Syniti Replicate

Setup Guide for SAP CDC for RFC Version 10.4

Table of Contents

Introduction	1
Pre-Requisites	1
SAP Environment Compatibility S/4HANA	1
User Authorization	1
Setup Summary	3
Download and Install Syniti Replicate	3
Install Mirroring Transport S/4HANA	3
Transport Contents S/4HANA	4
Executing the Generation Program	6
Master Log Table Database Objects - Sequence	6
Log Table Transportable Objects – Transparent Table	7
Log Table Database Objects – Triggers & Sequence	10
Executing the Consumption APIs	12
Read API	
Reading Master Log Table	13
Reading Log Table	
Reading Generated Target Objects	16
Reading Generated Transportable Objects	
Reading Generated Database Objects Table	
Reading Error Table	21
Update Master Log Table API	23
Updating Master Log Table	23
Update Log Tables API	25
Updating Log Table	
Delete Master Log Table API	
Deleting Master Log Table	
Delete Log Tables API	
Deleting Log Table	
Steps for Replicating Tables	34
Syniti Replication Windows Application Server	
Download zip file SAP RFC Extraction for Syniti Replicate Application Server	35
Install cData Driver for SAP ERP	
Register cData Driver for SAP ERP	

	Set Up a Source Connection to SAP	37
	2. Configure the Enable Transactional Replication Wizard	. 43
	Trigger Settings Screen	. 43
	Select source Tables	. 45
	Set up a Target Connection	.46
	Create Target Tables	. 47
	4. Define Replications	.49
Sta	art Replications	51
Sto	p Replications	52
Ар	pendix 1 – Important Connection Property Details	52
' Ap	pendix 2 – Troubleshooting	53
د ا.	Known Issue 1: Maximum ODBC Connection String Exceeded	53
	Known Issue 2: SAP connection using SNC	53

Introduction

This document describes the steps required to install and consume Syniti Data Replication – Mirroring solution ABAP components.

The Syniti Replicate – Mirroring solution ABAP components are divided in 2 groups:

- Generation Components
- Consumption API

The Generation Components are ABAP programs that should be used to generate the ABAP and HANA DB objects required to execute data mirroring.

The Consumption API can be consumed externally using CData ODBC Driver for SAP ERP for reading and querying data and SAP Connector for Microsoft .NET 3.0 for updating the solution and generated mirroring tables.

Pre-Requisites SAP Environment Compatibility S/4HANA

Transports are compatible with SAP installations of S/4HANA 1709 [S4CORE 102] or higher.

User Authorization

The following Authorization Objects have to be assigned to the user performing the generation steps.

Authorization Object	Authorization Field	Authorization Value
S_TCODE	TCD	/BS4/GENERATOR
/BS4/SDRMP	PROGRAM	/BS4/GENERATOR
	ACTVT	16 (Execute)
S_DEVELOP	DEVCLASS	<customer's package=""></customer's>
	OBJTYPE	TABL
	OBJNAME	<dependent and="" in="" on="" prefix="" scope="" tables=""> (e.g.: Z<prefix>*)</prefix></dependent>
	P_GRP	
	ACTVT	02
S_TRANSPRT	ТТҮРЕ	
	ACTVT	03

The following Authorization Objects have to be assigned to the user utilizing the Consumption APIs Read Capabilities.

Authorization Object	Authorization Field	Authorization Value
S_RFC	RFC_NAME	/BS4/SDRM_READ_TABLE or /BS4/SDRM_RFC_API
	RFC_TYPE	FUNC or FUGR
	ACTVT	16
/BS4/SDRMF	RFC_NAME	/BS4/SDRM_READ_TABLE
	ACTVT	16 (Execute)
S_TABU_NAM	TABLE	<name in="" of="" scope="" tables=""></name>
	ACTVT	03 (Display)
S_TABU_DIS	DICBERCLS	<authorization group="" in="" of="" scope="" tables=""></authorization>
	ACTVT	03 (Display)

The following Authorization Objects have to be assigned to the user utilizing the Consumption APIs Update Capabilities.

Authorization Object	Authorization Field	Authorization Value
S_RFC	RFC_NAME	/BS4/SDRM_UPDATE_MASTER_TABLE and
		/BS4/SDRM_UPDATE_LOG_TABLE and
		/BS4/SDRM_DELETE_MASTER_TABLE and
		/BS4/SDRM_DELETE_LOG_TABLE or /BS4/SDRM_RFC_API
	RFC_TYPE	FUNC or FUGR
	ACTVT	16
/BS4/SDRMF	RFC_NAME	/BS4/SDRM_UPDATE_MASTER_TABLE and
		/BS4/SDRM_UPDATE_LOG_TABLE and
		/BS4/SDRM_DELETE_MASTER_TABLE and
		/BS4/SDRM_DELETE_LOG_TABLE
	ACTVT	16 (Execute)
S_TABU_NAM	TABLE	<name in="" of="" scope="" tables=""></name>
	ACTVT	02 (Display)
S_TABU_DIS	DICBERCLS	<authorization group="" in="" of="" scope="" tables=""></authorization>
	ACTVT	02 (Display)

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. Mirroring	Enter a support ticket to request installation components.
Transport S/4HANA	Install the provided transport in the SAP Application Server.
Syniti Replicate Setup	In the Syniti Replicate Management Center:
	1. In the Metadata Explorer, create a source connection to your RDBMS.
	2. Create a source connection using the SAP NetWeaver Extract option in the Database field.
	3. Create a replication.
Start Replicating	In the Syniti Replicate Service Monitor:
	1. Start the Replication Agent.

Download and Install Syniti Replicate

To download and/or register Syniti Replicate, log in to the <u>support site</u>, then click the relevant link in the Replicate section of the article.

Install Mirroring Transport S/4HANA

The first step required to set-up the solution, is to install the provided transport in the SAP Application Server.

The transport files list is listed next. To have them installed, please contact the customer Basis team.

Transport Contents S/4HANA

Object Name	Туре	Description
/BS4/SDRM /BS4/SDRM_API /BS4/SDRM_CONSTANTS /BS4/SDRM_EXCEPTIONS	Package	Packages that contain all objects related to Syniti Replicate – Mirroring.
/BS4/ERROR_LOG /BS4/GEN_DB_OBJS /BS4/GEN_TR_OBJS /BS4/MASTER_LOG /BS4/TGT_OBJECTS	Table	Syniti Replicate – Mirroring delivered tables. These tables contain the names of the generated ABAP and HANA objects as well as mappings between standard tables and mirroring target tables. The Master Log table contain the header entry for all mirroring actions and the Error Log table store the messages raised when errors occur when populating target tables.
/BS4/TID_RANGE	Structure	Syniti Replicate – Mirroring delivered Structures.
/BS4/TID_RANGE_TT	Table Type	Syniti Replicate – Mirroring delivered Table Types.
/BS4/SDRM_RFC_API	Function Group	Syniti Replicate – Mirroring Consumption API Function Group.
/BS4/SDRM_READ_TABLE /BS4/SDRM_UPDATE_LOG_TABLE /BS4/SDRM_UPDATE_MASTER_TABLE /BS4/SDRM_DELETE_LOG_TABLE /BS4/SDRM_DELETE_MASTER_TABLE	Function Module	Syniti Replicate – Mirroring Consumption API Function Modules.
/BS4/GENERATOR	Program	Syniti Replicate – Mirroring – ABAP and HANA DB objects generation program.
/BS4/GENERATOR	Transaction	Syniti Replicate – Mirroring – Generator
/BS4/GENERATOR /BS4/MESSAGE_PROVIDER /BS4/SPECIFICATION	Interface	Syniti Replicate – Mirroring – OO Interfaces

/BS4/DATA_CLASS /BS4/DATA_TYPE /BS4/DDL_TYPE /BS4/DELIVERY_CLASS /BS4/MESSAGE_SEVERITY /BS4/RANGE_OPTION /BS4/RANGE_SIGN /BS4/SIZE_CATEGORY /BS4/TABLES /BS4/TABLES /BS4/VIEW_ACTION	Class	Syniti Replicate – Mirroring – Constants Enumeration Classes
/BS4/CX_GENERATION_ERROR /BS4/CX_SDRM /BS4/CX_SPECIFICATION_ERROR	Class	Syniti Replicate – Mirroring – Exception Classes
<pre>/BS4/DB_SPECIFICATION /BS4/DDL_GENERATOR /BS4/DDL_SPEC /BS4/DROP_TRIGGER_DELETE_SPEC /BS4/DROP_TRIGGER_INSERT_SPEC /BS4/DROP_TRIGGER_UPDATE_SPEC /BS4/LOG_TABLE_SPEC /BS4/MASTER_SEQUENCE_SPEC /BS4/MESSAGE_LOGGER /BS4/SEQUENCE_SPEC /BS4/TABLE_GENERATOR /BS4/TABLE_SPECIFICATION /BS4/TRIGGER_DELETE_SPEC /BS4/TRIGGER_INSERT_SPEC /BS4/TRIGGER_SPEC /BS4/TRIGGER_UPDATE_SPEC</pre>	Class	Syniti Replicate – Mirroring – Classes
/BS4/SDRM_API /BS4/SDRM_GENERATION /BS4/SDRM_SPEC	Message Class	Syniti Replicate – Mirroring – Message Classes

/BS4/SDRMF	Authorization	Syniti Replicate – Mirroring	_
/BS4/SDRMP	Object	Authorization Objects	

Executing the Generation Program

The Syniti Replicate Mirroring solution uses a mix of Transportable Objects (i.e.: Transparent Tables) and Data Base Objects (i.e.: Sequences and Triggers) to implement the change data capture solution.

