



## One Identity Active Roles 7.3

# Replication: Best Practices and Troubleshooting Guide

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One Identity LLC.  
Attn: LEGAL Dept  
4 Polaris Way  
Aliso Viejo, CA 92656

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### Legend

-  **WARNING:** A WARNING icon indicates a potential for property damage, personal injury, or death.
-  **CAUTION:** A CAUTION icon indicates potential damage to hardware or loss of data if instructions are not followed.
-  **IMPORTANT, NOTE, TIP, MOBILE, or VIDEO:** An information icon indicates supporting information.

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## Introduction

This document is designed for those who administer Active Roles and want to learn more about the Active Roles replication function. The document is intended to help Active Roles administrators configure and monitor Active Roles replication using Microsoft SQL Server tools.

This document details the SQL Server agents used during replication, accounts and logins used to access SQL Server, and strategies for monitoring and troubleshooting replication. The following topics are covered:

- Understanding the Active Roles replication model
- SQL Server-related permissions of Administration Services
- Replication maintenance-related tasks and troubleshooting

**i** **NOTE:** SQL Server Books Online should be the primary resource you use for SQL Server replication questions. All contents relevant to Microsoft SQL Server replication is indexed under the "SQL Server Replication" topic in SQL Server Books Online at <http://technet.microsoft.com/library/ms151198.aspx>.

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# Understanding the replication model

This section briefly discusses SQL Server replication functions used by Active Roles .

## Terminology

### Replication

To replicate its configuration data, Active Roles employs the replication capabilities of Microsoft SQL Server. In SQL Server, the term *replication* refers to a process that copies and distributes data and database objects from one database to another and then synchronizes information between databases for consistency.

### Publisher

The *Publisher* is a database server that makes data available for replication to other database servers. The Publisher can have one or more publications, each representing a logically related set of data. In the Active Roles replication model, the Publisher has only one publication.

### Subscribers

*Subscribers* are database servers that receive replicated data. Depending on the type of replication, the Subscriber can propagate data changes back to the Publisher or republish the data to other Subscribers. In the Active Roles replication model, a Subscriber can propagate data changes to the Publisher and receive replicated data from the Publisher.

# Distributor

The *Distributor* is a server that hosts the distribution database and stores history data, transactions, and metadata. In the Active Roles replication model, the same server is used as both the Publisher and Distributor.

## Replication group

In the Active Roles replication model, the Publisher and its Subscribers are collectively referred to as *replication group*, with each server in the replication group being referred to as *replication partner*.

Replication group is comprised of *replication partners* that include a single Publisher and may include any number of Subscribers. When data in a replication partner's database changes, replication ensures that the data changes are propagated to the databases maintained by all the other replication partners.

**i** **NOTE:** In the SQL Server documentation, replication partners are referred to as *synchronization partners*.

## Standalone database server

When initially set up, the Administration Service's database server is configured as a *standalone server* that does not belong to any replication group.

## Articles and publications

Articles are tables of data, partitions of data, or database objects that are specified for replication. Each publication is a collection of articles from one database. This grouping of multiple articles makes it easier to specify a logically related set of data that is to be replicated together. In the Active Roles replication model, each article is a table of data.

## SQL Server Agent

SQL Server Agent hosts and schedules the agents used in replication, and provides a way to run replication agents. SQL Server Agent also controls and monitors several other

operations outside of replication, including monitoring the SQL Server Agent service, maintaining error logs, running jobs, and starting other processes.

## Replication Agents

Replication Agents used with Microsoft SQL Server replication carry out the tasks associated with copying and distributing data. The Active Roles replication model employs the Snapshot Agent and Merge Agents.

### Snapshot Agent

The Snapshot Agent prepares schema and initial data files of published tables and stored procedures, stores the snapshot files, and records information about synchronization in the distribution database. In the Active Roles replication model, the Snapshot Agent runs at the Publisher.

### Merge Agent

The Merge Agent applies the initial snapshot to the Subscriber, and moves and reconciles incremental data changes that occur. Each Subscriber has its own Merge Agent that connects to both the Publisher and the Subscriber and updates both.

In the Active Roles replication model, the Merge Agents run continuously at the Publisher. Each Merge Agent uploads data changes from its Subscriber to the Publisher, and downloads data changes from the Publisher to the Subscriber.



