WEBfactory[®]

WEBfactory 2010

Logging WhitePaper Version 1.0 March 2012

www.webfactory-world.de







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1. Introduction

This whitepaper is intended for all the users of WEBfactory 2010 software and is designed to facilitate the understanding of WEBfactory 2010's approach on logging.

The document will present a Trending control overview as well as a guide through the workflow and configuration of the logging system.

For a correct understanding of the following information, WEBfactory 2010 software and additional modules must be installed on the operating machine.

For more information about installing WEBfactory 2010, system requirements, licensing and release notes, please visit the WEBfactory Knowledge Base at:

http://webfactory-support.de/assets/documentation/Default.htm .





2. Trending workflow overview

2.1. Online state visual representation





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2.2. Offline state visual representation



2.3. Used webservices and methods

Webservice	Method
Action.asmx	GetServers
Historical.asmx	ReadLogSignalList
HistoricalData.asmx	ReadTrendingLogs AddSignalValueToChart



2.4. Trendline Control online workflow

- Step 1. For each trendline, the Trendline control checks to see if it is enabled. If not enabled, the process stops.
- Step 2. If the trendline is enabled, the servers are checked. If there are no servers, the GetServers method from Action.asmx webservice is called. This method retrieves the information about all the signals form the server.
- Step 3. When servers available, the log of the signal is checked. If the signal has no log, ReadLogSignalList method from Historical.asmx webservice is called. The ReadLogSignalList method returns the information for the verified signal.
- Step 4. The signal is checked for logging information again. If after ReadLogSignalList the signal has logging information, the ReadTrendingLogs method from the HistoricalData.asmx webservice is called. This method returns the trend data from the logs. The AddSignalValuesToChart method is called to write the historical values to the Trending control graphic.

If no logging information is retrieved after calling the ReadLogSignalList, the RegisterSignalChanged method from WFConnector is called. This method checks the value of the signal and updates it asynchronously. Again, the AddSignalValueToChart method is called, to write the online values retrieved by the WFConnector.

2.5. Trending control offline workflow

For each trendline, the ReadTrendingLogs method from HistoricalData.asmx is called, retrieving the historical data for the signal. The AddSignalValuesToChart method is called to write the values to the Trending control.





3. Logging Setup

3.1. Logging Tab - Log Conditions

Log condition

- is a criterion to be met in order to record the process values of a signal variable.
- is defined by means of signal variables, constants and criteria.
- is linked to a signal variable in the Logging area.
- can be individually defined for each parameterized WEBfactory server.

WEBFactory 2010 Studio -	local/WEBfactory2010/DemoPri	ject					
Project Edit Help							
	0						
Logging	Condition No	me	Log Mode	Log Interval	Log Constant	Signal Value 2	Report Interval
E M Log Conditions	Logitwere	Once on change			1		
E III Logging	Log5sec	Time biggered		5 Second(s)			16%
1. 204/00/05 U	Logiveration	Time siggered		20 Second(s)			Nos .
	W Log Neec	Time triggeres		10 second(s)			Part
	2 Log-conditions details						
	General						
	Condition Neme	LogEvent					
	Los Mode	Once on charge					
	and a second	from the second s					
	Log Interval						
8 2 mar	Log Constant						
Column	Signal Value 2		10				
Condition Name	Report Interval						
Value:							
Province of the local data							
Filter							
🐼 Signals							
Alarming							
Logging							
W Translations							
Settings							
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3.1.1.Log Conditions Grid

In the conditions table, logging conditions have already been set to a default state.

Define the log conditions.

- directly in the conditions grid
- in the Log condition details tab, under the conditions grid

Condition Name Change the name of the log condition. Select a log condition.	Option	Description
Select a log condition.	Condition Name	Change the name of the log condition.
Mode Log Mode Log Mode Once on change: Values are logged if there is a change in the process values. • Mean value (only time controlled): Calculate the average value of the process values with the logging and the reporting intervals as reference parameters • Counter mean value (only time controlled): Total average values. • Parameters • Signal value: Process value of the signal variable to be recorded • Signal value 2: Process value of the signal variable to that is selected below • Constant value: constant	Log Mode	 Select a log condition. Mode Time triggered: Values are logged based on a the time cycle. Once on change: Values are logged if there is a change in the process values. Mean value (only time controlled): Calculate the average value of the process values with the logging and the reporting intervals as reference parameters Counter mean value (only time controlled): Total average values. Parameters Signal value: Process value of the signal variable to be recorded Signal value 2: Process value of the signal variable that is selected below Constant value: constant



	Relational comparators <, >, <> (unequal), =
Log Interval	Select a time cycle for time-controlled recording. [N/A] means that there is no recording taking place.
Log Constant	Set a constant.
Signal Value 2	Select a signal whose value will be used for comparison
Report Interval	Select a reporting interval The average value is calculated by means of the reporting interval and is issued at the end of the interval (as a "report")
Save	Save changes.
Cancel	Discard changes.





Editing the Conditions Grid - contextual menu or Edit menu:

Option	Description
Edit	Edits the current selected attribute.
Сору	Copy log conditions.
New	Create a new log condition.
Delete	Delete a log condition.
Log Condition Details	Hide/show the Log Condition Details.
Refresh	Update the current view.



3.2. Logging Tab - Logging

- A log defines a way to store data for a specific signal depending on a log condition.
- If the logging condition is fulfilled, the process values of the signal variable are logged.
- Logs can be individually defined for each parameterised WEBfactory server.

1 640 ET 170 168									
ing		Active	Log Tep	Signal Name	Description	Condition Name	Max Days	Max Numbers	Log dete base
g Conditions	1	e la companya de la compa	LogTogLevel2	Lavel 2		logEnnt	2	1.000	
paing		12	LogTag	Vibration 1		LogVibration		10.000	
91		100	Logi agreenue	Machine UP		LogEvent		10,000	
		13	LogTagCerteri	Temeratice 1		Logister	2	2 000	
		191	LogTagTemp1	Temperature 1		Loopses	2	1.000	
	8 Logging details General								
	R Loggrg shtals General ⊮ Active	(internet)							
	R Logging distails General I Active Log Tag	Log1st.ww2							
	 R. Logging details General ☑ Active Log Tag Signal Name 	LogTagLevel2 Level 2		2					
	R Logging details General ☑ Active Log Tag Sgrail Name Description	LogT spl.mod2 Land 2		60					
	Logang distails General W Active Log Tag Synal Name Description Constitution Name	LogTapLevel2 Level 2 Locationer		60					
	Loggrg distals General V Adve Log Tag Signal Name Description Candidon Name	LogTapLoveR Land 2 LogTopTopTopTopTopTopTopTopTopTopTopTopTopT							
	Logarg difeis General General General General Synd Name Synd Name Condition Name Max Days	LogTagLevel2 Land 2 LogEvent	0 2 (t)						
1	Logging details General Log Tag Synal Name Description Candidion Name Nas Kinshear	LogTepLevel2 Lond 2 LogEvert	■ 2 (*) 1000 (*)	60					
File	Logging diffails General Zardine Log Tag Syn Nane Description Candidon Naree Max Orys Max Nardeen Log did base	LogTapLevel2 LogEvert	■ 2년 1000년						
- Fiber	Logging data/s General General Jos Tap Signal Name Description Max Oyas Mess Numbers Log data hase	LogTapLave2 Lavel 2 LogEvere							
. Filer	E Logarg distails General Zeneral Zeneral Zeneral Zeneral Zeneral Soyra Nane Description Candition Nare Max Norben Log data base	LogTegLevel2 Lovel 2 LogEvert	■ 2 ± 1000 ⊕						
- Fiber	Logging details General General Jordina Jordina Signal Name Description Candidon Name Max Days Max Numbers Log data base	LogTapLevel2 Lond 2 LogEven	■ 2 (±) 1000 (±)						
- Fiber	Logarg driek Grows Grows Grows Log Tag Syste Name Candition Name Max Orys Max Numbers Lig drie have	Ligf splans2 Lind 2 Ligfort	■ 2 (± 1000 (±)						

In the parameters grid, logs that have already been set to the default values.

