Syniti

Syniti Replicate

Azure Event Hubs Setup Guide



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Introduction

Syniti Replicate allows you to replicate data from relational database tables to Azure Event Hubs, a big data streaming platform and event ingestion service, using:

- **Refresh**, or **Snapshot**, replication: a one-time complete replication from any major relational database source to Azure Event Hubs as a target, according to replication settings and scripts.
- **Mirroring**, or **Change Data Capture**, replication: a continuous read of changes to the source database that have been recorded in the database server log. Any changes found in the log are applied to Azure Event Hubs as a target, according to replication settings and scripts.

In order to replicate data in Syniti Replicate to an Azure Event Hub, the data is organized as virtual tables (with columns and data types). You can create a target table and define a replication to an Event Hub "target table", applying mappings and expression logic as with other relational data sources. The Azure Event is built using a JSON, CSV or XML serialization of the entire record, including metadata information such as the actual table name and the operation (Insert, Update or Delete), transactional information like transaction ID and timestamp, and finally the entire image (before and after) of the record. Every replication must be associated with an Event Hub so that Syniti Replicate can determine where to publish the event.

You can control the timing of the replication, identify the columns to be replicated and add scripts to transform data during replication. Source databases include Oracle, Microsoft SQL Server, IBM Db2 for i, IBM Db2 LUW, Sybase, Informix, MySQL.

Basic Configuration Steps

Use Syniti Replicate Management Center to:

- Create source connections to RDBMS tables
- Create Azure Event Hubs targets
- Map RDBMS sources to Azure Event Hubs targets
- Enable replication

Subsequent data management on the Azure Event Hubs side depends upon your application needs.

Connection Type

WindowsAzure.ServiceBus version 6.2

- Download the provider from the nuget site: https://www.nuget.org/packages
- 2. Search for WindowsAzure.ServiceBus version 6.2.
- 3. Click **Download package** on the right side of the page.
- 4. Download the nuget.exe command line tool (file name: nuget.exe): https://www.nuget.org/downloads
- 5. From a dos prompt with admin permissions, execute the following command. Be sure to insert the correct WindowsAzure.ServiceBus version. nuget install WindowsAzure.ServiceBus -Version 6.2.0 -Framework net480 -

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OutputDirectory C:/Temp/AzureHubs

The command will download the entire provider into the specified output directory.

- 6. Open the output directory to view the folders where the assemblies are located.
- 7. Select the following assemblies.
 - Microsoft.Azure.Services.AppAuthentication.dll
 - Microsoft.IdentityModel.Clients.ActiveDirectory.dll
 - Microsoft.IdentityModel.Clients.ActiveDirectory.pdb
 - Microsoft.IdentityModel.Clients.ActiveDirectory.Platform.dll
 - Microsoft.IdentityModel.JsonWebTokens.dll
 - Microsoft.IdentityModel.Logging.dll
 - Microsoft.IdentityModel.Tokens.dll
 - Microsoft.Rest.ClientRuntime.dll
 - Microsoft.ServiceBus.dll
 - Newtonsoft.Json.dll
 - System.IdentityModel.Tokens.Jwt.dll
- 8. Copy these files into the Plugins/AzureEventHubs folder.

Setup Summary

This section provides a summary of all the steps required for setting up and using Syniti Replicate. Use the link for each step for more information.

Download and Install Syniti Replicate	The <u>Knowledge Platform Product Suites article</u> acts as a hub to point to various resources. To download and/or register Syniti Replicate, log in to the support site, then click the relevant link in the Replicate section of the article. <u>Syniti Knowledge Base</u> <u>Enter a generic support ticket</u>
Install .NET Provider	Download and install the nuget package WindowsAzure.ServiceBus version 6.2
Syniti Replicate Setup (See Steps for Replicating Tables below)	 In the Syniti Replicate Management Center: In the Metadata Explorer, create a source connection to your RDBMS. Create a target connection using the Azure Event Hubs option in the Database field. Create a replication.

Start Replicating	In the Syniti Replicate Service Monitor:
(See Start Replications below)	1. Start the Replication Agent.

Syniti Replicate support for replicating relational data to Azure Event Hubs allows you to set up replications using either **Refresh** or **Mirroring** modes.

The steps below explain how to replicate data from a relational database to the Azure Event Hubs environment. Check <u>the Help Center</u> for the latest list of supported databases.

1. Set Up a Source Connection to a Relational Database

- 1. Make sure you have database connections via a .NET data provider to your source database. For each database you are planning to use in your replication project:
 - Install and configure your .NET Provider.
 - From the provider, test the connection to the database.
 - Create a connection string for the data access product/database you are using. Check the documentation for the data access product for information on how to do this.
 - Check that the user ID you are planning to use has sufficient permissions to complete all operations in Syniti Replicate. Contact Syniti Technical Support for specific requirements for your database.
- 2. Start the Management Center.

