Time Series Lister

Introduction

The Time Series Lister is a display to verify and inspect time series which are written to the database in any workflow.

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figure 1a: the GUI of the Time Series Lister (with a workflow selected)

When a filter - location - parameter selection is made via the Data Viewer, the Time Series Lister results will be filtered accordingly.

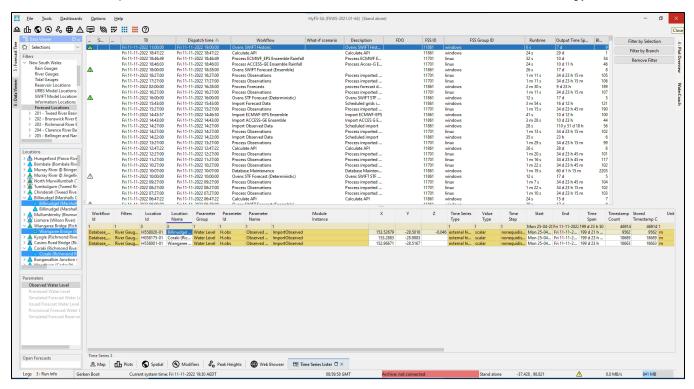


figure 1b: the GUI of the Time Series Lister (with a workflow selected AND a Data Viewer selection)

The Time Series Lister is a pre configured display and a very handy tool for inspecting the contents of the FEWS database (localdatastore). It provides an overview in tabular form of statistics and other metadata (columns) of the timeseries (rows) in the database. To aid the inspection of data, the user can add or remove columns, and select and filter rows. From the Time Series Lister it is also possible to access the content (=values) of selected timeseries by opening the timeseries display or the spatial (grid) display.

Configuration

To enable the Time Series Lister, it must be added as explorertask in Explorer.xml:

```
<explorerTask name="Timeseries Lister">
  <iconFile>tableInfo.jpg</iconFile>
  <taskClass>nl.wldelft.fews.gui.plugin.timeseriestableviewer.TimeSeriesTableViewer</taskClass>
  <toolbarTask>true</toolbarTask>
  <menubarTask>true</menubarTask>
  <allowMultipleInstances>false</allowMultipleInstances>
  <accelerator>ctrl T</accelerator>
  </explorerTask>
```

Usage

The Time Series Lister enables the user to inspect the database. The database records are visualised as individual rows, which can be selected. When selected it can be browsed through (all columns) or its values can be inspected through a graph (scalar series) or the spatial display (grid data).

In the top window, workflows are available. When selected, the lower part of the screen shows the records which have been written to the database in this selected workflow. In this lower part, individual rows can be selected as well.

All meta information and statistics are calculated on-the-fly and are not stored. Within selections or filters (e.g. on start/end time) the content of the (visible) columns are updated immediately.

There are many columns which can be viewed: general columns about module instance, location, parameter, disk space and all kind of relevant meta information about the selected record(s).

Besides the 'general' metadata, the basic statistics of that row can be inspected. These basic statistics are sum, average, maximum, minimum, etc.

The remaining columns describe the quality of the data. If the user e.g. wants to know how many values are 'unreliable' and how many 'periods' of unreliable data are available, this information can be retrieved. The same is true for all kinds of combinations of doubtful, completed and corrected data. This same functionality (number of records, periods) is available for primary and secondary validation results. This means that the user can inspect number of records and periods of e.g. hard maximums and flag comparison or series comparison.

When many records (rows) are available the user can filter the results. Double-clicking a cell will automatically filter for that value. If you want to filter on e. g. a location, select the location (name or Id) column and press F8 or double-click it. The background color of the cell will turn blue (meaning there's a filter on it).

This filter mechanism is applicable on all available columns, including the Start and End Time. When the users changes the start and/or end time, the visible columns will be updated accordingly.

Context Menu Options (lower table)

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Show <u>Time Series Dialog</u> F10 Show Spatial Display F11								
Show <u>Rating Curve</u> Copy TimeSeriesSet <u>x</u> ml to Clipboard								
ł	Higlight in workflow navigator Export table <u>c</u> ontents to CSV							

figure 2: context menu of the Time Series Lister

The Graphical User Interface contains a number of context menu options for selection/filtering and inspection of data. Right-click the mouse on one of the cells to access the context menu.