Edit logging parameters

- directly in the parameters grid
- in the Logging details



Logging parameters:

Option	Description
Active	Activate/deactivate log when the WEBfactory server is started.
Log Tag	Log name
Signal Name	Select an alarm signal whose values will be logged.
Description	Description of the signal whose values will be logged.
Condition Name	Select an log condition.
Max. Days	Set the maximum number of days for storage of data records (a ring buffer and/or the FIFO principle)
Max. Number	Set the maximum number of saved data (a ring buffer and/or the FIFO principle)
	The name of the database for data record storage
Log Database	 No name: The data record is saved in the default database.
	 Name: The data record is saved in a separate "Name" database.





Option	Description
Сору	The action for this selection is deactivated.
New	Create a new log.
Delete	Delete a log.
Export	Export the log configuration into a standard format XML file.
Import	Import the log configuration from a standard format XML file.
Logging Details	Hide/show the Logging details.
Refresh	Update the current view.

Contextual menu available for the parameters grid - or via the Edit menu:





3.3. Log Hysteresis

The Log Hysteresis option can be found in the signal details in WEBfactory Studio.

Active:					
Signal name:	Level 1		Description:		
OPC item name:	Cosinus 1		OPC enabled		
Write group:	Group 1		Log user activity		
Discrete value type:					
Factor X1:	0		Factor Y1:	0	
Factor X2:	100		Factor Y2:	100	
Minimum:	-30		Maximum:	30	
Unit:	-		Substitute-value:	0	
Hysteresis:	0	0.00 %			
Log Hysteresis:	0.3	3.00 %			
Alarm Hysteresis:	0	0.00 %	a.		

The Log Hysteresis option allows the user to specify a static or relative value (e.g. 0.3 or 3%) which is used when logging data in Float or Real format. The Log Hysteresis value will be used when the log condition for that signal is set to On Change, and acts like a minimum variation value.

This option is useful when the OPC Server is sending values with many decimals. If the 9th decimal is changing, when the log condition is set to On Change, the new value will be logged. In this case, difference might not be relevant to the user. Using Log Hysteresis, the user can define a value of minimum variation for the new value to be logged.

The Log Hysteresis value can be static -0.3 or relative -3%. If both static and relative values are specified (eg. 0.3 AND 3%), the new value will be logged only if the change of value is more than 0.3 AND 3% from the previous value.



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3.4. Exposed functionality

The following methods are exposed by the Trending control so they can be used from code:

```
public void LoadConfiguration(string configuration)
```

loads the configuration named "configuration" and ConfigurationNamespace (control property)

public void AddChannel(string name, Color color)

if the configuration has been loaded from code (using LoadConfiguration method), the signals can be dynamically added to the Trending control, specifying the signal name and the color to have in the Trending control.

```
public void StartQuery()
```

if the configuration has been loaded from code (using LoadConfiguration method), the process of value updates can be started.

```
public void Dispose()
```

used to dispose objects and the resources used by the object.

public event EventHandler OnTrendconfigurationLoaded

event that triggers when the configuration is changed. The event raises when:

- when the control starts with ClientsideConfiguration or InitialConfiguration;
- when the configuration in changed using the Load Configuration button;





• when the LoadConfiguration method is used and it succeeds.

4. The Trending Control at design time (Expression Blend).

When working with the Trending control (WFTrending3) in Expression Blend, an important set of properties are exposed in under the WEBfactory category, in the Properties panel.

▼ WEBfactory			
ButtonsConfiguration	(WFTrendingButtons)	New	
ChartTheme	Office2007Silver	~	
ClientsideConfiguration			
ConcurrentSignals	10		
ConfigurationNamespace			
InitialConfiguration			
LineThickness	1.5		
PopupModality	Modal	×	
SignalConfiguration	(SignalColumns)	New	
TimeZone	ClientTime	~	

These properties are available when using WEBfactory Smart Editor for design time editing too, and can be found in the Property Inspector panel.

The properties listed at design time are:

 ButtonsConfiguration – allows the user to set security authorizations for the options bar buttons from the Trending control. For each button, the SecurityAuthorizationName and the SecurityDenyAccessBehaviour can be set.

SecurityAuthorizationName		-	
SecurityDenyAccessBehaviour	Hide	~	
Visibility	v		

This means that the user can specify an authorization group that will have access to the button, and the behavior of the button if users belonging to other authorization groups than the one selected are using the control.





The buttons available for security access configurations are:

- o AddSignal
- AxisConfiguration
- CursorConfiguration
- Export
- o Import
- o LegendConfiguration
- o Load
- o Print
- o RemoveSignal
- o Save
- o Settings
- o Start
- o TimeRange





 WEBfactory 		
ButtonsConfiguration	(WFTrendingButtons) New]•
ChartTheme	Office2007Silver]=
ClientsideConfiguration	None	
ConcurrentSignals	Custom	
ConfigurationNamornaco	DuskBlue	
ConfigurationNamespace	DuskGreen	
InitialConfiguration	MediaPlayer	
LineThickness	Office2003Blue	
PopupModality	Office2003Classic	
SignalConfigurationColumns	Office2003Olive	
	Office2003Royale	
limezone	Office2003Silver	
	Office2007Black	
	Office2007Blue	
	Office2007Silver	
	Vista	

• ChartTheme – allows the user to select a visual theme for the Trending Control.

The available theme options are:

- None default theme is applied;
- DuskBlue
- DuskGreen
- MediaPlayer
- Office2003Blue
- Office2003Classic
- Office2003Olive
- Office2003 Royale
- Office2003Silver
- Office2007Black
- Office2007Blue
- Office2007Silver
- Vista



- ClientSideConfiguration if set to on, the configuration will be stored on the local machine's Isolated Storage. The loading of the configuration will be made from the local Isolated Storage.
- ConcurrentSignals the number of signals that can be displayed in the Trending graphic at the same time.
- ConfigurationNamespace the namespace of the configuration. A configuration is defined by a name and a namespace. The combination of name and namespace must be unique. If a namespace is defined in this option, the Trending control will only be able to see the configurations that belong to this namespace, when loading them from the database.
- InitialConfiguration the name of the configuration to be loaded by default. By
 declaring the namespace of the configuration (in the previous option) and the name of
 the configuration in the InitialConfiguration text field, the Trending control will load by
 default the specified configuration from de database.
- LineThickness the thickness of the trendline in the Trending graphic.
- PopupModality this settings allows the user to choose the modality for the popup windows displayed by the Trending control at runtime. The user can choose between modal and modeless.
- SignalConfigurationColumns allows the user to choose which columns will be displayed at runtime in the signal grid from the Change Settings window.

 SignalConfigurationColumns (SignalColumns) 	New]•
ShowAverageLineColumn		
ShowAveragePeriodColumn		
ShowAxisColumn		
ShowCustomDescriptionColumn		
ShowDescriptionColumn		
ShowDigitalBitColumn		
ShowGroupColumn		
ShowInterpolationColumn		
ShowInvertedColumn		
ShowIsDigitalColumn		
ShowIsStaticColumn		
ShowLogColumn 🗸		
ShowMaxColumn		
ShowMaximumLineColumn		
ShowMinColumn		
ShowMinimumLineColumn		
ShowNameColumn 🗸		
ShowNumberOfDecimalsColumn		
ShowOpcitemNameColumn		
ShowUnitColumn		



The SignalConfigurationColumns options are:

- ShowAverageLineColumn allows the user to enable a line that will mark the average of the values displayed by the Trending graph.
- ShowAveragePeriodColumn allows the user to customize the period of time over which the Average Line is visible and calculated.
- ShowAxisColumn enables the user to select an axis for the signal. Signals can be represented on custom axis, depending on the values or units.
- ShowCustomDescriptionColumn allows the user to input a custom description for the current signal.
- ShowDescriptionColumn shows the description of the signal, if available.
- ShowDigitalBitColumn allows the user to assign a signal value that will represent the digital state of 1 in the digital graph.
- o ShowGroupColumn lists the signal group which current signal is assigned to.
- ShowInterpolationColumn allows the user to set the algorithm used to draw the line between points.
- ShowInvertedColumn allows the user to invert the digital representation of the signal.
- ShowDigitalColumn allows the user to mark the signal to be represented in a digital format.
- ShowStaticColumn allows the user to mark a signal as static.
- ShowLogColumn shows the log name of the selected signal, if the signal has logging.
- o ShowMaxColumn defines the maximum value for the signal value.
- ShowMaximumLineColumn if enabled, Trending graph will draw a line, marking the highest value of the current signal.
- o ShowMinColumn shows the minimum value for the signal value.
- ShowMinimumLineColumn if enabled, Trending graph will draw a line, marking the lowest value of the current signal.
- ShowNameColumn shows the name of the signal.
- ShowNumberOfDecimalsColumn allows the user to specify the number of decimals the signal value will be displayed with.
- o ShowOpcItemNameColumn lists the OPC item name for the current signal.
- ShowUnitColumn shows the unit of measurement for the signal value, if available.





