Intel® VTune™ Amplifier XE 2015 Release Notes for Windows* OS

Installation Guide and Release Notes 16 May 2015

Contents:

You can find the latest Release Notes versions online.

1 Performance Profiling with Intel VTune Amplifier XE

Please visit our web site for training videos, technical articles, documentation and support.

2 What's New

Intel® VTune™ Amplifier XE 2015 Update 4

- Support for Intel® Manycore Platform Software Stack (Intel® MPSS) version 3.5
- Support for Intel® Atom™ x7 Z8700 & x5 Z8500/X8400 processor series (Cherry Trail) including GPU analysis
- Support for the __itt_detach API to detach collection from all processes
- Microsoft Visual Studio* 2015 IDE integration

Intel® VTune™ Amplifier XE 2015 Update 3

- OpenMP* analysis enhancements with:
    - Potential Gain expansion by parallelization inefficiencies representing their wall time cost
    - Precise trace-based imbalance calculation that is especially useful for profiling of small region instances

    - Detailed analysis by barrier-to-barrier region segments to explore performance of OpenMP work-sharing constructs and barrier cost inside a region

- OpenMP and MPI multi-rank analysis on a compute node with:
    - Per-rank Intel MPI communication busy wait time detection and displaying the metric in the Summary, grid and Timeline views
    - Selective rank profiling for MPI applications, including PMU analysis for multiple ranks on a node by using Intel MPI library 5.0.3 or higher
    - VTune Amplifier XE command line generation for selective rank profiling through Intel Trace Analyzer and Collector user interface
- Super Tiny display mode added for the Timeline pane to easily identify problem areas for results with multiple processes/threads
- Platform window replacing Tasks and Frames window and providing CPU, GPU, and Bandwidth metrics data distributed over time
- General Exploration analysis views extended to display confidence indication (greyed out font) for non-reliable metrics data resulted, for example, from the low number of collected samples
- GPU usage analysis for OpenCL™ applications extended to display compute-originated batch buffers on the GPU software queue in the Timeline pane (Linux* target only)
- New filtering mode for command line reports to display data for the specified column names only
- Microsoft Visual Studio* 2015 IDE integration

Intel® VTune™ Amplifier XE 2015 Update 2

- TSX Hotspots analysis providing Precise Clockticks data for the Intel microarchitecture code name Haswell
- Bandwidth analysis improvements including:
    - Support for the 5th Generation Intel® Core™ processors (code name: Broadwell) and Intel microarchitecture code name Silvermont
    - QPI Bandwidth data analysis for server platforms
    - Total, Read and Write Bandwidth timeline areas merged into single area

    - Grouping by package for the CPU Time timeline area

- GPU analysis improvements including:
    - GPU Architecture Diagram tab added to the Timeline pane to facilitate interpretation of the OpenCL™ application analysis data and easily match the GPU hardware metrics with the corresponding architecture blocks
    - Compute extended counter set support for GPU analysis on the 5th Generation Intel® Core™ processors (code name: Broadwell)
    - Compute basic counter set replacing the Global/local accesses set for GPU analysis

Intel® VTune™ Amplifier XE 2015 Update 1

- Support for Intel(R) Xeon(R) processor E5 v3 family based on the Intel microarchitecture code name Haswell-E, including General Exploration, Bandwidth and TSX Exploration analysis
- Support for the Intel microarchitecture code name Broadwell, including General Exploration analysis
- Spin and Overhead Time metrics classified by reasons for OpenMP* analysis [3]
- Direct access to the source analysis for an OpenMP parallel region when using the /OpenMP Region/.. grouping in the grid
- Showing OpenMP application serial time in grid that reacts on time filtering

Intel® VTune™ Amplifier XE 2015 Initial Release

- Improved OpenMP region analysis provides performance metrics for each parallel region, serial time and potential tuning gain for parallel regions. It allows detecting common performance bottlenecks, such as load imbalance, granularity or synchronization issues.
- Improved Intel Xeon Phi coprocessor analysis workflow is more user-friendly with new Target system configuration options. Stack collection is enabled for Intel Xeon Phi™ coprocessor analysis types.

