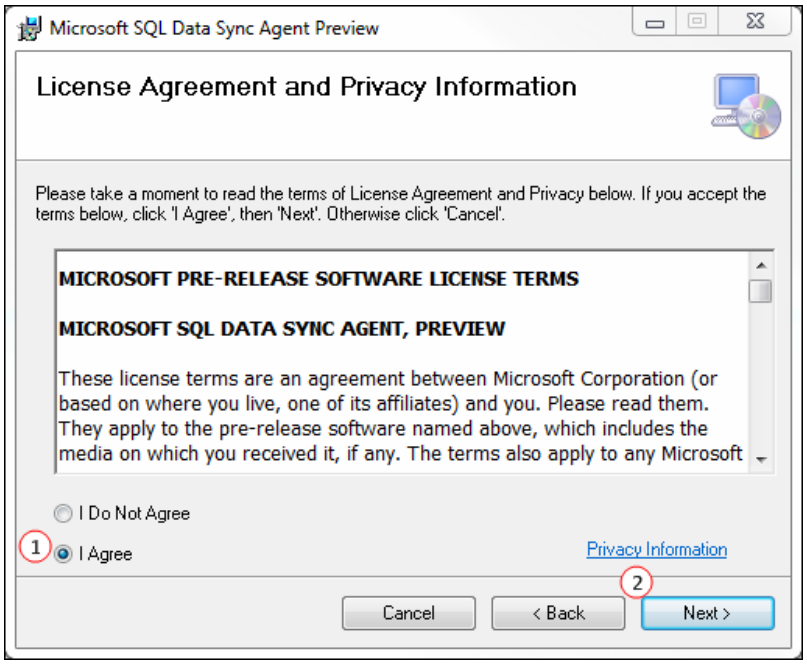

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Figure 1: License Agreement

8. Enter your user name (Figure 2:1) then your password. (Figure 2:2)

Important

- Be sure that this Windows Service account has permissions to connect to all the on-premises databases you want to register with the agent.
- Be sure that the service account has network access through network proxy and firewall.
- If you have a network proxy, ensure that the service account can connect to SQL Data Sync (Preview) service through the proxy.

Note

To later change to a different service account you must uninstall the current client agent than install a new client agent under the new service account.

9. Click **Next**.

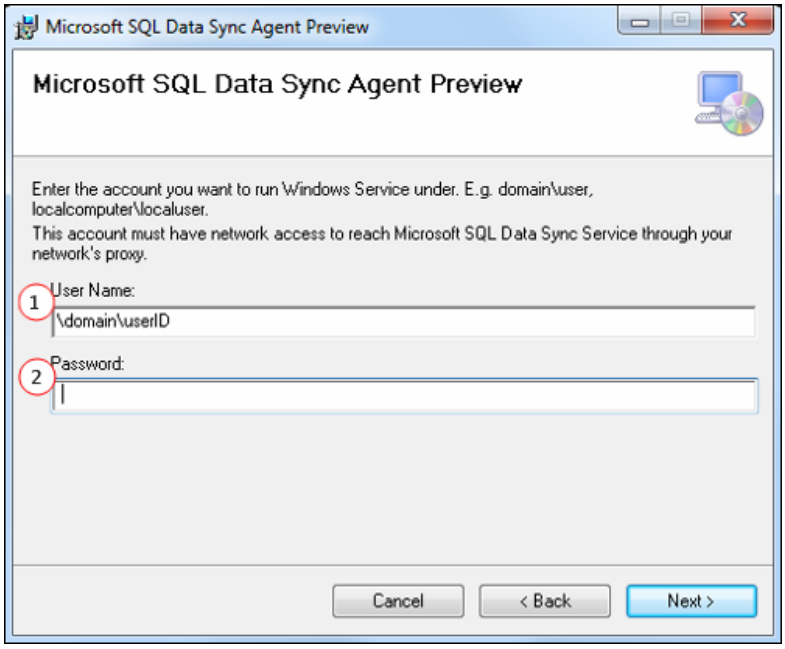

Figure 2: Enter credentials

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Warning

If you specify the run-as account as `.\[accountName]`, the installation fails.

If you specify the run-as account as `[computerName]\[accountName]` the installation succeeds.

10. Confirm or set the path where you want the agent installed.

    The default is `%SYSTEMDRIVE%%PROGRAMFILES%\Microsoft SQL Data Sync\` on 32-bit computers and `%SYSTEMDRIVE%%PROGRAMFILES(X86)%\Microsoft SQL Data Sync\` on 64-bit computers. (Figure 3:1)

    If you prefer you can **Browse** your local drives to set a path different from the default. (Figure 3:2)

    Security

    To provide the best security for your SQL Server credentials, install the SQL Data Sync (Preview) client agent under 'Program Files (x86)' on an x86 computer or 'Program Files' on an x64 computer.

    If you have any question as to whether a drive has sufficient room, click **Disk cost**. (Figure 3:3)

    Write down the installation path for later use.

11. Click **Next**. (Figure 3:4)

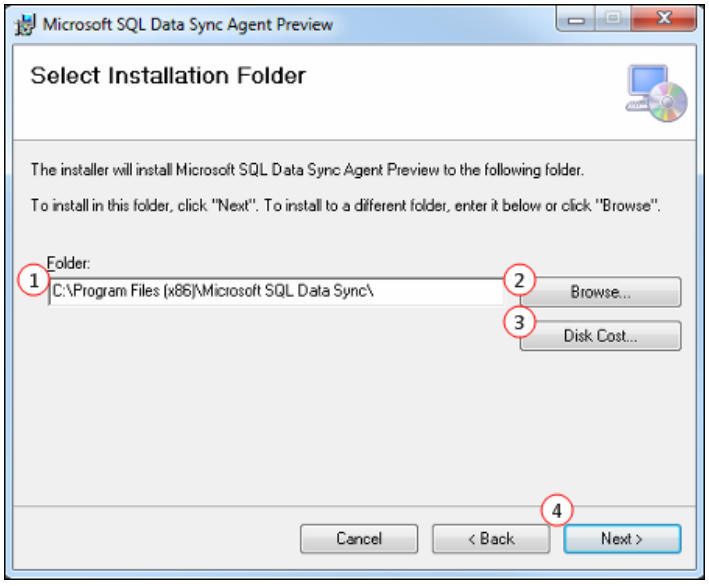

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Figure 3 - Agent installation path

12. When the installation is complete click **Close**.
13. Return to the web portal.
14. Give the agent a unique and meaningful name.
    The agent name must be unique across all your subscriptions.
15. Click **Create and Generate Key**.
    After the key is created, click the clipboard symbol to copy the key to your clipboard.
16. Go to Register a SQL Server database with a Client Agent (optional).

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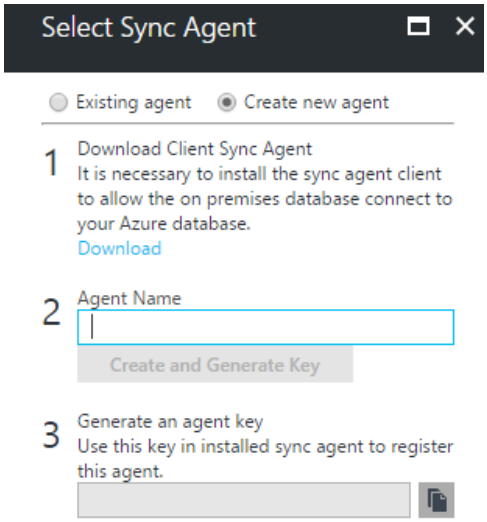

Figure 4: Install a new Agent

Before you begin to design and implement your synchronizations, you should be familiar with

these topics.

- System Requirements for SQL Data Sync
- Known SQL Data Sync Limits
- Plan for Optimization
- Understand and Avoid Synchronization Loops
- SQL Data Sync Best Practices

How to Create a Sync Group There are six steps to create a sync group. This topic walks you through the third step.	**How to Modify a Sync Group** You may need to modify a sync group by:
1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 2. Create your sync group 3. Add your sync members 4. Install a SQL Data Sync Client Agent (optional) 5. Register a SQL Server database with a Client Agent (optional) 6. Configure your sync group (SDS)	• Update a Sync Group Schema • Add a Database to your Sync Group • Add or remove a table in a sync group • Add or remove a column in a sync group • Change the width of a column in a sync group • Change a column's data type
	Other SQL Data Sync (Preview) actions • Change an Agent's Key • Cancel a Synchronization • Delete a Sync Group • Manually Deprovision a Database

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Next >>

See Also

Azure SQL Database Management portal

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Data Security in SQL Data Sync

Conflict Resolution when Synchronizing

Register a SQL Server database with a Client Agent

	SQL Data Sync (Preview) synchronization groups that include one or more on-premises SQL Server databases need a client agent to manage communications between SQL Data Sync (Preview) and SQL Server databases without compromising your firewall. After you install the client agent, you must register any SQL Server database you want to add to any sync group with the client agent. This topic walks you through registering an on-premises SQL Server database with the installed client agent.

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

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How To: Register a SQL Server Database with the Client Agent

Caution
Be sure that service account under which the agent Host is running has permissions to connect to the on-premises database you want to register.

Warning
Critical:
Be sure that you do not attempt to register a SQL Database instance with an agent.

Critical:
Be sure that you do not register the same database with multiple agents as this can lead to a synchronization loop.

Critical:
Be sure that you do not register the same database multiple times with the same agent.

1. From **Start** -> **Computer** navigate to where you installed the agent.

   The default is `%SYSTEMDRIVE%%PROGRAMFILES%\Microsoft SQL Data Sync\` on 32-bit computers and `%SYSTEMDRIVE%%PROGRAMFILES(x86)%\Microsoft SQL Data Sync\` on 64-bit computers.
2. Launch the program **SqlAzureDataSyncAgent.exe**.
3. Click **Submit Agent Key Configuration**. (Figure 1:1)
4. Paste the agent key and credential of Sync Metadata Database into the text box (Figure 2) and click **OK**.
   - The credential is required to be granted with [DataSync_executor] role in Sync Metadata Database.
   - Configure the server firewall settings of Hub Database and Sync Metadata Database properly to make those databases accessible for the local machine which install the agent.
5. Click **Ping Sync Service** to ensure that the Data Sync is running and reachable. (Figure 1:2)

   If you need to start the service
   a. Click **Start**.
   b. Type **services.msc** in the *Search programs and files* textbox.
   c. Double-click **Services.msc** found under Programs in the results window.
   d. Find the **SQL Data Sync (Preview) Preview** service.
   e. If its status is not **Started**, right-click the service, select **Start**, and press **Enter**.

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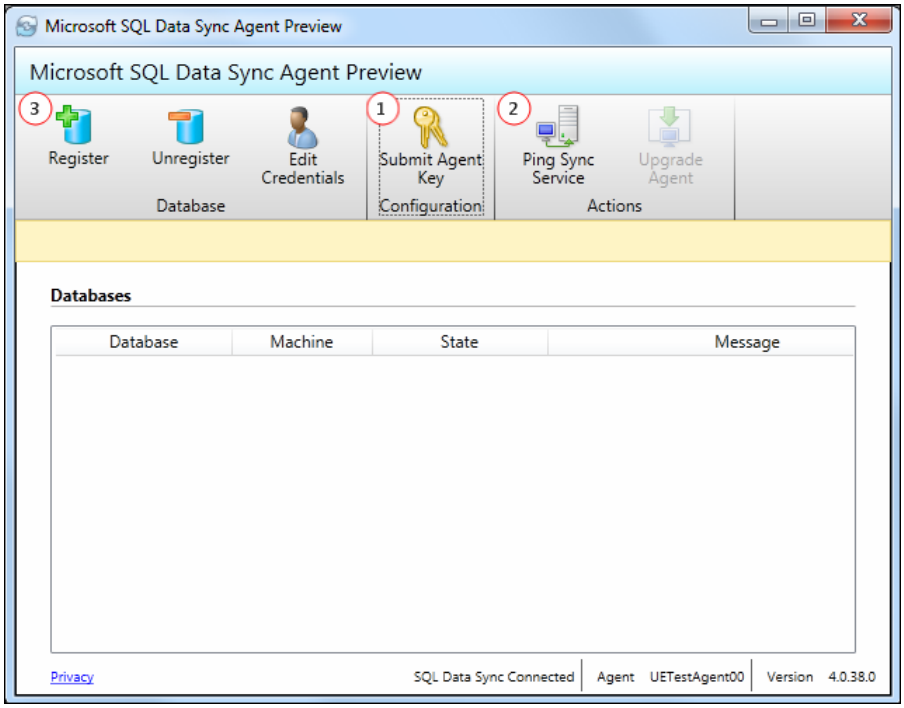

