MFCS Access SimApi User Guide

Contents

1 Introduction

This is the user guide for the MFCS Access SimApi from Sartorius Stedim Data Analytics.

A SimApi is the connection between the Umetrics® Suite and external data sources.

The MFCS Access SimApi described is the connector between a Sartorius **BioPAT MFCS/win 3.1** system (referred to as MFCS in this document) and SIMCA®-online Solution and SIMCA® Multivariate Data Analysis Solution.

For a detailed list of versions of this SimApi, see the **Version Info.txt** file that comes with the installation.

For more information on SimApis, see www.sartorius.com/umetrics-simapi.

1.1 Support

This SimApi is developed by Sartorius Stedim Data Analytics.
For support, please visit www.sartorius.com/umetrics-support

For questions about configuring or using BioPAT MFCS/win 3.1 please use the regular support channel for that product. It is developed by a different team at Sartorius.

1.2 Features

The SimApi implements the following SimApi features; Refer to http://www.sartorius.com/umetrics-simapi#FeatureMatrix to learn more about the general SimApi features.

- Connect to a Sartorius MFCS 3.1 server
- Connects to a network share of the MFCS server computer. Alternatively, can also be run locally on that computer
- Uses MFCS credentials to access the databases
- Exposes each process unit in MFCS as its own node, with the current variables of the process unit as tags
- Current and historical data for numerical values of variables, including computed values
- Bad data in MFCS is represented by a very large positive or negative number (for calculated variables). This is translated to missing data by the SimApi.
- Batch context node functionality in each node for a process unit. The batch node exposes the active batch and historical batches and is required to execute batches in SIMCA-online
- A synthetic process batch data tag, called **<BatchId>,** in each node, enabling batch project execution in SIMCA-online
- Multiple instances of the SimApi can be run on the same SIMCA-online server
- Connection resiliency – the SimApi reestablishes the connection to the data source automatically after being disconnected
- SimApi log file for troubleshooting

Some of these features are explained below where important limitations are explained.

1.2.1 Network requirements and performance

When the SimApi is connecting to databases over a file share, performance will suffer if the computer running SMICA or SIMCA-online is too far away from the MFCS computer in the network. We recommend they are located on the same network segment so that latency (ping time) is low, and bandwidth is high.

1.2.2 Process units and their variables

The SimApi enumerates process units and their variables at initialization. Only the process units and variables visible at this time are available through the SimApi.

This means that process units or variables that have been deleted or added by an MFCS administrator are not available. Specifically, that all historical batches that ran in such a unit are not available, and measurements for deleted variables are not available for historical batches. New variables or units are not available until the SimApi is restarted.

1.2.3 Inaccessible batches in MFCS

The SimApi can only see data for batches that are saved in folders that are accessible by the SimApi.

MFCS lets administrators manage batch databases for batches, so that batches can be moved to new locations or even deleted. If the new location of batches is not accessible to the SimApi, those batches will not contain any data when the SimApi is used.

If you can't read data for older batches and you see the following error message in the SimApi log file you can follow the instructions in chapter 4 to make them available for the SimApi.

```
[2022-08-09T15:51:54.2796793+08:00] [TID:3] [Error] [ProcessUnitNode.OpenConnectionTo]
Failed to open connection to: 'C:\MFCS_win\Database\BATCHES\RC18Q0122034 2000L.mdb' using driver 'Microsoft Access Driver (*.mdb, *.accdb)'
ERROR [HY024] [Microsoft][ODBC Microsoft Access Driver] "

ERROR [IM006] [Microsoft][ODBC]SQLSetConnectAttr

ERROR [HY024] [Microsoft][ODBC Microsoft Access Driver] "
```

1.2.4   Batch context node and its corresponding synthetic process batch data tag
A batch context node is needed by SIMCA-online to execute batch projects. The batch node keeps track of when batches start and stop.

For MFCS, the SimApi exposes batch nodes for each process unit separately. Each process unit has its own batch node for its batches.

By configuring SIMCA-online to use a specific process unit's node as the batch node, SIMCA-online will see batches in that unit, and can execute them to generate predictions.

However, not only a batch node is needed for batch project execution in SIMCA-online. It also needs a batch identifier tag specified for the logical unit in SIMCA-online where a phase model can execute. The SimApi exposes such a tag, called <BatchId>, for use by SIMCA-online.

For details about batch project execution, refer to the SIMCA-online Technical Guide and the help in SIMCA-online.

