

# New Features Guide Replication Server<sup>®</sup> Data Assurance Option 15.7.1 SP110

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## New Features in Replication Server Data Assurance Option 15.7.1 SP110

Replication Server<sup>®</sup> Data Assurance Option 15.7.1 SP110 includes support for IBM DB2 Universal Database (UDB) and Microsoft SQL Server as either source or target databases, and usability enhancements.

Replication Server Data Assurance Option 15.7.1 SP110 is compatible with the Sybase Control Center for Data Assurance 3.2.8 SP01 plug-in. See *Sybase Control Center for Data Assurance 3.2.8 SP01 Documentation*.

## Support for IBM DB2 UDB

Replication Server Data Assurance Option 15.7.1 SP110 supports comparisons where the source or target database is IBM DB2 UDB.

You can compare data between any source and target database combinations. For example:

- A homogeneous comparison IBM DB2 UDB to IBM DB2 UDB
- An SAP<sup>®</sup> Sybase<sup>®</sup> Adaptive Server<sup>®</sup> source database and an IBM DB2 UDB target database in a heterogeneous comparison
- An Oracle source database with multiple target databases, for example, both Adaptive Server and Sybase<sup>®</sup> IQ
- An Adaptive Server source database and an SAP HANA® target database

Supported versions:

- IBM DB2 UDB 9.5
- IBM DB2 UDB 9.7
- IBM DB2 UDB 10.1

Data Assurance (DA) does not ship the Java Database Connectivity (JDBC) driver JAR file for IBM DB2 UDB. Download the JDBC type4 driver JAR file from the IBM Web site for your IBM DB2 UDB, and configure DA to use the JDBC driver.

## Configuring DA to Use the IBM DB2 UDB JDBC Driver

To use an IBM DB2 UDB database in a comparison, configure the DA server and the DA agent to use the db2jcc4.jar file.

1. Download the db2jcc4.jar JDBC driver for your database version from the IBM Web site.

- 2. Copy the db2jcc4.jar file into the DA library folder:
  - On Windows %SYBASE%\DA-15\_5\server\lib\drivers \db2jcc4.jar
  - On UNIX \$SYBASE/DA-15\_5/server/lib/drivers/db2jcc4.jar where %SYBASE% (Windows) or \$SYBASE (UNIX) is the directory in which you installed the Data Assurance Option, and lib is the library folder of your DA server instance.
- 3. Open the RUN start-up script file:
  - On Windows 32-bit: %SYBASE%\DA-15 5\server\instance\RUN instance 32.bat
  - On Windows 64-bit: %SYBASE%\DA-15 5\server\instance\RUN instance 64.bat
  - On UNIX: \$SYBASE/DA-15 5/server/instance/RUN instance 64.sh

where *instance* is the name of your DA server instance.

**4.** Add the location of the IBM DB2 UDB JDBC driver JAR file to the DA server CLASSPATH.

On Windows:

set CLASSPATH=%CLASSPATH%;%DA\_LIB%\drivers\db2jcc4.jar

On UNIX:

set CP=\$CP:\$DA\_LIB/drivers/db2jcc4.jar

- 5. Save the RUN start-up script file.
- 6. Restart the DA server for the settings to take effect.

Follow the same steps to configure a DA agent to use the IBM DB2 UDB JDBC driver JAR file.

### Data Comparison Scenario: Adaptive Server to IBM DB2 UDB

Perform a heterogeneous comparison using Adaptive Server and IBM DB2 UDB databases.

#### Prerequisites

Before starting the DA agent, add the JDBC driver JAR file for an IBM DB2 UDB to the DA classpath.

#### Task

This example uses a DA server local agent connecting to an Adaptive Server and a DA agent connecting to an IBM DB2 Universal database.