• TimeZone – allows the user to choose the time zone for the Trending Control at runtime.

SignalConfigurationColumns	(SignalColumns)	New	
TimeZone	ServerTime	×	
	ClientTime		
	ServerTime		
	UTCTime		
	UTCTime		

The options are:

- \circ ClientTime the time zone of the machine where the visualization is running.
- ServerTime the time zone of the machine on which WEBfactory Server is running.
- UTCTime the UTC time zone.



5. The Trending Control at design time (Smart Editor).

In Smart Editor, the properties of the Trending Control are exposed in under the WEBfactory category, in the Property Inspector panel.



These properties are available in Expression Blend too, and can be located in the Properties panel.

The Trending Control specific properties are listed under three main categories:

- Configuration
- Security
- SignalConfiguration.



Configuration

✓ Configuration	
ChartTheme	Office2007Silver •
LineThickness	1.50
ConcurrentSignals	10
ClientSideConfiguration	
ConfigurationNamespace	
InitialConfiguration	
TimeZone	ClientTime •
PopupModality	Modal

- ChartTheme allows the user to select a visual theme for the Trending Control. The available theme options are:
 - None default theme is applied;
 - o DuskBlue
 - o DuskGreen
 - o MediaPlayer
 - o Office2003Blue
 - o Office2003Classic
 - o Office2003Olive
 - o Office2003 Royale
 - o Office2003Silver
 - o Office2007Black
 - o Office2007Blue
 - \circ Office2007Silver
 - o Vista
- LineThickness the thickness of the trendline in the Trending graphic.
- ConcurrentSignals the number of signals that can be displayed in the Trending graphic at the same time.
- ClientSideConfiguration if set to on, the configuration will be stored on the local machine's Isolated Storage. The loading of the configuration will be made from the local Isolated Storage.
- ConfigurationNamespace the namespace of the configuration. A configuration is defined by a name and a namespace. The combination of name and namespace must be unique. If a namespace is defined in this option, the Trending control will only



be able to see the configurations that belong to this namespace, when loading them from the database.

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- InitialConfiguration the name of the configuration to be loaded by default. By
 declaring the namespace of the configuration (in the previous option) and the name of
 the configuration in the InitialConfiguration text field, the Trending control will load by
 default the specified configuration from de database.
- TimeZone allows the user to choose the time zone for the Trending Control at runtime. The options are:
 - o ClientTime the time zone of the machine where the visualization is running.
 - ServerTime the time zone of the machine on which WEBfactory Server is running.
 - UTCTime the UTC time zone.
- PopupModality this settings allows the user to choose the modality for the popup windows displayed by the Trending control at runtime. The user can choose between modal and modeless.

Security

 ButtonsSettings – allows the user to set security authorizations for the options bar buttons from the Trending control. For each button, the SecurityAuthorizationName and the SecurityDenyAccessBehaviour can be set.

▲ Security	
ButtonSettings	

This means that the user can specify an authorization group that will have access to the button, and the behavior of the button if users belonging to other authorization groups than the one selected are using the control.



1	
Items	Properties
TimeRange	📥 DisplayName 🔻
Start	▲ Appearance
Settings	IsVisible 🔽
Save	▲ Security
RemoveSignal	SecurityAuthorizationName
Load	SecurityDenyAccessBehavior Disable •
LegendConfiguration	
Import	
Export	
CursorConfiguration	
AxisConfiguration	
AddSianal	
	OK Cancel

The buttons available for security access configurations are:

- o TimeRange
- o Start
- o Settings
- o Save
- o RemoveSignal
- \circ Load
- \circ LegendConfiguration
- o Import
- o Export
- CursorConfiguration
- o AxisConfiguration
- o AddSignal





SignalConfiguration

Allows the user to choose which columns will be displayed at runtime in the signal grid from the Change Settings window.

^	SignalConfiguration	
	ShowAverageLineColumn	
	ShowAveragePeriodColumn	
	ShowAxisColumn	
	ShowCustomDescriptionColumn	
	ShowDigitalBitColumn	
	ShowGroupColumn	
	ShowIsDigitalColumn	
	ShowInterpolationColumn	
	ShowMaxColumn	
	ShowMaximumLineColumn	
	ShowMinColumn	
	ShowMinimumLineColumn	
	ShowOpcItemNameColumn	
	ShowUnitColumn	
	ShowLogColumn	
	ShowNameColumn	
	ShowInvertedColumn	
	ShowNumberOfDecimalsColumn	
	ShowDescriptionColumn	
	ShowIsStaticColumn	

- ShowAverageLineColumn allows the user to enable a line that will mark the average of the values displayed by the Trending graph.
- ShowAveragePeriodColumn allows the user to customize the period of time over which the Average Line is visible and calculated.
- ShowAxisColumn enables the user to select an axis for the signal. Signals can be represented on custom axis, depending on the values or units.
- ShowCustomDescriptionColumn allows the user to input a custom description for the current signal.



- ShowDigitalBitColumn allows the user to assign a signal value that will represent the digital state of 1 in the digital graph.
- ShowGroupColumn lists the signal group which current signal is assigned to.

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- ShowDigitalColumn allows the user to mark the signal to be represented in a digital format.
- ShowInterpolationColumn allows the user to set the algorithm used to draw the line between points.
- ShowMaxColumn defines the maximum value for the signal value.
- ShowMaximumLineColumn if enabled, Trending graph will draw a line, marking the highest value of the current signal.
- ShowMinColumn shows the minimum value for the signal value.
- ShowMinimumLineColumn if enabled, Trending graph will draw a line, marking the lowest value of the current signal.
- ShowOpcItemNameColumn lists the OPC item name for the current signal.
- ShowUnitColumn shows the unit of measurement for the signal value, if available.
- ShowLogColumn shows the log name of the selected signal, if the signal has logging.
- ShowNameColumn shows the name of the signal.
- ShowInvertedColumn allows the user to invert the digital representation of the signal.
- ShowNumberOfDecimalsColumn allows the user to specify the number of decimals the signal value will be displayed with.
- ShowDescriptionColumn shows the description of the signal, if available.
- ShowStaticColumn allows the user to mark a signal as static.







6. The Trending Control at runtime.

6.1. User Interface

The UI of the Trending Control is divided in three sections:

- The graph
- The legend
- The options bar





6.1.1.The graph

The Trending Control displays data in a multi axes graphic environment, using colored shapes for accurate data representation.



The two signals are displayed as lines, relative to values and timestamps. This section can be configured at runtime using the Settings button from the options bar.





6.1.2.The legend

The legend is the part of the Trending Control that holds the details of the signals represented in the graph part.



It can be configured at runtime using the Settings button from the options bar.

6.1.3. The options bar

Contains the all the possible options of the Trending control:



- the Pause/Run button



- the settings button, configures the trend display



- loads configuration from database



- saves configuration to database



- import trend data (from xml)
- export trend data (to xml)







6.2. Trending functionality

6.2.1.Changing settings

The base functionality of the Trending control can be adjusted using the Settings button from the option bar. Pressing the Settings button will open the Change Settings window, which contains options to customize the core elements of the Trending control:

- The possibility to add and manage signals
- The axes setup
- The legend configuration
- The cursors configuration
- The way a signal is represented



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A	٩dd	Dele	ete	🐷 Fi	ilter		
	De	scription	Color	Name	Interpolation	Axes	
-	I			Level 1	Straight Line	Legend Configu	ration
			Local Second Straight Line		Cursors		
	oct All			Activ	vate Deartivate	 Show digital chart Digital chart height: Digital chart type: Show Overview (histor 	Line Fill rical data only

Managing the signals

The main part of the window is focused on signal management. It consists in a signal grid, which lists the signals from the Trending control as well as their attributes (listed in the grids columns).