The Transparent Tables can be separated in 4 different groups, Control, Master Log, Log, and Error Log tables.

The Control Tables are provided with the installation packaged and are used to keep up an inventory of what Log Transparent Tables (/BS4/GEN_TR_OBJS) and Database Objects (/BS4/GEN_DB_OBJS) were generated, as well as the mapping between Standard SAP Tables in scope for Mirroring and their corresponding Log Tables (/BS4/TGT_OBJECTS).

The Error Log Table (/BS4/ERROR_LOG) is also provided with the installation package and is populated with any error message raised during the execution of Triggers during the Mirroring activities.

The Master Log Table (/BS4/MASTER_LOG) is also provided with the installation package and is used to track all Mirroring activities.

Log Tables on the other hand are not provided with the installation package and need to be generated in the development environment of the source system. Log tables are Transportable Objects and need to be placed in Transport Requests and promoted through the landscape to the desired production environment.

No Database Object is provided with the installation package. All Database Objects must be generated directly in each environment of the source system.

To generate both Log Tables and Database Objects, report /BS4/GENERATOR (transaction code /BS4/GENERATOR) is available.

Master Log Table Database Objects - Sequence

As explained in the previous section, the Master Log Tables is provided with the installation packaged and does not need to be generated using /BS4/GENERATOR. However, the Database Objects associated with it must be created. In this case, only a Sequence will be created in the database as no Triggers are required for Master Log Table.

To execute this step, all that is required is to select the Master Table radio button under Generation Control in the selection screen and execute the report as shown in Figure 1 - Master Log Table Database Objects Generation.

Syniti Data Replication - Mirroring - Generator
Generation Control
⊙ Master Table
🔿 Log Table
Transportable or Database Objects
🔿 Transportable Objects
(Database Table)
Specify Transport, Package and Prefix below
● Database Objects
(Sequence/Triggers)
Specify Prefix below
Drop Triggers Only
Transport Request
Package
Prefix
Table Name

Figure 1 - Master Log Table Database Objects Generation

Once the report is executed, **Sequence /BS4/MASTER_LOG_SEQ** will be created and the execution log will be displayed. In the following example, the Master Log Table Sequence had previously been created, therefore in the execution log the message states that a new one cannot be created. When the program is executed in an environment where the Master Log Table Sequence does not exist, a successful message would be displayed.



Figure 2 - Master Log Table Sequence Generation Log

Log Table Transportable Objects – Transparent Table

The next objects that need to be created are the **Transportable Objects** for the tables in scope for Change Data Capture/Mirroring.

To execute this step using /BS4/GENERATOR, radio button **Log Table** must be selected under Generation Control section, and radio button Transportable Objects must be selected under Transportable or Database Objects section. On the main section, the following fields must be provided:

• **Transport Request**: Transport Request to be used to promote the Log Tables to other environments;

- **Package**: Development Package in which the Log Table should be created;
- **Prefix**: Used to construct the name of the Log Table Z<PREFIX><TABLE_NAME>;
- **Table Name**: Name of the table for which a Log Table should be created.

Figure 3 - Log Tables Transportable Objects Generation shows an example of how create Log Table ZSDRLFA1 for table LFA1 in package ZSDRGEN.

Syniti Data Replication - Mirroring - Generator		
ا لا الله الله الله الله الله الله الله		
Generation Control		
O Master Table		
 Log Table 		
Transportable or Database Objects		
Transportable Objects		
(Database Table)		
Specify Transport, Package and Pre	fix below	
O Database Objects		
(Sequence/Triggers)		
Specify Prefix below		
Drop Triggers Only		
Transport Poquet		
Package		
Prefix	SDR	
Table Name	LFA1	

Figure 3 - Log Tables Transportable Objects Generation

During the execution of the report for the creation of Log Tables Transportable Objects, the Package assignment and Transport Request assignment have to be confirmed.

🖙 Create Object Directory Entry 🛛 🗙 🗙		
Object R3TR TABL ZSDRI	FA1	
Attributes		
Package	ZSDRGEN 口	
Person Responsible	FPEIXOTO	
Original System	<u>54D</u>	
Original language		
Created On		
	📙 Local Object kock Overview	

Figure 4 - Log Tables Transportable Objects Generation - Package Assignment

🖙 Prompt for transportable Workbench request			×
Table Definition ZSDRLFA1			
Request	S4DK900449	Workbench request	_
Short Description Syniti Data Replication - Mirroring Log Tables		Mirroring Log Tables	
		Own Requests	×

Figure 5 - Log Tables Transportable Objects Generation - Transport Request Assignment

Once the report is executed, Table Z<PREFIX><TABLE_NAME> will be created and the execution log will be displayed.



Figure 6 – Log Tables Transportable Objects Generation Log

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Log Table Database Objects – Triggers & Sequence

The next objects that need to be created are the **Database Objects** for the tables in scope for Change Data Capture/Mirroring.

To execute this step using /BS4/GENERATOR, radio button **Log Table** must be selected under **Generation Control** section, and radio button **Database Objects** must be selected under **Transportable or Database** Objects section. On the main section, the following fields must be provided:

• **Prefix**: Used to construct the name of the Log Table Sequence and Triggers-Z<PREFIX><TABLE_NAME>_[SEQ, _INS, _UPD, DEL];

• **Table Name**: Name of the table for which a Log Table should be created.

Figure 7 - Log Tables Database Objects Generation shows an example of how create Sequence ZSDRLFA1_SEQ and Triggers ZSDRLFA1_INS, ZSDRLFA1_UPD, ZSDRLFA1_DEL for table LFA1.

Syniti Data Replicatio	1 - Mirroring - Generator
🌚 🔁	
Generation Control	
○ Master Table	
 Log Table 	
Transportable or Database Objects	
 Transportable Objects 	
(Database Table)	
Specify Transport, Package an	l Prefix below
 Database Objects 	
(Sequence/Triggers)	
Specify Prefix below	
Drop Triggers Only	
Transport Request	
Package	
Prefix	SDR
Table Name	LFA1

Figure 7 - Log Tables Database Objects Generation

Once the report is executed, the following objects will be created and the execution log will be displayed.

- Sequence Z<PREFIX><TABLE_NAME>_SEQ;
- Triggers:
 - o Z<PREFIX><TABLE_NAME>_INS;
 - Z<PREFIX><TABLE_NAME>_UPD;
 - Z<PREFIX><TABLE_NAME>_DEL;

Sj	Syniti Data Replication - Mirroring - Generator			
9	4 7	7 🗗 🟝 🖶 🕱 🎟		
ICON	Msg type	Message text		
	S	Sequence ZSDRLFA1_SEQ created		
	W	invalid trigger name: ZSDRLFA1_INS: line 1 col 14 (at pos 13)		
\triangle	W	invalid trigger name: ZSDRLFA1_UPD: line 1 col 14 (at pos 13)		
\triangle	W	invalid trigger name: ZSDRLFA1_DEL: line 1 col 14 (at pos 13)		
	S	Trigger ZSDRLFA1_INS created		
	S	Trigger ZSDRLFA1_UPD created		
	S	Trigger ZSDRLFA1_DEL created		

Figure 8 - Log Tables Database Objects Generation Log

It is possible to execute /BS4/GENERATOR to drop the created triggers for a table. To perform this action, radio button **Log Table** must be selected under **Generation Control** section, and radio button **Database Objects** must be selected under **Transportable or Database Objects** section as well as the check box **Drop Triggers Only**. On the main section, the following fields must be provided:

- Prefix: Used to construct the name of the Log Table Triggers-Z<PREFIX><TABLE_NAME>_[INS, UPD, DEL];
- Table Name: Name of the table for which a Log Table should be created.

Figure 9 - Log Tables Database Objects Generation - Drop Triggers shows an example of how create Sequence ZSDRLFA1_SEQ and Triggers ZSDRLFA1_INS, ZSDRLFA1_UPD, ZSDRLFA1_DEL for table LFA1.

Syniti Data Replicat	ion - Mirroring - Generator	
€ [5		
Generation Control		
O Master Table		
 Log Table 		
Transportable or Database Obje	cts	
 Transportable Objects 		
(Database Table)		
Specify Transport, Package	and Prefix below	
 Database Objects 		
(Sequence/Triggers)		
Specify Prefix below		
🔽 Drop Triggers Only		
Transport Request		
Package		
Prefix	SDR	
Table Name		

Figure 9 - Log Tables Database Objects Generation - Drop Triggers

Once the report is executed, the Triggers will be dropped and the execution log will be displayed.