Component Name	Machine Name	Port Numbers
DA server	mars	<ul> <li>6500 - RMI</li> <li>6501 - TDS</li> <li>6503 - DASD</li> </ul>
DA agent	neptune	<ul> <li>6500 - RMI</li> <li>6501 - TDS</li> <li>6502 - DTS</li> </ul>
Adaptive Server database	mars	5000 – server
IBM DB2 Universal Database	neptune	5001- server

Table 1. Deployment Summary

**1.** Start the DA server instance named mars:

\$SYBASE/DA-15\_5/server/instance/RUN\_instance\_64.sh

where \$SYBASE is the directory in which you installed the Data Assurance Option, *instance* is the name of your DA server instance, and RUN\_*instance\_*64.sh is the start-up script.

Note: On Windows, the start-up script file is named RUN\_instance\_32.bat or RUN\_instance\_64.bat. On UNIX or Linux platforms, the file is named RUN instance 64.sh.

- 2. Start the DA agent instance on the machine named neptune: \$SYBASE/DA-15 5/agent/instance/RUN instance 64.sh
- 3. From isql, log in to DA server as an administrator:

```
$SYBASE/OCS-15_0/bin/isql -S mars:6501 -U da_admin -P password -w 250
```

4. Create a DA agent connection that connects to the IBM DB2 Universal Database:

```
create agent agent_neptune
set host=neptune
and set port=6500
and set user=da_admin
and set password=password
go
```

5. View the newly created DA agent:

```
show agent agent_neptune
go
```

6. Test connection settings for the DA agent:

```
test agent agent_neptune
go
```

7. Create database connections for the new DA agent.

In this example, the pubs2 database is replicated on the IBM DB2 UDB. The DA server's local agent on mars points to the Adaptive Server database on mars, while the agent on neptune points to the IBM DB2 UDB:

```
create connection conn_mars
  set type=ase
  and set agent=localagent
  and set host=mars
  and set port=5000
  and set user=sa
  and set database=pubs2
  and set password=password
  go
create connection conn_neptune
  set type=UDB
  and set agent=agent_neptune
  and set host=neptune
  and set port=5001
```

```
and set database=PUBS2
and set user=JOHN
and set password=mssqt12
go
```

8. View the newly created database connections:

```
show connection
go
show connection conn_mars
go
show connection conn_neptune
go
```

9. Test the database connections:

```
test connection conn_mars
go
test connection conn_neptune
go
```

**10.** Create a compareset to map the entire source table.

This example compares the Adaptive Server and the IBM DB2 UDB data:

```
create compareset authors_demo4
with
   source conn_mars dbo authors s
   target conn_netpune DB2INST1 AUTHORS t
map
   s.au_id=t.AU_ID set key=true
   and s.au_lname=t.AU_LNAME
   and s.au_fname=t.AU_FNAME
   and s.phone=t.PHONE
   and s.address=t.ADDRESS
   and s.city=t.CITY
   and s.state=t.STATE
   and s.country=t.COUNTRY
```

and s.postalcode=t.POSTALCODE go

**11.** View the compareset:

```
show compareset authors_demo4
go
```

12. Create a job.

This job creates a single comparison that uses the compareset defined in step 10. It compares all rows in the authors table:

```
create job authors_job4
add comparison cmp_authors4
set COMPARESET=authors_demo4
and set NUM_PARTITIONS to 1
and set ENABLE_ROW_COUNT to false
and set COMPARE_MODE to row_compare
and set HASH_TYPE to AGENT_HASH
go
```

Note: Set the HASH\_TYPE comparison option to agent\_hash for heterogeneous comparison. The database\_hash comparison option is used only for comparisons between Adaptive Server.

13. Execute the job to compare the data:

```
run job authors_job4
go
```

DA compares equivalent values stored in distinct datatypes accurately.

## Support for Microsoft SQL Server

Replication Server Data Assurance Option 15.7.1 SP110 supports comparisons where the source or target database is Microsoft SQL Server.

Supported versions:

- Microsoft SQL Server 2008
- Microsoft SQL Server 2008 R2
- Microsoft SQL Server 2012

DA does not ship the JDBC driver JAR file for a Microsoft SQL Server database. Download the JDBC type4 driver JAR file from the Microsoft Web site for your database version, and configure DA to use the JDBC driver.

