SIEMENS

WinCC OA AddOn

WinCC OA CPU information

Contents

Introduction & Functionality

This document describes how to install and use the non-official AddOn "WinCC OA CPU information" for the SCADA software WinCC OA.
With this AddOn you can trace the CPU- and memory usage for processes started on a server in your WinCC OA project by the process monitor (PVSS00pmon, WCCILpmon). Processes which are started without reference to the process monitor or on a client-computer cannot be added to the list of monitored processes.
The results are written to a report-logfile and also to specific datapoint-elements.

The common use case for this AddOn is tracing the CPU and memory usage of your project in different situations and load scenarios when doing NFR-tests (NFR – non functional requirements), e.g. minimum load, average load, high load. Also you can check if the installed hardware is suitable for the project and if no system limits are exceeded. In long-time tests you can also proof if the the memory usage is constant and not increasing during runtime. The AddOn can also be used for analyzing purposes if problems with the CPU- and memory usages occur occasionally in your project.

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 "Tracing the CPU and memory usage 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_CPU_information.zip" you've downloaded from the ETM Portal you'll find the following files

- dplist/WinCC_OA_CPUinfo.dpl: Datapoint-list with required datapoint-types and datapoints
- helpen_US.iso88591/WinCC_OA_CPU_information.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_PMonInfo_CPU.pnl: Main-panel for the AddOn
- panels/WinCC_OA_tools/WinCC_OA_PMonInfo_CPU.pnl: Reference-panel
- scripts/WinCC_OA_CPU_usage.ctl: CTRL-script executed by a CTRL-manager
- scripts/libs/WinCC_OA_getPMonInfo_CPU.ctl: CTRL-library with necessary functions

Necessary 3rd party software

To be able to use this tool on a Windows operating system you have to download and install the PSTools-toolkit.
It can be downloaded from the Microsoft Technet-server (see following link):
http://technet.microsoft.com/en-us/sysinternals/bb896649.aspx

On Linux and Solaris systems it is not necessary to install additional tools.

Installation steps

To install this AddOn please perform the following steps

- Unzip the file "WinCC_OA_CPU_information.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

- Windows only: Unzip the zip-file "PSTools.zip" to the folder <PVSS-/WinCC OA-project>/data/PSTools

- Start the PVSS/WinCC OA project

- Make an ASCII-import of the file dplist/WinCC_OA_CPUinfo.dpl

- Add a new CTRL-manager to the process-list in the console with the startup parameter "WinCC_OA_CPU_usage.ctl"

- Start the CTRL-manager

- Start a user interface

- Open the panel WinCC_OA_tools/WinCC_OA_PMonInfo_CPU.pnl

Configuration panel

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

- PMon-User: Username for the process-monitor, it is only necessary if you have defined a Pmon-user for this project

- PMon-Password: Password for the process-monitor, it is only necessary if you have defined a Pmon-user for this project

- Process list: List of processes managed by the process monitor, in a redundant system you'll see a tab for server1 and a tab for server2. The selection has to be made for every server.

- Directory: Directory where the logfiles created by the AddOn shall be written to. Into this directory the report-logfile and temporary files will be written. Please note that the operating system user which is starting the project must have write permission for the configured directory.
If no path is defined the directory <project-path>/data will be chosen automatically when opening the panel.

- Report interval (seconds): Interval used for calculation and recording the CPU-/memory usage

- Logfile separator: Separator for the columns in the report-logfile

- Record CPU-idle: Option to record also the CPU-idle information

- Record MSG-information: Option to write the information for the MSG-simulation to the report-logfile. This option can only be used when using the AddOn "WinCC OA value simulation" (available on the ETM Portal).

- Cyclic reporting active: Option to activate/deactivate the reporting functionality

Screenshot of the configuration panel
WinCC_OA_tools/WinCC_OA_PMonInfo_CPU.pnl

Usage

To record the CPU- and memory usage please perform the following steps:

- Select the processes in the process list by checking the option in the column "Selection"
- Define the directory for the report-logfiles
- Define the interval
- Define the separator for the report-logfiles
- Activate/deactivate the option to record the CPU-idle information
- Activate/deactivate the option to write the MSG information to the report-logfile
- Activate the option to start the cyclic reporting, 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.
When using this functionality for the first time on a Windows operating system you have to confirm a dialog which is opened when the programs for the PSTools-toolkit are started.

