Release Notes

11 August 2016
## Version History

These are the main releases of Intel SoC Watch:

<table>
<thead>
<tr>
<th>Date</th>
<th>Revision</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>June, 2016</td>
<td>1.15.2</td>
<td>Bug fix for Hyper-V enabled platforms to get CPU C &amp; P states.</td>
</tr>
<tr>
<td>May, 2016</td>
<td>1.15</td>
<td>Adds individual timelines for more metrics and Intel server platform code name Skylake support for more than 64 processors.</td>
</tr>
<tr>
<td>Mar, 2016</td>
<td>1.14.1</td>
<td>Adds microseconds to collection start time display and fixes bugs.</td>
</tr>
<tr>
<td>Feb, 2016</td>
<td>1.14</td>
<td>Adds HWP support, snapshot collection for more metrics, and other improvements.</td>
</tr>
<tr>
<td>Nov, 2015</td>
<td>1.13</td>
<td>Modified Core P-state HW report and GT C-state residency calculations on Core platforms, plus other improvements.</td>
</tr>
<tr>
<td>Sept, 2015</td>
<td>1.12</td>
<td>Adds support for per process breakdown of CPU activity and frequency utilization in the following reports: Top 5 Processes by Platform Busy Duration, Processes by Platform Busy Duration, Kernel Modules by CPU Busy Duration, Processes by P-state Residency (OS), DPC Statistics, and ISR Statistics.</td>
</tr>
<tr>
<td>August, 2015</td>
<td>1.11.2</td>
<td>Update release that includes bug fixes.</td>
</tr>
<tr>
<td>August, 2015</td>
<td>1.11.1</td>
<td>Update release that includes multiple bug fixes and addition of a D-state OS timeline. Also removed the Intel Energy Profiler Visualization Guide.</td>
</tr>
<tr>
<td>June 2015</td>
<td>1.11</td>
<td>This release adds support for the Intel platform code named Skylake, top 5 active processes summary, and an option for controlling bucket sizes used in idle analysis. Also includes bug fixes.</td>
</tr>
<tr>
<td>May, 2015</td>
<td>1.10.3</td>
<td>Update release that includes fix for problem seen on pre-release Windows*10 OS builds &gt;10041 where data was not collected during context-switch points (default mode).</td>
</tr>
<tr>
<td>Mar, 2015</td>
<td>1.10.2</td>
<td>This update to v1.10 adds support for DRAM self-refresh, bandwidth and bandwidth approximation on Intel platform code named Cherry Trail and includes the fix for the high overhead in C-state residency seen on Windows 10 Tech Preview builds greater than 10009.</td>
</tr>
<tr>
<td>Feb, 2015</td>
<td>1.10</td>
<td>This release includes fixes for GT-C State reporting huge value and collection failure for Windows 10 OS technical preview builds &gt; 9901.</td>
</tr>
<tr>
<td>Jan, 2015</td>
<td>1.9.1</td>
<td>This update to v1.9 fixes the following two issues observed after its release.</td>
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<tr>
<td></td>
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<td>• Exception occurring when output option -r sww is used when the only metric collected is CPU P-states (-f cpu-pstate).</td>
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<tr>
<td></td>
<td></td>
<td>• Random crash occurring on Intel platforms code named Cherry Trail, Braswell, and Bay Trail.</td>
</tr>
<tr>
<td>Dec 2014</td>
<td>1.9</td>
<td>This release adds support for pre-release Windows 10 OS, includes polling mode option for data collection, adds precise entry/exit points for Connected Standby, fixes issues, and adds support for Intel platforms code named Cherry Trail and Skylake.</td>
</tr>
<tr>
<td>Aug 2014</td>
<td>1.8.1</td>
<td>This release reports more details on bandwidth, frequency, and interrupt statistics and fixes several issues observed in the previous release.</td>
</tr>
<tr>
<td>Aug 2014</td>
<td>1.8</td>
<td>This release introduces support for GPU metrics, revises the energy feature, adds time and collection statistics to the summary report, and offers new flexibility in limiting overhead and customizing reporting for your workload.</td>
</tr>
</tbody>
</table>
### 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](https://software.intel.com/en-us/intel-system-studio-support) or contact IntelSystemStudio@intel.com.

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<tr>
<td>June 2014</td>
<td>1.7</td>
<td>This release includes improvements to the energy report to replace the battery summary, detailed IPI statistics in the wakeup report, and several improvements to the summary report.</td>
</tr>
<tr>
<td>March 2014</td>
<td>1.6</td>
<td>This release enables graphical visualization of Intel® SoC Watch for Windows® OS trace data using Intel® VTune™ Amplifier for Systems data rendering capabilities and introduces SoC memory bandwidth and self-refresh metrics.</td>
</tr>
<tr>
<td>Feb 2014</td>
<td>1.5</td>
<td>This release includes support for Intel platforms code named Broadwell, a new concurrency report, and a fix for handling missing BIOS P-state data.</td>
</tr>
<tr>
<td>Dec 2013</td>
<td>1.4</td>
<td>This is the first external release of Intel® SoC Watch for Windows® OS platform power analysis tool.</td>
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1 Introduction

Intel SoC Watch is the data collector for power-related data including C/P/D/S-state residencies, temperature, energy consumption, and the idle and wakeup behavior. The collected data is used by the Intel® Energy Profiler. Use the Intel Energy Profiler bundled with Intel VTune™ Amplifier for Systems to visualize power-related data and understand how to improve efficiency of energy usage.

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

Release v1.16 includes the following new features.