The scroll bar at the bottom of the grid indicates that more columns are available. Setting which columns should appear in the grid, and thus, which attributes of the signals should be listed, is made at design time, in Smart Editor or Expression Blend.

In the above example, all the available columns are listed:

- Active contains a checkbox button toggling the shown/not shown state of the signal in the Trending control.
- Description lists the description of the signal, if available. The signal's description can be set from WEBfactory Studio for each signal.
- Color contains a color picker, indicating the color of the trend line, and allows the user to select a pre-defined color, or a custom color.


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	s Custom Col	or	Known Colors	Custom Color
alette: St	andard	•	0	E
Theme Co	lors			
Standard	Colors			

This color is randomly assigned when the signal is added with the signal Browser and can be changed.

- Name displays the name of the signal.
- Interpolation allows the user to set the algorithm used to draw the line between points.





The options are:

o Straight line



o Cubic Spline



o Differential





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- Digital marks the signal to be represented in a digital format. If a signal is marked as digital, a new digital graph will appear in the trending control, if the "show digital chart" option is checked. The base value is the Digital Bit.
- Inverted inverts the digital representation of the signal. If the Digital Bit, by default the 1 state is set to a certain signal value, the inverted signal will display the signal value as 0, thus inverting the graphic representation.
- Digital Bit allows the user to assign a signal value that will represent the digital state of 1 in the digital graph. If the signal outputs the value stated in the Digital Bit attribute, the digital graph will display the state 1. If any other value is output by the signal, the digital graph will state 0.

The Digital Bit cannot have a negative value assigned.

Add	Dele	te	Silter
Digital	Inverted	Digital Bit	Axis
	Ŭ	0	÷ Y
		0	ΨY

- Axis enables the user to select an axis for the signal. Signals can be represented on custom axis, depending on the values or units. The axes can be defined using the Axes button in the Change Settings window.
- Log displays the log name of the selected signal, if the signal has logging. Logging
 will enable the Trending control to fetch the data from the database, not from the
 signal changed event, thus being able to optimize the data acquisition speed and to
 display historical values.
- Group lists the signal group which current signal is assigned to.
- OPC Item Name lists the OPC item name for the current signal.
- Unit displays the unit of measurement for the signal value, if available.
- Min defines the minimum value for the signal value.
- Max defines the maximum value for the signal value.



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- Custom description allows the user to input a custom description for the current signal. This attribute can improve the filtering in some cases and the visualization on the signals in the legends.
- Minimum line if enabled, Trending graph will draw a line, marking the lowest value of the current signal. The color can be changed using the color picker.
- Maximum line if enabled, Trending graph will draw a line, marking the highest value of the current signal. The color can be changed using the color picker.
- Average Line allows the user to enable a line that will mark the average of the values displayed by the Trending graph. There are two types of average lines:
 - Absolute states the absolute average of the values.

Add	Delete		🕑 Filt
Average Line	_	Moving	Average Period
None	-	1.	Minutes 🔹
Absolute		1	Minutes •
Moving	1		
None			

• Moving – states the real time average value for the signal.

- Moving Average Period allows the user to customize the period of time over which the Average Line is visible and calculated. The user can view the average value over a timespan of specified minutes, hours or days.
- Number of decimals allows the user to specify the number of decimals the signal value will be displayed with. If the value of this attribute is set to 0, the signal value will be displayed with all its decimals.
- Cyclic acquisition marks a signal as static. For a signal that has a lower frequency
 of value updates, this option will enable the Trending control to display the last value
 until the next value update, even if between the updates no data has been retrieved.
 The change of value will be visible marked in the graph. As an abrupt change,
 meaning that the signal had that curtain value until that time and from that point on it
 has a new value. At the start of the data acquisition faze the last know value for the
 signal, prior to the start of the selected time interval, will be fetched from the server in



order to display the current value of the signal until new updates come along. Also if the historical data is shown in the graph on a signal that is marked as static it will be represented in the same abrupt change mode.

Above the signals grid, the Add, Delete and Filter options are available:

(C Filter
Add	Delete	Itter
C. CONTROL		

• Add – adding one or more signals. Clicking the button will open the signal browser, allowing the user to select and add signals to the Trending control.

Refresh Show logs	Signal Description	Connector	Group	Name
 WEBfactory.Sim.DA.1 Group 1 		.WEBfactory.Sim.DA.1	Group 1	AlarmCount
		.WEBfactory.Sim.DA.1	Group 1	Frequency :
		.WEBfactory.Sim.DA.1	Group 1	Frequency 2
		.WEBfactory.Sim.DA.1	Group 1	Level 1
		.WEBfactory.Sim.DA.1	Group 1	Level 2
		.WEBfactory.Sim.DA.1	Group 1	Local Hour
		.WEBfactory.Sim.DA.1	Group 1	Local Minut
		.WEBfactory.Sim.DA.1	Group 1	Local Secon
		.WEBfactory.Sim.DA.1	Group 1	Local Time
		.WEBfactory.Sim.DA.1	Group 1	MachineOP
		.WEBfactory.Sim.DA.1	Group 1	OperationM
Ciltar		.WEBfactory.Sim.DA.1	Group 1	OperationM
olumn		.WEBfactory.Sim.DA.1	Group 1	OperationM
Connector		.WEBfactory.Sim.DA.1	Group 1	Sensor 1
alue		.WEBfactory.Sim.DA.1	Group 1	Sensor 2
K)		.WEBfactory.Sim.DA.1	Group 1	Servo 1
		.WEBfactory.Sim.DA.1	Group 1	Servo 2
Filter	•			

The main feature of the Signal Browser is the filtering. A very useful filter option is the Show Logs checkbox. If selected, the Signal Browser will list only the signals that have logging. This is useful when using historical views in the Trending control.

Other filtering options are available in the bottom-left side of the Signals Browser window. The further filtering can be made by:





- Column with the options: Connector, Group, Name, Signal Description and OPC Item Name.
- Value for each column selected, the user can input the value for filtering. Wildcards are available.

Note that you can set filter for each column. If you want to remove the filter from one column, set the value to *.

Delete - this option is plain forward. It deletes the selected signals.

Filter – the signals listed in the signal grid can be filtered by columns and values for the selected columns:

- Column with the options: Connector, Group, Name, Signal Description and OPC Item Name.
- Value for each column selected, the user can input the value for filtering. Wildcards are available.

Note that you can set filter for each column. If you want to remove the filter from one column, set the value to *.

Under the signals grid are the Select All, Activate and Deactivate options. Like in the first column of the signals grid, the signals can be activated or deactivated. The advantage of using this options is that all the selected signals can be activated/deactivated at once.

Managing the trending graph and legend

The right side of the Change Settings window is focused on managing the graph and the legend.



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• Axes – the Axes button manages the Y axes that the signal can be displayed on. Clicking the button will open the Axes Configuration dialog.

Axes Configuration		x
Y	Name Title Color O Auto Fixed from	Y
Add Delete	Crientatio	ithmic tific on Left • Ok Cancel

The axes can be added to the graph by clicking the Add button. The axes will be listed in the left side of the window, the right side being used for configuring the selected axes:

- Name the name of the axes. It will be listed in the Axis column dropdown box.
- Title the title will be displayed in the Trending control graph. Each axis can have a representative title.
- Color the color of the axes. Clicking the corresponding button will open the color picker.
- Autoscale if enabled, the axis will modify its values according to the value of the signal/signals tied to this axis.



- Fixed range the axis will have a fixed value representation, using the values specified below (from... to...). If the signal value goes over or below the specified values, the trend line will be cut off the graphic.
- Logarithmic makes the values of the trend line to pass through a logarithmical function (In) and then display the values on the chart. It can be useful when dealing with signals representing sound levels or earth movement.



*The same signal represented on a normal scale (blue) and on logarithmical scale (red)

- Scientific enables the scale of the axis to be represented using scientific format (3.42E + 001). This is useful when dealing with extreme signal values (either very large values or very small values, negative or positive).
- Orientation the axis can be placed either on the left side of the graphic or on the right side of the graphic. If no signal is assigned to a certain axes it will not be drawn on the chart.
- Legend configuration allows the user to configure the legend (both analog and digital) of the Trending control. Clicking on the Legend Configuration button will open the Legend Configuration dialog.