Recorded information

If the reporting functionality is activated the CPU- and memory information is calculated and recorded in the given interval. The information is written to a report-logfile and to some datapoint-elements.
In the directory for the report-logfiles a new subdirectory is created whenever the functionality is activated. The name of the directory contains the following information <date_time_computer name>, in detail the directory name is YYYYMMDD_hhmmss_<computer name>.
This directory then contains a lot of files, depending on the configuration you've made. All files which contain the name "pslist", "tmp" or "stat" are temporary files which are necessary to store the information read from the operating system and to calculate the required values.
For reporting purposes you can use the following files:

- ReportFile.log: contains the complete information for the selected processes. For every calculation interval a new line is written. At the beginning of the file a header is written to describe which information is saved in every column. The separator for the columns is defined in the panel.

- <Process name>_CPU.log: These files contain the information only for the process given in the filename. The process name can be a PVSS-/WinCC OA process name or "Idle" if you have activated the option to record the CPU-idle-information. For every calculation interval a new line is written. At the beginning of the file a header is written to describe which information is saved in every column. The separator for the columns cannot be defined in the panel.

- SystemInfo.txt: This file contains basic information for the computer where the functionality was activated. The basic information consists of the hostname, installed operating system, specification of the CPU (type, number of cores including virtual cores), amount of physical memory. The format of the information stored in the file is different for Windows, Linux and Solaris because every operating systems reports this information in its own format.

The recorded information is also written to datapoint-elements. With the ASCII-file the datapoint-type NFR_ProcessInfo and the master-datapoint _mp_NFR_ProcessInfo is created. On the master-datapoint an _archive-config is added to the elements "CPU_Percent" and "Memory". With the default settings the archivation is done into the value_archive VA_0000. If you want to store the information into another archive please modify the master-datapoint and apply the changes to all datapoints.
When a process is selected in the process-list the necessary datapoint is created automatically.
The naming convention for the datapoint is <name of the PVSS-/WinCC OA-executable>#<manager number>, e.g. WCCOActrl#3. For processes which can only be started once in a project no manager number is given, e.g. WCCILevent. When the option to record the CPU-idle information is activated the datapoint "Idle_CPU" is created to store the information.

The datapoints for this datapoint-type have 2 elements

- CPU_Percent: used CPU-time for the last interval
- Memory: current memory usage

Enclosed you'll find an example for the information written to the report-logfile. The example contains the following information (as described in the header information): Time, %CPU and memory for the data- and event-manager, idle CPU-information.
The header is also included in the example, as separator the ";"-character was chosen.

```
Time;PVSS00data - %CPU;PVSS00data - Memory;PVSS00event - %CPU;PVSS00event - Memory;Idle - %CPU
2013.09.05 09:53:10.000;8.44;16832;6.24;14800;86.13
2013.09.05 09:53:20.000;7.36;16936;6.87;14904;82.02
2013.09.05 09:53:30.000;6.55;16884;4.21;14852;86.69
2013.09.05 09:53:40.000;6.86;16884;5.29;14852;85.47
```

Additional information

In a multi-core machine the calculated values for the CPU-usage of a single process always refer to the CPU-usage on a single core. Therefore you can get the result that an addition of all calculated values for the CPU-usage is higher than 100%. How many cores are installed/configured (Hyper-Threading) is detected automatically by the AddOn, there is no additional configuration necessary.

If you want to compare the calculated results with other operating system tools you have to be careful.
On Windows there are several tools available to get the CPU-usage for a specific process.
To get the „real"-value for the CPU-usage you have to use the Windows Performance Monitor (perfmon.exe).
When using the task-manager you might get incorrect results when using a multi-core machine and/or if Hyper-Threading is activated. Then you have to multiply the result of the CPU-column („Processes"-tab) with the number of cores.
E.g.: If the task-manager shows a CPU-usage of 5% for a process on a 4-core CPU with activated Hyper-Threading (4 real + 4 virtual cores) the „real"-value is 40% (5%x8).

On Linux and Solaris systems you also have to look how the system tools are calculating the CPU-usage to be able to compare the values.

Windows only: When the commands from the PsTools-toolkit (pslist, PsInfo) are started you'll see an output referring to copyright information for "SysInternals". This information written to the logfile for the CTRL-manager (starting the script WinCC_OA_CPU_usage.ctl) can be ignored.

When using Windows 8 we have detected problems with the tools included in the PsTools-toolkit or other system commands, e.g. tail. If the commands are called very often it can happen that they stop working. To get rid of this problem the computer has to be rebooted.

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