



P.O. Box 824
Auburn, AL 36831-0824

(334) 444-3492

<http://conflexion.com>

Simio Output Tables

Problem Description

We have a Simio model that uses an external process requiring access to the complete contents of a Simio output table. The external process output could be any of: Adding new rows, Changing the attributes of existing rows, and/or Deleting existing rows. In this example Simio will hold the *golden* copy of the data, but we envision other cases in which the *golden* copy would be externally with Simio pushing updates asynchronously and pulling data as needed.

System Requirements

To run this example as-is you'll need:

- Simio with a better-than-personal license (too many process steps)
- A SQL Server on which you can create a database. The Simio processes work with any database you can connect with DbReadWrite but the stored procedures for this example are SQL Server specific.

High-Level Process

In this example model we'll use Simio's DbReadWrite user extension to replicate the output table into a SQL Server database. The Simio process outline is:

1. Simio pushes each row via Search + DbWrite steps
2. Execute the external process (simulated by a SQL Server stored procedure)
3. Simio pulls each row via Search + DbRead steps
4. Simio pulls deletions via a DbQuery step in a loop
5. Simio pulls additions via a DbQuery step in a loop (DbRead is not possible because it requires a search condition)

Getting Started (initialize the system)

- Execute the *InitializeDatabase.sql* script in SQL Server Management Studio to create the tables and example stored procedures.
- Set the DbConnect Parameters (change as required for your system)
 - ConnectionString:
Server=localhost\SQLEXPRESS;Database=XOutputTable;Trusted_Connection=True;
 - Provider Name: SqlClient Data Provider

- Configure the Simio Data Importer to work with your database server.

Running the Example

1. Open the Simionly.spfx model in Simio
2. Depress Simio's run button. The process steps outlined have a breakpoint between each of the listed steps so that you can examine the database and Simio tables to see how each part works. Depress the run button again after examining the tables at each breakpoint.
 - a. **Post Write** – Simio has generated 9 rows into the output table (image on right) these have been written, using Search + DbWrite, to the database table (image on left).

Query Allsql - TH...UMPER(gsmith (52))

```

SELECT * FROM Objects;
*/
SELECT * FROM dbo.MainTable ORDER BY IntPK
SELECT * FROM dbo.DeleteTable ORDER BY IntPK
SELECT * FROM dbo.AddTable ORDER BY SourceIntPK
  
```

100 %

	IntPK	RealState	IntegerState	BooleanState	DateTimeState	StringState	ObjectRefState	SourceIntPK
1	1	561.118	668	0	2021-04-12 00:00:00.000	X01		1
2	2	553.7531	613	0	2021-04-12 00:00:00.000	L04		2
3	3	535.7766	455	0	2021-04-12 00:00:00.000	X04		3
4	4	403.5828	188	0	2021-04-12 00:00:00.000	X03		4
5	5	602.4132	599	0	2021-04-12 01:00:00.000	X02		5
6	6	583.3544	160	0	2021-04-12 01:00:00.000	X02		6
7	7	139.6680	645	0	2021-04-12 01:00:00.000	L01		7
8	8	452.0753	279	0	2021-04-12 01:00:00.000	X03		8
9	9	727.7803	646	0	2021-04-12 01:00:00.000	L01		9

IntPK

DBIntPK RealState IntegerState BooleanState DateTimeState StringState ObjectRefState SourceIntPK

Query executed successfully... THUMPER(SOLEXPRESS (15.0 RTM)) THUMPER(gsmith (52)) XOutputTable 00:00:00 9 rows

Ln 10 Col 1 INS

- b. **Post Raptomize** (Random simulation of Optimizer). The database stored procedure *Raptomize* has selected 2 random rows for deletion (6 and 8), 2 different random rows to be parents for adding rows (2 added and the “parents” in the main table are edited – hence difference between the database tables and the Simio output table for rows 2 and 5). Note that the Simio output table has not

changed.

The screenshot shows a SQL Server Enterprise Manager interface. The query window displays a query that selects data from three tables: `dbo.MainTable`, `dbo.DeleteTable`, and `dbo.AddTable`, ordered by `IntPK`. The results pane shows a table with 13 rows and 9 columns: `IntPK`, `RealState`, `IntegerState`, `BooleanState`, `DateTimeState`, `StringState`, `ObjectRefState`, and `SourceIntPK`. The table view on the right shows the same data, with the `ObjectRefState` column populated with values like `DC04`, `DC02`, and `DC03`.

Int PK	Real State	Integer State	Boolean State	Date Time State	String State	Object Ref State	Source Int PK
1	561.1180	668		4/12/21 12:00:00 AM	X01	[None]	
2	553.7530	613		4/12/21 12:00:00 AM	L04	[None]	
3	535.7766	455		4/12/21 12:00:00 AM	X04	[None]	
4	403.5828	188		4/12/21 12:00:00 AM	X03	[None]	
5	602.4132	599		4/12/21 1:00:00 AM	X02	[None]	
6	583.3544	160		4/12/21 1:00:00 AM	X02	[None]	
7	139.6680	645		4/12/21 1:00:00 AM	L01	[None]	
8	452.0753	279		4/12/21 1:00:00 AM	X03	[None]	
9	727.7803	646		4/12/21 1:00:00 AM	L01	[None]	

- c. **Post Read** The database `MainTable` has been imported, via `Search + DbRead`, into the Simio output table. Note that the `ObjectRefState` attributes are populated and that the edited rows, 2 and 5, have a different `IntegerState` value than in the previous screen snapshot.