Figure 1: Agent UI

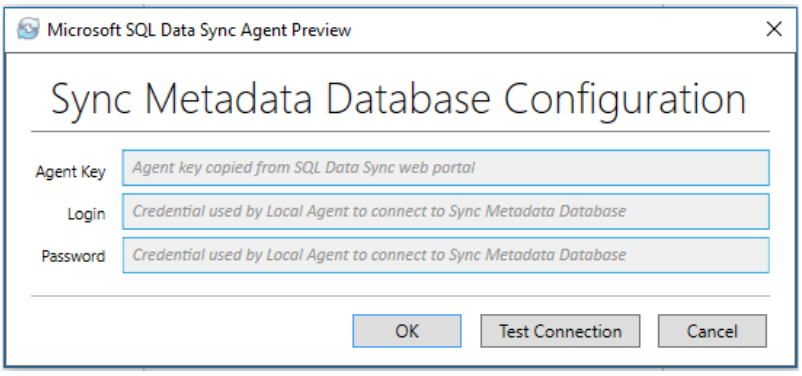

Figure 2: Enter agent key and credential of Sync Metadata Database

6. Register a local SQL Server database with the agent.

   For each local SQL Server database, register:

   a. Click **Register**. (Figure 1:3)

   b. Click the appropriate **Authentication** tab. (Figure 3:1)

   c. Enter the host server name and the database name. (Figure 3:2)

   d. If needed, enter your credentials. (Figure 3:3)

   e. If you want to use an SSL connection for this server, check the **Enable SSL connection with SQL Server** checkbox. (Figure 3:4)

   f. Click **Test Connection**. (Figure 3:5)

      If the connection fails ensure the above information is correct, and then re-click **Test Connection**.

   g. After the connection succeeds, click **Save**. (Figure 3:6)

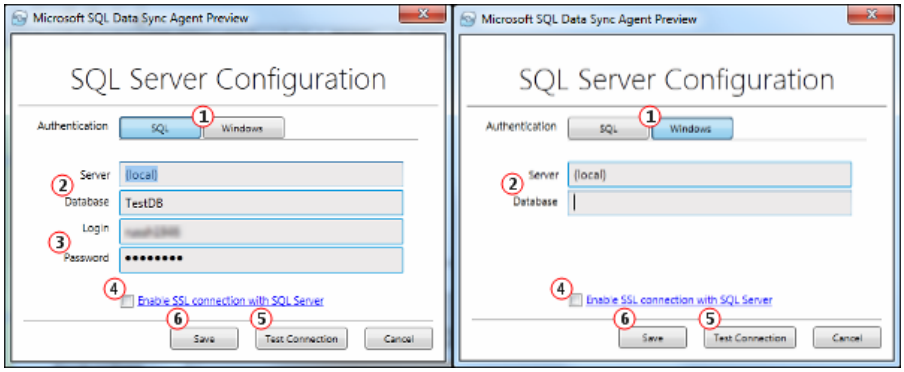

Figure 3: Register a SQL Server database

Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

Before you start	**How to create a sync group**
Before you begin to design and implement your synchronizations, you should be familiar with	There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these

these topics.	links.
• System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices	1. Sign in to the Azure SQL Database Management portal SQL Data Sync (Preview) is along with all the settings under SQL Database 2. Install a SQL Data Sync Client Agent 3. Register a SQL Server database with a Client Agent 4. Create your sync group 5. Define your data sync 6. Configure your sync group (SDS)
	How to modify a sync group You can modify a sync group's schema by adding/removing tables or columns in the sync group; or by altering a column's width or data type. Details can be found by following the links. • Update a Sync Group Schema • Add a Database to your Sync Group • Add or remove a table in a sync group • Add or remove a column in a sync group • Change the width of a column in a sync group • Change a column's data type

<< Previous – Next >>

See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Data Security in SQL Data Sync

Conflict Resolution when Synchronizing

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

Configure your sync group (SDS)

A sync group is a logical grouping of SQL Database instances and optional SQL Server databases. This grouping defines which databases, tables and columns are synchronized together. This topic walks you through the final step in creating a working sync group – configuring your sync group.

The Microsoft Azure SQL Data Sync service on the Microsoft Azure AUX portal will be decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync.

You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

[<< Previous]

How To: Configure your Sync Group

1. Navigate to the Step 3 of **New sync group** and you will see a new pane.
2. Select the database in your sync group and Click **REFRESH SCHEMA**, so that you see the table list for that database.
3. Use the checkboxes to add and/or remove tables and columns you want included in the synchronization. Columns of unsupported data types are disabled and cannot be selected.
4. If you want to keep the changes, click **SAVE**.

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Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

Before you start Before you begin to design and implement your synchronizations, you should be familiar with these topics.	**How to create a sync group** There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links.
• System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices	1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 4. Create your sync group 5. Add your sync members 6. Install a SQL Data Sync Client Agent (optional) 7. Register a SQL Server database with a Client Agent (optional) 8. Configure your sync group (SDS)
	How to modify a sync group You can modify a sync group's schema by adding/removing tables or columns in the sync group; or by altering a column's width or data type. Details can be found by following the links. • Update a Sync Group Schema • Add a Database to your Sync Group • Add or remove a table in a sync group • Add or remove a column in a sync group • Change the width of a column in a sync group • Change a column's data type

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[<< Previous]

See Also

Azure Management Portal

SQL Data Sync

SQL Azure Data Sync [Channel 9 videos]

SQL Database Data Types supported by SQL Data Sync

Data Security in SQL Data Sync

Conflict Resolution when Synchronizing
SQL Data Sync Troubleshooting Guide
Glossary of SQL Data Sync Terms

Modify an Existing Sync Group

To use SQL Data Sync (Preview) to synchronize your data across multiple databases you need to create a sync group which logically groups together two or more SQL databases. The topics in this section cover how to modify an existing sync group from the Microsoft Azure Management portal.

You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

In this section

Topic	Description
Update a Sync Group Schema	Update the sync group's schema and add or remove tables and columns from your sync group.
Remove a Database from a Sync Group	Steps to remove a database from a sync group. Do not delete a database before you remove it from all the sync groups it belongs to.
Delete a Sync Group	Steps to delete a sync group and confirm that it was fully deleted. Do no delete any databases before you delete the sync group.
Manually Deprovision a Database	If a database fails to deprovision when you delete a sync group you need to manually deprovision it.
Cancel a Synchronization	Steps to cancel a synchronization if it is taking

Topic	Description
	too long.
Change an Agent's Key	Steps to change an agent's key on both the agent and with SQL Data Sync.

See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Data Security in SQL Data Sync

Conflict Resolution when Synchronizing

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

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Update a Sync Group Schema

	Over time, you may want to modify a SQL Data Sync (Preview) sync group. This topic walks you through modifying an existing sync group's schema by adding/removing tables or columns to the sync group or by modifying a column's width or data type. If you need to add or remove a database to a sync group, see the topics Add a Database to your Sync Group or Remove a Database from a Sync Group. The Microsoft Azure SQL Data Sync service on the Microsoft Azure AUX portal will be decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync. You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

Modifications you can make to a sync group include:

- **How To: Update a Sync Group Schema (SDS)** – this topic
- Add a Database to your Sync Group
- Remove a Database from a Sync Group
- Delete a Sync Group
- Manually Deprovision a Database
- Cancel a Synchronization
- Change an Agent's Key

Sections in this topic

Prerequisites

Before you can make changes to a deployed sync group you must:

- Install the latest version of the SQL Data Sync (Preview) Preview Agent.
- Ensure that no sync group reference databases are provisioning or synchronizing or have unfinished work, such as changes that have not been applied.

Supported changes to a sync group

SQL Data Sync (Preview) allows the following changes to a sync group:

- Add a table to the dataset
- Remove a table from to the dataset
- Add a column to the dataset

- Remove a column from the dataset
- Change a column's width

Sync Group Update Limitations

The following changes to a database schema cannot be applied to a sync group. If you need to incorporate any of these changes to your sync group, you need to delete and re-create the sync group.

- Change a column's data type.
- Add, remove or modify a column's filter.
- Remove a column that has a filter

> **Warning**
> Data Sync prevents you from removing a column from a sync group if the column belongs to a filter that is defined in that sync group.
> When you edit a sync group SQL Data Sync (Preview) does not detect filters defined in other sync groups. You are responsible for not removing a column from a sync group if the column belongs to a filter that is defined in another sync group or another subscription. Doing so may cause sync errors when inserting data into a table that contains the filtered column.

Sync group changes: scenarios

Add or remove a table in a sync group

There are a number of different scenarios for adding a table to a sync group.

Add a table to a sync group

Add table W to the sync group. (Figure 1)

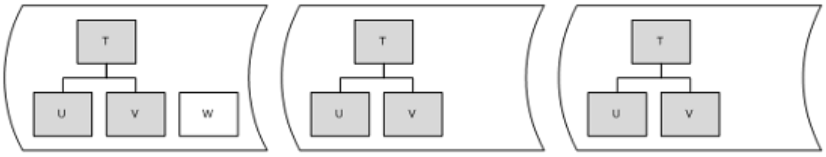

Figure 1 – Add table W to the sync group

- Table W is a new table that the user creates in each of the databases but does not populate with data in any of the instances. (Figure 2)

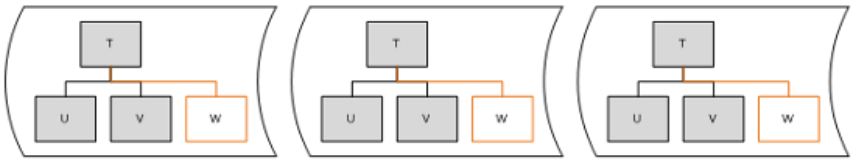

Figure 2 – User creates empty table in all the databases

When the changes are deployed the databases are re-provisioned. Because there is no data in any of the instances of table W no synchronization takes place.

- Table W exists in one database. The user creates empty tables in the other databases. (Figure 3)

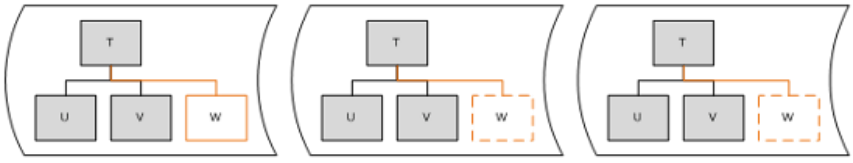

Figure 3 – User creates empty table in databases where W does not exist

When the changes are deployed the databases are re-provisioned. Because there is no data in any instance of table W no synchronization is performed.

- Table exists in multiple database and has different data among the instances (Figure 4)

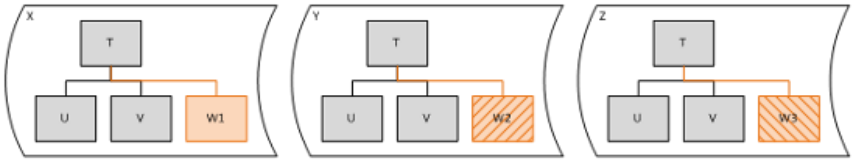

Figure 4 –Table exists in multiple databases and has difference data among the instances

When the changes are deployed the databases are re-provisioned and all rows in the table synchronized so that the data in table W is consistent across all the databases.

Remove a table from a sync group

When a table is removed from a sync group the databases are re-provisioned but a synchronization is not performed since there is no data to be updated.

Add or remove a column in a sync group

To add a column to a sync group's dataset the column's table must be a member of the sync group dataset. If the table is not a member of the dataset, add it then select the column to add.

Add a column to a sync group

User desires to add column D to the sync group. Table T is already a member of the sync group. (Figure 5)

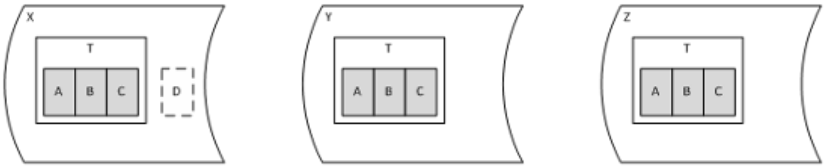

Figure 5: Add column D to a sync group

- Column D is a new column that the user creates in each of the databases but does not populate with data in any of the instances. (Figure 6)

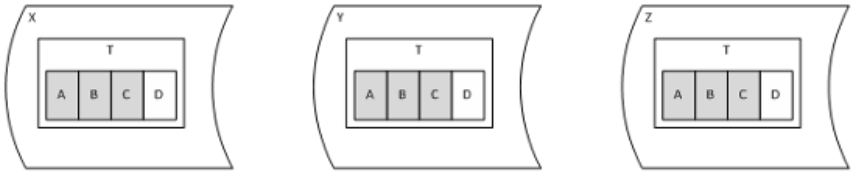

Figure 6 – New and empty column added to table T in multiple databases

When the changes are deployed the databases are re-provisioned. Since there is no new data in any instance of column D no synchronizing is done.