- **Adds support for Intel platforms code named Kaby Lake and Apollo Lake.**
- **Modified report for D-state feature (acpi-dstate) as follows:**
  - List of devices is now filtered to show only selected ACPI devices. To get the complete device list use --no-device-filter option.
  - **Device ID is now reported as a hexadecimal value.** The Device ID shown used to be unsigned long, but is now shown as a hexadecimal value to be consistent with other tools.
  - **F-state report is separated from the D-state residency report.** Previously the component F-states were embedded within the D-state report.
  - **A separate timeline file for F-states is now written when a detail result is requested.** The F-states are written to _osdevice_fstate_tl.csv, whereas previously they were not included in a timeline report.
- **Dynamically turns off/on collection of gfx-cstate and gfx-pstate across connected standby.** Intel SoC Watch now stops collection of gfx-cstate and gfx-pstate when the display shuts off (an indicator of entry to connected standby) since collection of those metrics across connected standby can crash the system. When the display turns on again, collection of those metrics is resumed and the before and after metrics are summed when generating the residency reports. A warning message that the display turned off during collection is included in the reports of these metrics.
  (Note that Intel SoC Watch does not generate correct reports if a system enters hibernation. The reports will contain wild data due to counters being reset.)
- **Console output improved.** Now displays actual feature names that can be collected rather than descriptive name.
3 Fixed Issues
Release v1.16 has the fix for the below issue.

- **Fixed error in F-state residency calculation.** Previously always reported 100% residency in the final state read.
4 Known Issues

This release contains the following known issues.

- **System crash on some Intel platforms code named Apollo Lake when collecting bandwidth or DRAM self-refresh metrics.** Newer Apollo Lake platforms have disabled access to bandwidth and dram-srr metrics resulting in a system crash if specified for collection. Intel SoC Watch is unable to detect the failure situation, so to avoid --f sys causing a crash, -f ddr-bw has been removed from the --f sys group on this platform. These metrics can be manually included for collection on older platforms. There is no workaround.

- **Collection across hibernation results in wild values reported.** Intel SoC Watch does not handle the resetting of counters that occurs when resuming from hibernation resulting in bad summary data being reported.

- **Failure to load Intel SoC Watch driver.** On some Windows* 10 OS systems the signed Intel SoC Watch driver fails to load with the message "ERROR: Failed to install Intel(R) SoC Watch driver. Please reboot the system and try again". The cause is not known. The workaround is to disable Secure Boot.

- **The syscall feature does not produce any output.**

- **Issues with Intel platforms code named Cherry Trail and Braswell:**
  - S0ix residencies may not total 100% during connected standby.
  - CPU C-state percentages may not add up to 100%. Intel SoC Watch reads the hardware provided C1 counter rather than calculating it as a difference. The SoC provides counters for all C-states, including C0. If any counters are off, they won’t add up to 100%. An issue was seen on an Intel microarchitecture platform code named Braswell where the total residency was significantly under 100%. Which counter is undercounting has not been determined. The problem was not seen on an Intel platform code named Cherry Trail.
  - Core temperature report is invalid on Intel microarchitecture code named Cherryview steppings prior to B0.

- The H/W Timeline report will have missing data and unaligned columns if --r detail report option is used when --m (--max-detail) is not used for collection. Collecting with -m option is advised in order to have sufficient data to generate detailed results.

- If the Task Manager is used to kill the socwatch process, you will need to reboot the system to clear the drivers (there is no OS event allowing proper cleanup). Terminate Intel SoC Watch using Ctrl-C, not the Task Manager.

- **Issues with Intel platform code named Bay Trail (Intel microarchitecture code named Valleyview 2):**
  - Collection of gfx (GT), bandwidth, or self-refresh data during Connected Standby can result in a system crash or bad data. That data is not available when resuming from Connected Standby.
  - Thermal data may not be valid on Intel microarchitecture platforms code named Bay Trail, even with B1 stepping. We have not determined why some systems show reasonable data and others do not.
  - Energy data is invalid on both A0 and B0. C0 stepping is over-reporting energy consumed.
  - If platform under test does not have its BIOS configured to enable "Speed Step" then an empty OS P-state residency report is given.
5 Related Documentation
The below documents are available with this release.

- Intel® SoC Watch for Windows* OS User’s Guide
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

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<th>Intel® SoC Watch for Windows® OS User’s Guide</th>
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<td>Intel® SoC Watch for Windows® OS Release Notes</td>
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<tr>
<td>Intel® SoC Watch for Windows® OS executables</td>
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</table>
8 System Requirements

Supported Architectures and Terminology
Intel SoC Watch supports the following Intel microarchitecture code names:

- Nehalem
- Sandy Bridge
- Ivy Bridge
- Haswell, Haswell-ULT
- Bay Trail/Valleyview 2
- Broadwell
- Cherry Trail
- Skylake
- Apollo Lake
- Kaby Lake

Minimum System Requirements
This tool can be run on the Windows* 8, 8.1, and 10 (desktop) operating systems, with administrator permissions.
9 Installation Notes

Intel SoC Watch for Windows* OS is automatically installed as part of Intel VTune™ Amplifier for Systems.

**Default Installation Folders**
The default top-level installation folder for this product is:

C:\Program Files\IntelSWTools\system_studio_<version>\target\windows_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.

**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 VTune™ Amplifier <version> for Systems, and click Change. To remove the product, select Remove instead of Change.

When installing an updated version of Intel VTune™ Amplifier <version> for Systems, 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):

<table>
<thead>
<tr>
<th>Acronym/Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SoC</td>
<td>System on Chip</td>
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11 Legal Information

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