Legend Configuration X
Legend Columns Description Name Group OVC Item Name
 Min Max Unit Log Show current values ✓ Show signal information
Visible Single line Visible Signal name V Signal description V Show timestamp V Show current value
Legend Position
OK Cancel

This dialog allows the customization of the legend columns and its position:

- Description column displays the description of the signal in the legend.
- Name column displays the name of the signal in the legend.
- o Group column displays the signal group in the legend.
- OPC Item Name column displays the OPC item name in the legend.
- Min column displays the minimum value of the signal.
- Max column displays the maximum value of the signal.
- Unit column displays the unit of the signal value.
- Log column displays the logging info of the signal.
- Show current values shows the current value of the signal if no cursor is defined in the trending, or if the cursor is placed before the last updated value. If the cursor is placed in a time range where the charts has data, the current value will be the closest value to the cursor position. This happens for all the trend lines.
- 0
- Show signal information shows more signal information, with the ability to put different information on different lines (if more than one information is displayed on the same line, it will be split with the character '|'):
 - Signal name



- Signal description
- Show timestamp
- Show current value
- Legend position allows the user to select the position of the legend in the Trending control.

• Cursors – manages the configuration of the graphic cursor. If clicked, the Cursor Configuration window will open.

Cursors Configuration		x
	Name Use signal color Color Signal Show in legend	•
	Display information Tooltip Label Cursor Name Description Group Opc Item Name Min Max Unit Tag Date Time CurrentValue Label background opacity	
Add Delete	Show label border	
	ОК	Cancel

Cursors can be added and deleted using the Add/Delete buttons from the bottom-left side. The main part of the window focuses on cursor customization:

• Name – cursor name.





- Use signal color enables the cursor to use the signal color if it is attached to one signal.
- Color allows the user to set a custom color for the cursor.
- o Signal allows the user to attach the cursor to a signal.
- Show in legend displays the cursor information in the legend of the Trending control.

Display information – this table consists in options that can be marked to be displayed either in the tooltip of the cursor, the label of the cursor or both:

- Cursor Name the name of the cursor.
- Signal name the name of the attached signal.
- Description the description of the signal, if available.
- Group the signal group that the attached signal belongs to.
- OPC Item Name the OPC item name of the attached signal.
- o Min the minimum value of the attached signal.
- o Max the maximum value of the attached signal.
- Unit the unit of measurement of the signal's value.
- Tag the tag of the signal.
- Date the current date stamp of the signal.
- Time the current timestamp of the signal.
- CurrentValue the current value of the signal if no cursor is defined in the trending, or if the cursor is placed before the last updated value. If the cursor is placed in a time range where the charts has data, the current value will be the closest value to the cursor position. This happens for all the trend lines.

Below the main settings, the Cursors Configuration window displays two graphical settings for the cursors:

- Label background opacity allows the user to set the percentage of opacity of the label.
- Show label border displays a border around the label.

The signal of the cursor can be changed without the need to come to the configuration dialog. If a curtain cursor is selected and the user clicks on a different signal in the legend, the signal for that cursor will be changed along with its color.

Digital chart



The digital chart options are located below the Cursors options. These settings are useful when dealing with signals marked as digital.

Show digital chart	
Digital chart height:	50 🚔
Digital chart type:	Line Fill 🔻

By enabling the Show digital chart option, a digital chard will be displayed below the main graphic in the Trending control, if we have at least one signal set as digital.

- Digital chart height allows the user to set the desired height for the digital chart along with the height of the digital legend.
- Digital chart type allows the user to choose between Area, Line and Line Fill types of digital representation of the data.



* Area, Line and Line Fill types of digital graphic

Overview

This option works when using historical data only. This means that only signal with logs will be displayed.

The Show overview option enables an overview graphic to be displayed above the main graphic, when in historical view mode. When in online mode, the overview graphic is not visible.

The overview graphic provides a quick and easy navigation through dense historical data, allowing the user to extend/move the part that the main graphic displays, or focus the main graphic view on different data.



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When the main graphic is zoomed, the overview graphic allows the user to control the data displayed in the main graphic, by moving or extending/shrinking the selection area in the overview graphic.



Controlling the selection area is made by dragging the whole selection area or dragging the left or/and right selection handles.

To move the selection area to a different location, click inside the selection area and drag it somewhere else on the overview graphic. Notice that the main graphic will update its view.

To resize the selection area, drag the left or right handles and adjust it to fit the desired portion of the overview graphic. Notice that the main graphic will update the view.



6.2.2.Online mode

The time range button allows the user to switch from the online mode to the historical mode. Historical mode means viewing logged data from the signals. This is why only signals that have logging can be viewed in historical mode.

Clicking on the time range button will open the Range Selection dialog.

Range Selection		x
Timespan: Online	•	
Display range: Start at now minus: Get values for last:	1 Minutes 0 Minutes 0 Minutes 0 Minutes	
ок	Cancel	

When online, the Range Selection dialog will display the options of viewing online data:

- Display range the time range of the graphic. It can be set to days, hours or minutes.
- Start at now minus sets the starting time of the graphic X minutes/hours/days after the normal start point.
- Get values for last display the historical values for the last X minutes/hours/days and continues with the online data.

Combined, this settings allow the user to see data progress so far and the current data in real time.







6.2.3. Historical mode

When selecting the Timespan option from the Range Selection dialog, the dropdown menu will list the options for displaying historical data.

Range Selection		Х
Timespan:	Online 🔹	
	fromto	
Display ran	Year	
Start at no	Month	
Get values	Week	
	Day	
	Online	
	Yesterday	
	Current day	
	OK Cancel	

• From...to - allows the user to select a time range using exact start and end points. The logged data (historical data) from that period will be displayed in the main graphic.



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Tim	espan: from	to	•	
Start:	3/6/2012	■ 11:	24:33 AM	▦
End:	3/6/2012	■ 12:	24:33 PM	▦

• Year – allows the user to select a specific year to be displayed in the timeline of the main graphic. This option will display the logged (historical) data from the whole year.

Timespan:	Year	•
	Year:	2012

 Month – allows the user to select a specific month to be displayed in the timeline of the main graphic. This option will display the logged (historical) data from the whole month.

Month:			
4	20	12	Þ
Jan	Feb	Mar	Apr
May	Jun	Jul	Aug
Sep	Oct	Nov	Dec

 Week – allows the user to select a specific week to be displayed in the timeline of the main graphic. This option will display the logged (historical) data from the whole week.



Timespan: Week								
Start day:								
	•	1	Mar	ch, 2	2012	2	•	
	Su	Мо	Tu	We	Th	Fr	Sa	
	26	27	28	29	1	2	3	
	4	5		7	8	9	10	
	11	12	13	14	15	16	17	
	18	19	20	21	22	23	24	
	25	26	27	28	29	30	31	
	1	2	3	4	5	6	7	
l								

• Day – allows the user to select a specific day to be displayed in the timeline of the main graphic. This option will display the logged (historical) data from the whole day.

imespar	: D	ay					
	Day:						
	•		Mar	ch, 2	2012	2	•
	Su	Мо	Tu	We	Th	Fr	Sa
	26	27	28	29	1	2	3
	4	5		7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
	1	2	3	4	5	6	7

- Online the online mode.
- Yesterday displays the data from the day before the current day.
- Current day displays the data from the current day, up to the point representing the current time of selection.



6.2.4. Save/Load Configuration

Loading and saving a configuration is done using the load (⁵⁰) and save (⁵⁰) buttons from the options bar.

The configurations are written to the database, and loaded from there back. The name of the configuration is case sensitive. If the name of the configuration already exists, the new save will overwrite the old one.

If a Namespace is set in the Trending Control at design time, only the configurations belonging to that namespace will be available to load from the database. Thus, a configuration is uniquely defined by its name and/or namespace.





7. DataTable control diagram





Webservices	Methods
SignalsService.svc	GetLogIDs List of SignalLogTagFilterDTO: • LogTag • SignalID
	GetLogValues
	List of LogID's and other parameters





The GetLogValues method returns paged data, in a determined period of time or elements.

