

Simio API Note: Excel ReadWrite Steps

Nov 2020 (Dan Houck)

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Overview

This API Note describes an implementation of a Read and Write step for Excel spreadsheets, and specifically using the Open-Source EPPlus package.

These steps are User Extensions, and therefore can be modified to suit your needs.

The entire implementation can be found at [GitHub/SimioLLC/ExcelReadWriteEPPlus](https://github.com/SimioLLC/ExcelReadWriteEPPlus), which includes this documentation, all source, example data and sample models.

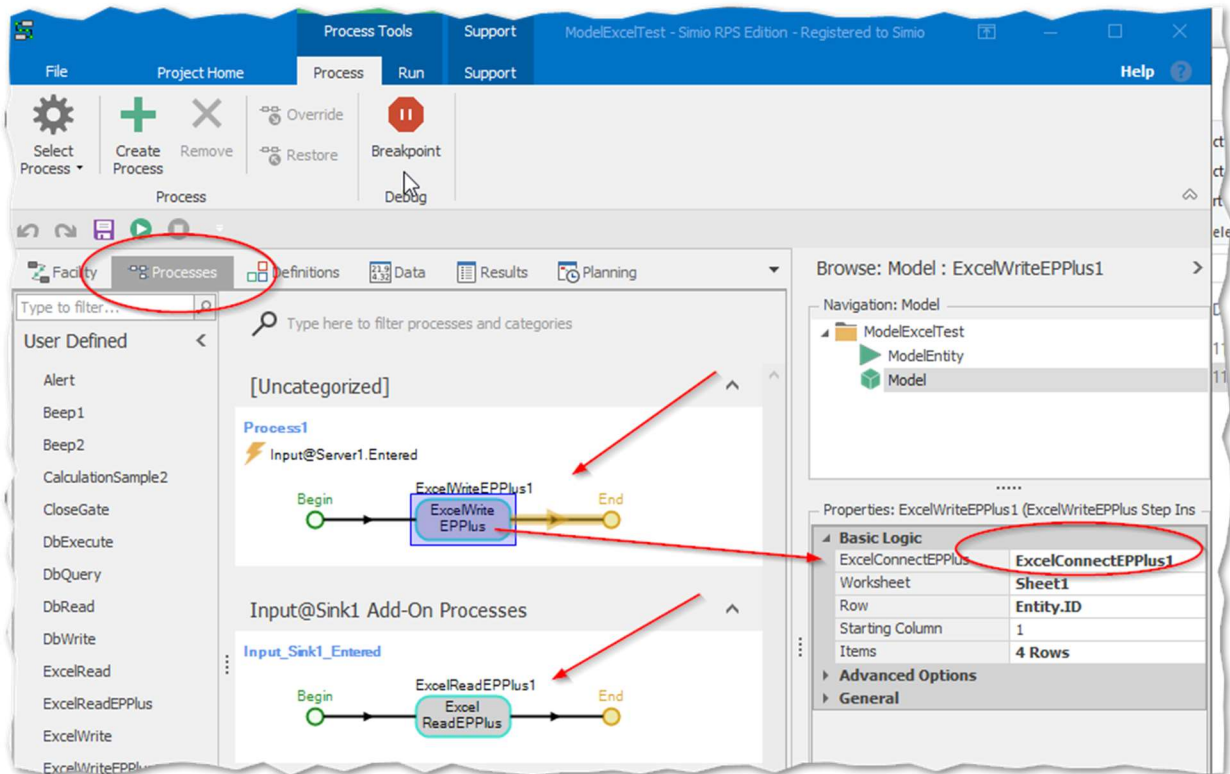
Quick Start

To demonstrate the use of these steps you can perform the following steps:

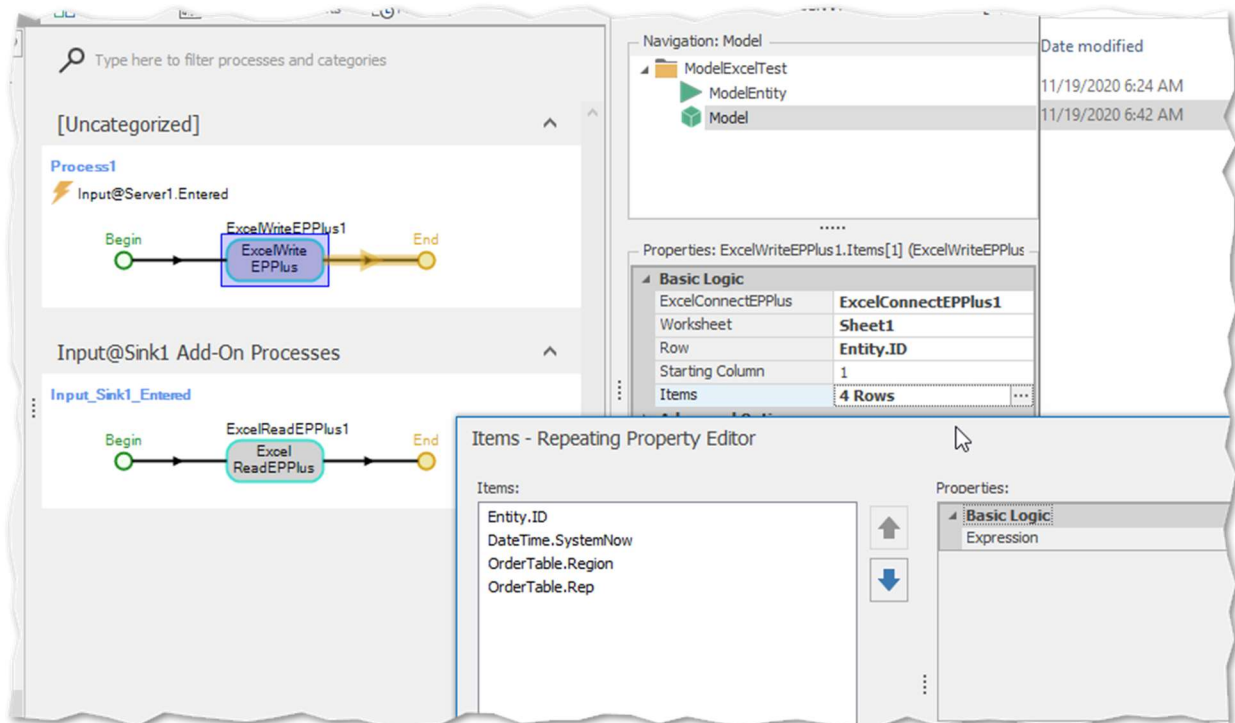
It is assumed that you have downloaded the GitHub repository to your computer.

1. Create a folder `c:/test` to hold the example files. The included sample Simio project expects to find this folder.
2. Copy the Excel files found under the Data folder to this location.
3. Put the DLLs found under the Executables folder to your Documents > SimioUserExtensions folder.

Now we are ready. When you open the Simio project “ModelExcelTest.spfx” and navigate to Process > Processes you should see the ExcelWriteEPPlus and ExcelReadEPPlus steps. Select the Write step to display its properties, and there should be a defined ExcelConnectEPPlus1 element that references the ExcelWriteStepTest.xlsx file. Similarly, the Read step should have ExcelConnectEPPlus2 referencing ExcelReadStepTest.xlsx.



The Write step has "Item" defined, which is a Simio repeating group with 4 entries:



Also notice that its row is defined according to its Entity.ID.

Each time an Entity executes this step, it is going to write an Excel row to the location specified by its ExcelConnectEPPlus1 connection, and that row will have these 4 pieces of data.

After the run completes the results are written to the Excel file (Note: it will fail if you have the Excel file opened in Excel).

Running the Code

(Not complete yet)

Appendix – Using the DevExpress Excel Spreadsheet Library

If you have the (paid) license for it, the Spreadsheet library provided by DevExpress can also be used as an Excel interface. Here are its main characteristics.

See Also:

<https://documentation.devexpress.com/OfficeFileAPI/DevExpress.Spreadsheet.Worksheet.Cells.property>

Objects

The objects are:

Workbook – The spreadsheet document

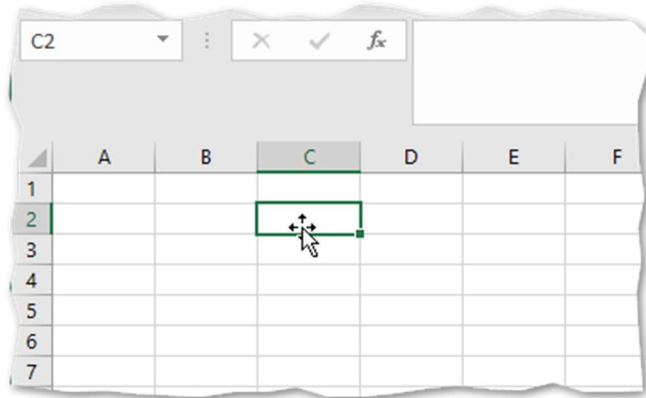
Worksheet – Pages within the Workbook

Cells and Cell Ranges

Rows and Columns: 1,048,576 rows and 16,384 columns.

Cell Referencing

DevExpress has a variety of ways to reference cells.



