

New Features Bulletin Replication Agent™ for DB2 UDB 15.0 for z/OS

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This bulletin describes the new features released in Replication Agent for DB2 UDB 15.0 ESD #3. No new features were released with ESD #1 or ESD #2.

These new features support DB2 version 9.1.

Big integer support

BIGINT is a new DB2 version 9.1 SQL datatype. Use BIGINT in a table when integer values for a column are too large to fit in an integer column value.

BIGINT is a binary integer and an exact numeric datatype, like SMALLINT and INTEGER. It has a precision of 63 bits.

Note Replication Agent for DB2 UDB sends the BIGINT value to Replication Server, which then passes the value to the target database for the replicated table. Because some databases may not support an integer value with the precision of BIGINT, some precision may be lost during replication.

See the IBM DB2 version 9.1 for z/OS documentation for more information.

Decimal float support

DECFLOAT is a new DB2 version 9.1 built-in SQL real-number (IEEE 754r format) datatype. Use DECFLOAT in a table when numeric values containing decimal points are too large to fit in a floating point or decimal column. Use DECFLOAT to minimize the effects of rounding or to represent extremely large values that need more precision than what is provided by an IEEE floating point value.

DECFLOAT is a finite number with a decimal point. It has a precision of up to 34 digits. The decimal position is stored in each decimal floating point value.

Note Replication Agent for DB2 UDB sends the DECFLOAT value to Replication Server, which then passes the value to the target database for the replicated table. Because some databases do not support decimal or floating point values with the precision of DECFLOAT, some precision may be lost during replication.

See the IBM DB2 version 9.1 for z/OS documentation for more information.

Extended binary value support

BINARY and VARBINARY are new DB2 version 9.1 SQL datatypes. Use BINARY and VARBINARY to expand support for binary string data, which can contain structured data, encrypted data, compressed data, images, pictures, and other values that are not text-oriented.

The BINARY datatype is a fixed-length binary string. The VARBINARY datatype is a variable-length binary string.

Note Replication Agent for DB2 UDB sends the BINARY and VARBINARY values to Replication Server, which then passes the values to the target database for the replicated table. Because some databases may not support BINARY or VARBINARY values, you may need to configure Replication Server and Replication Agent for DB2 UDB to ignore these columns.

See the IBM DB2 version 9.1 for z/OS documentation for more information.

Extended monitoring

Use the MONITOR command to scan the log and report a summary of activity.

Syntax

```
F REPJOB,C,MONITOR=nn|OFF
```

where “*nn*” represents time expressed in minutes.

Example

This example displays a trace every minute:

```
F REPJOB,C,MONITOR=1
```

When a minute has elapsed, Replication Agent for DB2 UDB writes a report similar to this to the operator console:

```
-----
LEX0076 Log Scan Summary, minutes:    1
Log Records Scanned:                510
Log Records Processed:              256
Log Process Activity
Updates:                             27
Inserts:                              101
Deletes:                              5
Records Expanded:                    10
Transaction Activity
Open:                                  1
Committed:                            8
Aborted:                               0
Maintenance User                      0
System Activity
LTMOBJECT Changes:                   0
Data Capture on/off:                 0
```

```
Network Information
Buffers Sent:           4
-----
```

Quiescing and resuming Replication Agent for DB2 UDB

Use the QUIESCE and RESUME operator commands to temporarily suspend Replication Agent for DB2 UDB when you do not want to perform a complete shutdown and restart.

For example, if you are using the REORG command on a table space that Replication Agent for DB2 UDB is monitoring, and the job ends abnormally because databases or tables are locked by Replication Agent for DB2 UDB, you can use QUIESCE to suspend Replication Agent for DB2 UDB work, and RESUME to start it again.

Note Occasionally processes that make large modifications to a monitored table space, such as REORG, may still require you to shut down and restart Replication Agent for DB2 UDB.

Syntax

```
F REPJOB,E,QUIESCE
F REPJOB,E,RESUME
```

Usage

This is how the QUIESCE and RESUME operator commands work:

- 1 Issue the QUIESCE command.
- 2 Replication Agent stops reading log records, begins to sleep, and repeatedly checks for the RESUME command.
- 3 Run your job while Replication Agent for DB2 UDB is sleeping. The job completes.
- 4 Issue the RESUME command.
- 5 Replication Agent for DB2 UDB resumes processing the log records it has in its buffers, then attempts to begin reading where it left off before the QUIESCE command, if possible.

Removing the oldest open transaction

Use the rollback oldest open transaction (ROOT) operator command to remove the oldest open transaction from the Replication Agent for DB2 UDB transaction queue.

If a very large transaction (such as a transaction that deletes all rows in a 600000-row table) has been captured by Replication Agent for DB2 UDB, the transaction causes a large number of records to be processed by Replication Agent for DB2 UDB if it is monitoring the table.

Because Replication Agent for DB2 UDB processes data in sequence, the large transaction may hold up many other transactions. Also, on rare occasions, a transaction may end in an abnormal way in DB2 so that a COMMIT or ROLLBACK is never issued.

Eventually, the large transaction becomes the oldest open transaction. You can use the ROOT operator command to remove the transaction from the Replication Agent for DB2 UDB transaction queue.

Note It may be more efficient to turn off replication for the table and DELETE the target table and the source table instead of using the ROOT command.