Syniti Data Replication - Mirroring - Generator		
3 4 7	TF 🚯 🟝 🖪 🖽 🎟	
ICON Msg type	Message text	
∆ W	cannot use duplicate sequence name: ZSDRLFA1_SEQ: line 1 col 17 (at pos 16)	
S	Trigger ZSDRLFA1_INS dropped	
S S	Trigger ZSDRLFA1_UPD dropped	
S S	Trigger ZSDRLFA1_DEL dropped	

Figure 10 - Log Tables Database Objects Generation - Drop Triggers Log

Executing the Consumption APIs

As mentioned in the Overview section, the Syniti Replicate Mirroring solution, realizes the Consumption API using Remote Function Modules that can be consumed externally using CData ODBC Driver for SAP ERP for reading and querying data, and SAP Connector for Microsoft .NET 3.0 for updating the solution and generated mirroring tables. The Consumption API consists of the Remote Function Modules below:

- **/BS4/SDRM_READ_TABLE**: Read API can be used with CData ODBC Driver
- /BS4/SDRM_UPDATE_MASTER_TABLE: Update Master Log Table
- **/BS4/SDRM_UPDATE_LOG_TABLE**: Update Log Tables

The following sections depicts how the different components of the Consumption API can be utilized. Usage with CData ODBC Driver is not covered.

Read API

The Read API (/BS4/SDRM_READ_TABLE) can be used to read any table in the system, provided that the user executing it has the required authorizations. This includes the tables delivered with the solution as well as the ones generated using /BS4/GENERATOR. This API works in the same way other Syniti solutions work to extract data from SAP ERP/S/4HANA (e.g.: Collect, Syniti Data Replication – Read Table for CData ODBC Driver).

The input parameters for the Read API are the following:

- **QUERY_TABLE**: Name of the Table to be read;
- **DELIMITER**: Field separator for output data;
- **NO_DATA**: Flag that controls if DATA output table is filled;
- **ROWSKIPS**: Number of rows to be skipped while extracting data;
- **ROWCOUNT**: Number of rows to be selected while extracting data;
- **OPTIONS**: Table of free text fields to define the extraction where clause;
- **FIELDS**: Table of structured field. Structure field FIELDNAME can be used to specify a projection clause.

The output parameters for Read API are the following:

- **TABLE_ROWS**: Total number of rows in the QUERY_TABLE. It is only populated when ROWCOUNT is negative.
- FIELDS: Return the details of the fields of QUERY_TABLE;
- **DATA**: Return the extracted data in a table of text fields.

Reading Master Log Table

In order to read the Master Log Table, input field **QUERY_TABLE** must be populated with value '/BS4/MASTER_LOG'. The other input fields are optional. The example below reads 100 entries (ROWCOUNT = 100) from the Master Log Table skipping the first 10 entries (ROWSKIPS = 10).

Test Function Module: Initial Screen			
Debugging Test data directory			
Test for function group /BS4/SDRM_RFC_API Function module /BS4/SDRM_READ_TABLE Uppercase/Lowercase RFC target sys:			
Import parameters	Value		
QUERY_TABLE DELIMITER NO_DATA ROWSKIPS ROWCOUNT	/BS4/MASTER_LOG 10 100		
Tables	Value		
OPTIONS FIELDS DATA	0 Entries 0 Entries 0 Entries		

Figure 11 - Read API - Master Log Table

Once the API is executed, tables FIELDS and DATA are populated.

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Test Function Module: Result Screen				
9				
Test for function group /BS4/SDRM_RFC_API Function module /BS4/SDRM_READ_TABLE Uppercase/Lowercase				
Runtime: 5,269 Microsecon	ds			
RFC target sys:				
Import parameters	Value			
QUERY_TABLE DELIMITER NO DATA	/BS4/MASTER_LOG			
ROWSKIPS ROWCOUNT	10 100			
Export parameters	Value			
TABLE_ROWS	0			
Tables	Value			
OPTIONS	0 Entries			
FIELDS Result:	0 Entries			
DATA Result:	0 Entries 100 Entries			

Figure 12 - Read API - Master Log Table – Output

Structure Editor: Display FIELDS from Entry 1					
🛃 l4 4 🕨 🎦 Column 🖉	Entry Metadata				
6 Entries					
FIELDNAME	OFFSET LENGTH T FIELDTEXT				
TID	000000 000020 8				
SNAME	000020 000064 C				
TNAME	000084 000064 C				
TTS	000148 000026 P				
TUSER	000174 000081 C				
FLAG	000255 000003 b				
IID SNAME TNAME TTS TUSER FLAG	000000 000020 8 000020 000064 C 000084 000064 C 000148 000026 P 000174 000081 C 000175 000083 b				

Figure 13 - Read API - Master Log Table - Fields Table

Structure Editor: Display DATA from Entry 1						
💑 🖌 🔸 🕨 💭 Column 📮 Entry Metadata	A K ← → N A Column A Bentry Metadata					
100 Entries						
FELD						
11 SAPHANADB	BUT000	20220621224418.8040000 SAPHANADB				
12 SAPHANADB	BUT000	20220621224752.5570000 SAPHANADB				
13 SAPHANADB	BUT000	20220621224956.2960000 SAPHANADB				
14 SAPHANADB	BUT000	20220624141028.3100000 SAPHANADB				
15 SAPHANADB	BUT000	20220624141043.6380000 SAPHANADB				
16 SAPHANADB	BUT000	20220624184358.9240000 SAPHANADB				
17 SAPHANADB	BUT000	20220624195540.6480000 SAPHANADB				
18 SAPHANADB	BUT000	20220624205042.9740000 SAPHANADB				
19 SAPHANADB	BUT000	20220715085919.3200000 SAPHANADB				
20 SAPHANADB	BUT000	20220715090037.6220000 SAPHANADB				
21 SAPHANADB	BUT000	20220715092652.7360000 SAPHANADB				



Reading Log Table

In order to read a Log Table, input field **QUERY_TABLE** must be populated with value Log Table Name (e.g.: ZSDRBUT000). The other input fields are optional. The example below reads all entries from the Log Table ZSDRBUT000 using semi colon as the data delimiter (**DELIMITER** = ';').

Test Function Module: Initial Screen					
🚯 🚯 Debugging 🛛 🧟 Test data dire	Debugging				
Test for function group /BS4/SDRM_RFC_API Function module /BS4/SDRM_READ_TABLE Uppercase/Lowercase					
RFC target sys:					
Import parameters	Value				
QUERY_TABLE DELIMITER NO_DATA ROWSKIPS DOUGOUNT	ZSDRBUT000 ; 0				
ROWCOUNT	0				
Tables	Value				
OPTIONS FIELDS DATA	0 Entries 0 Entries 0 Entries				

Figure 15 - Read API - Log Table

Once the API is executed, tables FIELDS and DATA are populated.

Test Function Module: Result Screen			
g			
Test for function group /BS4/SDRM_RFC_API Function module /BS4/SDRM_READ_TABLE Uppercase/Lowercase			
Runtime: 43,830	0 Microsecon	ds	
RFC target sys:			
Import parameters		Value	
QUERY_TABLE DELIMITER NO_DATA ROWSKIPS ROWCOUNT		ZSDRBUT000 ; 0 0	
Export parameters		Value	
TABLE_ROWS		0	
Tables		Value	
OPTIONS Re: FIELDS	sult:	0 Entries 0 Entries 0 Entries	
DATA Re:	sult:	0 Entries 271 Entries	

Figure 16 - Read API - Log Table - Output

Structure Editor: Display DAT	A from Entry 1					
📇 🖪 🖌 🕨 🔛 💭 Column 🛛 🐺 Entry	Metadata					
271 Entries						
FELD						
1;	1 ;I; 0 ;100;0001001402;2;	;0001;	j	;		
2;	2 ;A; 0 ;100;0001001402;2;	;0001;	3	3		11 1
2;	2 ;B; 0 ;100;0001001402;2;	;0001;	;	;	; ; ;	;; ;
3;	3 ;D; 0 ;100;0001001402;2;	;0001;	;	;	; ; ;	;; ;
4;	4 ;A; 0 ;100;0001001280;2;	;0001;	; ORGAN	;	; ; ;	3 3 3
4;	4 ;B; 0 ;100;0001001280;2;	;0001;	; ORGAN	3	; ; ;	3.3 3
5;	5 ;A; 0 ;100;0001001280;2;	;0001;	; ORGAN	3	; ; ;	3.3 3
5;	5 ;B; 0 ;100;0001001280;2;	;0001;	;ORGAN	3	3 3 3	3 3 - 3

Figure 17 - Read API - Log Table - Data Table

Reading Generated Target Objects

In order to read the Generated Target Objects Table, input field **QUERY_TABLE** must be populated with value '/BS4/TGT_OBJECTS'. The other input fields are optional. The example below uses the **OPTIONS** table to read only the Target Objects for Log Table ZSDRLFA1 (OPTIONS[] = TNAME = 'ZSDRLFA1').

