



DATA MANAGEMENT SOFTWARE SUITE HANDS ON

2018

Content

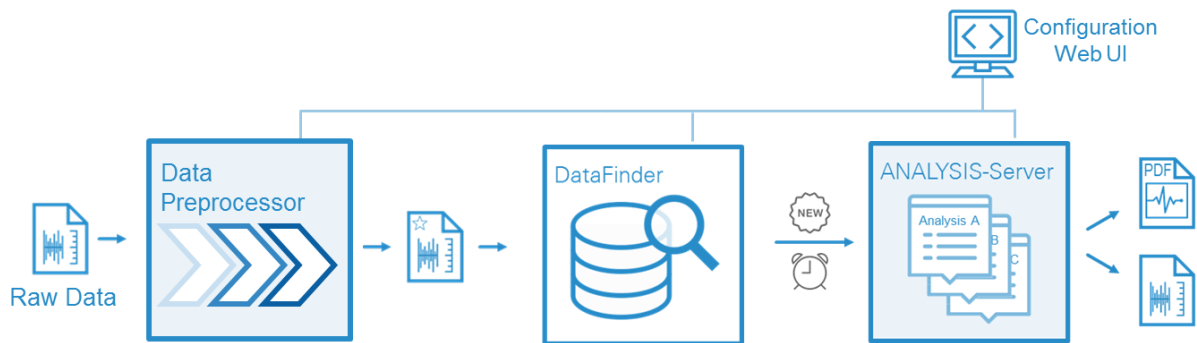
1	How to Set Up a Preprocessing Routine	2
1.1	Data Preprocessor Configuration for TDMS Files.....	2
1.1.1	Data Preprocessor Operation.....	2
1.2	Using DIAdem to Define a Data Preprocessor Configuration	4
1.3	<i>Configure the Property Identifier Mapping</i>	7
1.4	Configure the Property Value Mapping	11
1.5	Defining Additional Channel Statistics	13
1.6	Define the Standard File Format	16
1.7	Verify the Data Preprocessor Routine.....	18
1.8	Deploy Data Preprocessor Package via Web Server	20
1.9	Next Steps.....	26
2	Setting up a DataFinder to Index Processed Files	27
2.1	Next Steps.....	30
3	Set Up a Triggered Analysis Server Task to Process New Files.....	31
3.1	Define the Analysis Server Procedure in DIAdem	31
3.2	Create a New Analysis Server Package.....	31
3.3	Define the Execution Condition of Your Procedure	32
3.4	Define the Analysis Script for the Procedure	34
3.5	<i>Create a New Analysis Server</i>	37
3.6	<i>Upload an Analysis Procedure</i>	39
3.7	<i>Define a Triggered Task</i>	40
3.8	Test the Entire Process.....	42
4	Searching for Analysis Server Reports (PDF) with DataFinder	46
4.1	Next Steps.....	53
5	Using Other File Formats (XLSX) as Data Preprocessor Input	54
5.1.1	Configuring a Data Preprocessor.....	54
5.1.2	Setting Up a Data Preprocessor for XLSX Example Files.....	54
5.1.3	Defining the Data Preprocessor Configuration for XLSX Example Files Using DIAdem.....	59
6	Explore your indexed data with a different hierarchical view	67
7	Create a hierarchical view using DIAdem.....	67
8	Configure a DataFinder server using a specific hierarchical view	70
9	Connect to a DataFinder hierarchical view from DIAdem.....	74
10	Searching for Data with the Data Navigator	75

1 How to Set Up a Preprocessing Routine

The Data Preprocessor is designed to convert raw data from different sources to homogenous “smart data” by standardizing property identifiers and values, applying unit conversion, adding additional statistical calculations from the individual channel data, and verifying the resulting data. The last step is to convert the data into a standard file format such as TDM or TDMS, so that the modifications made during the preprocessing routine do not affect the original data file.



In this tutorial, you will learn with the help of examples how to configure Data Preprocessor to standardize metadata and prepare data for automated analysis. This is an important part of the Technical Data Management process chain to ensure consistent and automated analysis for every data point that is collected. There are other tutorials that cover the other steps in the process.



1.1 Data Preprocessor Configuration for TDMS Files

The files you will see in the following example were created in DIAdem, where you specify how your data should be cleansed and unified.

This example shows you how to first change property identifiers and content to standardized and more suitable names and values and add some additional signal characteristics using the Data Preprocessor. The example data is stored in your National Instruments public example folder (for instance: C:\Users\Public\Documents\National Instruments) and the example starts with the TDMS files located in ... \National Instruments\DataFinder\Data.

1.1.1 Data Preprocessor Operation

The example TDM files are written with 3 levels of information and metadata saved at each level. For an overview of the TDM file format, read this [whitepaper](#). These example files contain some properties that describe a common set of information, such as test information, on file level, common channel

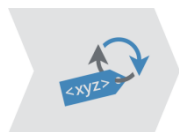
information on group level, and sensor-specific information on channel level. As of DIAdem 2018, you can group properties in the Data Portal using the tilde character (~) for additional organizational structure.

In our data cleansing routine, we will replace ‘_’ with a ‘~’ to show how you can further organize your data.

File Level Properties		Group Level Properties		Channel Level Properties	
Original Name	Processed Name	Original Name	Processed Name	Original Name	Processed Name
Test_Module	Test~Module	Test_NoOfSensors	Test~NoOfSensors	Limit_High	Sensor~Limit~High
Test_Name	Test~Name	Test_Status	Test~Status	Limit_Low	Sensor~Limit~Low
Test_Operator	Test~Operator			Sensor_ID	Sensor~ID
Test_Procedure	Test~Procedure			Sensor_Type	Sensor~Type
UUT	Test~UUT			Sensor_Calibration_Date	Sensor~Calibration_Date

The screenshot below shows the effect of grouping properties in the DIAdem Data Portal using the file level property replacement as an example:

Custom Properties		Custom Properties	
Test_Module	17	Test	
Test_Name	M18-B4	Module	17
Test_Operator	Paul	Name	M18-B4
Test_Procedure	Heating B	Operator	Paul
UUT	T17-A11	Procedure	Heating B
		UUT	T17-A11



Use the “Replace Property Identifiers” function in the Data Preprocessor to build property groups by inserting the tilde character (~) into the property identifier as a separator.



Additionally, the individual channels have abbreviated channel names, which you are going to replace with more meaningful names using the “Replace Property Values” function. Because the names follow a certain pattern, you can apply a replacement pattern to convert “Temp” to “Temperature” using a single mapping rule.

Channel Name	
Original	Standardized
Temp_A	Temperature_A
...	...
Temp_J	Temperature_J



We will then add some channel properties containing signal characteristics, such as:

Channel Data Statistics	
Characteristic Value	Property Name
Minimum	Statistics~Minimum
Maximum	Statistics~Maximum
Arithmetic mean	Statistics~ArithmeticMean
Standard deviation	Statistics~StandardDeviation



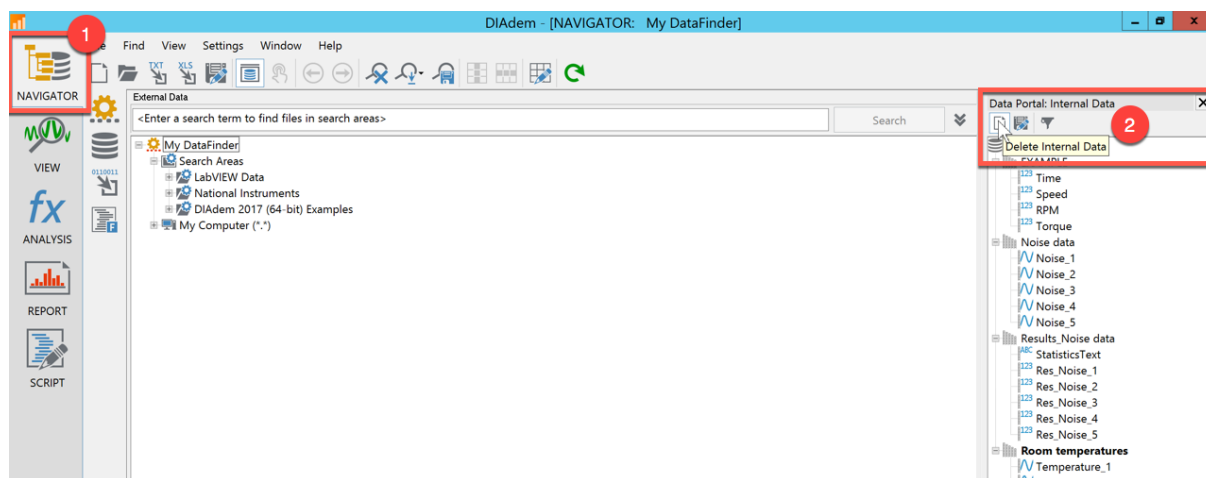
Finally, you define the file format of the cleansed and enriched data. You can choose between the file formats TDM or TDMS. Our example uses the TDM format.

1.2 Using DIAdem to Define a Data Preprocessor Configuration

Use the Data Preprocessor Configuration dialogs to define the Data Preprocessor processing steps which will configure a Data Preprocessor in the TDM Server Manager.

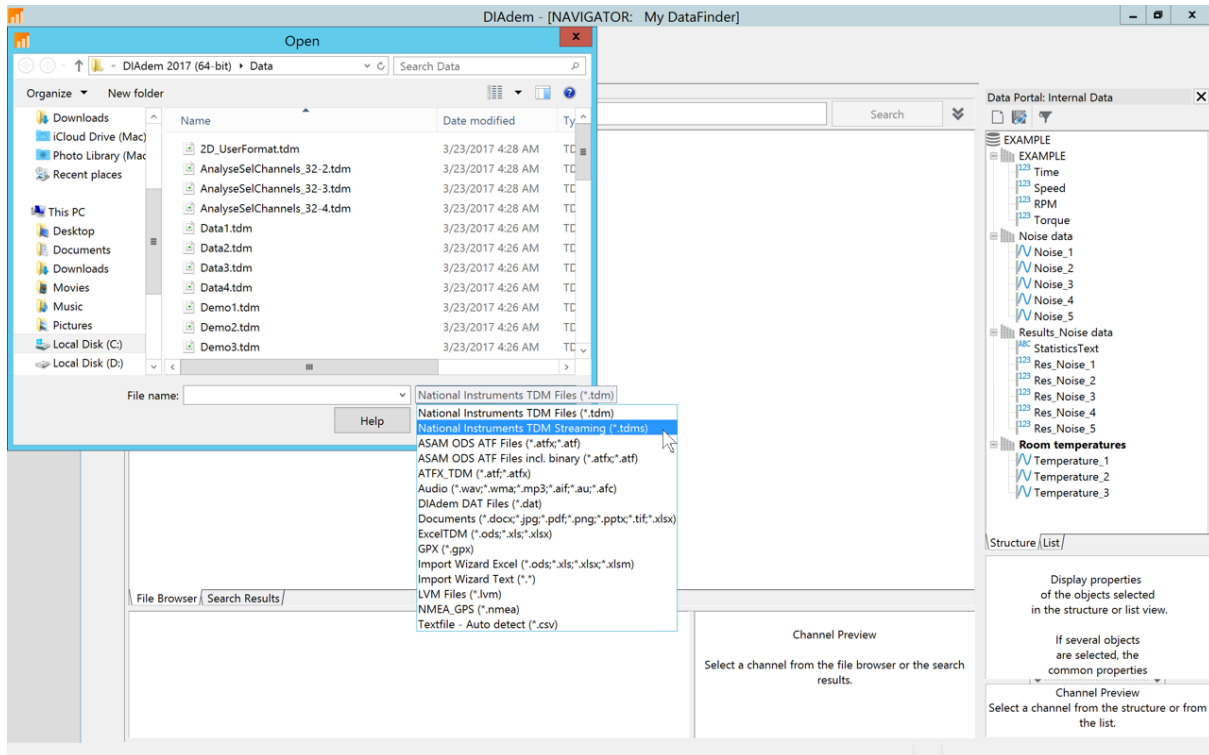
For convenience, it is easier to load one example file into the DIAdem Data Portal and use drag&drop for some configuration steps:

1. Select the **DIAdem NAVIGATOR** panel.
2. Click the **Delete Internal Data** symbol.

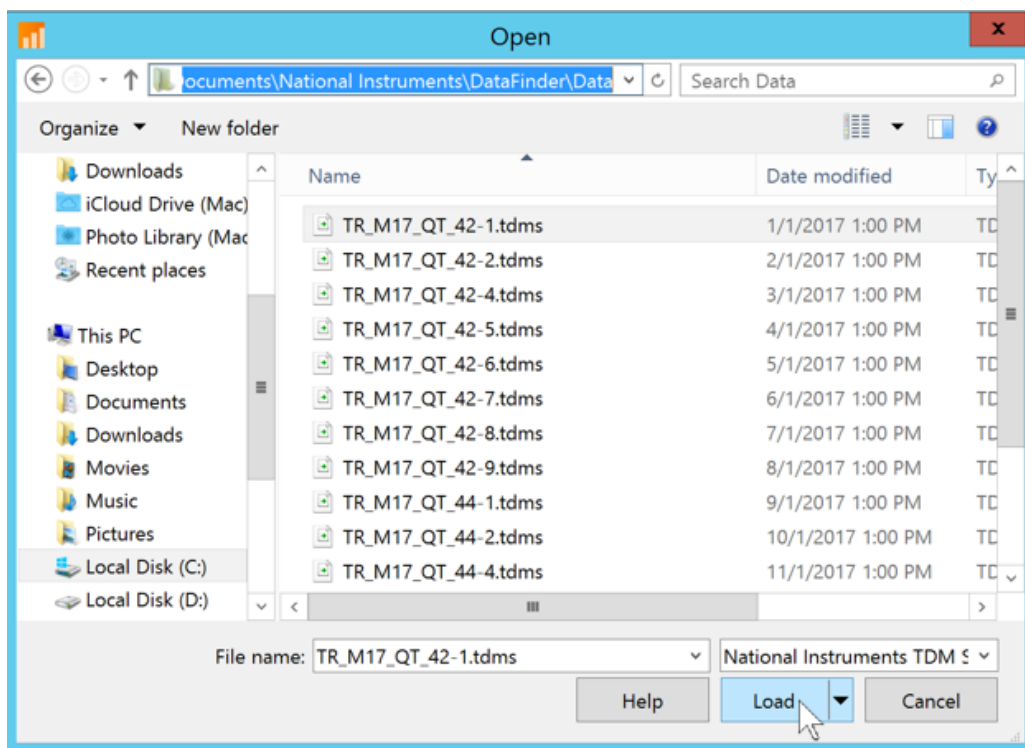


3. Select **File>>Open**.

4. Change the file type to **TDMS** (National Instruments TDM Streaming).

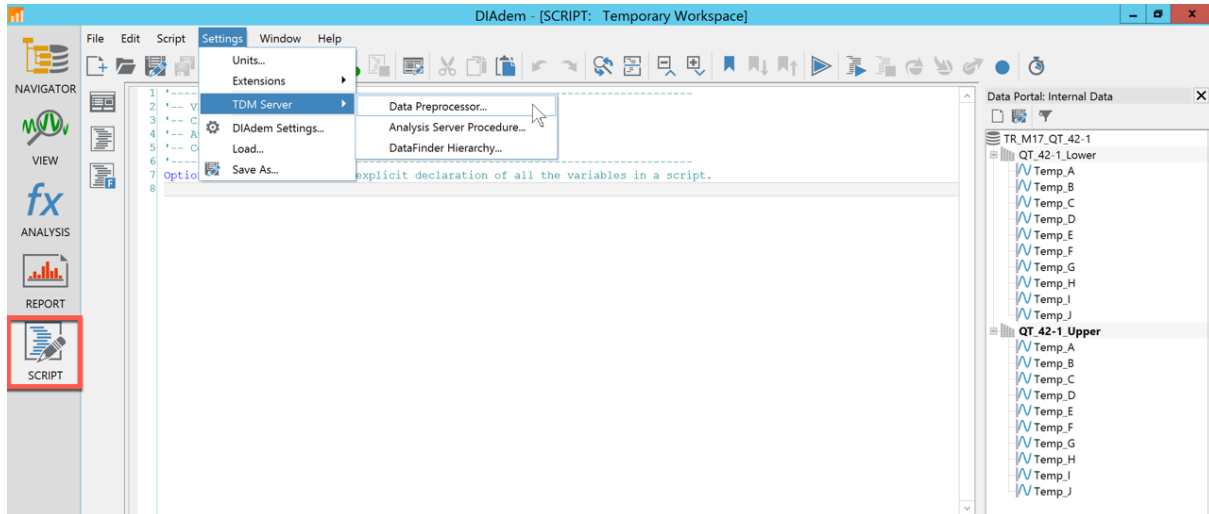


5. Navigate to the TDM Server Demo Data folder (“C:\Users\Public\PublicDocuments\National Instruments\DataFinder\Data”) and select a file.
6. Click **Load** to load a TDMS example file into the DIAdem Data Portal.

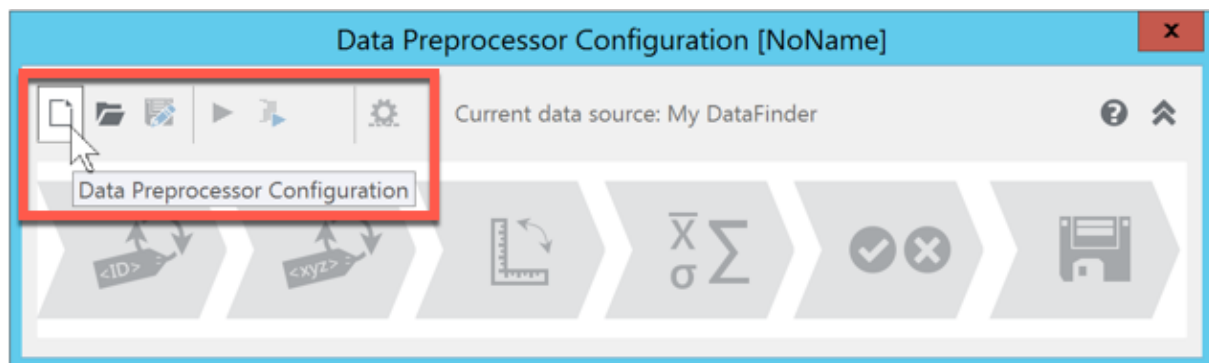


Now specify the DataFinder Preprocessor configuration:

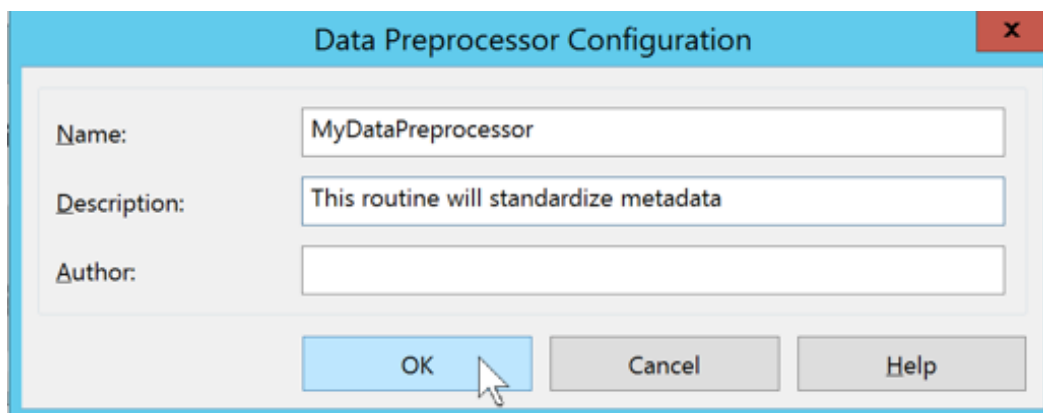
7. Select the **DIAdem Script** panel.
8. Select **Settings>>TDM Server>>Data Preprocessor**.



9. Click the **New Data Preprocessor Package** symbol.



10. Enter the **Name** of the new Data Preprocessor and an optional **Description** and **Author**.

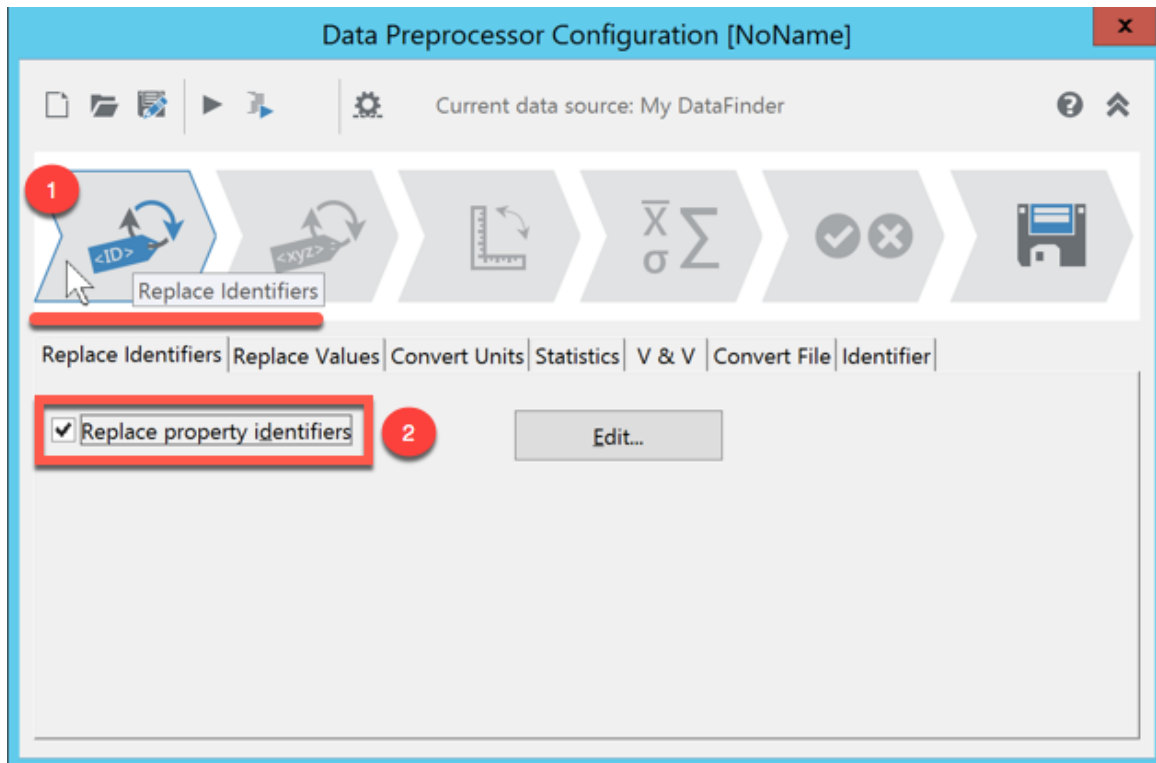


11. Click **OK**.

1.3 *Configure the Property Identifier Mapping*

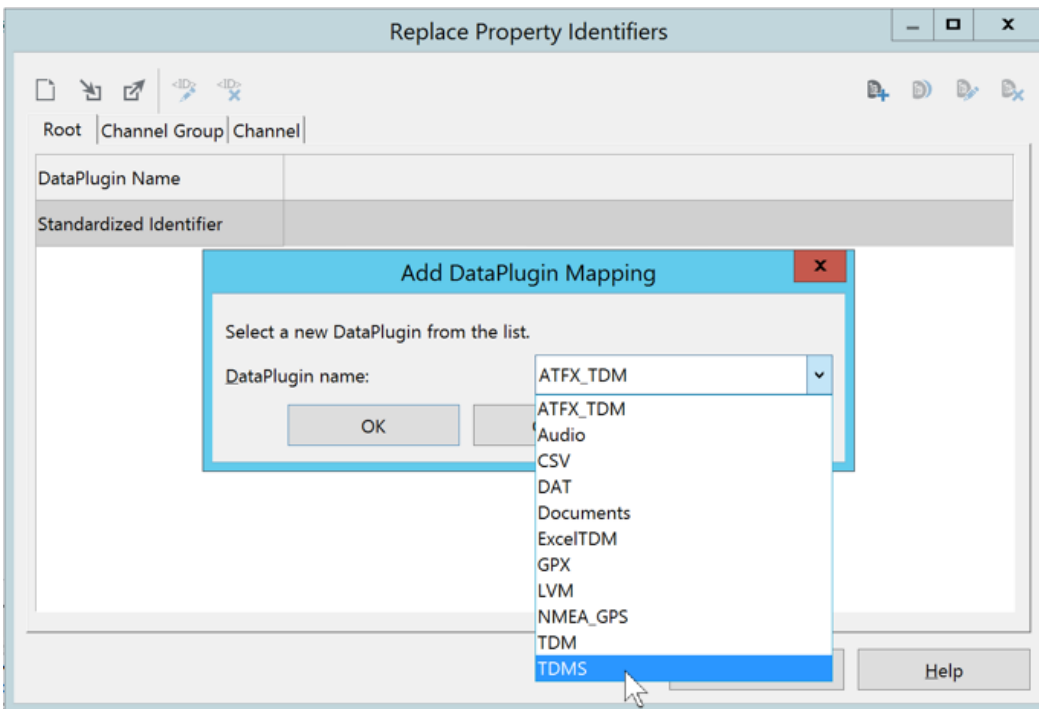
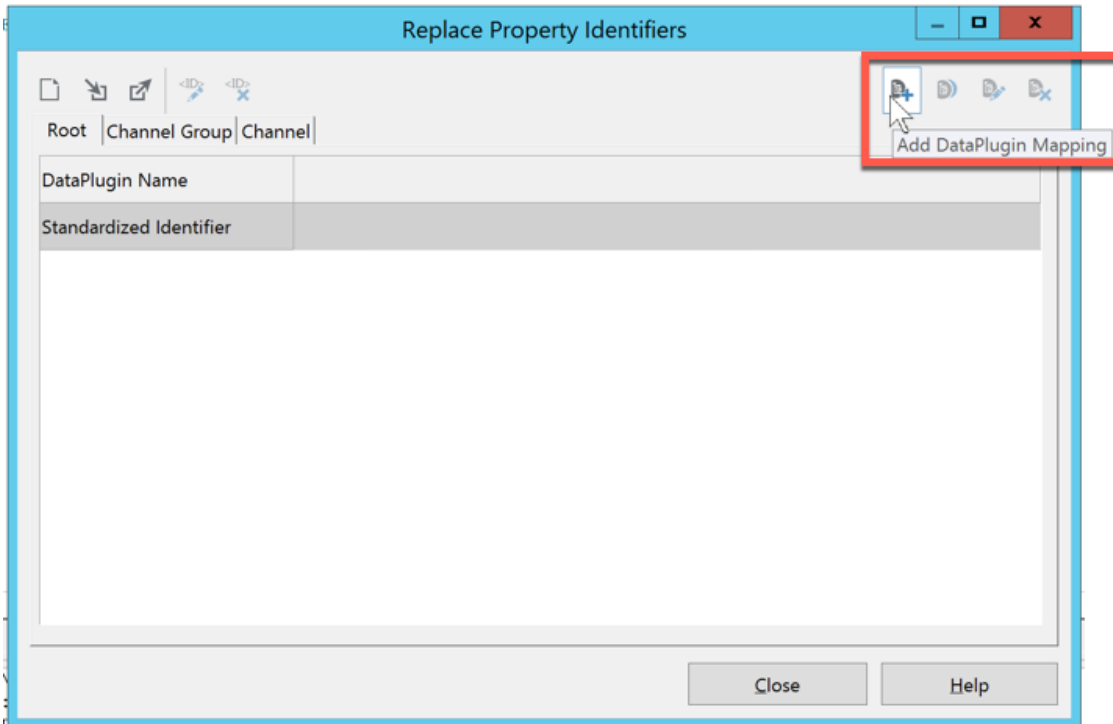
12. Select the **Replace identifiers** tab

13. Enable **Replace property identifiers**



14. Click **Edit**.

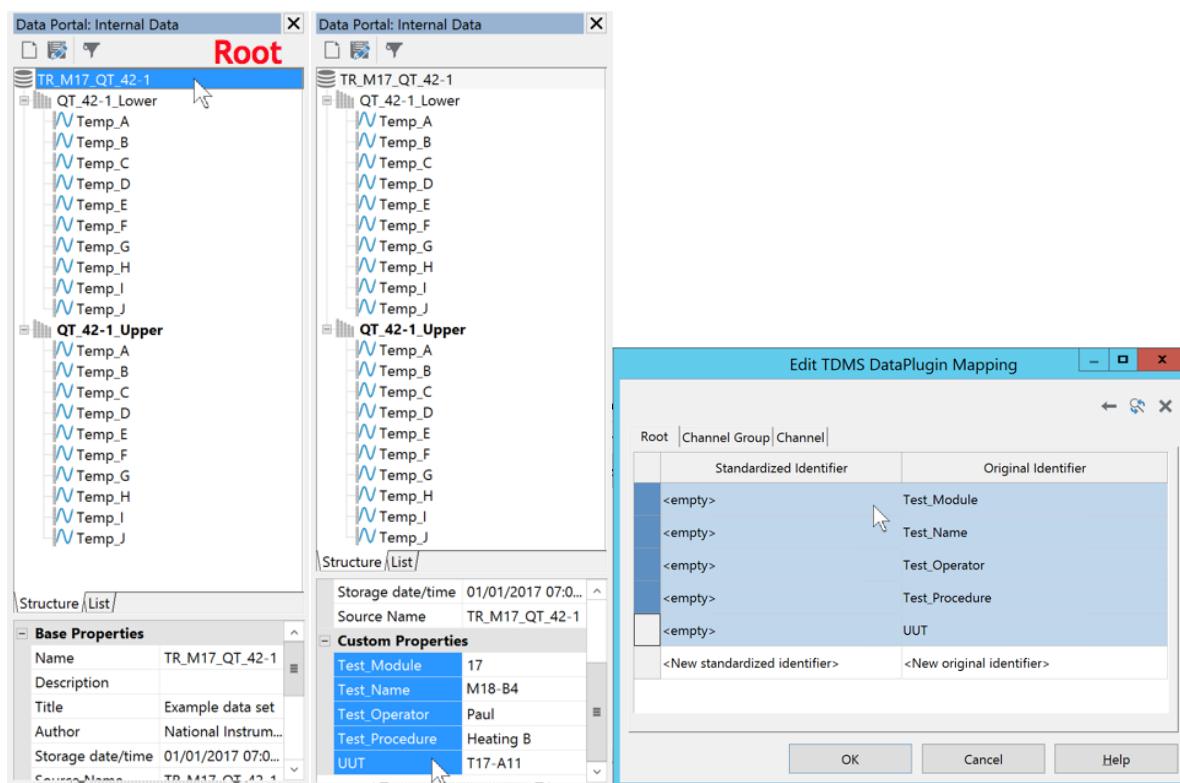
15. Click the **Add DataPlugin Mapping** symbol and select *TDMS* as **DataPlugin name**.



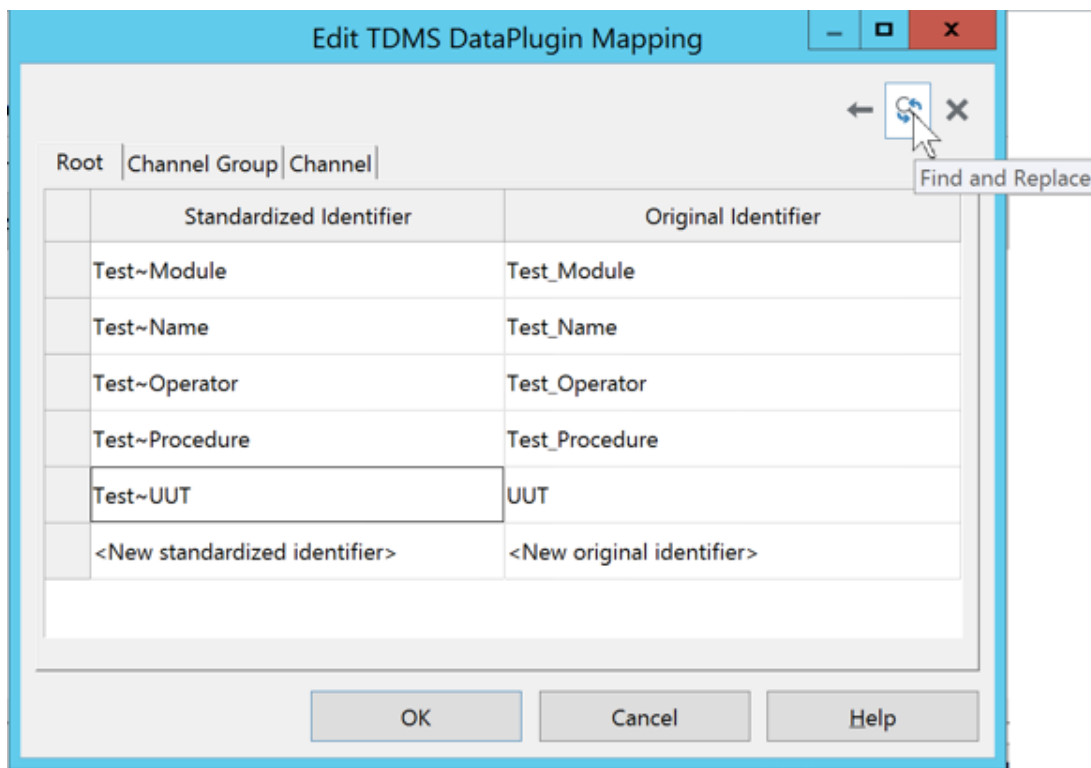
16. Click **OK**.

17. Select the root element in the Data Portal (the root of the tree structure).

18. Select all **Custom Properties** and drag&drop them into the still open **Edit DataPlugin Mapping** dialog.



19. Specify the **<vacant> Standardized Identifier** as defined in the table above. To do so, use the **Transfer Property Names** function. Where applicable, replace the separators like “_” with “~” using the **Find and Replace** dialog box.



20. Repeat this procedure for **ChannelGroup** and **Channel** on the respective tabs.

The screenshot shows the 'Data Portal: Internal Data' window with the 'Channel Group' tab selected for 'QT_42-1_Lower'. The 'Custom Properties' section is highlighted, showing 'Test_NoOfSensors' set to 10 and 'Test_Status' set to Fail. The 'Edit TDMS DataPlugin Mapping' dialog box is open, showing the 'Channel Group' tab with a table mapping standardized identifiers to original identifiers.