- Graphical interface for remote data collection provides clear workflow for configuring and running analysis on remote Linux* systems via SSH. Target tab in Project Properties allows to get a list of processes running on the remote Linux* system, to specify a path to the VTune Amplifier installed on a remote machine and a path to a remote temporary directory used for storing performance results.
- GPU OpenCL™ kernel analysis extended with memory transfers, visualization of OpenCL API and computing queue and new SIMD Width metric.
- OS X* host support for performing automated remote collection on other platforms and viewing collected results.
- New analysis type “TSX Exploration” for 4th generation Intel® Core™ processors based on the Intel microarchitecture code name Haswell can detect inefficiency in using Intel® TSX instructions with possible reasons.
- Usability improvements:
    - General Exploration and Bandwidth analysis types are not CPU specific now. So the same command line can be applied to different microarchitectures.
    - User can create a custom grouping level in grid views
    - Summary window with hyperlinks for Top Hotspots and performance metrics navigating to the Bottom-up grid view
    - Grouping options in Timeline pane
- Support for importing *.perf files with the event-based sampling data collected by the Linux Perf tool
- An option to limit the call stack size (in system pages) and minimize collection overhead for custom hardware event-based sampling analysis results
- Support for external data collection launched from the VTune Amplifier to integrate additional custom counters into result. It is also possible to import a csv file with the externally collected data into an existing VTune Amplifier result.

3 System Requirements

For an explanation of architecture names, see http://software.intel.com/en-us/articles/intel-architecture-platform-terminology/

Processor Requirements

- For general operations with user interface and all data collection except Hardware event-based sampling analysis
    - A PC based on an IA-32 or Intel® 64 architecture processor supporting the Intel® Streaming SIMD Extensions 2 (Intel® SSE2) instructions (Intel® Pentium® 4 processor or later, or compatible non-Intel processor).
    - For the best experience, a multi-core or multi-processor system is recommended.
    - Because the VTune Amplifier XE requires specific knowledge of assembly-level instructions, its analysis may not operate correctly if a program contains non-Intel instructions. In this case, run the analysis with a target executable that contains only Intel® instructions. After you finish using the VTune Amplifier XE, you can use the assembler code or optimizing compiler options that provide the non-Intel instructions.
- For Hardware event-based sampling analysis (EBS)
    - EBS analysis makes use of the on-chip Performance Monitoring Unit (PMU) and requires a genuine Intel processor for collection. EBS analysis is supported on Intel® Pentium® M, Intel® Core™ microarchitecture and newer processors (for more precise details, see the list below).
    - EBS analysis is not supported on the Intel Pentium 4 processor family (Intel® NetBurst® MicroArchitecture) and non-Intel processors.
    - However, the results collected with EBS can be analyzed using any system meeting the less restrictive general operation requirements.
    - EBS analysis within a virtual machine is supported only in VMware Fusion* 5 virtual environment. EBS is not supported within other virtual machine environments.

- The list of supported processors is constantly being extended. Here is a partial list of processors where the EBS analysis is enabled:

  Mobile Processors
  Intel® Atom™ Processor
  Intel® Core™ i7 Mobile Processor Extreme Edition (including 2nd, 3rd and 4th Generation Intel® Core™ processors)
  Intel® Core™ i7, i5, i3 Mobile Processors (including 2nd, 3rd and 4th Generation Intel® Core™ processors)
  Intel® Core™2 Extreme Mobile Processor
  Intel® Core™2 Quad Mobile Processor
  Intel® Core™2 Duo Mobile Processor
  Intel® Pentium® Mobile Processor

  Desktop Processors
  Intel® Atom™ Processor

Intel® Core™ i7 Desktop Processor Extreme Edition (including 2nd, 3rd and 4th Generation Intel® Core™ processors)
Intel® Core™ i7, i5, i3 Desktop Processors (including 2nd, 3rd and 4th Generation Intel® Core™ processors)
Intel® Core™2 Quad Desktop Processor
Intel® Core™2 Extreme Desktop Processor
Intel® Core™2 Duo Desktop Processor

Server and Workstation Processors
Intel® Xeon® processors E7 family
Intel® Xeon® processor E5 family
Intel® Xeon® processors E3-1200 family
Intel® Xeon® processors 65xx/75xx series
Intel® Xeon® processors 36xx/56xx series
Intel® Xeon® processors 35xx/55xx series
Intel® Xeon® processors 34xx series
Quad-Core Intel® Xeon® processors 7xxx, 5xxx, and 3xxx series
Dual-Core Intel® Xeon® processors 7xxx, 5xxx, and 3xxx series

System Memory Requirements

- At least 2 GB of RAM

Disk Space Requirements

- 650 MB free disk space required for all product features and all architectures

Software Requirements

- Supported operational systems (embedded editions not supported):
  - Microsoft* Windows* 7 and SP1
  - Microsoft* Windows* Server 2008
    Microsoft Windows* 8 and 8.1 (including Windows Store applications [1])
  - Microsoft* Windows Server 2012*

- Supported compilers:
  - Intel® C/C++ Compiler 11 and higher
  - Intel® Fortran Compiler 11 and higher
  - Intel® Parallel Composer
  - Microsoft* Visual Studio* C/C++ Compiler
  - Cygwin (tested Cygwin 1.7.17 with GCC 4.5.3)
  - MinGW (tested MinGW with GCC 4.6.2)

- Supported Microsoft Visual Studio versions:
  - Microsoft* Visual Studio* 2010 and SP1
  - Microsoft* Visual Studio* 2012

    - Microsoft* Visual Studio* 2013 RC
    - **NOTE: Support for Microsoft Visual Studio 2010* is deprecated** - In a future major release of the Intel VTune Amplifier XE, support for use with Microsoft Visual Studio 2010* will be removed. Intel recommends that customers migrate to Microsoft Visual Studio 2012* at their earliest convenience.