Menu option	Shortcut	Functionality	Alternative	Remark	Visible effect
Filter for selection	<insert></insert>	Uses the cell content as a filter	Doubleclicking the cell	You can set different filters in different columns	Cell background turns blue
Remove filter for column	<f3></f3>	Show all timeseries (again) for this column	Doubleclicking the blue cell		Cell background turns white
Remove all filters	<f6></f6>	Show all timeseries (again)	Doubleclicking the blue cell		Cell background turns white
Sort column	<f7></f7>	Sort the content of the column	Clicking the header		
Select columns	<f8></f8>	Opens a dialog for selecting the columns (Met Data Elements/groups)			
Show Timeseries Dialog	<f10></f10>	Opens the TimeSeriesDialog and shows the content of the selected (scalar) timeserie(s)			
Show Spatial Display	<f11></f11>	Opens the Spatial Display and shows the content of the selected (gridded) timeserie(s)			
Show Rating Curve	SHIFT + <f12></f12>	Opens the TimeSeriesDialog and shows the details of the selected rating curve			
Copy TimeseriesSet. xml to clipboard		Copies the TimeSeriesSet in XML format			Shows the XML in popup
Highlight in workflow navigator		Highlights selected time series in workflow navigator			Workflow navigator will be shown
Export to CSV Exports the tabular overview of (filtered) timeserie(s) to a CSV file				For exporting the data to a CSV file, use the Timeseries Dialog (select the data in the table and use context menu / save as)	File dialog opens for saving the CSV file

Special Filter option: Start time / End time

Two columns have special features: The Start and End time columns can be used to increase or limit the view period. If you adjust these all statistical columns or columns showing information about quality flags and (secondary) validation will be adjusted automatically.

Doubleclicking in these time columns will provide the user with the following, see figure below.

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figure 3: Special filter in the Start/End time columns

Meta Data Elements / Select Columns (F8)

🖄 Select Columns			×				
> 🗸 📕 General							
🗸 🔽 🔚 Basis Statis	tics						
🗸 · Sum							
Mean							
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Standard D	eviation						
 Percentile 	5						
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> Rate Of Change							
> 🔄 🖿 Temporary Shift							
> Oscillation							
> Series Comparison							
> 🗌 🖿 Flag Compa	rison						
> 🗌 🖿 Spatial Hom							
Copy Selection	Paste Selection	ОК	Cancel				

figure 4: Selecting different columns (elements) in the Time Series Lister

The meta data elements are grouped as follows.

- General (e.g. moduleinstanceld, location, parameter, timestep, blobsize etc.)
 Basis Statistics (Sum, Mean, Median, Standard Deviation, Percentile-5, Percentile-95)

The below mentioned groups give an overview of number of values and periods based on quality flags, primary and secondary validation.

- MissingOriginal Reliable
- Corrected Reliable
 Completed Reliable
- Original Doubtful
 Corrected Doubtful
- Completed Doubtful
 Original Unreliable
- Corrected Unreliable
- Completed Unreliable
 Soft Min
- Soft Max
- Hard Min
- Hard Max
- Same Reading
- Rate of Change
- Temporary shift
 Series Comparison
- Flag Comparison
- Spatial Homogeneity

The list of available columns can be adjusted by (un)selecting the individual elements. Only the selected ones will be visible in Time Series Lister after confirming by clicking <OK>.

Selections can be copied to the clipboard (<Copy Selection> button) and adjusted in a text editor (figure 5). These lists can be shared amongst users (e.g. e-mail). From a text editor you can adjust the list by removing rows, select the remaining rows and then copy it the clipboard (<CTRL+C>) again. After that use the <Paste Selection> button to update your selected columns (figure 6). See below:

DOMAIN PARAMETER IDS LOCATION NAME Z START END PARTITION MODIFIED SIGMA MISSING MEDIAN TIME SPAN PERCENTILE 5 VALUE UNIT MIN VALUE TIME TIME SERIES TYPE MAX_VALUE х COMMENT LOCATION ID TASK RUN ID LOCATION START TIME STANDARD DEVIATION VALUE TYPE PARAMETER ID EDIT WORKFLOW ID TIME 0 TIME STEP MIN VALUE VALUE BITS MODULE INSTANCE EXPIRY QUALIFIERS PARAMETER NAME SUM LOCATION END TIME PERCENTILE 95 SAMPLE ID MEAN PARAMETER GROUP MAX VALUE TIME LIFE SPAN QUALITY Y BED LEVEL VALUE RESOLUTIONS figure 5: Copying the selection of columns to clipboard