Standardized Identifier	Original Identifier
Test~NoOfSensors	Test_NoOfSensors
Test~Status	Test_Status
<New standardized identifier>	<New original identifier>

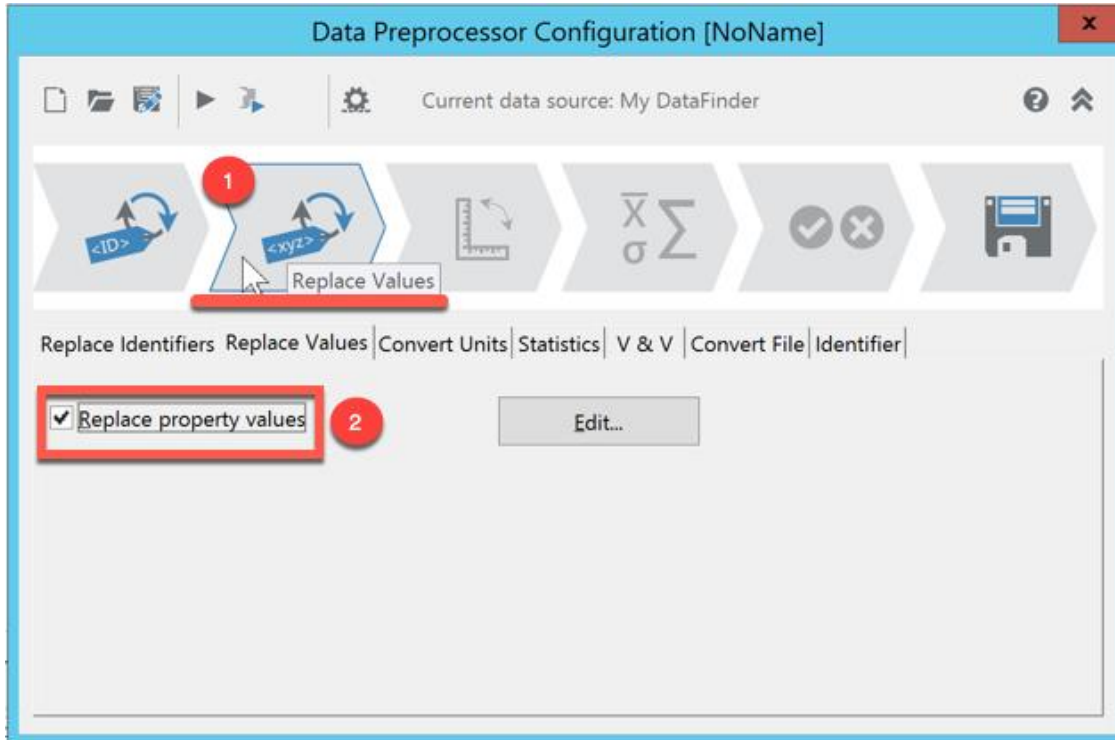
The screenshot shows the 'Data Portal: Internal Data' window with the 'Channel' tab selected for 'Temp_A'. The 'Custom Properties' section is highlighted, showing 'Limit_High' set to 50, 'Limit_Low' set to 20, 'Sensor_Calibration' set to 06/09/2016 17:0..., 'Sensor_ID' set to A5_206, and 'Sensor_Type' set to TC-K. The 'Edit TDMS DataPlugin Mapping' dialog box is open, showing the 'Channel' tab with a table mapping standardized identifiers to original identifiers.

Standardized Identifier	Original Identifier
Sensor~Limit~High	Limit_High
Sensor~Limit~Low	Limit_Low
Sensor~ID	Sensor_Calibration_Date
Sensor~Type	Sensor_ID
Sensor~Calibration_Date	Sensor_Type
<New standardized identifier>	<New original identifier>

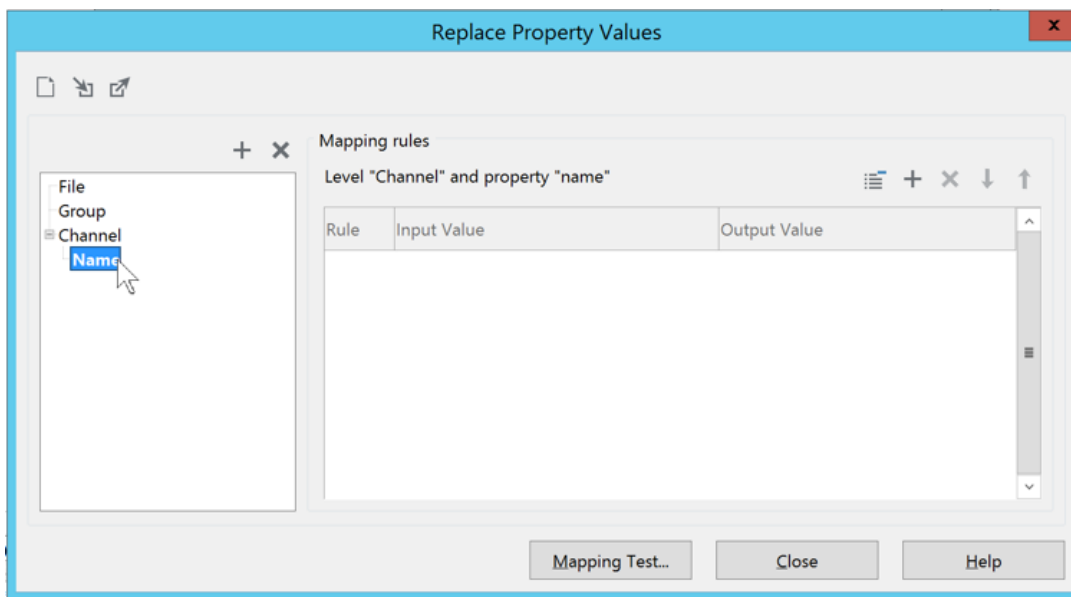
21. Click **OK**.
22. Click **Close**.

1.4 Configure the Property Value Mapping

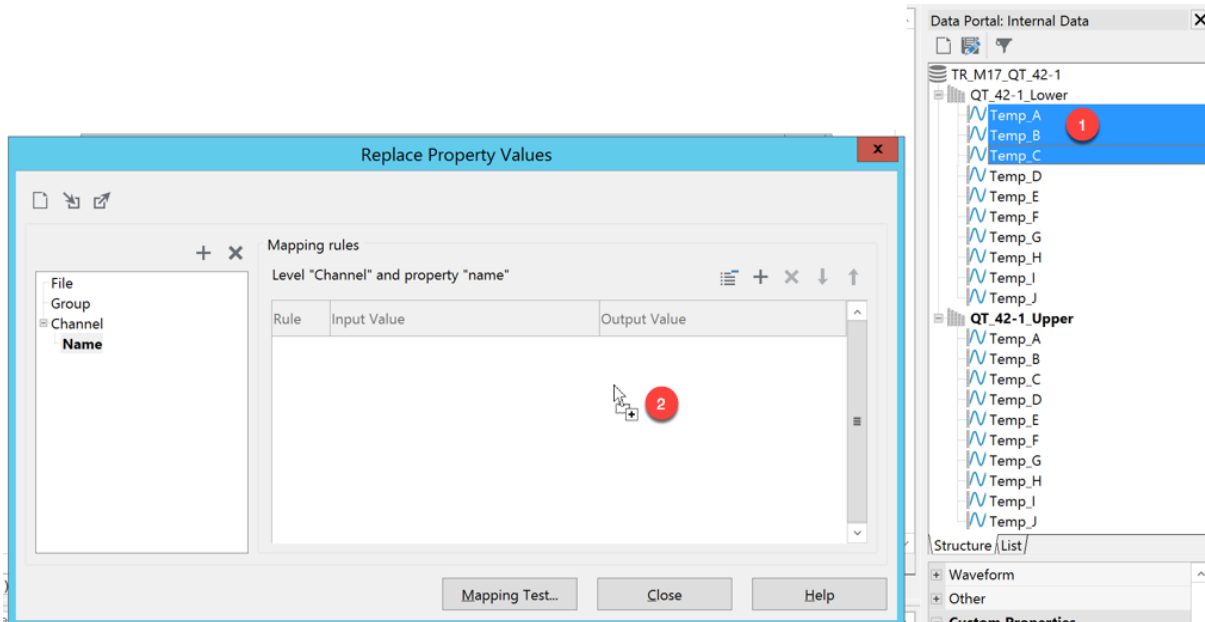
23. Switch to the **Replace Values** tab
24. Enable **Replace property values**



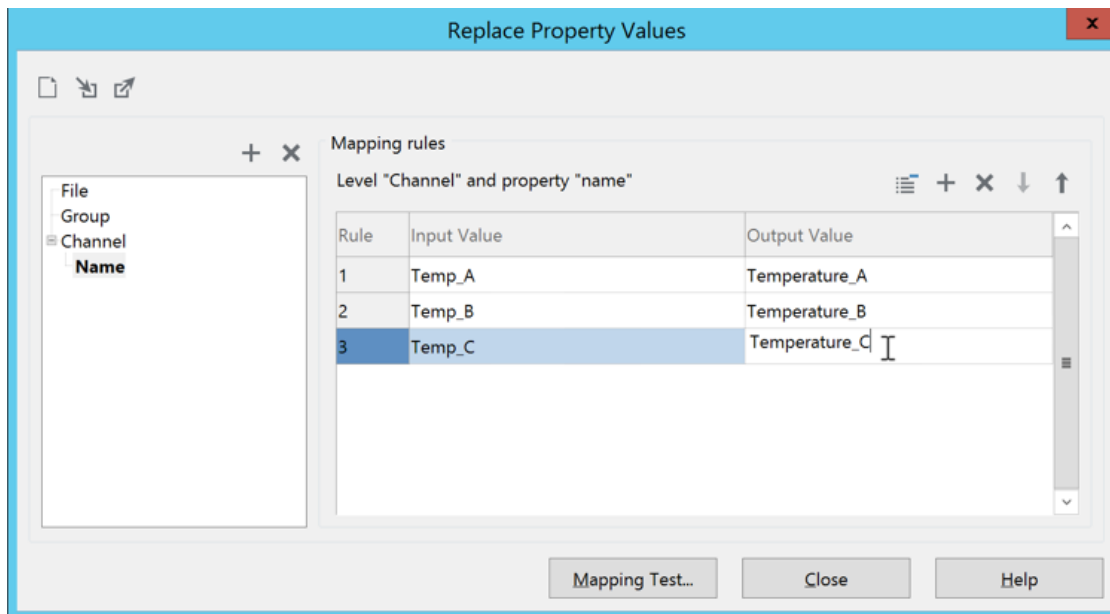
25. Click **Edit**
26. Select **Channel/Name** in the tree



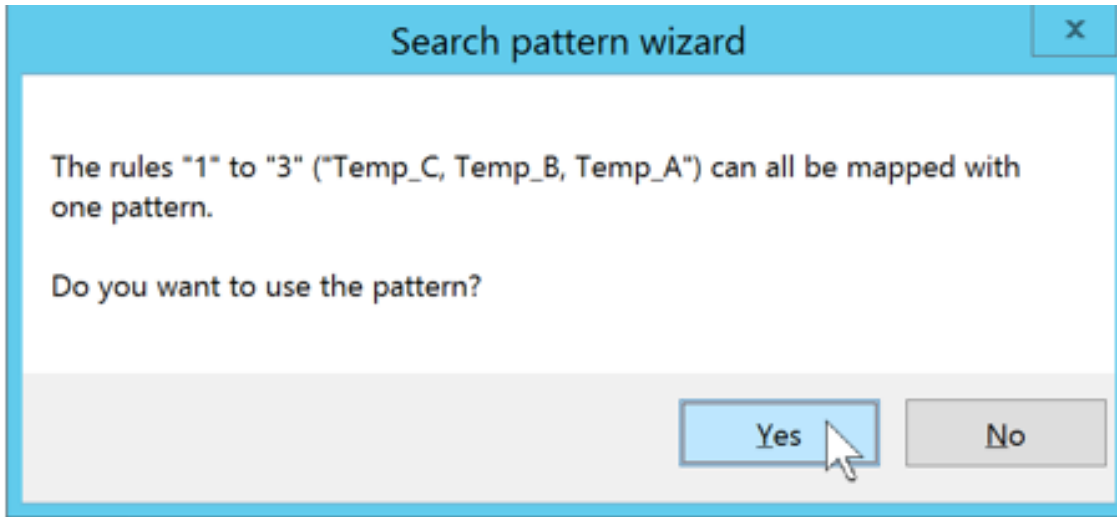
27. Select three channels (*Temp_A*, *Temp_B* and *Temp_C*) in the Data Portal
28. Drag&Drop the selected channels into the **Mapping rules** area of the **Replace Property Values** dialog box.



29. For *Temp_A* specify *Temperature_A* as **Output Value**.
30. For *Temp_B* specify *Temperature_B* as **Output Value**.
31. For *Temp_C* specify *Temperature_C* as **Output Value**.

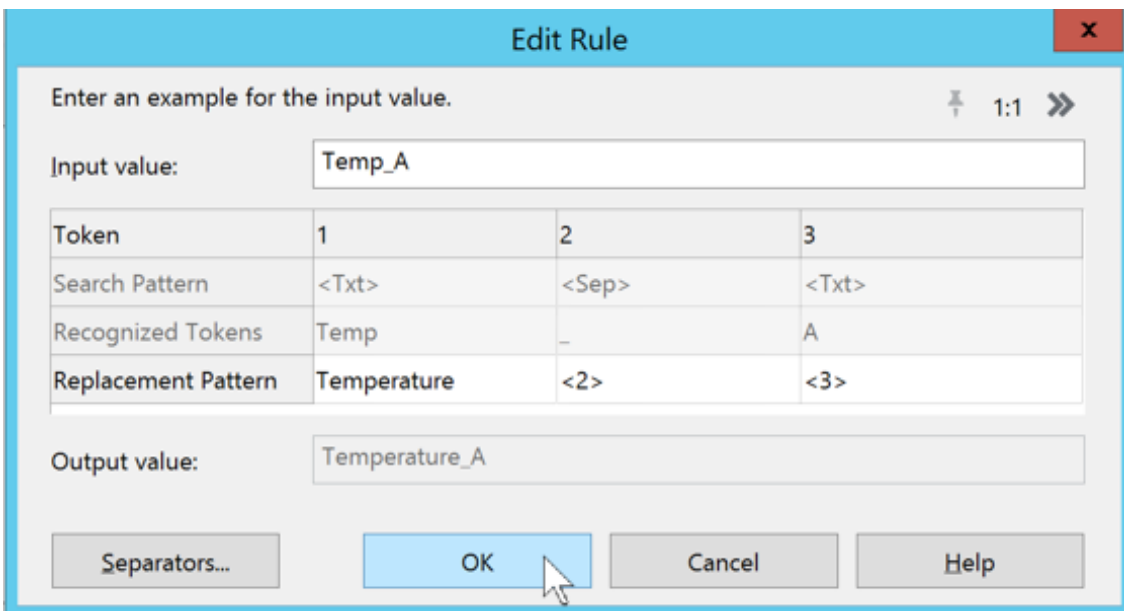


32. The **Search pattern wizard** has detected a pattern.



33. Click **Yes** to use this pattern and map all *Temp_?* channels to *Temperature_?*

34. Confirm the **Edit rule** dialog box by clicking **OK**.

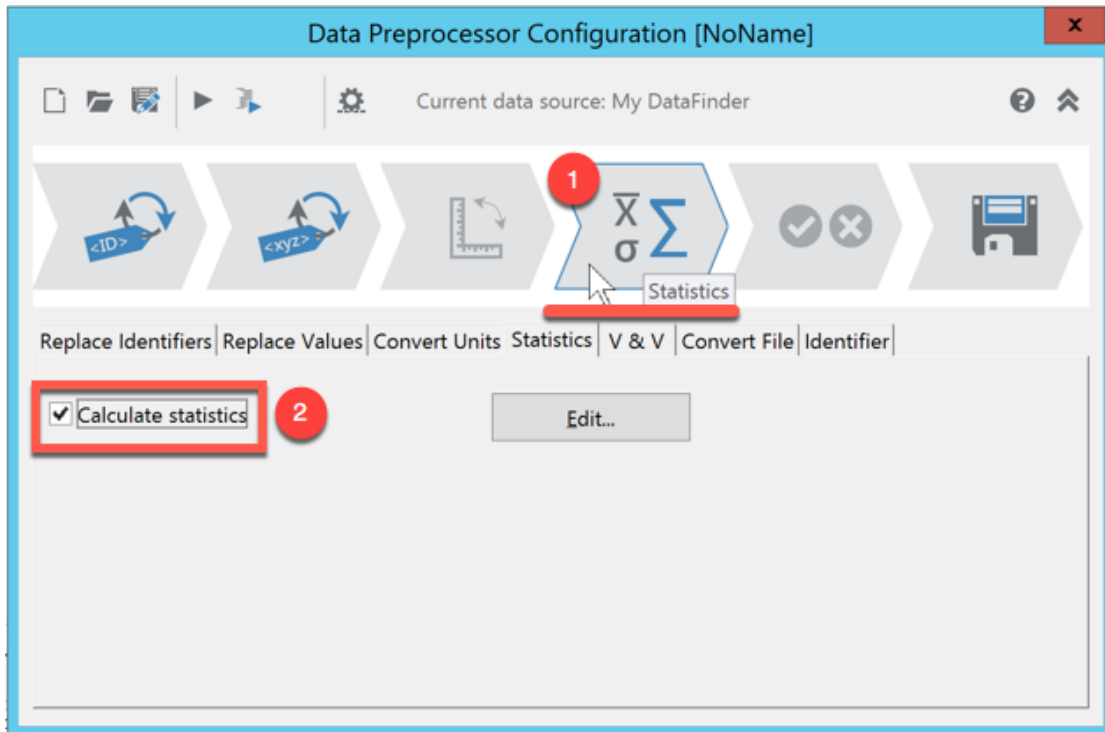


35. **Close** the **Replace Property Values** dialog box.

1.5 Defining Additional Channel Statistics

36. Switch to the **Statistics** tab.

37. Enable **Calculate statistics**.



38. Click **Edit**.

39. Enable **Minimum**.

40. Use *Statistics~Minimum* as **Custom Property Name**.

41. Enable **Maximum**.

42. Use *Statistics~Maximum* as **Custom Property Name**.

43. Enable **Arithmetic mean**.

44. Use *Statistics~ArithmeticMean* as **Custom Property Name**.

45. Enable **Standard deviation**.

Calculate Statistics

List of channel filters. The calculations are executed for these channels. + X

*/

Calculate	Custom Property Name
Sums	
<input type="checkbox"/> Measured values	Result~Statistics~Sums~Sum
<input type="checkbox"/> Measured value squares	Result~Statistics~Sums~SumOfSquares
Extreme values	
<input checked="" type="checkbox"/> Minimum	Statistics~Minimum
<input checked="" type="checkbox"/> Maximum	Statistics~Maximum
Mean Values	
<input checked="" type="checkbox"/> Arithmetic mean	Statistics~ArithmeticMean
<input type="checkbox"/> Root mean square	Result~Statistics~MeanValues~SquareMean
<input type="checkbox"/> Geometric mean	Result~Statistics~MeanValues~GeometricMean
<input type="checkbox"/> Harmonic mean	Result~Statistics~MeanValues~HarmonicMean
Quantiles	
<input type="checkbox"/> 0.25 quantile (lower quartile)	Result~Statistics~Quantiles~LowerQuartile
<input type="checkbox"/> 0.5 quantile (median)	Result~Statistics~Quantiles~Median
<input type="checkbox"/> 0.75 quantile (upper quartile)	Result~Statistics~Quantiles~UpperQuartile
Dispersion	
<input type="checkbox"/>	

Close Help

46. Use *Statistics~StandardDeviation* as **Custom Property Name**.

Calculate Statistics

List of channel filters. The calculations are executed for these channels. + X

/

Calculate	Custom Property Name
<input type="checkbox"/> 0.5 quantile (median)	Result~Statistics~Quantiles~Median
<input type="checkbox"/> 0.75 quantile (upper quartile)	Result~Statistics~Quantiles~UpperQuartile
Dispersion	
<input type="checkbox"/> Range	Result~Statistics~Dispersion~Range
<input type="checkbox"/> Quartile distance	Result~Statistics~Dispersion~QuartileDistance
<input checked="" type="checkbox"/> Standard deviation	Statistics~StandardDeviation
<input type="checkbox"/> Standard error	Result~Statistics~Dispersion~StandardError
<input type="checkbox"/> Variance	Result~Statistics~Dispersion~Variance
<input type="checkbox"/> Variation coefficient	Result~Statistics~Dispersion~VariationCoefficient
<input type="checkbox"/> Relative variation coefficient	Result~Statistics~Dispersion~RelativeVariationCoefficient
Average absolute deviation	
<input type="checkbox"/> From mean	Result~Statistics~AverageAbsDeviation~AverageAbsD
<input type="checkbox"/> From median	Result~Statistics~AverageAbsDeviation~AverageAbsD
Form	
<input type="checkbox"/> Skewness	Result~Statistics~Form~Skewness
<input type="checkbox"/> Kurtosis	Result~Statistics~Form~ExcessKurtosis

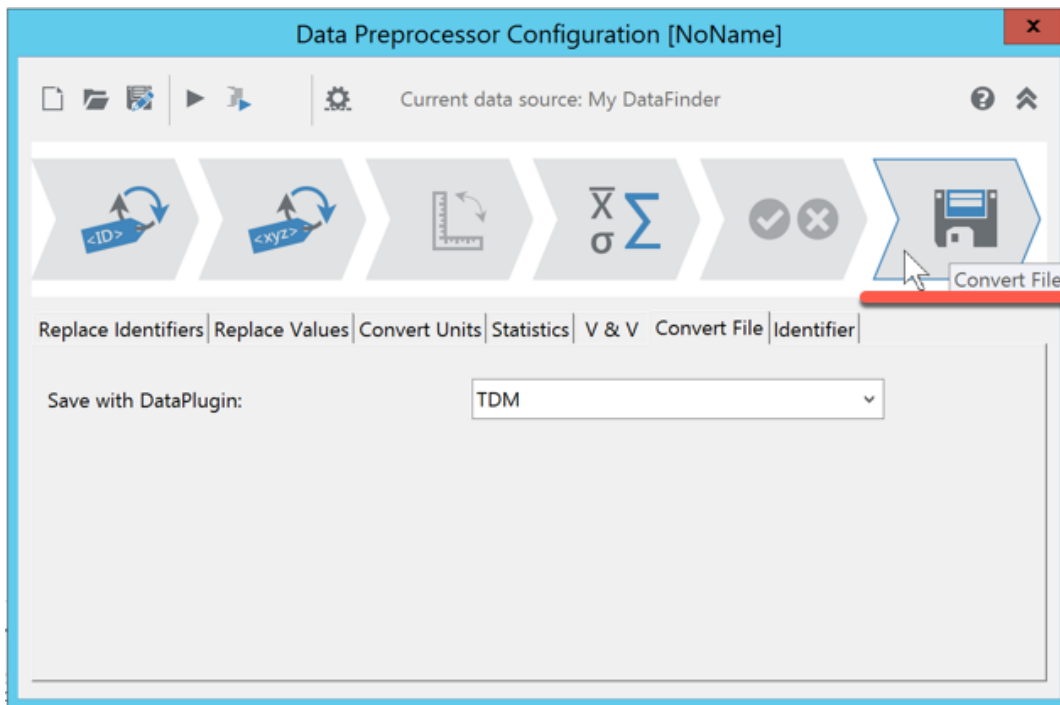
Close Help

47. Click **Close**.

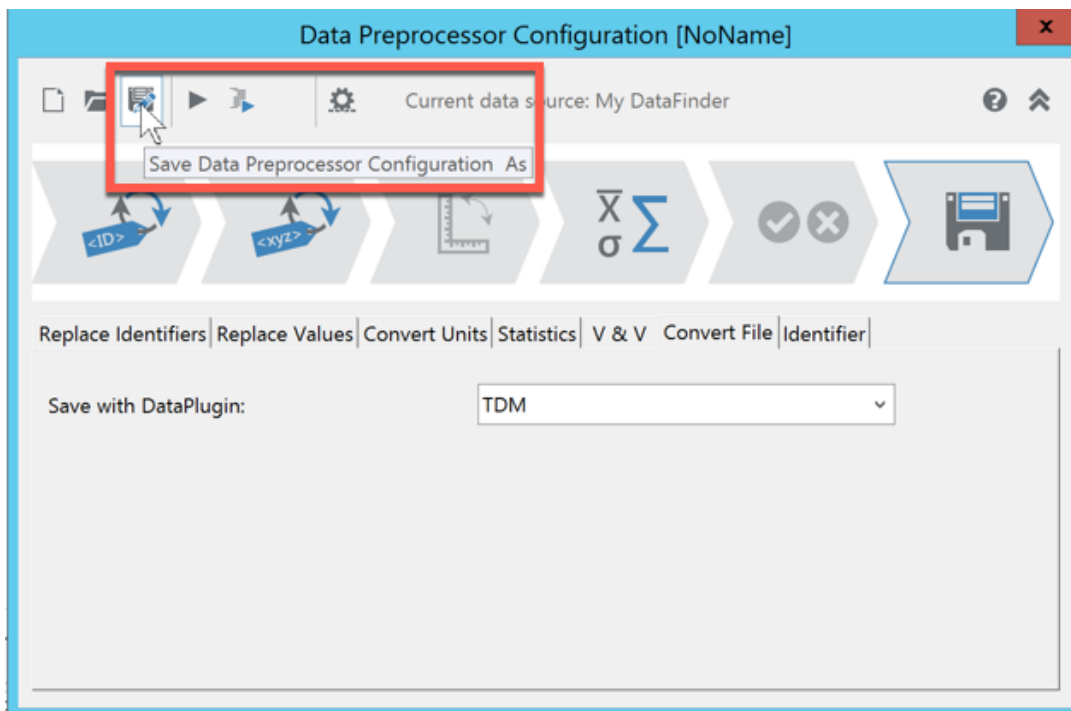
1.6 Define the Standard File Format

48. Switch to the **Convert File** tab.

49. Define **Save with DataPlugin** as *TDM*.

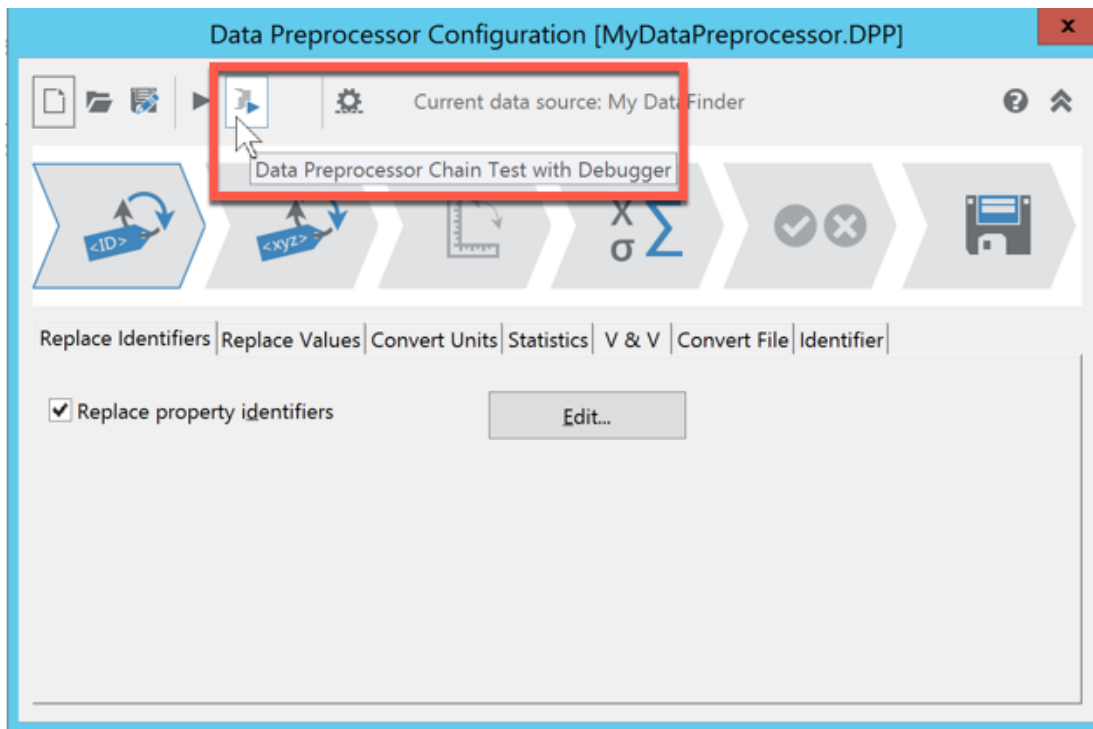


50. Click **Save Data Preprocessor Configuration As** and save the DPP file to a folder you specify.



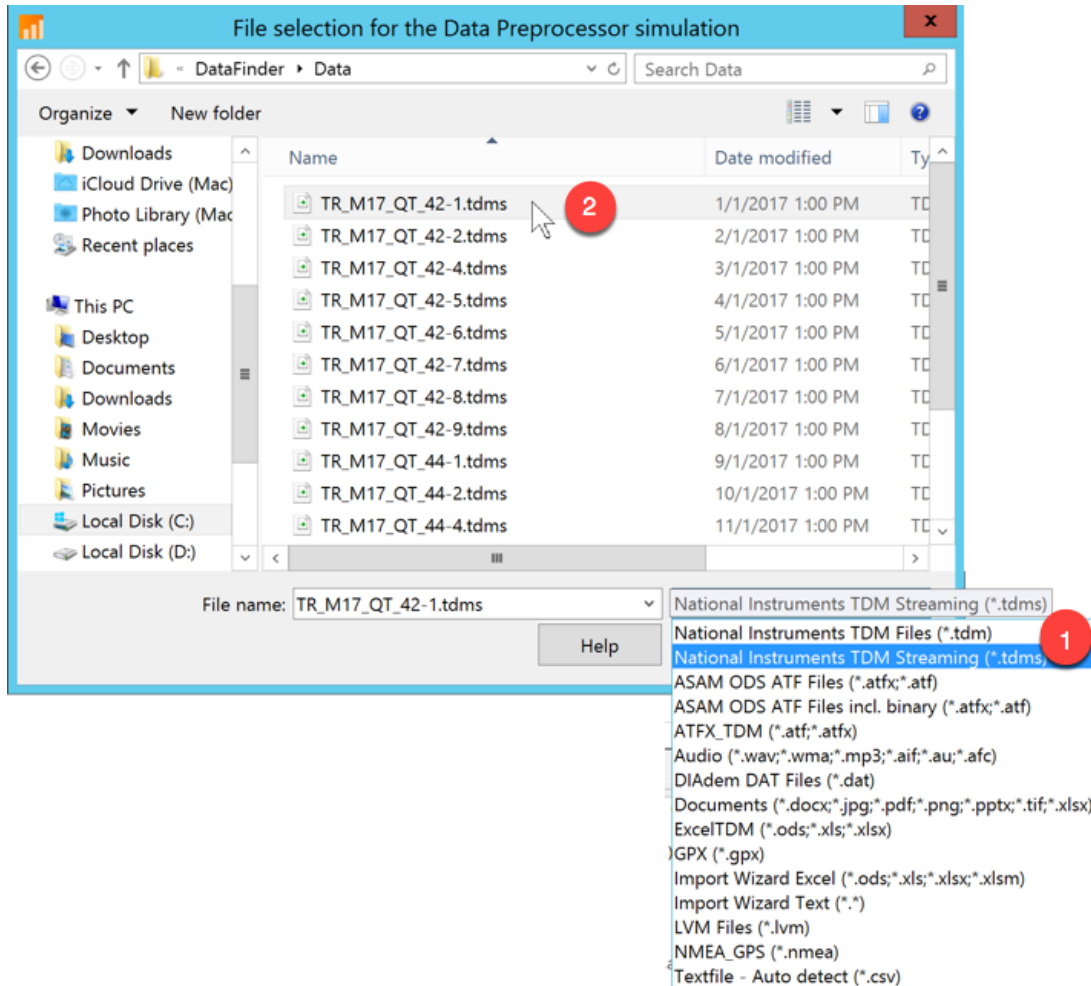
1.7 Verify the Data Preprocessor Routine

51. Select **Data Preprocessor Chain Test with Debugger**



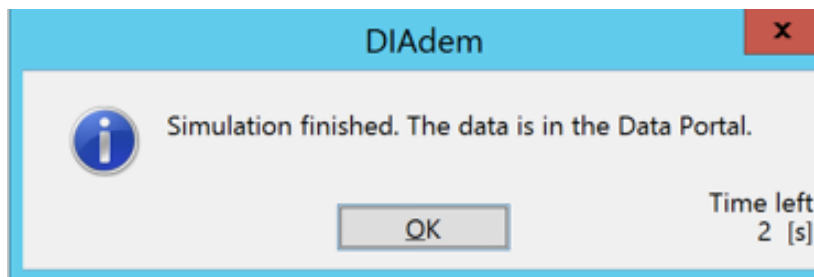
52. Browse to C:\Users\Public\Documents\National Instruments\DataFinder\Data

53. Select TDMS from the File name drop down menu

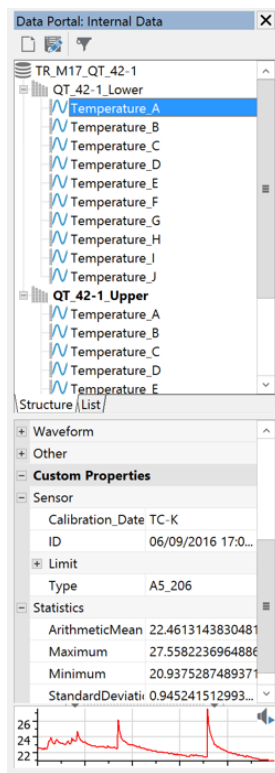


54. Select a TDMS file and click **Load**

55. A pop up dialog will appear letting you know the data has been processed and loaded into the Data Portal.



56. Explore the Data Portal and verify the channel names changed from Temp_X → Temperature_X and the Custom Properties show the new organization we set up.