Test Function Module: Initial Screen				
Provide the second s				
Test for function group /BS4/SDRM_RFC_API Function module /BS4/SDRM_READ_TABLE Uppercase/Lowercase				
RFC target sys:				
Import parameters	Value			
QUERY_TABLE DELIMITER NO_DATA ROWSKIPS ROWCOUNT	/BS4/TGT_OBJECTS 0 0			
Tables	Value			
OPTIONS	iii 1 Entry			

Figure 18 - Read API - Target Objects

Structure Editor: Change OPTIONS from Entry					1					
3 🗛	M	∢	►	M	🔁 Column	된 Entry	₽₽	New Line	Double Line	Met
	1	Ent	try							
TEXT										
	= 'Z	SDRI	.FA1							

Figure 19 - Read API - Target Objects – Options

Once the API is executed, tables FIELDS and DATA are populated.

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Test Function Module: Result Screen				
<u>e</u>				
Test for function group /BS4/SDRM_RFC_API Function module /BS4/SDRM_READ_TABLE Uppercase/Lowercase				
Runtime: 46,047 Microsecon	ds			
RFC target sys:				
Import parameters	Value			
QUERY_TABLE DELIMITER NO_DATA DONUSY TES	/BS4/TGT_OBJECTS			
ROWCOUNT	0			
Export parameters	Value			
TABLE_ROWS	0			
Tables	Value			
OPTIONS Result:	1 Entry 1 Entry			
FIELDS Result:	0 Entries 4 Entries			
Result:	1 Entry			

Figure 1 - Read API - Target Objects - Output

Structure Editor: Display DATA from Entry	1	
🚠 🛚 🖌 🕨 💭 Column 🐺 Entry Metadata		
1 Entry		
FELD		
SAPHANADB	ZSDRLFA1	0 /BS4/MASTER_LOG



Reading Generated Transportable Objects

In order to read the Generated Transportable Objects Table, input field **QUERY_TABLE** must be populated with value '/BS4/GEN_TR_OBJS'. The other input fields are optional.

Test Function Module: Initial Screen					
🚱 🚱 Debugging 🛛 🧐 Test data directory					
Test for function group /BS4/SDRM_RFC_API Function module /BS4/SDRM_READ_TABLE Uppercase/Lowercase					
RFC target sys:					
Import parameters	Value				
QUERY_TABLE DELIMITER NO_DATA ROWSKIPS ROWCOUNT	/BS4/GEN_TR_OBJS 0 0				
Tables Value					
OPTIONS FIELDS DATA	<pre>0 Entries 0 Entries 0 Entries 0 Entries</pre>				

Figure 22 - Read API - Generated Transportable Objects

Once the API is executed, tables FIELDS and DATA are populated.

Test Function Module:	Result Screen
g	
Test for function group Function module Uppercase/Lowercase	/BS4/SDRM_RFC_API /BS4/SDRM_READ_TABLE
Runtime: 7,362 Microse	conds
RFC target sys:	
Import parameters	Value
QUERY_TABLE DELIMITER	/BS4/GEN_TR_OBJS
ROWSKIPS ROWCOUNT	0 0
Export parameters	Value
TABLE_ROWS	0
Tables	Value
OPTIONS	0 Entries
FIELDS	0 Entries
DATA Besult:	0 Entries

Figure 23 - Read API - Generated Transportable Objects – Output

Structure Editor: Display DATA from Entry 1				
晶 l4 4 🕨 🕅 💭 Column	🚰 Entry	Metadata		
7 Entries				
FELD				
BUT000				ZSDRBUT000
KNA1				ZSDRKNA1
LFA1				ZSDRLFA1
T001				ZSDRT001
T001B				ZSDRT001B
T001C				ZSDRT001C
T001W				ZSDRT001W

Figure 24 - Read API - Generated Transportable Objects - Data Table

Reading Generated Database Objects Table

In order to read the Generated Database Objects Table, input field **QUERY_TABLE** must be populated with value '/BS4/GEN_TR_OBJS'. The other input fields are optional.

Test Function Module: Initial Screen					
Debugging State data directory					
Test for function group /BS4/SDRM_RFC_API Function module /BS4/SDRM_READ_TABLE Uppercase/Lowercase					
RFC target sys:					
Import parameters	Value				
QUERY_TABLE DELIMITER NO_DATA	/BS4/GEN_DB_OBJS				
ROWCOUNT	0				
Tables	Value				
OPTIONS FIELDS DATA	<pre>0 Entries 0 Entries 0 Entries 0 Entries</pre>				

Figure 25 - Read API - Generated Database Objects

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Once the API is executed, tables FIELDS and DATA are populated.

Test Function Module: Result Screen			
9			
Test for function group /BS4 Function module /BS4 Uppercase/Lowercase	/SDRM_RFC_API /SDRM_READ_TABLE		
Runtime: 8,068 Microsecond	s		
RFC target sys:			
Import parameters	Value		
QUERY_TABLE DELIMITER NO_DATA ROWSKIPS ROWCOUNT	/BS4/GEN_DB_OBJS 0 0		
Export parameters	Value		
TABLE_ROWS	0		
Tables	Value		
OPTIONS Result: FIELDS	0 Entries 0 Entries 0 Entries		
Result: DATA Result:	<pre>5 Entries 0 Entries 6 Entries</pre>		

Figure 26 - Read API - Generated Database Objects - Output

Structure Editor: Display DATA from Entry	1		
📇 🖌 🔸 🕨 💭 Column 💭 Entry Metadata			
6 Entries			
FELD			
/BS4/MASTER LOG	/BS4/MASTER LOG SEO		
BUT000	ZSDRBUT000_SEQ	ZSDRBUT000_INS	ZSDRBUT000_UPD
LFA1	ZSDRLFA1_SEQ	ZSDRLFA1_INS	ZSDRLFA1_UPD
T001B	ZSDRT001B_SEQ	ZSDRT001B_INS	ZSDRT001B_UPD
T001C	ZSDRT001C_SEQ	ZSDRT001C_INS	ZSDRT001C_UPD
T001W	ZSDRT001W_SEQ	ZSDRT001W_INS	ZSDRT001W_UPD

Figure 27 - Read API - Generated Database Objects - Data Table

Reading Error Table

In order to read the Error Log Table, input field **QUERY_TABLE** must be populated with value '/BS4/ERROR_LOG'. The other input fields are optional.

Test Function Module: Initial Screen					
🚱 🚱 Debugging 🛛 🧟 Test data directory					
Test for function group /BS4, Function module /BS4, Uppercase/Lowercase	/SDRM_RFC_API /SDRM_READ_TABLE				
RFC target sys:					
Import parameters	Import parameters Value				
QUERY_TABLE DELIMITER NO_DATA ROWSKIPS ROWCOUNT	/BS4/ERROR_LOG 0 0				
Tables					
OPTIONS FIELDS DATA	0 Entries 0 Entries 0 Entries				

Figure 28 - Read API - Error Log

Once the API is executed, tables FIELDS and DATA are populated.

Test Function	Test Function Module: Result Screen				
<u>e</u>					
Test for function group /BS4/SDRM_RFC_API Function module /BS4/SDRM_READ_TABLE Uppercase/Lowercase					
Runtime: 5,0	060 Microsecond	s			
RFC target sys:					
Import parameters	5	Value			
QUERY_TABLE DELIMITER NO_DATA ROWSKIPS		/BS4/ERROR_LOG			
ROWCOUNT	ROWCOUNT 0				
Export parameters	5	Value			
TABLE_ROWS		0			
Tables		Value			
OPTIONS	Result:	0 Entries 0 Entries 0 Entries			
DATA	Result: Result:	4 Entries 0 Entries 0 Entries			

Figure 29 - Read API - Error Log - Output

Update Master Log Table API

The Update Master Table API (/BS4/SDRM_UPDATE_MASTER_TABLE) can be used to update the FLAG field of the Master Log Table /BS4/MASTER_LOG, provided that the user executing it has the required authorizations.

The input parameters for the Update Master Log Table API are the following:

- **OLD_FLAG**: Current value of field FLAG Used to select entries in /BS4/MASTER_LOG;
- **NEW_FLAG**: Value to be used to update field FLAG;
- **SCHEMA_NAME**: Selection parameter for querying /BS4/MASTER_LOG;
- **TABLE_NAME**: Selection parameter for querying /BS4/MASTER_LOG;
- **TOP**: Maximum number of rows to be updated;
- **TID**: Selection parameter for querying /BS4/MASTER_LOG multiple values can be defined;
 - SIGN:
 - I Include;
 - E Exclude;
 - **OPTION**:
 - EQ Equal;
 - NE Not Equal;
 - GT Greater Than;
 - LT Lower Than;
 - GE Greater or Equal;
 - LE Lower or Equal;
 - BT Between;
 - CP Contains Pattern;
 - LOW: Value for single value options and from value for double value options;
 - **HIGH**: To value for double value options.

The output parameters for Update Master Log API are the following:

• **MESSAGES**: Table of messages raised during the execution of the API.

Updating Master Log Table

In order to update the Master Log Table, input fields **OLD_FLAG** and **NEW_FLAG** must be populated. The other input fields are optional. It is recommended to populate either **SCHEMA_NAME** and **TABLE_NAME** or **TID** table

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to limit the records being updated. The following example updates **FLAG** field from **/BS4/MASTER_LOG** from 0 to 1 for TIDs 1 to 10.