## Replication model overview

Active Roles replication propagates the changes to configuration data to all replication partners whenever the data is modified on any one of replication partners. To achieve this goal, Active Roles relies on the *merge replication* provided by Microsoft SQL Server. For details on merge replication, refer to the content indexed under the [Merge Replication](#) topic in SQL Server Books Online.

This section briefly discusses the following elements of the Active Roles replication model:

- Replication group management
- Data synchronization and conflict resolution

### Replication group management

The tasks performed when managing a replication group include the Publisher-related tasks, such as **Promote** or **Demote**, and the Subscriber-related tasks, such as **Add** or **Delete**.

#### Promote

This task assigns the Publisher role to the Administration Service database server, thereby creating a replication group. When performing the **Promote** task, SQL Server creates the **AelitaReplica** publication, and starts the Snapshot Agent. The Agent creates an initial snapshot of schema and data, and saves it to the snapshot folder.

Active Roles automatically specifies and passes to SQL Server all replication settings, such as filters, type of replication, and retention period for subscriptions. For details, see [Viewing replication settings](#) later in this document.

## Add

This task adds the Administration Service database server to the replication group, thus assigning the Subscriber role to the database server. When performing the **Add** task, SQL Server starts the Merge Agent. The Agent copies data from the Publisher's snapshot folder to the Subscriber SQL Server. This process is referred to as applying the initial snapshot (see "Create and Apply the Snapshot" in SQL Server Books Online at <http://msdn.microsoft.com/en-us/library/ms151785.aspx>).

## Delete

This task removes the Subscriber from the replication group, causing the database server to revert to the standalone state. When performing the **Delete** task, SQL Server deletes the subscription at the Publisher. The database of the former Subscriber retains the replicated data.

## Demote

This task removes the Publisher from the replication group, causing the database server to revert to the standalone state. The Publisher can only be demoted after all of its Subscribers are deleted. When performing the **Demote** task, SQL Server deletes the **AelitaReplica** publication, and erases data in the snapshot folder.

# Data synchronization and conflict resolution

After applying the initial snapshot to Subscribers, SQL Server tracks changes to published data at the Publisher and at the Subscribers:

- When data is modified at a Subscriber, the data changes are sent to the Publisher. Then, the Publisher propagates the data changes to the other Subscribers.
- When data is modified at the Publisher, the data changes are propagated to the Subscribers.

These operations are performed by the Merge Agents running on the Publisher SQL Server.

The Merge Agents are configured so that once data changes are made at a given replication partner, it normally takes two minutes or less for SQL Server to start synchronizing the data changes with other replication partners. The time required for the synchronization process to be completed depends on SQL Server load and on the bandwidth of network

connections. As there is normally a moderate volume of data changes, the replication traffic is manageable.

The synchronization process tracks data changes on both the Subscribers and the Publisher. At the Publisher, the changes are merged to form a single version of the data. During the merge, some conflicts may be found where multiple Subscribers modified the same data.

.Any conflict between the arrived values is automatically resolved based on the Microsoft SQL Server DATETIME (Later Wins) Conflict Resolver: The winner of the conflict is chosen according to a "later wins" solution, with the last to modify the data winning the conflict. For information about conflict resolvers, see Microsoft COM-Based Resolvers in SQL Server Books Online at <http://msdn.microsoft.com/en-us/library/ms152573.aspx>.

## SQL Server-related permissions

The health of Active Roles replication heavily depends on the access permissions that the Administration Service and SQL Server Agent has on SQL Server. The required permissions are listed in the “SQL Server permissions” section in the Active Roles Quick Start Guide.

## Best practices

This section provides instructions on how to monitor replication and perform administrative tasks to resolve replication-related problems. The following topics are covered:

- [Viewing replication settings](#)
- [Monitoring replication](#)
- [Viewing database connection settings](#)
- [Modifying database connection settings](#)
- [Changing the service account](#)
- [Changing the SQL Server Agent logon account](#)
- [Modifying Replication Agent credentials](#)
- [Moving the Publisher role](#)
- [Recovering replication if Publisher is not available](#)

### Viewing replication settings

When configuring replication, Active Roles automatically sets replication parameters to the appropriate values. This ensures that replication is functioning properly. Normally, there is no need to modify the replication settings except for some error situations outlined the [Troubleshooting](#) section later in this document.

The following table lists the values that Active Roles assigns to certain replication parameters.