Select Columns	×	
🕽 🗹 🛅 General		
🗸 📝 🔚 Basis Statistics		
Sum		
V Mean		
 Median 		
Standard Deviation Percentile 5		
Percentae 5		
V Petoenge V		
✓ Percentage		
Timestamp Count		
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Avg Period		
Min Period		
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Corrected Reliable Consisted Reliable		
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> 🗌 📗 Original Unreliable		MISSING AVG PERIOD
> Corrected Unreliable		MISSING PERIOD COUNT
> IIII Completed Unreliable		HISSING_FERIOD_COUNT
> I III Soft Min		MISSING TIMESTAMP COUNT
> Band Min		HIDDING_IIIIDJIAII_COONI
> Hard Max		MISSING MIN PERIOD
> Same Reading		
Copy Selection Paste Selection OK	Cancel	MISSING PERCENTAGE

figure 6: Pasting the selection of columns from the clipboard

Delete module instance from Time Series Lister

From build 2016.02 it is possible to remove module instances from Local Data Store via Time Series Lister. This function only exists in FEWS stand alone mode. The procedure is as follows:

1. In Time Series Lister, select one workflow, press F12, a menu will pop out (figure 7).

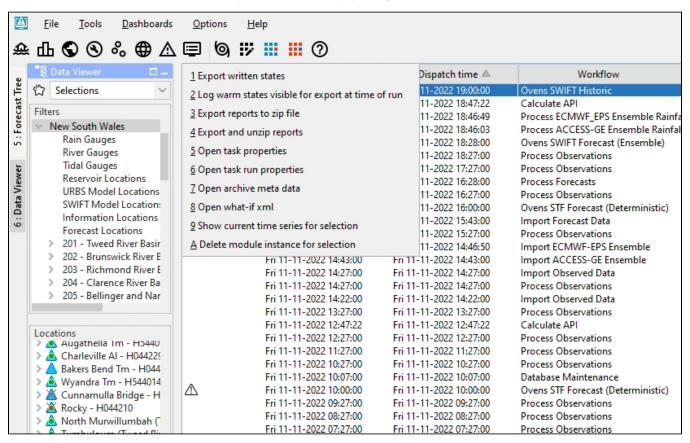


figure 7: <F12> menu in Time Series Lister

2. Select '9 Delete module instance for selection', the module instances in this workflow will be displayed for selection. One can select the module instances that should be removed from the database.

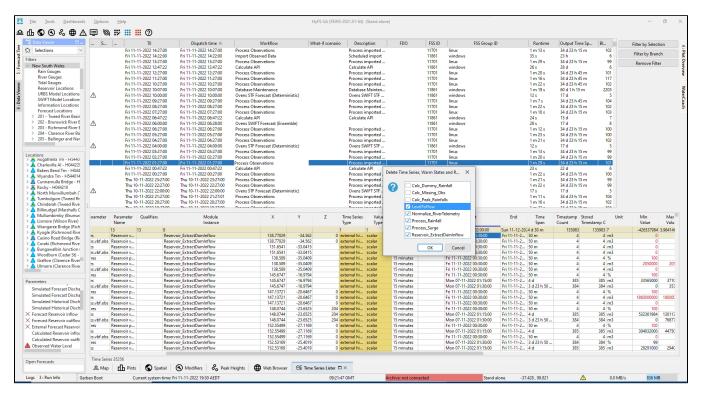


figure 8: select module instances to be removed from database

3. Press 'OK', the selected module instances will be removed. If all module instances in one workflow are all removed, the workflow will become empty, but the workflow still appears in the Time Series Lister.

To completely remove this workflow from the list, go to FEWS F12 menu (in log panel, press F12), select 'P database', select 'validate, repair, and compact datastore indices and cache files', then restart FEWS, the workflow will be completely removed. To completely remove the data from the localDataStore (i. e. reduce file size), press F12, select 'P database,' and select 'repair and defrag localdatastore'.

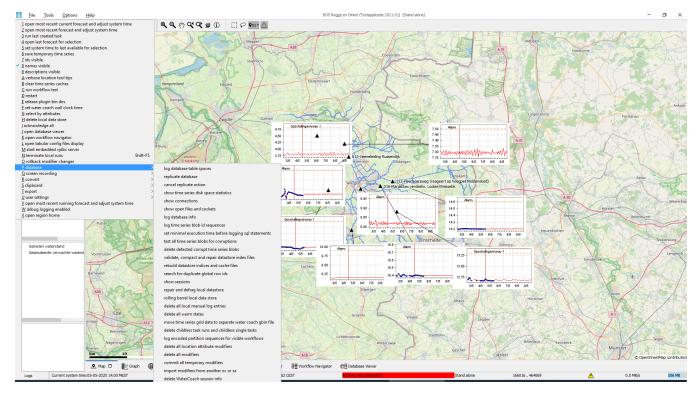


figure 9: Remove workflow and data using F12 - P - database menu