Test Function Module: Ini	Test Function Module: Initial Screen		
🚱 🚱 Debugging 🛛 🧟 Test data dire	ectory		
Test for function group /BS4 Function module /BS4 Uppercase/Lowercase RFC target sys:	/SDRM_RFC_API /SDRM_UPDATE_MASTER_TABLE		
Import parameters	Value		
OLD_FLAG NEW_FLAG SCHEMA_NAME TABLE_NAME TOP TID	0 1 0 1 Entry		

Figure 30 - Update Master Log Table API

Stru	ctu	re	Edi	itor	r: Cha	ange	TID fro	om Ent	ry	1
Ð 晶	М	∢	►	M	🚑 Co	lumn	⊱ Entry	66	New Line	Do
	1	En:	try							
S OP L	.OW					HIGH				
Е ВТ					1			10		

Figure 31 - Update Master Log Table API - TID Table

Once the API is executed, table MESSAGES is populated.

Test Function Module: Res	sult Screen
9	
Test for function group /BS4, Function module /BS4, Uppercase/Lowercase	/SDRM_RFC_API /SDRM_UPDATE_MASTER_TABLE
Runtime: 237,658 Microsecon	nds
RFC target sys: L	<u> </u>
Import parameters	Value
OLD_FLAG NEW_FLAG SCHEMA_NAME TABLE_NAME TOP TID	0 1 1 1 Entry
Export parameters	Value
MESSAGES	iii 1 Entry

Figure 32 - Update Master Log Table API - Output

Structure Editor:	Display MESSAGES from Entry 1			
🚠 📢 🔸 🕨 👫 Col	umn 🖾 Entry Metadata			
1 Entry	1 Entry			
T ID	NUM MESSAGE			
S /BS4/SDRM_API	001 Master Log Table Update Successful. 10 rows affected.			

Figure 33 - Update Master Log Table API - Messages

Update Log Tables API

The Update Log Table API (/BS4/SDRM_UPDATE_LOG_TABLE) can be used to update the FLAG field of the Log Tables, provided that the user executing it has the required authorizations.

The input parameters for the Update Log Table API are the following:

- LOG_TABLE_NAME: Name of the Log Table to be updated;
- **OLD_FLAG**: Current value of field FLAG Used to select entries from LOG_TABLE_NAME;
- **NEW_FLAG**: Value to be used to update field FLAG;
- **TOP**: Maximum number of rows to be updated;
- **TID**: Selection parameter for querying LOG_TABLE_NAME multiple values can be defined;

- SIGN:
 - I Include;
 - E Exclude;
- \circ **OPTION**:
 - EQ Equal;
 - NE Not Equal;
 - GT Greater Than;
 - LT Lower Than;
 - GE Greater or Equal;
 - LE Lower or Equal;
 - BT Between;
 - CP Contains Pattern;
- LOW: Value for single value options and from value for double value options;
- **HIGH**: To value for double value options.

The output parameters for Update Log API are the following:

• **MESSAGES**: Table of messages raised during the execution of the API.

Updating Log Table

In order to update the Log Table, input fields LOG_TABLE_NAME, OLD_FLAG and NEW_FLAG must be populated. The following example updates FLAG field from ZSDRBUT000 from 0 to 1 for TIDs 1 to 10.

Test Function Module: Ini	Test Function Module: Initial Screen			
🚱 🚱 Debugging 🛛 🧟 Test data dire	ectory			
Test for function group /BS4 Function module /BS4 Uppercase/Lowercase RFC target sys:	/SDRM_RFC_API /SDRM_UPDATE_LOG_TABLE			
Import parameters	Value]			
LOG_TABLE_NAME OLD_FLAG NEW_FLAG TOP TID	ZSDRBUT000 0 1 0 1 Entry			

Figure 34 - Update Log Table API

2	Str	uctu	Ire	Edi	itor	r: Cha	ange	TID fro	om Ent	r y	1
-5	2	<mark>‰</mark> .⊮	◀	►	H	🚑 Co	lumn	🚰 Entry	B B	New Line	D
			1 En	itry							
s	OP	LOW					HIGH				
Ξ	вт					1			10		

Figure 35 - Update Log Table API - TID Table

Once the API is executed, table MESSAGES is populated.

Test Function Module: Re	sult Screen	
e		
iest for function group /BS4/SDRM_RFC_API unction module /BS4/SDRM_UPDATE_LOG_TABLE Jppercase/Lowercase		
Runtime: 121,470 Microseco	nds	
RFC target sys:	•	
Import parameters	Value	
LOG_TABLE_NAME OLD_FLAG NEW_FLAG TOP TID	ZSDRBUT000 0 1 0 11 Entry	
	Nr. 7	
Export parameters	Altre	
MESSAGES	1 Entry	

Figure 36 - Update Log Table API - Output

Structure Editor:	Structure Editor: Display MESSAGES from Entry 1			
📇 🖪 🖌 🕨 🔛 🖾 Col	umn 💭 Entry Metadata			
1 Entry				
T ID	NUM MESSAGE			
S /BS4/SDRM_API	003 Log Table ZSDRBUT000 Update Successful. 18 rows affected.			

Figure 37 - Update Log Table API - Messages

Delete Master Log Table API

The Delete Master Table API (/BS4/SDRM_DELETE_MASTER_TABLE) can be used to delete entries of the Master Log Table /BS4/MASTER_LOG, provided that the user executing it has the required authorizations.

The input parameters for the Delete Master Log Table API are the following:

- **SCHEMA_NAME**: Selection parameter for querying /BS4/MASTER_LOG;
- **TABLE_NAME**: Selection parameter for querying /BS4/MASTER_LOG;
- **TOP**: Maximum number of rows to be updated;
- **TID**: Selection parameter for querying /BS4/MASTER_LOG multiple values can be defined;
 - SIGN:
 - I Include;
 - E Exclude;
 - **OPTION**:
 - EQ Equal;
 - NE Not Equal;
 - GT Greater Than;
 - LT Lower Than;
 - GE Greater or Equal;
 - LE Lower or Equal;
 - BT Between;
 - CP Contains Pattern;
 - **LOW**: Value for single value options and from value for double value options;
 - **HIGH**: To value for double value options.

The output parameters for Update Master Log API are the following:

• MESSAGES: Table of messages raised during the execution of the API.

Deleting Master Log Table

In order to delete the Master Log Table the input fields are optional. It is recommended to populate either **SCHEMA_NAME** and **TABLE_NAME** or **TID** table to limit the records being updated. The following example deletes records **/BS4/MASTER_LOG** for TIDs 1 to 10.

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Test Function Module: Initial Screen		
🚱 🚱 Debugging 🛛 🥞 Test data dire	ectory	
Test for function group /BS4, Function module /BS4, Uppercase/Lowercase RFC target sys:	/SDRM_RFC_API /SDRM_DELETE_MASTER_TABLE	
Import parameters	Value	
SCHEMA_NAME TABLE_NAME TOP TID	0 I Entry	

Figure 38 - Delete Master Log Table API



Figure 39 - Delete Master Log Table API - TID Table

Once the API is executed, table MESSAGES is populated.

Test Function Module: Res	sult Screen
9	
Test for function group /BS4, Function module /BS4, Uppercase/Lowercase	/SDRM_RFC_API /SDRM_DELETE_MASTER_TABLE
Runtime: 57,934 Microsecond	ds
RFC target sys:	
Import parameters	Value
SCHEMA_NAME TABLE_NAME TOP TID	0 III 1 Entry
Export parameters	Value
MESSAGES	iii 1 Entry

Figure 40 - Delete Master Log Table API - Output

	Structure Editor: Display MESSAGES from Entry 1			
é	晶 🖊 🔺 🕨 🕅 💭 Colu	imn 🔛	Entry Metadata	
	1 Entry			
Т	ID I	NUM MESS	AGE	
S	/BS4/SDRM_API	011 Mast	er Log Table Delete Successful. 10 rows affected.	

Figure 41 - Update Master Log Table API - Messages

Delete Log Tables API

The Delete Log Table API (/BS4/SDRM_DELETE_LOG_TABLE) can be used to delete entries from Log Tables, provided that the user executing it has the required authorizations.

The input parameters for the Delete Log Table API are the following:

- **LOG_TABLE_NAME**: Name of the Log Table to be updated;
- **TOP**: Maximum number of rows to be updated;
- **TID**: Selection parameter for querying LOG_TABLE_NAME multiple values can be defined;
 - SIGN:
 - I Include;
 - E Exclude;
 - **OPTION**:
 - EQ Equal;
 - NE Not Equal;
 - GT Greater Than;
 - LT Lower Than;
 - GE Greater or Equal;
 - LE Lower or Equal;
 - BT Between;
 - CP Contains Pattern;
 - LOW: Value for single value options and from value for double value options;
 - **HIGH**: To value for double value options.

The output parameters for Update Log API are the following:

• **MESSAGES**: Table of messages raised during the execution of the API.