**Table 1: Values assigned to Replication parameters**

Replication Parameter	Value
Publication name	AelitaReplica
Replication type	Merge

<b>Replication Parameter</b>	<b>Value</b>
Subscription type	Push
Subscription expiration	Subscriptions expire and may be dropped if not synchronized in 60 days.
Schedule	The Merge Agents are running continuously at the Publisher. The Snapshot Agent starts daily at 12:00 a.m. at the Publisher.

You can use the following instructions to examine these settings using SQL Server Management Studio.

It is advisable not to change these settings. Replication may not be functioning correctly if you manually modify replication settings with the use of SQL Server tools.

Start Management Studio and connect to the Publisher SQL Server:

1. In Object Explorer, click **Connect**, and then click **Database Engine**.
2. Complete the **Connect to Server** dialog box to connect to the instance of the SQL Server Database Engine that holds the Publisher role.

Open the **Publication Properties** dialog box:

1. In Object Explorer, under the Publisher SQL Server, expand **Replication | Local Publications**.
2. In Object Explorer, under **Local Publications**, right-click **AelitaReplica**, and click **Properties**.

In the **Publication Properties** dialog box, you can review the Active Roles publication settings.

Open the **Subscription Properties** dialog box:

1. In Object Explorer, under **Local Publications**, expand **AelitaReplica**.
2. In Object Explorer, under **AelitaReplica**, right-click a Subscription, and click **Properties**.

In the **Subscription Properties** dialog box, you can review the Active Roles subscription settings.

## Replication Agent schedule

By default, Active Roles schedules the Replication Agents to run as follows:

- The Snapshot Agent starts every day at 12:00 a.m. at the Publisher.
- The Merge Agents start automatically when SQL Server Agent starts, and runs continuously at the Publisher.

### ***To verify the Snapshot Agent schedule***

1. Open SQL Server Management Studio.
2. In Object Explorer, connect to the instance of the SQL Server Database Engine that holds the Publisher role, and then expand that instance.
3. Right-click the **Replication** folder, and click **Launch Replication Monitor**.
4. In the left pane of the **Replication Monitor** window, expand your Publisher SQL Server, and click **AelitaReplica**.
5. In the right pane of the **Replication Monitor** window, on the **Warnings and Agents** tab, right-click the Snapshot Agent in the **Agents and jobs related to this publication** list, and click **Properties**.
6. In the left pane of the **Job Properties** window, click **Schedules**.
7. Review the replication agent schedule settings in the right pane of the **Job Properties** window.
8. Click the **Edit** button to examine the replication agent schedule settings in detail.

### ***To verify the Merge Agent schedule***

1. Open SQL Server Management Studio.
2. In Object Explorer, connect to the instance of the SQL Server Database Engine that holds the Publisher role, and then expand that instance.
3. Right-click the **Replication** folder, and click **Launch Replication Monitor**.
4. In the left pane of the **Replication Monitor** window, expand your Publisher SQL Server, and click **AelitaReplica**.
5. In the right pane of the **Replication Monitor** window, on the **All Subscriptions** tab, right-click the subscription whose Merge Agent you want to examine, and click **View Details**.
6. In the **Subscription** window, on the **Action** menu, click **Merge Agent Job Properties**.
7. In the left pane of the **Job Properties** window, click **Schedules**.
8. Review the replication agent schedule settings in the right pane of the **Job Properties** window.
9. Click the **Edit** button to examine the replication agent schedule settings in detail.

## **Monitoring replication**

In order to identify replication-related problems, you can use the Active Roles console connected to the Publisher Administration Service. If there are any replication failures, a red triangle is displayed on the **Server Configuration** and **Configuration Databases** containers in the console tree. In the details pane, the same icon is used to highlight the database affected by a replication failure.

If you have encountered a replication failure, you should ensure that the SQL Server Agent service is started on the computer running the Publisher SQL Server, and then use SQL Server Management Studio to get more information on that failure:

1. In Object Explorer, connect to the instance of the SQL Server Database Engine that holds the Publisher role, and then expand that instance.
2. Right-click the **Replication** folder, and click **Launch Replication Monitor**.
3. In the left pane of the **Replication Monitor** window, expand your Publisher SQL Server, and click **AelitaReplica**.
4. In the right pane of the **Replication Monitor** window, on the **Warnings and Agents** tab, look for a red icon under **Agents and jobs related to this publication**. This icon indicates a Snapshot Agent error: ❌
5. Right-click the agent that has encountered an error and then click **View Details**.
6. In the **Snapshot Agent** window, view the error description under **Error details or message of the selected session**.
7. In the right pane of the **Replication Monitor** window, on the **All Subscriptions** tab, look for a red icon in the list of subscriptions. This icon indicates a Merge Agent error: ❌
8. On the **All Subscriptions** tab, right-click the subscription that has encountered an error and then click **View Details**.
9. In the **Subscription** window, view the error description under **Last message of the selected session**.