### Configuring DA to Use the Microsoft SQL Server JDBC Driver

To use a Microsoft SQL Server database in a comparison, configure the DA server and the DA agent to use the sqljdbc4.jar file.

- 1. Download the sqljdbc4.jar JDBC driver for your database version from the Microsoft Web site.
- 2. Copy the sqljdbc4.jar file into the DA library folder:
  - On Windows %SYBASE%\DA-15\_5\server\lib\drivers \sqljdbc4.jar

• On UNIX - \$SYBASE/DA-15\_5/server/lib/drivers/sqljdbc4.jar where %SYBASE% (Windows) or \$SYBASE (UNIX) is the directory in which you installed the Data Assurance Option, and lib is the library folder of your DA server instance.

- 3. Open the RUN start-up script file:
  - On Windows 32-bit: %SYBASE%\DA-15 5\server\instance\RUN instance 32.bat
  - On Windows 64-bit: %SYBASE%\DA-15 5\server\instance\RUN instance 64.bat
  - On UNIX: \$SYBASE/DA-15\_5/server/instance/RUN\_instance\_64.sh

where *instance* is the name of your DA server instance.

**4.** Add the location of the Microsoft SQL Server JDBC driver JAR file to the DA server CLASSPATH.

On Windows:

```
set CLASSPATH=%CLASSPATH%;%DA_LIB%\drivers\sqljdbc4.jar
```

On UNIX:

set CP=\$CP:\$DA\_LIB/drivers/sqljdbc4.jar

- 5. Save the RUN start-up script file.
- 6. Restart the DA server for the settings to take effect.

Follow the same steps to configure a DA agent to use the Microsoft SQL Server JDBC driver JAR file.

### Data Comparison Scenario: Adaptive Server to Microsoft SQL Server

Perform a heterogeneous comparison using Adaptive Server and Microsoft SQL Server databases.

#### Prerequisites

Before starting the DA agent, add the JDBC driver JAR file for a Microsoft SQL Server to the DA classpath.

#### Task

This example uses a DA server local agent connecting to an Adaptive Server, and a DA agent connecting to a Microsoft SQL Server.

Component Name	Machine Name	Port Numbers
DA server	mars	<ul> <li>6500 – RMI</li> <li>6501 – TDS</li> <li>6503 – DASD</li> </ul>
DA agent	pluto	<ul> <li>6500 - RMI</li> <li>6501 - TDS</li> <li>6502 - DTS</li> </ul>
Adaptive Server database	mars	5000 - server
Microsoft SQL Server data- base	pluto	1433 – server

Table 2. Deployment Summary

**1.** Start the DA server instance named mars:

```
$SYBASE/DA-15_5/server/instance/RUN_instance_64.sh
```

where \$SYBASE is the directory in which you installed the Data Assurance Option, *instance* is the name of your DA server instance, and RUN\_*instance\_*64.sh is the start-up script.

Note: On Windows, the start-up script file is named RUN\_instance\_32.bat or RUN\_instance\_64.bat. On UNIX or Linux platforms, the file is named RUN\_instance\_64.sh.

**2.** Start the DA agent instance on the machine named pluto:

\$SYBASE/DA-15\_5/agent/instance/RUN\_instance\_64.sh

3. From isql, log in to DA server as an administrator:

\$SYBASE/OCS-15\_0/bin/isql -S mars:6501 -U da\_admin -P password -w 250

4. Create a DA agent connection that connects to the Microsoft SQL Server:

```
create agent agent_pluto
set host=pluto
and set port=6500
and set user=da_admin
and set password=password
go
```