Deleting Log Table

In order to delete the Log Table entries, input field **LOG_TABLE_NAME** must be populated. The following example deletes entries from **ZSDRBUT000** for TIDs 1 to 10.

Test Function Module: Initial Screen			
🚱 🚱 Debugging 🛛 🧟 Test data dire	ectory		
Test for function group /BS4 Function module /BS4 Uppercase/Lowercase RFC target sys:	/SDRM_RFC_API /SDRM_DELETE_LOG_TABLE		
Import parameters	Value		
LOG_TABLE_NAME TOP TID	ZSDRBUT000 0 III 1 Entry		

Figure 42 - Delete Log Table API

Structure Editor	r: Cha	nge TIL	O from En	try 1
🔁 晶 K 🔹 🕨 N	🚑 Colu	umn 🛛 👫 E	Entry 🛃 🗄	o New Line D
1 Entry				
S OP LOW	ł	HIGH		
I BT	1		10	J

Figure 43 - Delete Log Table API - TID Table

Once the API is executed, table MESSAGES is populated.

Test Function Module: Result Screen			
Q			
Test for function group /BS4/SDRM_RFC_API Function module /BS4/SDRM_DELETE_LOG_TABLE Uppercase/Lowercase			
Runtime: 113,586 Microseconds			
RFC target sys:			
Import parameters	Value		
LOG_TABLE_NAME TOP TID	ZSDRBUT000 0 1 Entry		
Export parameters	Value		
MESSAGES	iii 1 Entry		

Figure 44 - Delete Log Table API - Output

Structure Editor: Display MESSAGES from Entry 1				
晶 🖬 ◀ 🕨 א 💭 Co	lumn 💭 Entry Metadata			
1 Entry				
T ID	NUM MESSAGE			
S /BS4/SDRM_API	013 Log Table ZSDRBUT000 Delete Successful. 18 rows affected.			

Figure 45 - Delete Log Table API - Messages

Steps for Replicating Tables

Extracting data from SAP ECC and S/4 HANA Systems using Syniti Replicate requires software to be installed on the application server running Syniti Replicate.

Syniti Replication Windows Application Server

To use the Syniti Replicate SAP NetWeaver Extract database type, the SAP NetWeaver RFC SDK must be installed on the application server running Syniti Replicate. The following libraries from the RFC SDK must be available at run time:

- sapnwrfc.dll
- icudt30.dll
- icuin30.dll
- icuuc30.dll
- libicudecnumber.dll
- libsapucum.dll

NOTE: Details explaining how to download the SAP NetWeaver RFC SDK can be found at the following location: <u>https://support.sap.com/en/product/connectors/nwrfcsdk.html</u>

NOTE: The Syniti Replicate Application Server MUST have .Net Framework 3.5 and Windows Visual Studio 2013 C++ installed.

NOTE: After installing the SAP NetWeaver RFC SDK, the installation location must be added to the PATH System Environment Variables.

NOTE: It is important that the above installations are all aligned to the correct 64-bit processing capability as Syniti Replicate is a 64-bit application and will rely on the .Net Framework, Windows Visual Studio 2013 C++ and SAP NetWeaver RFC SDK being aligned to 64-bit. If not, then errors will occur when testing the connectivity either directly via 64-bit ODBC connections or via Syniti Replicate.

Example:

Variable	Value	^
NUMBER_OF_PROCESSORS	2	11
OS	Windows_NT	
Path	C:\Ruby22-x64\bin;C:\Program Files (x86)\Common Files\Oracle\Ja	
PATHEXT PROCESSOR_ARCHITECTURE PROCESSOR_IDENTIFIER	.COM; EXE; BAT; .CMD; .VBS; .VBE; JS; JSE; .WSF; .WSH; .MSC; .RB; .RBW AMD64 Intel64 Family 6 Model 85 Stepping 7, GenuineIntel	
PROCESSOR LEVEL	6	Y

:\Oracle Files\instantclient_12_2	New
:\app\client\Administrator\product\12.1.0\client_1\bin	
:\Program Files (x86)\Common Files\Oracle\Java\javapath	Edit
(\ProgramData\Oracle\Java\javapath	
6SystemRoot%\system32	Browse
6SystemRoot%	
6SystemRoot%\System32\Wbem	Delete
6SYSTEMROOT%\System32\WindowsPowerShell\v1.0\	- Distriction
6SYSTEMROOT%\System32\OpenSSH\	
\Program Files\Amazon\cfn-bootstrap\	Mour Ho
\Program Files\Git\cmd	Move up
:\Program Files\Microsoft SQL Server\Client SDK\OD8C\170\To	A COLOR DALLA
\Program Files (x86)\Microsoft SQL Server\150\Tools\Binn\	Move Down
:\Program Files\Microsoft SQL Server\150\Tools\Binn\	
:\Program Files\Microsoft SQL Server\150\DTS\Binn\	24203000
\Program Files (x86)\Microsoft SQL Server\150\DTS\Binn\	Edit text
\Program Files\Amazon\AWSCLIVZ\	
\SAPNetweaverSDK\mwrfcsdk\lib\	

Download zip file SAP RFC Extraction for Syniti Replicate Application Server

Download and unzip file Syniti Replicate.zip onto the Windows Server where Syniti Replicate is installed. Before unzipping the file, check the properties of the zip file to ensure it's not blocked. If it is, check the Unblock flag and click apply.

Connte D	SAP RFC Extraction for Synit	i Data Replication.zi		
Type of file:	Compressed (zipped) Folder (.	zip)		
Opens with:	Hindows Explorer Change			
Location:	C:\			
Size:	10.4 MB (10,912,275 bytes)			
Size on disk:	10.4 MB (10,915,840 bytes)			
Created:	Tuesday, June 21, 2022, 12:17:25 PM			
Modified:	Tuesday, June 21, 2022, 12:14:14 PM			
Accessed:	Tuesday, June 21, 2022, 12:17:25 PM			
Attributes Read-only Hidden Advan		Advanced		
Security: This file came from another computer and might be blocked to help protect Unb this computer.		mputer Unblock		

Install cData Driver for SAP ERP

To install the cData Driver for SAP ERP:

1. Copy the folder cData from file 'SAP RFC Extraction for Syniti Replicate.zip.

2. Paste the folder into location where Syniti Replicate was installed. By default, Syniti Replicate is installed in the following location:

C:/Program Files/Syniti/Syniti Replicate

Register cData Driver for SAP ERP

To register the cData Driver for SAP ERP:

The Syniti_Register_cData_Driver_for_SAP_ERP.reg file expects that the driver files have be copied to the default Syniti Replicate installation location. If Syniti Replicate has been installed in a different location, then the highlighted file paths below will need to be modified.

Syniti_Register_cData_Driver_for_SAP_ERP.reg 1 Windows Registry Editor Version 5.00 2 [HKEY_LOCAL_MACHINE\SOFTWARE\ODBC\ODBCINST.INI\Syniti-CData Driver for SAP ERP] 3 4 "Driver"="<mark>C:\\Program Files\\Syniti\\Syniti Replicate\\</mark>CData\\CData ODBC Driver for SAP ERP\\lib64\\CData.ODBC.SAPERP.dll" 5 "Setup"="<mark>C:\\Program Files\\Syniti\\Syniti Replicate\\</mark>CData\\CData ODBC Driver for SAP ERP\\lib64\\CData.ODBC.SAPERP.dll" "OEM"="TRUE" 6 7 "DisplayProperties"="ALL" 8 "Help"="<mark>C:\\Program Files\\Syniti\\Syniti Replicate\\</mark>CData\\CData ODBC Driver for SAP ERP\\help\\help.\tm" 9 [HKEY_LOCAL_MACHINE\SOFTWARE\ODBC\ODBCINST.INI\ODBC Drivers] 10 11 "Syniti-CData Driver for SAP ERP"="Installed"

When prompted, confirm that you want to update the registry.



Set Up a Source Connection to SAP

To set up the connection:

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

LP
🗜 🗙 📑 Start Page 🗙 🐃 Object Browser
Syniti Replicate
- Oynici Kepticate
nnection
tion Ctrl+V OME

- 4. In the Source Connection Wizard, follow steps to add a connection string and test the connection to the database.
- 5. Enter a Name for the Source Connection.

💰 Add Source Connecti	on Wizard		×
		Syniti	Replicate
Select provider Set connection string	Select the datab	ase that contains source data to be replicated and indicate v	vhich provider to use.
Select tables Actions	Name:	SAP Demo Source	
Summary	Data Provider(s)	SAP NetWeaver Extract	~
	Provider:	CDATA SAP RFC ODBC Driver 64 bit	~
Constant of the		< Back Next >	Cancel Help
and the second s		< Back Next >	Cancel Help

- 6. Select SAP NetWeaver Extract from the Database list box.
- 7. Select cData SAP RFC ODBC Driver 64-bit from the Provider list box.

💰 Add Source Connectio	n Wizard X
	Syniti Replicate
Select provider Set connection string	Specify the connection parameters for the source connection.
Select tables Actions Summary	Required Driver Syniti-CData Driver for SAP ERP Connection String Driver=(Syniti-CData Driver for SAP ERP) Connection String ODBC connection properties string. Edit Test
	< Back Next > Cancel Help

8. Click the connection properties and configure the connection. The cData ODBC Driver for SAP ERP DSN configurator opens.