- Column D with data exists in the source table. The user creates empty instances of the column in table T of the other databases in the sync group. (Figure 7)

Important

The column must allow NULLs or have a DEFAULT for the user to create it in the other tables.

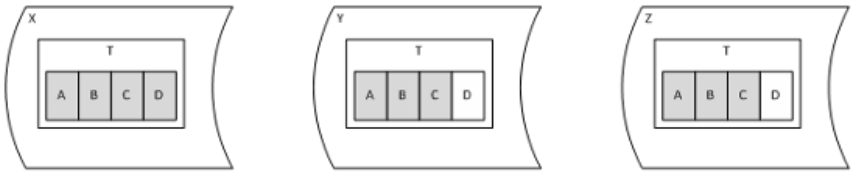

Figure 7 - Column exists in one table, user creates empty column D in table T of the other databases

When the changes are deployed the databases are re-provisioned. Since the data in column D in database X does not exist in column D of databases Y or Z all rows that contain data, not NULLs or DEFAULTs are synchronized.

- Column exists in multiple databases but with differing data. (Figure 8)

  This condition may exist if the column has existed in the different databases but was not synchronized since it did not previously belong to the sync group. As the column is undated in the normal course of business different data is added, updated or deleted from each instance independent of the other instances. When this column is added to the sync group all instances of the column are assumed to be out of sync with the other instances.

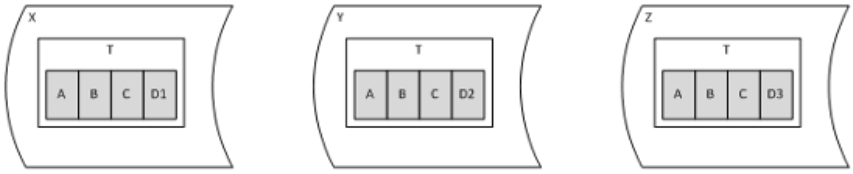

Figure 8 - Column and disparate data exist across multiple databases

When the changes are deployed the databases are re-provisioned and column D in table T is synchronized across all the databases.

Important

If the conflict resolution policy is *Client Wins*, sync results are indeterminate.

Each reference database overwrites the contents of table T with its own data, therefore

a. At the end of the first sync the hub contains a copy of the last reference database to synchronize.
b. During the next synchronization the hub copies this data to each reference database.
c. Since the order in which the reference databases are synchronized cannot be guaranteed, the final version of the data cannot be predicted.

Remove a column from a sync group

When a column is removed from a table the sync group is re-provisioned but a synchronization is not performed since there is no data to be updated.

Change the width of a column in a sync group

You cannot change the width of a column in a sync group directly in Data Sync. You must first alter the column in the reference database, and then use the updated database schema as the source for the updating the sync group.

Data Sync supports column width changes for these data types:

- CHAR
- VARCHAR
- NCHAR
- NVARCHAR
- BINARY
- NBINARY

Change a column's data type

Some data type changes can be incorporated into your sync group. Others cannot. In general, if a data type change can result in lost data, from a float to an int, or from a varchar(10) to a varchar(9), the change cannot be incorporated into the sync group's schema. If you make a data type change that could result in a loss of data, SQL Data Sync (Preview) gives you an error message when you include that column in the sync group.

How to apply changes to your sync group

This section walks you through how to update the sync group schema to incorporate changes you made in your schema's database to the sync group.

Whether you need to add or remove a table or column or change a column's width, the process is the same.

1. Navigate your browser to the Azure SQL Database Management portal and sign in.
2. After the portal finishes loading, click **SQL DATABASES** in the left pane.
3. Choose hub database in your sync group and go to the **SETTINGS** group for the database. Select **Sync to other databases.**
4. You can see the existing sync groups are there.
5. Select and click the sync group you want to modify, you will see a new pane with all the information for this sync group.
6. Click the **Property** on the top pf the pane and then you will see more detailed information. (Figure 9)

   If **AUTOMATIC SYNC** is **ON** set it to **OFF** (Figure 9) then click **SAVE**.

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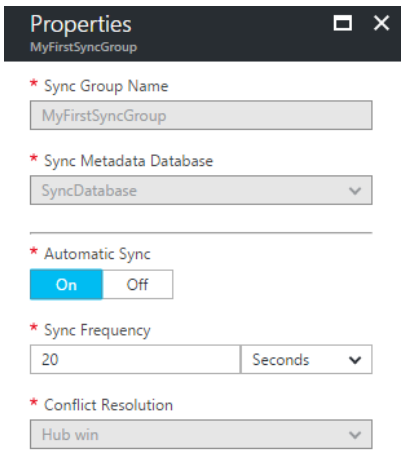

Figure 9 – Turn AUTOMATIC SYNC off

7. Click the **Table** in sync group pane and then you will see the table and schema selected for synchronization.
8. To override the schema for synchronization, select the database and Click **REFRESH SCHEMA**.
9. Use the checkboxes to add and/or remove tables and columns from the sync group. (Figure 10)

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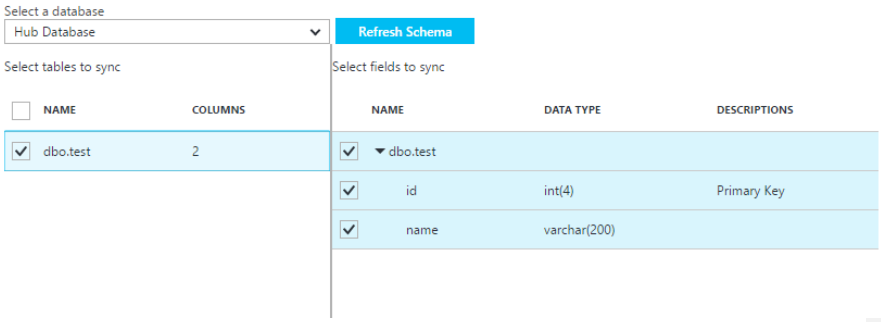

Figure 10 – Add/Remove tables and columns

10. If you want to keep the changes, click **SAVE**. (When you click Save, the tables with their column show to you in the page will be the new schema for sync group. The old schema for sync group will be override.)

11. Click **SYNC**.
12. If you turned **AUTOMATIC SYNC** off in step 6, or if you want to change the frequency of your synchronizations, click the **Property** tab and set **AUTOMATIC SYNC** back to **ON**.

Best Practices for schema updates

- Always use the latest schema when you need to update a sync group's dataset.
- If you plan to remove a table, check the results of the most recent sync to make sure there are no unapplied changes for that table.
  If you remove the table before the changes have been applied, Data Sync will retain the pending changes, which may cause sync to fail after some period of time (45 days).
- Data Sync prevents you from removing a column from a sync group if the column belongs to a filter that is defined in that sync group.
  You are responsible to not remove a column from a sync group if the column belongs to a filter that is defined in another sync group or another subscription. Doing so may cause sync errors when inserting data into the table that contains the column.

Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Microsoft Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

Before you start Before you begin to design and implement your synchronizations, you should be familiar with these topics.	**How to create a sync group** There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links.
• System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices	1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 2. Create your sync group 3. Add your sync members 4. Install a SQL Data Sync Client Agent (optional) 5. Register a SQL Server database with a Client Agent (optional) 6. Configure your sync group (SDS)

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See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Data Security in SQL Data Sync

Conflict Resolution when Synchronizing

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

Add a Database to your Sync Group

	Over time, you may want to modify a SQL Data Sync (Preview) sync group. This topic walks you through adding a SQL Server or a SQL Data Sync (Preview) to an existing sync group. The Microsoft Azure SQL Data Sync service on the Microsoft Azure AUX portal will be decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync. You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

Modifications you can make to a sync group include:

- Update a Sync Group Schema
- **How To: Add a Database to your Sync Group (SDS)** – this topic
- Remove a Database from a Sync Group
- Delete a Sync Group
- Manually Deprovision a Database
- Cancel a Synchronization
- Change an Agent's Key

Add a database to an existing sync group

Whenever possible, when you add a database to an existing sync group, it should be empty. If the database contains data, then the first time it is synchronized with the sync group, every row in the database is treated as a data conflict (even if the data is identical). Conflict resolutions can, depending on the database size, cause the initial synchronization to take days, weeks, or in some known cases, months.

How to add a database to an existing sync group

1. Navigate your browser to the Azure SQL Database Management portal and sign in.
2. After the portal finishes loading, click **SQL DATABASES** in the left pane.
3. Choose hub database in your sync group and go to the **SETTINGS** group for the database. Select **Sync to other databases.** You can see the existing sync groups are there.
4. Select and click the sync group you want to add databases, you will see a new pane with all the information for this sync group.
5. Click the **Database.** You can see all the existing sync member database are listed in a new pane. You can add either Azure SQL databases or on-premises SQL database through the following different process:

Add Azure SQL databases

1. Click **Add an Azure SQL Database**
2. Provide a **Name** to the sync member.
3. Select the **subscription** which the database belongs to.
4. Select the **Azure SQL Server**.
5. Select the **Azure SQL database**.
6. Select the **Sync Directions** for this database.
   Valid sync directions are:
   - **Bi-directional** – data changes in either this database or the Hub Database are written to the other database.
   - **To the Hub** – data changes in this database are written to the Hub Database, but changes in the Hub Database are not written to this database.
   - **From the Hub** – data changes in the Hub Database are written to this database, but changes to this database are not written to the Hub.
7. Input the **user name & password** to get access on the Azure SQL Database
8. Click **OK**

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Add on-premises SQL Server Database

1. Click **Add an on-premises SQL Database**
2. Choose the **Sync Agent Gateway**, you can either choose an existing sync agent or create new sync agent through check box:

   Check **Existing agents:**

   a. From the dropdown, select the sync agent name if you had already installed the sync agent in your on-prem server.

   Check **New agent:**

   b. Go to Install a SQL Data Sync Client Agent (optional)

   c. Go to Register a SQL Server database with a Client Agent (optional)
3. Click **Select the database**

   a. Provide a reasonable **Name** to the sync member.

   b. Select the right on-premises SQL databases connected to this sync agents. (The local SQL Server database has been registered in the agent through Register a SQL Server database with a Client Agent (optional))

   c. Select the **Sync Directions** for this database.
   Valid sync directions are:

   - **Bi-directional** – data changes in either this database or the Hub Database are written to the other database.
   - **To the Hub** – data changes in this database are written to the Hub Database, but changes in the Hub Database are not written to this database.
   - **From the Hub** – data changes in the Hub Database are written to this database, but changes to this database are not written to the Hub.
4. Click **OK**

When finished this database is listed with the other databases in this sync group.

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Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

Before you start	**How to create a sync group**
Before you begin to design and implement your synchronizations, you should be familiar with these topics.	There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links.
• System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization	1. Sign in to the Azure SQL Database Management portal SQL Data Sync (Preview) is found as a tab

• Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices	under SQL Database only after you create a sync group. 2. Install a SQL Data Sync Client Agent 3. Register a SQL Server database with a Client Agent 4. Create your sync group 5. Define your data sync 6. Configure your sync group (SDS)

See Also

Azure Management Portal

SQL Data Sync

SQL Azure Data Sync [Channel 9 videos]

SQL Database Data Types supported by SQL Data Sync

Data Security in SQL Data Sync

Conflict Resolution when Synchronizing

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

Remove a Database from a Sync Group

	Over time, you may want to modify a SQL Data Sync (Preview) sync group. This topic walks you through removing a database from an existing sync group. If you need to add a database to a sync group, see the topics Add a Database to your Sync Group. The Microsoft Azure SQL Data Sync service on the Microsoft Azure AUX portal will be decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync. You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the

	topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

Modifications you can make to a sync group include:

- Update a Sync Group Schema
- Add a Database to your Sync Group
- **How To: Remove a Database from a Sync Group (SDS)** - this topic
- Delete a Sync Group
- Manually Deprovision a Database
- Cancel a Synchronization
- Change an Agent's Key

To Remove a Database from a Sync Group

Caution

Do not physically delete any database in the Sync Group before you remove it from the Sync Group. If you delete the database prior to removing it from the Sync Group, **it is still registered with the synchronization service**, and must be recreated to remove it from the Sync Group.