5. View the newly created DA agent:

```
show agent agent_pluto
go
```

6. Test connection settings for the DA agent:

```
test agent agent_pluto
go
```

7. Create database connections for the new DA agent.

In this example, the pubs2 database is replicated on the Microsoft SQL Server database. The DA server's local agent on mars points to the Adaptive Server database on mars, while the agent on pluto points to the Microsoft SQL Server database:

```
create connection conn mars
   set type=ase
   and set agent=localagent
   and set host=mars
   and set port=5000
   and set user=sa
   and set database=pubs2
   and set password=password
  qo
create connection conn pluto
  set type=MSSQL
  and set agent=agent pluto
  and set host=pluto
  and set port=1433
  and set database=pubs2
  and set user=steve
  and set password=ibmstel1
  qo
```

**8.** View the newly created database connections:

```
show connection
go
show connection conn_mars
go
show connection conn_pluto
go
```

9. Test the database connections:

```
test connection conn_mars
go
test connection conn_pluto
go
```

**10.** Create a compareset to map the entire source table.

This example compares the Adaptive Server and the Microsoft SQL Server data:

```
create compareset authors_demo4
with
   source conn_mars dbo authors s
   target conn_pluto dbo authors t
   map
   s.au id=t.au id set key=true
```

```
and s.au_lname=t.au_lname
and s.au_fname=t.au_fname
and s.phone=t.phone
and s.address=t.address
and s.city=t.city
and s.state=t.state
and s.country=t.country
and s.postalcode=t.postalcode
go
```

11. View the compareset:

```
show compareset authors_demo4
go
```

12. Create a job.

This job creates a single comparison that uses the compareset defined in step 10. It compares all rows in the authors table:

```
create job authors_job4

add comparison cmp_authors4

set COMPARESET=authors_demo4

and set NUM_PARTITIONS to 1

and set ENABLE_ROW_COUNT to false

and set COMPARE_MODE to row_compare

and set HASH_TYPE to AGENT_HASH

go
```

Note: Set the HASH\_TYPE comparison option to agent\_hash for heterogeneous comparison. The database\_hash comparison option is used only for comparisons between Adaptive Server.

13. Execute the job to compare the data:

```
run job authors_job4
go
```

DA compares equivalent values stored in distinct datatypes accurately.

## **Changes to Connection Profile Commands**

Replication Server Data Assurance Option 15.7.1 SP110 accepts MSSQL and UDB values in the **type** parameter, when you create Microsoft SQL Server and IBM DB2 UDB connections using the **create connection** command.

You can also use the **type** parameter to enter MSSQL and UDB values in the **replace connection** and **test connection config** commands.

As of 15.7.1 SP110, you can specify an optional sessionTimeZone property for an Oracle database connection.

This property is used by the Oracle JDBC driver, when comparing TIMESTAMP WITH LOCAL TIME ZONE columns. For example:

```
create connection ora_conn1
    set type=oracle
    and set agent=agent_jupiter
    and set host=jupiter
    and set port=1521
    and set database=XE
    and set user=harry
    and set password=openSesam3
    with properties
        set sessionTimeZone='Europe/London'
go
```

The sessionTimeZone property overrides the default value.

See Replication Server Data Assurance Option Users Guide.

## **Usability Enhancements**

Replication Server Data Assurance Option 15.7.1 SP110 includes several changes to improve usability.

## **Changes to the Run Job Command**

To determine whether a job has completed, you can now use the **run job** command with the **wait** parameter rather than issuing multiple **monitor job** commands.

Earlier versions of DA required you to execute separate commands to run a job and monitor the comparison results. For example:

```
run job myJob
go
monitor job myJob [myComparison]
go
```

While waiting for DA server to complete the job, you might have had to execute the **monitor** command multiple times.

Now, you can execute a single **run job** command with the **wait** parameter and view the comparison results immediately when the job completes. For example:

```
run job myJob wait [timeout seconds]
go
```

where:

- wait the isql prompt does not return until DA server completes the job.
- **timeout** (optional) specifies a value, in seconds, after which you can regain control of the **isql** prompt if, for example, the job is taking too long to complete. Valid values are 1 to 2147483647; if you do not specify a **timeout** parameter value, the **isql** prompt waits indefinitely.