Some typical errors are discussed later in this document (see the [Troubleshooting](#) section). The [Troubleshooting](#) section also provides information on how to resolve such errors.

## Viewing database connection settings

The most common reasons for replication problems are access failures that Replication Agents encounter when attempting to connect to the Publisher or Subscriber SQL Server. Given that security credentials of Replication Agents depend on authentication mode of the Administration Service, you may need to examine Administration Service database connection settings in order to see which mode is actually used—Windows authentication or SQL Server authentication.

You can view connection settings in the Active Roles console:

1. In the console tree, select **Configuration | Server Configuration | Administration Services**.
2. In the details pane, right-click the Administration Service you want to examine, and click **Properties**.
3. In the **Properties** dialog box, go to the **Configuration Database** tab.

The **Configuration Database** tab displays the following information:



- **SQL Server** Identifies the SQL Server instance used by the Administration Service.
- **Database** The name of the Administration Service database.
- **Use Windows authentication** When selected, indicates that the Administration Service uses Windows authentication mode when connecting to SQL Server.
- **Use SQL Server authentication** When selected, indicates that the Administration Service uses SQL Server authentication mode when connecting to SQL Server.
- **Login name** The name of the SQL Server login that the Administration Service uses to access SQL Server; only applies to the **Use SQL Server authentication** option.

## Modifying database connection settings

You may need to modify Administration Service database connection settings if the login of the Administration Service for SQL Server authentication is no longer valid, or has the password changed. If you change the login, you also need to change it for Replication Agents, as described in the [Modifying Replication Agent credentials](#) section later in this document.

You can modify connection settings by using Active Roles Configuration Center:

1. Start Configuration Center on the computer running the Administration Service, or connect Configuration Center to that computer.

You can start Configuration Center by selecting **Active Roles 7.3 Configuration Center** on the **Apps** page or **Start** menu, depending upon the version of your Windows operating system. For detailed instructions, see "Running Configuration Center" in the Active Roles Administrator Guide.

2. On the **Dashboard** page in the Configuration Center main window, click **Manage Settings** in the **Administration Service** area.
3. On the **Administration Service** page that opens, click **Change** in the **Active Roles database** area.
4. Use the Change Active Roles Database wizard that appears to view or change the login or password of the Administration Service for SQL Server authentication: Type the appropriate login name and password in the fields under the **SQL Server authentication** option on the **Connection to Database** page.

## Changing the service account

With the Windows authentication option selected for database connection, the Administration Service uses its service account to authenticate with SQL Server. Additionally, if the Administration Service's database server holds the Publisher role, and has a Subscriber with Windows authentication, the service account requires the appropriate

permissions on the Subscriber SQL Server. For details, see the “SQL Server permissions” section in the Active Roles Quick Start Guide.

Given this role of the service account, you may need to specify a different service account with sufficient SQL Server permissions. Also, you may need to change the service account’s password. You can view or change the service account by using Active Roles Configuration Center as follows.

1. Start Configuration Center on the computer running the Administration Service, or connect Configuration Center to that computer.

You can start Configuration Center by selecting **Active Roles 7.3 Configuration Center** on the **Apps** page or **Start** menu, depending upon the version of your Windows operating system. For detailed instructions, see “Running Configuration Center” in the Active Roles Administrator Guide.

2. On the **Dashboard** page in the Configuration Center main window, click **Manage Settings** in the **Administration Service** area.
3. On the **Administration Service** page that opens, click **Change** in the **Service account** area.
4. On the **Change Service Account** page that appears, type the logon name and password of the service account, and then click **Change**.

## Changing the SQL Server Agent logon account

If the Publisher has a Subscriber that uses Windows authentication, it is required that the SQL Server Agent logon account on the Publisher SQL Server have appropriate access permissions on the Subscriber SQL Server. For details, see the “SQL Server permissions” section in the Active Roles Quick Start Guide.

Given these requirements of the SQL Server Agent logon account, you may encounter a situation where you need to specify a different logon account with sufficient access permissions. You may also need to change password for the logon account. This section provides instructions on how to change the SQL Server Agent logon account.