- Application coding requirements
    - Supported programming languages:
        - Fortran
        - C
        - C++
        - C# [2]
        - Java*
        - OpenCL*
    - Concurrency and Locks and Waits analysis types interpret the use of constructs from the following threading methodologies:
        - Intel® Threading Building Blocks
        - Win32* Threads on Windows*
        - OpenMP* [3]
        - Intel's C/C++ Parallel Language Extensions

- Supported Java* environments:
    - Oracle* JVM 6 and 7 – Hotspots and Hardware event-based analysis types
    - IBM* J9 – Hardware event-based analysis types only

- Supported OpenCL* environments:
    - Intel® SDK for OpenCL Applications 2013 for Windows* Oss

- Supported Intel® Manycore Platform Software Stack (Intel® MPSS) versions for Intel® Xeon Phi™ co-processor profiling:
    - Hardware event-based sampling analysis: the MPSS 2.1, 3.0 and higher up to 3.5
    - Hardware event-based sampling analysis with stacks is not available for Windows* host.

- To view PDF documents, use a PDF reader, such as Adobe Reader*.

Notes:

1. VTune Amplifier XE supports analysis of Windows Store applications on Microsoft Windows 8* via the Attach to Process or Profile System modes. Launch Application mode is not supported. Supported analysis types are Basic Hotspots and hardware event-based sampling analysis, including stack collection. Concurrency and Locks and Waits analysis types are not supported.

2. VTune Amplifier fully supports .NET* versions 3.5 and below. There are limitations for .NET 4.0 and higher: analysis types “Locks and Waits” and “Concurrency” can’t detect synchronization primitives from Task Parallel Library classes and algorithms in the System.Threading.Tasks namespace. For more details about .NET profiling, refer to this article.

3. VTune Amplifier XE supports analysis of applications built with Intel® Fortran Compiler Professional Edition version 11.0 or higher, Intel® C++ Compiler Professional Edition version 11.0 or higher, GNU* C/C++ Compiler 4.2 or higher, or Microsoft* Visual Studio* C/C++ Compiler.

4 Technical Support

If you did not register your product during installation, please do so at the Intel® Software Development Products Registration Center. Registration entitles you to free technical support, product updates and upgrades for the duration of the support term.

For information about how to find Technical Support, Product Updates, User Forums, FAQs, tips and tricks, and other support information, please visit http://www.intel.com/software/products/support/

Note: If your distributor provides technical support for this product, please contact them for support rather than Intel.

5 Installation Notes

If you are installing the product for the first time, please be sure to have the product serial number available so you can type it in during installation. A valid license is required for installation and use.

The installation of the VTune Amplifier XE removes any earlier installed version of the VTune Amplifier XE.

The product is a self-extracting executable archive with one IA-32 package you can install on either a 32-bit or 64-bit system.

To begin installation, double click the `VTune_Amplifier_XE_2015_setup.exe` file as a user with *Administrative* privileges. This installs the full package (includes GUI front-end for using the VTune Amplifier XE as well as Microsoft* Visual Studio integration). Activation is required.

Activation

It is required to activate the product to finish installation. There are several methods for product activation:

- Activation using serial number. Internet connection is required;
- Activation using license file;

- Activation using license server.

You can also evaluate the product for 31 days.

Installing Collectors on Remote Systems

You can install the command line data collection features of the product on remote systems to reduce overhead and simply collect data remotely. Data collection on a remote system does not require a license; however, viewing of the data cannot be done on the remote system unless a license is present.

The results of any data collection that is run on the remote system must then be copied to the system where the regular install was done for analysis, viewing, and reporting.

To do this:

1. Unpack the product web image manually using the command:
   `VTune_Amplifier_XE_2015_setup.exe --extract-only --silent --extract-folder C:\temp\VTune_Amplifier_XE_2015_unpacked`

   Use any convenient path for the `--extract-folder` option.

