Intel® SoC Watch for Windows* OS 2.6.1

Release Notes

03 May 2018

Version History

These are the main releases of Intel SoC Watch:

Date	Revision	Description
November, 2017	2.4	First release that aligns all command line parameters and output formats across all supported operating systems.
December, 2017	2.4.2	Update release, includes support for Intel platforms code named Apollo Lake (new stepping) and corrected console message order when using delayed start option.
February, 2018	2.5	Includes support for Intel platform code named Gemini Lake and other fixes.
April, 2018	2.6	Enhancements include new hot key Alt-S, new --log option, modified metric groupings, and improved support in gfx metrics.
May, 2018	2.6.1	Update release.

Intended Audience

Use this document if you use Intel SoC Watch to analyze power consumption on a Windows* system.

Customer Support

For technical support, including answers to questions not addressed in this product, visit the technical support forum, FAQs, and other support information at: https://software.intel.com/en-us/intel-system-studio-support or contact IntelSystemStudio@intel.com.

Contents:

1   Introduction

Intel SoC Watch is the data collector for power-related data to debug blockers to low power sleep states. The metrics it captures include system sleep states, CPU and GPU sleep states, processor frequencies, temperature data, and device sleep states among others. The collected data can be correlated and visualized over time using the Intel® VTune™ Amplifier.

This document provides system requirements, installation instructions, issues and limitations, and legal information.

To learn more about this product, see:

- New features listed in the New in this Release section below
- Reference documentation listed in the Related Documentation section below
- Installation instructions can be found at: Installation Notes

2 New in This Release

Update release v2.6.1 includes the following.

- **Modified --version option output.**

Release v2.6 includes the following:

- **Added option to log console output to a file.** Use option `--log <filename>` (short name `-l`) to log all console messages to a file.
- **Added explanatory note to reports containing the *Unknown* value.** For `-f hw-cpu-cstate` and `-f hw-cpu-pstate`, CPU C-State and CPU P-State reports now include a note explaining the meaning of the *Unknown* value that may appear in these reports. The residency table note is: *"Unknown" state occurs when the system enters a platform idle state (ACPI S3 or S4)*. The wakeup table note is: *"Unknown" wakeups mean the CPU wakeup reason could not be attributed to a known cause*.
- **Added driver version to the summary report header.** Summary reports now include the version of the Intel SoC Watch driver used to collect the data in addition to the application version number.
- **Added Alt-S as a hot key alternative to Ctrl-C for Windows 10 Desktop OS.**
- **Removed several OS-based features from the -f sys group.** The OS-based features which had a comparable hardware data (os-cpu-cstate, os-cpu-pstate, os-gfx-cstate) were removed from the group *sys*. Processing the OS-based ETL trace data is very time consuming for longer collections and often users do not need these OS-based metrics since the hardware metrics are more accurate. Removing these from the commonly used *sys* group reduces post-processing time and file size. Both OS and hardware based metrics are still included in the *cpu* and *gfx* group names, or can be explicitly added to the command line using their individual feature names.
- **HWP reporting is no longer included in the hw-cpu-pstate feature.** The `-f hw-cpu-pstate` feature now collects only Core P-state frequencies to allow finer-grained selection of which data to collect. Use the new feature `-f hw-cpu-hwp` to collect the HWP Guaranteed, Highest, Lowest, Most-Efficient Performance summary reports. The HWP feature is still included in the *sys*, *cpu*, and *cpu-pstate* groups.

3   Fixed Issues

Update release v2.6.1 has a fix for the below issues.

- **Occasionally cpu-gpu-concurrency data sums to >100%.** This occurs when hardware over counts. SoC Watch now checks the timestamp delta and adjusts for over counting.
- **Removed trailing hyphen from report titles in the trace output** (e.g., Graphics Active State).
- **Large collection durations specified with -t option are now handled correctly.** Previously, a time value > 2^{16} would be truncated.

Release v2.6 has a fix for the below issues.

- **Gfx C-State Residency report was missing for short collections.** If the GPU was inactive during the entire collection period the Gfx C-State Residency report would not appear in the summary file because no valid C-states are collected. Now `-f hw-gfx-cstate` will report a message in the report rather than omit the report entirely. The message is*: Note: GPU was inactive during the entire collection. No valid gfx-cstate values were collected*.
- **Using -f hw-cpu-cstate feature with --polling option when collecting on a multi-socket server platform like SKX resulted in erroneous data reporting.** The problem has been fixed.
- **Summary totals reported by Intel® VTune™ Amplifier were different than what was found in the Intel SoC Watch summary report due to lost precision during the import of the trace data.** The problem is fixed but requires the new .pwr files to be visualized using VTune Amplifier 2018 Update 2 or newer. If still using an older version of VTune Amplifier you will need to set environment variable *PW_ENABLE_LEGACY_VTUNE=y* before generating the .pwr file to be able to import it (reverting to loss of precision in the total values).
- **The console message indicating the data output was written to the result files is now written after completion of writing to that file**.
- **ACPI D-State Residency report no longer contains same device ID twice in the report as seen on some systems.** Running collections for more than 30 minutes on systems with 3rd-party devices could result in the same device appearing twice in the ACPI D-State Residency report generated by -f acpi-dstate. Intel SoC Watch now handles the case when more than one ETL rundown event occurs for a device.

4   Known Issues

This release contains the following known issues.