The screenshot shows a SQL Server Enterprise Manager interface. The query window displays a query that selects data from three tables: `dbo.MainTable`, `dbo.DeleteTable`, and `dbo.AddTable`, ordered by `IntPK`. The results pane shows a table with 13 rows and 9 columns: `IntPK`, `RealState`, `IntegerState`, `BooleanState`, `DateTimeState`, `StringState`, `ObjectRefState`, and `SourceIntPK`. The table view on the right shows the same data, with the `ObjectRefState` column populated with values like `DC04`, `DC02`, and `DC03`.

Int PK	Real State	Integer State	Boolean State	Date Time State	String State	Object Ref State	Source Int PK
1	561.1180	668		4/12/21 12:00:00 AM	X01	DC04	
2	553.7531	239		4/12/21 12:00:00 AM	L04	DC02	
3	535.7766	455		4/12/21 12:00:00 AM	X04	DC03	
4	403.5828	188		4/12/21 12:00:00 AM	X03	DC02	
5	602.4131	280		4/12/21 1:00:00 AM	X02	DC02	
6	583.3544	160		4/12/21 1:00:00 AM	X02	DC02	
7	139.6680	645		4/12/21 1:00:00 AM	L01	DC03	
8	452.0753	279		4/12/21 1:00:00 AM	X03	DC02	
9	727.7803	646		4/12/21 1:00:00 AM	L01	DC02	

- d. **Post Delete** The rows from the database DeleteTable table (6 and 8) have been deleted from that table and from Simio's output table. These use DbQuery and DbExecuteand DDbDbExecute in a loop

Query Allsql - TH_UMPER(gsmith (52))

```

SELECT * FROM Objects;
*/
SELECT * FROM dbo.MainTable ORDER BY IntPK
SELECT * FROM dbo.DeleteTable ORDER BY IntPK
SELECT * FROM dbo.AddTable ORDER BY SourceIntPK

```

Results

IntPK	RealState	IntegerState	BooleanState	DateTimeState	StringState	ObjectRefState	SourceIntPK
1	561.1180	668	0	2021-04-12 00:00:00.000	X01	DC04	1
2	553.7531	239	0	2021-04-12 00:00:00.000	L04	DC02	2
3	535.7766	455	0	2021-04-12 00:00:00.000	X04	DC03	3
4	403.5828	188	0	2021-04-12 00:00:00.000	X03	DC02	4
5	602.4131	280	0	2021-04-12 01:00:00.000	X02	DC02	5
6	583.3544	160	0	2021-04-12 01:00:00.000	X02	DC02	6
7	139.6680	645	0	2021-04-12 01:00:00.000	L01	DC03	7
8	452.0753	279	0	2021-04-12 01:00:00.000	X03	DC02	8
9	727.7803	646	0	2021-04-12 01:00:00.000	L01	DC02	9

IntPK

DBIntPK	RealState	IntegerState	BooleanState	DateTimeState	StringState	ObjectRefState	SourceIntPK
1	553.7531	374	0	2021-05-06 17:17:02.850	L04	DC01	2
2	602.4131	319	0	2021-05-06 17:17:02.850	X02	DC03	5

Query executed successfully... THUMPER(SQLEXPRESS (15.0 RTM)) THUMPER(gsmith (52)) XOutputTable 00:00:00 11 rows

- e. **Post Add** The rows from the database AddTable (DbIntPK 1 and 2, based on IntPK rows 2 and 5, respectively) have been deleted from that table and added to the Simio output table with the new IntPK's 10 and 11

Query Allsql - TH_UMPER(gsmith (52))

```

SELECT * FROM Objects;
*/
SELECT * FROM dbo.MainTable ORDER BY IntPK
SELECT * FROM dbo.DeleteTable ORDER BY IntPK
SELECT * FROM dbo.AddTable ORDER BY SourceIntPK

```

Results

IntPK	RealState	IntegerState	BooleanState	DateTimeState	StringState	ObjectRefState	SourceIntPK
1	561.1180	668	0	2021-04-12 00:00:00.000	X01	DC04	1
2	553.7531	239	0	2021-04-12 00:00:00.000	L04	DC02	2
3	535.7766	455	0	2021-04-12 00:00:00.000	X04	DC03	3
4	403.5828	188	0	2021-04-12 00:00:00.000	X03	DC02	4
5	602.4131	280	0	2021-04-12 01:00:00.000	X02	DC02	5
6	583.3544	160	0	2021-04-12 01:00:00.000	X02	DC02	6
7	139.6680	645	0	2021-04-12 01:00:00.000	L01	DC03	7
8	452.0753	279	0	2021-04-12 01:00:00.000	X03	DC02	8
9	727.7803	646	0	2021-04-12 01:00:00.000	L01	DC02	9

IntPK

DBIntPK	RealState	IntegerState	BooleanState	DateTimeState	StringState	ObjectRefState	SourceIntPK
1	553.7531	374	0	2021-05-06 17:17:02.850	L04	DC01	2
2	602.4131	319	0	2021-05-06 17:17:02.850	X02	DC03	5

Query executed successfully... THUMPER(SQLEXPRESS (15.0 RTM)) THUMPER(gsmith (52)) XOutputTable 00:00:00 9 rows