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WinCC OA AddOn

WinCC OA message simulation

Contents

Introduction & Functionality

This document describes how to install and use the non-official AddOn "WinCC OA message simulation" for the SCADA software WinCC OA.
With this AddOn you can simulate values for analog and boolean values. The simulation can be made with a defined amount of value changes or based on the CPU-usage for the event-manager. To be able to use the simulation based on the CPU-usage you have to install the non official AddOn "WinCC OA CPU information" (available in the ETM Portal).

The common use case for this AddOn is the simulation of values if no connection to real PLCs/field devices is available or if you want to simulate a specific situation in your project. Also you could use this AddOn to check if your project and the installed hardware fulfils requirements defined by your customer, e.g. amount of value changes / second with a defined usage of ressources. With the AddOn it is possible to make NFR-tests (NFR – non functional requirements) to get operating figures for your project based on different scenarios, e.g. minimum load, average load, high load.

Please note that the described AddOn is not part of the WinCC OA standard product and is therefore not officially supported.
If you have problems with the usage of this AddOn or if you want to report an error please use the thread "Simulating values in your WinCC OA project" in the ETM Portal → Forum → Features / Solutions".
This AddOn can be used for PVSS 3.9 and newer PVSS-/WinCC OA versions on the supported platforms for Windows, Linux and Solaris x86.
To get the information which operating systems are supported for the PVSS-/WinCC OA-version you are using please have a look at the online-help: Installation → Requirements for PVSS / WinCC OA.

File list for the AddOn

In the zip-file "WinCC_OA_msg_simulation.zip" you've downloaded from the ETM Portal you'll find the following files

- dplist/WinCC_OA_msg_simulation.dpl: Datapoint-list with required datapoint-types and datapoints
- help/en_US.iso88591/WinCC_OA_msg_simulation.pdf: Documentation for the AddOn
- msg/de_AT.iso88591/WinCC_OA_tools.cat: Message catalogue (german)
- msg/en_US.iso88591/WinCC_OA_tools.cat: Message catalogue (english)
- panels/WinCC_OA_tools/WinCC_OA_messageSimulation.pnl: Main-panel for the AddOn
- scripts/WinCC_OA_msg_simulation.ctl: CTRL-script executed by a CTRL-manager

Necessary additional tools

As described in the introduction the AddOn "WinCC OA CPU information" needs to be installed when you want to use the option to simulate the values based on the CPU-usage for the event-manager.

The AddOn and its documentation can be downloaded from the ETM Portal.

Installation steps

To install this AddOn please perform the following steps

- Unzip the file “WinCC_OA_msg_simulation.zip “ to your PVSS/WinCC OA project, extract the zip file including the full path names to ensure that the files are copied to the correct directories
- Start the PVSS/WinCC OA project
- Make an ASCII-import of the file dplist/WinCC_OA_msg_simulation.dpl
- Add a new CTRL-manager to the process-list in the console with the startup parameter “WinCC_OA_msg_simulation.ctl”
- Start the CTRL-manager
- Start a user interface
- Open the panel WinCC_OA_tools/WinCC_OA_messageSimulation.pnl

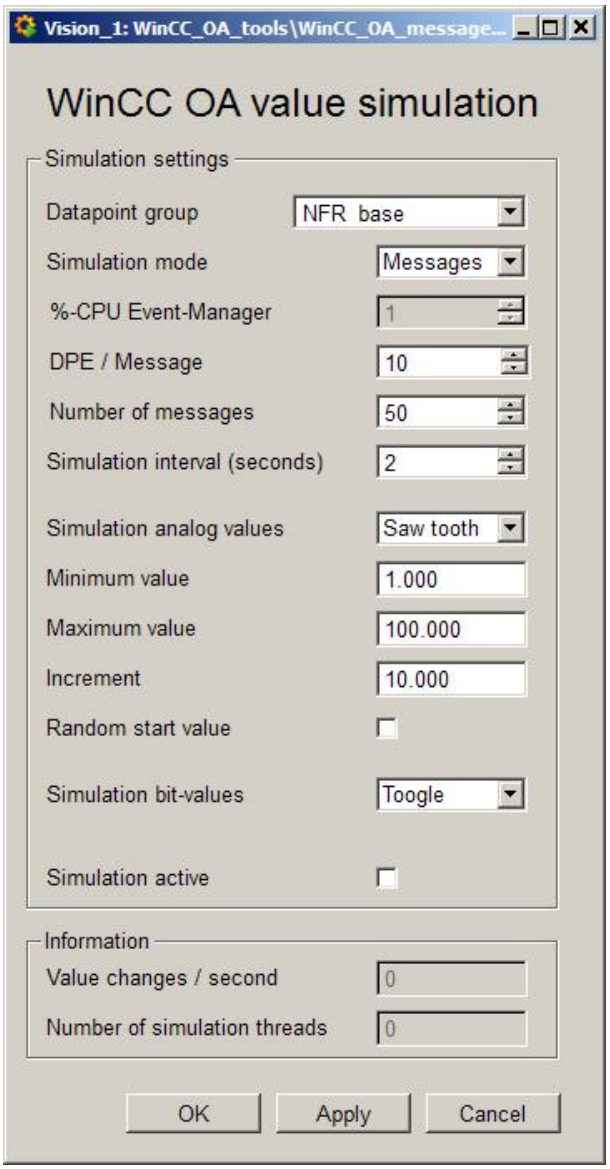
Configuration panel

With the configuration panel (see picture below) you can define the following options:

- Datapoint group: Datapoint group with the datapoint elements which shall be simulated. The configuration of the datapoint group can be done in the common way, e.g. defining a DPE-pattern and/or a list of datapoint elements.
  In a distributed system only datapoint elements for the own system will be simulated.
- Simulation mode: The selection mode can be selected, the options “Messages” or “CPU” are possible. If the option “Messages” is selected you can define a fixed amount of messages. When you have selected “CPU” the necessary amount of messages is calculated based on the CPU-usage for the event manager.
  Please note that it can take some time until the simulation is running stable when the option “CPU” is selected. The amount of messages is modified stepwise automatically until the defined limit for the CPU-usage is reached.
- %-CPU Event-Manager: If the option “CPU” is selected this object is set active and the limit for the CPU-usage can be defined.
- DPE / Message: With this option you can define how many datapoint elements shall be set within one simulated message.
  Information: A PVSS/WinCC OA driver may also include several datapoint elements in one message if the value changes from the PLC have the same time.
- Number of messages: If the option “Messages” is selected this object is set active and the amount of messages can be defined.
- Simulation interval (seconds): With this option you can define in which interval the datapoint elements (defined for the datapoint group) shall be set. To avoid peaks in the simulation a random delay is used before the first message is sent for every simulation thread. The number of simulation threads is defined with the parameter “Number of messages” or calculated automatically based on the CPU-usage.
- Simulation analog values: This option defines the type of simulation for analog values. There are 3 options available: Ramp, Saw Tooth, Random
- Minimum value: Minimum value for the simulation of analog values
- Maxmimum value: Maximum value for the simulation of analog values
- Increment: Defines the difference between two value changes.
- Random start value: If this option is set the simulation starts with a random value for every analog datapoint element (defined for the datapoint group). If the simulation type “Random” is used this option is always set.
- Simulation bit-values: This option defines the type of simulation for boolean values. There are 4 options available: Toggle, Always 0, Always 1, Random.
- Simulation active: Option to activate/deactivate the simulation functionality

The panel also shows the information for the current simulation:

- Value changes / second: Number of value changes / second based on the current state of the simulation.
- Number of simulation threads: If the simulation mode “Messages” is used the value is equal to the value defined for the option “Number of messages”. In case of the simulation based on the CPU-usage the current number of simulation threads is displayed.
  For the simulation the CTRL-script is starting CTRL-threads (CTRL-function startThread). Every thread gets a list of datapoint elements. Those elements are then set within one message in the given interval. If the simulation based on the CPU-usage is chosen the CTRL-script modifies the number of necessary threads on its own (CTRL-function startThread and stopThread).



Screenshot of the configuration panel WinCC_OA_tools/WinCC_OA_msg_simulation.pnl

Usage

To activate the message simulation please perform the following steps:

- Select the datatpoint group with the datapoint elements for the simulation
- Define the simulation mode
- Define the limit for the CPU-usage or the number of messages based on the settings for the simulation mode
- Define the number of datapoint elements set within one message
- Define the simulation interval
- Select the simulation type for analog values
- Define the settings for the analog values: minimum value, maximum value, increment
- Activate/deactivate the option to use a random start value
- Select the simulation type for boolean values
- Activate the option to start the simulation, the current settings are saved automatically.

If you only want to save the settings you can click the “OK” or “Apply” button. When the “OK” button is clicked the panel is closed afterwards.

Additional information

If the calculated amount of value changes (number of DPE/messages multiplied with the number of simulation threads) exceeds the number of datapoint elements defined for the datapoint group the same datapoint elements will be used in one or more simulation threads. Therefore it can happen that the datapoint elements are changed in a shorter interval than defined with the parameter “Simulation interval”.

As the value simulation is made with a CTRL-script and not with a driver/simulation-driver the driver related configs (smoothing _smooth, message conversion _msg_conv) and their functionality is not used during the simulation.

If you want to simulate a very high load you should set several datapoint elements within one message, e.g. 50 - 100 DPE / message. Otherwise the number of necessary simulation threads will be too high and the CPU-usage for the control manager (for the simulation) will reach the system limits.

If the simulation mode “CPU” is selected only the CPU-usage for the event manager is used for the calculation of necessary simulation threads. You have to check on your own if other processes (data-manager, archive-managers, CTRL-manager) reach the system limits. When the limits are reached you have to modify the settings for the simulation to get below the limits.

Please note the maximum amount of value changes which can be handled by a system depends on a lot of factors: hardware, operating system, project configuration (single/redundant, database configuration, active query-connects, ...). Therefore ETM cannot give you information about the performance limits for your project/configuration.

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