Syniti Replicate provides a default database (Microsoft SQL Server CE) for your metadata, all the information that Syniti Replicate needs to store about your replication setup.

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🚯 Syniti Replicate - Management Center	
<u>FILE VIEW TOOLS WINDOW H</u> ELP	
🏟 🗙 🖻 🐂 🧬 🖳 😮	
Metadata Explorer 🛛 👻 👎 🗙	📑 Start Page 🗙 🏣 Object Browser 📑 Replication
🗄 🎲 New Metadata 📲 🥸 🎲 🌅 🛟 🧮	
Syniti Replicate Syniti Replicate Social Model Sources Targets ADLS Gen2	Syniti Replicate
	WELCOME
	 >> Get Started Set up and run a replication >> What's New in Release 10.1.0
	New features and changes in this release

- 3. In the Metadata Explorer, expand the metadata node to view the Sources and Targets nodes.
- 4. Select the **Sources** node.
- 5. From the right mouse button menu, choose Add New Connection.

🚷 Syniti Replicate - Management Center	
<u>FILE VIEW TOOLS WINDOW HELP</u>	
🏟 🗙 🖻 🐂 🚅 🔛 🛛 🚱	
Metadata Explorer 👻 🖣 🗙	🗐 Start Page 🗙 🐃 Object Browser 🛛
🗄 🎲 New Metadata 📲 🏰 🏟 🅃 🛟 🔚	
Syniti Replicate	
e 😭 metadata	Syniti Replicate
Replic 👔 Paste Connection	Ctrl+V OME
🗄 🔜 Groups	

- 6. In the Source Connection Wizard, follow steps to add a connection string and test the connection to the database.
- 7. Check the User's Guide Database Access Providers and Supported Databases page to verify what value to enter in the Assembly field.

💰 Add Source Connectio	on Wizard	×
		Syniti Replicate
Select provider	Select the datat	base that contains source data to be replicated and indicate which provider to use.
Set connection string	Source name	
Select tables	Name:	IBMDB2i-Src
Actions Summary	Data Provider(s)	
	Database:	IBM Db2 for i
	Provider:	HiT Software .NET Driver (Ritmo/i)
	Assembly:	Ritmo_i/lib/SqI400.dll
Constant and a		Browse
		< Back Next > Cancel Help

8. In the Set Connection String screen, fill out the following fields:

Connection Properties

Edit at least the **Required** connection properties by clicking in the property value field and typing a new value.

Note: If using an Oracle 11 client, in the Data Source field, be sure to add the **Oracle Service Name** after the IP address.

- 9. In the **Setup Info** screen, click **Next** without completing any fields. This screen is used specifically for transactional replications, not refresh or snapshot replications.
- 10. Choose the tables that you plan to replicate.
- 11. If using Refresh mode to replicate data to Azure Event Hubs, in the **Actions** screen, check the option **Launch the Add Target Connection Wizard**.

- OR-

If using Mirroring mode to replicate data to Azure Event Hubs, in the Actions screen, check

the option Launch the Enable Transactional Replication Wizard.

💰 Add Source Connect	ion Wizard X
	Syniti Replicate
Select provider Set connection	Choose the action(s) to perform at the end of the wizard.
string Select tables	At the end of the wizard:
Summary	Check this option to set up transaction details for mirroring or synchronization replications that use this connection as a source.
	Launch the Add Target Connection Wizard Proceed with the definition of a target connection.
	< Back Next > Cancel Help

2. Configure the Enable Transactional Replication Wizard

Skip this section if you are setting up a Refresh replication. Continue here if you are setting up a Mirroring replication.

This section assumes you have checked the Source Connection wizard option to launch the Enable Transactional Replication wizard. To open the wizard from the Management Center, choose the connection in the Metadata Explorer, then right-click to choose Transactional Setup > Enable...

In the Enable Transactional Replication wizard:

 Select the type of transactional replication to use. The options depend on the source database and can include Log Reader, Log Server Agent, Triggers, plus Log Reader API (for IBM Db2 for i only.)

💰 Enable Transactional	Replication Wizard X
	Syniti Replicate
Log Type Log Settings	Choose the appropriate type of logging for this connection. For more information, see <u>Choosing a Log</u> Type for Transactional Replications
Actions Summary	 Log Type Log Reader [Default option] Every replication will activate a reader thread to check for new transactions to replicate. Choose this option if you plan to add a limited number of replications and do not want to install additional services on the system that is running Syniti Replicate.
	 Log Reader API Same as Log Reader with additional support for Large Object Binary values in transactional mode. Select this option if tables contain LOBs.
	Log Server Agent A Server Agent service will be created to autonomously read the transaction log from the database. Choose this option if you plan to add many replications and you need a scalable solution that doesn't require multiple simultaneous connections to the database.
	< Back Next > Cancel Help

- 2. Click **Next** to enter the log settings. The fields and appropriate values depend on the database and log type. Submit a request in the <u>Help Center</u> to obtain a Setup Guide for your database.
- 3. All Log Server Agent setups require the following Agent Settings to establish details for the Windows service and log files:

Log Files Folder

An existing folder where all the intermediate binary logs files are written. The folder is also used to contain trace files.