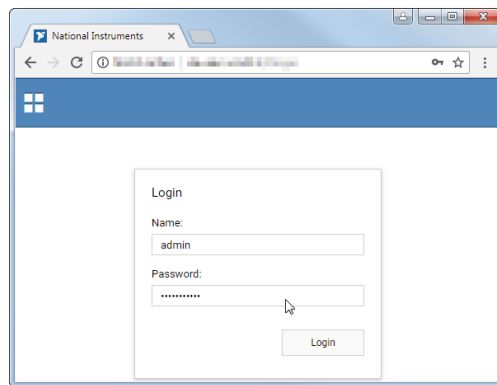
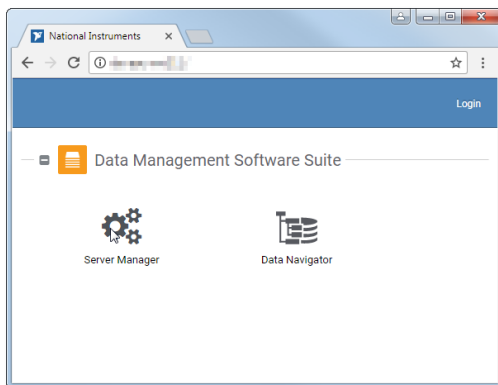
1.8 Deploy Data Preprocessor Package via Web Server

Now we can deploy the Data Preprocessor to the server via the TDM Web Server.

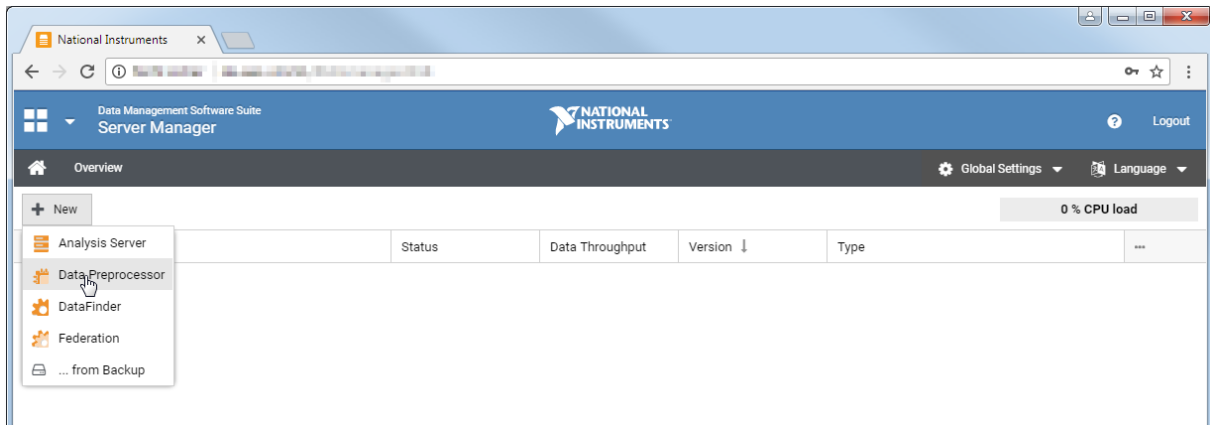
The **Data Preprocessor** uses a configuration file (*.DPP), which you created in DIAdem, to convert raw file data from one or more raw data folders to homogenous data, which you save in the respective processed data folder.

To setup the Data Preprocessor, complete the following steps in the wizard:

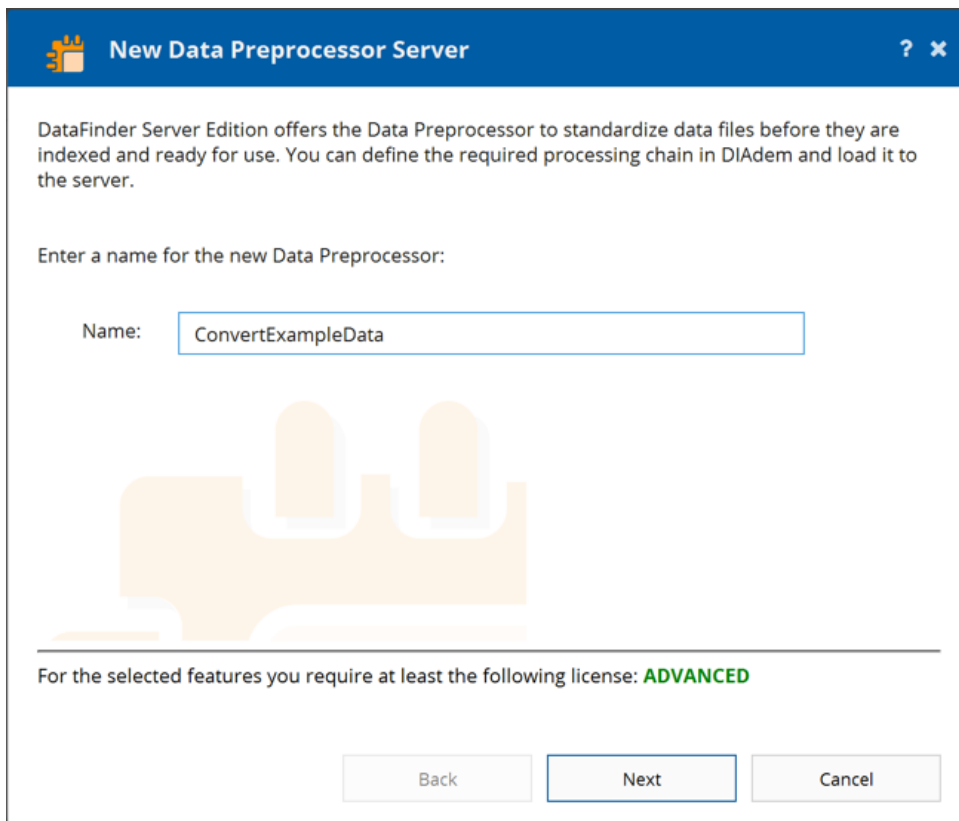
1. Open TDM Server Manager in your web browser and login using your credentials.



2. Select **New>>Data Preprocessor** to start the configuration wizard.

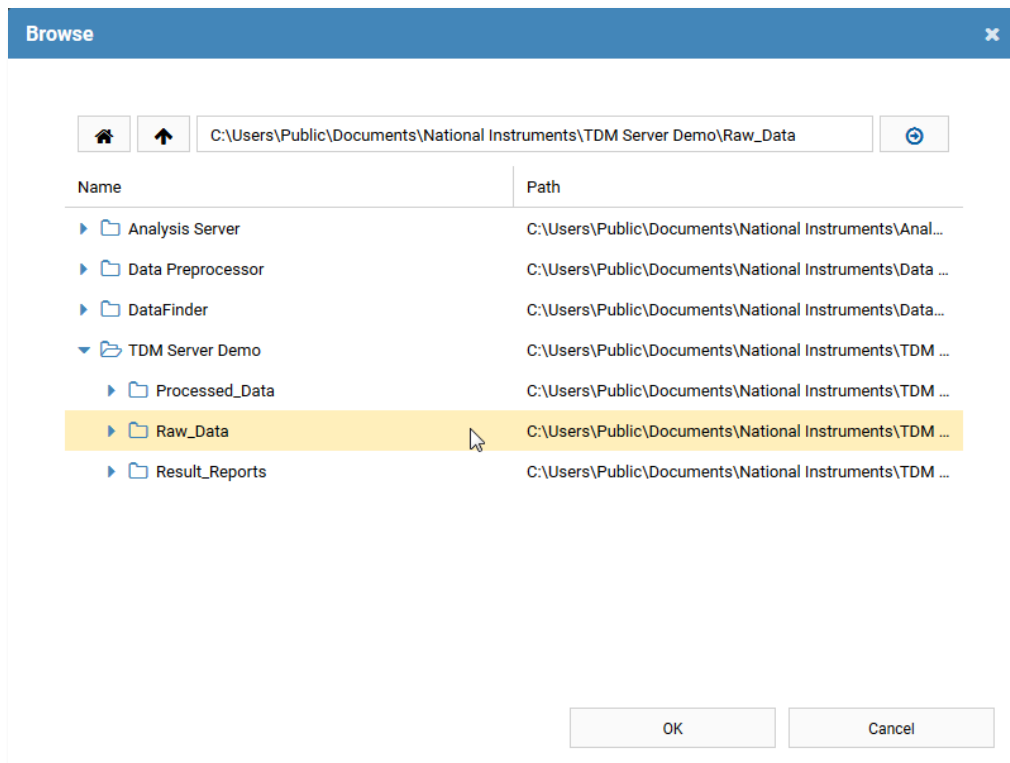


3. Enter *ConvertExampleData* as the **Name** of the new Data Preprocessor server, and click **Next**.



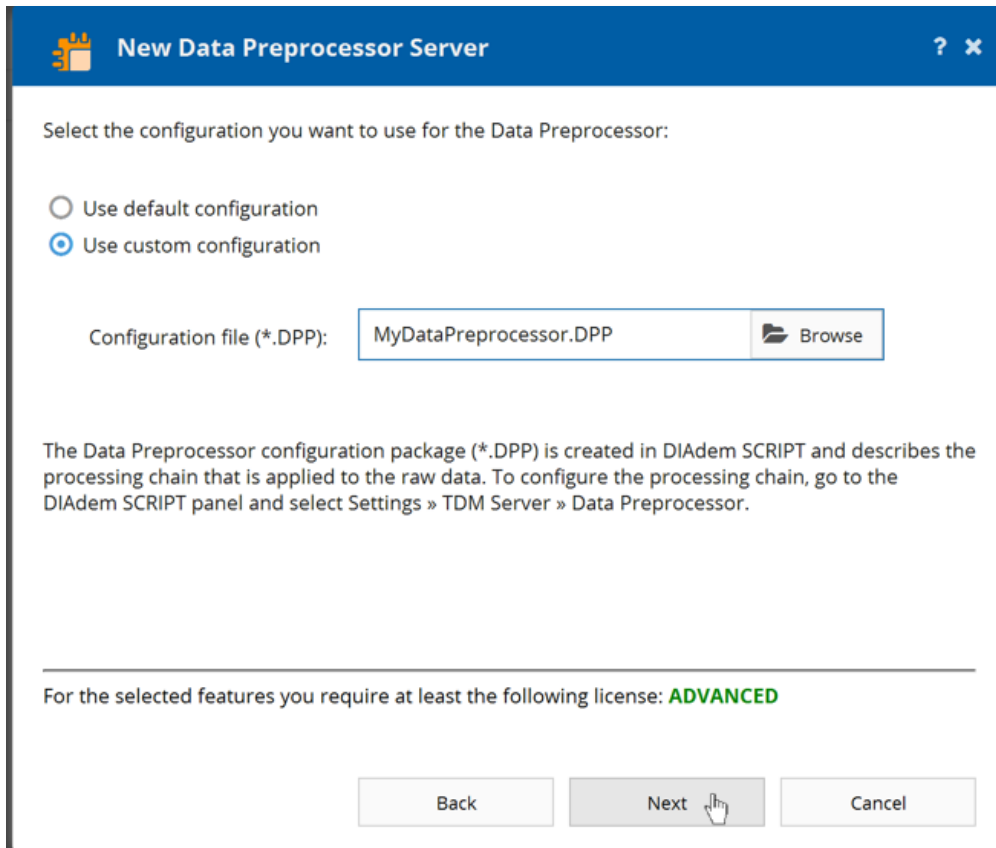
4. Enter the **Name** of the raw data area.

5. Specify the **Raw data** folder. Click the **Choose a Folder** symbol and select the **TDM Server Demo**.



6. Specify the **Processed data** folder. Click the **Choose a Folder** symbol and navigate to "C:\Users\Public\Documents\National Instruments\TDM Server Demo\Processed_Data"
7. Click **Next** to continue the configuration wizard

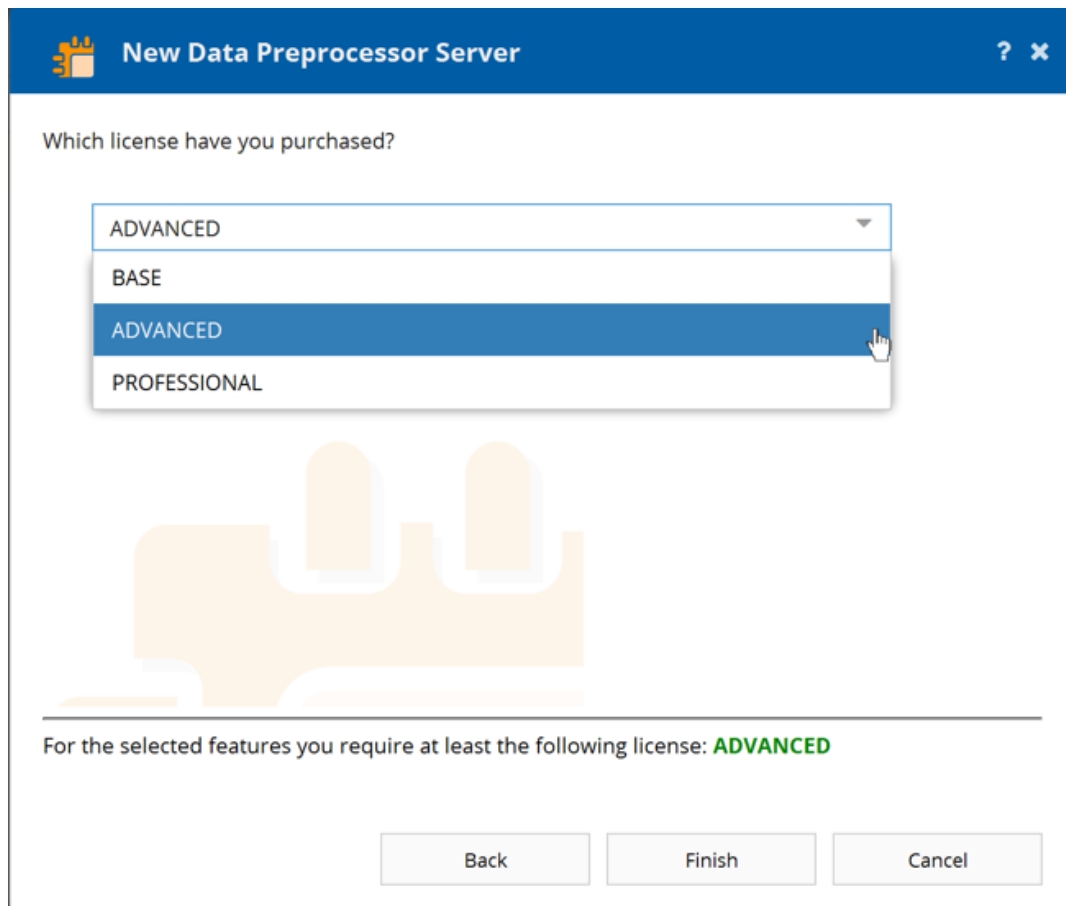
8. Select **Use custom configuration** and specify your Data Preprocessor that you saved in step 50.



In case you want to use a preconfigured Data Preprocessor file, you can find the **Configuration file** at "C:\Users\Public\Documents\National Instruments\Data Preprocessor\Configuration\Process_Example_Data_TDMS.DPP".

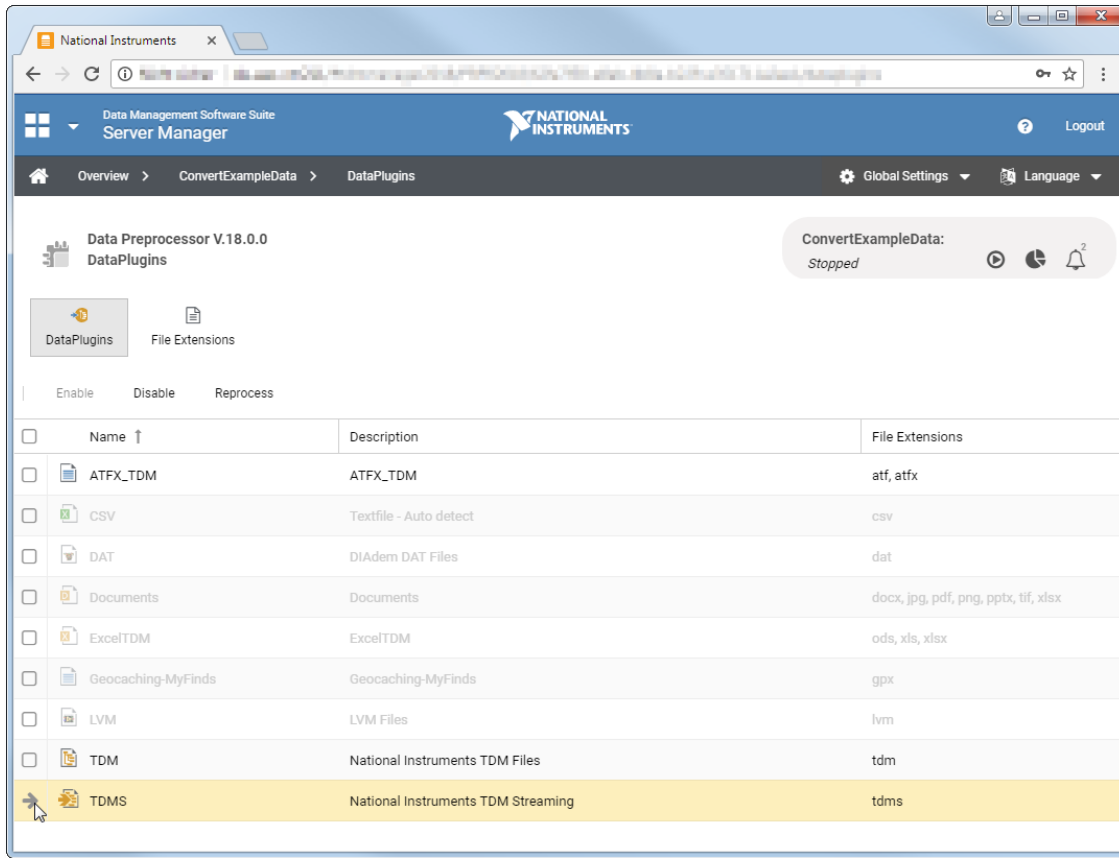
9. Click **Next** to continue the configuration wizard.

10. Select the *ADVANCED* license

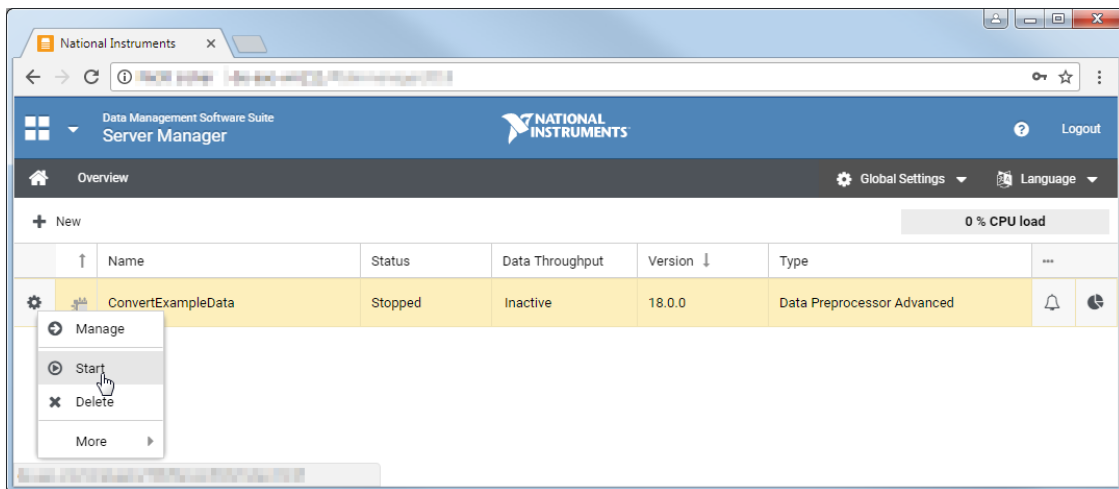


11. Click **Finish** to complete the initial configuration of the Data Preprocessor

12. TDM Server Manager asks you to enable the TDMS DataPlugin. Click **Manage** and open the **DataPlugins** page. Check the **TDMS** DataPlugin.



13. Return to the Server Manager.
14. Select the newly created Data Preprocessor in the list and click **Start** to initiate processing.



1.9 Next Steps

After configuring the preprocessor routine, you may want to test the functionality. To do this, open up three folders and arrange on your desktop:

1. C:\Users\Public\Documents\National Instruments\DataFinder\Data (Contains Data)
2. C:\Users\Public\Documents\National Instruments\TDM Server Demo\Raw_Data (Empty)
3. C:\Users\Public\Documents\National Instruments\TDM Server Demo\Processed_Data (Empty)

A figure could be inserted here showing the three folders (as the four folders in the “Analysis Server” Tutorial

Now copy the data files into the Raw_Data folder and see how the Processed_Data folder updates.

The next step is to set up a DataFinder to index the processed data.

2 Setting up a DataFinder to Index Processed Files

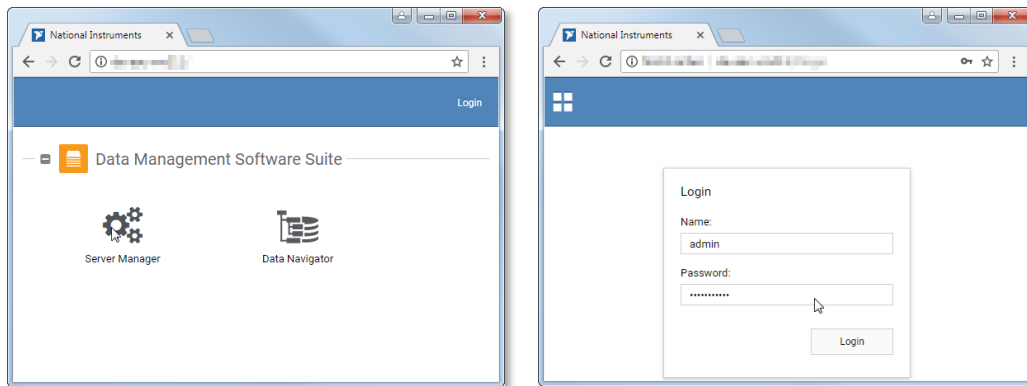
This example shows how to setup a DataFinder server to index the cleansed and extended files of the Data Preprocessor you created earlier.

Specify the Processed Data folder of the Data Preprocessor as a search area for the new DataFinder. DataFinder will either scan search areas at regular intervals for new files or receive notifications from the file system about new files. Once these files have been successfully indexed, the search areas can be used as data source for searching specific files or for data analytics.

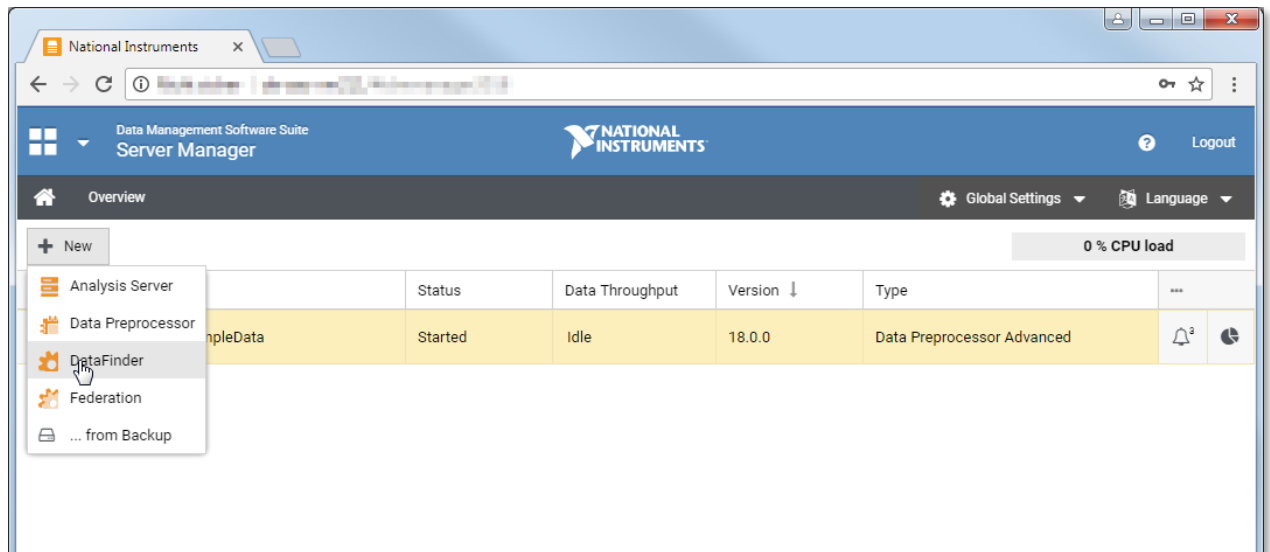
The same DataFinder also triggers the immediate processing of new files by the Analysis Server.

To setup the DataFinder, complete the following steps in the wizard:

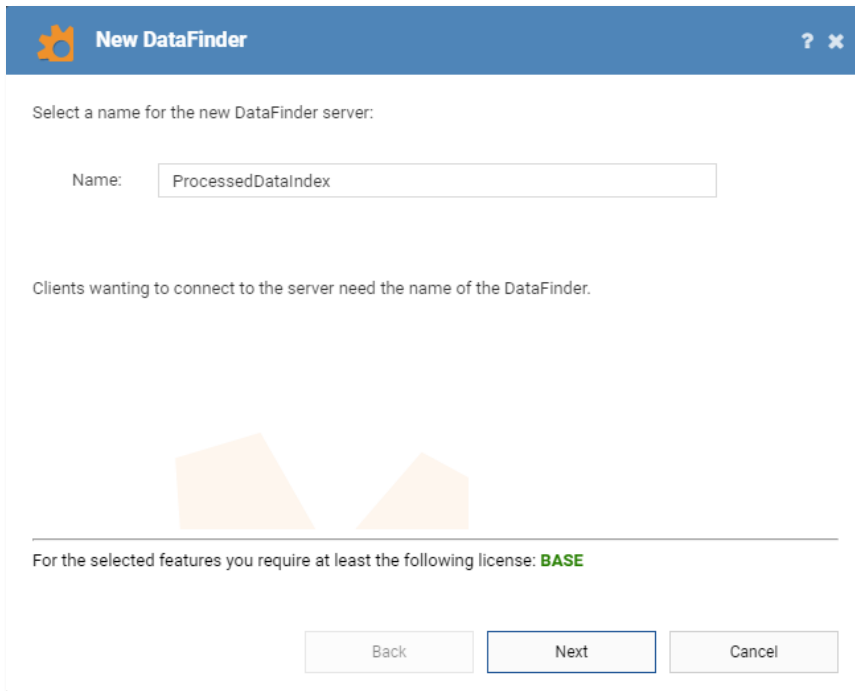
1. Open TDM Server Manager in your web browser and login using your credentials.



2. Select **New>>DataFinder** to start the configuration wizard.



3. Enter *ProcessedDataIndex* as the **Name** of the new DataFinder server, and click **Next**.



The 'New DataFinder' dialog box has a blue header with a gear icon and the title 'New DataFinder'. It contains a text input field for the server name, which is 'ProcessedDataIndex'. Below the input field, there is a note: 'Clients wanting to connect to the server need the name of the DataFinder.' At the bottom, there are three buttons: 'Back', 'Next' (highlighted with a blue border), and 'Cancel'. A license requirement message at the bottom states: 'For the selected features you require at least the following license: **BASE**'.

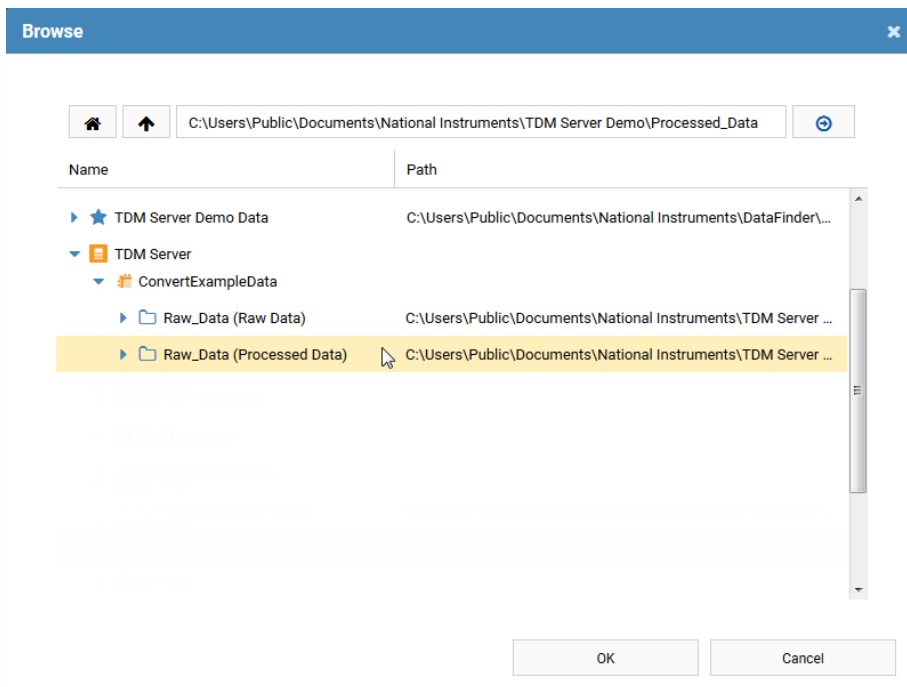
Select a name for the new DataFinder server:

Name:

Clients wanting to connect to the server need the name of the DataFinder.

For the selected features you require at least the following license: **BASE**

4. Enter the **Name** of the search area.
5. Click the **Choose a Folder** symbol and activate **TDM Server**.
6. Select the *ConvertExampleData* Data Preprocessor.
7. Select **Processed data (Raw_Data)**.



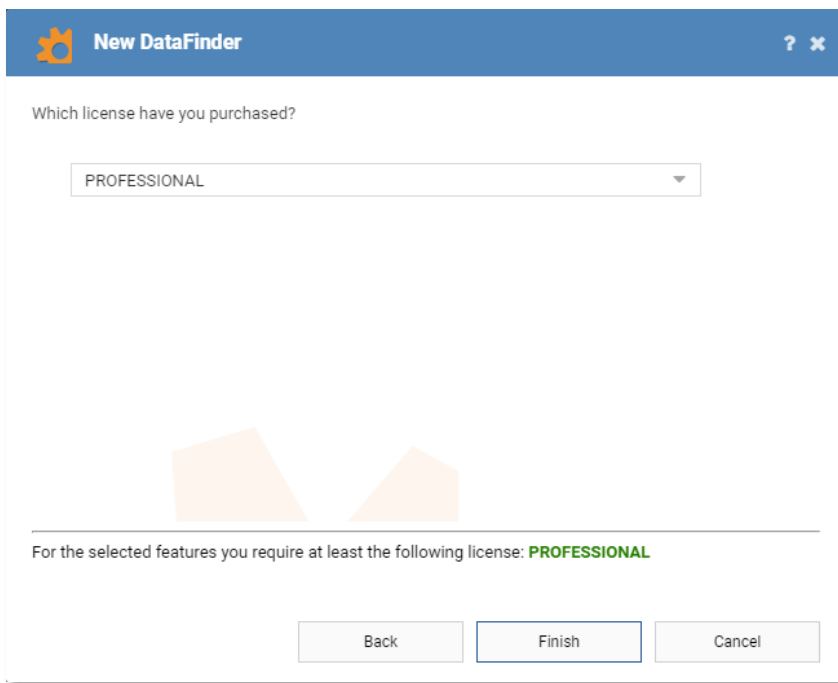
The 'Browse' dialog box shows a file tree structure. The address bar at the top displays the path 'C:\Users\Public\Documents\National Instruments\TDM Server Demo\Processed_Data'. The tree has a root 'TDM Server Demo Data' which contains a folder 'TDM Server'. Inside 'TDM Server' is a folder 'ConvertExampleData', which contains two sub-folders: 'Raw_Data (Raw Data)' and 'Raw_Data (Processed Data)'. The 'Raw_Data (Processed Data)' folder is selected and highlighted in yellow. At the bottom, there are 'OK' and 'Cancel' buttons.

Browse

C:\Users\Public\Documents\National Instruments\TDM Server Demo\Processed_Data

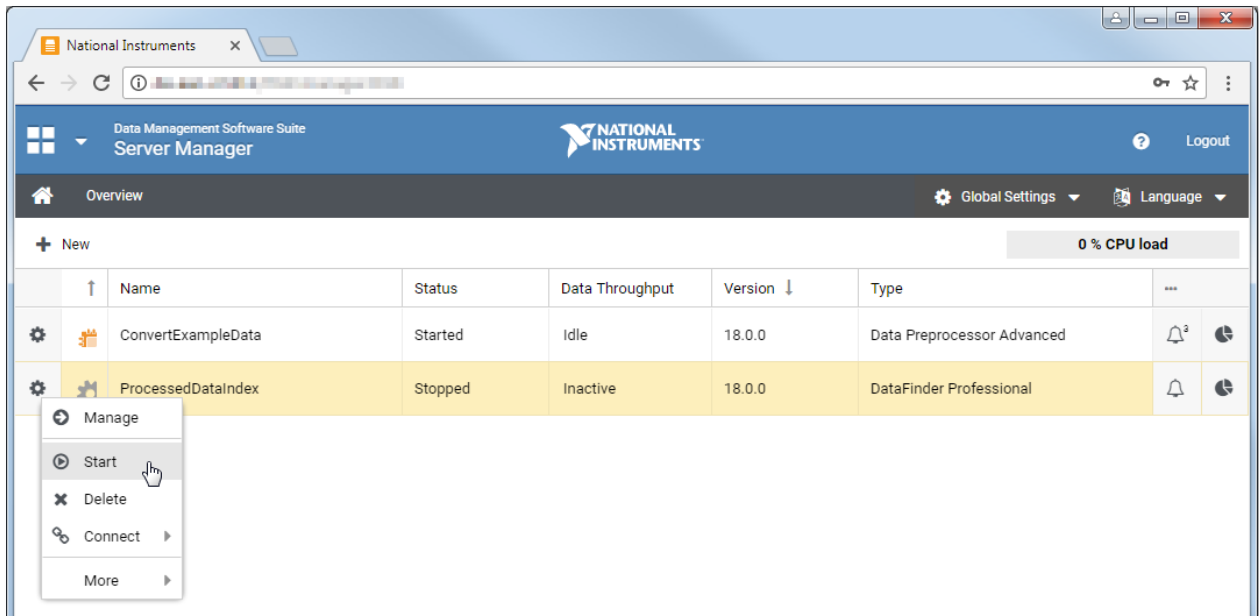
Name	Path
▶ ★ TDM Server Demo Data	C:\Users\Public\Documents\National Instruments\DataFinder\...
▶ 📁 TDM Server	
▶ 📁 ConvertExampleData	
▶ 📁 Raw_Data (Raw Data)	C:\Users\Public\Documents\National Instruments\TDM Server ...
▶ 📁 Raw_Data (Processed Data)	C:\Users\Public\Documents\National Instruments\TDM Server ...