If a page returns empty it means that there is no data in the requested time frame. The GetLogValues method will be called for minimum 1 element from the left time (startDate) to the end of the global time frame (endDate). Then the method will retrieve paged data until the next empty frame.

7.2. Write Logs

SignalsService.svc UpdateLogValues

Required

System Authorization DataTable edit log values

Webservices	Methods
	UpdateLogValues
SignalsService.svc	Parameters: logID Time EditedValue EditedValue2 Value Value2





8. The DataTable control at design time

8.1. Expression Blend

h	2 3 💰 🖹 8 8	^O	
	Time	Signal 1	Signal 2
1	3/21/2012 2:53:13.643 PM	84.3	1.1
2	3/21/2012 2:53:14.643 PM	62.14	21.89_Geänder
3	3/21/2012 2:53:15.643 PM	75.13_Geändert	7.43_Geänder
4	3/21/2012 2:53:16.643 PM	97.77_Geändert	22.8
5	3/21/2012 2:53:17.643 PM	30.42_Geändert	41.39_Geänder
6	3/21/2012 2:53:18.643 PM	97.41	56.75_Geänder
7	3/21/2012 2:53:19.643 PM	o 78.4	21.7_Geänder
8	3/21/2012 2:53:20.643 PM		91.8_Geänder
9	3/21/2012 2:53:21.643 PM	38.11	9.3
10	3/21/2012 2:53:22.643 PM	17.62_Geändert	61.71_Geänder
11	3/21/2012 2:53:23.643 PM	66.21_Geändert	62.25_Geänder
12	3/21/2012 2:53:24.643 PM	93.18_Geändert	56.2
13	3/21/2012 2:53:25.643 PM	37.75	24.0
•			
	Sta	tus:Fertig	Zeilenanzahl:2

The DataTable expose the following properties in Expression Blend:

- ButtonsConfiguration allows the user to input a username in the SecurityAuthorizationName and an alternative behavior in the SecurityDenyAccessBehavior field, for each button from the options menu of the control:
 - o Export
 - \circ Load
 - o Print
 - o Save
 - o Settings
 - TimeSelection





The SecurityDenyAccessBehavior options are:

- Hide the button is not displayed, if the other user than the one specified in the SecurityAuthorizationName uses the DataTable control.
- Disable the button is displayed but disabled, if the other user than the one specified in the SecurityAuthorizationName uses the DataTable control.

The ButtonsConfiguration also allows the user to select for each button whether to be visible or not.

 ClientSideConfiguration – if set to on, the configuration will be stored on the local machine's Isolated Storage. The loading of the configuration will be made from the local Isolated Storage.



- InitialConfiguration this option allows the user to enter the name of a saved configuration, this configuration being loaded as default configuration for the DataTable control. The configuration can be later changed at runtime.
- ShowPager if on, this option will divide the DataTable entries in pages (the size of a page can be specified in the Page size option) and activates the navigation.
- PageSize allows the user to select the maximum number of lines to be displayed in one page. The maximum number of displayed lines per page at runtime is 100.





8.2. Smart Editor

Page	-																-	Property	Inspector			φ×
	. 1	50 100	150 200	250 300	350 400	450 50	0 550	600	650	700 75	800	850	900	950	1000			Dis	playName	τ		
		•																^ App	earance			
1.5	-															2		Pag	eSize			100
ľ		a 🖸 🗖		•											_			Sho	wPager]	
		Time	Signal 1	Signal 2	Signal 3										-			Initi	alConfiguration			
l° :	1	20.03.2012 17:08:	-31	66.367830879226	OFF													Clie	ntSideConfiguration]	
1	2	20.03.2012 17:08:	-412	-435.3169970844	OFF													Opa	city			1.00
<u> </u>	3	20.03.2012 17:08:	-173	249.49257203819	OFF													Too	ITip			
8-	4	20.03.2012 17:08:	-249	-256.9741745279														Wid	th			1,023.45
l° :	5	20.03.2012 17:08:	290	-486.9339526570	ON													Hei	ght			542.92
	6	20.03.2012 17:08:	-192	-130.7177644366	ON													➤ Mis				
l° :	7	20.03.2012 17:08:	665	306.17714291726	OFF										_			^ Sec	urity			
8	8	20.03.2012 17:08:	863	-311.1520669474														Butt	onSettings			
l° :	9	20.03.2012 17:08:	246	-338.5549978532	ON																	
1	10	20.03.2012 17:08:	477	-111.2357385508																		
8	11	20.03.2012 17:08:	836	135.42628271292	OFF																	
8	12	20.03.2012 17:08:	-55	-365.8373308674	ON																	
183	13	20.03.2012 17:08:	-916	-52.69069529729	OFF																	
	14	20.03.2012 17:08:	-141	-343.5957417095	ON																	
8	15	20.03.2012 17:08:	-359	467.30460504410																		
8	16	20.03.2012 17:08:	-813	427.05106918097	ON																	
187	17	20.03.2012 17:08:	-870	428.27643124772											-							
						Status: Io	lle	_					N	umber of L	ines: 20							
8-	H	(1)))											1	Page 1	of 1							

The DataTable expose the following specific properties in Smart Editor:

^	Appearance	
	PageSize	100 🛋
	ShowPager	
	InitialConfiguration	Test
	ClientSideConfiguration	V

- PageSize allows the user to select the maximum number of lines to be displayed in one page. The maximum number of displayed lines per page at runtime is 100.
- ShowPager if on, this option will divide the DataTable entries in pages (the size of a page can be specified in the Page size option) and activates the navigation.
- InitialConfiguration this option allows the user to enter the name of a saved configuration, this configuration being loaded as default configuration for the DataTable control. The configuration can be later changed at runtime.
- ClientSideConfiguration if set to on, the configuration will be stored on the local machine's Isolated Storage. The loading of the configuration will be made from the local Isolated Storage.
- ButtonsConfiguration allows the user to input a username in the SecurityAuthorizationName and an alternative behavior in the SecurityDenyAccessBehavior field, for each button from the options menu of the control:
 - TimeSelection





- o Settings
- o Save
- \circ Print
- o Load
- Export

0				
Items	Pro	operties		
TimeSelection		DisplayName T		
Settings	^	Appearance		
Save		IsVisible	V	
Print	^	Security		
Load		SecurityAuthorizationName		
Export		SecurityDenyAccessBehavior	Disable	•
		(ОК	Cancel

The SecurityDenyAccessBehavior options are:

- Hide the button is not displayed, if the other user than the one specified in the SecurityAuthorizationName uses the DataTable control.
- Disable the button is displayed but disabled, if the other user than the one specified in the SecurityAuthorizationName uses the DataTable control.

The ButtonsConfiguration also allows the user to select for each button whether to be visible or not.



9. The DataTable control at runtime

The DataTable control displays the logged values of the selected signal in a tabular way. The control is divided in three main parts:

- options menu
- main view (grid of values)
- navigation

9.1. The options menu

	Copy Selection	This button activates only when one or more lines are selected from the data table. Copying to clipboard in Silverlight requires user permission.
X	Settings	Allows the user to set up a configuration for the DataTable control and customize its appearance.
Ø	Select time interval	Allows the user to select the time interval for displaying the data in the DataTable.
S	Print data	Allows the user to print the data from the DataTable and tweak the printing settings.
B	Export data	Allows the user to export the data from the DataTable to various file formats.





50	Load configuration	Allows the user to load a configuration from the database.
80	Save configuration	Allows the user to save the current configuration to the database.

9.1.1.Settings

The Settings window is organized in three tabs:

- Signal Columns
- Time Columns
- Common

9.1.1.1. Signal Columns

The signal management operation (add, delete, move up or down) are focused on the left side of this window, the right side displaying the signal details.

Using the bottom-left buttons the user can add, delete or move signals in the DataTable.







As the new signals are added, they will be listed above in the signals list. By selecting a signal from the list, the signal details can be edited.

Settings				X
Signal columns	Time column	Common		
Level 1		Signal settings		
MachineOP Temperature 1		Signal name:	Level 1	
		Signal description: Log name:	LogTagLevel1	_
		Column caption:	Signal name	•
		Layout		
		Alignment:	Right	•
		Column width:	190.00	*
		Appearance		
		Digits:	2.00 Automatic formatting	*: *:
		Foreground color:	Scientific format #FF000000	<u>A</u> -
		Background color:	#00FFFFF	A .
1	3			
			ок	Cancel

Signal settings:

• Signal name – the user can select the signal name by clicking the browse button. The Signal browser window will open, allowing the user to browse the connectors for signals.



