SYBASE®

An **SAP** Company

New Features Bulletin

Replication Server® Options
15.7.1 SP100

Linux, Microsoft Windows, and UNIX

Contents

New Features in Replication Server Options 15.7.1 SP100

Learn about new features in Replication Server® Options 15.7.1 SP100 and its components: Replication Agent™, Enterprise Connect™ Data Access (ECDA), and ExpressConnect for Oracle (ECO).

Change in Release Version Number

Software patches currently known to Sybase® customers as ESDs (Electronic Software Deliveries) following major or minor releases are now referred to as SPs (support packages), with numbers of up to three digits.

See SAP® Release Strategy for all Major Software Releases at: *https://service.sap.com/releasestrategy*. There is no change to upgrade or downgrade procedures because of this change in version number.

Platform Support

Replication Server Options 15.7.1 SP100 adds sub-capacity licensing support for Microsoft Hyper-V, KVM, and VMware ESXi 5.0.

See the *Replication Agent Installation Guide* and *Replication Server Options 15.7.1 SP100 Release Bulletin* for supported versions.

Support for Microsoft SQL Server 2012

(For Microsoft SQL Server only) Replication Agent supports Microsoft SQL Server 2012 at the Microsoft SQL Server 2008 functional level.

See the *Replication Agent 15.7.1 SP100 Primary Database Guide*.

Enterprise Connect Data Access

The ECDA Option for ODBC, a component of Replication Server Options, provides basic connectivity to IBM DB2 UDB, Microsoft SQL Server, and ODBC-accessible databases. The ECDA Option for Oracle has been replaced by ECO.

You can use ECDA if you have a licensed Replication Server and have purchased Replication Server Options 15.7.1.

See the *Enterprise Connect Data Access 15.7 Release Bulletin* for your operating system.

ExpressConnect for Oracle

ExpressConnect for Oracle (ECO), a component of the Replication Server Option for Oracle, provides direct communication between a Replication Server and a replicate data server.

ECO is installed automatically with Replication Server 15.7.1 ESD #1 or later. A static license is included with the Replication Server Option for Oracle. You can use ECO if you have a licensed Replication Server and have purchased the Replication Server Option for Oracle.

See the *ExpressConnect for Oracle Configuration Guide*.

Oracle Instant Client libraries for ExpressConnect for Oracle

ECO no longer ships with Oracle Instant Client libraries.

Replication Server installation automatically installs ECO. After installing Replication Server, obtain the Oracle Instant Client libraries from the Oracle Web site and install them.

See the *ExpressConnect for Oracle Configuration Guide*.

HANA DB

HANA DB is supported as a replicate database.

Use ExpressConnect for HANA DB to replicate to the HANA DB database from these primary databases:

- Adaptive Server® Enterprise
- Oracle
- Microsoft SQL Server
- IBM DB2 UDB

Direct-load materialization is supported from ASE, MSSQL, Oracle, and UDB to HANA DB.

See the *Replication Server New Features Guide*.

New Features in Replication Agent

These new features are available in Replication Agent™ 15.7.1 SP100 for Linux, UNIX, and Microsoft Windows.

Replication Agent Instance and RASD Login Requirement, Dynamic Password Encryption, Configurable Password Policy, and Secure Sockets Layer features were already available in Replication Agent for Oracle in the 15.7.1 ESD #2 release. These features are now available in Replication Agent for UDB and Microsoft SQL Server in the 15.7.1 SP100 release.

Replication Agent Instance and RASD Login Requirement

Replication Agent no longer provides a default user ID and password for Replication Agent instances and the Replication Agent System Database (RASD) at installation.

When you create a new Replication Agent instance, you must provide a user ID and password. You can specify these from the command line or in a response file using the **ra_admin** utility. The default password policy requires that the password be at least 6 but not more than 255 characters long.

For the RASD, Replication Agent automatically generates a user ID and password. You can change this password later.