Data Source Name:		Test Connection	Reset 0	Personal Section
				, on nector
Connection Properties				
🗉 Show Required 📑 Show All 📰 💱 🗐				
Authentication				
Connection Type	NetWeaver			
Host	10.21.12.205			
System Number	10			
User	dsp_rfc			
Password				
Client	400			
X509Certificate				
Message Server				
Group	5			
System Id				
05710				
Conservation Trans				

The table below defines the available cData ODBC SAP ERP driver connection properties along with recommended values to be used for particular properties.

YELLOW = Syniti recommended changes to default values

GREEN = SAP connection information that may or may not need to be populated based upon requirements.

Group	Property	Recommended Value
Authentication	ConnectionType	Netweaver
Authentication	Host	{Enter SAP Host or Message Server}
Authentication	SvstemNumber	{Enter SAP System Number}
Authentication	User	{Enter SAP RFC Username}
Authentication	Password	{Enter SAP RFC User Password}
Authentication	Client	{Enter SAP Client}
Authentication	X509Certificate	
Authentication	MessageServer	{Enter SAP Host or Message Server}
Authentication	Group	{Enter Group if using Message Server}
Authentication	SvstemId	{Enter SAP System ID}
Authentication	RFCURL	
Authentication	MessageServerService	
Caching	AutoCache	FALSE
Caching	CacheProvider	
Caching	CacheConnection	
Caching	CacheLocation	%APPDATA%\CData\SAPERP Data Provider

Group	Property	Recommended Value
Caching	CacheTolerance	600
Caching	Offline	FALSE
Caching	CacheMetadata	FALSE
Firewall	FirewallType	NONE
Firewall	FirewallServer	
Firewall	FirewallPort	0
Firewall	FirewallUser	
Firewall	FirewallPassword	
Logging	Logfile	
Logging	Verbosity	1
Logging	LogModules	
Logging	MaxLogFileSize	100MB
Logging	MaxLogFileCount	-1
Misc	Charset	
Misc	Destination	
Misc	EndianType	Auto
Misc	GatewayHost	{Populate if SAP Gateway is used}
Misc	GatewayService	{Populate if SAP Gateway is used}
Misc	GenerateSchemaFiles	Never
Misc	InitialValueMode	InitialValue
Misc	Language	EN
Misc	Location	
Misc	MaxRows	-1
Misc	Other	
Misc	Pagesize	25000
Misc	PseudoColumns	*=*
Misc	QueryMode	Global
Misc	ReadTableFunction	/BOA/SDR_READ_TABLE (SAP ECC Systems) /BS4/SDR_READ_TABLE (SAP S/4 HANA Systems)

Group	Property	Recommended Value
Misc	RTK	
Misc	StoredProcedureFilter	BAPI*
Misc	SupportEnhancedSQL	TRUE
Misc	TableMode	(NOT TABNAME LIKE '%/%' AND (TABCLASS = 'TRANSP' OR TABCLASS = 'POOL' OR TABCLASS = 'CLUSTER') AND CONTFLAG <> 'L')
Misc	Timeout	60
Misc	UseLabels	FALSE
Misc	UseUnicodeRFC	TRUE
Misc	UseSimpleNames	FALSE
Misc	DefaultDomain	
Misc	EnableForeignKeyDetection	FALSE
Misc	IncludeDualTable	FALSE
Misc	LimitKeySize	255
Misc	MapBigintToVarchar	FALSE
Misc	MapToInt	FALSE
Misc	MapToLongVarchar	-1
Misc	MapToWVarchar	TRUE
Misc	MaximumColumnSize	16000
Misc	UpperCaseIdentifiers	FALSE
Proxy	ProxyAutoDetect	
Proxy	ProxyServer	
Proxy	ProxyPort	80
Proxy	ProxyAuthScheme	BASIC
Proxy	ProxyUser	
Proxy	ProxyPassword	
Proxy	ProxySSLType	Auto
Proxy	ProxyExceptions	
Schema	BrowsableSchemas	

Group	Property	Recommended Value
Schema	Tables	
Schema	Views	
Security	SNCMode	{Set to TRUE if SNC Used}
Security	SNCName	{Populate if SNC is used}
Security	SNCQop	{Populate if SNC is used}
Security	SNCPartnerName	{Populate if SNC is used}
Security	SNCLibPath	{Populate if SNC is used}
SSL	SSLServerCert	

9. If using Mirroring mode to replicate data from SAP, 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 Actions Summary	At the end of the wizard: Launch the Enable Transactional Replication Wizard 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.
and the second second	< 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:

- 1. Select the Triggers option.
- 2. Complete the Triggers Based Log Setting

			Syni	ti Repli	cate
og Type	Provide values specific to tr	ransactional replications usi	ng the database ar	nd/or database log re	ader.
rigger Settings	Trigger Based Log Settings -	Triggers			
ummary	User:	VFARRUGGIO	Password:	******	
	Master Table:	"/BS4/MASTER_LOG"		(
	Tablespace:		Prefix	K: SDR	
	Retention Time (hours):	72	Trigg	er Order: 0	
	Delete Block Size:	10000 Lowe	-case Trigger Iden	tifiers	
	Uncommitted Transact	ions Recovery Option			
	O None				
	() Wait 0	Mirroring Intervals for	Uncommitted Tran	hsactions	
	Continue And Pr	ocess when Committed			
Same and State	Skip Uncommitted T	ransactions Older Than	Minute	is	
and the second second					
AND ALL AND A					
		< Back	Next >	Cancel	Help

Trigger Settings Screen

User and Password

Add credentials for the user in SAP

Master Table

Either specify an existing qualified table name, or click **Change** to create a new table to hold general information about replication transactions including user name, timestamp, table name for each transaction.

There are two tables associated with each replication: a Master table, common to all replications using that connection, and a Log table for each replication source table. The Master table keeps track of all the transactions affecting the source tables and it records general transactional information.

Master and Log tables are created in the schema specified when you set the Master table name. You can choose a Master table name, or use the default _DBM__MASTERLOG. Log tables are automatically generated by Syniti Replicate and the names are _DBM__LOG_#, where # is a number. The selected schema for the Master and Log tables must not contain other non-Syniti Replicate tables with names _DBM__LOG_#. You should create a new schema to use specifically for the Syniti Replicate Master and Log tables.

Tablespace

SAP HANA does not use tablespaces.

Retention Time

The amount of time in hours that a transaction is kept in the log tables. The default value is 72 hours. When the amount of time a transaction resides in the log exceeds the retention time, the transaction is permanently removed from the log tables. Tuning the retention time provides control over the size of the log tables. It is also possible to instruct Syniti Replicate to remove all the processed transactions at the end of each mirroring interval. Tuning the retention time provides control over the size of the log tables.

Delete Block Size

Based on the retention time, Syniti Replicate deletes items from the log. This field specifies the maximum number of records to delete from the Syniti log tables with a single SQL statement. The default value is 10,000 records. You do not typically need to edit this value.

Lower-case Trigger Identifiers

Check this option if your database installation uses lower-case trigger identifiers.

Trigger Order

Always inactive for SAP HANA sources.

Uncommitted Transactions Recovery Option

This section can be used to indicate how uncommitted transactions should be handled during replication.

None	No gap conditions handled. Uncommitted transactions may cause data to be skipped in replication.
Wait	Set a number of mirroring intervals to hold all replications on the connection to wait when a gap is found due to an uncommitted transaction. All replications in the connection will hold and wait for the number of cycles specified to see if the gap is filled. If after the number of cycles, a transaction is still not committed, it will be skipped.
Continue and Process when Committed	Instead of pausing all replications in case of a gap, replication proceeds with all currently committed transactions. During the next mirroring cycle, the trigger log table is checked for earlier transactions that now have been committed, and any identified transactions are processed.
Skip Uncommitted Transactions Older Than	If wait or continue are selected, this property sets a limit on the amount of time to wait for uncommitted transactions. For instance, a value of 15 minutes means that, no matter which option you choose, transactions opened and not committed for more than 15 minutes will be skipped.

Select source Tables

Right-click the Source Connection that represents the SAP System where data is being extracted and choose Select Tables.



1. In the Select Tables dialog box, expand the Source navigation tree (S4I_Demo_Source) and then click the schema called SAPERP.

Tip: Avoid expanding the navigation tree below the SAPERP schema. If you expand it, the system attempts to load all the tables defined by the 'TableMode' connection property and could take a few minutes to complete.

Select Tables	-	
Expand the treeview and select t source connection.	he objects you want to replical	le under the
Filter:	Ŧ	×(x-)
S41_Demo_Source		ŀ
		₽
] Hide System Tables		

Select the specific table that needs to be extracted by entering the name in the Filter field and then clicking the Apply Filter icon.

Tip: Append % to the first characters of a table to retrieve a list of tables that begin with specific characters.