You can specify the name and password of the SQL Server Agent logon account by using SQL Server Configuration Manager:

1. On the computer running the Publisher SQL Server, open SQL Server Configuration Manager.
2. In the console tree, select **SQL Server Services**.
3. In the details pane, right-click the SQL Server Agent to modify, and then click **Properties**.
4. On the **Log On** tab, click **This account**, and specify the account name and password.

5. Click **OK**.
6. For the changes to take effect, click **Yes** in the confirmation message box.

## Modifying Replication Agent credentials

This section provides information on how to repair Active Roles replication if it fails due to insufficient permissions of Replication Agents. The credentials used by Replication Agents to access a given SQL Server depend on authentication mode of the Administration Service connection to that SQL Server:

- **Windows authentication** In this mode, Replication Agents use the credentials of the SQL Server Agent service running on the Publisher SQL Server computer
- **SQL Server authentication** In this mode, Replication Agents use the credentials of the SQL Server login specified for the Administration Service connection to SQL Server

The following sub-sections elaborate on each of these two options.

### Windows authentication

If the Administration Service uses Windows authentication, Replication Agents connect to SQL Server in the security context of the SQL Server Agent service. Therefore, the SQL Server Agent logon account must have sufficient permissions for replication to work properly (see the "SQL Server permissions" section in the Active Roles Quick Start Guide.

If the SQL Server Agent logon account does not have the appropriate permissions, is deleted, or has the password changed, Active Roles replication fails. To resolve this problem, give the required permissions to the logon account, or configure the SQL Server Agent service to log on with a different account that has the appropriate permissions. For instructions on how to configure the SQL Server Agent service to log on with a given account, see [Changing the SQL Server Agent logon account](#) earlier in this document.

You can use the following instructions to verify that the Replication Agents are configured properly. The instructions vary depending on whether the SQL Server holds the Publisher or Subscriber role. In both cases, you should connect to the Publisher SQL Server using SQL Server Management Studio.

### Replication Agent connection to Publisher

If the Administration Service connects to the Publisher SQL Server using Windows authentication, follow these steps to verify that the Replication Agents are configured properly:

1. With SQL Server Management Studio, connect to the Publisher SQL Server.
2. In the Object Browser, under the Publisher SQL Server, right-click the **Replication** folder, and then click **Distributor Properties**.
3. In the left pane of the **Distributor Properties** window, click **Publishers**.
4. In the **Publishers** list, select the entry representing the Publisher SQL Server, and click the **...** button in that entry to display the **Publisher Properties** dialog box.
5. In the **Publisher Properties** dialog box, under **Agent Connection to the Publisher**, verify that the Agent Connection Mode property is set to **Impersonate the agent process account**.

## Replication Agent connection to Subscriber

If the Administration Service connects to the Subscriber SQL Server using Windows authentication, follow these steps to verify that the Replication Agents are configured properly:

1. With SQL Server Management Studio, connect to the Publisher SQL Server.
  - NOTE:** You must have Management Studio connected to the Publisher SQL Server, regardless of whether you are managing Replication Agents for the Publisher or for a Subscriber.
2. In the Object Browser, under the Publisher SQL Server, expand **Replication | Local Publications | AelitaReplica**.
3. In the list under **AelitaReplica**, right-click the entry corresponding to the Subscriber SQL Server and click **Properties**.
4. In the **Subscription Properties** window, in the **Security** section, expand the **Subscriber connection** entry.
5. Verify that the **Subscriber connection** property is set to **Impersonate agent process account (Windows Authentication)**.

## SQL Server authentication

If the Administration Service uses SQL Server authentication, the Replication Agents connect to SQL Server in the security context of the SQL Server login specified for the Administration Server connection to SQL Server.

If the login does not have sufficient rights, is deleted, or has the password changed, Active Roles replication fails. To resolve this problem, do the following:

1. Choose a SQL Server login with sufficient rights (see the "SQL Server permissions" section in the Active Roles Quick Start Guide).

2. Configure the Administration Service to use that login (see [Viewing database connection settings](#) earlier in this document).
3. Configure the Replication Agents to use that login.

The following sections elaborate on how to configure the Replication Agents to use a given SQL Server login. The instructions vary depending on whether SQL Server in question is the Publisher or a Subscriber.