**Example 1** – waits indefinitely until the job is completed. You cannot regain the **isql** prompt control until DA server completes the job. The job is considered complete when all comparisons run successfully, or if there are errors that abort the job, or if you abort the job manually using a different **isql** prompt:

run job myjob wait go

The returned result is:

SUBMIT ERRORS	TIME	FINISH '	TIME	COME	PARISONS	READ	(S)	DIFFS	М	0	I	R	
2013-06	 5-27 10:20:51	2013-06	6-27 10:26:	:59 1		10000		0	0	0	0	- 0 (	)
(0 rows	s affected)												

In this example, you regain control of the **isql** prompt after 6 seconds approximately (the difference between the Submit Time and the Finish Time). The job is completed and the output is identical to that of show history myjob latest summary command.

**Example 2** – waits for 10 seconds before transferring control of the **isql** prompt to you. The job is considered complete when all comparisons run successfully, or if there are errors that abort the job, or if you abort the job manually using a different **isql** prompt:

run job myjob wait 10 go

The returned result is:

SUBMIT TIME ERRORS	FINISH TIN	IE C	OMPARISONS	READ	(S)	DIFFS	М	0	Ι	R
2013-06-27 10	:31:52 2013-06-2	7 10:38:02	1	10000		0	0 (	- ) (	- 0 0	0

```
(0 rows affected)
```

In this example, you regain control of the **isql** prompt after 6 seconds approximately (the difference between the Submit Time and the Finish Time). The job is completed and the output is identical to that of show history myjob latest summary command.

**Example 3** – waits for 5 seconds before transferring control of the **isql** prompt to you. The job is considered complete when comparisons run successfully, or if there are errors that abort the job, or if you abort it manually using a different **isql** prompt:

```
run job myjob wait 5
go
```

#### The returned result is:

```
COMPARISON PART STATUS SUBMIT TIME END TIME RUN PROGRESS NEXT
RETRY ERROR
```

mycmp 0 RUNNING 2013-06-27 10:49:54 1 89%
[#103] Waited 5 seconds, the job is still running.

```
(0 rows affected)
```

In this example, you regain control of the **isql** prompt after 5 seconds and the output shows the current 'running' state of the job. The job is still running and the output is identical to that of monitor job myjob command.

#### **Changes to the Show History Command**

As of Replication Server Data Assurance Option 15.7.1 SP110, the **show history** command no longer shows report files to avoid generating potentially very large report files, when you want to view the history.

In earlier versions of DA, when you executed **show history**, report files were generated along with the history in a potentially large file. For example:

```
show history myJob
go
```

Now, you must execute the **show report** command to view the report files. For example:

```
show report myJob 12
```

show report myJob latest

### Improvements to Large Object Support

In Replication Server Data Assurance Option 15.7.1 SP110, large object (LOB) support is improved, with an increase in the maximum value of the **lob\_fetch\_size** parameter, for comparing and reconciling LOBs of greater length.

## **Changes to Sybase Control Center Data Assurance Plug-In**

Sybase Control Center Data Assurance plug-in now supports Microsoft SQL Server and IBM DB2 UDB for creating database connections.

See Document Changes > SCC for Data Assurance Help: New Supported Database Platforms in the Sybase Control Center 3.2.8 ESD #2 Release Bulletin.

### Monitoring and Managing Data Assurance 15.7.1 SP110 Environment

Use Sybase Control Center (SCC) 3.2.8 ESD #2 with SCC for Data Assurance 3.2.8 SP01 to monitor Data Assurance (DA) server, and manage DA agent and database connections.

## New Features in Replication Server Data Assurance Option 15.7.1 SP100

Replication Server<sup>®</sup> Data Assurance Option15.7.1 SP100 includes support for Sybase<sup>®</sup> IQ, Oracle, and SAP HANA<sup>®</sup> as either source or target databases, data partitions for large tables, and heterogeneous comparison enhancements.

Replication Server Data Assurance Option 15.7.1 SP100 is compatible with Sybase Control Center 3.2.8. See *Sybase Control Center 3.2.8 for Data Assurance Documentation*.