For each Sync Group you want to remove a database from:

1. Navigate your browser to the Azure SQL Database Management portal and sign in.
2. After the portal finishes loading, click **SQL DATABASES** in the left pane.
3. Choose hub database in your sync group and go to the **SETTINGS** group for the database. Select **Sync to other databases.** You can see the existing sync groups are there.
4. Select and click the sync group you want to remove databases from, you will see a new pane with all the information for this sync group.
5. Click the **Database** and you will see a new pane with all the sync member database listed. Choose the right database and Click **Remove Database.**
6. Confirm that the database was successfully removed and deprovisioned.

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Manual Database Deprovisioning

If a database fails to deprovision, you can deprovision the database manually.

1. At the Windows **Start** menu, type in `cmd` in the Search text box and hit enter.
2. Navigate to the directory where you installed the client agent.
3. Use `DeprovisioningUtil` to deprovision the database.

DeprovisioningUtil.exe

Usage: `Deprovisioningutil.exe <connection_string> [/f]` `<connection_string>` - Specifies the connection string of the SQL Server database or SQL Database instance to be deprovisioned. `[/f]` - Deprovision without warning.	

Examples:
SQL Server
`deprovisioningutil`
`"Server=(local);Database=NorthWind;Trusted_Connection=True`
 	
SQL Database
`deprovisioningutil`
`"Server=tcp:rwbhdyp2ym.database.windows.net;`
`Database=NorthwindAzure; User ID=<yourID>;`
`Password=<yourPassword>; Trusted_Connection=False;" /f`	

Confirm Success

Confirm that the database was properly removed and deprovisioned.

1. Launch SQL Server Management Studio.
2. Connect to the server that hosts the database you deprovisioned.
3. Find the database you deprovisioned.
4. If this database belonged to only one sync group, ensure that there are no tables with "_dss" in the name.
   If any tables with "_dss" in the name remain, use DeprovisioningUtil.exe to clean up the database. See the Manual Database Deprovisioning section above.

Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

Before you start	**How to create a sync group**
Before you begin to design and implement your synchronizations, you should be familiar with these topics.	There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links.
• System Requirements for SQL Data Sync	1. Sign in to the Azure SQL Database Management portal and go to the

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• Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices	"SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 2. Create your sync group 3. Add your sync members 4. Install a SQL Data Sync Client Agent (optional) 5. Register a SQL Server database with a Client Agent (optional) 6. Configure your sync group (SDS)

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See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Data Security in SQL Data Sync

Conflict Resolution when Synchronizing

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

Delete a Sync Group

	If you need to make changes to a SQL Data Sync (Preview) synchronization that cannot be made to an existing sync group, you must delete then recreate the sync group incorporating the changes in the new sync group. This topic walks you through deleting an existing sync group. The Microsoft Azure SQL Data Sync service on the Microsoft Azure AUX portal will be decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync. You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for

	guidance on creating and modifying a sync group from this portal.

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

Modifications you can make to a sync group include:

- Update a Sync Group Schema
- Add a Database to your Sync Group
- Remove a Database from a Sync Group
- **How To: Delete a Sync Group (SDS)** - this topic
- Manually Deprovision a Database
- Cancel a Synchronization
- Change an Agent's Key

To Remove a Sync Group

Do not delete any database in the Sync Group before you remove the Sync Group. If a database in the Sync Group does not exist when you attempt to remove the Sync Group you must recreate the database then synchronize it before you remove the Sync Group.

1. Navigate your browser to the Azure SQL Database Management portal and sign in.
2. After the portal finishes loading, click **SQL DATABASES** in the left pane.
3. Choose hub database in your sync group and go to the **SETTINGS** group for the database. Select **Sync to other databases.** You can see the existing sync groups are there.
4. Select the right sync group and Click Delete.

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Confirm Success

Confirm that each database was properly removed and deprovisioned.

1. Launch SQL Server Management Studio.
2. For each database that was in the sync group:
   a. Connect to the server that hosts the database you deprovisioned.
   b. Find the database you deprovisioned.
   c. If the database belonged only to this sync group, ensure that there are no tables with "_dss" in the name.
   If there are any tables with "_dss" in the name use the deprovisioning utility, DeprovisioningUtil.exe, to manually deprovision the database.

DeprovisioningUtil.exe

Usage: `Deprovisioningutil.exe <connection_string> [/f]` `<connection_string>` - Specifies the connection string of the	

SQL Server database or SQL Database instance to be deprovisioned. `[/f]` - Deprovision without warning.	

Examples:
SQL Server
`deprovisioningutil`
`"Server=(local);Database=NorthWind;Trusted_Connection=True`
 	
SQL Database
`deprovisioningutil`
`"Server=tcp:rwbhdyp2ym.database.windows.net;`
`Database=NorthwindAzure; User ID=<yourID>;`
`Password=<yourPassword>; Trusted_Connection=False;" /f`	

Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

Before you start	**How to create a sync group**
Before you begin to design and implement your synchronizations, you should be familiar with these topics.	There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links.
• System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices	1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 9. Create your sync group 10. Add your sync members 11. Install a SQL Data Sync Client Agent (optional) 12. Register a SQL Server database with a Client Agent (optional) 13. Configure your sync group (SDS)

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See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync
Data Security in SQL Data Sync
Conflict Resolution when Synchronizing
SQL Data Sync Troubleshooting Guide
Glossary of SQL Data Sync Terms

Manually Deprovision a Database (deprecated)

There may be times when you delete a database from a SQL Data Sync (Preview) sync group and the database does not fully deprovision. In such cases, you must manually deprovision the database. This topic walks you through manually deprovisioning a database after you removed it from all sync groups.

The Microsoft Azure SQL Data Sync plug-in on the Microsoft Azure Silverlight portal has been decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync.

You access SQL Data Sync (Preview) via the **SYNC** tab under SQL Database at the Microsoft Azure Management portal. The **SYNC** tab is only available when you have one or more sync groups. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

Modifications you can make to a sync group include:

- Update a Sync Group Schema
- Add a Database to your Sync Group
- Remove a Database from a Sync Group
- Delete a Sync Group
- **How To: Manually Deprovision a Database (SDS)** - this topic

- Cancel a Synchronization
- Change an Agent's Key

Manually Deprovision a Database

A standalone executable is installed with the SQLDataSyncAgent-Preview-ENU.msi that you can use to de-provision the SQL Data Sync (Preview) objects that are created when you add a database or table to your synchronization service.

Warning
If you deprovision a database that is a member of more than one sync group synchronizations for all sync groups which the database is associated fail since the database is no longer provisioned.

Note
If your topology does not include any SQL Server databases you need to install a client agent locally to get the deprovisioning tool.

Usage:		
`DeprovisioningUtil.exe` *<connectionstring>* `[/f]`		
	<connectionstring>	Specifies the connection string of the SQL Server database or SQL Database instance to be deprovisioned.
	[/f]	Deprovision without warning.
Examples:		
SQL Server	`deprovisioningutil "Server=(local); Database=NorthWind;Trusted_Connection=True`	
SQL Database	`deprovisioningutil "Server=tcp:rwd3dyq2ym.database.windows.net; Database=NorthwindAzure; User ID=<yourID>; Password=<yourPassword>; Trusted_Connection=False;" /f`	

Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Microsoft Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

Before you start	**How to create a sync group**
Before you begin to design and implement your synchronizations, you should be familiar with these topics.	There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links.
• System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices	1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 2. Create your sync group 3. Add your sync members 4. Install a SQL Data Sync Client Agent (optional) 5. Register a SQL Server database with a Client Agent (optional) 6. Configure your sync group (SDS)

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See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Data Security in SQL Data Sync

Conflict Resolution when Synchronizing

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

Cancel a Synchronization

	Under certain conditions, a SQL Data Sync (Preview) synchronization task can take a long time and you may want to cancel an in process synchronization. This topic covers why you might want to cancel a sync task and how to cancel scheduled or on-demand SQL Data Sync (Preview) synchronizations. Factors that can cause long synchronizations include: • Large databases or databases with many changes to synchronize. • Many data conflicts. Data conflicts are resolved one by one. • Synchronization failures due to nonsupported scenarios.

The Microsoft Azure SQL Data Sync service on the Microsoft Azure AUX portal will be decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync.

You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

Modifications you can make to a sync group include:

- Update a Sync Group Schema
- Add a Database to your Sync Group
- Remove a Database from a Sync Group
- Delete a Sync Group
- Manually Deprovision a Database
- **How To: Cancel a Synchronization (SDS)** - this topic
- Change an Agent's Key

Why cancel a synchronization?

You would likely want to cancel a synchronization if:

- The synchronization was taking too long.
  A synchronization could take an inordinate amount of time if:
  - There are many data conflicts.
    You get one data conflict per row when the target database is prepopulated with data.
    See Initial Synchronization for more information.

- The synchronization task includes large databases.
- There is a synchronization loop.
  If you have a sync loop the number of rows synchronized increases each time, you synchronize. (See Understand and Avoid Synchronization Loops.)

- There are issues within the sync group that prevent successful synchronizations.
  Common issues that prevent successful synchronizations include:
  - The client agent is offline.
  - Configuration issues, such as row filtering for columns that are non-null columns so that all rows that apply fail.
- You clicked **Sync** multiple times, initiating multiple synchronization tasks where only one is needed. (Yes, this does happen.)

You can only cancel synchronization tasks, not provisioning.

How to cancel a synchronization

1. Navigate your browser to the Azure SQL Database Management portal and sign in.
2. After the portal finishes loading, click **SQL DATABASES** in the left pane.
3. Choose hub database in your sync group and go to the **SETTINGS** group for the database. Select **Sync to other databases.** You can see the existing sync groups are there.
4. Select the sync group and click **Stop**.

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Results of canceling a synchronization

The cancelation is successful. Synchronizations are always canceled successfully.

What happens

When you click **Stop**, the current synchronization task is canceled as soon as possible. If a change is being made at the time you click **Stop**, that change is completed, then the synchronization task is terminated.

A log entry is made – **Synchronization canceled successfully** – which can be seen using the Log Viewer.

What does not happen

Changes are not rolled back. Therefore, if a synchronization task is canceled once it has started the sync group is partially synchronized.

Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Microsoft Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

Before you start	How to create a sync group
Before you begin to design and implement your synchronizations, you should be familiar with these topics.	There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links.
• System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices	1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 2. Create your sync group 4. Add your sync members 5. Install a SQL Data Sync Client Agent (optional) 6. Register a SQL Server database with a Client Agent (optional) 6. Configure your sync group (SDS)

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See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Data Security in SQL Data Sync

Conflict Resolution when Synchronizing

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

Change an Agent's Key

	A SQL Data Sync (Preview) client agent key can only be used once by an agent. It cannot be reused when you remove then reinstall a new agent, nor can it be used by multiple agents. If you need to create a new key for an existing agent you must be sure that the same key is recorded with the client agent and with the SQL Data Sync service. This article covers how to change the key for a

	local SQL Data Sync (Preview) client agent. If you do not have a client agent and need to install one, see the topics Install a SQL Data Sync Client Agent and Register a SQL Server database with a Client Agent. The Microsoft Azure SQL Data Sync service on the Microsoft Azure AUX portal will be decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync. You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

Modifications you can make to a sync group include:

- Update a Sync Group Schema
- Add a Database to your Sync Group
- Remove a Database from a Sync Group
- Delete a Sync Group
- Manually Deprovision a Database
- Cancel a Synchronization
- **How To: Change an Agent's Key (SDS)** - this topic

Change a client agent's key

Follow these steps to change a client agent's key.

1. Navigate your browser to the Azure SQL Database Management portal and sign in.
2. After the portal finishes loading, click **SQL DATABASES** in the left pane.
3. Choose hub database in your sync group and go to the **SETTINGS** group for the database. Select **Sync to other databases.** You can see the installed sync agents are listed there.
4. From the agent list, select the agent whose key you want to change by clicking Agent name.
5. Click **Regenerate Key** on the top of new pane.
   After the key is created, click the clipboard symbol to copy the key to your clipboard.
6. Submit the new key from the sync agent.

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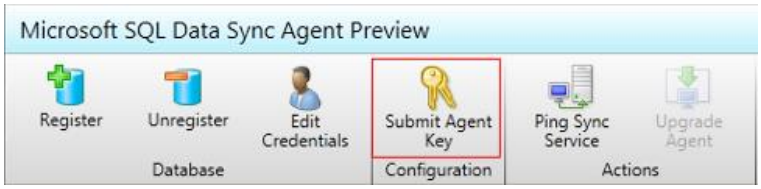
a. Go to where you installed the agent and launch SqlAzureDataSyncAgent.
b. Click **Submit Agent Key**.



c. Paste the agent key from your clipboard into the text box.
d. Provide the credential of Sync Metadata Database.
e. Close the textbox dialog box.
f. Close the agent UI.

