



Data Replication

Setup Notes for Replicating with PostgreSQL

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These notes provide essential information for setting up replications using **PostgreSQL**. The setup process for a refresh replication can usually be completed using the Syniti Data Replication wizards without additional documentation because it does not involve access to the PostgreSQL log. For complete details on the setup process, check the *Syniti Data Replication User Guide* available from the Management Center **Help** menu or the *Syniti Data Replication Setup Guide*, available for download in the [Help Center](#).

This guide describes the setup process using the Log Server Agent option for one-way mirroring and synchronization when replicating data from a PostgreSQL database. For mirroring and synchronization replications using PostgreSQL as a source, Syniti Data Replication offers:

- **Log Server Agent:** Uses a Windows service and a Log Server component to query the PostgreSQL log for increased performance when dealing with large amounts of data.
- **Triggers:** Uses Syniti DR triggers installed on the PostgreSQL database to log changes. This option is required for implementing synchronization with PostgreSQL. (Ask the technical support team via the [Help Center](#) to see if this approach would work in your application.) Download the separate setup guide [Setup Notes for PostgreSQL Using Triggers](#).

Connection Type

PostgreSQL .NET Data Provider [recommended by PostgreSQL](#)

Assembly: Npgsql (file name: Npgsql.dll)

Sample path: C:\Npgsql-2.2.3-net40\Npgsql.dll

To use the bulkinsert feature for increased performance:

1. The driver DLL has to be installed using the [Microsoft Global Assembly Cache Tool](#) (GAC). If the provider is not registered, you will receive the following error when attempting to use the provider:

```
Error creating the command for writing to the target (Replication: 'EMP1' - Target table: 'public.test1')
```

```
System.IO.FileNotFoundException: Could not load file or assembly 'Npgsql, Version=2.2.3.0, Culture=neutral, PublicKeyToken=5d8b90d52f46fda7' or one of its dependencies. The system cannot find the file specified.
```

```
File name: 'Npgsql, Version=2.2.3.0, Culture=neutral, PublicKeyToken=5d8b90d52f46fda7'
```

```
at ....
```

The commands for installing the PostgreSQL DLLs are as follows when running from the location where the GAC tool is installed:

```
gacutil.exe -i C:\Npgsql-2.2.3-net40\Npgsql.dll
```

```
gacutil.exe -i C:\Npgsql-2.2.3-net40\Mono.Security.dll
```

2. The provider version number stored in the DBReplicator.exe.config file (in the Syniti Data Replication install folder) should match the provider version that you are using. To change the version of the provider, specify the "newVersion" in the DBReplicator.exe.config file as follows:

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```
<dependentAssembly>
  <assemblyIdentity name="Npgsql" publicKeyToken="5d8b90d52f46fda7"
culture="neutral"></assemblyIdentity>
  <bindingRedirect oldVersion="2.2.3.0" newVersion="2.2.3.0"></bindingRedirect>
</dependentAssembly>
```

PostgreSQL System Settings

Syniti Data Replication supports PostgreSQL versions 9.5 and above as a source database for mirroring. It takes advantage of the PostgreSQL replication slot feature by requiring that every connection to PostgreSQL from Syniti Data Replication use a dedicated replication slot. The [PostgreSQL documentation](#) provides an in-depth explanation of replication slots, but briefly, a single slot represents an ordered stream of changes that occur on a specific database on the origin server. Note that if you enable a replication slot from Syniti Data Replication without using it, the slot will consume resources and prevent the database cleanup functionality to purge old records from the transaction log, because they do not appear as consumed by an existing slot. Therefore, it is important to remove replication slots from the database by removing the Syniti Data Replication connection if it is not used in replication.

Notes and Limitations on Using PostgreSQL as a Source in Mirroring

- Obtain the library files developed for PostgreSQL replications by requesting them in the [Help Center](#)
- PostgreSQL Versions 9.5 and above are supported as a source for mirroring. Synchronization is not supported.
- No DDL (schema changes) operations are logged, only INSERT, UPDATE and DELETE.
- In updates, only the after record of the new changes is logged. No before image is available
- The functions used to create and retrieve changes from the replication slots can only be executed by a superuser or a user with replication role.
- Replicated tables need to have primary keys defined.
- Replication last ID by datetime is not supported.

Setup steps on PostgreSQL (Windows environment)

1. Syniti DR uses the test_decoding.dll (test_decoding.so) that is included with PostgreSQL. However, it is possible to obtain a specialized library for enhanced performance, dbm_decoding, that reduces the size of the stream sent through the network:
 - Contact the technical support team via the [Help Center](#) to request the library files developed for PostgreSQL replications.
 - Extract the files from the zip file to a folder that is accessible to the PostgreSQL lib folder.
 - If using Microsoft Windows, rename the appropriate DLL to dbm_decoding.dll.
If using LINUX, rename the .so file to dbm_decoding.so.
 - Copy the file to the lib folder in your PostgreSQL installation.
2. Edit the postgresql.conf file to set up the environment for replication using Syniti Data Replication:

```
wal_level = logical
max_replication_slots = 3
track_commit_timestamp = on
```

where:

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wal_level sets the amount of information that is written to the WAL (Write-Ahead Logging, or Postgres transaction log). The value `logical` represents the level of detail necessary to support logical decoding, required for using PostgreSQL as a source database for replicating data changes only in Syniti Data Replication. This parameter can only be set at server start.

max_replication_slots sets the maximum number of replication slots available to all applications. Syniti Data Replication requires a “`replication_slot`” for every connection that it uses to replicate from PostgreSQL. A maximum number of 3 is reasonable if you are defining one single connection to the database. If you require additional connections to the same PostgreSQL database, the maximum number of slots should be raised accordingly.

Details on settings in the configuration file can be found in the [PostgreSQL documentation](#).

3. Restart the PostgreSQL database service so that your changes take effect.
4. Make sure that the user setting up and running replications is a superuser or a user with replication role.

Add Source Connection Wizard

Select Provider Screen

Database

Select PostgreSQL from the drop-down list.

Provider

PostgreSQL .NET Driver

Assembly

Locate the file `Npgsql.dll`, typically in the installation folder for the PostgreSQL .NET Provider.

Enable Transactional Replication Wizard

For transactional replications (mirroring and synchronization), use the Enable Transactional Replication wizard after setting up a source connection. The following field(s) require specific information for PostgreSQL.

Log Type Screen

Select the Log Server Agent option.

Log Settings

Decoding Plugin: Plugin Name

The default plugin is called ‘`test_decoding`’ and is normally installed with every PostgreSQL installation. To verify availability, check the location where the decoding plugins are normally installed:

MS Windows	<Postgres installation folder>/lib
Ubuntu	/usr/lib/postgres/9.5/lib

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RedHat /usr/pgsql-9.5/lib

If the plugin is missing, you can either install it using the Postgres installation files, or request a file from the technical support team via the [Help Center](#) to install the dbm_decoding plugin. Note that if you are using PostgreSQL as a cloud database, you need to use the test_decoding plugin.

Replication Slot: Use Existing Slot

Replication slots are channels that you open on the database to allow Syniti Data Replication to receive data changes from the log. While the default is to use a new slot specifically for a Syniti Data Replication connection, it is possible to reuse an existing slot if it is not consumed by any other connection. A replication slot has to be uniquely assigned to a single Syniti Data Replication connection.

Replication Slot: Add New Slot

Syniti Data Replication needs to define a “replication_slot” for every connection that it uses to replicate from PostgreSQL. This option allows you to set up a new slot from Syniti Data Replication. However, the new slot will be added only if the maximum number of slots has not been exceeded. This value is set in the postgresql.conf file. Be aware that if slots are created then left unused, they still consume resources, so you should always manage replication slots carefully.

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