See the *Replication Agent 15.7.1 SP100 Administration Guide > Setup and Configuration > Replication Agent Utilities > The Command Line Interface > ra_admin.*

Dynamic Password Encryption

Replication Agent uses a dynamic key for password encryption.

When you create a Replication Agent instance, a random key is generated automatically and stored in the **instance_rand** configuration parameter. You can use the **ra_regenerate_keys** command to regenerate the value of the **instance_rand** configuration property. When the **ra_regenerate_keys** command is invoked, all encrypted passwords in the userinfo and password tables are reencrypted.

After you run the **ra_regenerate_keys** command:

1. Stop the Replication Agent instance, and it may be necessary to kill the process.
2. Reset the Replication Agent administrator user name and password.
3. Log in to the Replication Agent instance with the new administrator user name and password.

Configurable Password Policy

The password policy for Replication Agent is now configurable.

You can configure:

- The maximum and minimum lengths of passwords using **max_password_len** and **min_password_len**.
- Whether passwords must contain lowercase characters, uppercase characters, numeric characters, or special characters using **password_lowercase_required**, **password_uppercase_required**, **password_numeric_required**, and **password_special_required**.
- The number of days before passwords expire and must be changed using **password_expiration**.

See the *Replication Agent 15.7.1 SP100 Reference Manual*.

Resetting the Replication Agent Administrator Password

Use the **reset** option of the **ra_admin** utility to reset the Replication Agent administrator password.

Secure Sockets Layer

Replication Agent supports use of the secure sockets layer (SSL) for connections to and from Replication Agent instances.

As a client, a Replication Agent instance can use SSL in connecting to servers, including:

- Replication Server
- Primary data servers:
  - Oracle
  - Microsoft SQL Server
  - IBM DB2 UDB

Client applications can use SSL to encrypt connections to Replication Agent.

Replication Agent General Configuration for SSL

Each Replication Agent instance stores an asymmetric encryption key pair in an identity file located at the path indicated by **ssl_identity_filename**. The identity file is encrypted and is accessed with the password stored in **ssl_identity_password**. The Certificate Authority (CA) certificates for a Replication Agent instance are stored in a file located at the path indicated by **ssl_certificates_filename**.

Replication Agent as a Server

To configure a Replication Agent instance to listen for SSL client connections on its administration port, set **use_ssl** to true. Clients must then use SSL to connect to the Replication Agent instance.

Replication Agent as a Client

- To connect to an Oracle data server, set the **pds_use_ssl** Replication Agent configuration parameter to true. To verify the distinguished name (DN) of the server certificate, set **pds_ssl_sc_dn**. Also specify the Oracle SSL port number using **pds_port_number**.
- To connect to Microsoft SQL Server, set the **pds_use_ssl** Replication Agent configuration parameter to true. To verify the primary dataserver server certificate common name, set **pds_ssl_sc_cn** to the common name (CN) of the server (as specified in the distinguished name (DN) of the server certificate)
- To connect to IBM DB2 UDB, set the **pds_use_ssl** Replication Agent configuration parameter to true.
- To connect to a Replication Server, set **rs_use_ssl** to true. To verify the DN of the Replication Server server certificate, set **rs_ssl_sc_dn**.

See the *Replication Agent 15.7.1 SP100 Administration Guide* and the *Replication Agent 15.7.1 SP100 Reference Manual*.

Enhanced Replication Definition Support

If the version of Replication Server that connects to Replication Agent is 15.5 or later, Replication Agent does not add the **replicate minimal columns** clause when creating replication definitions.

You can control minimal columns on the Data Server Interface (DSI) by using the Replication Server **replicate_minimal_columns** parameter. If the version of Replication Server is 15.2 or earlier, Replication Agent adds the **replicate minimal columns** clause to the replication definitions.

Naming Convention for Replication Definitions

The naming convention for replication definitions is changed to present the replication definition names in a more readable format.

Note: Before you create a new replication definition using **rs_create_repdef**, make sure that a replication definition with the same name does not already exist in Replication Server.