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Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Microsoft Azure Management portal, you can perform all tasks necessary to create, deploy, and modify a sync group.

Before you start	**How to create a sync group**
Before you begin to design and implement your synchronizations, you should be familiar with these topics.	There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links.
• System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices	1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database. 2. Create your sync group. 3. Add your sync members 4. Install a SQL Data Sync Client Agent (optional) 5. Register a SQL Server database with a Client Agent (optional) 6. Configure your sync group (SDS)

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See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Data Security in SQL Data Sync

Conflict Resolution when Synchronizing

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

Data Security in SQL Data Sync

	Your data is important to you and the success of your business. Unfortunately, your data may also be important to someone else. You want to make sure that it is secure from unauthorized access. Therefore, it is prudent and reasonable for you to ask, “How does SQL Data Sync (Preview) help me keep my data secure?” All client agent communications use SSL to help secure your data. The Microsoft Azure SQL Data Sync service on the Microsoft Azure AUX portal will be decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync. You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

Encryption

Encrypted Data

The SQL Data Sync (Preview) service encrypts all sensitive data that it stores, including:

- User credentials for the user's SQL Database in Sync Metadata Database.
- User credentials for the user's SQL Server database.
- The configuration file for the SQL Data Sync (Preview) client agent.

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Encrypted Connections

The SQL Data Sync (Preview) service encrypts all connections between components, including:

- The connections between the service and Sync Metadata Database.
- The connections between all components in the cloud-based service
- The connection between the portal and the cloud-based service.

Authentication

Client Agent Authentication

- The client agent authenticates local users with Windows user security.
- The client agent requires that anyone that installs or accesses the client agent UI supply admin credentials, though service log-in credentials supplied during the client agent install do not have to be admin credentials.
- The cloud-based Data Sync service authenticates the client agent using a unique token or "agent key." The user generates the agent key in the portal and then installs the agent key in the client agent. The user can regenerate and reinstall an agent key at any time.

Database Access Authentication

The on-premises SQL Server database authenticates the client agent using the connection string and credentials that the user provides.

System Component Authentication

The cloud-based Data Sync service authenticates connections between system components within the cloud service using certificates.

Portal Access Authentication

The portal authenticates users with Windows Live ID and the Azure subscription database. Users should follow good security procedures to protect their Windows Live IDs, including:

- Keep your ID and password secure.
- Do not check the "Remember my password" checkbox on the Windows Live sign in page.
- Log out of your Windows Live session any time you are going to be away from your computer.

Suggestions for creating strong passwords and password security can be found at Create Strong Passwords. You can check the strength of a password by using the secure password checker at Password Checker. You can generate passwords with various levels of strengths at Strong Password Generator. This site also evaluates the strength of passwords.

Note
SQL Server supports both Windows Credentials and SQL Credentials. SQL Database supports only SQL Credentials.

Recommendations

Some of the actions you can take to increase your system's security are:

- Use the "In Private" browsing option if your browser supports it.
- Have the SQL Server on one computer behind the firewall, the local agent on a public internet facing computer (since it needs to connect to the service) and the service itself as an entity.
- Have the local agent service run as a min-privileged user instead of an admin account

Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Microsoft Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

Before you start Before you begin to design and implement your synchronizations, you should be familiar with these topics.	**How to create a sync group** There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links.
• System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices	1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 2. Create your sync group 3. Add your sync members 4. Install a SQL Data Sync Client Agent (optional) 5. Register a SQL Server database with a Client Agent (optional) 6. Configure your sync group (SDS)
	How to modify a sync group

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	You can modify a sync group's schema by adding/removing tables or columns in the sync group; or by altering a column's width or data type. Details can be found by following the links. • Update a Sync Group Schema • Add a Database to your Sync Group • Add or remove a table in a sync group • Add or remove a column in a sync group • Change the width of a column in a sync group • Change a column's data type

See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Conflict Resolution when Synchronizing

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

SQL Database Data Types supported by SQL Data Sync

	Each column, local variable, parameter, and expression has a data type. The data type specifies the kind of data that the column, variable, parameter, or expression can contain. The data type informs the system how to interpret bit patterns. SQL Data Sync supports a subset of SQL Database data types. The first table below lists SQL Database data types supported by SQL Data Sync (Preview). The second table lists the SQL Database data types currently not supported by SQL Data Sync (Preview). The Microsoft Azure SQL Data Sync service on

	the Microsoft Azure AUX portal will be decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync. You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

Sections in this topic

Section	Description
Supported Data Types	Table of SQL Database data types supported by SQL Data Sync (Preview) Preview.
Unsupported Data Types	Table of SQL Database data types that are not supported by SQL Data Sync (Preview) Preview.
Unsupported Column Properties	List of column properties that are not supported by SQL Data Sync (Preview) Preview.
Navigation	Topics you should read before you start and guidance on creating and modifying sync groups.

Supported Data Types

Data Type Category	Supported SQL Database Data Type
Exact Numbers	Supported: **bit, decimal, int, numeric, smallint, tinyint**, **money, smallmoney**.
Approximate Numbers	Supported: **float, real**.

Data Type Category	Supported SQL Database Data Type
Date and Time	Supported: **date, datetime2, datetime, datetimeoffset, time, smalldatetime.**
Character Strings	Supported: **char, varchar, text**.
Unicode Character Strings	Supported: **nchar, nvarchar, ntext**.
Binary Strings	Supported: **binary, varbinary, image**.
Spatial Data Types	Supported: **geography, geometry**.
Other Data Types	Supported: **sql_variant, table, uniqueidentifier, xml**.

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Unsupported Data Types

Data Type Category	Unsupported Data Type
FileStream	Not supported.
CLR UDT	Not supported.
SQL UDT	Not supported.
XML Data Types	Not supported: **XmlSchemaCollection**.
Other Data Types	Not supported: **cursor, timestamp, hierarchyid**.

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Unsupported Column Properties

The following column properties are not supported.

- ROWGUICOL
- FILESTREAM
- XML SCHEMA COLLECTION

Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Microsoft Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

Before you start	How to create a sync group

Before you begin to design and implement your synchronizations, you should be familiar with these topics.	There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links.
• System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices	1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 14. Create your sync group 15. Add your sync members 16. Install a SQL Data Sync Client Agent (optional) 17. Register a SQL Server database with a Client Agent (optional) 6. Configure your sync group (SDS)
	How to modify a sync group You can modify a sync group's schema by adding/removing tables or columns in the sync group; or by altering a column's width or data type. Details can be found by following the links. • Update a Sync Group Schema • Add a Database to your Sync Group • Add or remove a table in a sync group • Add or remove a column in a sync group • Change the width of a column in a sync group • Change a column's data type

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See Also

SQL Data Sync

Data Types (SQL Azure)

Data Types (Transact-SQL)

Conflict Resolution when Synchronizing

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

Conflict Resolution when Synchronizing

	A SQL Data Sync (Preview) data conflict occurs whenever the same data row in two or more databases within a sync group is changed between syncs. No matter what policy you adopt, whenever a conflict situation arises one of the changed rows is kept and the others are lost. This article describes the behavior of each conflict resolution policy. The Microsoft Azure SQL Data Sync service on the Microsoft Azure AUX portal will be decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync. You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

Conflict Resolution Policies

SQL Data Sync (Preview) enables you to select between two conflict resolution policies: Hub Wins and Client Wins.

Hub Wins

The first row change written to the hub is kept. Subsequent attempts to write to the same row in the hub are discarded. Thus the first change in a row written to the hub is propagated out to all the member databases by the end of the sync.

Client Wins

Every row changed in a client database is written to the hub, overwriting prior changes to the same row. Thus the last write to the hub is propagated out to all the member databases by the end of the sync.

Case Study

Initial State

Using Figure 1 let's assume the following:

- Both remote offices are in the same sync group with the SQL Database Hub Database.
- In this illustration, the sync order is Remote Office #1 then Remote Office #2. In reality, the sync order is indeterminate and can vary from sync to sync.
- The Contacts table has four interesting columns with these values:

Row	FName	LName	Phone	Company
1	William	Vong	(270)555-1234	Contoso

Changes since Last Sync

Changes are made in multiple versions of the same row. The conflict resolution policy determines which version of the row is kept.

Database/Office	Row	FName	LName	Phone	Company
RO #1	1	**Bill**	Vong	**(206)555-1212**	Contoso
RO #2	1	**Will**	Vong	(270)555-1234	**Contoso, Inc.**

Hub Wins Sync Steps

Step/Changes	Row	FName	LName	Phone	Company
First RO#1 polled for changes.	1	**Bill**	Vong	**(206)555-1212**	Contoso
Second Entire changed row written to the hub. Row is marked as changed in the hub.	1	**Bill**	**Vong**	**(206)555-1212**	**Contoso**
Third Any other rows marked as					

changed in the hub are written to RO#1, completing the sync with RO#1.					
Fourth RO#2 polled for changes.	1	**Will**	Vong	(270)555-1234	**Contoso, Inc.**
Fifth Since row 1 is already marked as changed in the hub, all of RO#2's changes in row 1 are discarded.					
Sixth Hub writes all changed rows to RO#2.	1	**Bill**	**Vong**	**(206)555-1212**	**Contoso**
State of all three databases after this sync There is data congruence following this sync cycle. If a different row had been changed in RO#2, that change would not be written to RO#1 until the next sync cycle.					
Hub	1	Bill	Vong	(206)555-1234	Contoso
RO#1	1	Bill	Vong	(206)555-1234	Contoso
RO#2	1	Bill	Vong	(206)555-1234	Contoso

Client Wins Sync Steps

Step/Changes	Row	FName	LName	Phone	Company
First RO#1 polled for changes.	1	**Bill**	Vong	**(206)555-1212**	Contoso
Second Entire changed row written to the hub. Row is marked as changed in the hub.	1	**Bill**	**Vong**	**(206)555-1212**	**Contoso**
Third Any other rows marked as changed in the hub are written to RO#1, completing the sync with RO#1.					
Fourth RO#2 polled for changes.	1	**Will**	Vong	(270)555-1234	**Contoso, Inc.**
Fifth Changed row written to the hub, overwriting prior changes.	1	**Will**	**Vong**	**(270)555-1234**	**Contoso, Inc.**
Sixth Any other rows marked as changed in the hub are written to RO#2, completing the sync with RO#2.	1	**Will**	**Vong**	**(270)555-1234**	**Contoso, Inc.**
State of all three databases after this sync There is data					

incongruence after this sync cycle. On the next sync cycle, the changed row in the hub is written to RO#1 bringing that row into congruence with the other two databases.					
Hub	1	Will	Vong	(270)555-1234	Contoso, Inc.
RO#1	1	Bill	Vong	(206)555-1234	Contoso
RO#2	1	Will	Vong	(270)555-1234	Contoso, Inc.

Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Microsoft Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

Before you start	**How to create a sync group**
Before you begin to design and implement your synchronizations, you should be familiar with these topics.	There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links.
• System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices	1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 18. Create your sync group 19. Add your sync members 20. Install a SQL Data Sync Client Agent (optional) 21. Register a SQL Server database with a Client Agent (optional) 22. Configure your sync group (SDS)
	How to modify a sync group You can modify a sync group's schema by adding/removing tables or columns in the sync

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	group; or by altering a column's width or data type. Details can be found by following the links. • Update a Sync Group Schema • Add a Database to your Sync Group • Add or remove a table in a sync group • Add or remove a column in a sync group • Change the width of a column in a sync group • Change a column's data type

See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Conflict Resolution when Synchronizing

Data Security in SQL Data Sync

Create a Sync Group

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

How to Upgrade a Client Agent

	If any of your sync groups include an on-premises SQL Server database, you must have the current client agent installed. You can install an agent from SQL Database at the Microsoft Azure Management portal. (See Install a SQL Data Sync Client Agent.) Before you can add an on-premises SQL Server database to your sync group, you must register it with the agent. (See Register a SQL Server database with a Client Agent.) The current client agent version is 4.2.5658. You can download the latest client agent from client agent download site.

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The Microsoft Azure SQL Data Sync service on the Microsoft Azure AUX portal will be decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync.

You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

How to upgrade to the latest version of the client Agent?

Before you upgrade, check to see if you need to. If you have version 4.2.5605 or later, you do not need to upgrade.

A. Determine your client agent version

There are two ways to determine the version of the installed client agent.