8. Click **OK**.
9. Click **Next** to continue the configuration wizard.
10. Click **Use DataFinder hierarchy**
11. Select **Year-Month**
12. Click **Web access**
13. Click **Allow access to DataFinder through web connections**
14. Click **Next**.
15. Select the *PROFESSIONAL* license.



16. Click **Finish** to complete the initial configuration of the DataFinder.

17. Select the newly created DataFinder in the list, and click **Start** to start indexing the data.



2.1 Next Steps

Now you can connect to the DataFinder Index using a client such as DIAdem and perform a simple or complex query.

The next step is to automate the analysis of the processed data.

3 Set Up a Triggered Analysis Server Task to Process New Files

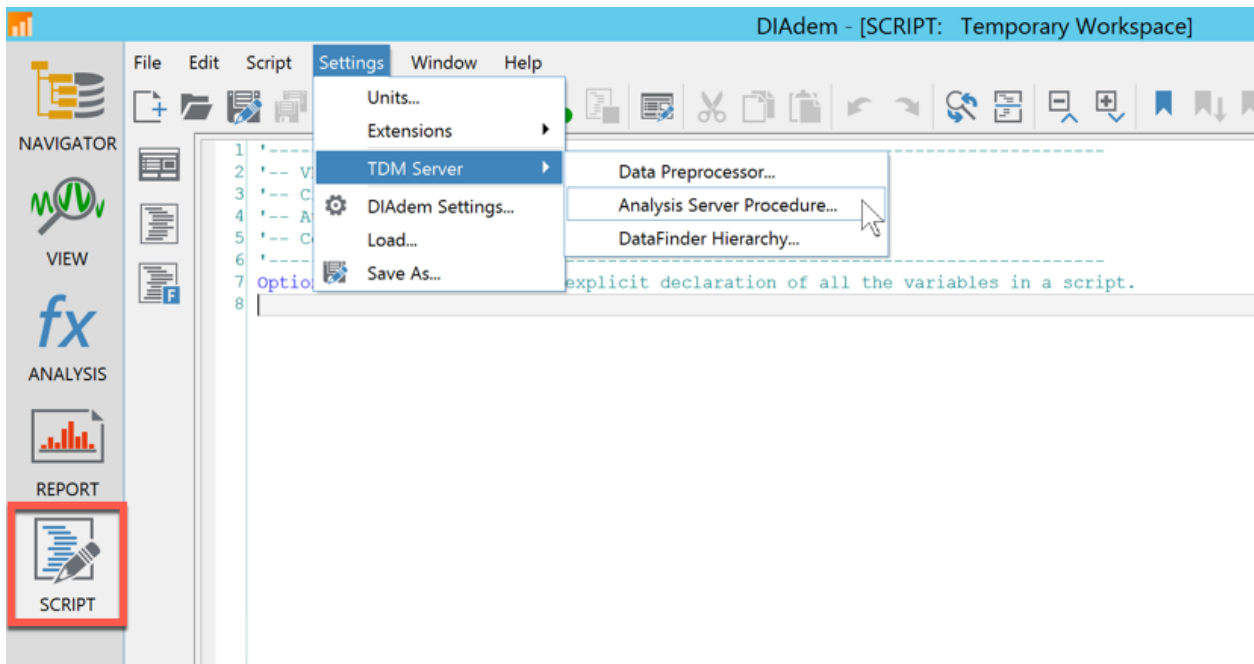
3.1 Define the Analysis Server Procedure in DIAdem

Use the Analysis Server Procedure Configuration dialog box to define the Analysis Server Procedure you then upload to the Analysis Server in TDM Server Manager.

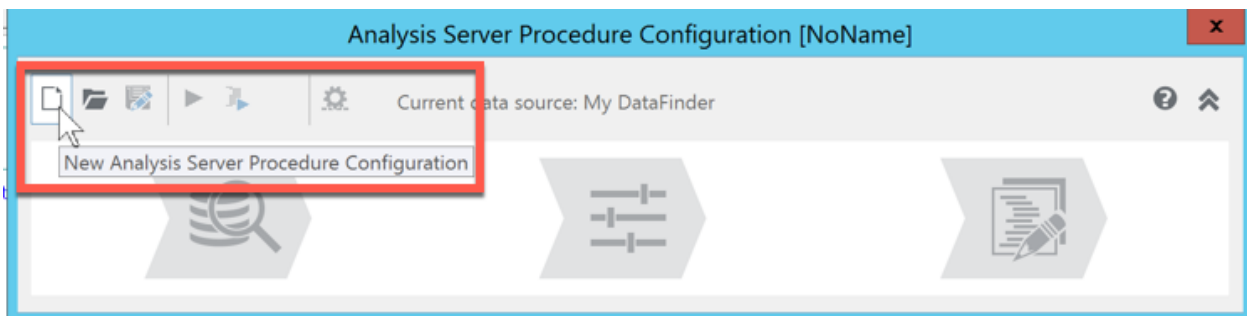
The example assumes that you have an existing analysis routine which you would like to automate using the Analysis Server. The basic steps for integrating your existing analysis routine will be shown. For more details about how to script an analysis procedure, please refer to the DIAdem online help.

3.2 Create a New Analysis Server Package

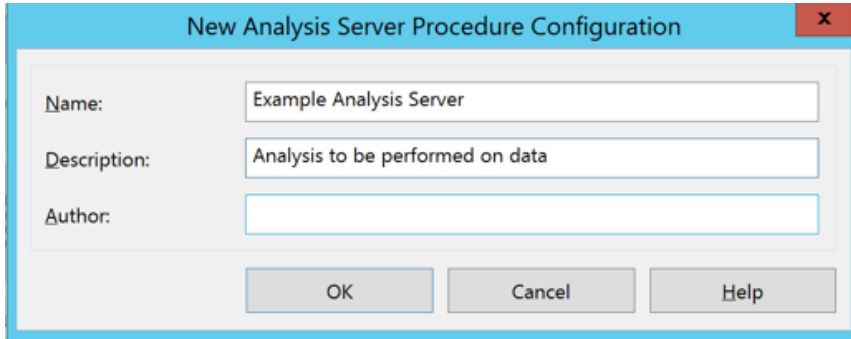
1. Select the **DIAdem Script** panel
2. Select **Settings>>TDM Server>>Analysis Server Procedure**



3. Click the **New Analysis Server Package** symbol



4. Enter the **Name** of the new Analysis Server Package and an optional **Description** and **Author**.

A screenshot of a Windows-style dialog box titled "New Analysis Server Procedure Configuration". The dialog has a blue title bar with a red close button (X) on the right. Inside, there are three text input fields: "Name:" with the text "Example Analysis Server", "Description:" with the text "Analysis to be performed on data", and "Author:" which is empty. At the bottom, there are three buttons: "OK", "Cancel", and "Help".

New Analysis Server Procedure Configuration

Name: Example Analysis Server

Description: Analysis to be performed on data

Author:

OK Cancel Help

5. Click **OK**

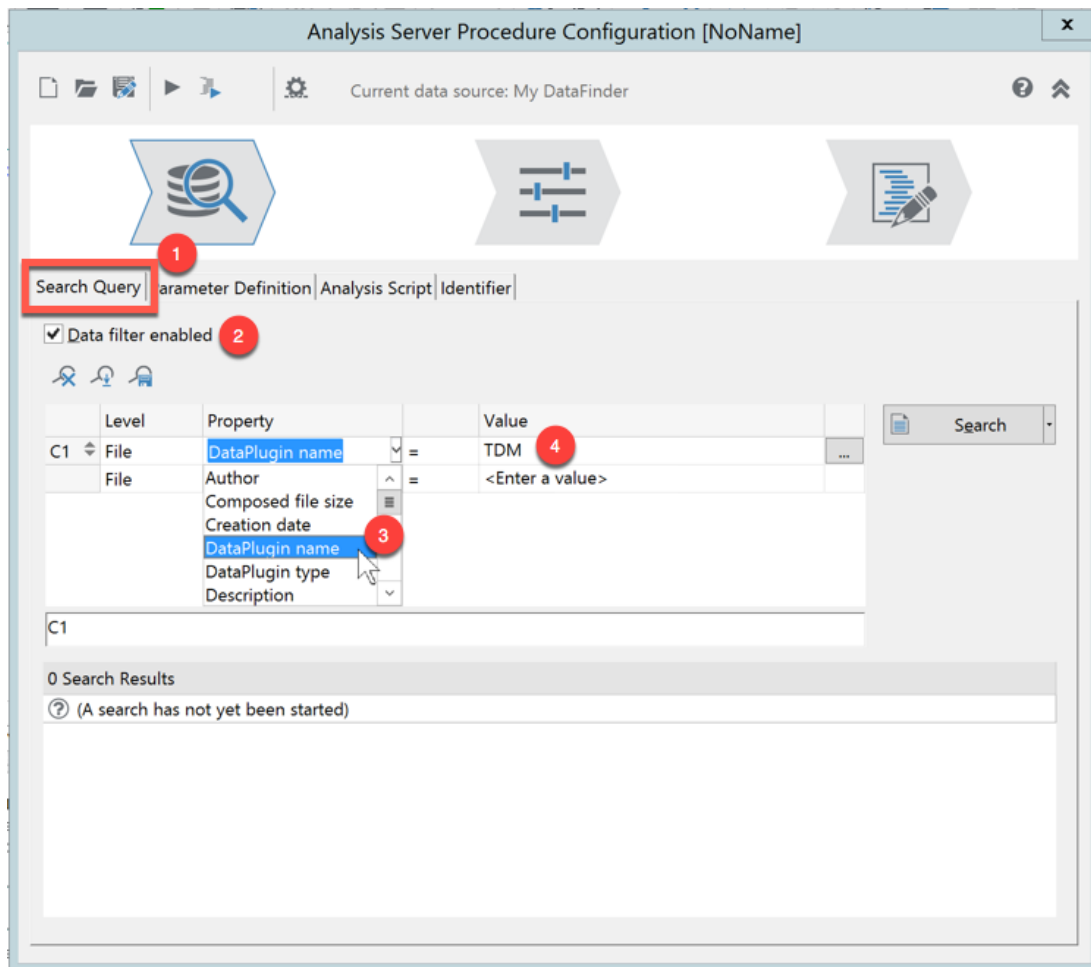
3.3 Define the Execution Condition of Your Procedure

In this step you configure the file types your analysis procedure processes. You can refer to information from the file itself, such as file type (DataPlugin), but you can also use any kind of meta data from within the file. In our example, we will narrow down the scope to address only TDM files.

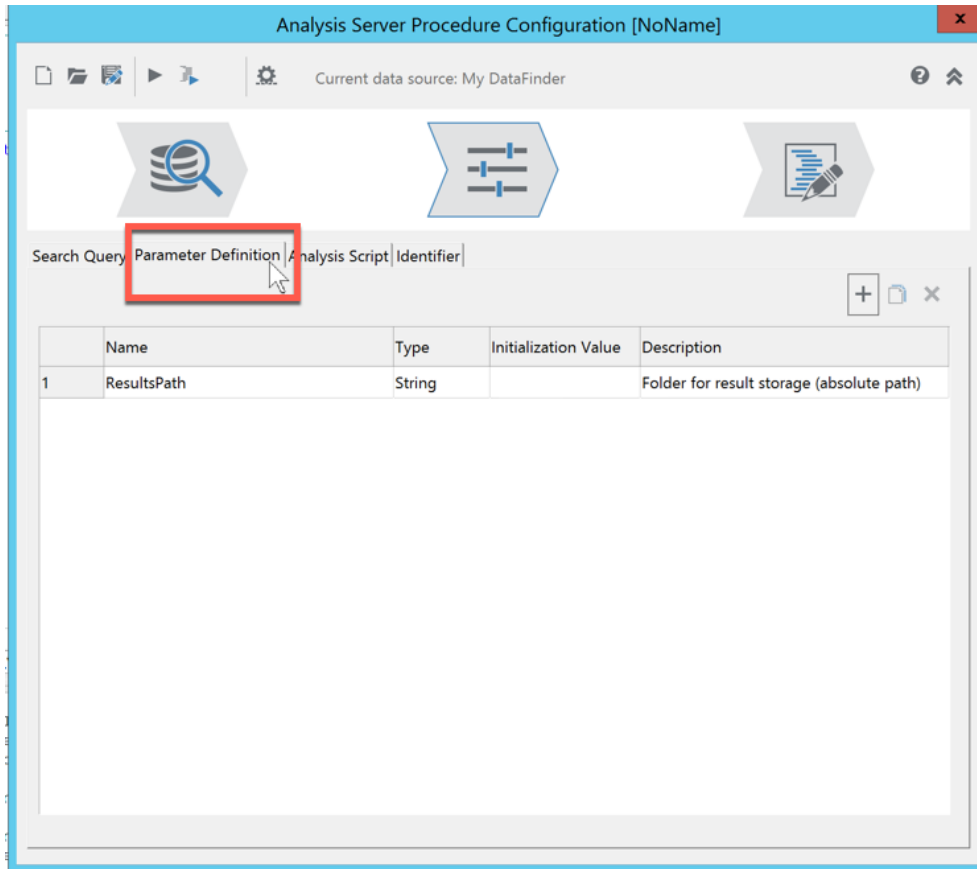
6. Select the **Search Query** tab.
7. Enable **Data filter enabled**.

8. Define the following query condition:

Level	Property		Value
File	DataPlugin name	=	TDM



9. Select the **Parameter Definition** tab.

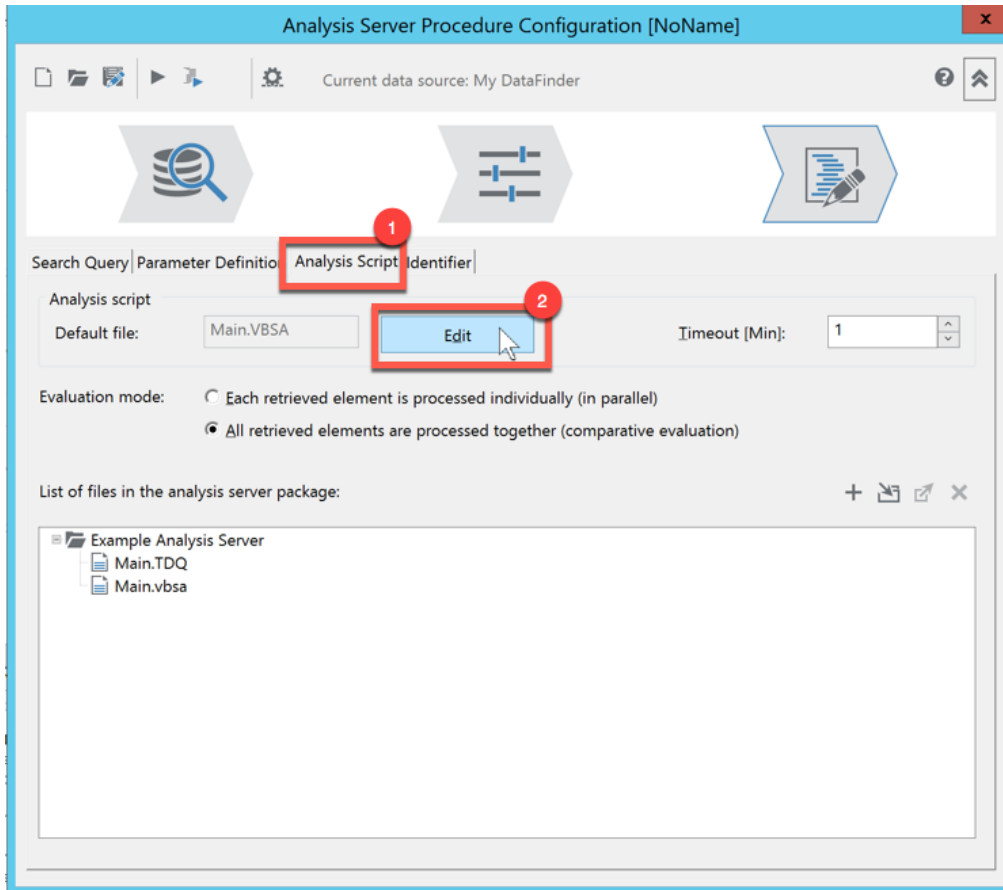


10. You can add any additional parameters to an analysis procedure to modify its execution. The *ResultsPath* parameter is used in the analysis script to determine the output path for analysis results, such as PDF files. The actual value is returned/entered? during the Analysis Server task definition.

3.4 Define the Analysis Script for the Procedure

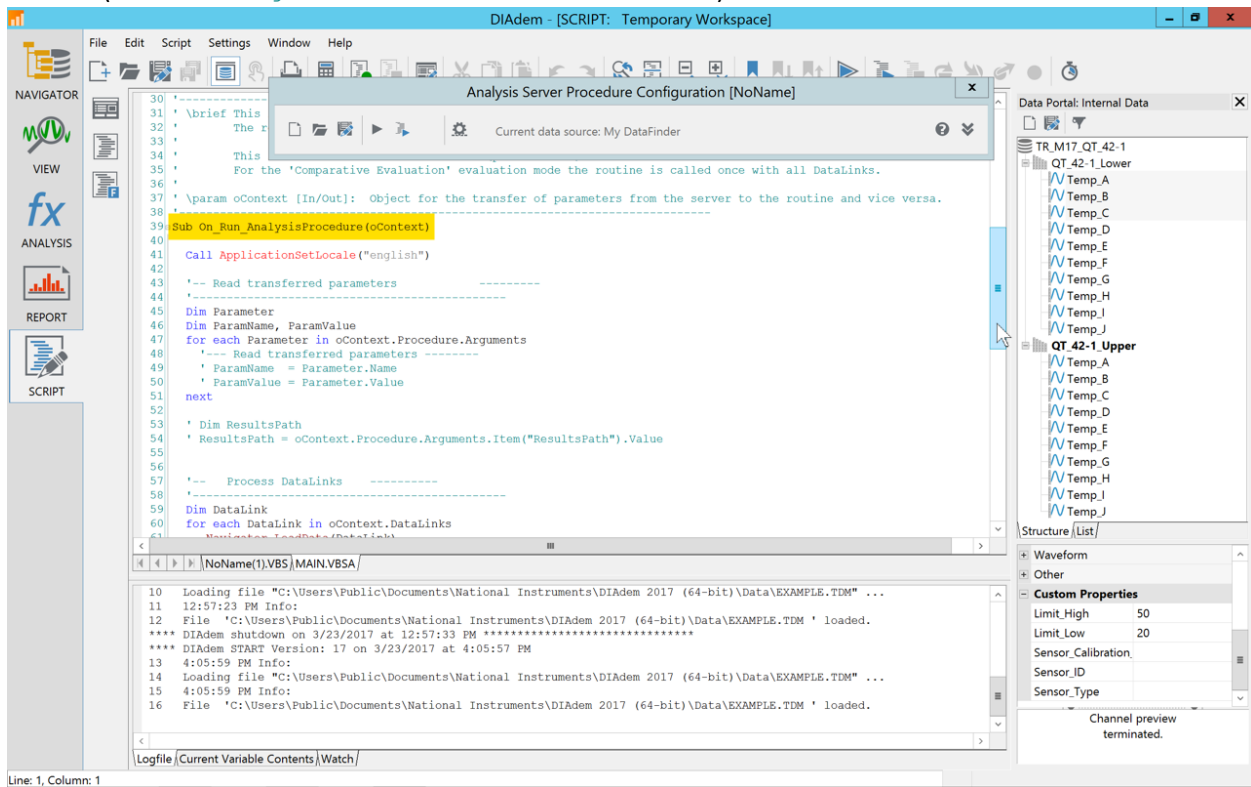
11. Select the **Analysis Script** tab.

12. Click **Edit** to edit the main script (main.vbsa), which is called first.



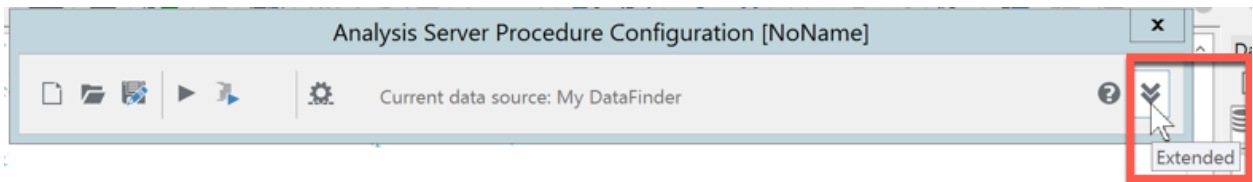
The main.vbsa file you created contains example code which includes the most important variables and methods to control your analysis script. The first section of the main Sub ([Sub](#) `On_Run_AnalysisProcedure(oContext)`) gives you an example of how to access parameters from the **Parameter Definition** (`oContext.Procedure.Arguments`), how to load actual data into

DIAdem (oContext.DataLinks), and how to report back results of your analysis routine (oContext.LogResult (ResultsPath & " ... ")).

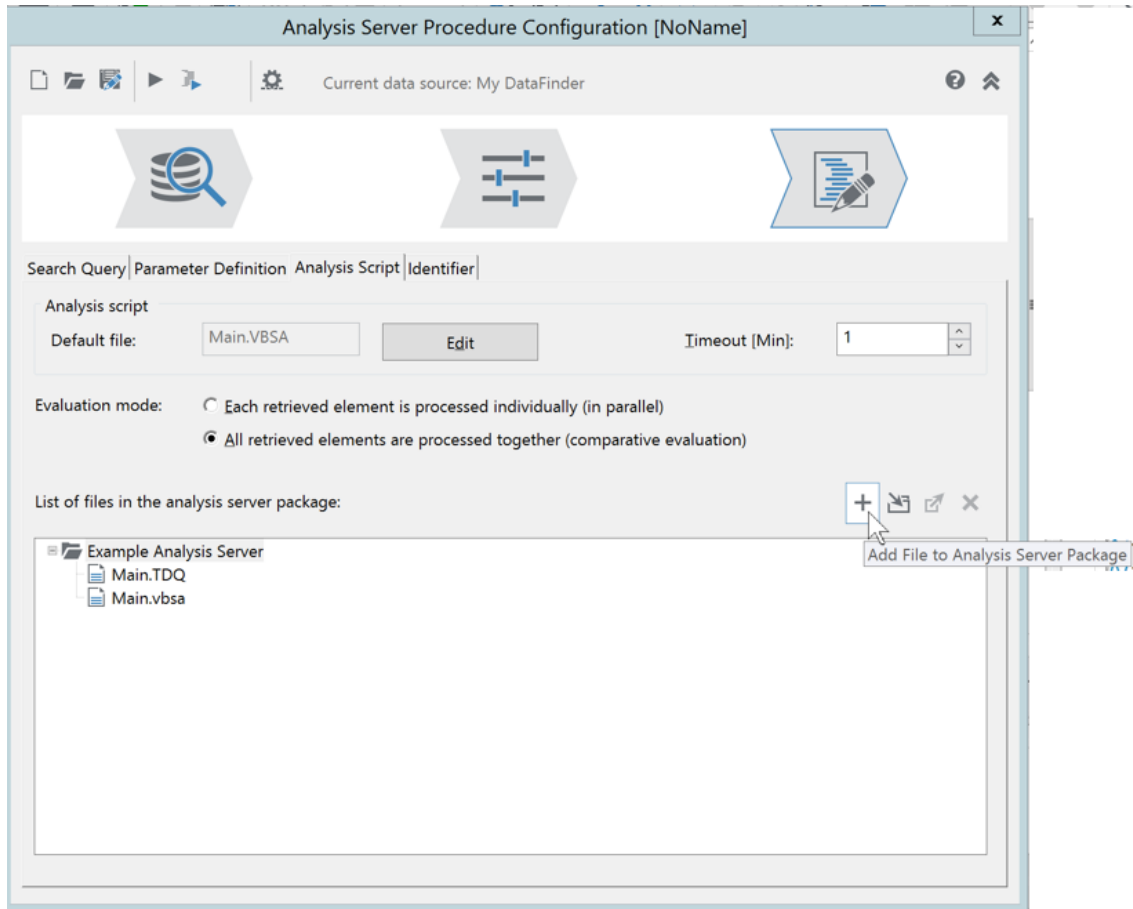


In most cases you can convert your existing scripts with only a few steps: replace the way your current script loads the data by using `oContext.DataLinks` as data source, and report back results (`oContext.LogResult (ResultsPath & " ... ")`). You can even use Sub scripts which you refer to with `ScriptInclude` or REPORT layouts (TDR files) and other files. To add these additional files to your analysis procedure, complete the following steps:

13. To return to the extended view of the Analysis Server Procedure Configuration click on the **Extended** double arrows.



14. Click the **Add File to the Analysis Server Package** symbol to add single files. ?



15. You can also click the **Add Folder to Analysis Server Package** symbol to add a complete folder.
This is the icon to the right of the **Add File to the Analysis Server Package**.

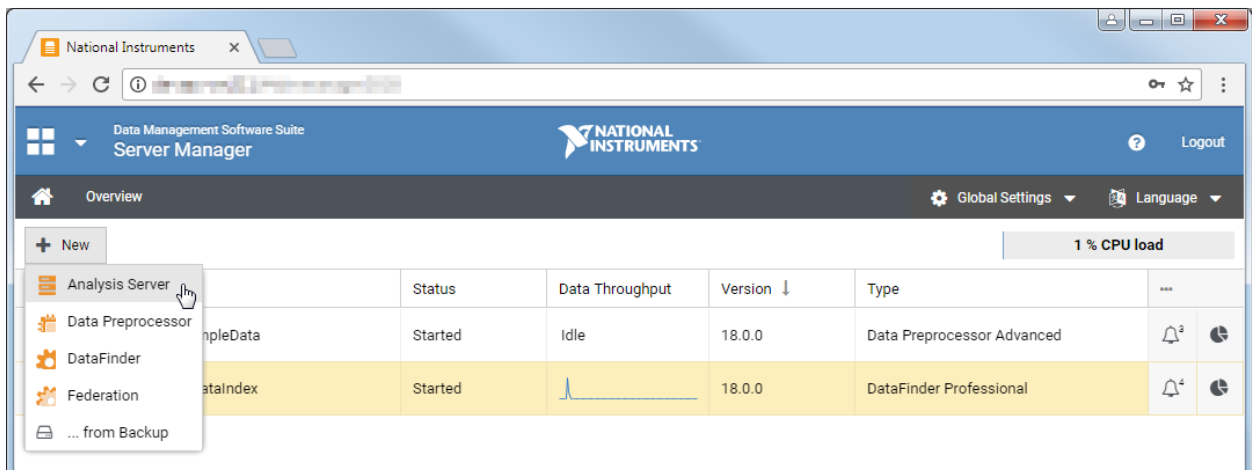
To explore a pre-defined analysis procedure, you can open and browse the “..\National Instruments\Analysis Server\Immediate_Analysis.ANP” example.

3.5 Create a New Analysis Server

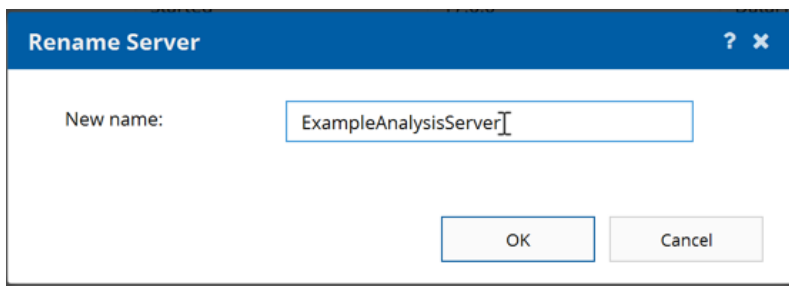
The next step is to upload an analysis procedure to the Analysis Server and use this analysis procedure to define a triggered task for files that are indexed by an existing DataFinder.

To setup the Analysis Server task, complete the following steps:

1. Open TDM Server Manager in your web browser and login using your credentials.
2. Select **New>>Analysis Server** (Note that you can only operate one Analysis Server at a time in TDM Server Manager).

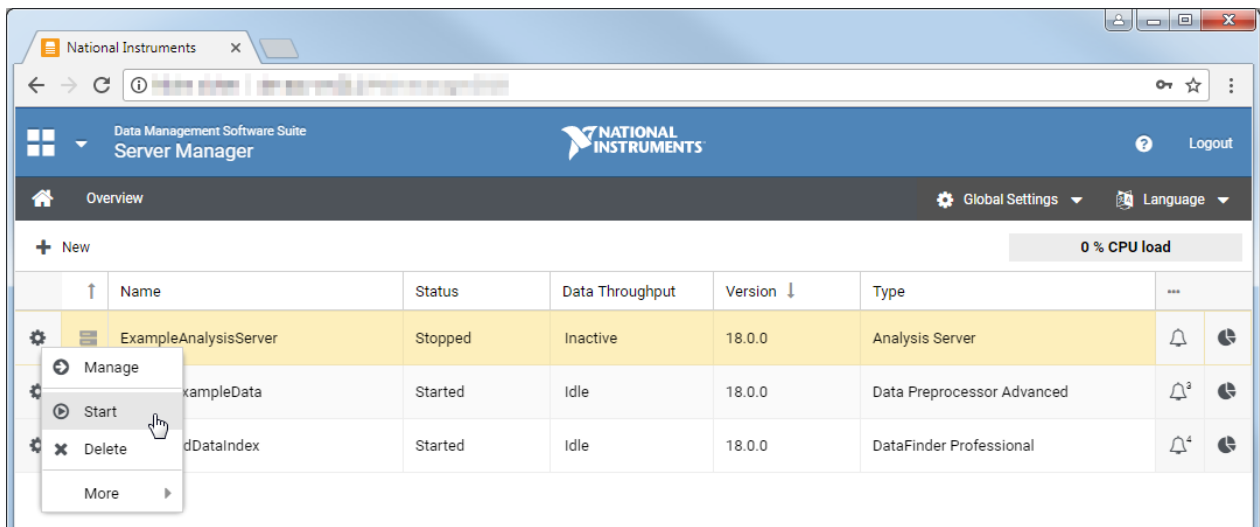


3. Enter a **Name** for the new Analysis Server.



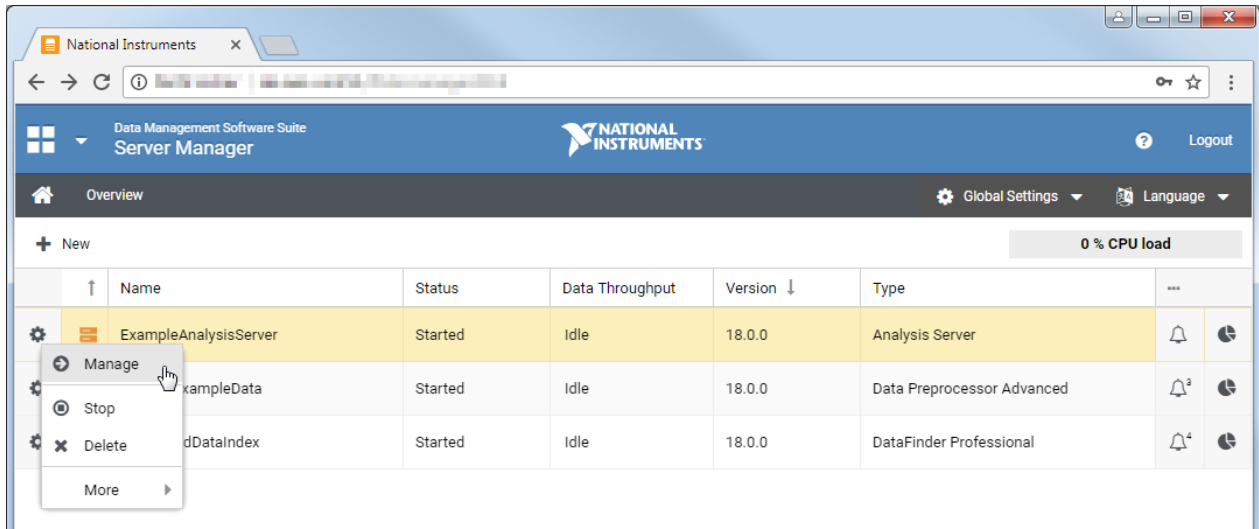
4. Click **OK**.