## Replication Agent connection to Publisher


If you have changed the SQL Server login for the Administration Service connection to the Publisher, use the following steps to configure the Replication Agents with that login:

1. With SQL Server Management Studio, connect to the Publisher SQL Server.
2. In the Object Browser, under the Publisher SQL Server, right-click the **Replication** folder, and then click **Distributor Properties**.
3. In the left pane of the **Distributor Properties** window, click **Publishers**.
4. In the **Publishers** list, select the entry representing the Publisher SQL Server, and click the **...** button in that entry to display the **Publisher Properties** dialog box.
5. In the **Agent Connection to the Publisher** area, click **Login**, and type the login name.
6. Click **Password**, and then click the **...** button in the **Password** entry.
7. In the **Enter Password** dialog box, type and confirm by retyping the password of that login.
8. Click **OK** to close the **Enter Password** dialog box.
9. Click **OK** to close the **Publisher Properties** dialog box.

## Replication Agent connection to Subscriber

If you have changed the SQL Server login for the Administration Service connection to a Subscriber, use the following steps to configure the Replication Agents with that login:

1. With SQL Server Management Studio, connect to the Publisher SQL Server.
  - 1 **NOTE:** You must have Management Studio connected to the Publisher SQL Server, regardless of whether you are managing Replication Agents for the Publisher or for a Subscriber.
2. In the Object Browser, under the Publisher SQL Server, expand **Replication | Local Publications | AelitaReplica**.
3. In the list under **AelitaReplica**, right-click the entry corresponding to the Subscriber SQL Server and click **Properties**.

4. In the **Subscription Properties** window, in the **Security** section, expand the **Subscriber connection** entry.
5. Click the  button in the **Subscriber Connection** entry.  
This displays the **Enter Connection Information** dialog box.
6. In the **Login** box, type the login name.
7. In the **Password** and **Confirm password** boxes, type and confirm by retyping the password of that login.
8. Click **OK** to close the **Enter Connection Information** dialog box.
9. Click **OK** to close the **Subscription Properties** dialog box.

## Moving the Publisher role

In the Active Roles replication model, a replication group includes the Publisher and may include several Subscribers. The Publisher plays a special role in the replication group: it synchronizes data changes between Subscribers. In some scenarios, you may want to move the Publisher role to another SQL Server.

For example, you might need to move the Publisher role to a different SQL Server if the service level becomes insufficient. Given that the Publisher receives and synchronizes data changes from all Subscribers, the volume of requests being serviced by the Publisher increases as the number of Subscribers grows. Respectively increases the workload for SQL Server that holds the Publisher role so its performance can suffer. To resolve this problem, you can transfer the Publisher role to another, more powerful server.

This section provides instructions on how to reconfigure the existing replication group so that the Publisher role is assigned to SQL Server other than the current Publisher. You can perform this task using the Active Roles console connected to the Administration Service whose database server currently holds the Publisher role (Publisher Administration Service).

**NOTE:** The Publisher Administration Service must be up and running. If the Publisher is unavailable, you can move the Publisher role using the instructions outlined in the next section of this document.

Open the Active Roles console and connect to the Publisher Administration Service:

1. Look for the **Active Roles Console** application, and then click to start that application.
2. Right-click the console tree root, click **Connect**, and then select the Administration Service whose database server currently holds the Publisher role.

Use the Active Roles console to remove all Subscribers and to demote the Publisher as follows:

1. In the console tree, expand **Configuration | Server Configuration**, and select **Configuration Databases**.
2. In the details pane, right-click a Subscriber, and click **Delete**.
3. In the confirmation message box, click **Yes**.
4. Repeat Steps 2–3 for each Subscriber.
5. In the details pane, right-click the Publisher, and click **Demote**.
6. In the confirmation message box, click **Yes**.
7. Wait while Active Roles demotes the Publisher.

After these steps, you can promote the appropriate SQL Server to Publisher and designate the other SQL Servers as Subscribers to the new Publisher, thus configuring the new replication group.

**TIP:** After you add a Subscriber, the configuration data stored on the Publisher is replicated to the Subscriber, overriding the data on that Subscriber. Therefore, in order to retain your existing Active Roles configuration, it is advisable to assign the Publisher role to SQL Server that belonged to the old replication group. This ensures that each Administration Service in the new replication group inherits the configuration that was in place when you removed the Subscribers and demoted the Publisher.