## Support for Sybase IQ

Replication Server Data Assurance Option 15.7.1 SP100 supports comparisons where the source or target database is Sybase IQ.

Supported versions:

- Sybase IQ 15.4
- Sybase IQ 15.3

The jConnect<sup>TM</sup> for JDBC<sup>TM</sup> driver included with DA server and DA agent connects to a Sybase IQ database. No further configuration is required.

See create connection in the Replication Server Data Assurance Option Users Guide.

## **Support for Oracle**

Replication Server Data Assurance Option 15.7.1 SP100 supports comparisons where the source or target database is Oracle.

Supported versions:

- Oracle 11g
- Oracle 10g

**Note:** Data Assurance (DA) does not ship the Java Database Connectivity (JDBC) driver JAR file for an Oracle database. You must configure DA to use the Oracle JDBC driver, which is deployed with your Oracle installation.

See create connection and Configuring DA to Use the Oracle JDBC Driver in the Replication Server Data Assurance Option Users Guide.

## Support for HANA DB

Replication Server Data Assurance Option 15.7.1 SP100 supports comparisons where the source or target database is HANA DB.

Supported version:

• SAP HANA 1.0

**Note:** DA does not ship the JDBC driver JAR file for the HANA DB. Download the JDBC type4 driver JAR file from the SAP<sup>®</sup> Web site for your HANA DB version, and configure DA to use the JDBC driver.

See *create connection* and *Configuring DA to Use the HANA DB JDBC Driver* in the *Replication Server Data Assurance Option Users Guide*.

## **Heterogeneous Comparison**

Replication Server Data Assurance Option 15.7.1 SP100 compares row data between two or more databases in a heterogeneous comparison environment.

A heterogeneous environment means two or more of the databases in use are from different vendors.

You can compare data between any source and target database combinations. For example:

- An Adaptive Server source database and a Sybase IQ target database
- An Oracle source database with multiple target databases, for example, both Adaptive Server and Sybase IQ.
- An Adaptive Server source database and an HANA target database

DA accurately compares equivalent values stored in distinct datatypes. For example, the value 1 stored in a Sybase IQ NUMERIC column is equivalent to the value 1 stored in an Oracle NUMBER column, and to 1.0 stored in an ASE FLOAT column.

To use heterogeneous comparison:

- Configure DA to use the JDBC drivers for Oracle and HANA DB instances, if your heterogeneous comparison includes these databases.
- Create connections for each new database.
- Set the hash\_type comparison option to agent\_hash.

See create connection and Heterogeneous Comparison Deployment in the Replication Server Data Assurance Option Users Guide.

## **Data Partitions**

Replication Server Data Assurance Option 15.7.1 SP100 allows large tables to be split into logical partitions.

For maximum performance, you can run each logical partition in parallel on a database with multiple engines. The data partitions can be run in smaller groups, if DA is configured to run fewer comparisons at the same time.

**Note:** When you run a comparison with a new compareset for the first time, DA runs the comparison with a single partition to gather partition information for subsequent runs.

The SQL **where** clause on the compareset key columns defines the upper and lower partition boundaries. The boundary key values are sampled for a compareset when a comparison that uses it is run for the first time. These boundary samples are stored in the Data Assurance System Database (DASD).

On subsequent runs, any comparison that uses the same compareset uses those boundary samples to split a table into as many logical partitions as required. Each time a comparison is run, DA collects the new boundary samples for the compareset in use, and updates them in the DASD.

To view and manage the data partitions and boundary samples, use:

- **show boundary** and **drop boundary** commands to view or delete the data partition boundary samples for each compareset.
- **NUM\_PARTITIONS** comparison option to set the number of data partitions for a comparison.
- PART column in the **monitor job** and **show job** command's result set to view the data partition number for a comparison.

See *Row Comparison Job Commands* and *Data Partition Commands* in the *Replication Server Data Assurance Users Guide*.