Prefix

A prefix for all files created in the folder. This provides easy identification and management of files associated with your connection. The primary purpose for the prefix is to support the case when you configure more than one connection to use the same folder. In general, however, it is advisable to use different folders for different connections.

Log File Size

The maximum size of each binary log file in megabytes.

Keep Max Files

The maximum number of binary log files to keep. Combined with the log file size, this number needs to be large enough to make sure that all the files are read by Syniti Replicate before they get deleted.

Trace

Unchecked by default. When checked, enables tracing for diagnostics and problem reporting. Trace files are saved in the Log Server folder.

Windows Service Name

Prefix:

This value is provided and cannot be changed It allows you to easily identify the service in the Microsoft Windows Services tool.

Name:

Specify a unique name for the Windows service. Each connection runs its own instance of the Log Server as a Windows service.

Start service after completing the wizard:

When checked, starts the service automatically after you click Finish to complete the wizard.

- 4. Click **Next** to verify your settings against the source connection to the database. If any information is missing, you will not be able to proceed.
- 5. In the Actions screen, check the option to launch the Add Target Connection wizard.
- 6. Click **Next** to review your changes.
- 7. Click **Finish** to complete the wizard.

The source connection is now set up for transactional replications.

3. Set up a Target Connection to Azure Event Hubs

1. Select the Targets node.

2. From the right mouse button menu, choose Add New Connection.



3. In the Add Target Connection Wizard **Database** field, select the Azure Event Hubs option. The **Provider** and **Assembly** fields are automatically filled out for you.

💰 Add Target Connectio	n Wizard	×
		Syniti Replicate
Select provider	Specify the connection parameter	s for the target connection.
Set connection string	Connection properties	
Set staging connection string	✓ Required Server	
Select tables	Shared Access Policy Name Shared Access Key	3
Actions	Default Hub	
Summary	Output Folder Port	5671
	Connect Timeout	15
	✓ Optional	
	Match Hub with Table Name	False
	Serialization	0 - JSON
	ExtendedProperties	
Contraction of the second	Server The Azure Event Hubs namespa form: <yournamespace>.service</yournamespace>	ice or IP address, that is the container for Event Hubs. Usually in this abus.windows.net
		< Back Next > Cancel Help

4. In the Set Connection String page, set properties as described in the table below.

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💰 Create Replication Wi	zard	×
		Syniti Replicate
Replication type	Mirroring mode will defin server.	ne a one-way transactional replication, from the source server to the target
Source connection	Replication Name	
Source log info	Replication Name	CUSTOMER
Target connection	Description:	
Target log info	Use Group:	
Mapping info		
Scheduling	Replication Type	
Actions	O Refresh	
Summary	Continuous Mirro	ring
Contractory	Synchronization	
STRAIN AND		< Back Next > Cancel Help

Server	The Azure Event Hubs namespace or IP address, i.e., the container for Event Hubs. Typical format: <yournamespace>.servicebus.windows.net</yournamespace>
Shared Access Policy Name	The name of your shared access policy. The default value is Root Manage Shared Access Key.
Shared Access Key	Shared access primary key.
Default Hub	The Event Hub name for the initial connection. If you select the option Match Hub with Table Name , each replication will connect to a hub with the matching table name.
Output Folder	Pathname to folder that will contain information related to the replication process.

Port	The port number. The default value is 5671.
Connect Timeout	The connection timeout (in seconds).
Match Hub with Table Name	If set to true, each replicated table will send data to the existing hub with the same table name.
Serialization	Select the type of serialization required for Azure Event Hubs messages. The following types of message serialization are currently supported: 0 - JSON 1 - CSV 2 - XML

- Click Next to display the Select tables page. At this point, there is no output structure available to display. You can add the information after completing the Target Connection wizard.
- 6. Click Next to display the Summary page.
- 7. Click Finish to complete the wizard.

3. Add Table Information to the Target Connection

The target connection is displayed in the Metadata Explorer, but you still need to add the file representation for source table data so that when you create replications below, you can specify a source table and target "file."