Note that array referencing is 0-based, so Column "A" is index 0, and the first row is index 0.

Cell referencing for Cell A1

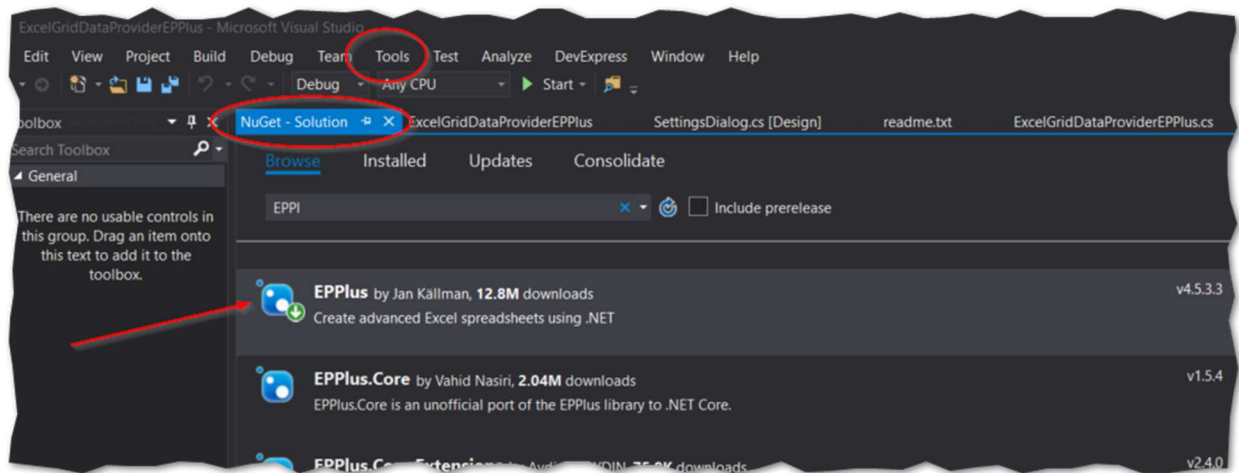
- `Worksheet.cells["A1"]` // where the letter ("A") is the column
- `Worksheet.cells[0,0]` // This is in row, column format
- `Worksheet.cells.Columns[0],["1"]`

Cell referencing for Cell C2. Column "C" is index 2, "2" is index 1

- `Worksheet.cells["C2"]`
- `Worksheet.cells[1,2]` // Note that row is first
- `Worksheet.cells.Columns["C"],[1]`
- `Worksheet.cells.Rows[1]["C"]`

Appendix – Using the EPPlus Excel Spreadsheet

The EPPlus Excel interface is a free Open Source API and can be retrieved as a NuGet package from within Visual Studio (VS > Tools > .NuGet Package Manager > Manage NuGet Packages for Solution). The package is easy to find with “EPPlus” (it is the one with over 12M downloads by Jan Kallman).

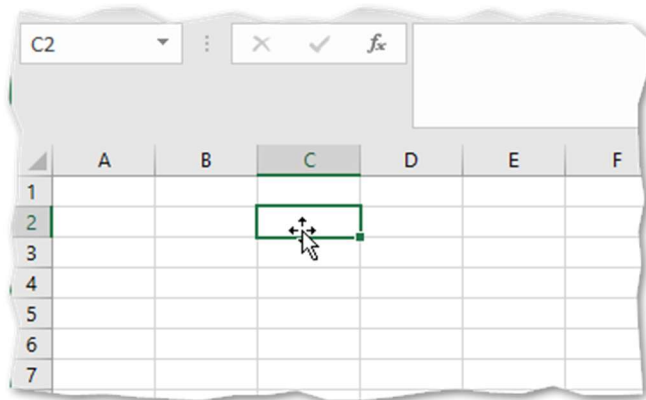


EPPlus provides an interface that is different from DevExpress. The rest of the appendix explains the usage and differences.

Components

Cell Referencing

The method “Cells()” for a Worksheet retrieves a CellRange, which is 1 or more cells.



Cells can be referenced in multiple ways.

An array reference is always [row, column]

Note that EPPLUS referencing is 1-based. So, the column A is index 1, and the first row is index 1

Cell Referencing for cell "A1":

Worksheet.Cells["A1"].Value

Worksheet.Cells[1,1].Value

Cell Referencing for cell "B1":

Worksheet.Cells["B1"].Value

Worksheet.Cells[1,2].Value

Cell Referencing for "B3":

Worksheet.Cells["B3"]

Worksheet.Cells[3,2]

References:

<https://github.com/JanKallman/EPPlus/wiki/Getting-Started>