1.3   Location for log file and settings
The SimApi stores its log files in the **Program Data** folder[1] in the following location:

%programdata%\Umetrics\SimApi, where %programdata% maps to the actual folder on your computer. It defaults to C:\ProgramData.

The MFCS log file is useful for troubleshooting. The log file is named MFCSAccessSimApi*.log.

You can change the log level that affects how much logging is made in the graphical configuration utility. Debug-level logging gives the most verbose logs, which is useful for troubleshooting, but can affect performance negatively.

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[1] This folder is hidden in Windows by default. In order to see it in Windows Explorer you configure File Explorer to show hidden files. Note that you still can navigate to a hidden folder by copying and pasting the folder path to File Explorer's address bar.

2 Prerequisites

For the SimApi to work the following are required:

- A **MFCS/win version 3.1 system**. It is likely to work with earlier versions, as well as later versions if they are backward compatible.

- Installation of the 32-bit SimApi for a 32-bit SIMCA or SIMCA-online, a 64-bit SimApi for 64-bit SIMCA or SIMCA-online

- A 64-bit or 32-bit **Microsoft Access Runtime**, matching the SimApi you intend to use

- A Microsoft Access ODBC driver matching the SimApi you intend to use

- The SimApi needs **read/write[2] access to the MFCS databases** over a network share, or locally on the MFCS server computer.

Please read the sub sections for details.

2.1 Microsoft Access Runtime

The MFCS databases are based on Microsoft Access. The SimApi requires the Microsoft Access runtime to be installed on the computer running the SimApi.

Note that the **32-bit** SimApi requires 32-bit Access runtime and ODBC drivers. The **64-bit** SimApi requires the 64-bit Access runtime and ODBC drivers.

If you already have Office installed (often this is 32-bit) on the computer running the SimApi, it might work without a separate runtime. You can also obtain and install the Microsoft Access 2016 runtime on https://www.microsoft.com/en-us/download/confirmation.aspx?id=50040. There are both 64-bit x64 version and the 32-bit x86 version.

2.2 Microsoft Access ODBC drivers

The SimApi uses Microsoft ODBC drivers to access the databases. The currently installed drivers can be see in Windows control panel **ODBC Data Sources.** Notice there are separate programs to see 32-bit and 64-bit ODBC drivers. Search Start in Windows to find these programs.

We have tested these ODBC drivers successfully:

- The Access runtime includes the driver **Microsoft Access Driver (*.mdb, *.accdb)** version 16.00.4266.1001 (ACEODBC.DLL) which can be used.

- You can also obtain the latest driver from the Microsoft Access Database Engine 2016 redistributable at https://www.microsoft.com/en-us/download/details.aspx?id=54920. At the time of writing this version is **Microsoft Access Driver (*.mdb, *.accdb)** version 16.00.4513.1000 (ACEODBC.DLL.

- We have also tested the 32-bit **Microsoft Access Driver (*.mdb)** version 1000.17763.01 (ODBCJT32.DLL) that comes with 32-bit Office 365.

Notice that you specify the *driver name* (**bold in the bullet list above**) in the configuration GUI of the SimApi (see below). The driver name is all that is needed for the SimApi to find all MFCS databases in the configured database folder[3].

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[2] The SimApi does not change data in the databases, write-access is a technical requirement by the Microsoft Access runtime used to connect to the databases.

[3] You need not create an ODBC data source for the MFCS SimApi (unlike for the ODBC SimApi). Only the driver is needed.

2.3 Network share or local access to the MFCS databases

The SimApi needs read/write access to the internal databases[4] of MFCS. The databases are by default located in the folder C:\MFCS_win\Database of the MFCS server computer.

- If the SimApi (and thus SIMCA-online or SIMCA) is run on that same computer you can specify the local folder directly (typically C:\MFCS_win\Database).

- If the SimApi is run on another computer in the same network, the database folder must be shared in Windows with read/write-access to the user running the SimApi (the user running SIMCA, or the service account of the SIMCA-online server[5]). The default share is \\server\MFCS_win\Database.

    - The field **BatchDir_1** found in **WKST.ini** must be changed from a local path to a UNC path. The **server name must be the same** as configured in the SimApi configuration **Database folder** field. WKST.ini can be found in the MFCS_win install directory.