From the client agent UI.

a. Make sure your client agent is running.
   If the client agent isn't running the UI shows version 0.0.0.
   i. Click **Start**.
   ii. Type **services.msc** in the search textbox.
   iii. In the results pane, click the **services** program.
   iv. Scroll down to **Microsoft SQL Data Sync**.
   v. If the status is not **Started**, right-click the service and select **Start**.
b. Navigate to where you installed the client agent.
c. Find and launch the application **SqlAzureDataSyncAgent**.
d. Find the version in the lower-right corner of the client agent UI. (Figure 1.1)

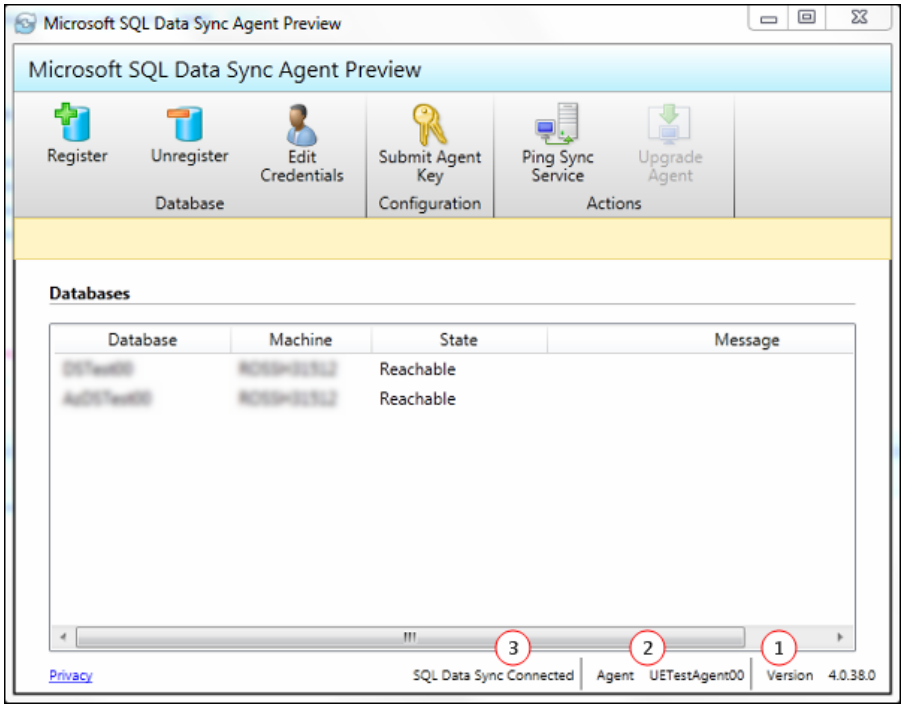

Figure 1: SQL Data Sync Status, Agent Name, and Agent Version

From Start -> Control Panel -> Programs and Features.

a. From the **Start** menu, click **Control Panel**.
b. Click **Programs and Features**.
c. Scroll down to **Microsoft SQL Data Sync**.
d. Find the version number in the far-right column. (Figure 2)

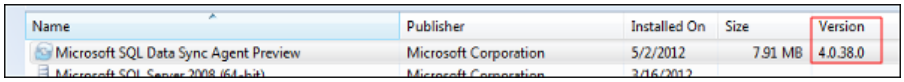

Figure 2: Agent Version

If your client agent version is 4.2.5605 or later, you do not need to upgrade.

B. Upgrade to the new agent

SQL Data Sync client agent require .NET Framework 4.5 or above. If you only have .NET Framework 4 installed, prior to upgrade, please download the .NET Framework 4.5 from here and install.

Go to the client agent download site and follow the instructions in Install a SQL Data Sync Client Agent under the **Steps to install a client agent** section, starting with step 5, to install the new agent. Please choose the same folder as where your old agent was installed.

Note

Best Practice

Back Up: All of your SQL Data Sync agent and on premises database information is stored in AgentConfigData.xml. Before upgrading, we suggest that you follow these steps to back up the file, in case you encounter any issues and need to restore your settings later.

1. Start Windows Explorer.
2. Navigate to the folder where the current SQL Data Sync was installed. The default installation path is:

   32-bit systems: C:\Program Files (x86)\Microsoft SQL Data Sync

   64-bit systems: C:\Program Files\Microsoft SQL Data Sync
3. Find and make a copy of AgentConfigData.xml.

   Restore: If you uninstalled your old agent and then reinstalled a new one, or if you installed the upgrade agent in a different folder than the old one, you can restore your previous settings on agent and on premise by following the below procedure. Note that the new agent must be installed on the same computer as the one AgentConfigData.xml is copied from. For more information, see the **Back Up** section above.

1. Start Windows Explorer.
2. Navigate to the data folder of the newly installed client agent:

   32-bit systems: C:\Program Files (x86)\Microsoft SQL Data Sync\data

   64-bit systems: C:\Program Files\Microsoft SQL Data Sync\data
3. Paste the AgentConfigData.xml file (backed up previously) into the data folder.

Navigation

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Before you start	How to create a sync group
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	links.
• System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices	1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 23. Create your sync group 24. Add your sync members 25. Install a SQL Data Sync Client Agent (optional) 26. Register a SQL Server database with a Client Agent (optional) Configure your sync group (SDS)
	How to modify a sync group You can modify a sync group's schema by adding/removing tables or columns in the sync group; or by altering a column's width or data type. Details can be found by following the links. • Update a Sync Group Schema • Add a Database to your Sync Group • Add or remove a table in a sync group • Add or remove a column in a sync group • Change the width of a column in a sync group • Change a column's data type

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See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Conflict Resolution when Synchronizing

Data Security in SQL Data Sync

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

Get Help with SQL Data Sync

	SQL Data Sync (Preview) is an Azure service that enables you to easily synchronize geographically disbursed SQL Server databases and SQL Database instances. The topics in this section provide answers to questions and help with issues you might run into. The Microsoft Azure SQL Data Sync service on the Microsoft Azure AUX portal will be decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync. You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

In This Section

Topic	Description
SQL Data Sync FAQ	Frequently asked questions about SQL Data Sync (Preview).
SQL Data Sync Troubleshooting Guide	Help with fixing common SQL Data Sync (Preview) issues you might encounter.
	SQL Data Sync (Preview) issues that we know about and their workarounds.

See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Conflict Resolution when Synchronizing

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

SQL Data Sync FAQ

This article covers the most frequently asked questions about SQL Data Sync (Preview).

The Microsoft Azure SQL Data Sync plug-in on the Microsoft Azure Silverlight portal has been decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync.

You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

Caution

SQL Data Sync (Preview) is available only as a Preview and is meant only for product feedback for future releases and should not be used in production environments.

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Use Questions

How to …

Q: If I have question about using SQL Data Sync, who do I contact?

A. You can contact us at the forums with any questions or comments about SQL Data Sync (Preview).

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Introductory Questions

Q: What is new in the latest version of SQL Data Sync?

A. See the topic What's New in SQL Data Sync.

Q: What are the minimum requirements to use SQL Data Sync?

A. See the topic System Requirements for SQL Data Sync for minimum system requirements for using SQL Data Sync (Preview).

Q: Can I use SQL Data Sync in production?

A. No. SQL Data Sync (Preview) is available only as a Preview and is meant only for product feedback for future releases and should not be used in production environments.

Q: Can I use SQL Data Sync with a mobile device?

A. No. SQL Data Sync (Preview) does not currently support synchronizing with mobile devices.

Q: How much does the SQL Data Sync (Preview) service cost?

A. During the Preview, there is no charge for the SQL Data Sync (Preview) service; however, **you still accrue data transfer charges for data movement in and out of your SQL Database instance**. For more details on this pricing, visit: http://www.microsoft.com/windowsazure/pricing/.

Q: Where is SQL Data Sync located?

A. Currently there is a SQL Data Sync (Preview) service located in each Azure data center.

Q: Is a SQL Database account required? If so, how do I get a SQL Database account?

A. Yes. You must have a SQL Database account to host the Hub Database.

Use Questions

Q: Does SQL Data Sync change a database?

A. Yes, in order to track incremental data changes, SQL Data Sync (Preview) adds a change-tracking table for each table that is being synchronized when synchronization is configured. During this configuration, it also adds triggers to your base tables as well as some stored procedures for gathering and applying changes. We recommend you test SQL Data Sync (Preview) on a non production database first to ensure that it does not have an adverse effect on your existing applications.

Q: How do I access a SQL Database when synchronizing using the scheduled service?

A. When you set up a synchronization group, the service requests credentials for your SQL Database servers. These credentials are stored in encrypted format within the SQL Data Sync (Preview) system database.

Q: Does SQL Data Sync fully create and provision tables?

A. If the sync schema tables are not already created in the destination database, SQL Data Sync (Preview) creates them with the selected columns. However, this does not result in a full fidelity schema due to:

- Only the columns selected are created in the destination table.
  Thus, if some columns are not part of the sync group those columns are not provisioned in the destination tables.
- Indexes are created only for the selected columns.
  If the source table index has columns that are not part of the sync group those indexes are not provisioned in the destination tables.
- Indexes on XML type columns are not provisioned.
- CHECK constraints are not provisioned.
- Existing triggers on the source tables are not provisioned.
- Views and Stored Procedures are not created on the destination database.

Because of these limitations, we recommend that for production environments you provision the full fidelity schema yourself and not depend on the schema provisioned by SQL Data Sync (Preview). The auto provisioning feature of SQL Data Sync (Preview) works well for trying out the service.

Q: Is collation supported in SQL Data Sync?

A. Yes. SQL Data Sync supports the below scenarios with collation:

- If the selected sync schema tables are not already in your hub or member databases, upon deploying the sync group, the service will auto create the corresponding tables and columns with the same collation settings as the selected in the empty database(s).
- If the tables to-be-synced are already created in both of your hub and member databases, SQL Data Sync requires the primary key columns are set with the same collation between hub/member databases to successfully deploy the sync group. No collation restriction on the non-primary key columns.

Q: Is federation supported in SQL Data Sync?

A. Federation Root Database can be used in the SQL Data Sync (Preview) Service without any limitation. The Federated Database endpoint cannot be added to the current version of SQL Data Sync (Preview). If you have a pressing requirement, state your scenario at the SQL Database MSDN forum.

Q: What are limits I should know about?

A: For SQL Data Sync (Preview) Preview limits, see the topic Known SQL Data Sync Limits.

Q: How many instances of the local agent UI can be run?

A. Only one instance of the UI can be run.

Q: When can I delete a client agent?

A. You must delete all sync groups for a client agent before you delete the client agent.

Q: Why do I need a Client Agent?

A. The SQL Data Sync (Preview) service communicates with SQL Server databases via the client agent. This security feature prevents direct communication with databases behind a firewall. When the SQL Data Sync (Preview) service communicates with the agent it does so using encrypted connections and a unique token or “agent key”. The SQL Server databases authenticate the agent using the connection string and agent key. This design provides a high level of security for your data. For more information in SQL Data Sync (Preview) security measures see the article Data Security in SQL Data Sync.

Q: Why is my database status "Out-of-Date"?

A. The "Out-of-Date" status results from the database being offline 45 or more days. See A database has an "Out-of-Date" status in the Troubleshooting Guide for how to bring the database back up to date.

Q: What happens when I restore lost or corrupted databases?

A. If you restore lost or corrupted databases from a backup, there may be non-convergence of your data in the sync group(s) that the databases belong to.

Q: Should I use SQL Data Sync to backup and restore my databases?

A. While it is possible to use SQL Data Sync (Preview) to create a backup of your data it is not recommended. SQL Data Sync (Preview) does not version synchronizations. Therefore, you cannot backup and restore to a specific point in time.

Additionally, SQL Data Sync (Preview):

- Does not back up other SQL objects, such as stored procedures.
- Does not "restore" quickly.

We recommend `Database Copy` for SQL Database instances (How To: Backup Up Your Database) and your well-established procedures for SQL Server databases.

Q: Is my data convergent after a sync?

A. Not necessarily. Given a sync group with a hub and three spokes, A, B, and C, the synchronizations are Hub/A, Hub/B, and Hub/C. If after the Hub/A sync a change is made to A, that change is not written to either B or C until the next sync task.

How do I…

Q: How do I upgrade to the latest version?

A.SQL Data Sync (Preview) Preview is not backward compatible with CTP2. See the article How to Upgrade a Client Agent for complete instructions on how to upgrade.

Q: How can I change my service account?

A. Once you install an client agent the only way to change the service account is to uninstall it and install a new client agent with the new service account.

Q: How do I avoid a "synchronization loop"?