Syntax

F REPJOB,E,ROOT

Usage

This is how the ROOT command works:

- 1 Issue the ROOT command, which creates a rollback transaction record for the oldest open transaction.
- 2 Replication Agent for DB2 UDB processes the rollback as if it came from the log. The transaction is automatically removed from the queue and all other log records for that transaction are ignored.
- 3 Replication Agent for DB2 UDB continues to process all other records for tables that it is monitoring.

Reordered row format support

Use the new DB2 version 9.1 reordered row format (RRF) option to automatically move variable-length column data to the end of each physical row of data. Because log records are a copy of what is stored in the database for each row, log records in Replication Agent for DB2 UDB also are kept in the RRF format.

Each log record has a bit flag that indicates whether the table row data is in column or reordered format. RRF:

- 1 Places fixed-length columns at the front of the row.
- 2 Lists displacements to the variable-length columns after the fixed columns.
- 3 Places all variable columns at the end of the row.

To the DB2 user, columns appear to be in the same order in which they were defined. DB2 and Replication Agent for DB2 UDB both process the row's columns in the order that they were specified at table creation. The row's columns are passed to Replication Server in the same order as in earlier versions of Replication Agent for DB2 UDB.

See the IBM DB2 version 9.1 for z/OS documentation for more information.

Tracing memory and expanding log records

There are two new options for the TRACE operator command: *mem* and *exp*. The *mem* option allows you to trace memory problems in the log extract. The *exp* option allows you to display log records in the SYSPRINT output that were not expanded automatically by the DB2 Instrumentation Facility Interface (IFI). Both options are toggle switches.

Syntax

```
F REPJOB,E,TRACE=on|off|qid|mem|exp
```

Example of *mem* option output

TRACE=mem generates SYSPRINT output with a trace similar to this:

```
MEMTRACE size 6000, at 0FBA6890 from 00006BA6. sp= 0.
MEMTRACE size 22, at 0FA01998 from 00006C52. sp= 0.
MEMTRACE size 122, at 0FAFA3C0 from 00006C52. sp= 0.
MEMTRACE size 22, at 0FAFA3A8 from 00006C52. sp= 0.
MEMTRACE size 122, at 0FAFA328 from 00006C52. sp= 0.
MEMTRACE size 22, at 0FAFA310 from 00006C52. sp= 0.
MEMTRACE size 122, at 0FAFA290 from 00006C52. sp= 0.
```

This trace shows a one-time request for a 6000-byte work area and storage for three reusable column header areas of 22 and 122 bytes. It also shows the length, the storage pointer, the displacement in the log extract that requested the storage, and the storage pool. If there is a memory problem in the log extract, this trace identifies it.

How the *exp* option works

TRACE=exp displays log records in the SYSPRINT output that were not expanded automatically by the IFI interface. These log records are expanded by Replication Agent for DB2 UDB using image copy compression dictionaries.

Occasionally, log record formats are modified by IBM to facilitate DB2 enhancements. These modifications may cause Replication Agent for DB2 UDB to have problems when expanding log records. If Replication Agent for DB2 UDB cannot expand a log record in this situation, Sybase Technical Support can use the display to help diagnose and fix the problem.

Tracing the IFI API

Use the new TRACE configuration to trace the DB2 IFI API being used by Replication Agent for DB2 UDB to read DB2 log records.

Syntax

TRACE=IFI

When this trace is turned on, Replication Agent for DB2 UDB displays trace messages with information about the IFI process.

Note Because this trace produces a large amount of output, use it only temporarily to research a problem that appears to be related to the DB2 database. Sybase Technical Support personnel may request that you start Replication Agent for DB2 UDB with this trace turned on when they are researching a problem.

LTMIFI output

This example shows typical Log Transfer Manager Instrumentation Facility Interface (LTMIFI) output when the IFI trace is on:

```
LTMIFI initialization
LTMIFI WLI RC=00000004 RES=00E60800
LTMIFI IFI read H
LTMIFI IFI read F
LTMIFI Check 306
LTMIFI records read 116
```

IFI return codes

When the IFI trace is on, all return codes from the DB2 IFI API are displayed with a short explanation, even though you can ignore the messages. For example:

```
IFI 04/00E60804 No data was returned for the request
```

The return code 04 indicates that the message is a warning. Messages with return codes higher than 04 are always traced and placed on the console.

Note Messages that are returned when the IFI trace is on are not preceded by “LTM.” This helps these messages stand out from all the other LTM console messages, because they may require immediate attention or may be the cause for an abnormal termination.

Example

In this example, a bootstrap data set (BSDS) is made unavailable at start-up and an invalid Relative Byte Address (RBA) is used to start Replication Agent for DB2 UDB. These issues may cause the IFI interface to become unstable and Replication Agent for DB2 UDB to terminate abnormally.

The IFI message makes this information available to the operator immediately so that he or she can make changes before restarting Replication Agent for DB2 UDB is with a valid RBA field.

```
LEX0025LogprocessingtobeginatlogRBA000000000FF.  
IFI 08/00E60863 A resource was unavailable for a READS  
306  
LEXTRACE Read Error rc=00000008 reason=00E60863
```

See the IBM DB2 version 9.1 for z/OS documentation for more examples of the TRACE command.