The naming convention for replication definition is:

`ra$<rs_source_ds>_<rs_source_db>_<owner>_<objname>`

where:

`ra$` is the prefix for all replication definition names.

<rs_source_ds> is the value of the **rs_source_ds** parameter.

<rs_source_db> is the value of the **rs_source_db** parameter.

<owner> is the user name of the object owner in primary database.

<objname> is the object name in primary database.

The maximum length of the replication definition name is 255 characters. Replication Agent truncates the name exceeding 255 characters. It also replaces the last *n* characters of the replication definition name with the object ID in hexadecimal format, where *n* is the length of the object ID in hexadecimal.

See the *Replication Agent 15.7.1 SP100 Reference Manual*.

Resolve Inconsistencies in the Primary Database Object Marking Status

Use the **ra_truncatearticles** to remove marked tables that have been dropped at the primary database from the RASD. Otherwise, the tables appear marked in the Replication Agent when you run the **pdb_setreptable** command.

If you drop a table in the primary database that is marked for replication and run **pdb_setreptable**, the command returns an incorrect mark status indicating that the table is marked. However, the **pdb_setreptable** *owner.tablename* command returns a correct error message indicating that the table does not exist in the primary database. If you create the same table again and run **pdb_setreptable**, the command still returns an incorrect mark status. The **pdb_setreptable** *owner.tablename* command returns a correct status indicating that the table is unmarked. These inconsistencies can also occur when you drop a stored procedure in the primary database and run the **pdb_setrepproc** command or drop a sequence in the primary database and run the **pdb_setrepseq** command. To avoid these inconsistencies, run **ra_truncatearticles** after you drop any table, stored procedure, or sequence in the primary database.

See the *Replication Agent 15.7.1 SP100 Reference Manual*.

New Considerations for Creating Replication Agent Instances

When creating a Replication Agent instance, provide appropriate values for the **asa_password**, **pds_username**, and **pds_password** parameters.

Considerations:

- In addition to the existing password policy, the value of the **asa_password** parameter cannot contain single quotes, double quotes, or a semicolon when you create a Replication Agent instance with or without a resource file.
- When creating a Replication Agent instance with a resource file, the **pds_username** and **pds_password** parameter values cannot contain single quotes, double quotes, or a semicolon if the **create_pds_username** parameter is set to yes.

Permissions on Files and Directories

The permissions on all files and directories in the RAX-15_5 installation directory are set to 600 (read/write for user, no permissions for group and other) and 700 (read/write/execute for user, no permissions for group and other) respectively, to improve security.

Table 1. Permissions on Replication Agent Instance Files and Directories

File/Directory	Permission
$SYBASE/RAX-15_5/bin/ra_admin.sh	700
$SYBASE/RAX-15_5/*<instance_name>*/*<instance_name>*.cfg where *<instance_name>* is the name of your Replication Agent instance.	600
$SYBASE/RAX-15_5/*<instance_name>*/log	700
$SYBASE/RAX-15_5/*<instance_name>*/ RUN_*<instance_name>*.sh	700

New Parameters

New Replication Agent parameters.

Parameter	Description
lob_uncommitted_read	(IBM DB2 UDB only) Enables or disables uncommitted read
ltl_trace_in_hex	Determines whether Replication Agent logs values of non-unichar datatypes in hexadecimal format in the LTITRACELTL.log file, when LTITRACELTL trace is set to true
pdb_archive_control_path	(IBM DB2 UDB only) Sets the explicit path for the SQLOGCTL.LFH file or other control files
pdb_auto_alter_repdefs	(Oracle only) Determines whether Replication Agent automatically generates the **alter replication definition** statements, when processing changes in a marked table schema

Parameter	Description
pds_ssl_sc_cn	(Microsoft SQL Server only) The common name (CN) of the primary data server certificate. This optional parameter is only valid if **pds_use_ssl** is set
ra_admin_owner_password	(Oracle only) The password for the user name specified in the **ra_admin_owner** parameter
repdef_send_standby	(Oracle only) Determines whether Replication Agent adds the send **standby clause** when creating replication definitions
rman_path	(Oracle only) The directory path for the Oracle **RMAN** utility

See the *Replication Agent 15.7.1 SP100 Reference Manual*.