5. Click **Start** to start the newly created Analysis Server.

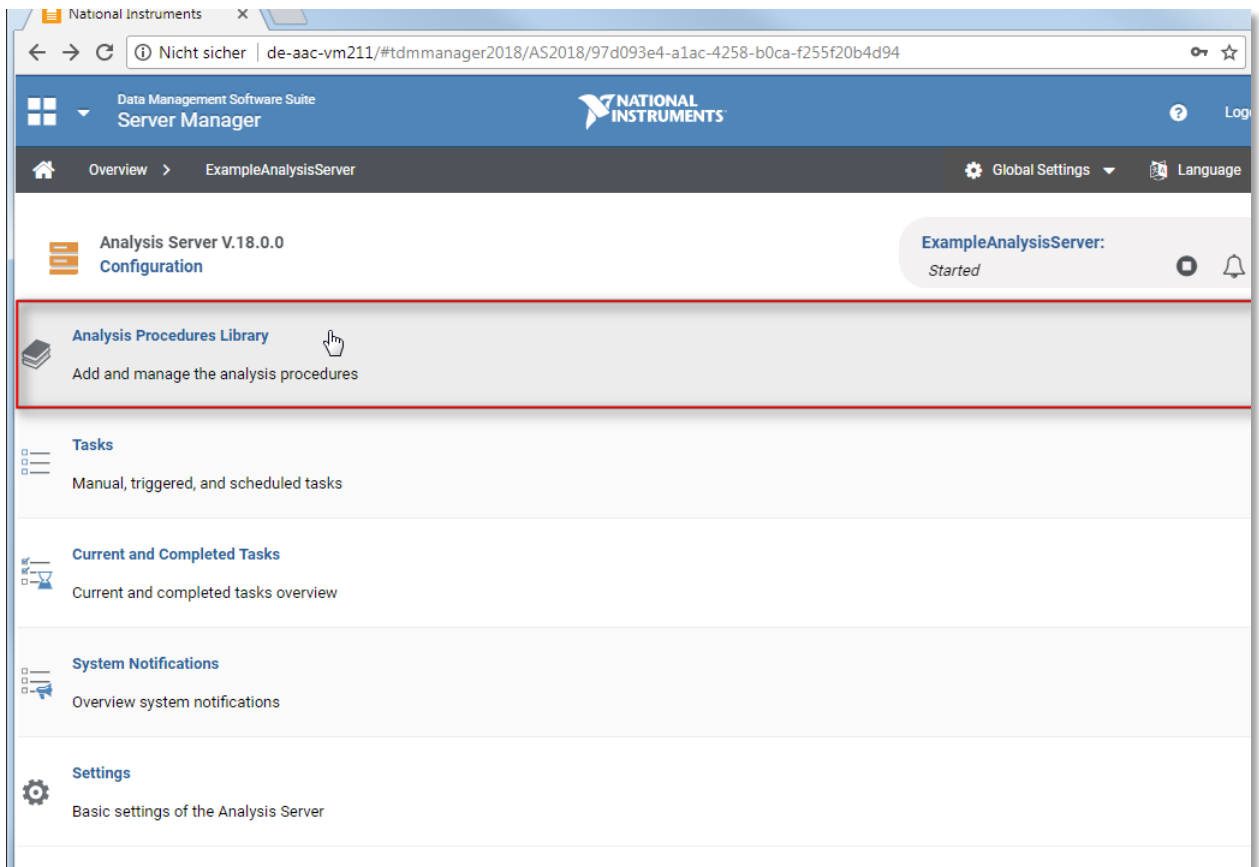


3.6 Upload an Analysis Procedure

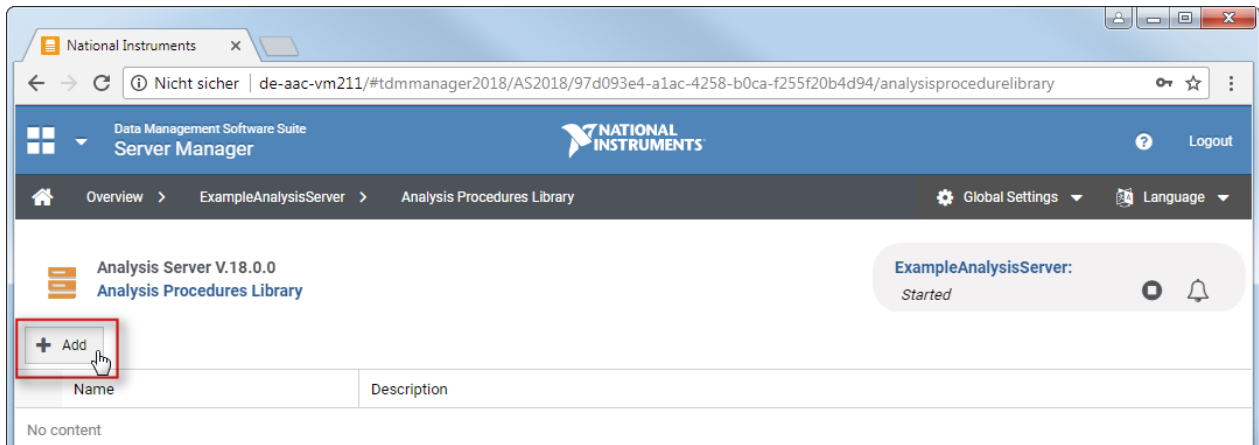
6. Select the Analysis Server in the list of configured servers, and click **Manage**.



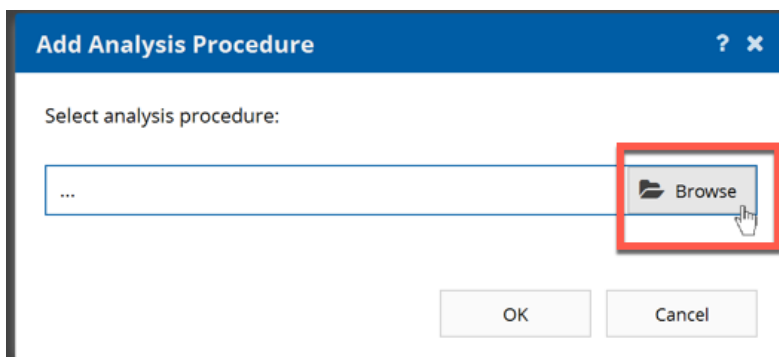
7. Open the **Analysis Procedures Library** page.



8. Click **Add**.



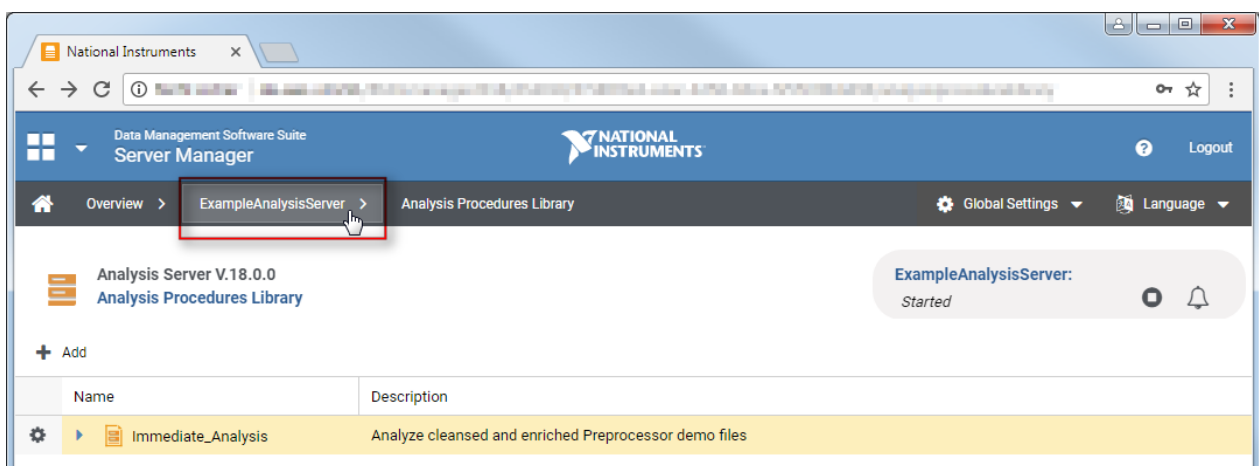
9. Click **Browse** and specify “..\National Instruments\Analysis Server\Immediate_Analysis.ANP” as analysis procedure (*.ANP).



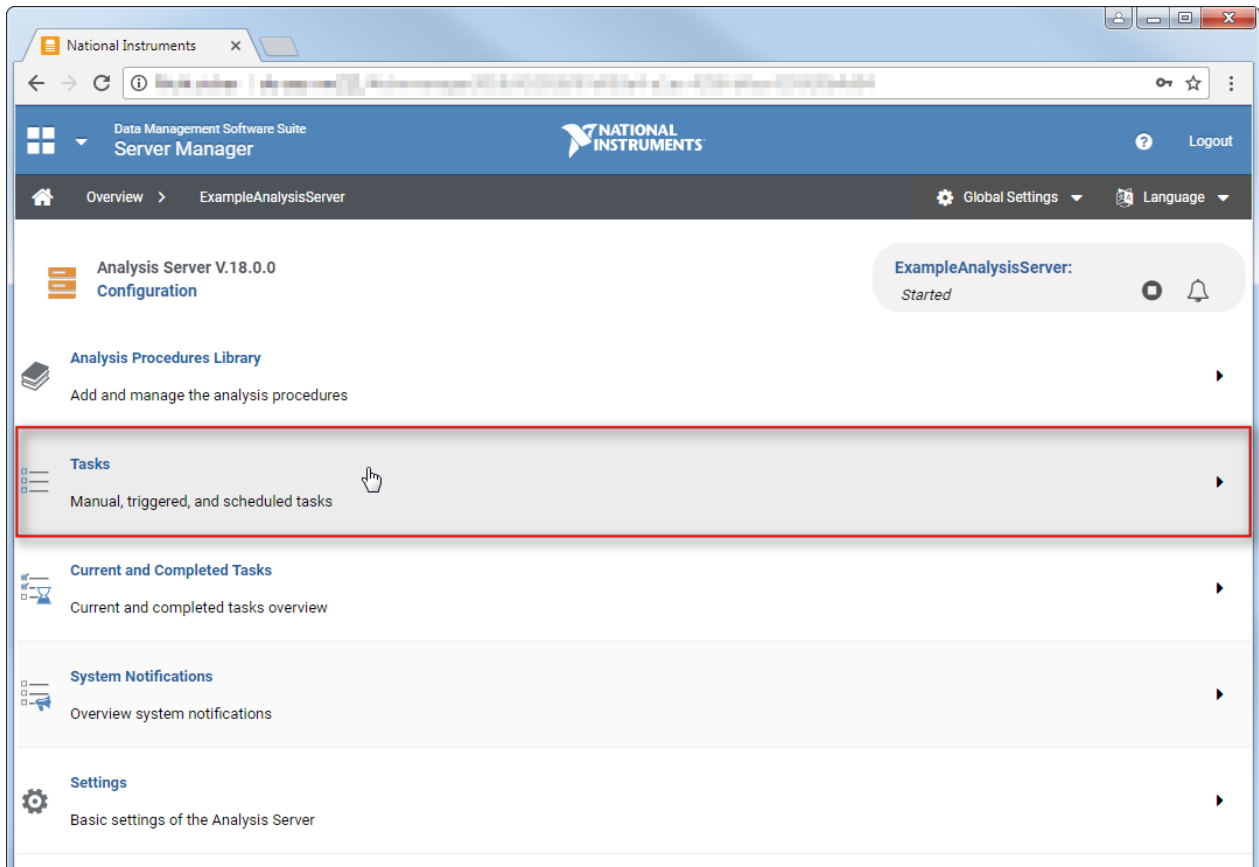
10. Click **OK**.

3.7 Define a Triggered Task

11. Click **Back** in your browser (or click on the Analysis Server name in the breadcrumbs navigation).

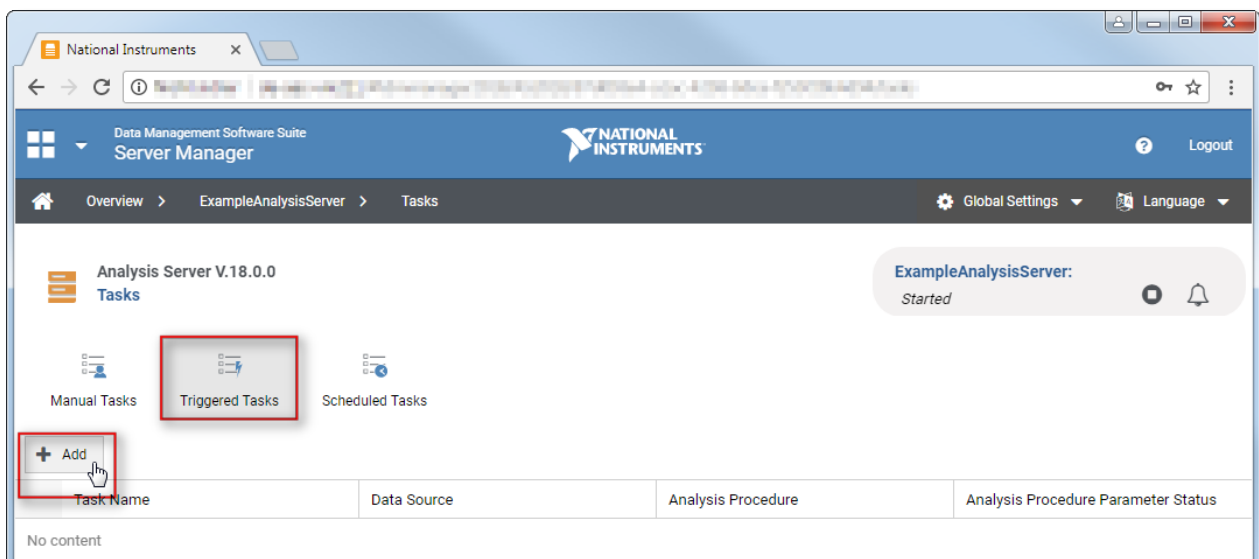


12. Open the **Tasks** page.



13. Select **Triggered Tasks**.

14. Click **Add**.



15. Specify *ImmediateTask* as **Task Name**.

16. Select the *ProcessedDataIndex@...* DataFinder as **Data Source**.
17. Select *Immediate_Analysis* as **Analysis Procedure**.
18. In the **Parameters** list, specify “C:\Users\Public\Documents\National Instruments\TDM Server Demo\Result_Reports” as **ResultsPath Value**.

Add Triggered Task

Task name:

Data source:

Analysis procedure:

Parameters			
Name	Type	Value	Description
ResultsPath	String	\Result_Reports	Folder for result storage (absolute path)

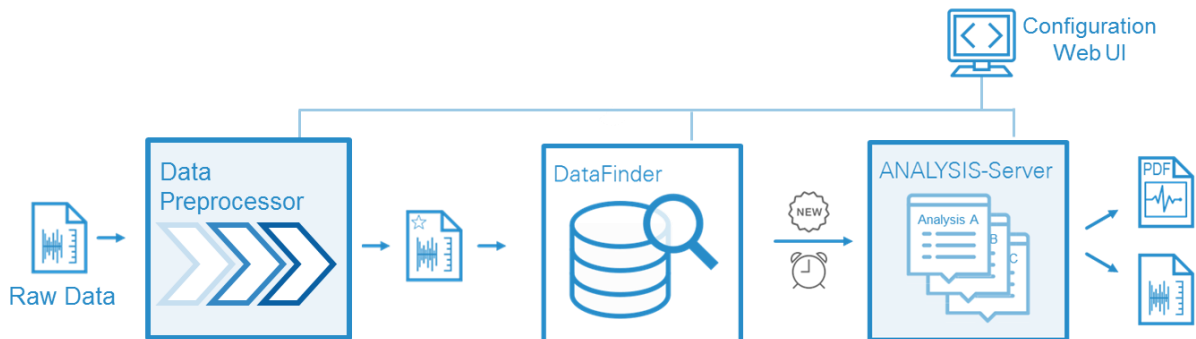
OK Cancel

19. Click **OK**.

The Analysis Server will now execute the *ImmediateTask* whenever a new file has been indexed by DataFinder as a result of a Data Preprocessor operation.

3.8 Test the Entire Process

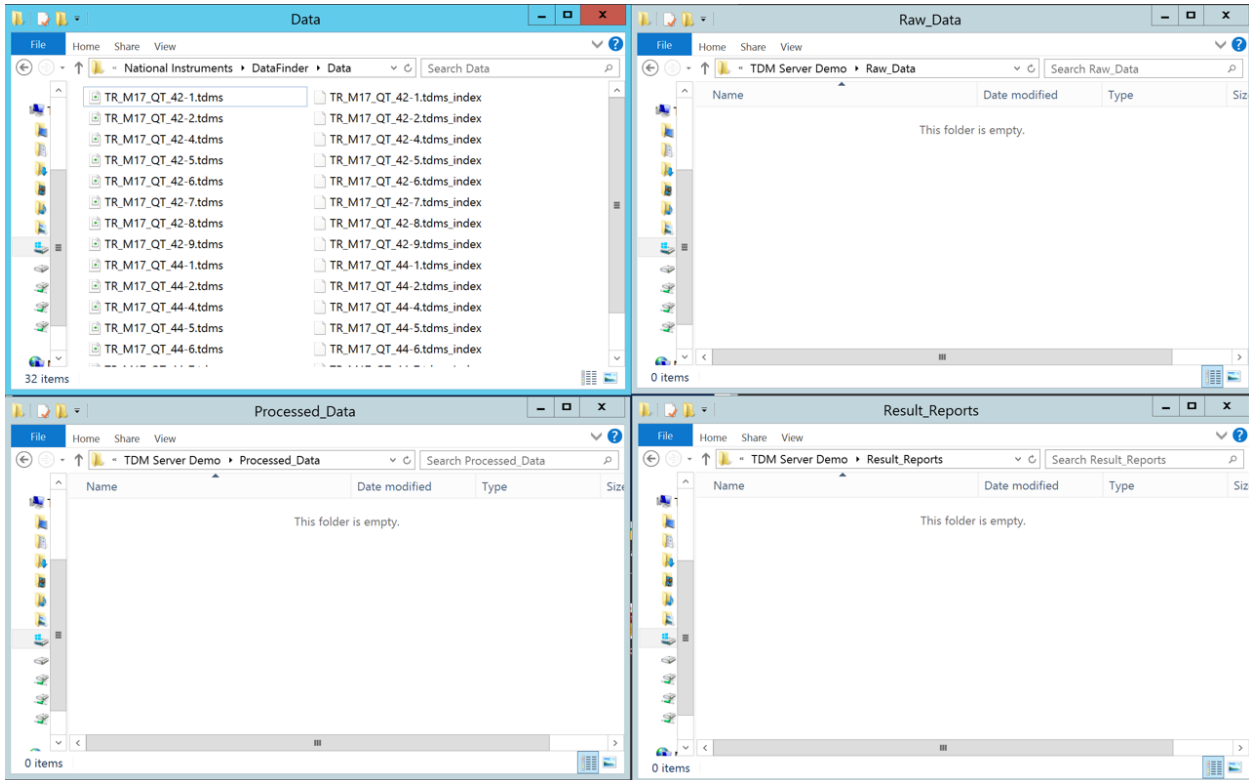
By following the complete tutorial series, you have created a complete TDM Server process chain. The Data Preprocessor accepts TDMS files as input and produces cleansed TDM files as output. Those TDM files are indexed by a DataFinder, which triggers an Analysis Server task.



You can watch this TDM Server processing chain in operation by completing the following steps:

20. Open 4 folders on your desktop.

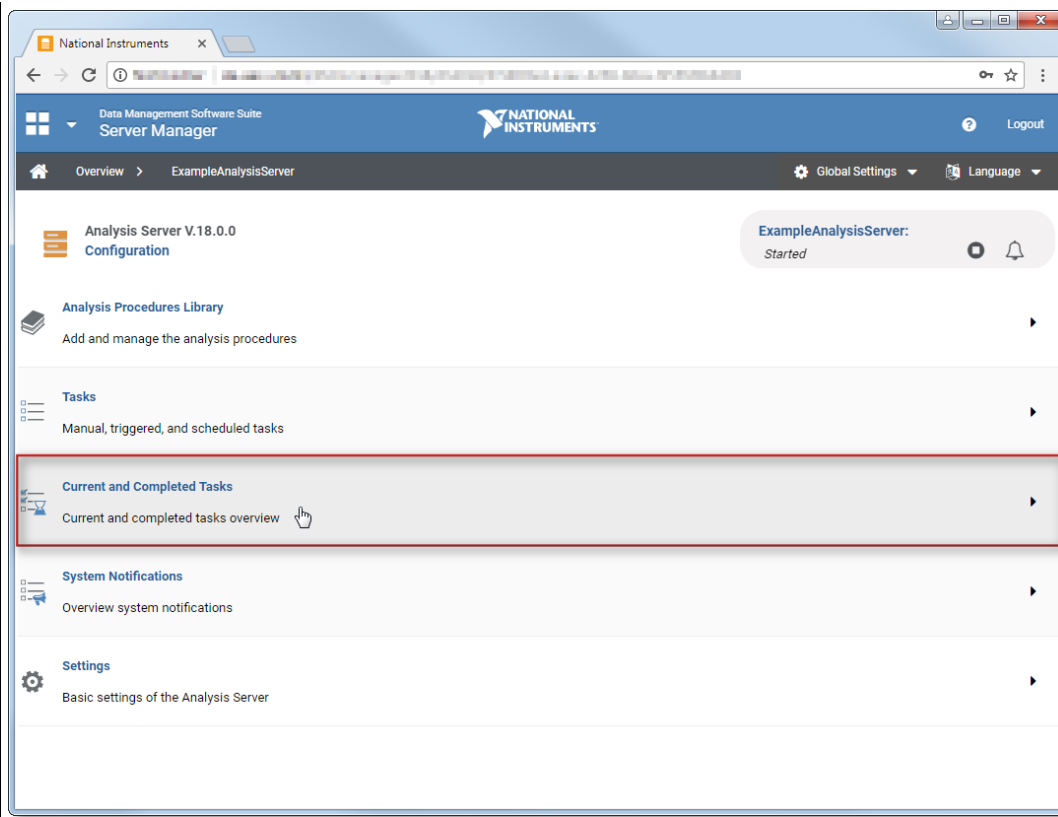
- a. C:\Users\Public\Documents\National Instruments\DataFinder\Data (Contains Data)
- b. C:\Users\Public\Documents\National Instruments\TDM Server Demo\Raw_Data
 - i. Delete Data Files if any exist in this folder
- c. C:\Users\Public\Documents\National Instruments\TDM Server Demo\Processed_Data
 - i. Delete Data Files if any exist in this folder
- d. C:\Users\Public\Documents\National Instruments\TDM Server Demo\Result_Reports



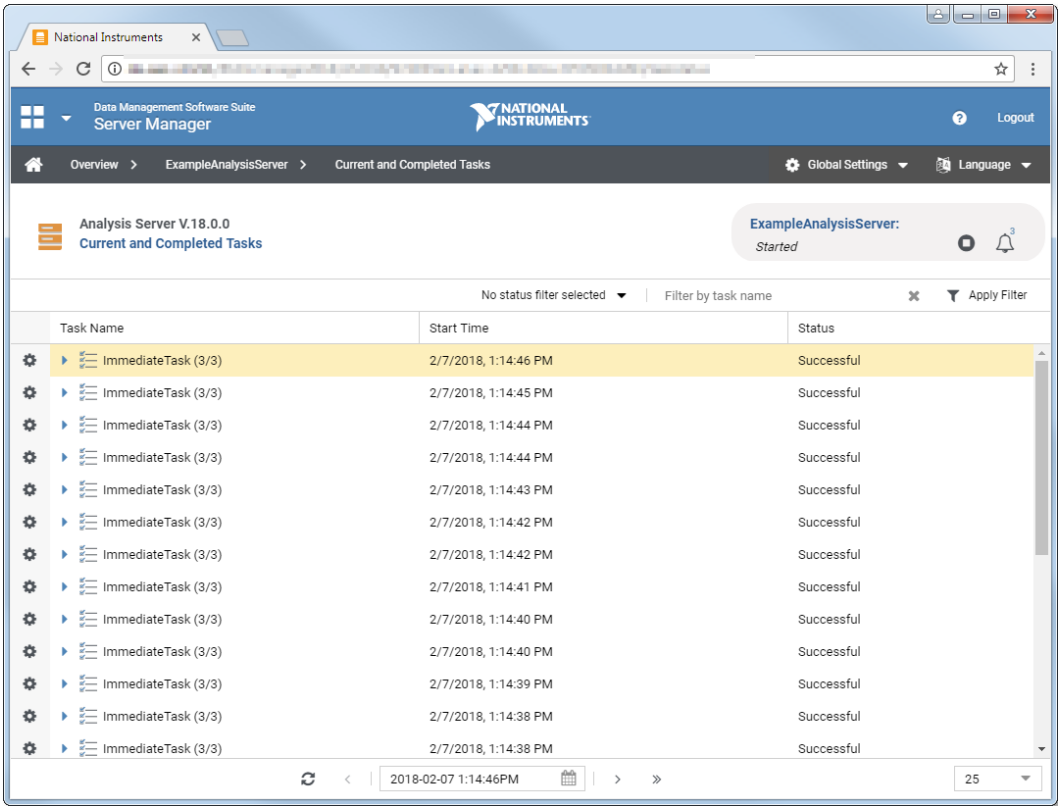
21. Copy the data and paste it into the Raw_Data Folder

22. The Preprocessing routine will create the cleansed and enriched TDM files, followed by the triggered analysis routine that produces a PDF report

23. In the TDM Web Manager, navigate to the **Current and Completed Tasks** section in the **Configuration**

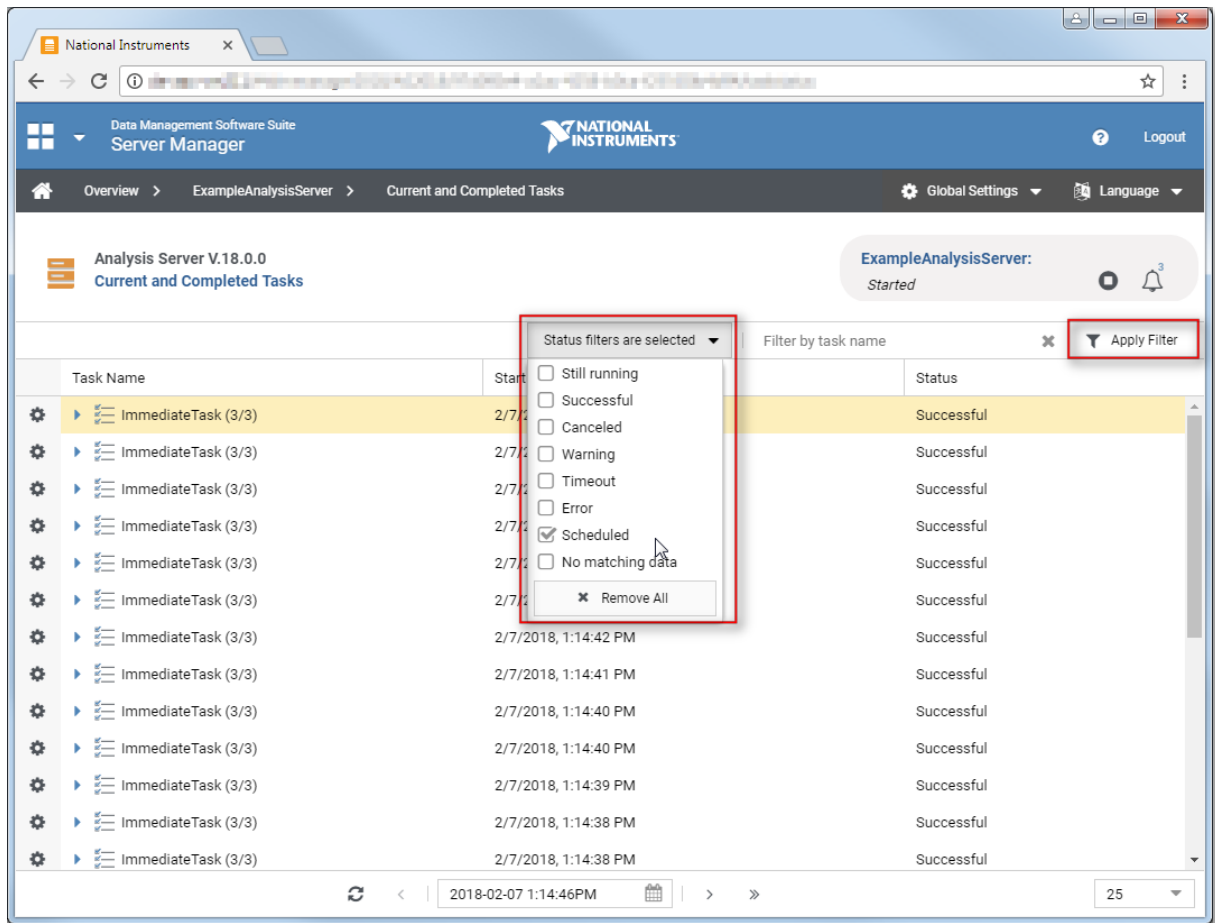


24. See the tasks which have executed.



Note: If the data triggering a task does not apply to the filter condition for task execution, the specific tasks are displayed in the list with the **Status No data**.

25. Select a status filter and then click **Apply Filter** to filter tasks.
- 26.



Note: You can cancel current tasks which are still running. If there is an executed task with a series of sub-tasks which, for example, include several files that are being processed in parallel, canceling this task will cancel all unfinished sub-tasks.

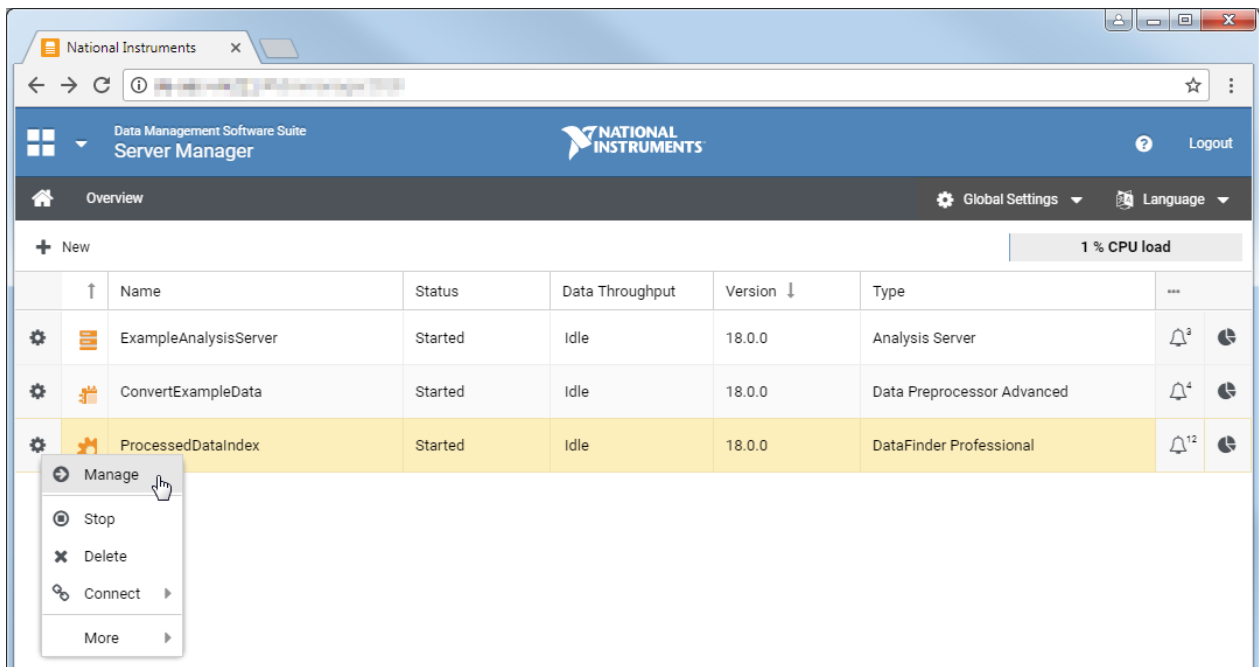
4 Searching for Analysis Server Reports (PDF) with DataFinder

PDF reports created by an Analysis Server task can contain custom properties. The custom properties allow you to index and search those files. Use the same custom properties as on the data files root level to search for common data files and (PDF) documents. In the example PDF files, the following custom properties are added to the file level:

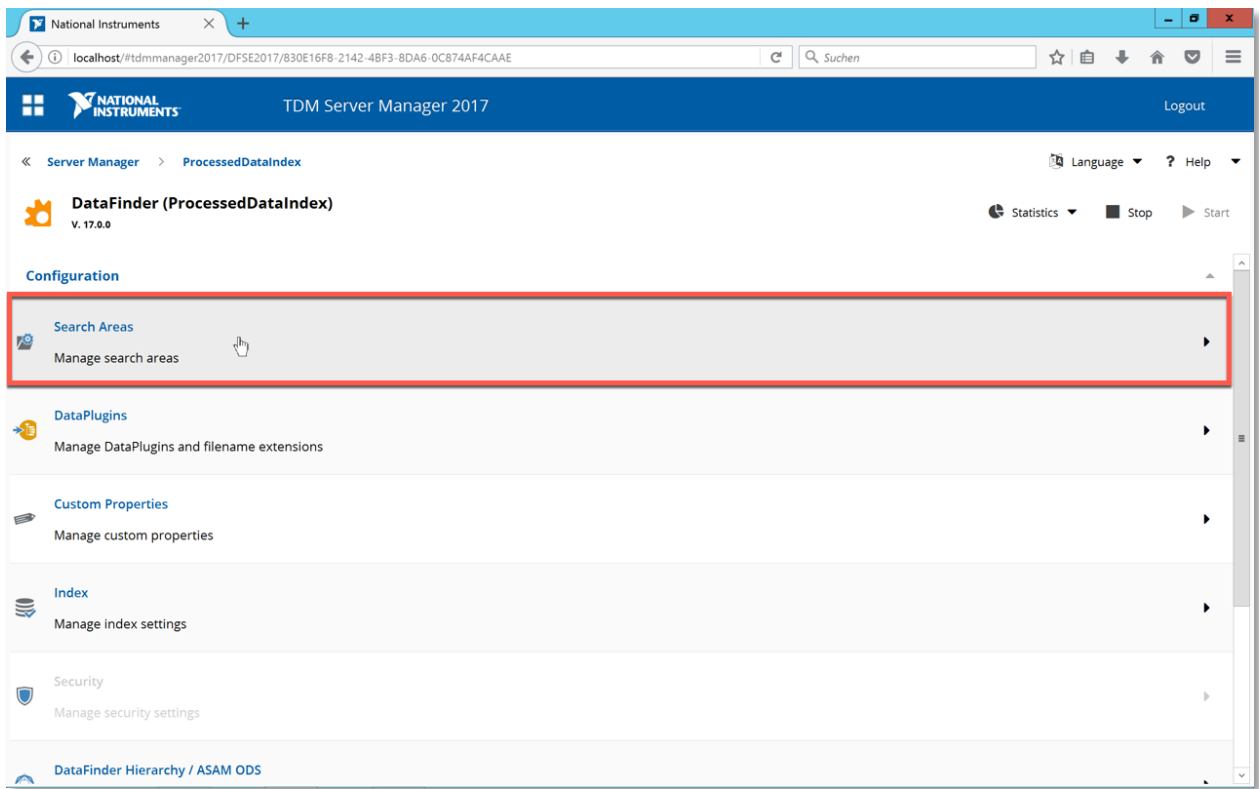
- Test~Module
- Test~Name
- Test~Operator
- Test~Procedure
- Test~UUT

Apply the following steps to add the PDF documents created by the Analysis Server task (*ImmediateTask*), to the *ProcessedDataIndex* DataFinder server:

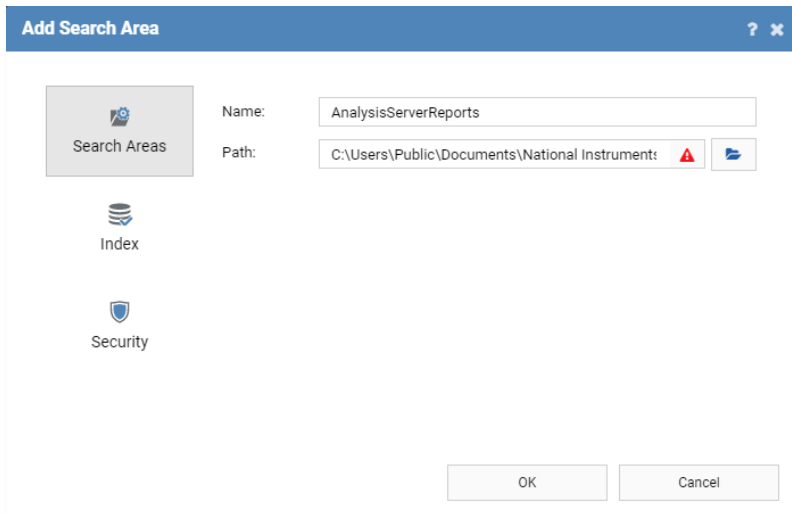
1. Open TDM Server Manager in your web browser and login using your credentials.
2. Select the existing *ProcessedDataIndex* Data Finder server in the list of configured servers, and click **Manage**.



