



TrendWorX64 Viewer

CPU Usage and Overall Performance Optimization



APPLICATION NOTE

September 2013

Description: Guide to TrendWorX64 Viewer optimization.

OS Requirement: Vista x64/ Windows 7 x64/ Windows 8 x64/ Windows Server 2008 x64/ Windows Server 2008 R2 x64/ Windows Server 2012.

General Requirement: Installation of GENESIS64 or Hyper Historian v10.8, large amount of historical data logged.

Introduction

TrendWorX64 Viewer has an ability to replay large amounts of historical data in many pens. However, when replaying large periods from the history, the viewer could be overloaded by too many requested samples. In such cases its parameters must be correctly set to replay data smoothly and without any lag. We will focus namely on ICONICS Hyper Historian as the source of OPC historical data in this application note.

This application note will cover historical data replay optimization for cases such as:

- TrendWorX64 Viewer consumes considerable amount of CPU performance.
- Replying raw data from an OPC historian.
- Replying raw OPC historical data for multiple pens.
- Replying large amounts of collected samples per a single historical tag.

Graphic Optimization

There are a couple configuration tips you can use to optimize the graphical display.

- **Viewer size** - You can improve the performance such as Viewer response period time by decreasing the Viewer size.
- **Use High Performance Mode** - There is a special option in the Chart → Advanced menu called "Use High Performance Mode". Enabling this feature will disable the Anti-aliasing filter during data display, which significantly influences the CPU usage in TrendWorX64 Viewer runtime mode, chart initialization time when using multiple pens, or when the chart is running in "full screen" mode.

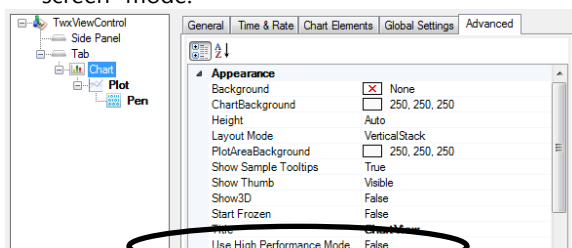


Figure 1 - Advanced Trend Viewer Properties

Time Optimization

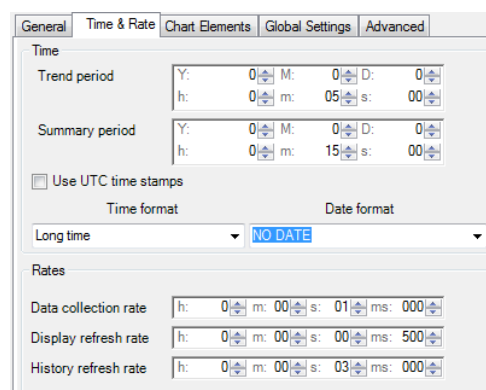


Figure 2 - Time & Rate Properties

- **Trend Period** – Shortening the Trend Period (the period of displayed history) will affect the overall performance of TrendWorX64 Viewer, including CPU usage, memory usage, chart data initialization time and chart refresh time (under high CPU load) as well as chart manipulation response time.
- **Data collection rate** – For real-time pens, the data collection rate is how often the OPC server should send updates. For historical pens with a filter such as Interpolative, it determines how often a sample should be drawn. For example, with a five minute trend period and a data collection rate of 1 minute you will should have five samples drawn for real-time or filtered historical pens. Slower rates make for faster updates between the server and client and fewer samples drawn, which leads to better performance.

NOTE: The data collection rate does not affect historical pens with no filter (raw data).

- **Display refresh rate** – Configuring this type of rate to be slower will affect the CPU usage when the viewer is in the runtime state and displaying data.
- **History refresh rate** – Under some conditions this rate is modified automatically by the viewer to prevent overloading of the client-server communication. This time defines how often the TrendWorX64 Viewer will retrieve the historical data.
- **Optimize History Refresh** – This option can be found in the Advanced tab of the chart object. When enabled, it will automatically adjust the frequency of the historical data refresh.