New Replication Agent Trace Flags

Two new trace flags with exclusive log files are added for troubleshooting.

- LRTRACETX: When set to "true," this flag turns on tracing of all transaction management commands processed by Operation Processor in the LRTRACETX.log file.
- SNDRTRACETX: When set to "true," this flag turns on tracing of all transaction management commands sent by SenderThread in the SNDRTRACETX.log file.

Deprecated Commands and Parameters

Some Replication Agent commands and parameters have been deprecated as of 15.7.1 ESD #2. In the 15.7.1 SP100 release, avoid using these deprecated commands and parameters and use new commands and parameters where possible.

Table 2. Commands

Deprecated	New
pdb_xlog	**ra_admin**
pdb_xlog create **pdb_xlog init**	**ra_admin init**
pdb_xlog create, force **pdb_xlog init, force**	**ra_admin refresh**
pdb_xlog remove	**ra_admin deinit**

Deprecated	New
pdb_xlog remove, force	**ra_admin deinit, force**
pdb_xlog move_truncpt	**ra_locator move_truncpt**
ra_downgrade_accept	**ra_downgrade**
ra_downgrade_prepare	**ra_migrate**

Table 3. Parameters

Deprecated	New
ltm_admin_pw_min_length	**min_password_len**
pdb_convert_datetime	Use the Replication Server heterogeneous datatype support (HDS) feature for all data-type conversion and translation.
pdb_xlog_device	**ra_admin_device**
pdb_xlog_prefix	**ra_admin_instance_prefix**
pdb_xlog_prefix_chars	**ra_admin_prefix_chars**

Removed Utilities

Some Replication Agent utilities have been removed as of 15.7.1 ESD #2. These utilities are also removed in the 15.7.1 SP100 release.

The Administrator GUI utility has been removed. Use the existing **ra**, **ra_admin**, and **raagent_service** command line utilities instead.

Enhancements in Replication Agent for Oracle

These enhancements are available for Replication Agent for Oracle in the 15.7.1 SP100 release.

Replication Agent Permissions

Replication Agent for Oracle uses the **pds_username** command to connect to Oracle. You must grant the Oracle permissions that are currently identified in the *Replication Agent 15.7.1 SP100 Primary Database Guide*, as well as these new additions.

- **GRANT SELECT ON SYS.PARTOBJ$** – required to support partitioned table replication.

- **GRANT SELECT ON SYS.ICOLS$** – required to support the use of a unique index on columns as the primary key of the replication definition when there is no primary key defined for that table.

See the *Replication Agent 15.7.1 SP100 Primary Database Guide > Replication Agent Permissions*.

ra_admin_owner User Permissions

For Oracle 10g and 11g, if you configure the **ra_admin_owner** user, you must also grant the appropriate permissions.

- **GRANT CREATE SESSION**
- **GRANT CREATE TABLE**
- **GRANT CREATE SEQUENCE**
- **GRANT CREATE ANY PROCEDURE**
- **GRANT SELECT_CATALOG_ROLE**

See the *Replication Agent 15.7.1 SP100 Primary Database Guide > Replication Agent Permissions*.

Enhanced lr_dump_marker Command

The **lr_dump_marker** command behavior has changed. When you perform database resynchronization by the setting the **lr_dump_marker scn** value, and then run **resume** instead of **resume resync**, the value of **lr_dump_marker** is reset to zero.

The value of **lr_dump_marker** is reset to zero if:

- You remove the Replication Agent transaction log base components using the **pdb_xlog** command.
- Replication Agent resumes after you run the **resume** command with no option. The dump database marker is not sent to the Replication Server.

See the *Replication Agent 15.7.1 SP100 Reference Manual > Command Reference > Replication Agent Commands Table > lr_dump_marker*.

Enhanced ra_admin Command

The **ra_admin** command has new parameters.