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Signal browser				X
Refresh Show logs	Signal Description	Connector	Group	Name
]	.WEBfactory.Sim.DA.1	Group 1	Level 1
4 🖳 .		.WEBfactory.Sim.DA.1	Group 1	Level 2
WEBfactory.Sim.DA.1		.WEBfactory.Sim.DA.1	Group 1	MachineOP
Group 1		.WEBfactory.Sim.DA.1	Group 1	Temperature 1
		.WEBfactory.Sim.DA.1	Group 1	Temperature 1
		.WEBfactory.Sim.DA.1	Group 1	Vibration 1
Silter				
Column				
Connector 🔹				
Value				
*				
Filter	4			•
			ок	Cancel

- Signal description the description of the signal can be added here.
- Log name the name of the log assigned to the selected signal.
- Column caption the tile of the column assigned to the signals value in the DataTable.

Layout:

- Alignment allows the user to set the default text alignment throughout the table.
- Column width allows the user to set the default column width.

Appearance:

- Digits allows the user to select the number of digits for the signal values.
- Automatic formatting displays the values as they are stored in the data base. Overrides the Digits option.
- Scientific format allows the user to select the scientific representation of the values.
- Foreground color enables the user to select a custom color for the foreground of the control (text color).
- Background color enables the user to select a custom color for the background of the control.





9.1.1.2. Time Column

The Time Column tab allows the user to make layout and appearance settings for the Time column of the DataTable.

Settings			23
Signal columns	Time column	Common	
Layout			
Aligr	nment: Right	•	
Column	width:	190.00	
Appearance			
	🖌 Free	ze time column	
	🖌 Sho 🖌 Sho	v date v Miliseconds	
Foreground	color: #FF00	000 <u>A</u> -	
Background	color: #00FF	FFF A -	
			OK Cancel

Layout:

- Alignment allows the user to select the alignment of the text inside the Time column.
- Column width allows the user to select the width of the Time column.

Appearance:

- Freeze time column the time column stays fixed at the beginning of the table if the user scrolls horizontally through the table page.
- Show date toggles the date on or off.





- Show Milliseconds toggles the milliseconds on or off.
- Foreground color enables the user to select a custom color for the foreground of the control (text color).
- Background color enables the user to select a custom color for the background of the control.

9.1.1.3. Common

The Common tab offers the possibility to edit the page size and toggle on or off the DataPager.

Settings	23
Signal columns Time column Common	
C Layout	
Page size 100	
0	K Cancel





Layout:

- Show DataPager if on, this option will divide the DataTable entries in pages (the size of a page can be specified in the Page size option) and activates the navigation.
- Page size allows the user to select the maximum number of lines to be displayed in one page. The maximum number is 100.

9.1.2. Select Time Interval

When selecting the Timespan option from the Time Interval dialog, the dropdown menu will list the options for displaying the data.

Select time interv	al	23
Timespan:	Year 💌	
	fromto	
	Year	
	Month	
	Week	
	Day	
	Yesterday	
	Current day	
	Number of measurement points	
	OK Canc	el

• From...to - allows the user to select a time range using exact start and end points. The logged data (historical data) from that period will be displayed in the main graphic.

Tim	espan:	fromto			•	
Start:	3/6/201	2	▦	11:24:33 AM		▦
End:	3/6/201	2	Ħ	12:24:33 PM		▦





• Year – allows the user to select a specific year to be displayed in the timeline of the main graphic. This option will display the logged (historical) data from the whole year.

Timespan:	Year		•
	Year:	2012	

 Month – allows the user to select a specific month to be displayed in the timeline of the main graphic. This option will display the logged (historical) data from the whole month.

Month:			
4	20	12	•
Jan	Feb	Mar	Apr
May	Jun	Jul	Aug
Sep	Oct	Nov	Dec

 Week – allows the user to select a specific week to be displayed in the timeline of the main graphic. This option will display the logged (historical) data from the whole week.



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Timespan	ïmespan: Week							
	Start	day	:					
	•	1	Mar	ch, 2	2012	2	•	
	Su	Мо	Tu	We	Th	Fr	Sa	
	26	27	28	29	1	2	3	
	4	5		7	8	9	10	
	11	12	13	14	15	16	17	
	18	19	20	21	22	23	24	
	25	26	27	28	29	30	31	
	1	2	3	4	5	6	7	
l								

• Day – allows the user to select a specific day to be displayed in the timeline of the main graphic. This option will display the logged (historical) data from the whole day.

Timespar	n: 🖸	ay					
	Day:						
	•	I	Mar	ch, 2	2012	2	•
	Su	Мо	Tu	We	Th	Fr	Sa
	26	27	28	29	1	2	3
	4	5		7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
	1	2	3	4	5	6	7

- Yesterday displays the data from the day before the current day.
- Current day displays the data from the current day, up to the point representing the current time of selection.
- Number of measurements points displays the last X (value specified in the field) log recordings.



Number of measurement points	•
umber of measurement points:	
5	
	Number of measurement points

9.1.3.Print Data

The Print option allows the user to print the data content of the control, having the possibility to apply custom headers and/or footers to the page. Also, the possibility of printing the DataTable with column captions on each page is available.

		23
Header		
Show column captic Show Header	ons on every page	
	Edit header	
Footer		
Show Footer		
	Edit footer	
Advanced printing optio	ins	
🔲 Monochrome printo	ut	
Column caption:	Column appearance	÷.
	Normal	
Time	Normal	1
Time Level 1 [-]	Normal	1



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Header:

- Show column captions on every page displays the titles of the column on each printed page.
- Show Header toggles the header on or off.
- Edit header available only if the Show Header option in enabled.

Header	Height Number o	Image properties Stretch Horizontal alignment Vertical alignment				
Left section:	0 🕆 🗹 Auto	Center section	n: 0 ‡]√ Auto	Right section: Width	0 🛊 🗹 Auto	
					ОК Сапс	el

- Height the height of the header/footer
- Number of sections the number of sections the header/footer is divided in. The header/footer can have 1, 2 or 3 sections.
- inserts a page number placeholder
- *I* o inserts a total number of pages placeholder
- inserts a date placeholder
- 。 🙆 inserts a time placeholder
- 。 📓 inserts an image
- deletes an existing image
- o The width of the sections can be either set on auto or edited manually

Image properties

- Stretch extends the image accordingly to one of the following settings: None, Fill, Uniform, UniformToFill
- o Horizontal alignment aligns the image horizontally
- o Vertical alignment aligns the image vertically





Footer:

- Show Footer toggles the footer on or off.
- Edit Footer available only if the Show Footer option in enabled.

Footer					X	
	Height Number of	100 F sections 3	Image properties Stretch Horizontal alignment Vertical alignment			
Left section: Width 0		Center section: Width	्रे 🖌 Auto	Right section: Width	0 ÷ Auto OK Cancel	

- Height the height of the header/footer
- Number of sections the number of sections the header/footer is divided in. The header/footer can have 1, 2 or 3 sections.
- inserts a page number placeholder
- 。 *I* inserts a total number of pages placeholder
- 。 🗾 inserts a date placeholder
- inserts a time placeholder
- inserts an image
- deletes an existing image
- The width of the sections can be either set on auto or edited manually

Image properties

- Stretch extends the image accordingly to one of the following settings: None, Fill, Uniform, UniformToFill
- o Horizontal alignment aligns the image horizontally
- o Vertical alignment aligns the image vertically


Advanced printing options:

- Monochrome printout toggles monochrome printing on or off.
- Advanced printing allows the user to customize the appearance of each column. The options are Normal, Always Visible or Hidden.

Column caption:	Column appearance	-
Time	Normal	•
Level 1 [-]	Normal	
MachineOP [-]	Normal	
Temperature 1 [-]	Normal	-

- Normal the columns are printed normally on the page, from left to right, as the table fits to page.
- Always Visible preserves the column on each printed page. The time column can be useful when set to Always Visible.
- Hidden the hidden column is not printed.