3. Open the **Search Areas** section.

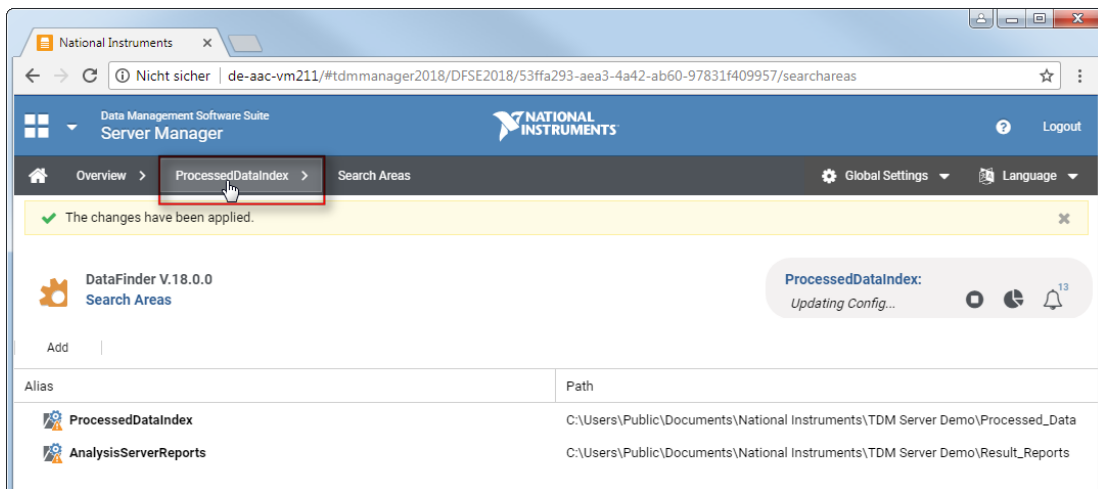


4. Click **Add**.
5. Enter the **Name** of the search area.
6. Click the **Browse** button and specify “C:\Users\Public\Documents\National Instruments\TDM Server Demo\Result_Reports” as **Path**.

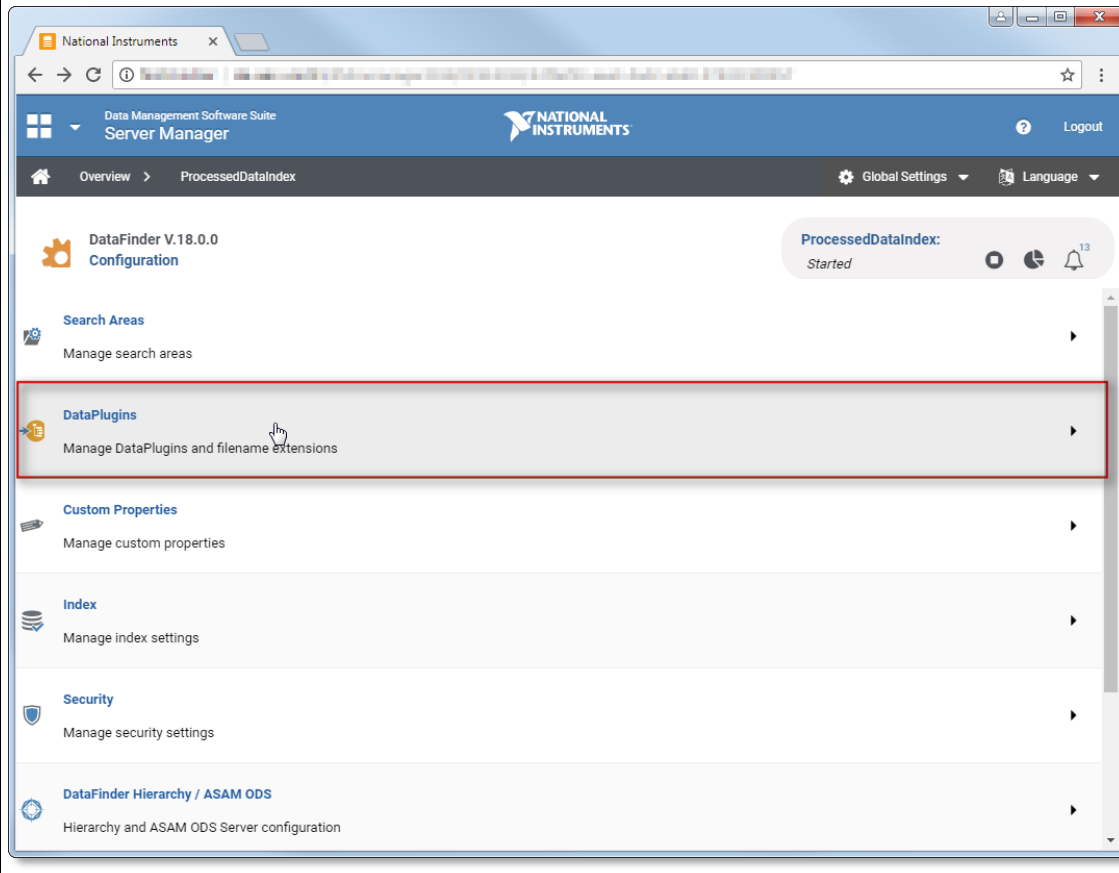


The 'Add Search Area' dialog box is shown. It has a blue header bar with the title 'Add Search Area' and a close button. On the left, there is a sidebar with three icons: 'Search Areas' (selected), 'Index', and 'Security'. The main area contains two input fields: 'Name:' with the text 'AnalysisServerReports' and 'Path:' with the text 'C:\Users\Public\Documents\National Instruments\'. To the right of the 'Path' field is a red warning triangle icon and a blue folder icon. At the bottom, there are 'OK' and 'Cancel' buttons.

7. Click **OK**.
8. Click **Apply** to apply the change.
9. Click **Back** in your browser (or click on the *ProcessedDataIndex* in the breadcrumbs navigation).

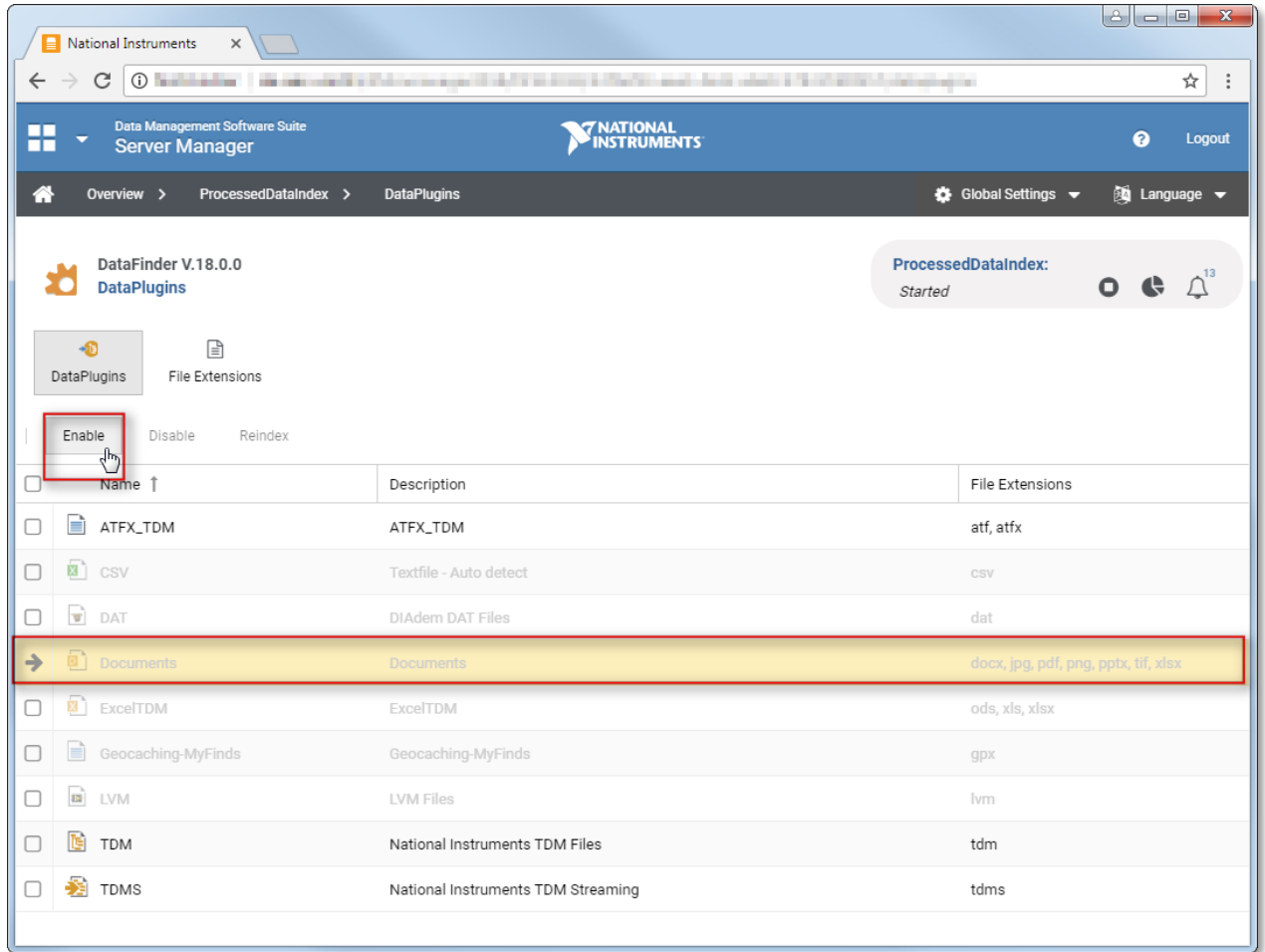


10. Open the **DataPlugins** page.



11. Select the *Documents* DataPlugin in the list of DataPlugins.

12. Click **Enable**.

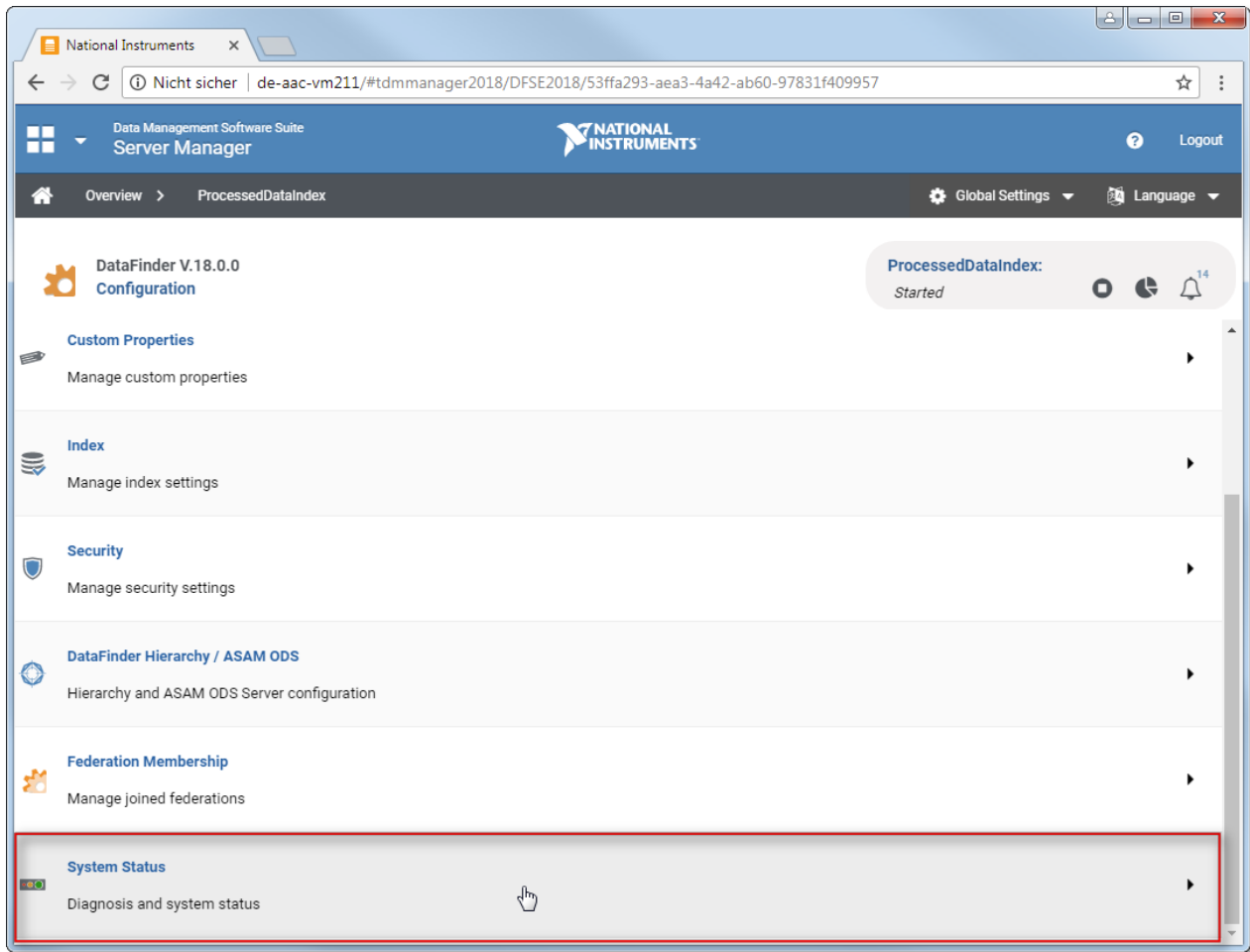


13. Click **Apply** to apply the change.

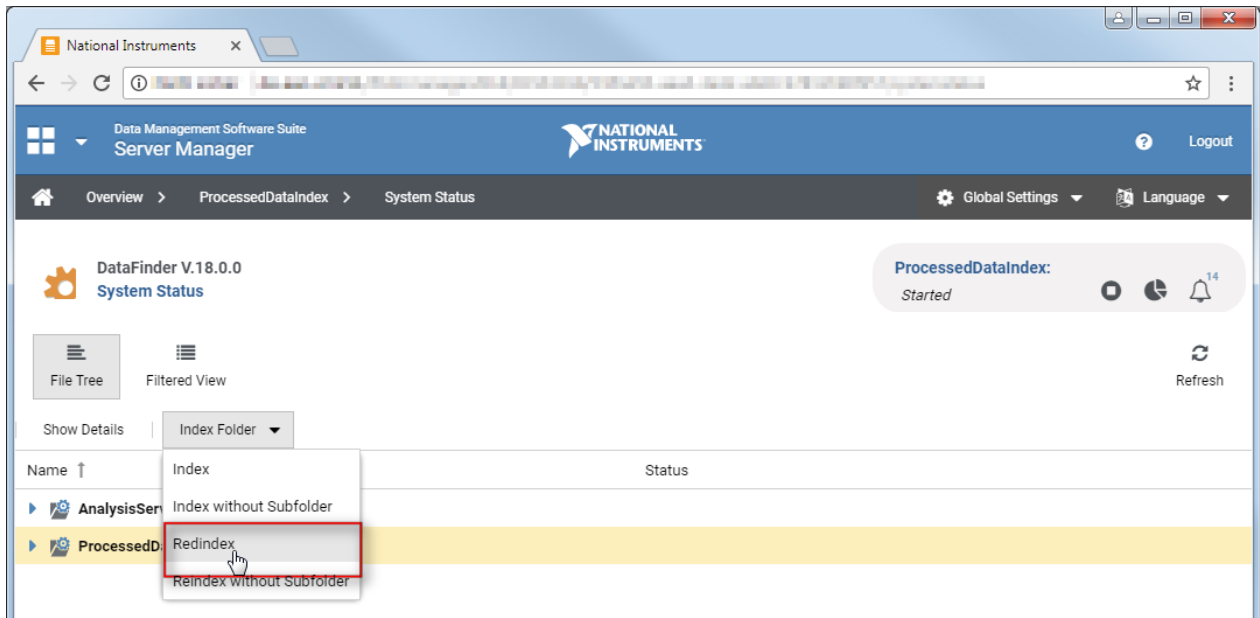
To verify whether your newly added search area, including your PDF files, are indexed by DataFinder, you can follow these additional steps:

1. Click **Back** in your browser (or click on the *ProcessedDataIndex* in the breadcrumbs navigation).

2. Open the **System Status** page.

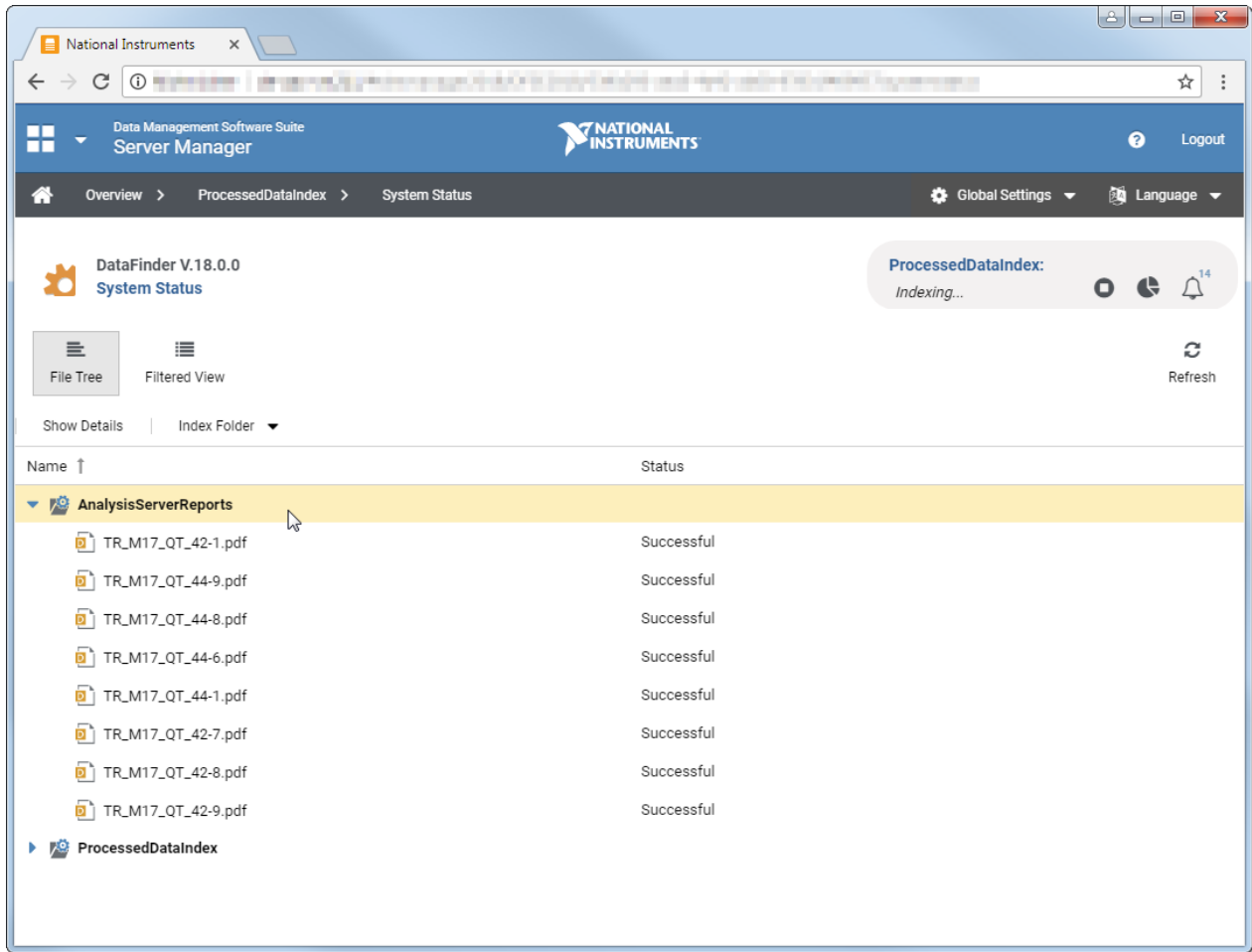


3. Select **Index Folder** and select **Reindex** to ensure the reports you have generated are indexed by the DataFinder.



4. Click **Ok**.

5. Browse the files in your search areas.



You can also use the **System Status** page to investigate indexing issues.

4.1 Next Steps

The exercises in this tutorial are just the basics when it comes to customizing the preprocessor and analysis routines for your needs. The Data Management Software Suite scales to your needs whether you are a single department or a global enterprise looking to manage and analyze your data. Please contact NI to learn more about what our solutions can do for your organization.

5 Using Other File Formats (XLSX) as Data Preprocessor Input

This example shows you how to extend the already defined Data Preprocessor to support two file formats: TDMS and Excel. In addition, this example applies unit conversion.

The example data is stored in your National Instruments public example folder (for example, C:\Users\Public\Documents\National Instruments), and the example uses Excel files located in ...\\National Instruments\Data Preprocessor\ExcelData.

5.1.1 Configuring a Data Preprocessor

The Data Preprocessor uses the same conversion rules as described in “Data Preprocessor Configuration for TDMS files” but also applies them to XLSX files.



The Excel example data contains temperature channels measured in degrees Fahrenheit, whereas the TDMS temperature channels were measured in degrees Celsius. Use the “Convert Units” function in the Data Preprocessor to standardize the temperature to the unit degrees Celsius.

You can find the extended configuration described above in the ...\\National Instruments\Data Preprocessor\Configuration\Process_Example_Data_XLSX.DPP file, which the example uses to extend the Data Preprocessor you already created.

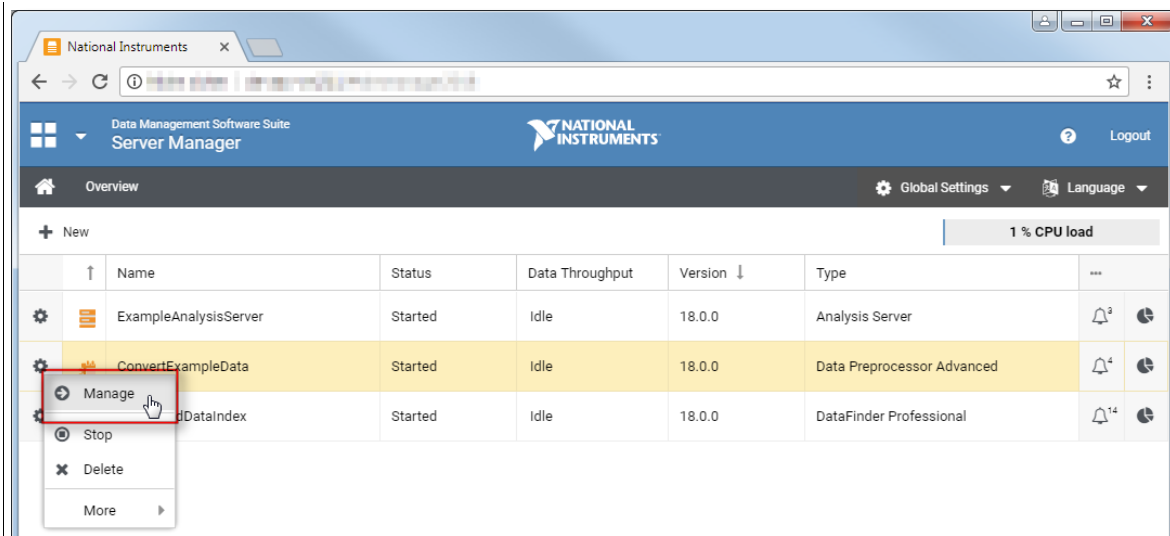
In case you did not create the Data Preprocessor as described in “Data Preprocessor Configuration for TDMS files”, please do so now. Use the Process_Example_Data_XLSX.DPP as configuration file instead, and skip steps 3 to 7.

5.1.2 Setting Up a Data Preprocessor for XLSX Example Files

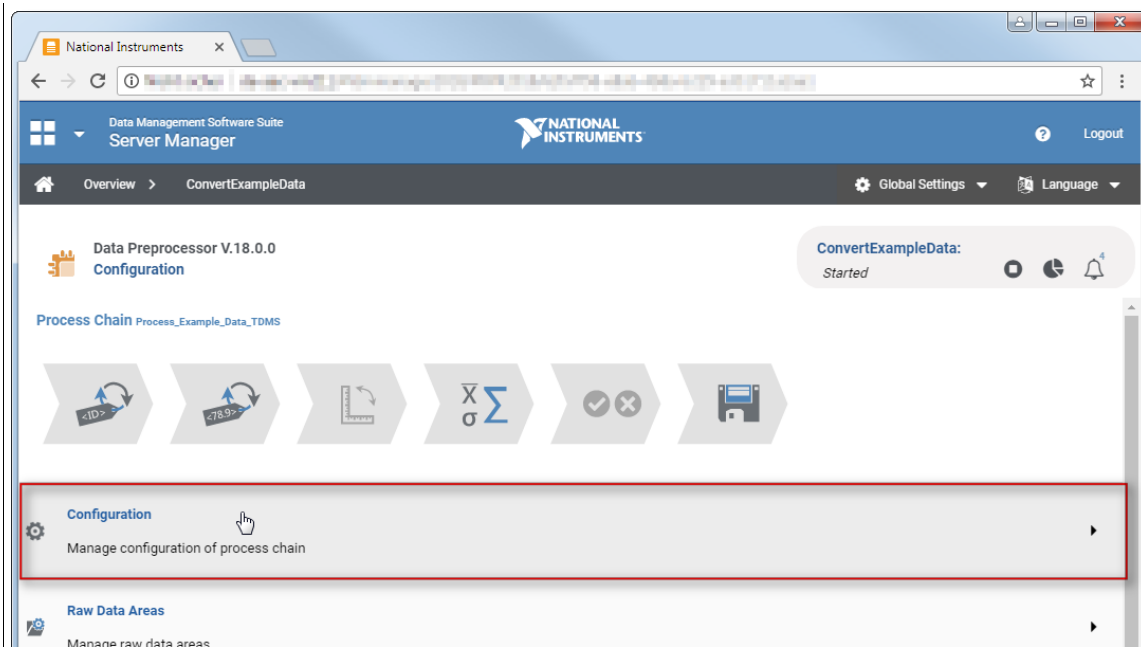
The Data Preprocessor uses a configuration file (*.DPP) you created in DIAdem to convert raw file data from one or more raw data folders to homogenous data, which you save in the respective processed data folder.

To apply this new configuration to the Data Preprocessor, complete the following steps in the wizard:

1. Open TDM Server Manager in your web browser and login using your credentials.
2. Select the existing Data Preprocessor server *ConvertExampleData* in the list of configured servers, and click **Manage**.



3. Click **Configuration**.
4. Click **Configuration Package**.




5. Click **Browse** and specify “..\National Instruments\Data Preprocessor\Configuration\Process_Example_Data_XLSX.DPP” as configuration file (*.DPP).

Configuration Package?×

Load new configuration:

Process_Example_Data_XLSX.dpp

Browse

☐ Reprocess data after upload

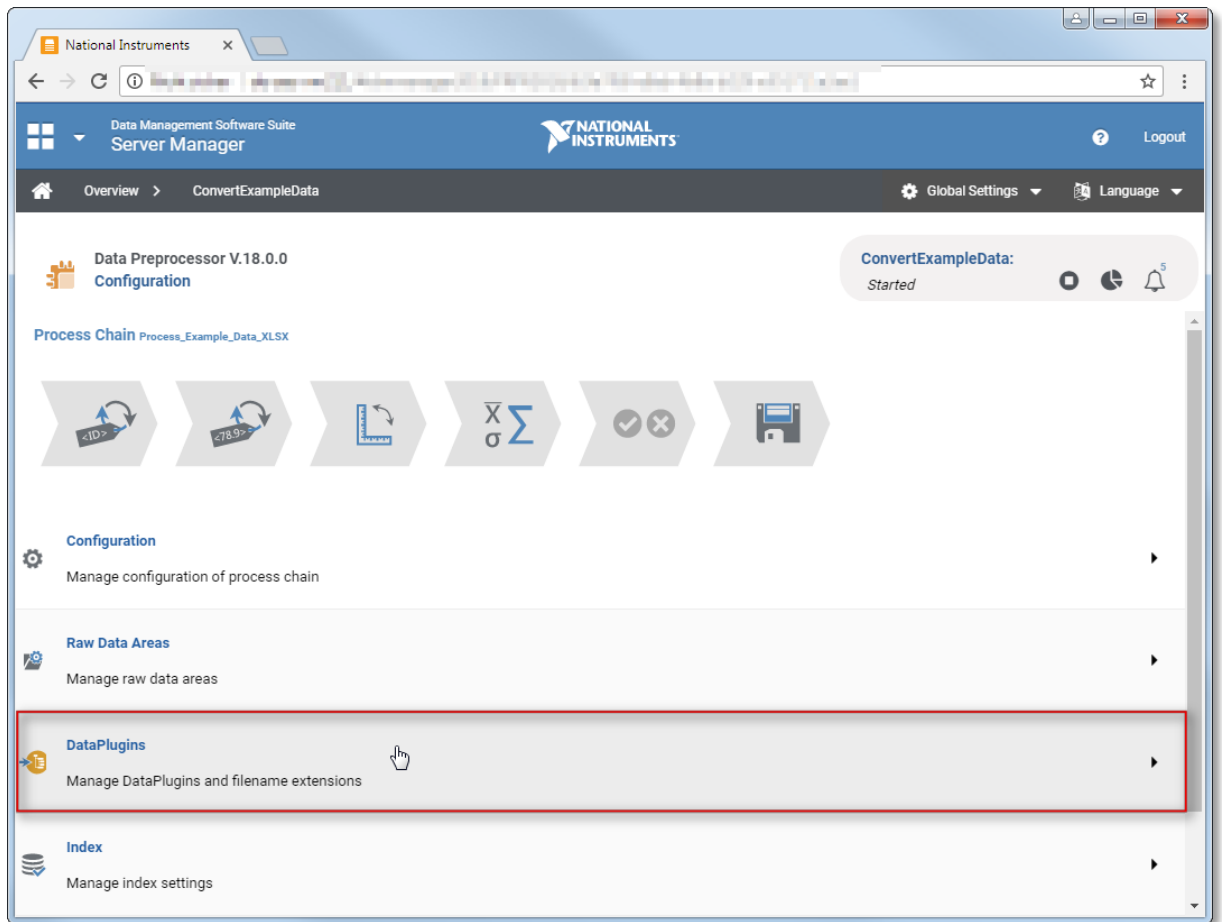
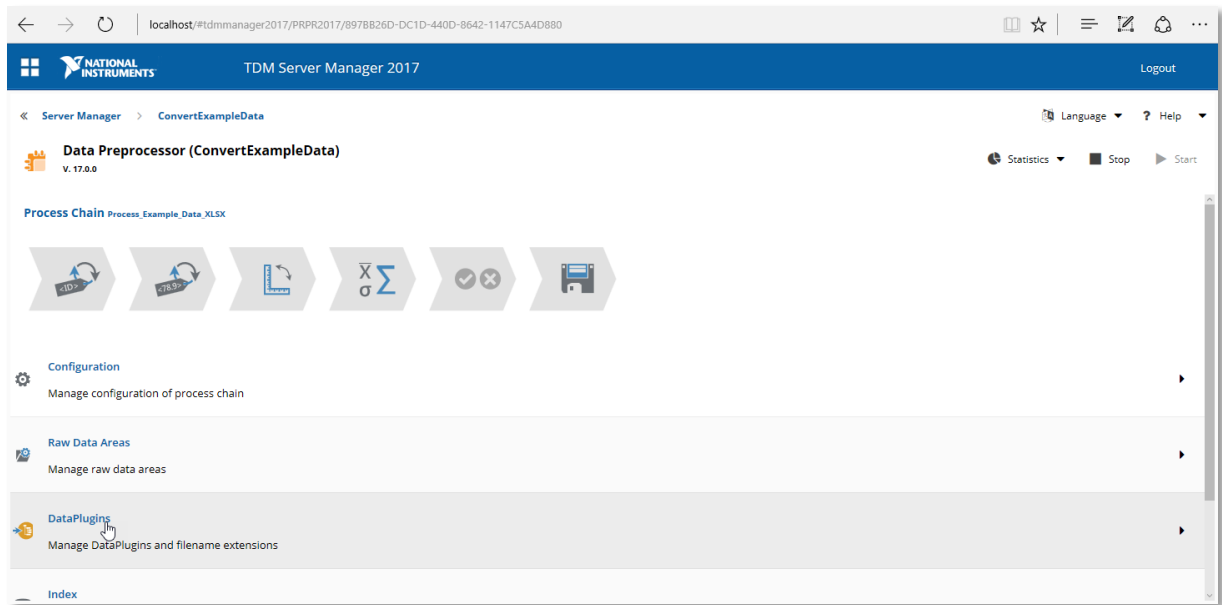
Name	Process_Example_Data_XLSX
Description	Adds property grouping and sta...
Author	National Instruments

OK

Cancel

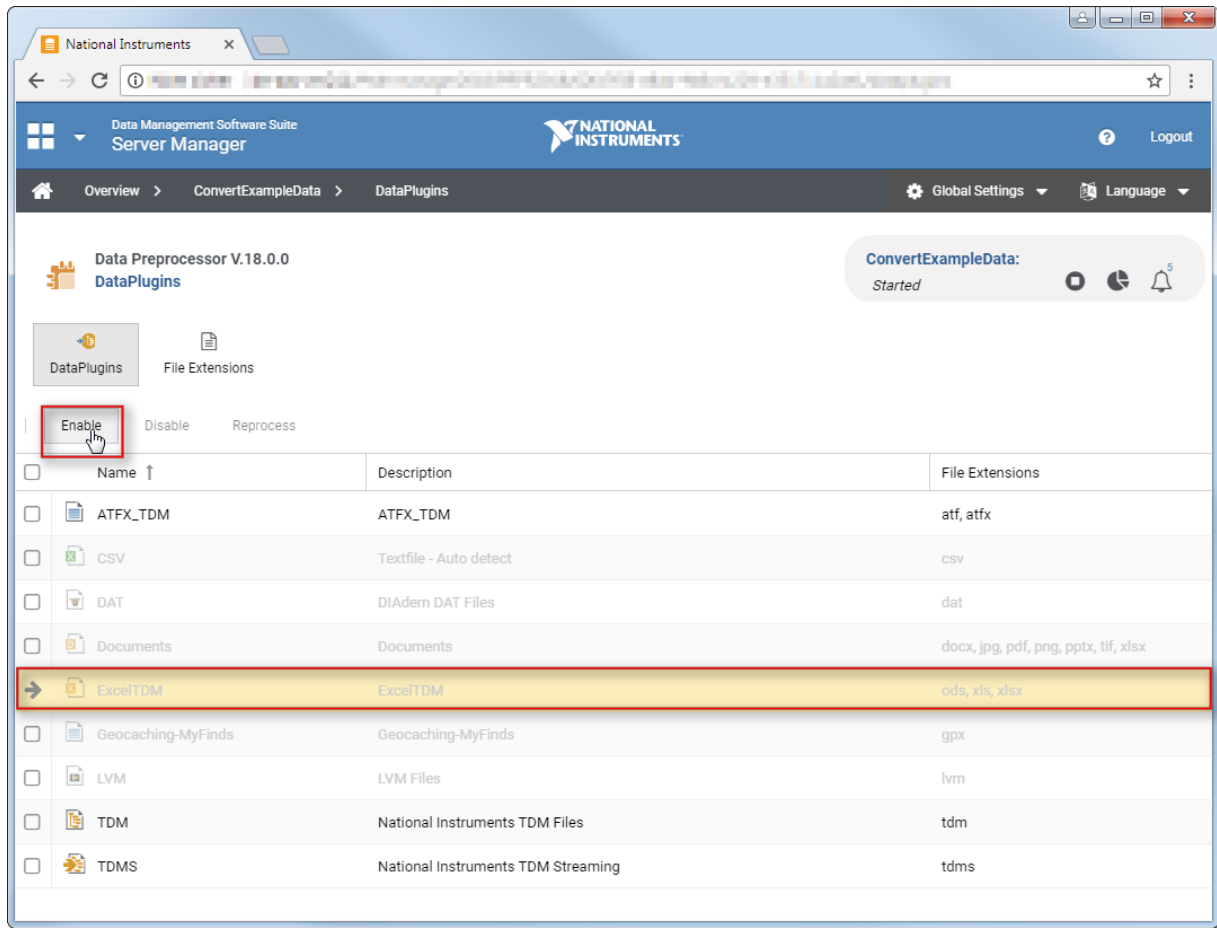
- Click **OK**.
- Click **Back** in your browser (or click **ConvertExampleData** in the breadcrumbs navigation).