- **prepare** – the keyword for generating a script that is used for granting permissions to **pds_username** and turning on supplemental logging according to the supplemental logging level setting.
- **supplemental_logging_level** – the keyword for the setting the supplemental logging level on a primary database.
- **database** – the keyword for representing supplemental logging at database level.
- **table** – the keyword for representing supplemental logging at table level.

See the *Replication Agent 15.7.1 SP100 Reference Manual > Command Reference > Replication Agent Commands Table > ra_admin*.

Supplemental Logging of Primary Key and Unique Index Columns at Table Level

When you create a Replication Agent instance, you can choose to enable supplemental logging of primary key (PK) and unique index (UI) columns at the table level.

Supplemental logging at database level is not essential for Replication Agent while replicating. Instead, you can enable supplemental logging of PK and UI columns at table level for the Oracle system tables and user tables that need to be replicated. After you enable supplemental logging of PK and UI columns at table level, Oracle only writes those columns of PK and UI to the redo log file, whenever the table is updated. This reduces the size of redo log file compared to supplemental logging of PK and UI at database level. For a table whose supplemental logging is not enabled, Oracle writes columns of PK and UI to the redo log file, only when any column of PK or UI is updated.

You can switch between supplemental logging at database level and table level at any point in time. Do not turn off supplemental logging at database level before you turn on supplemental logging at table level because it takes some amount of time for switching. During this period, Oracle does not write the PK and UI columns to the redo log file, until the supplemental logging at table level is turned on. This can cause Replication Agent to go to the Replication Down state.

See the *Replication Agent 15.7.1 SP100 Administration Guide* and the *Replication Agent 15.7.1 SP100 Reference Manual*.

Supported and Unsupported Datatypes

Learn about the datatypes supported and not supported by Replication Server Options 15.7.1 SP100.

Datatypes for Oracle Replication

Supported and unsupported datatypes for replicating into and out of Oracle.

Replicating Datatypes into Oracle
These Sybase datatypes are supported or unsupported by ExpressConnect for Oracle for replicating into Oracle.

Table 4. ExpressConnect Supported and Unsupported Sybase Datatypes

Datatype	Supported	Unsupported
Sybase	bigint	bigdatetime

Datatype	Supported	Unsupported
	`integer`	`bigtime`
	`smallint`	
	`tinyint`	
	`decimal`	
	`numeric`	
	`unsigned bigint`	
	`unsigned integer`	
	`unsigned smallint`	
	`unsigned tinyint`	
	`unichar`	
	`univarchar`	
	`unitext`	
	`float`	
	`double`	
	`real`	
	`money`	
	`smallmoney`	
	`date`	
	`time`	
	`datetime`	
	`smalldatetime`	
	`timestamp`	
	`char`	
	`nchar`	
	`varchar`	

Datatype	Supported	Unsupported
	`nvarchar`	
	`text`	
	`binary`	
	`varbinary`	
	`image`	
	`bit`	
	`sysname` (same as varchar(30))	
	`longsysname` (same as var-char(255))	
	`user-defined datatypes` (as underlying type)	

These Oracle datatypes are supported or unsupported by ExpressConnect for Oracle for replicating into Oracle.

Table 5. ExpressConnect Supported and Unsupported Oracle Datatypes

Datatype	Supported	Unsupported
Oracle	`anydata` (limited support)	associative array
	`bfile` (only for replication not gateway)	`mlslabel`
	`binary_double`	nested tables
	`binary_float`	Oracle-supplied datatypes
	`blob`	partial large object (LOB) up-dates
	`char`	`ref`
	`clob`	user-defined datatypes (UDDs) containing LOBs
	`date`	UDDs that are not final
	`interval day to second`	`urowid`
	`interval year to month`	`varray`

Datatype	Supported	Unsupported
	`long`	SecureFile LOBs
	`long raw`	Oracle 11g `xmltype`
	`nchar`	
	`nclob`	
	`number`	
	`nvarchar2`	
	`raw`	
	`rowid`	
	`simple_integer`	
	`timestamp`	
	`timestamp with [local] time zone`	
	`UDD object type` (only for replication not gateway)	
	`varchar2`	
	Oracle 10g `xmltype` (limited support, handled as `clob`)	

Replicating Datatypes out of Oracle
These Oracle datatypes are supported or unsupported by Replication Agent for replicating out of Oracle.