- 1. In the Metadata Explorer, expand the source connection you created above.
- 2. Select and drag a source table to the target file connection.
- The Create Target Table wizard is displayed. Although you are not actually creating tables, you can use this wizard to create a representation of the data.
- 4. In the **Source Connection** screen, you should see the source table you selected above.
- 5. Click Next to display the Target Connection screen.
- 6. Verify that the screen displays the correct target connection name, and table name.
- Click Next to review the table structure. At this point, you can modify data types, null values and so on, if you want to modify the data eventually sent to a file.
- Click Next to display the SQL Script screen. The contents of this screen are inactive because there is no editable SQL script to create a table. Instead, Syniti Replicate outputs the table information to a file.
- 9. Click Next to display the Summary screen.
- 10. Click Finish to create the table representation in the Metadata Explorer.

- 11. Click Yes to add the table name to the target connection entry in the Metadata Explorer
- 12. Repeat steps 2 through 11 for each source table that you want to replicate to a file.

4. Define Replications

- 1. Expand the Metadata Explorer tree to display the table that contains the data you want to replicate.
- 2. Select the table.
- 3. From the right mouse button menu, choose Replication then Create New Replicaton....
- 4. In the Define Replication Type screen, type a name to identify the replication.
- 5. Optionally provide a description of the replication.
- 6. In the Replication Mode area, choose Refresh or Continuous Mirroring.

💰 Create Replication Wizard X					
			Syniti	Replic	cate
Replication type Source connection	Select the source conn	ection and table to be replicated.			
Source log info					
Target connection	Connection Name:	IBMDB2i-Src		Ň	-
Target log info Mapping info	Table Name:	OLETEST.CUSTOMER			- F
Scheduling Actions Summary				Open Table	
		< Back	Next >	Cancel	Help

- 7. Click Next to go to the Select Source Connection screen.
- 8. Choose the source connection name from the drop-down list that includes all the source connections you have created in Syniti Replicate.
- 9. Choose the table that you want to replicate from the drop-down list.
- 10. If you want more information about the table before proceeding, click Open Table....
- 11. Click **Next** to go to the **Source Log Info** screen. Complete the fields in this screen only if you are setting up a mirroring replication. The fields displayed depend on the source database log type.

💰 Create Replication Wiza	ard			×
			Syniti Re	plicate
Replication type Source connection Source log info Target connection Target log info Mapping info Scheduling Actions Summary	Click Next to use the current TID to set the transaction Journal: Receiver: Transaction ID: Transaction Timestamp: Read Interval (sec):	ent transaction read point from ID from which to replicate. OLETEST.QSQJRN OLETEST.QSQJRN3424 5550 6/28/2022 9:42:41 PM 60	n the IBM i/AS400 server. To ov	Read TID
		< Back	Next > Canc	el Help

12. Click Next to go to the Select Target Connection screen.

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- **13.** Choose the target connection for Azure Event Hubs from the drop-down list that includes all the target connections you have created in Syniti Replicate.
- 14. Choose the data set you want to replicate from the drop-down list.If the drop-down list is empty, exit the wizard and add or create a target data set.
- 15. Click **Next** to go to the **Set Mapping Info** screen. Source columns and target data with the same name are automatically mapped.
- 16. Click Next to go to the Scheduling screen.

💰 Create Replication Wiz	ard X
	Syniti Replicate
Replication type Source connection	Set scheduling information for the replication.
Source log info Target connection Target log info Mapping info <i>Scheduling</i> Actions Summary	 Enable Replication Execute Initial Refresh Start Time: 6/29/2022 2:10:45 PM Refresh Schedule Mirroring Schedule Verifier Schedule Run One Time Only Run Recurrently:
	< Back Next > Cancel Help

- 17. Make sure the **Enable Replication** option is checked. This is required for the replication to run.
- 18. Set a start time for the replication. The **Start Time** field indicates the time at which the Data Replicator will begin considering the replication for execution.
- 19. Check the option to Execute Initial Refresh.

A full replication will be performed from the source table to the data file.

- 20. Click Next to go to the Summary screen.
- 21. Click Finish to complete the wizard.

Start Replications

If you installed the Replication Agent as a service during Syniti Replicate setup, you just need to start the service using the ServiceMonitor program

- The replication that you have scheduled should start at the specified time.
- Use the Replication Monitor tab in the Management Center to track the progress of the replication.

If you would like to set up the Replication Agent as a service:

- From the ServiceMonitor program sin the Windows Notification Area, choose Launch Service Installer.
- Manage the service from Service Monitor program (located in the Windows Notification Area 5).
- Use the Replication Monitor tab in the Management Center to track the progress of the replication.

To run the Replication Agent interactively:

- In the Windows Notification Area, select the Service Monitor icon 🛸
- From the right mouse button menu, choose **Replication Agent**, then **Start** then **Application**. The replication that you have scheduled should start at the specified time.
- Use the Replication Monitor tab in the Management Center to track the progress of the replication.

Stop Replications

Stop the Replication Agent from the Service Monitor in the Windows Notification Area.