A. A synchronization loop occurs when a circular reference is formed between two or more sync groups. In a synchronization loop a change created in one sync group is written out to the databases in other sync groups and ultimately written back as a new change to the database where the change originated, beginning the entire process again. Since it is circular, once the loop is started it never ends unless you break the loop by removing the circular references. For more detailed information and examples see the topic Understand and Avoid Synchronization Loops.

Q: How do I manually deprovision a database?

A. If you remove a database from a sync group or remove a sync group and one or more databases fail to deprovision, you can manually deprovision the database. See the topic Manually Deprovision a Database for details.

Q: How do I get schema changes into a sync group?

A.SQL Data Sync (Preview) Preview supports dynamic schema changes.

Q: How do I change my agent key?

A. An agent key can only be used once by an agent. It cannot be reused when you remove then reinstall a new agent, nor can it be used by multiple agents. If you need to create a new key for an existing agent you must be sure that the same key is recorded with the client agent and with the SQL Data Sync (Preview) service.

Q: How do I retire a client agent?

A. To immediately invalidate or retire an agent regenerate it's key in the portal but do not submit it in the Agent UI.Regenerating a key invalidates the previous key irrespective if the corresponding agent is online or offline.

Q: How do I move a client agent to another computer?

A. If you would like to run the local agent from a different computer than it is currently on, please follow steps below:

1. Install the agent on desired computer.
2. Log onto the SQL Data Sync (Preview) portal and regenerate agent key for the new agent.
3. Use the new agent's UI to submit the new agent key.
4. Wait while the client agent downloads the list of on-premise databases that were registered earlier.
5. Provide database credentials for all databases that display as unreachable. Of course, these database must be reachable from the new computer on which agent is installed.

Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

Before you start Before you begin to design and implement your synchronizations, you should be familiar with these topics.	**How to create a sync group** There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links.
• System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices	1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 27. Create your sync group 28. Add your sync members 29. Install a SQL Data Sync Client Agent (optional) 30. Register a SQL Server database with a Client Agent (optional) 6. Configure your sync group (SDS)
	How to modify a sync group You can modify a sync group's schema by

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	adding/removing tables or columns in the sync group; or by altering a column's width or data type. Details can be found by following the links. • Update a Sync Group Schema • Add a Database to your Sync Group • Add or remove a table in a sync group • Add or remove a column in a sync group • Change the width of a column in a sync group • Change a column's data type

See Also

SQL Data Sync

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SQL Data Sync Troubleshooting Guide

	The Troubleshooting Guide covers current issues that are known to the SQL Data Sync (Preview) team. If there is a work-around for an issue it is also explained. We will add to and update this article as new issues are discovered and/or workarounds change. The Microsoft Azure SQL Data Sync plug-in on the Microsoft Azure Silverlight portal has been decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync. You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for

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	guidance on creating and modifying a sync group from this portal.

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

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My client agent won't work

Description/Symptoms

You get the following error messages when you attempt to use the client agent.

"Sync failed with exception There was an error while trying to deserialize parameter www.microsoft.com/.../05:GetBatchInfoResult. Please see InnerException for more details.

Inner exception message: Type 'Microsoft.Synchronization.ChangeBatch' is an invalid collection type since it does not have a default constructor."

Cause

This is an issue with the SQL Data Sync (Preview) Preview.

The most likely cause is:

- You are running Windows 8 Developer Preview, or
- You have .NET 4.5 installed.

Solution/Workaround

Make sure that you install the client agent on a computer that is not running Windows 8 Developer Preview and that the .NET Framework 4.5 is not installed.

My client agent will not work after I cancel the Uninstall

Description/Symptoms

The client agent does not work even though you canceled its uninstallation.

Cause

This is due to the fact that SQL Data Sync (Preview) client agent does not store credentials.

Solution/Workaround

There are two solutions to try:

- First, use services.msc to re-enter your credentials for the client agent.
- Second, uninstall this client agent and install a new one.
  If you need to you can download and install the latest client agent from Download Center.

My database isn't listed in the agent dropdown

Description/Symptoms

When you attempt to add an existing SQL Server database to a sync group it is not listed in the dropdown.

Cause

There are three possible causes for this.

First, The client agent and sync group are in different data centers.

Second, The client agent's list of databases not current.

Solution

The solution depends upon the cause.

The client agent and sync group are in different data centers

Second, you must have both the client agent and the sync group in the same data center. You can accomplish this by:

- Create a new agent in the same data center as the sync group then register the database with that agent. See How To: Install a SQL Data Sync (Preview) Client Agent for more information.
- Delete the current sync group (see How to: Delete a Sync Group for guidance on deleting a sync group) and recreate it in the same data center as the agent.

The client agent's list of databases not current

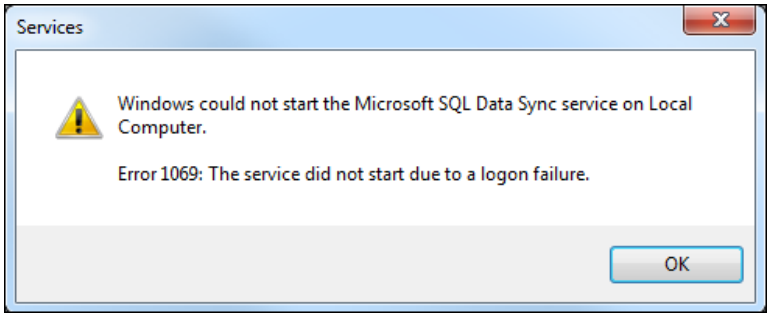
The local agent downloads the list of associated databases only on the first submission of the agent key, not on subsequent agent key submissions. Thus, databases registered during an agent move do not show up on the original agent instance.

Solution: stop then re-start the client agent service.

Client agent won't start (Error 1069)

Description/Symptoms

If you discover that the agent on a computer hosting SQL Server isn't running. When you attempt to manually start the agent you get an error dialog with the error message, "Error 1069: The service did not start due to a log on failure."



Error 1069 Dialog

Cause

A likely cause of this error is that the password on the local server has changed since you created the agent and gave it a log on password.

Solution/Workaround

The fix is quite simple; update the agent's password to your current server password.

1. Locate the SQL Data Sync (Preview) client agent Preview service

   Windows 7 / Vista

   a. Click **Start**.
   b. Type “services.msc” in the text field labeled **Search programs and files**.
   c. In the search results click “Services.”
2. In the **Services** window, scroll to the entry for **SQL Data Sync (Preview) Agent Preview**.
3. Right-click the entry and select **Stop**.
4. Right-click the entry and then click **Properties**.
5. In the **SQL Data Sync (Preview) Agent Preview Properties** window, click the **Log on** tab.
6. Enter your password in the Password textbox.
7. Confirm your password in the Confirm Password textbox.
8. Click **Apply** then click **OK**.
9. In the Services window right-click the **SQL Data Sync (Preview) Agent Preview** service, then click **Start**.
10. Close the Services window.

I get a "disk out of space" message

Cause

The "disk out of space" message can appear when files that should be deleted are not. This may be due to things like antivirus software or files being open when the deletes were attempted.

Solution

The solution is to manually delete the sync files under %temp% (del *sync* /s), and then remove the subdirectories as well.

Important
Wait until the synchronization completes before you delete any files.

I cannot delete my sync group

Description/Symptoms

You fail in your attempt to delete a sync group.

Cause/Fix

Any of the following can result in a failure to delete a sync group.

- **The client agent is offline.**

  Be sure that the client agent is online then try again.
- **The client agent is uninstalled or missing.**

  If the client agent is uninstalled or otherwise missing:

  a. Remove agent XML file from the SQL Data Sync (Preview) installation folder if the file exists.

  b. Install the agent on same/another on-premise computer, submit the agent key from the portal generated for the agent that's showing offline.
- **The SQL Data Sync (Preview) service is stopped.**

  a. In the **Start** menu, search on Services.

  b. Click Services in the Programs section of the search results.

  c. Find the **SQL Data Sync (Preview) Preview** service.

  d. If the service status is **Stopped** right-click the service name and select **Start** from the dropdown menu.
- **A database is offline.**

  Check your SQL Database and SQL Server databases to be sure they are all online.
- **The sync group is provisioning or synchronizing.**

Wait until the provisioning or synchronizing process finishes then retry deleting the sync group.

Sync fails on the portal UI for on-premises databases associated with the client agent

Description/Symptoms

Sync fails on the SQL Data Sync (Preview) portal UI for on-premises databases associated with the agent. On the local computer running the agent, you will see System.IO.IOException errors in the Event Log, stating that the disk has insufficient space.

Solution/Workaround

Create more space on the drive on which the %TEMP% directory resides.

I can't unregister an on-premises SQL Server database

Cause

Most likely you are trying to unregister a database that has already been deleted.

Solution/Workaround

SQL Server Database

To unregister an on-premises SQL Server database select the database and click **Force Delete**.

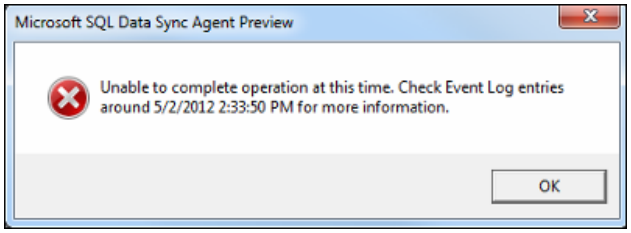
If this doesn't remove the database from the sync group:

1. Stop then restart the client agent host service.
    a. Click the Start menu.
    b. Enter *services.msc* in the search text box.
    c. In the Programs section of the results pane double-click **Services**.
    d. Find and right-click the service **SQL Data Sync (Preview)**.
    e. If the service is running stop it.
    f. Click **Start**.
    g. Check whether the database is no longer registered. If it is no longer registered you are done. Otherwise proceed with the next step.
2. Open the client agent UI (SqlAzureDataSyncAgent).
3. Click **Edit Credentials** and supply the credentials for the database so it is reachable.
4. Proceed with unregistration.

I cannot submit the Agent Key

Description/Symptoms

After you (re)create a key for an agent you try to submit that key through the SqlAzureDataSyncAgent application but the submission fails to complete.



Key Submission Failure Dialog

Before proceeding make sure that one of the following conditions is not the cause of your issue. Make sure that:

- The SQL Data Sync (Preview) Windows service is running.
- The service account for SQL Data Sync (Preview) Preview Windows service has network access.
- The client agent is able to contact Locator Service.
  Please check that following registry key has value "https://locator.sync.azure.com/LocatorServiceApi.svc"
  - On x86 computer: HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\SQL Azure Data Sync\LOCATORSVCURI
  - On x64 computer: HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Microsoft\SQL Azure Data Sync\LOCATORSVCURI

Cause

The agent key uniquely identifies each local agent. The key must meet two conditions for it to work:

- The client agent key on the SQL Data Sync (Preview) server and the local computer must be identical.
- The client agent key can be used only once.

Solution/Workaround

If your agent is not working it is because one or both of these conditions were not met. To get your agent to work again:

1. Generate a new key.

   Go to step 15 within Install a SQL Data Sync Client Agent (optional)
2. Apply the new key to the agent.
   a. Use Windows Explorer to navigate to your agent installation directory.

      The default installation directory is `c:\program files (x86)\microsoft sql data sync`.
   b. Double-click the `bin` subdirectory.
   c. Launch the SqlAzureDataSyncAgent application.
   d. Click **Submit Agent Key**.
   e. Paste the key from your clipboard in the space provided.
   f. Click **OK**.
   g. Close the program.

I do not have sufficient privileges to start system services

Cause

This error occurs in two situations:

- User name and/or password are incorrect.
- The specified user account does not have sufficient privileges to logon as a service.

Solution/Workaround

Grant logon-as-a-service credentials to the user account.

1. Navigate to **Start > Control Panel > Administrative Tools > Local Security Policy > Local Policy > User Rights Management**.
2. Find and click the **Logon as a service** entry.
3. Add the user account in the **Logon as a service Properties** dialog.
4. Click **Apply** then **OK**.
5. Close the windows.

Local Sync Agent UI is unable to connect to the local sync service

Solution/Workaround

Try the following:

1. Exit the UI.
2. Open the Component Services Panel
   a. Start > Search programs and files
   b. Type in "services.msc"
   c. Double-click "Services" in the **Programs** section of the search results.
3. Stop then restart the "SQL Data Sync (Preview) Preview" service.
4. Restart the UI.

Install, Uninstall, or Repair Fails

Cause

There could be any of a number of causes for the failure. You need to look at the logs to determine the specific cause for this failure.