Table 6. Replication Agent Supported and Unsupported Oracle Datatypes

Datatype	Supported	Unsupported
Oracle	`anydata` (limited support)	associative array
	`binary_double`	`bfile`
	`binary_float`	`mlslabel`
	`blob`	nested tables
	`char`	Oracle-supplied datatypes

Datatype	Supported	Unsupported
	clob	partial LOB updates
	date	ref
	interval day to second	SecureFile LOBs
	interval year to month	UDDs containing LOB
	long	UDDs that are not final
	long raw	urowid
	nchar	varray
	nclob	
	number	
	nvarchar2	
	raw	
	rowid	
	simple_integer	
	timestamp	
	timestamp with [local] time zone	
	UDD object type	
	varchar2	
	xmltype (limited support, handled as clob)	

Oracle-Supplied Datatype Limitations
Replication Agent cannot replicate these Oracle-supplied datatypes:

- "ANY" types (SYS.ANYTYPE, SYS.ANYDATASET), except for SYS.ANYDATA
- Oracle 10g and 11g XMLType data replicated to Oracle 11g. Replication Agent does support replicating XMLType data to Oracle 10g.
- Spatial Types (MDSYS.SDO_GEOMETRY, SDO_TOPO_GEOMETRY, SDO_GEORASTER)

- Media Types (`ORDSYS.ORDAudio`, `ORDSYS.ORDImage`, `ORDSYS.ORDImageSignature`, `ORDSYS.ORDVideo`, `ORDSYS.ORDDoc`, `SI_StillImage`, `SI_Color`, `SI_AverageColor`, `SI_ColorHistogram`, `SI_PositionalColor`, `SI_Texture`, `SI_FeatureList`)
- Expression filter type
- Replication from an `ANYDATA` column to a non-`ANYDATA` column
- `ANYDATA` size exceeding 16KB, which is the size constraint of the Replication Server `OPAQUE` datatype
- `BFile`, `UROWID`, `REF`, `NESTED TABLE,` and `VARRAY` datatypes stored in the `ANYDATA` column
- `XMLType` not stored as `CLOB`

> **Note:** `XMLType` stored as `CLOB` can be replicated to Oracle 10g and to Adaptive Server Enterprise. Replication Agent does support replicating `XMLType` data to Oracle 11g.

- Replication of data stored in Oracle XML DB repository using standard protocols such as FTP and HTTP(S) or WebDAV, and other Oracle XML DB API
- Marking procedures that use `PLS_INTEGER` PL/SQL type or any of its other subtypes; however, Replication Agent does support marking procedures that use `SIMPLE_INTEGER` PL/SQL type.

Datatypes for Microsoft SQL Server Replication

Learn about the datatypes supported and unsupported for replicating into and out of Microsoft SQL Server.

Replicating Datatypes into Microsoft SQL Server

These Sybase datatypes are supported or unsupported by ECDA 15.0.1 and later for replicating into Microsoft SQL Server.

Table 7. ECDA Supported and Unsupported Sybase Datatypes

Datatype	Supported	Unsupported
Sybase	bigint	bigdatetime
	integer	bigtime
	smallint	
	tinyint	
	decimal	
	numeric	
	unsigned bigint	

Datatype	Supported	Unsupported
	unsigned integer	
	unsigned smallint	
	unsigned tinyint	
	unichar	
	univarchar	
	unitext	
	float	
	double	
	real	
	money	
	smallmoney	
	date	
	time	
	datetime	
	smalldatetime	
	timestamp	
	char	
	nchar	
	varchar	
	nvarchar	
	text	
	binary	
	varbinary	
	image	
	bit	

Datatype	Supported	Unsupported
	sysname (same as varchar(30))	
	longsysname (same as varchar(255))	
	UDDs (as underlying type)	

These Microsoft SQL Server datatypes are supported or unsupported by ECDA 15.0.1 and later for replicating into Microsoft SQL Server.