      Example on updating BatchDir_1 field:
      BatchDir_1=C:\MFCS_win\Database\BATCHES
      to
      BatchDir_1=\\myserver.sartorius.com\MFCS_win\Database\BATCHES

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[4] The required databases are MFCSWIN.MDW, MFCSCONF.MDB, MFCSBDIR.MDB, and the individual batch databases for all batches that should be accessible to the SimApi (MFCS stores historical data for finished batches in individual databases that can be moved or deleted by administrators. If they are not accessible to the SimApi data is not available for those batches).

[5] If the service is running as Local System, you can configure access to the network share to the computer account of the server computer. It is called \\domain\$servername for a domain joined server computer.

3 Installation and setup

First refer to the **SimApi Guide** at www.sartorius.com/umetrics-simapi for step by step instructions for installing a SimApi.

After installing it, continue below to configure the SimApi settings.

3.1 Configuring SimApi settings

To change settings for the SimApi in SIMCA-online; launch the Server Options utility, and on the SimApi tab, click **Configure...** for the SimApi instance you want to configure. The same guidelines apply to SIMCA, although all screenshots and examples below are of SIMCA-online.

The following dialog is displayed. Configure the settings you require for you environment. Refer to the descriptions in the dialog, and to the explanations in section 2 above.

After saving and exiting, the SIMCA-online server service needs to be restarted for the changes to be effective.
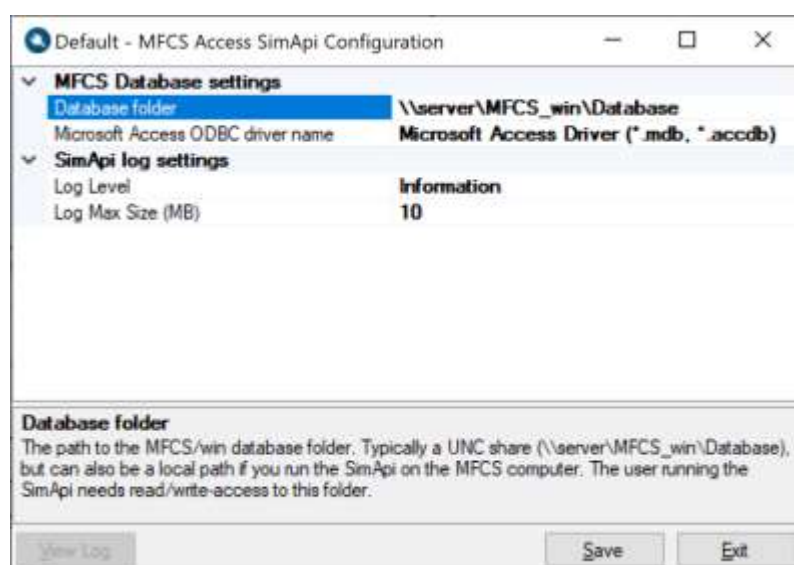
3.2 Configuring MFCS/win 3.1

You need to change the deadband for the _BatchAge variable to 0 in order for it to work correctly in SIMCA-online, otherwise the value cannot be used for maturity.

3.3 A configuration example

Here is a short outline of the steps required to install and configure the SimApi:

1. Install the MFCS SimApi itself by clicking through the setup program. 32-bit or 64-bit depending on the SIMCA or SIMCA-online version.
2. Install the prerequisite Microsoft Access runtime and ODBC driver (see above).
3. Change Log Level to Debug (from Information). This makes the log file contains more information which might be helpful when troubleshooting. When the SimApi works, you may change back to Information.
4. Specify the database folder, make sure this folder is accessible with read/write access, by the account running the SimApi. This means the user running SIMCA, or the SIMCA-online service account.
5. Specify the Microsoft Access driver name matching the one you see in ODBC Data Sources in Windows, (32-bit or 64-bit depending on the SIMCA software you run)
6. Save the settings, and Exit.

Then you should test the SimApi:

1. Use SIMCA to obtain data, or re-start the SIMCA-online server service, connect with a client and Extract some data from the MFCS SimApi on the file Menu.
2. If the SimApi doesn't work, open its log file and see why. You'll find the log file in the folder %programdata%\Umetrics\SimApi

The document SimApi Planning and Installation Guide contains detailed instructions for how to test and troubleshoot a SimApi, so please see that document available from www.sartorius.com/umetrics-simapi.

4 Move historical batches in MFCS

The SimApi can only see data for batches that are saved in folders that are accessible by the SimApi, see 1.2.3.

The instructions below are only true if the WKST.ini file was changed to use an address instead of a path after some batches has already been produced (which means the older batches are still referred to as a local path internally in MFCS and not as an address).