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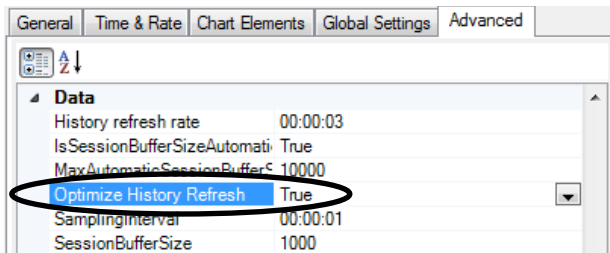


Figure 3 - History Data Refresh

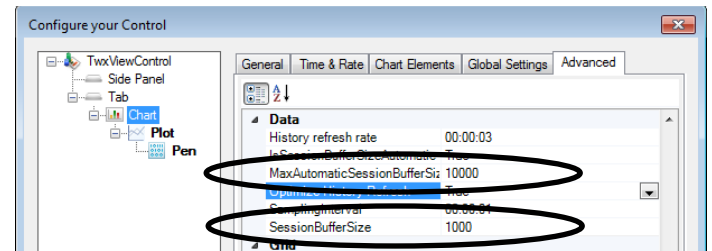


Figure 5 - Setting Buffer Sizes

Sample and Buffer Optimization

Max. samples – This “Single Pen Buffer” defines the maximum number of samples that will be displayed for this particular pen. It can be defined only when the “(raw data)” Aggregate type on the pen is selected. If this value is set too small, not all data will be displayed. The Pen Status field in the legend will say, “Not all data is visible, because the buffer is too small.” This number should be configured large enough to show all samples for a pen, but be aware that the more samples shown the more resources the TrendWorX64 Viewer will consume. This setting is designed to prevent the TrendWorX64 Viewer from freezing or having other problems in case the range is set wide enough to cause a “raw data” pen to retrieve far too many samples for the system to handle.

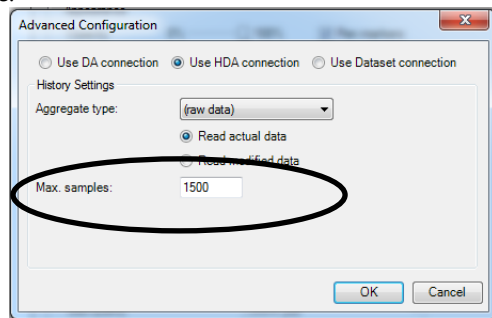


Figure 4 - Limiting Maximum Samples

- **SessionBufferSize** – This number defines the buffer size used for a pen when caching data. Setting this limitation will greatly affect the CPU usage when displaying and replaying data. However, this buffer size is accepted only when “IsSessionBufferSizeAutomatic” is set to **False**. Otherwise, the following automatic buffer will be accepted.
- **MaxAutomaticSessionBufferSize** – This buffer is the maximum sample count that an aggregate can use when drawing the particular pen after all values are calculated according to the currently applied aggregate type. Configuring this number will strongly affect the overall CPU usage when using aggregate pens.

Aggregates

There are many types of aggregation you can select and each of them has a different influence on data replaying performance. For example these are the most common used aggregates: **Interpolative, Minimum, Maximum, Average, Start** and **End**.

Aggregates provide a way to display a pen without drawing every individually plotted sample, and are useful when your raw data collection rate would cause an extremely large number of samples to be drawn (such as trying to display a year’s worth of data that has a sample logged once every second). You can limit the Aggregates buffer size to tune up the performance and make the performance replaying process less CPU and memory consuming.

Interpolative, Minimum, and Maximum are the fastest aggregates so they should be used for very large replaying periods.

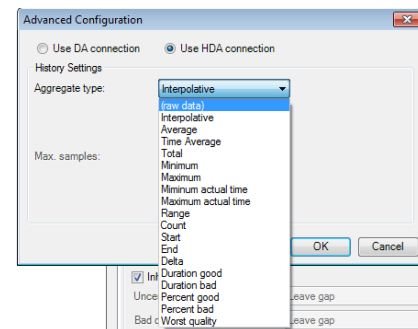


Figure 6 - Available Aggregates

For more details about ICONICS Hyper Historian aggregates please refer to the Hyper Historian help documentation or Application notes.