9.1.4.Export Data

The Export Data dialog allows the user to export all or just selected data from the DataTable control in several file formats: Excel, Excel XML, Word, Csv, Html.

Export data		X
Format:	Excel •	
Data:	All	
	OK Canc	el





9.1.5.Load Configuration

Load Configuration option allows the user to load an existing configuration from the database.

3/20/2012 5:19	:30 PM	
3/20/2012 5:19	:30 PM	

The Load Configuration dialog provides a simple filtering option, the Only show own configurations. When enabled, the Load Configuration window will list only configurations owned by the current user.



9.1.6. Save Configuration

The Save Configuration option allows the user to save the current configuration to the database. The saved configuration can be loaded later using the Load Configuration option, or can be set as default user configuration at design time.

Save configuration				23
Configuration already exists				
Name	Owner	Created	Namespace	
Test		3/20/2012 5:19:30 PM		
•				•
			Delete	
Configuration name				Ξ.
		Sa	ve Cancel	





9.1.7. Editing logged values

The DataTable control allows the user to edit the logged values if the user has the required System Authorization – DataTable: Edit log values.

The Edit log values system authorization is granted Authorization Groups in WEBfactory User Manager.

Authorization Groups	🐈 New 🛛 💢 Delete		
Name Description Check acces	Name: Administratoren		
Administratoren	General Name:	Administratoren	
E 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Check access groups:		
	Write groups Alarm types AlarmGroups Pi	roject authorizations System authorizations	Access groups Scheduler locations
	✓ DataTable: Edit log values		
	✓ MaintenancePro: Allow export to Database		
	MaintenancePro: Allow import from Databa	ise	
	MaintenancePro: Use Configuration		
	MaintenancePro: Use Manager		
	MaintenancePro: View Configuration		
	🗹 MaintenancePro: View Manager		
	MessengerPro: Administrator		
	MessengerPro: Guest		
	C SconarioManagorDray Administrator		•
<pre></pre>			Save Cancel

If the user belongs to an Authorization Group that has the DataTable: Edit log values System Authorization, the DataTable values can be edited.

The edited values will not overwrite the log value, but they will be stored separately (EditedLoggingValue if the value input can be converted to double or EditedLoggingValue2 if the value cannot be converted to double).

The edited value will be visible in the DataTable control only, and will not affect the historical data represented by the Trending control. The edited values will be marked by the symbolic text FSN_DataTable_WFDataTable.editedLogValue, placed as a suffix.



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To edit logged values in DataTable, the user must be logged in the application using credentials that have the required system authorization. After logging in, the user will be able to double-click any data cell from the DataTable grid and edit the values. The editing will be confirmed upon pressing Enter.

<					
	Zeit	Level 1 [-]	MachineOP [-]		
1	06.04.2012 00:00:10.473		1,00		
2	06.04.2012 00:00:25.483		2,00		
3	06.04.2012 00:00:35.307		3,00		
4	06.04.2012 00:00:40.307		4,00		
5	06.04.2012 00:00:55.337		5,00		
6	06.04.2012 00:00:59.290		0,00		
7	06.04.2012 00:01:10.350		1,00		
8	06.04.2012 00:01:25.253		2,00		
9	06.04.2012 00:01:35.313		3,00		
10	06.04.2012 00:01:40.217		4,00		
11	06.04.2012 00:01:55.257		5,00		
12	06.04.2012 00:01:59.550		0,00		

After a value is edited, the suffix Edited (FSN_DataTable_WFDataTable.editedLogValue) will be displayed in the data cell.

0.00	4/6/2012 12:00:59.290 AM	6
2Edited	4/6/2012 12:01:10.350 AM	7
2.00	4/6/2012 12:01:25.253 AM	8

More information regarding the User Manager and System Authorizations can be found at http://webfactory-support.de/assets/documentation/Default.htm.

Click here for more information on System Authorizations and User Manager.



9.2. DataTable main view

The main view of the DataTable control consists in a grid of values logged at a specific time. The columns displayed by the grid of values are the time column and the signal columns.

The columns are customizable, the customization options being available in the Settings dialog.

	Time	Level 1 [-]	MachineOP [-]	Temperature 1 [-]		•
4	3/20/2012 5:09:30.000 PM			8.3066666666666		Ĩ
5	3/20/2012 5:09:35.000 PM			16.64	•	+
6	3/20/2012 5:09:35.350 PM		3.00			
7	3/20/2012 5:09:40.000 PM			24.9466666666667		
8	3/20/2012 5:09:40.347 PM		4.00			
9	3/20/2012 5:09:45.000 PM			16.745		
10	3/20/2012 5:09:50.000 PM			9.45333333333334		
11	3/20/2012 5:09:55.000 PM			0.600000000000001		
12	3/20/2012 5:09:55.497 PM		5.00			
13	3/20/2012 5:09:59.117 PM		0.00			
14	3/20/2012 5:10:00.000 PM			7.708333333333333		
15	3/20/2012 5:10:05.000 PM			16.0416666666666		
16	3/20/2012 5:10:10.000 PM			23.826666666666		
17	3/20/2012 5:10:10.660 PM		1.00			
18	3/20/2012 5:10:17.390 PM		1.00			
19	3/20/2012 5:10:20.000 PM			9.1666666666666		
20	3/20/2012 5:10:25.000 PM			0.808333333333334		•
			Status: Done		Number of lines: 173	34

All DataTable's columns can be sorted ascendant or descendant by clicking on the column header.

The Index column marks the line number. The total number of lines displayed by the control is listed at the bottom-right side of the main view.

The status indicator is displayed at the bottom of the main view.





9.3. DataTable navigation

The navigation controls of the DataTable are displayed only when the Show DataPager option is enabled (Settings > Common).



The navigation controls are placed below the main view (the grid of values), and allow the user to navigate through the DataTable pages.



10. Accessing the DataTable web services using HTML and JavaScript

Accessing the webservices using HTML and JavaScript is possible by using additional scripts. Follow <u>this link</u> to download the necessary scripts.

IMPORTANT: The jquery.ajaxdotnet.js script needs to be downloaded from our source. This version has an error handling bug fix which is not available in the original version of the script.

IMPORTANT: In order to work, the HTML file and the scripts need to be accessed using IIS and need to have the same protocol, host and port as the web services.

In order to access the scripts, the head of the HTML file must contain the links to the external scripts:

```
<script src="Scripts/jquery-1.5.1.min.js" type="text/javascript"/>
<script src="Scripts/json2.min.js" type="text/javascript"/>
<script src="Scripts/jquery.ajaxdotnet.3.js" type="text/javascript"/>
<script src="Scripts/knockout-2.0.0.js" type="text/javascript"/>
<script src="Scripts/helpers.js" type="text/javascript"/>
```

Besides the provided scripts, the HTML file must contain the actual code that will access the web service and retrieve the data. The web service call can be wrapped inside a function for easier usage:







The above function calls the GetLogValues method from the SignalService web service.

The GetLogValues function defined above will require additional filters in order to get the data properly from the web service:

<pre>GetLogValues({ filter:{</pre>	
	LogIDs: ["299F590C-A740-4B7C-A762-802E3F208FA5"], StartDate : {
	<pre>DateTime: new Date(1900,0,0).toMsJson(), OffsetMinutes: 0</pre>
	}, EndDate : {
	DateTime: <i>new</i> Date().toMsJson(),
	<pre>}, MarDacultar E</pre>
	SortOrder: 4
}	

The values are written in the HTML table using JavaScript:

function(result){
<pre>for(var i = 0; i<result.length;++i){ +="" +item.entriesdate+"";="" +item.values[0].editedvalue+"";="" +item.values[0].editedvalue2+"";="" ;="" <="" cells="" item="result[i];" pre="" var=""></result.length;++i){></pre>
<pre>cells += ""+item.Values[0].Value+""; cells += ""+item.Values[0].Value2+""; \$(".logValues tbody").append(""+cells+"";</pre>
};
}

If the GetLogValues method fails to retrieve the correct data, the following function executed:





The Head of the HTML file should look like this:









The body of the HTML file will contain the table:

```
<body>
 <h1>Data Table</h1>
 <thead>
    EntriesDate
      EditedValue
      EditedValue2
      Value
      Value2
    </thead>
   </body>
```