To configure the new replication group, perform the following steps using the Active Roles console:

1. Right-click the console tree root, click **Connect**, and then select the Administration Service whose SQL Server you want to hold the Publisher role.
2. In the console tree, expand **Configuration | Server Configuration**, and select the **Configuration Databases** container.
3. In the details pane, right-click the database and click **Promote**.
4. In the confirmation message box, click **Yes**.
5. Wait while Active Roles performs the operation.
6. In the details pane, right-click the Publisher, and click **Add Replication Partner**.
7. On the **Welcome** page in the New Replication Partner wizard, click **Next**.
8. On the **Database Selection** page, click **Browse**.
9. In the **Connect to Administration Service** dialog box, select the Administration Service whose SQL Server is to be configured as a Subscriber to this Publisher. Click **OK**.
10. In the New Replication Partner wizard, click **Next**, click **Next**, and then click **Finish**.
11. Repeat Steps 6–10 for each SQL Server you want to make a Subscriber.

# Recovering replication if Publisher is not available

Once the Publisher becomes unavailable, Subscribers cannot synchronize configuration data. The only way that replication can be recovered is by restoring the current Publisher or making another SQL Server the Publisher.

If the current Publisher cannot be restored, you need to transfer the Publisher role to SQL Server that holds the Subscriber role, and reconfigure the other Subscribers to use the new Publisher. This requires that you first remove all Subscribers from the replication group.

Given that the Publisher is unavailable, you can remove a Subscriber from the replication group by using the Active Roles console as follows:

1. Right-click the console tree root, click **Connect**, and then select the Administration Service that uses the Subscriber SQL Server.
2. In the console tree, expand **Configuration | Server Configuration**, and select **Configuration Databases**.
3. In the details pane, right-click the Subscriber and select **All Tasks | Advanced Properties**.
4. In the **Advanced Properties** window, select both the **Show all possible attributes** and **Include attributes with empty values** check boxes.
5. In the list of attributes, double-click the attribute **edsvaReplicationForceStandalone**.
6. In the **Edit Attribute** window, type **TRUE** in the **Value** box. Click **OK**.
7. In the **Advanced Properties** window, click **OK**.

Once you have removed all Subscribers from the replication group, you can promote one of the former Subscribers to Publisher and add Subscribers to the new Publisher by using the Active Roles console as follows:

1. Right-click the console tree root, click **Connect**, and then select the Administration Service whose SQL Server you want to hold the Publisher role.

**TIP:** After you add a Subscriber, the configuration data stored on the Publisher will be replicated to the Subscriber, overriding the data on that Subscriber. Therefore, in order to retain your existing Active Roles configuration, assign the Publisher role to one of the former Subscribers. This ensures that each Administration Service in the new replication group inherits the configuration that was in place when you removed the Subscribers from the replication group.

2. In the console tree, expand **Configuration | Server Configuration**, and select **Configuration Databases**.
3. In the details pane, right-click the database and click **Promote**.
4. In the confirmation message box, click **Yes**.



5. Wait while Active Roles performs the operation.
6. In the details pane, right-click the Publisher, and click **Add Replication Partner**.
7. On the **Welcome** page in the New Replication Partner wizard, click **Next**.
8. On the **Database Selection** page, click **Browse**.
9. Use the **Connect to Administration Service** dialog box to specify the Administration Service whose SQL Server is to be configured as a Subscriber to this Publisher. Click **OK**.
10. In the New Replication Partner wizard, click **Next**, click **Next**, and then click **Finish**.
11. Repeat Steps 6–10 for each SQL Server you want to make a Subscriber.

## Troubleshooting

If there are any replication failures in Active Roles , the Active Roles console provides a visual indication of this issue by placing a red triangle on the **Server Configuration** and **Configuration Databases** containers in the console tree. To get more information on a replication failure, you can use SQL Server Management Studio (see [Monitoring replication](#) earlier in this document).

The following sections discuss specific actions to take if you encounter a replication problem in Active Roles .

### Replication Agent malfunction

#### Symptoms

Replication stops synchronizing changes to configuration data, that is, changes made on a replication partner are not propagated to other replication partners. Replication Monitor in SQL Server Enterprise Manager or SQL Server Management Studio does not indicate any error.

#### Solution

Verify that the SQL Server Agent service is started on the Publisher SQL Server:

1. With SQL Server Management Studio, connect to the Publisher SQL Server.
2. In the console tree, right-click **SQL Server Agent**, and then click **Start**.