8. Click **DataPlugins**.

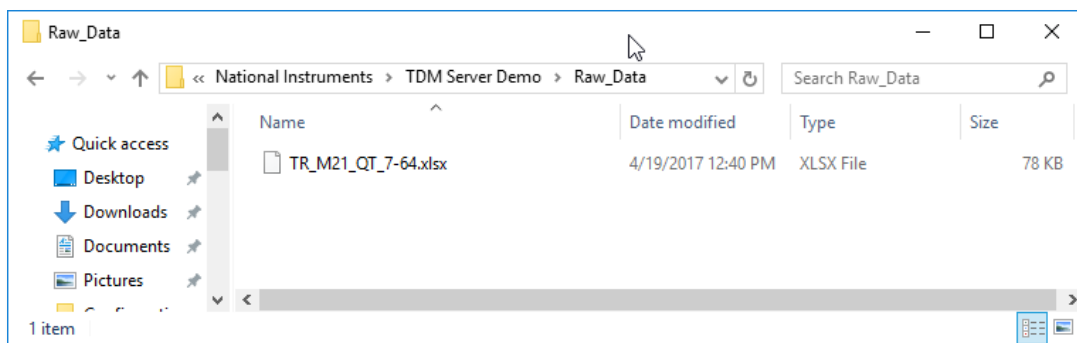


9. Select the *ExcelTDM* DataPlugin.

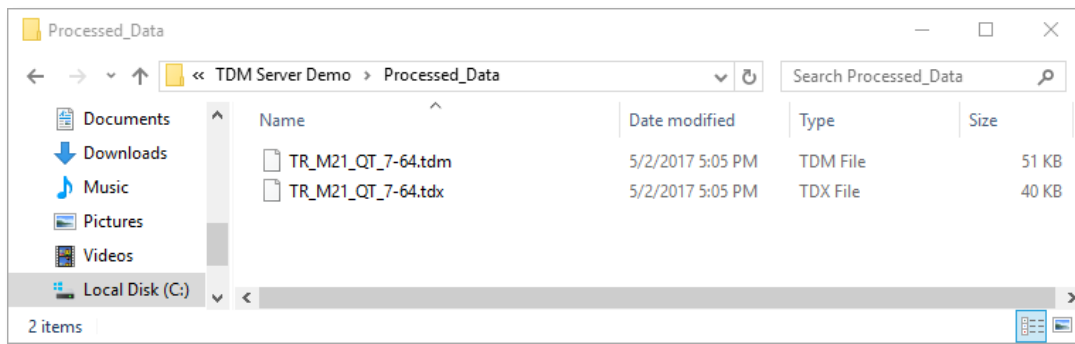
10. Click **Enable** to use the ExcelTDM DataPlugin in your Data Preprocessor in order to convert XLSX files.



11. Open the folder with the raw data:



12. Open the folder with the processed data to view your result:

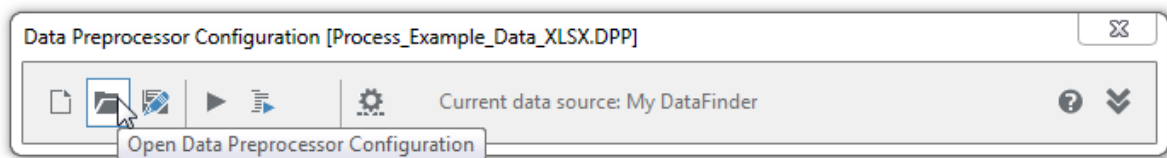


5.1.3 Defining the Data Preprocessor Configuration for XLSX Example Files Using DIAdem

Use the Data Preprocessor configuration dialog box to define the Data Preprocessor processing steps which configure a Data Preprocessor in TDM Server Manager.

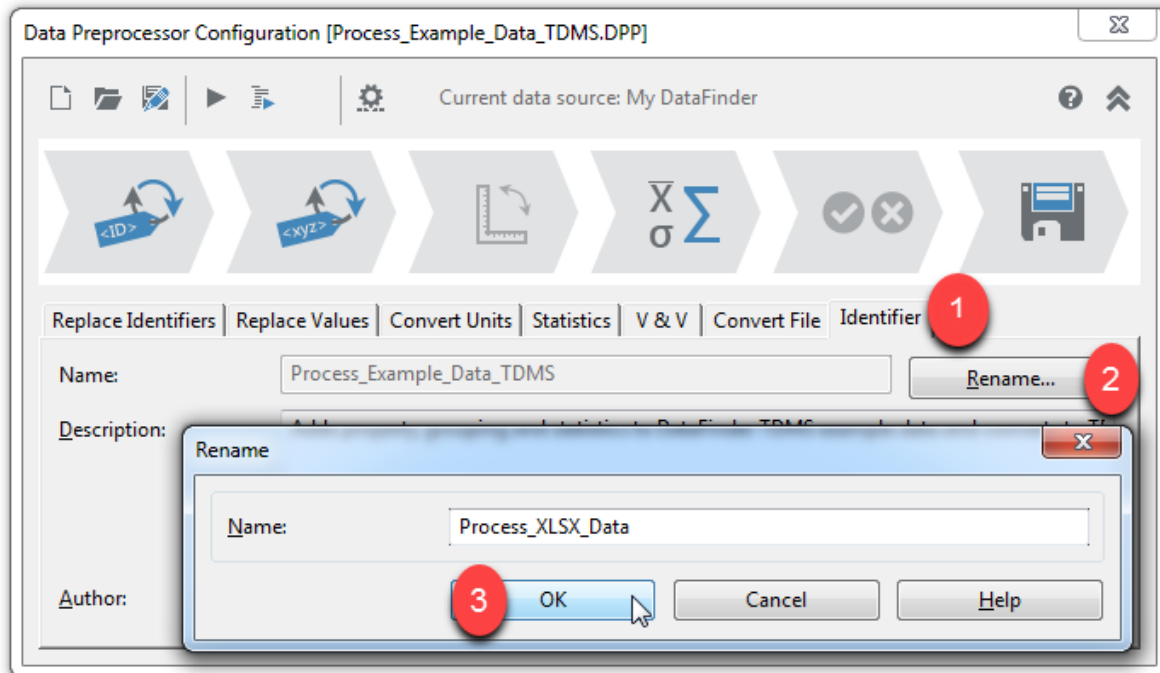
5.1.3.1 *Rename the existing Data Preprocessor configuration*

1. Select the **DIAdem Script** panel.
2. Select **Settings>>TDM Server>>Data Preprocessor**.
3. Click the **Open Data Preprocessor Package** symbol and specify "<DIAdem Program Folder>\Examples\TDM Server configurations\Process_Example_Data_TDMS.DPP." as the configuration file (*.DPP).



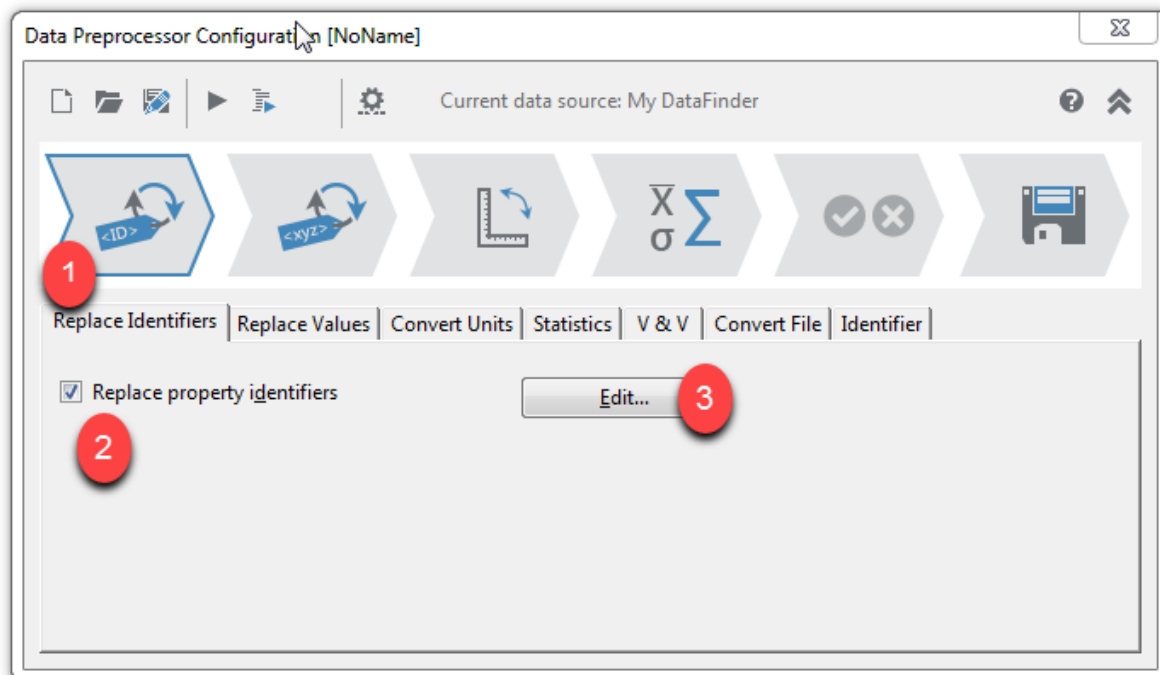
4. Switch to the **Identifier** tab.
5. Click **Rename** to change the **Name** of the Data Preprocessor and optionally change **Description** and **Author**.

6. Click **OK**.



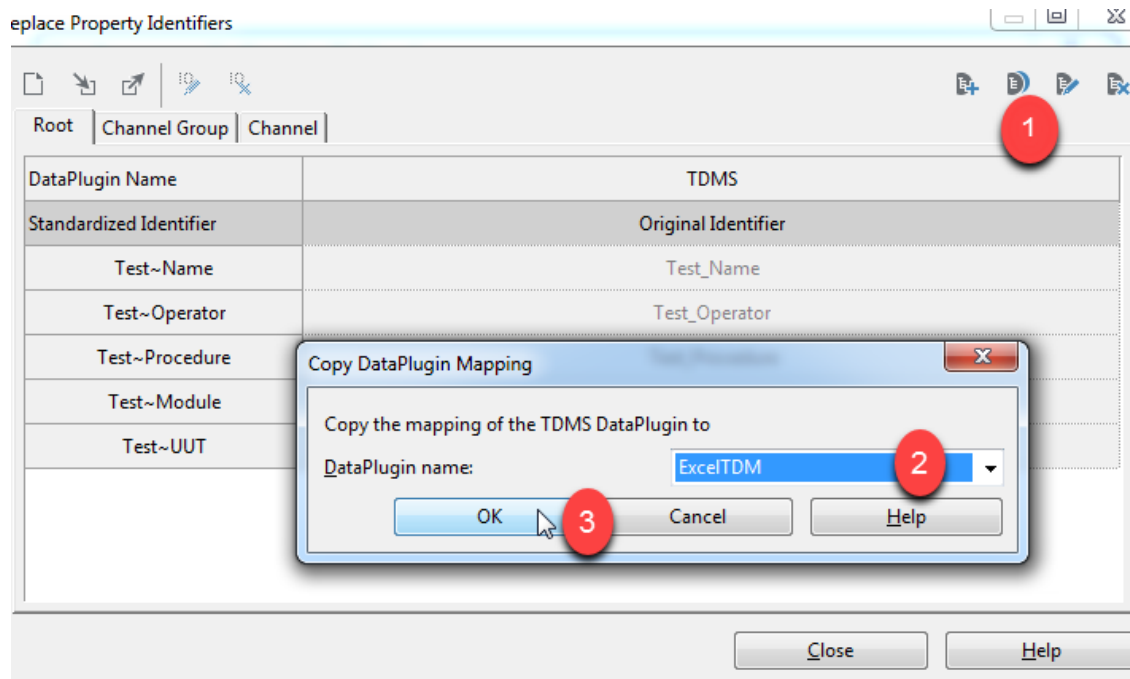
Configure property identifier mapping

7. Select the **Replace Identifiers** tab
8. Enable **Replace property identifiers**
9. Click **Edit**.

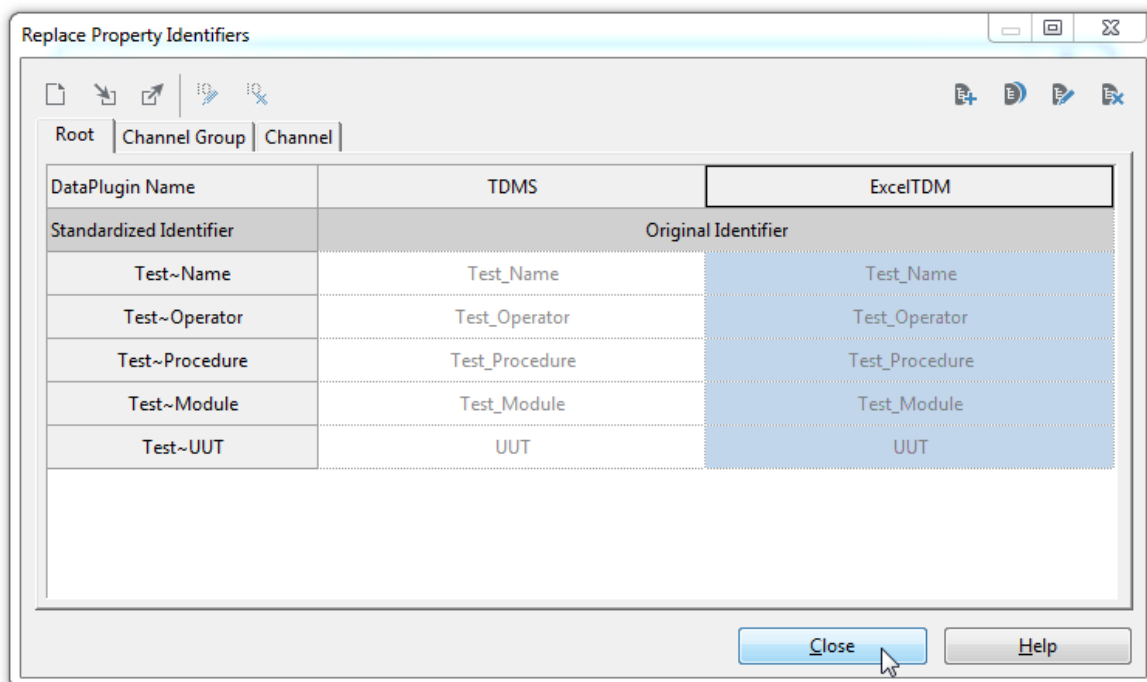


10. Click the **Copy DataPlugin Mapping** symbol and select *ExcelTDM* as **DataPlugin name**.
11. Click **OK**.

Note: This step ensures that the metadata in the Excel file will have the same consistent metadata structure as the TDM files that was previously configured.

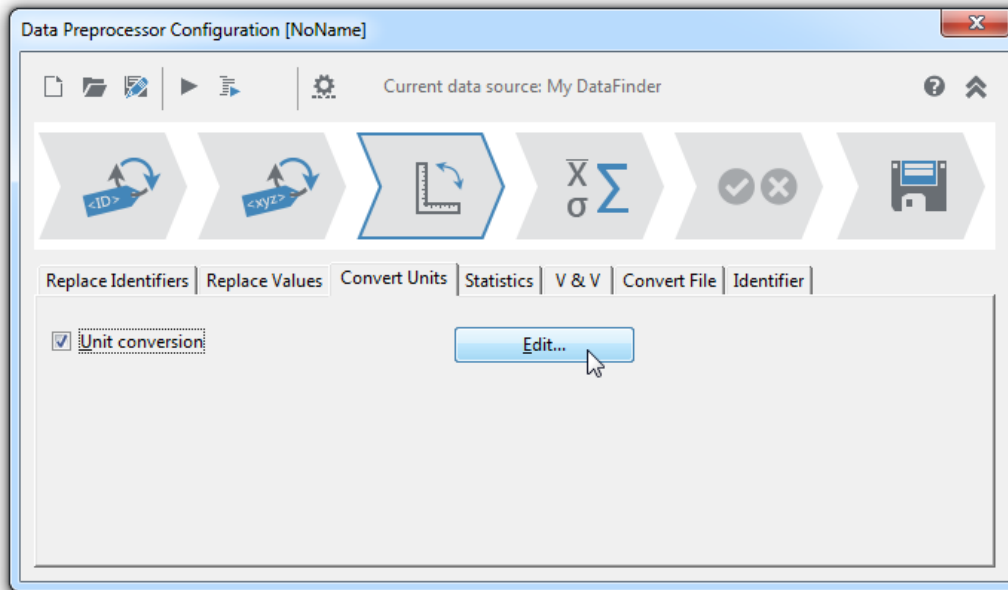


12. Click **Close**.

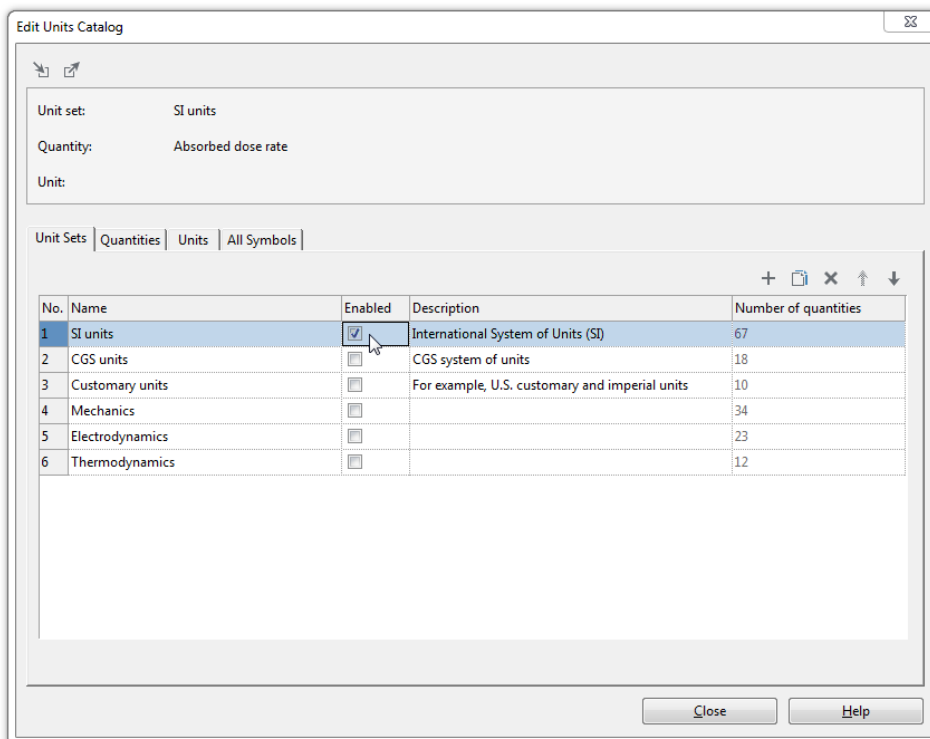


Configure engineering unit conversion

13. Select the **Convert Units** tab.
14. Enable **Unit conversion**.
15. Click **Edit**.

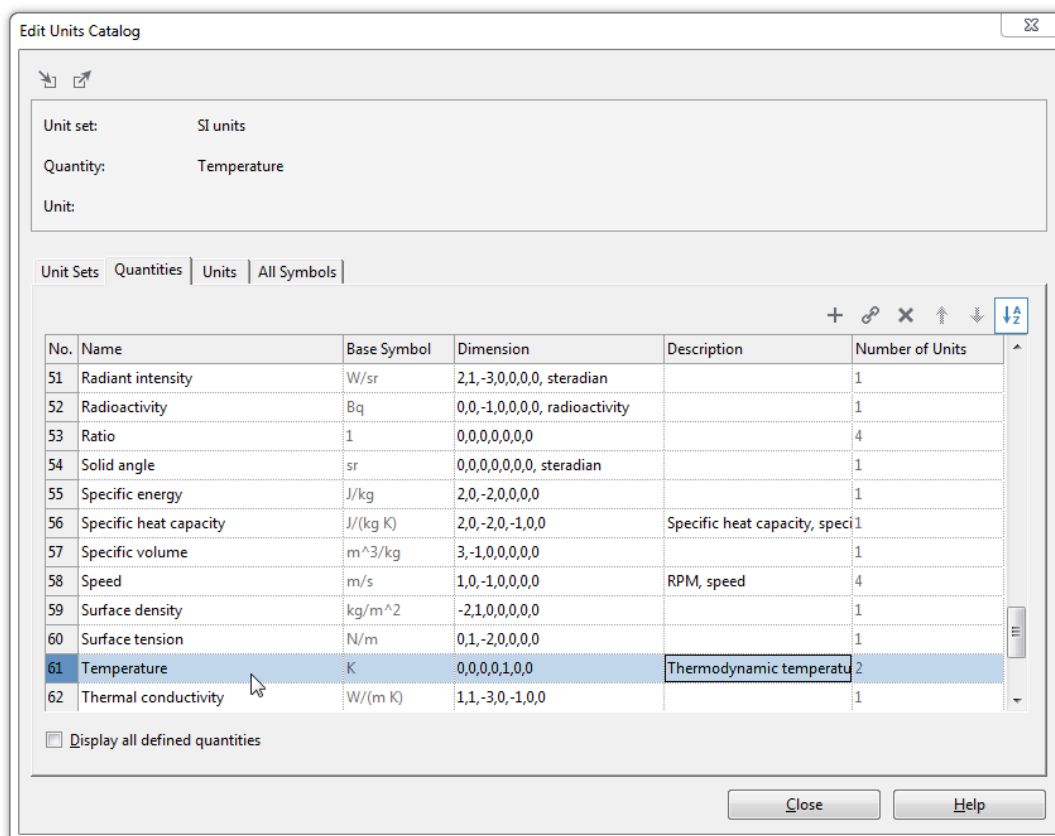


16. Enable **SI units**.



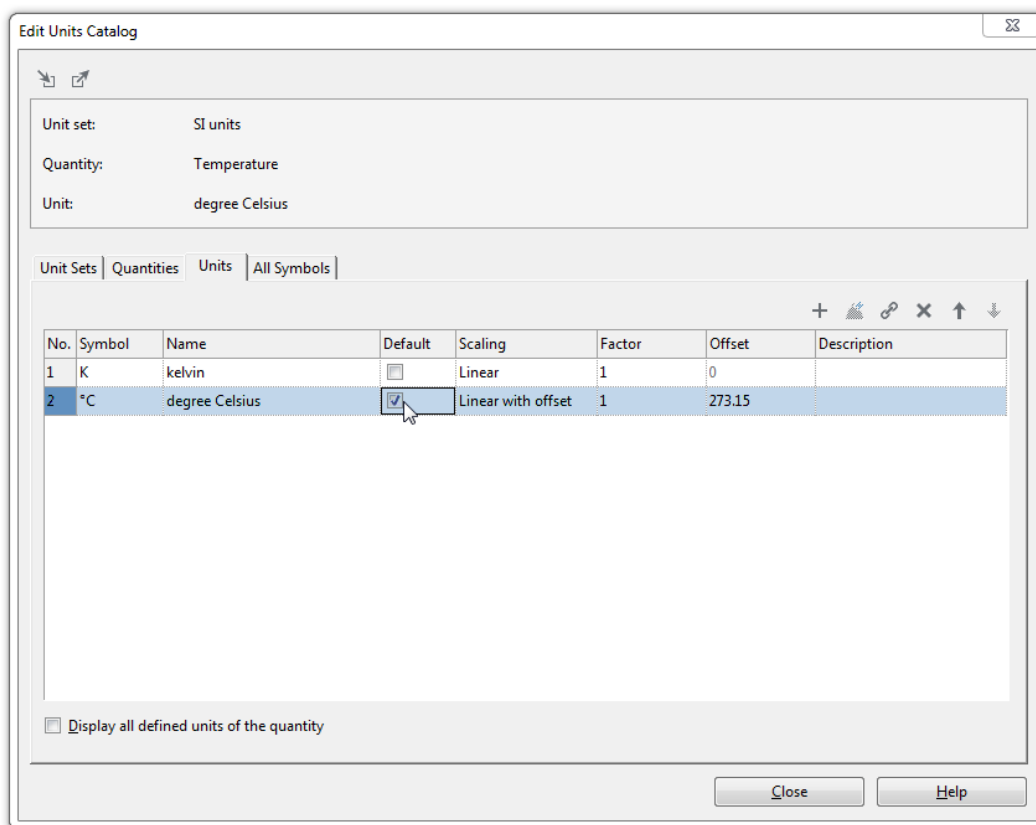
17. Select the **Quantities** tab.

18. Scroll down in the list and select the **Temperature** row.



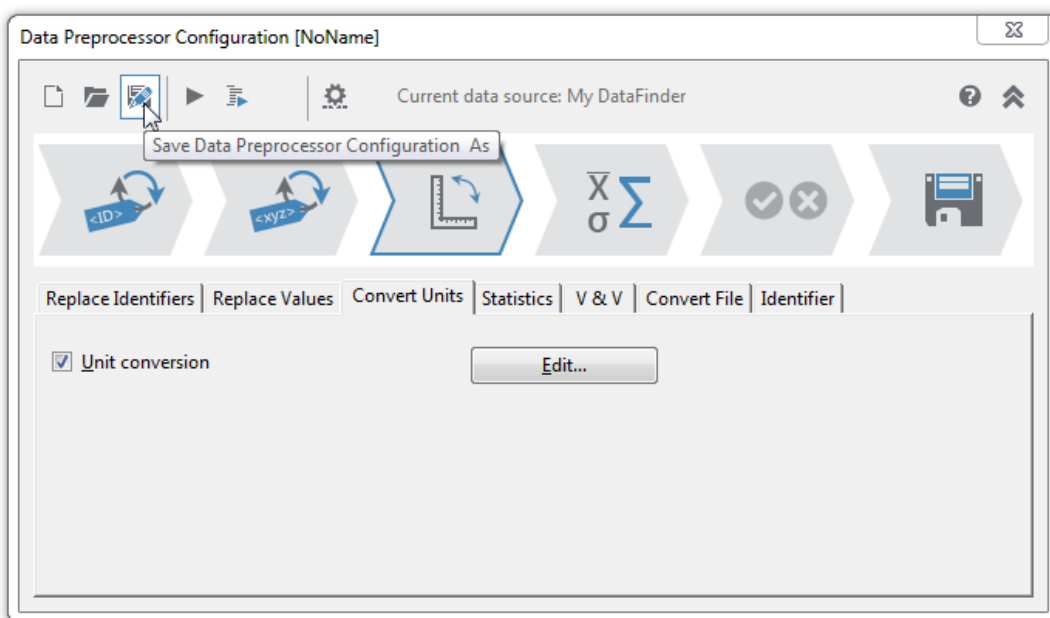
19. Select the **Units** tab.

20. Mark **degree Celsius** as **Default**.

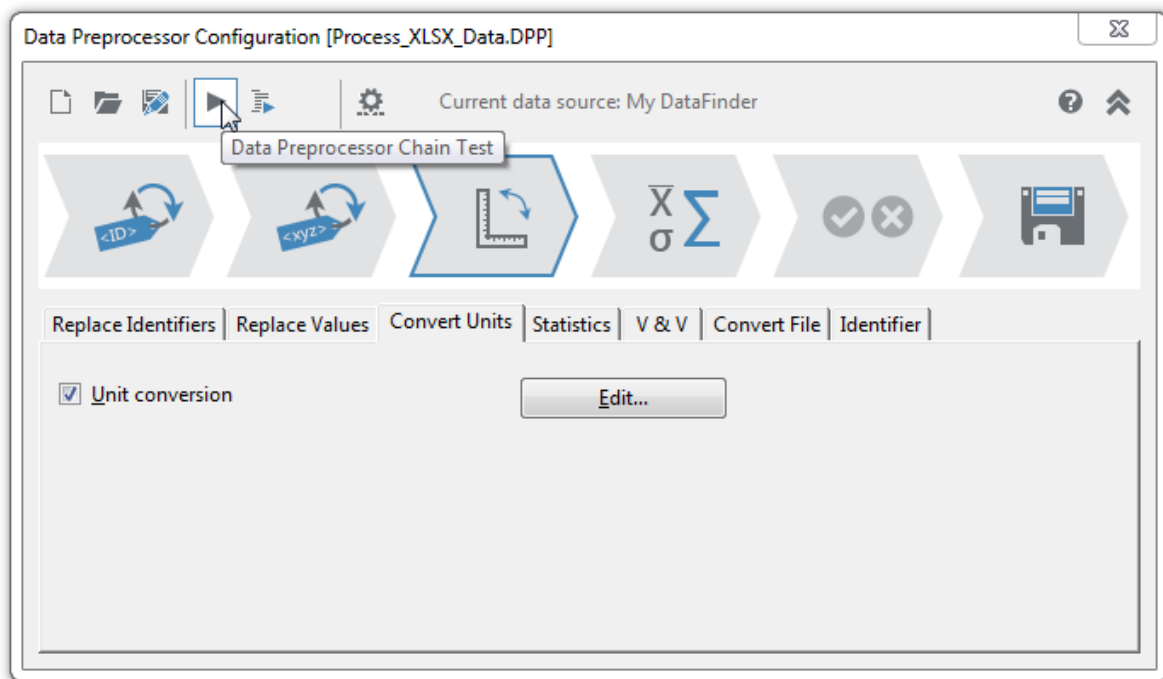


21. Click **Close**.

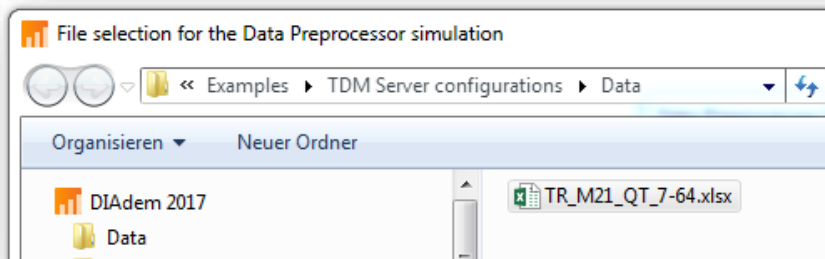
22. Click **Save Data Preprocessor Configuration As** and save the DPP file to a folder you specify.



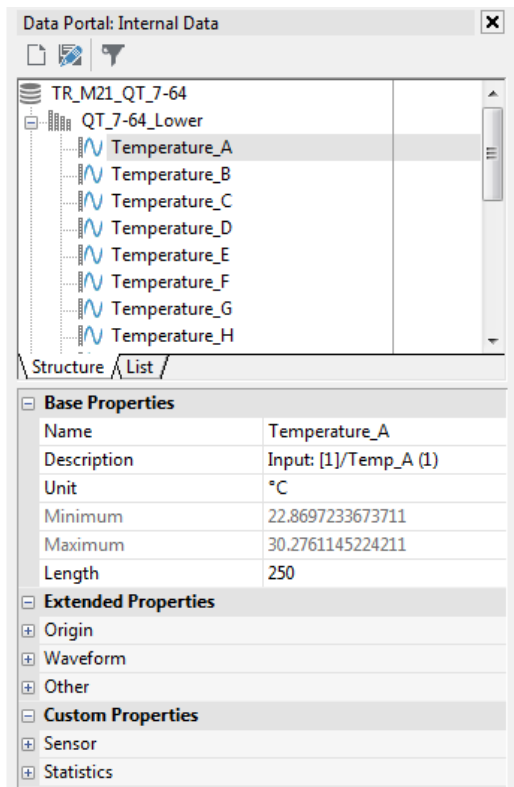
23. Click **Data Preprocessor Chain Test**.