If the SimApi log show this error message

```
[2022-08-09T15:51:54.2796793+08:00] [TID:3] [Error] [ProcessUnitNode.OpenConnectionTo]
Failed to open connection to: 'C:\MFCS_win\Database\BATCHES\RC18Q0122034 2000L.mdb' using driver 'Microsoft Access Driver (*.mdb, *.accdb)'
ERROR [HY024] [Microsoft][ODBC Microsoft Access Driver] "

ERROR [IM006] [Microsoft][ODBC]SQLSetConnectAttr

ERROR [HY024] [Microsoft][ODBC Microsoft Access Driver] "
```

You can tell that the batch it is trying to read historical data from has the wrong path (see the red underline) you can work around the issue by moving the batch in the MFCS admin tool. That way the path to the batch gets updated to use the settings entered in the WKST.ini file.

How to do the work around

In the MFCS Shell, click Run and then Batch Management to see the batches

Find the batch mentioned in the SimApi log in the list of batches

```
[2022-08-09T15:51:54.2796793+08:00] [TID:3] [Error] [ProcessUnitNode.OpenConnectionTo]
Failed to open connection to: 'C:\MFCS_win\Database\BATCHES\RC18Q0122034 2000L.mdb' using driver 'Microsoft Access Driver (*.mdb, *.accdb)'
ERROR [HY024] [Microsoft][ODBC Microsoft Access Driver] "

ERROR [IM006] [Microsoft][ODBC]SQLSetConnectAttr

ERROR [HY024] [Microsoft][ODBC Microsoft Access Driver] "
```
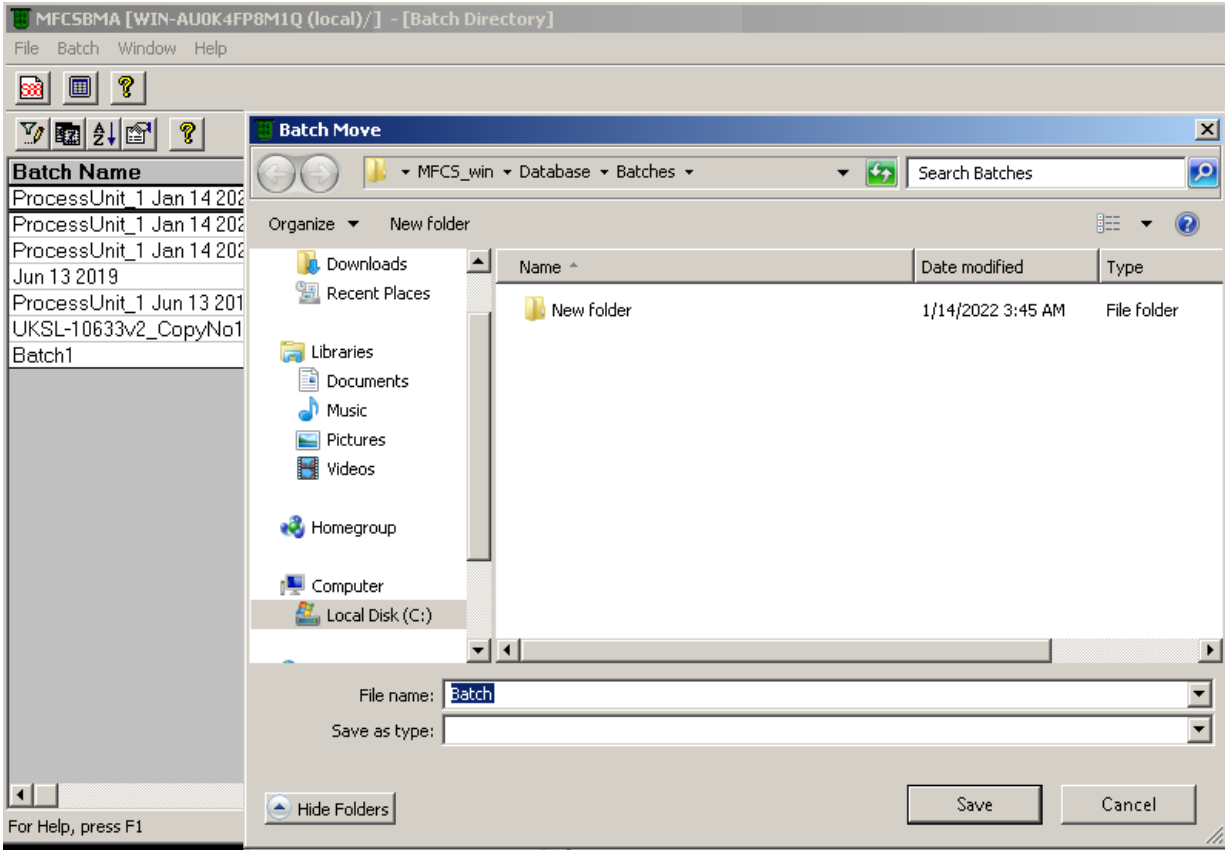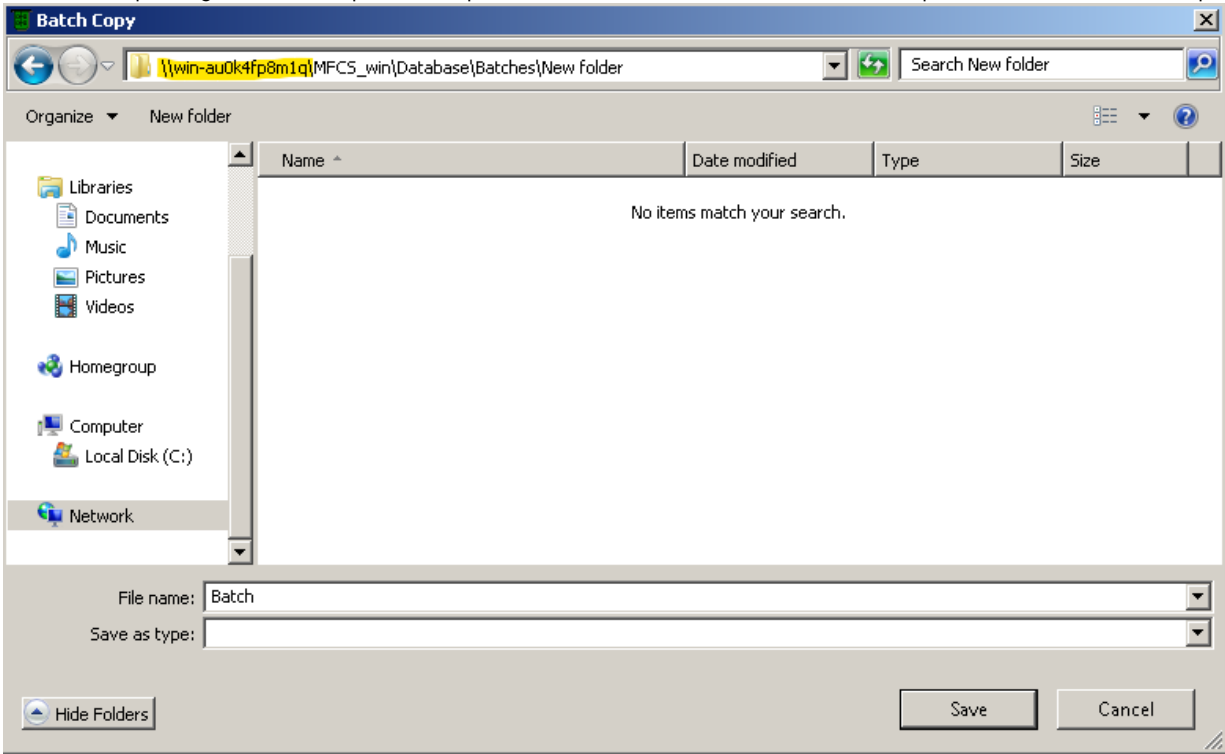
Right click on the batch in the list and select 'Batch Move'
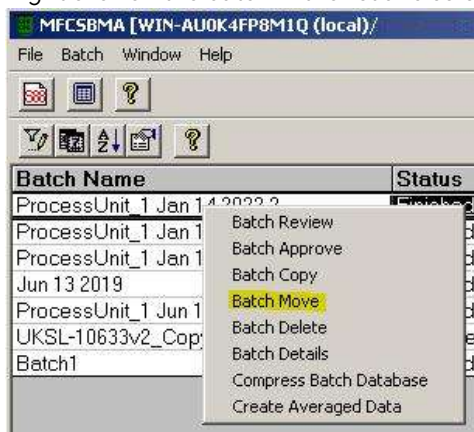
Save the batch in some other folder (in the image a new folder was created for this)

Before completing the move, update the path in the address field to use the UNC path instead of the local path

Then do the same thing again and move it back to the original folder, the batch will now have updated the path stored internally by MFCS and SIMCA-online should be able to read historical data from it.