Table 8. ECDA Supported and Unsupported Microsoft SQL Server Datatypes

Datatypes	Supported	Unsupported
Microsoft SQL Server	bigint	cursor
	nchar	date
	nvarchar	datetime2
	ntext	datetimeoff-set
	varchar(max) (only for replication not gateway)	filestream
	nvarchar(max) (only for replication not gateway)	geography
	sql_variant	geometry
	binary	hierarchyid
	bit	large UDDs
	char	table
	datetime	time
	decimal	xml
	float	
	image	
	integer	
	money	

Datatypes	Supported	Unsupported
	`numeric`	
	`real`	
	`smalldatetime`	
	`smallint`	
	`smallmoney`	
	`text`	
	`timestamp`	
	`tinyint`	
	`uniqueidentifier`	
	`varbinary`	
	`varbinary (max)` (only for replication, not gateway)	
	`varchar`	

Note: The `varbinary(max)`, `varchar(max)`, `nvarchar(max)`, and `sql_variant` datatypes are supported only in a replication environment (not for gateway or any other ECDA use) and only to a replicate Microsoft SQL Server database.

Replicating Datatypes out of Microsoft SQL Server
These Microsoft SQL Server datatypes are supported or unsupported by Replication Agent for replicating out of Microsoft SQL Server.

Table 9. Replication Agent Supported and Unsupported Microsoft SQL Server Datatypes

Datatypes	Supported	Unsupported
Microsoft SQL Server	`bigint`	`cursor`
	`nchar`	`date`
	`nvarchar`	`datetime2`
	`ntext`	`datetimeoffset`

Datatypes	Supported	Unsupported
	`varchar(max)` (replicate must be Microsoft SQL Server)	`filestream`
	`nvarchar(max)` (replicate must be Microsoft SQL Server)	`geography`
	`sql_variant`	`geometry`
	`binary`	`hierarchyid`
	`bit`	`large UDDs`
	`char`	`table`
	`datetime`	`time`
	`decimal`	`xml`
	`float`	
	`image`	
	`integer`	
	`money`	
	`numeric`	
	`real`	
	`smalldatetime`	
	`smallint`	
	`smallmoney`	
	`text`	
	`timestamp`	
	`tinyint`	
	`uniqueidentifier`	
	`varbinary`	
	`varbinary(max)` (replicate must be Microsoft SQL Server)	

Datatypes	Supported	Unsupported
	`varchar`	

Datatypes for IBM DB2 UDB Replication

Learn about the datatypes supported and unsupported for replicating into and out of IBM DB2 UDB.

Replicating Datatypes into IBM DB2 UDB

These Sybase datatypes are supported or unsupported by ECDA 15.0.1 for replicating into IBM DB2 UDB.

Table 10. ECDA Supported and Unsupported Sybase Datatypes

Datatype	Supported	Unsupported
Sybase	`bigint`	`bigdatetime`
	`integer`	`bigtime`
	`smallint`	`image`
	`tinyint`	`text`
	`decimal`	`unitext`
	`numeric`	
	`unsigned bigint`	
	`unsigned integer`	
	`unsigned smallint`	
	`unsigned tinyint`	
	`unichar`	
	`univarchar`	
	`float`	
	`double`	
	`real`	
	`money`	
	`smallmoney`	

Datatype	Supported	Unsupported
	date	
	time	
	datetime	
	smalldatetime	
	timestamp	
	char	
	nchar	
	varchar	
	nvarchar	
	binary	
	varbinary	
	bit	
	sysname (same as varchar(30))	
	longsysname (same as varchar(255))	
	UDDs (as underlying type)	

These IBM DB2 UDB datatypes are supported or unsupported by ECDA 15.0.1 for
replicating into IBM DB2 UDB.