24. Select “TR_M21_QT_7-64.xlsx” from the folder “<DIAdem Program Folder>\Examples\TDM Server configurations\Data” for the Data Preprocessor simulation.



25. DIAdem processes the Data and loads it into the Data Portal.



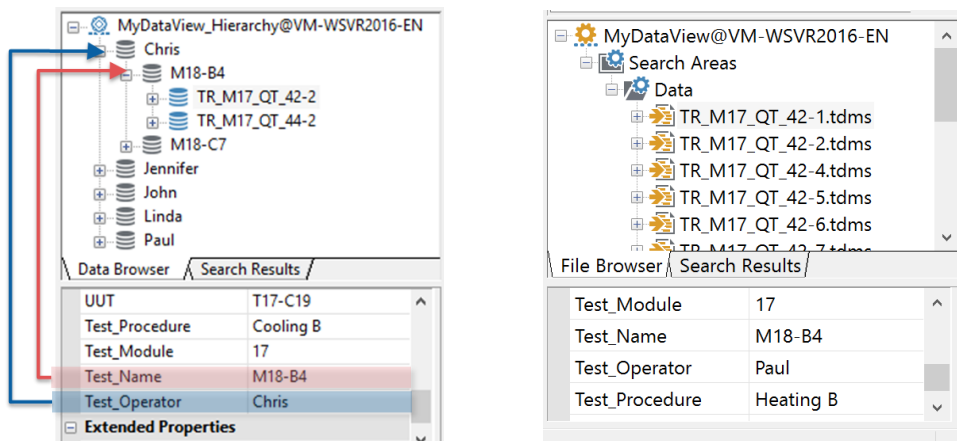
The unit of the process data is °C.

6 Explore your indexed data with a different hierarchical view

DataFinder Server Edition allows you to view your indexed data from a different perspective. Instead of browsing the file system tree structure, DataFinder can provide a different hierarchical view on that same data, without the need to change any of your data or the way it is stored on your file system.

To do so, you use custom properties already indexed by DataFinder and specify the order by which the custom properties define the hierarchy.

In this exercise, you'll learn how to setup a DataFinder with a hierarchical data view and how to create such a view using DIAdem. After applying the view to your DataFinder, each DIAdem client can experience that way of data exploration. And in case you have activated DataFinder's ASAM ODS option, other ASAM ODS clients can do so, too.



For custom properties to define a hierarchical view, the following conditions apply:

- Custom properties from either file or group level can be used
- An arbitrary number of custom properties can be used
- All custom properties have to be a “String” type
- The custom properties have to be optimized in the DataFinder index

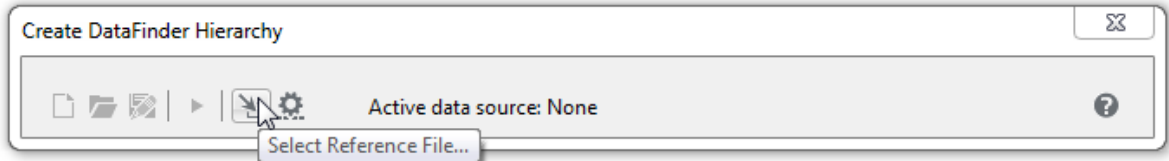
7 Create a hierarchical view using DIAdem

You use DIAdem to create a hierarchical view for your DataFinder. You can connect to the respective DataFinder if it already exists or is accessible, or you use a reference file containing the custom properties needed to define the hierarchical view.

In this example a reference file is used:

57. Select the **DIAdem Script** panel.
58. Select **Settings>>TDM Server>>DataFinder Hierarchy**.

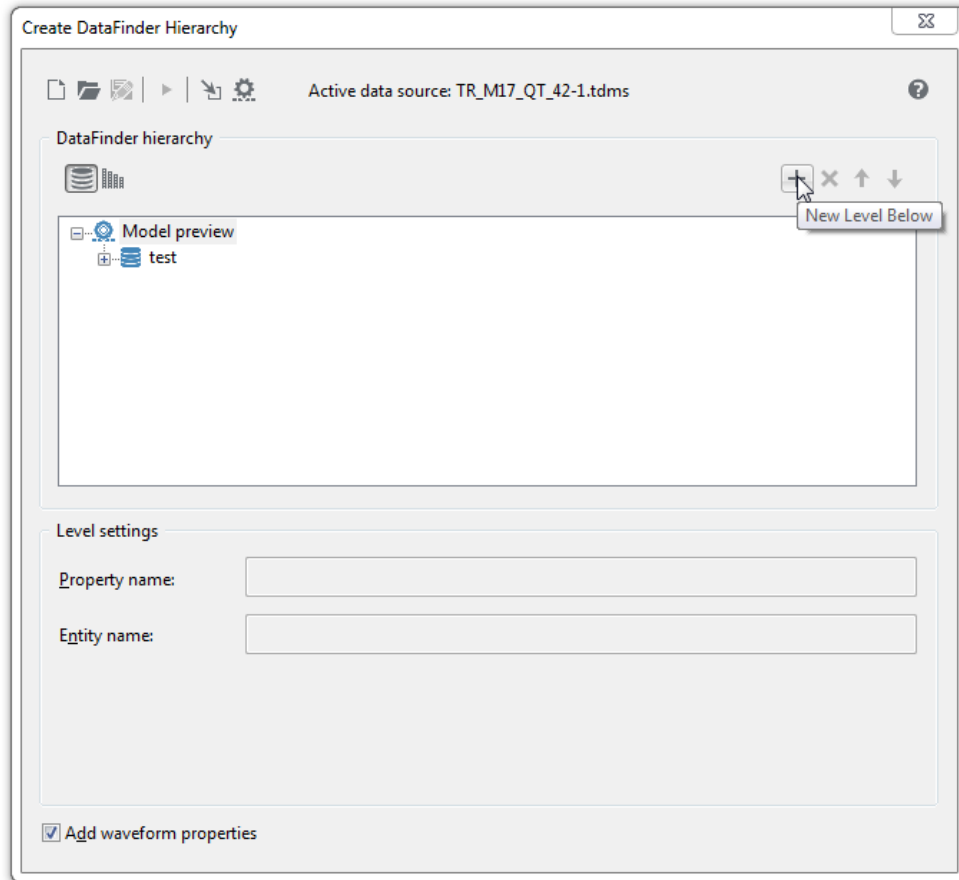
59. Click the **Select reference file** symbol.



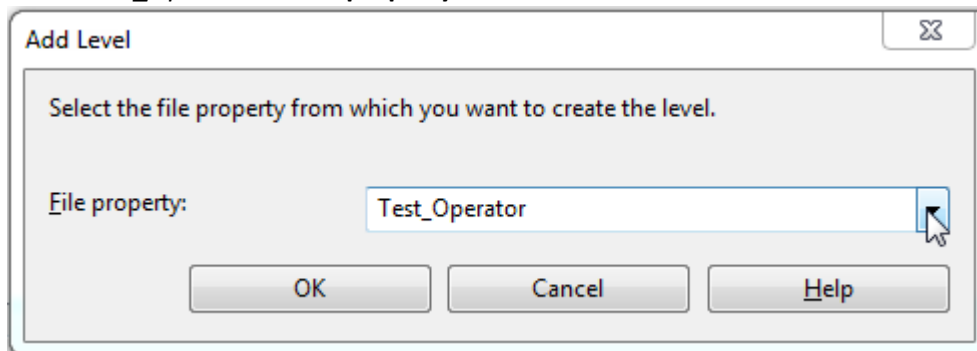
60. Change the file type to **National Instruments TDM Streaming (*.TDMS)**.

61. Select “C:\Program Files\National Instruments\DIAdem 2018\Examples\TDM Server configurations\Data\TR_M17_QT_42-1.tdms” and click **Open**.

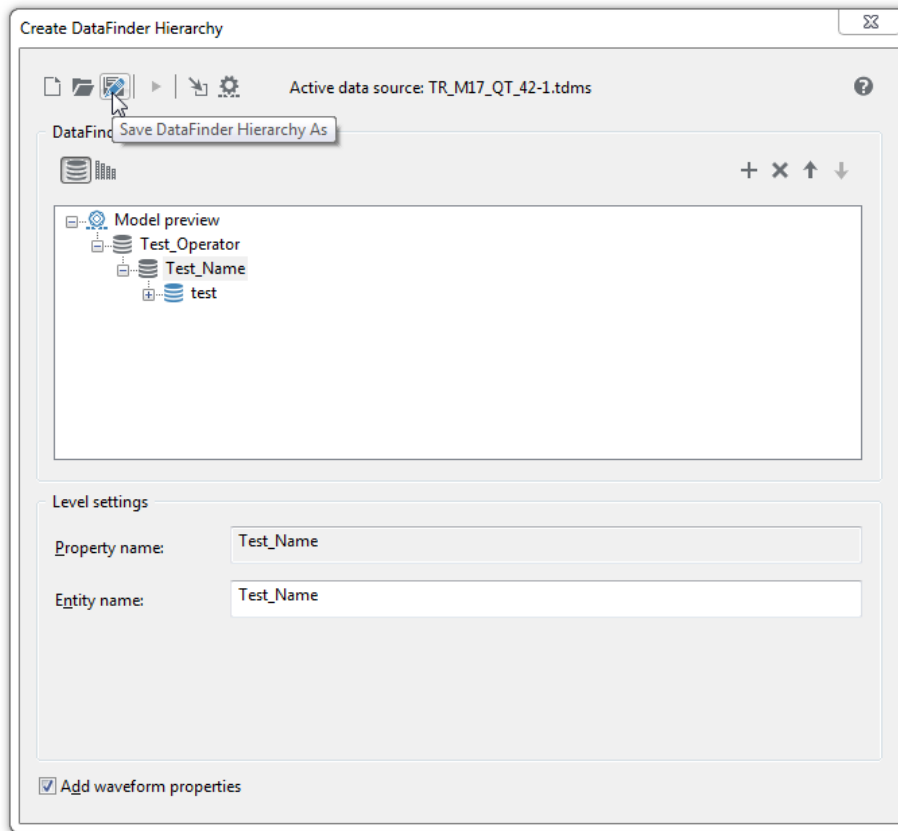
62. Click the **New Level Below** symbol.



63. Select *Test_Operator* as **File property** and click **OK**.

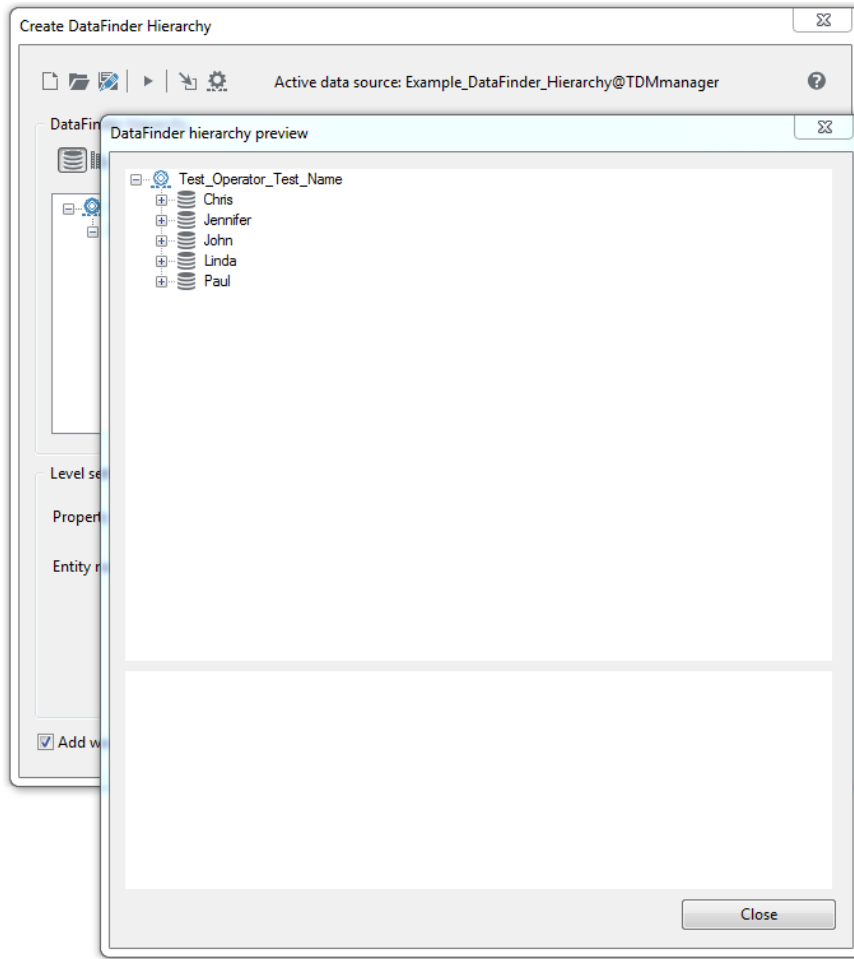


64. Select *Test_Name* as **File property** and click **OK**.
65. Select the **DataFinder Hierarchy save as** symbol to store your configuration file.



Instead of using a reference file, you can connect to an existing DataFinder if you click the **Select Active Data Source** button and change the DataFinder hierarchy with the same steps as described above. Then click **Data Preview** to use the new hierarchy view for your DataFinder server's live data. The data

preview is only available if your computer is connected to the server.



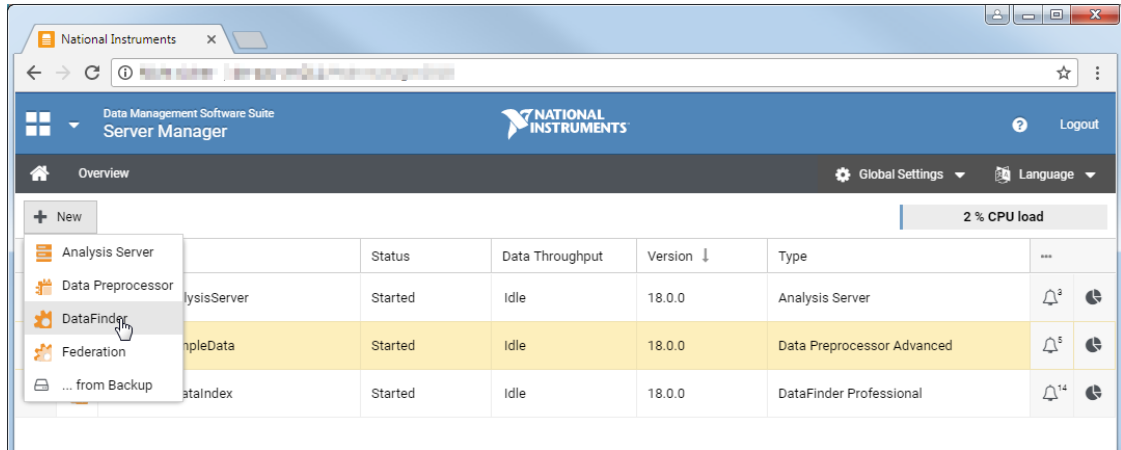
8 Configure a DataFinder server using a specific hierarchical view

This example shows how to setup a DataFinder with a specific hierarchical view based on the example data and predefined example views. The next chapter will explain how to use DIAdem to define such a view .

To setup the DataFinder, complete the following steps in the wizard:

18. Open TDM Server Manager in your web browser and login using your credentials.

19. Select **New>>DataFinder** to start the configuration wizard.



20. Enter the **Name** of the new DataFinder server, and click **Next**.

21. Enter the **Name** of the search area.

Select a name for the new DataFinder server:

Name:

Clients wanting to connect to the server need the name of the DataFinder server.

For the selected features you require at least the following license: **BASE**

22. Click the **Choose a Folder** symbol and select the **TDM Server Demo Data** (C:\Users\Public\Documents\National Instruments\DataFinder\Data).

New DataFinder Server

Add Search Area:

Name: Example_Search_Area

Path: lic\Documents\National Instruments\DataFinder\Data

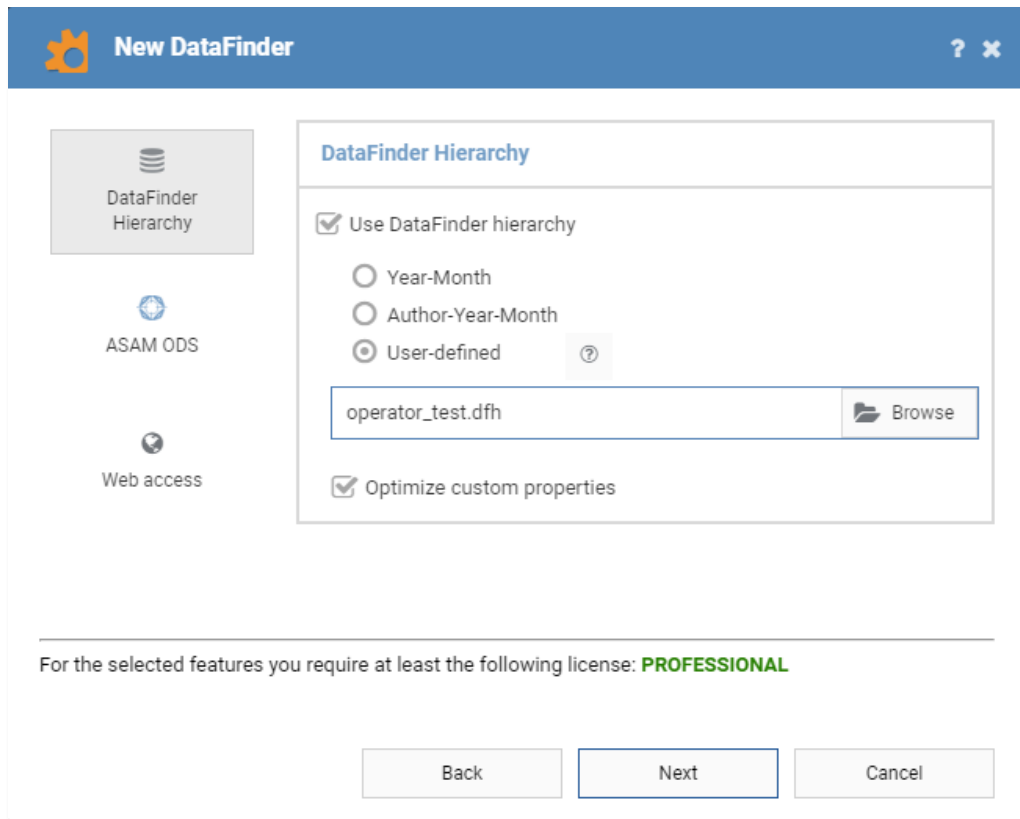
Add a search area in order to search for files, groups, or channels or to browse in them. Once you have completed the wizard, you can add further search areas.

For the selected features you require at least the following license: **BASE**

Back Next Cancel

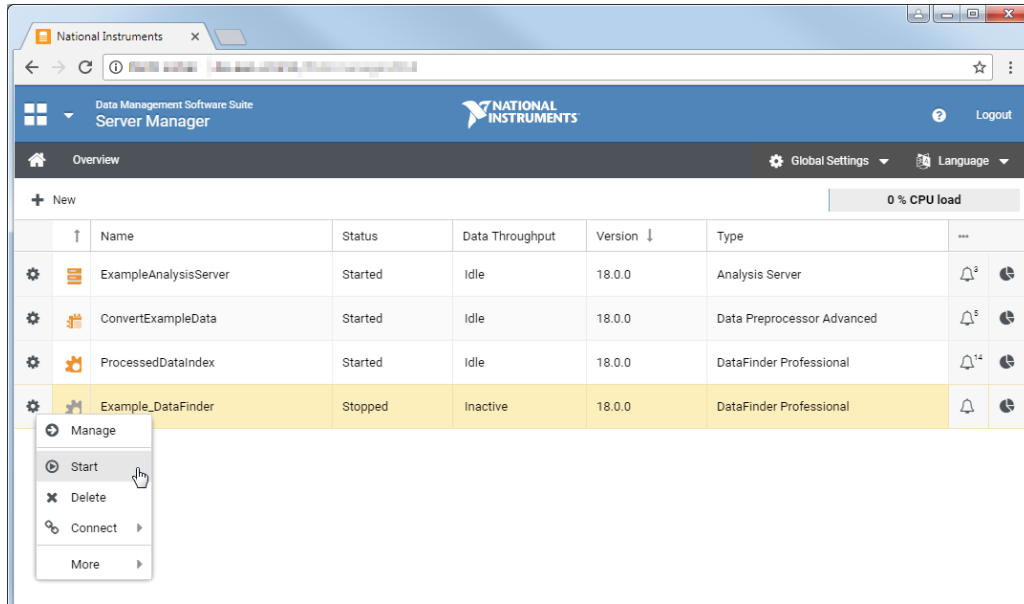
23. Click **OK**.
24. Click **Next** to continue the configuration wizard
25. Enable **Use DataFinder hierarchy**.
26. Select **User-defined** and click the **Browse** symbol.

27. Select “C:\Users\Public\Documents\National Instruments\DataFinder\Model Hierarchy\operator_test.dfh” as **Custom file (*.DFH)** and click **Open**.



28. Click **Web access**
29. Click **Allow access to DataFinder through web connections**
30. Click **Next** to continue the configuration wizard.
31. Select the *PROFESSIONAL* license.
32. Click **Finish** to complete the initial configuration of the DataFinder.

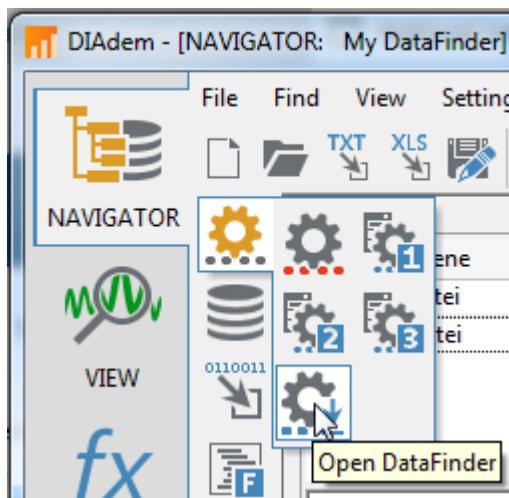
33. Select the newly created DataFinder in the list, and click **Start** to start indexing the data.



9 Connect to a DataFinder hierarchical view from DIAdem

To connect to this newly created DataFinder select the DataFinder in the list and click **Connect>>Export Client Configuration**, download the connection file, and copy it to the computer running DIAdem. To make this DataFinder server connection available in your DIAdem client follow these steps:

1. Double-click the urf-file to make this DataFinder server connection available in your DIAdem client.
2. Start DIAdem and open the **NAVIGATOR** panel.
3. Click the **DataFinder** symbol and then the **Open DataFinder** symbol



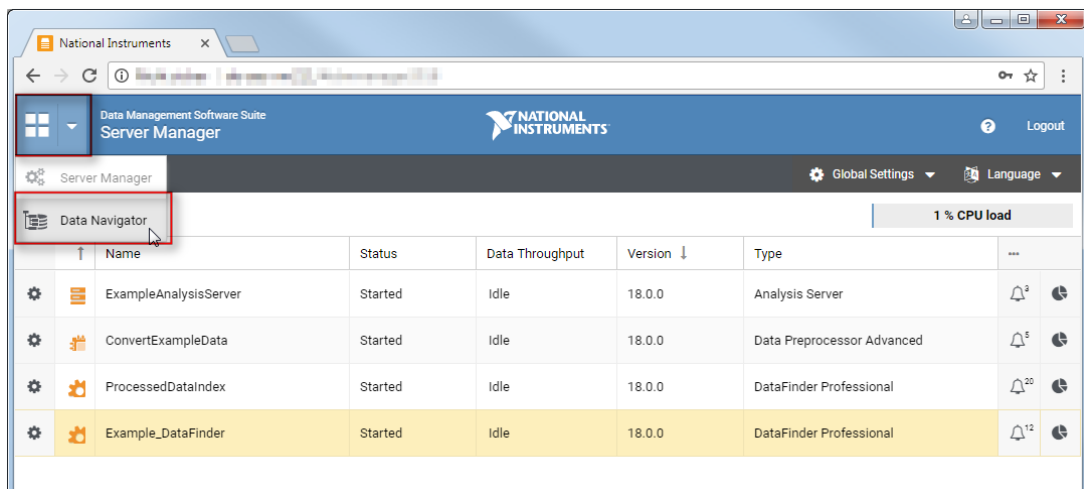
4. Select your newly created DataFinder from the list and click **OK**.
The DataFinder connection providing the hierarchical view has the “_Hierarchy” postfix.

10 Searching for Data with the Data Navigator

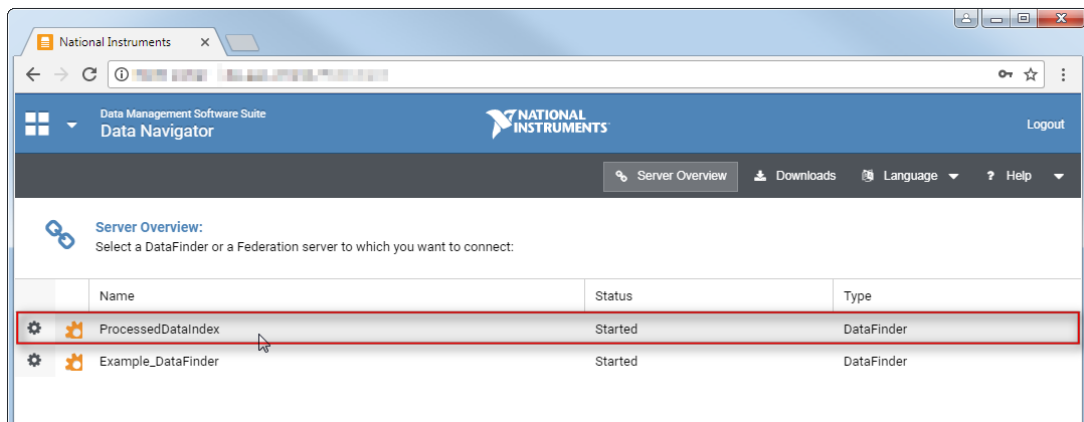
Use the Data Navigator to browse and search in the search areas of a TDM Server DataFinder. You can run quick searches and advanced searches, evaluate the properties of the search results, and save search results in the original or in the TDM format on your hard disk.

For example, complete the following steps to execute a quick search and save the search results to your hard disk.

1. Open the Data Navigator

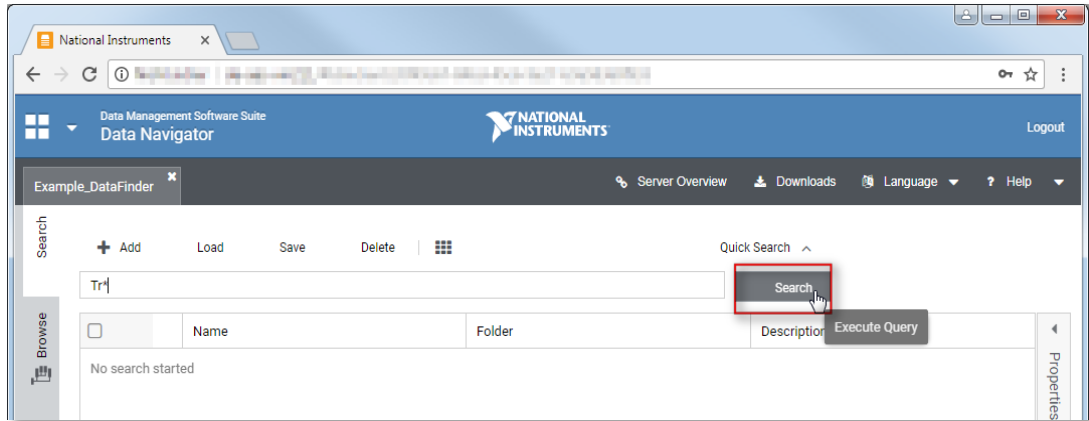


2. Double-click the data source in whose search areas you want to search for data. The Data Navigator opens the search input area.

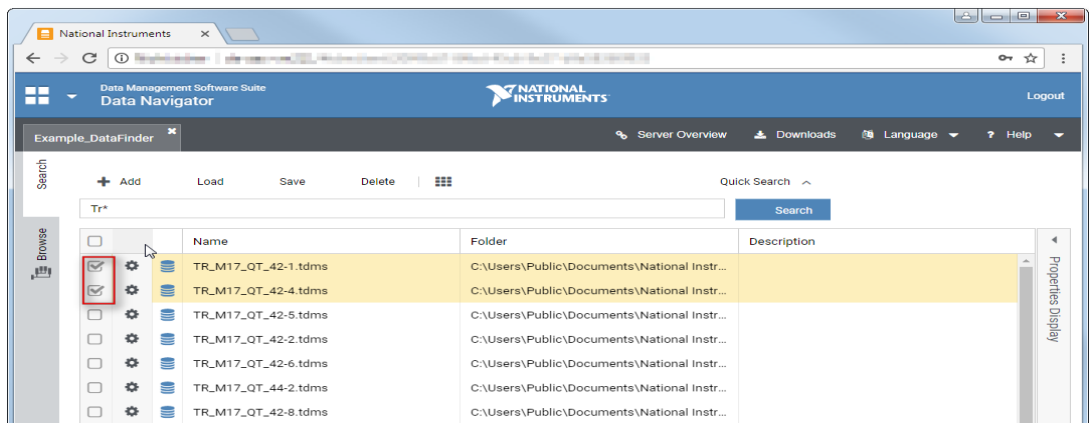


3. Enter a search text, for example, Tr*. In the quick search, the Data Navigator searches for the entered search term in the file, group and channel properties of all files in the search areas of the selected DataFinder. The files must be in TDM or TDMS format or in a format that can be

opened with a DataPlugin registered in the DataFinder.

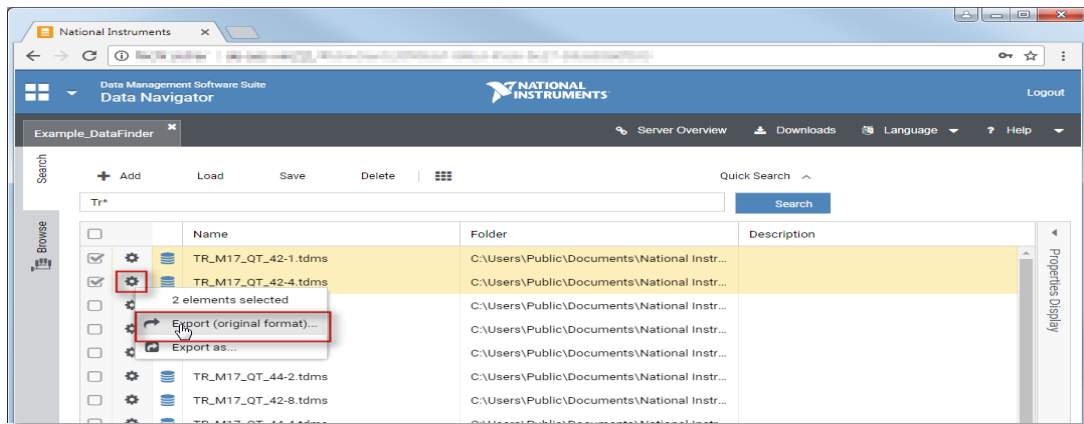


4. Click **Search**, to start the search. The Data Navigator now displays the search results list.
5. Select the search results that you want to transfer to the download area by clicking on the corresponding checkboxes in the left column. In the download area, you collect the search results that you later download to your local hard drive.

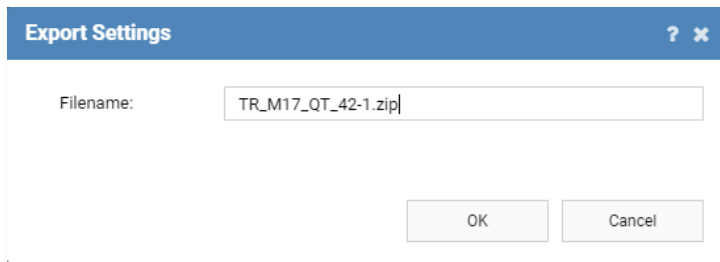


6. Click the **Actions** icon of one of the highlighted search results.

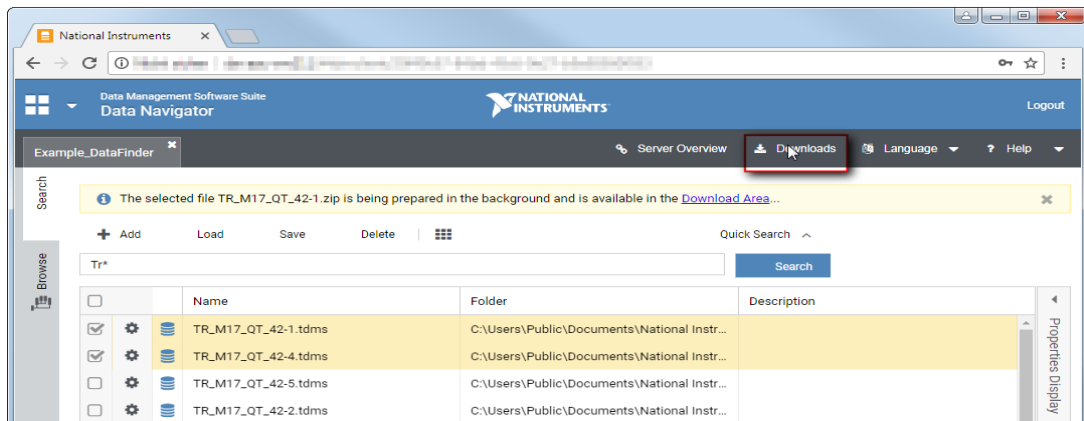
7. Select **Export (Original Format)** to export the selected search results in the original format. The Data Navigator exports all selected search results to a zip file.



8. If desired, modify the name of the zip file to export in the **Export Settings** dialog.



9. Click **OK**. The Data Navigator provides the zip file with the search results in the download area for download.
10. Open the download area by clicking **Downloads**.



11. Select the zip file by checking the corresponding checkbox in the left column and click **Actions**.

12. Select **Download** . The Data Navigator saves the zip file with the search results in your download folder.