Select the table(s) that need to be imported into the Source Connection table metadata store and click OK.

ection.		
5	T X	±-
MARA_STRL MARA_STRL_DQ_RES MARA_STRL_PRC MARA_STRL_PRC MARC_ARS_ENT MARC_DQ_RES MARC_MPST MARC_MPST MARC_MPST MARC_MPST MARC_MPST MARC_MPST	*	0 0
	econ.	ANDRAL STRAL MARAL STRAL MARAL STRAL OD JRES MARAL STRAL OD JRES MARAL STRAL SRC MARAL STRAL SRC MARAL STRAL SRC MARAL OD JRES MARAL OD JRES MARAL CHART MARAL CHART MARAL CHART CAC

NOTE: This action may take 10 – 15 seconds to complete.

Set up a Target Connection

- 1. Select the **Targets** node.
- 2. From the right mouse button menu, choose Add New Connection.



 In the Add Target Connection Wizard Database field. The Provider and Assembly fields are automatically filled out for you.

💰 Add Target Connectio	n Wizard	×
		Syniti Replicate
Select provider	Select the data	base target where to replicate data and indicate which provider to use.
Set connection string	Target name	
Set staging connection string	Name:	AWS DocumentDB
Select tables Actions	Data Provider(s)
Summary	Database:	DocumentDB V
	Provider:	MongoDB Data Provider 🗸 🗸
	Assembly:	Plugins/MongoDB/DataAccess.Plugins.MongoDB.dll
		La Browse
Constant and the second se		
		< Back Next > Cancel Help

In the **Set Connection String** page, set properties as described in the table below. The table displays only properties specific for use with Syniti Replicate.

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

Create Target Tables

1. Drag the source table to the target to open the Create Target Wizard.

🗴 Create Target Table W	izard		×
		Syniti Replicate	9
Source connection	Select the target connect	ection and define the target table name.	
Target connection			
Define columns SQL script Actions	Connection Name: Database Name:	SAP ECC Target	
Summary	Owner Name:		
and the second second	Table Name:	KNA1	
		< Back Next > Cancel Help	

- 2. Click Next twice to reach the Target Connection Details form, and populate the Database Name, Owner Name and Table Name and click Next.
- 3. In the Table Structure form, scroll to the bottom to assign the **datetime2** Type to the **ReplicateDateTime** field and click Next:

💰 Create Target Table W	izard									×
							Syniti	i Rep	lica	ite
Source connection	The t conte	able structure h ext menu on the	as been auto grid if you w	omat ant	ically gene to change	rated in th the table s	e source table. U structure.	se the buttons	or the	
Target connection	Table	Structure								
Define columns	=+	=+ =* 🔧	•			Cre	eate Table Rule	Automatic	~	/
SOL script		Field name	Туре		Size	Precisi	Scale Null	Defaul	Identity	^
our script	- 2	MANDT	nvarchar	\sim	3	0	0			[]
Actions	- 3	KUNNR	nvarchar	\sim	10	0	0			
Summary		LAND1	nvarchar	\sim	3	0	0 🔽			
		NAME1	nvarchar	\sim	35	0	0 🔽			
		NAME2	nvarchar	\sim	35	0	0 🗸			
		ORT01	nvarchar	\sim	35	0	0 🔽			
		PSTLZ	nvarchar	\sim	10	0	0			
		REGIO	nvarchar	\sim	3	0	0 🗸			
		SORTL	nvarchar	\sim	10	0	0			
		STRAS	nvarchar	\sim	35	0	0			
State and State		TELF1	nvarchar	\sim	16	0	0 🗹			. ~
A CARLES AND A CARLES	<								>	
Service and a service of the service										
					< E	lack	Next >	Cancel		Help

4. Click Next twice and then click **Finish**.

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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 Replication....
- 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.

		S	Syniti Rep	olicate
Replication type Source connection	Mirroring mode will defi server.	ne a one-way transactional replicatio	n, from the source server t	o the target
Source log info Target connection	Replication Name Description:	CEPC		
Mapping info Scheduling Actions	Replication Type	C <underined></underined>		Create
Summary	 Continuous Mirro Synchronization 	ring		

- 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....
- 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 Wi	izard			
			Syniti	Replicate
Replication type Source connection	Click Next to use the curry transaction ID from which	ent transaction read point usi to replicate.	ng triggers. To override	, click Read TID to set the
Source log info				
	Master Table Qualifier:	/BS4/MASTER_LOG		Read TID
Mapping info Scheduling Actions Summary	Transaction ID: Transaction Timestamp: Read Interval (sec):	194 6/16/2023 6:49:40 PM 60		
States and		< Back	Next >	Cancel Help

- 12. Click Next to go to the Select Target Connection screen.
- 13. Choose the target connection for text output from the drop-down list that includes all the target connections you have created in Syniti Replicate.
- 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.

				Syniti	Rep	lica	ite
Replication type	The mapping hat target fields. D	as been automatically <u>c</u> rag source fields to tar	enerated using t get fields or use t	he default mapping rule the toolbar to edit mapp	to match so ings.	ource and	
Source connection	III - III III	0 - 10 -					
	[SAP_S4] SAPEF	RP.KNA1		[SAP EC	C Target] DE	EMO.dbo.K	NA1
Target connection	Field name	Ordinal ^		Field na	ame	Ordinal	TV /
	S MANDT	01			NDT	01	n
		02			INR	02	n١
Manning info	LAND1	03			ID1	03	n١
apping into	NAME1	04	/		ME1	04	n١
scheduling	NAME2	05			ME2	05	n١
Actions	ORT01	06 🗡			F01	06	n۱ ۱
Summary	<	>	/	<			>
	Field name	Target Table	Ordinal	Туре	Size		£1
	MANDT	[SAP ECC Targe	1	nvarchar	3		1
	KUNNR	[SAP ECC Targe	2	nvarchar	10		ę
Company of the second second second	LAND1	[SAP ECC Targe	3	nvarchar	3		
Contraction of the second							

16. Click Next to go to the Scheduling screen.

& Create Replication Wiza	rd ×
	Syniti Replicate
Replication type	Set scheduling information for the replication.
Source log info Target connection Target log info Mapping info <i>Scheduling</i> Actions Summary	Stantble 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:
Canada	< 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 Replication Agent 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 in the Windows Notification Area.

- 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 Service Monitor program ⁵⁵ in the Windows Notification Area, choose Launch Service Installer.
- Manage the service from Service Monitor program (located in the Windows Notification Area ⁵⁵).
- 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.

Appendix 1 – Important Connection Property Details

TableMode

The value entered here represents the filter criteria that is applied to SAP data dictionary table DD02L to extract the scope of tables available for extraction.

This statement can be altered to add some additional tables e.g., cluster / pooled or views e.g., (NOT TABNAME LIKE '%/%' AND TABCLASS = 'TRANSP' AND (CONTFLAG = 'A' OR CONTFLAG = 'C' OR CONTFLAG = 'G' OR CONTFLAG = 'E' OR CONTFLAG = 'S' OR CONTFLAG = 'W')) OR TABNAME = 'PAPPINSVH'

Using criteria that select more tables than recommended may cause performance issues when performing operations that browse the SAP metadata.

PageSize

This property defines the number of records that will be extracted per RFC call. The recommended default value is 25000, however, this can be adjusted. Using a higher value may reduce extraction times, however, if the value is too large, then extracting tables with lots of columns may fail due to lack of temporary memory on the SAP application side.

QueryMode

The SAP Query to extract long text BOAQ_READ_TEXT is a global query, hence by default it's recommended to use value Global.

However, if Local queries are created, then this value can be set to ALL.

NOTE: If there are queries with names that overlap with standard SAP tables or queries with the same name but in different User Groups then this may be problematic and hence should be avoided if possible.

InitialValue

This property controls how Blank versus NULL values are handled. By default, it's recommended that value InitialValue is used. This writes a <Blank> value to a table field with no data. This value can be changed to NULL if the value written should be NULL.

NOTE: If there are columns that are primary keys that have <Blank> values then using value NULL will cause the extract to fail.

Views

This property allows a subset of the tables returned by the TableMode criteria to be restricted in the metadata extract.

Appendix 2 – Troubleshooting

If there are data extraction errors that can't be resolved through the usual Syniti Replicate logs, it's possible to activate detailed logging in the cData Driver for SAP ERP. This can be done by setting the following connection properties:

- Logfile -> Enter the location and filename of the log file e.g. C:\SDR\Debuglog.txt
- Verbosity -> Enter value 3

Logging	
Logfile	C:\SDR\Debuglog.txt
Verbosity	3

Known Issue 1: Maximum ODBC Connection String Exceeded

When creating a connection using the properties in Syniti Replicate, there is a limit to maximum connection string length. This limit is 1032 characters. Therefore, deviating from the recommended property values may cause the character limit to be exceeded and hence cause problems.

To get around this issue it's possible to create a DSN record and then reference this DSN directly in the Syniti Replicate connection.

Known Issue 2: SAP connection using SNC

When connecting to SAP systems using SNC with the latest versions of the SAP RFC SDK dll's there is a connection failure due to a missing parameter that was previously automatically set by the dll. The workaround for this issue is to request the SAP RFC SDK (Patch 7) dll from Syniti support.