Table 11. ECDA Supported and Unsupported IBM DB2 UDB Datatypes

Datatypes	Supported	Unsupported
IBM DB2 UDB	bigint	blob
	graphic	clob
	vargraphic	dbclob
	decfloat (for replication only, not gateway)	long varchar
	smallint	long vargraphic
	float	ROWID

Datatypes	Supported	Unsupported
	`integer`	`long varchar for bit data`
	`decimal`	`xml`
	`real`	UDDs
	`double`	
	`time`	
	`timestamp`	
	`date`	
	`char`	
	`varchar`	
	`char for bit data`	
	`varchar for bit data`	

Note: The `decfloat` datatype is supported only in a replication environment (not for gateway or any other ECDA use).

Replicating Datatypes out of IBM DB2 UDB
These IBM DB2 UDB datatypes are supported or unsupported by Replication Agent for replicating out of IBM DB2 UDB.

Table 12. Replication Agent Supported and Unsupported IBM DB2 UDB Datatypes

Datatypes	Supported	Unsupported
IBM DB2 UDB	`bigint`	`ROWID`
	`char`	UDDs
	`char for bit data`	`xml`
	`blob`	
	`clob`	
	`date`	

Datatypes	Supported	Unsupported
	`dbclob`	
	`decfloat`	
	`decimal`	
	`double`	
	`float`	
	`graphic`	
	`integer`	
	`long varchar`	
	`long varchar for bit data`	
	`long vargraphic`	
	`real`	
	`smallint`	
	`time`	
	`timestamp`	
	`varchar`	
	`varchar for bit data`	
	`vargraphic`	

IBM DB2 UDB 9.5 and 9.7 Support Limitations
Replication Agent does not support these features of IBM DB2 UDB 9.5 or 9.7:

• Replication of `XML` datatype

> **Note:** Since Replication Agent does not support replicating XML, restrictions have been imposed on marking a table containing XML columns. Replication Agent generates an error message each time an attempt is made to mark a table with XML columns. To replicate all but the XML columns of a table, use the **force** option when marking the table for replication.

- When replicating DECFLOAT columns from UDB to other databases that do not support DECFLOAT or an equivalent datatype, DECFLOAT is mapped to FLOAT, which may cause a loss of precision.
- Replication Agent does not support replication of DECFLOAT special values such as positive and negative INFINITY, NAN, and SNAN. Replication Agent replicates these values to NULL if the column is nullable, or 0.0 if the column is not nullable.

Unsupported Functionalities

These functionalities are not supported by Replication Server Options 15.7.1.

Note: Only features and functionality covered in the Replication Server Options documentation are supported for that solution. If a feature or type of functionality is not documented, it is not supported.

General Functionalities

- IPv6-formatted addresses
- 4KB-sector disk drives
- Replication Server **rs_init** utility (for non-ASE databases)
- Replication Server **rs_subcomp** utility (for non-ASE databases)
- Replication Server when replicating in an environment where other vendors are replicating (for non-ASE databases)

Oracle-Related Functionalities

- Oracle-packaged stored procedures and functions (standalone procedures and functions are supported)
- Oracle virtual columns
- Oracle label security
- Custom function strings for text and image processing with ECO – see the *Replication Server Heterogeneous Replication Guide*.

IBM DB2 UDB-Related Functionalities

- IBM DB2 Universal Database data definition language (DDL) commands
- IBM DB2 Universal Database stored procedures
- IBM DB2 clients and servers of different versions on different machines – if your IBM DB2 client is installed on a different operating system than your IBM DB2 server, both the client and server must be of the same version.

Microsoft SQL Server-Related Functionalities

- Microsoft SQL Server Cluster
- Microsoft SQL Server virtual computed columns
- Replication Agent does not support these features of Microsoft SQL Server 2008:
  - Transparent data encryption (TDE)
  - Procedures with table-valued parameters (TVPs)
  - Sparse column and column set
  - MERGE SQL statement