If the **Start** command is unavailable, the SQL Server Agent service is already started.

Ensure that the Merge Agents are started on the Publisher SQL Server:

1. With SQL Server Management Studio, connect to the Publisher SQL Server.
2. In the console tree, right-click **Replication**, and click **Launch Replication Monitor**.
3. In Replication Monitor, in the left pane, browse the **My Publishers** branch to select the **AelitaReplica** publication.
4. In Replication Monitor, in the right pane, right-click a subscription and click **Start Synchronizing**. Perform this step for each subscription of the **AelitaReplica** publication.

If the **Start Synchronizing** command is unavailable, the agent is already started.

Verify that the replication agent schedule is correct. The Merge Agents must be configured to run continuously at the Publisher. The Snapshot Agent must be configured to start daily at 12:00 a.m. at the Publisher. For details, see [Replication Agent schedule](#) earlier in this document.

## Replication Agent authentication problems

### Symptoms

Replication fails with one of the following errors on the Snapshot Agent or Merge Agent (see [Monitoring replication](#) earlier in this document):

- The process could not connect to Publisher '`<Server_name>`'. Login failed for user '`<User_name>`'.
- The process could not connect to Subscriber '`<Server_name>`'. Login failed for user '`<User_name>`'.

### Solution

By using SQL Server Enterprise Manager or SQL Server Management Studio, verify that the Replication Agent credentials are set properly. The following conditions must be met:

**Table 2: Conditions for Replication Agent credentials**

Server role	Authentication mode	Replication Agent credentials
Publisher	Windows Authentication	Impersonate the SQL Server

Server role	Authentication mode	Replication Agent credentials
		Agent account on the computer running the Publisher SQL Server (trusted connection)
	SQL Server Authentication	SQL Server login and password that the Publisher Administration Service uses to connect to its SQL Server
Subscriber	Windows Authentication	Impersonate the SQL Server Agent account on the computer running the Publisher SQL Server (trusted connection)
	SQL Server Authentication	SQL Server login and password that the Subscriber Administration Service uses to connect to its SQL Server

For information on how to view or modify the credentials that the Snapshot Agent and Merge Agents use to connect to the Publisher and Subscribers, see [Modifying Replication Agent credentials](#) earlier in this document.

## SQL Server identification problems

### Symptoms

When promoting SQL Server to Publisher, or adding it as a Subscriber to the existing Publisher, the operation fails with the following error: "An alias cannot be used for replication. Use the name of the SQL Server instance."

### Solution

This error may be due to one of the following reasons:

- Incorrect server name. The computer running SQL Server is renamed, or SQL Server has lost its name.
- Administration Service identifies SQL Server by alias. An alias was used to specify SQL Server when installing the Administration Service.

## Incorrect server name

To isolate and resolve this problem, run the following two queries on the SQL Server instance affected by this issue. Copy these queries "as is," without making any substitutions for the **servername** parameter:

```
select @@servername  
select serverproperty('servername')
```

If **select @@servername** returns a non-null value that is different from the value returned by the second query, execute the following SQL script:

```
exec sp_dropserver 'oldname', 'droplogins'  
exec sp_addserver 'newname', 'local'
```

In this script, replace:

- *oldname* with the value returned by **select @@servername**
- *newname* with the value returned by **select serverproperty('servername')**

If **select @@servername** returns NULL, execute the following SQL script:

```
exec sp_addserver 'newname', 'local'
```

In this script, replace *newname* with the value returned by **select serverproperty('servername')**.

For these changes to take effect, you must restart SQL Server. You can restart SQL Server by using SQL Server Configuration Manager:

1. In the console tree, select **SQL Server Services**.
2. In the details pane, right-click the SQL Server instance to restart, and then click **Restart**.

## Administration Service identifies SQL Server by alias

The Administration Service must be configured to identify SQL Server by computer name, rather than using a client alias. Otherwise, when attempting to make SQL Server the Publisher or a Subscriber, you encounter the error "An alias cannot be used for replication. Use the name of the SQL Server instance."

To avoid this problem, you may need to reinstall the Administration Service. When installing the Administration Service, use the following syntax to identify SQL Server:

- *computername* — for the default instance
- *computername\instancename* — for a named instance

In this syntax:

- *computername* is the (short) NetBIOS name of the computer running SQL Server;
- *instancename* is the name of a SQL Server named instance.

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- View services to assist you with your product