- **Metrics report Unknown 0 and do not sum to total collection time when -m is not used and hibernation occurs.** Metrics with a snapshot default collection mode, such as CPU C-state, will show the *Unknown* state with 0 time and the remaining states will not sum to the total collection duration if the system entered hibernation during the collection and the `-m` option was not specified. The snapshot metrics are only collected at the start and end of a collection by default, but finding hibernation time requires samples taken throughout the collection - including `-m` will cause continuous sampling to occur for all metrics. When hibernation occurs, a message reporting time spent in hibernation appears at the beginning of the summary report. The *Unknown* state is then included for all appropriate metrics and the time in hibernation is included in that state. Refer to the Intel SoC Watch User's Guide *Options Quick Reference* section to learn which metrics have a snapshot collection mode by default.
- **Syntax errors in the command line may not report a visible error message**. If a collection did not run and you are not seeing any error message, add option `-d 2` to your command line to get more information.
- **Insufficient system resources error seen on occasion when collecting OS event trace metrics such as acpi-dstate.** The system error "*WARNING: Cannot enable provider in the trace file <etl filename>*" has been reported when collecting metrics that enable event trace logging. This error prevents ETL logging from being started and is usually caused by a background process consuming system resources. Use Task Manager to find and remove such processes then try the collection again.
- **Hyper-V and Virtualization-based Security (VBS) prevent some metrics from being collected**. Intel SoC Watch detects when Hyper-V and Virtualization-based Security is enabled on the platform, reports a warning message on the console and disables metrics that are blocked by these settings. When Hyper-V and VBS are enabled then `cpu-gpu-concurrency` cannot be collected.
- **Total DDR bandwidth does not include EDRAM**. On systems using EDRAM, the `ddr-bw` feature report may have a discrepancy between the total data read and writes and the total component requests. The Data Reads+Data Writes will be significantly higher than the total IA+GT+IO requests, because the EDRAM requests are not included.
- **Collection on Windows* Server 2016 OS will result in failure to load the Intel SoC Watch driver if Secure Boot is enabled on the platform.** The workaround is to disable Secure Boot. The problem on Windows 10 client OS was resolved.
- **If a command window is closed (using either the X button or Alt-F4) while the socwatch process is running, or the Task Manager is used to kill the socwatch process, then the behavior of a subsequent run of Intel SoC Watch becomes unknown.** The proper way to terminate Intel SoC Watch is using Ctrl-C. A collection driver may be left in an undefined state when Intel SoC Watch is abruptly terminated because there is no OS event to allow proper cleanup. This can cause the next Intel SoC Watch collection to result in anything from bad data to a system crash. If a driver is left running, it must be removed. You can reboot the system to clear a driver or use the following set of commands to check if the driver is running, stop it, and then delete it: `sc query socwatchdrv; sc stop socwatchdrv; sc delete socwatchdrv`.

- **OS-based CPU P-state report does not support platforms with > 64 logical processors.** The hardware-based P-state report is correct. The problem is in the OS event trace which provides state changes for only a partial set of logical processors when the platform is configured for more than 64 logical processors. When this situation occurs, a warning message is printed in the report indicating which processors have no OS P-state change events.
- **Issues on Intel platforms code named Apollo Lake and Gemini Lake:**
    - **Memory bandwidth and memory self-refresh metrics not available.** The following features are not supported: ddr-bw, cpu-ddr-bw, cpu-ddr-mod0-bw, cpu-ddr-mod1-bw, disp-ddr-bw, isp-ddr-bw, gfx-ddr-bw, io-bw, all-approx-bw, dram-srr.

5 Related Documentation

The below documents are available with this release.

- Intel® SoC Watch for Windows* OS User's Guide
- <u>Energy Analysis help</u>

6   Where to Find the Release

Go to the Intel® System Studio website to get either an Evaluation (30-day trial release) license or a commercial license, and download the package from Intel Registration Center.

7   Release Content

Intel® SoC Watch for Windows* OS User's Guide
Intel® SoC Watch for Windows* OS Release Notes
Intel® SoC Watch for Windows* OS executables

8   System Requirements

Supported Architectures and Terminology

Intel SoC Watch supports the following Intel microarchitecture and platform code names:

- Apollo Lake
- Gemini Lake
- Skylake
- Kaby Lake
- Coffee Lake

Minimum System Requirements

This tool can be run on the Windows* 8.1 and Windows 10 (desktop) 64-bit operating systems, with administrator permissions.

9   Installation Notes

Intel SoC Watch for Windows* OS is installed as part of Intel System Studio when downloaded to a Windows host system.

Default Installation Folders

The default top-level installation folder for this product is:

```
C:\Program Files (x86)\Intel\SoCWatch
```

If you are installing on a system with a non-English language version of Windows OS, the name of the `Program Files` folder may be different. On Intel® 64 systems, the directory name is `Program Files (X86)` or the equivalent.

Installing on a Remote Target

You can install Intel SoC Watch on a remote Windows system. Detailed instructions are available from https://software.intel.com/en-us/socwatch-help-preparing-a-target-windows-system-for-energy-analysis.

Changing, Updating, and Removing the Product

If you want to add or remove components from an installation, open the Control Panel, select the Add or Remove Programs applet, select Intel System Studio, and click **Change**. To remove the product, select Intel SoC Watch and click **Remove**.

When installing an updated version of Intel SoC Watch, any previously installed version will automatically be removed.

10 Acronyms and Terms

The following acronyms and terms are used in this document (arranged in alphabetic order):

Acronym/Term	Description
SoC	System on Chip

11 Legal Information

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