Solution/Workaround

To find the specific cause for the failure you experienced you need to generate and look at the Windows Installer logs. You can turn on logging from the command line. For sake of illustration assume that the downloaded AgentServiceSetup.msi file is `LocalAgentHost.msi`. Generate and examine log files using the following command lines:

- For installs: `msiexec.exe /i SQLDataSyncAgent-Preview-ENU.msi /l*v LocalAgentSetup.InstallLog`
- For uninstalls: `msiexec.exe /x SQLDataSyncAgent-se-ENU.msi /l*v LocalAgentSetup.InstallLog`

You can enable logging for all installations performed by Windows Installer. Microsoft KB article (http://support.microsoft.com/kb/223300) provides a one-click solution to turn on logging for Windows Installer. It also provides the location of these logs.

A database has an "Out-of-Date" status

Cause

SQL Data Sync (Preview) removes databases that have been offline 45 days or more (as counted from the time the database went offline) from the service. If a database is offline for 45 days or more and then comes back online its status is set to "Out-of-Date".

Solution/Workaround

You can avoid an "Out-of-Date" status by making sure that none of your databases go off line for 45 days or more.

If a database's status is "Out-of-Date" you need to:

1. Remove the "Out-of-Date" database from the sync group.
2. Add the database back in to the sync group. See the topic Add a Database to your Sync Group.

Warning
You lose all changes made to this database while it was offline.

You can enable logging for all installations performed by Windows Installer. Microsoft KB article (http://support.microsoft.com/kb/223300http://support.microsoft.com/kb/223300) provides a one-click solution to turn on logging for Windows Installer. It also provides the location of these logs.

A sync group has an "Out-of-Date" status

Cause

A sync group can become outdated if one or more changes fail to apply for the whole retention period of 45 days.

Solution/Workaround

To avoid an "Out-of-Date" status examine the results of your sync jobs (in the UI history viewer) on a regular basis, and investigate and resolve any changes that fail to apply.

If a sync group's status is "Out-of-Date" you need to delete the sync group and recreate it. See the topics Delete a Sync Group and Create your sync group.

You can enable logging for all installations performed by Windows Installer. Microsoft KB article (http://support.microsoft.com/kb/223300) provides a one-click solution to turn on logging for Windows Installer. It also provides the location of these logs.

I see erroneous data in my tables

Description/Symptoms

If tables with same name but from different schemas in a database are involved in sync, you will see erroneous data in these tables after sync.

Cause/Fix

The SQL Data Sync (Preview) provisioning process uses the same tracking tables for tables with same name but in different schemas. As a result, changes from both tables are reflected in the same tracking table, thus causing erroneous data changes during sync.

Resolution/Workaround

Ensure that the names of tables involved in sync are different even if they belong to different schemas.

I see inconsistent PK data after a successful synchronization

Description/Symptoms

After a synchronization that is reported as successful and the log shows no failed or skipped rows, you note that PK data is inconsistent among the databases in the sync group.

Cause

This is by design. Change in any primary key column results in inconsistent data in the row where the PK was changed.

Resolution/Workaround

To prevent this scenario ensure that no data in a PK column is changes.

To fix it once the situation has occurred you must drop the affected row from all endpoiints in the sync group then re-insert it.

I see a significant degradation in performance

Description/Symptoms

Your performance degrades significantly, possibly to the point where you cannot even launch the Data Sync UI.

Cause

The most likely cause is a Understand and Avoid Synchronization Loops. A synchronization loop occurs when a synchronization by sync group A triggers a synchronization by sync group B, which in turn triggers a synchronization by sync group A. The actual situation may be more complex, involving more than two sync groups in the loop, but the significant factor is that there is a circular triggering of synchronizations caused by sync groups overlapping one another.

Resolution/Workaround

The best fix is prevention. Ensure that you do not have circular references in your sync groups. Any row that is synchronized by one sync group cannot be synchronized by another sync group.

Client agent cannot be deleted from the portal if its associated on-premises database is unreachable

Description/Symptoms

If a local end point (database) that is registered with a SQL Data Sync (Preview) client agent becomes unreachable, the client agent cannot be deleted.

Cause

The local agent cannot be deleted because the unreachable database is still registered with the agent and when you try to delete the agent, the deletion process tries to reach the database, which fails.

Resolution/Workaround

Use “force delete” to delete the unreachable database.

Note
If after a “force delete” sync metadata tables remain use deprovisioningutil.exe to clean them up. See Q: How do I manually deprovision a database?.

A sync group cannot be deleted within 3 minutes of uninstalling/stopping the Agent

Description/Symptoms

You are not able to delete a sync group within 3 minutes of uninstalling/stopping the associated SQL Data Sync (Preview) client agent.

Resolution/Workaround

1. Remove a sync group with associated sync agents online (strongly recommended).
2. If the agent is offline but installed, bring it online on the on-premise computer, wait for the status of the agent as online in SQL Data Sync (Preview) portal, and then remove the sync group.
3. If the agent is offline because it was uninstalled, perform the following steps and try deleting the sync group.
   - Remove agent XML file from the SQL Data Sync (Preview) installation folder if the file exists.
   - Install the agent on same/another on-premise computer, submit the agent key from the portal generated for the agent that's showing offline.

My sync group is stuck in the processing state

Description/Symptoms

A sync group in SQL Data Sync (Preview) has been has been in the processing state for a long period of time, does not respond to the stop command, and the logs show no new entries.

Cause/Fix

Any of the following can result in a sync group being stuck in the processing state.

- **The client agent is offline.**

  Be sure that the client agent is online then try again.
- **The client agent is uninstalled or missing.**

  If the client agent is uninstalled or otherwise missing:

  a. Remove agent XML file from the SQL Data Sync (Preview) installation folder if the file exists.

  b. Install the agent on same/another on-premise computer, submit the agent key from the portal generated for the agent that's showing offline.
- **The SQL Data Sync (Preview) service is stopped.**

  a. In the **Start** menu, search on Services.

  b. Click Services in the Programs section of the search results.

  c. Find the **SQL Data Sync (Preview)** service.

  d. If the service status is **Stopped** right-click the service name and select **Start** from the dropdown menu.

Solution/Workaround

If you are unable to fix the problem, the status of your sync group can be reset by Microsoft support. In order to have your status reset, create a forum post on the Azure SQL Database forum, and include your subscription ID and the sync group ID for the group that needs to be

reset. A Microsoft support engineer will respond to your post and let you know when the status has been reset.

Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

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Before you start Before you begin to design and implement your synchronizations, you should be familiar with these topics.	**How to create a sync group** There are six steps to creating a sync group from the Azure Management portal. Details on each step can be found by following these links.
• System Requirements for SQL Data Sync • Known SQL Data Sync Limits • Plan for Optimization • Understand and Avoid Synchronization Loops • SQL Data Sync Best Practices	1. Sign in to the Azure SQL Database Management portal and go to the "SETTINGS" for SQL Database, "Sync to other database" is along with all the other settings under SQL Database 2. Create your sync group 3. Add your sync members 4. Install a SQL Data Sync Client Agent (optional) 5. Register a SQL Server database with a Client Agent (optional) 6. Configure your sync group (SDS)
	How to modify a sync group You can modify a sync group's schema by adding/removing tables or columns in the sync group; or by altering a column's width or data type. Details can be found by following the links. • Update a Sync Group Schema • Add a Database to your Sync Group • Add or remove a table in a sync group • Add or remove a column in a sync group • Change the width of a column in a sync group • Change a column's data type

See Also

SQL Data Sync

SQL Database Data Types supported by SQL Data Sync

Conflict Resolution when Synchronizing

SQL Data Sync Troubleshooting Guide

Glossary of SQL Data Sync Terms

Microsoft Sync Framework Dev Center

Glossary of SQL Data Sync Terms

This topic defines terms you need to know and understand when working with SQL Data Sync (Preview).

The Microsoft Azure SQL Data Sync service on the Microsoft Azure AUX portal will be decommissioned. Going forward, use the Microsoft Azure Management portal, for Azure SQL Data Sync.

You access SQL Data Sync (Preview) via the SETTINGS page for each SQL Database at the Microsoft Azure Management portal. See the topic How To: Create a Sync Group (SDS) for guidance on creating and modifying a sync group from this portal.

See the Navigation section below for links to topics you should read before you start and guidance on creating and modifying sync groups.

Table of Contents

Sync Group
Sync Job
Sync Loop
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Navigation

Client Agent

The SQL Database client agent sits between the SQL Server database and the SQL Database Hub Database. As part of the SQL Data Sync (Preview) service the client agent enables bidirectional HTTPS based communication between the on-premise SQL Server database and the SQL Database Hub Database.

Dashboard

The dashboard gives you an overview of a particular SQL Data Sync (Preview) server's status. For example, the number of sync groups and agents created under this server, synchronization activity, and status of each sync group and agent. This page allows you to do the first level of triage to understand your sync groups' overall health status.

Dataset

A dataset is the collection of databases, tables, columns, and optional rows (by filtering) that are synchronized each time a sync job is performed. The dataset is defined as you configure your sync group.

Force Removal

When a database is removed from a sync group in the normal fashion, it is deprovisioned for synchronization so that all the sync metadata is cleaned up from the database. However, if the deprovision operation fails for any reason, an error status on the database is displayed that this database failed to be removed from the sync group. You can then fix the issues that stopped the database from being deprovisioned automatically, for example, the network connection is down or the credential to the database is expired. If, for any reason, the deprovision failure reason is unknown delete this database from the sync group by using the “Force Removal” link. This action can leave sync metadata behind inside your database. If this happens, perform a manual cleanup. To cleanup metadata, use the standalone tool (DeprovisioningTool.exe) that is installed when you install an agent. See the FAQ Q: How do I manually deprovision a database?

Hub Database

A Hub Database is the SQL Database instance that you defined as the "hub" when you created the Sync Group. In a Sync Group, SQL Database instances that are not the hub are "member" databases. For each of the tables selected to participate in a Sync Group, the following steps occur every time a sync job is run: 1) changes in the member databases are uploaded to the Hub Database, and then 2) changes in the Hub Database are downloaded to the member databases. After you deploy a sync group, you cannot change which database is the Hub Database.

Member Database

A member database is any SQL Server or SQL Database instance that is part of the Sync Group and is not defined as the “hub” database. For more information on how member databases behave during synchronization, see the definition for “Hub Database.” For more information on how member databases behave during a synchronization conflict, see the definition for “Synchronization Conflict.” A member database can be added to or removed from a sync group any time the sync group is not synchronizing.

Sync Metadata Database

The metadata of sync is stored in a special database called Sync Metadata Database. When creating Sync Group, user is given the choice to select one database to be the Sync Metadata Database if one is not selected previously. Sync Metadata database stores the following information:

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1. State information

Sync Service will modify various state for Sync Group, Sync Member, Sync Agent and the progress information. These information will be stored in Sync Metadata Database.

2. Sync Task queue and task information

Sync Agent relies on a task queue to retrieve work item. This will be stored as a task table in the Sync Metadata Database.

SQL Data Sync Preview

The current version of SQL Data Sync (Preview).

Sync Group

A sync group is a collection of SQL Database instances and SQL Server databases that are configured for mutual synchronization by the SQL Data Sync (Preview) service. A Sync Group is comprised of a "hub" database and one or more "member" databases. The "hub" database must be a SQL Database instance.

Sync Job

A sync job is a scheduled synchronization task that can be added to the Sync Job Schedule, which defines the interval at which scheduled synchronizations are run. When a Sync Job is run, synchronization is executed among the databases in the job's associated sync group.

Sync Loop

A sync loop occurs when one sync group's sync triggers the sync of another sync group in a circular fashion. This becomes an infinite loop of synchronizations which can so consume your resources that you cannot even bring up the portal page. For information on the causes and cures of a sync loop, see Understand and Avoid Synchronization Loops.

Synchronization Conflict

A synchronization conflict occurs when changes are made to the same piece of data in two or more databases between synchronizations. The synchronization attempts to apply the changes into a single database. In SQL Data Sync (Preview) Preview, you select the conflict resolution policy when you configure the sync group. See Conflict Resolution when Synchronizing for a fuller explanation.

Topology

SQL Data Sync (Preview) uses a hub-spoke topology. The Hub Database must be a SQL Database instance. The spoke databases can be any combination of SQL Database instances and SQL Server databases.

All synchronizations take place between the hub and a spoke, never directly between spokes. Thus if your sync group is made up of a hub and three spokes, synchronizations are Hub/SpokeA, Hub/SpokeB, and Hub/SpokeC. The order in which these synchronizations take place is nondeterministic and can vary between synchronization tasks.

Navigation

SQL Data Sync (Preview) is a feature of SQL Database. From the Azure Management portal you can perform all tasks necessary to create, deploy, and modify a sync group.

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See Also

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