   In case the `--extract-folder` option is omitted, the default location for the extracted image would be:
   "`C:\Program Files (x86)\Intel\Download\VTune_Amplifier_XE_2015_setup`" for 64-bit and
   "`C:\Program Files\Intel\Download\VTune_Amplifier_XE_2015_setup`" for 32-bit OS.
2. Copy the folder containing the installation files for the collectors and command line tools to the remote machine. With the example shown above, the location of this folder would be
   `C:\temp\VTune_Amplifier_XE_2015_unpacked\Installs\amplifier_xe\ps_he_cli.*`
3. ps_he_cli`.msi` with *Administrative* privileges and follow the instructions. No activation will be required.
4. On a 64-bit remote machine, from the VTune Amplifier XE installation location, run and install `msvcrt_x86.msi` and `msvcrt_x64.msi` (requires *Administrative* privileges).
5. On a 32-bit remote machine, from the VTune Amplifier XE installation location, run and install `msvcrt_x86.msi` (requires *Administrative* privileges).

Default Installation Folders

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

```
C:\Program Files (x86)\Intel\VTune Amplifier XE 2015\
```

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

This product installs into an arrangement of folders shown in the list below. Not all folders will be present in a given installation.

- `C:\Program Files\Intel\VTune Amplifier XE 2015\`
  - `bin32`
  - `bin64*`
  - `config`
  - `documentation`
  - `include`
  - `lib32`
  - `lib64*`
  - `message`
  - `resource`
  - `samples`
  - `sepdk`
  - `sdk`

(*) bin64 and lib64 are available for Intel® 64 architecture install package

Changing, Updating and Removing the Product

If you want to add or remove components from an installation, open the Control Panel and select the Add or Remove Programs applet, select **Intel® VTune™ Amplifier XE 2015** and click **Change**. To remove the product, select **Remove** instead of **Change**.

When installing an updated version of the product, you do not need to remove the older version. Installation program will remove the old version automatically.

Note: If the SEP driver uninstallation failed during the normal uninstall process, open a Command Prompt window and execute the following commands with Administrative privileges to manually remove the SEP driver from the system:

```
cd %windir%\system32\drivers
dir sep*.sys
net stop sep3_15   # unload SEP3 driver from kernel
del sep3_15.sys    # delete SEP3 driver from filesystem
net stop vtss      # unload VTSS driver from kernel
del vtss.sys       # delete VTSS driver from filesystem
net stop sepdal    # unload PAX driver from kernel
del sepdal.sys     # delete PAX driver from filesystem
```

Intel® Software Manager

Intel® Software Manager is a utility that allows users to:

- Download and install updates for your Intel® Software Development Products.
- Manage subscription status of installed software.
- Activate serial numbers.
- Find out about the latest news for Intel Software Development Products.
- Intel® Software Manager requires an Internet connection to connect to a remote server for information and updates.

Intel Software Manager installs with Intel Software Development Products on Windows*, Linux*, and OS X* operating systems.

To obtain more information about Intel Software Manager, please refer to the https://registrationcenter-ssl.intel.com/Docs/ism.htm web-page.

Known Installation and Configuration Issues

- If you encounter problems using F1 Help for the VTune Amplifier XE windows and dialog boxes on Microsoft Visual Studio* 2008 systems: Choose **Tools > Options > Help > Online > Try local first, then online**.
- When installing the VTune Amplifier XE for the first time on a Microsoft Visual Studio* 2010 system, you may be asked to initialize the Local Store for documentation. Follow **Help Library Manager** installation wizard instructions to register and install the VTune Amplifier XE Help documentation. You do not need to re-register the VTune Amplifier XE Help documentation when you install future VTune Amplifier XE updates. For more information, see http://msdn.microsoft.com/en-us/library/dd264831.aspx.

  If you encounter problems viewing the VTune Amplifier XE (local) help: Choose **Help > Manage Help Settings > Settings**, and check **I want to use local help**.

- By default, Microsoft Visual Studio* 2012 sets the **Launch in Help Browser** option to display documentation for integrated products. To view the VTune Amplifier XE (local) help documentation: Choose **Help > > Intel VTune Amplifier XE > Intel VTune Amplifier XE Help** (or use context-sensitive help). If you still encounter problems viewing the help, Choose **Help > Set Help Preferences > Launch in Help Viewer**.

6 Issues and Limitations

Known Issues and Limitations

Profiling .NET and Windows Store* applications

For full list of requirements, limitations and tips about profiling .NET and Windows Store applications using VTune™ Amplifier, refer to this article.

- **Running time is attributed to the next instruction** (200108041)
  - To collect the data about time-consuming running regions of the target, the VTune™ Amplifier XE interrupts executing target threads and attributes the time to the context IP address.
  - Due to the collection mechanism, the captured IP address points to an instruction AFTER the one that is actually consuming most of the time. This leads to the running time being attributed to the next instruction (or, rarely to one of the subsequent instructions) in the Assembly view. In rare cases, this can also lead to wrong attribution of running time in the source - the time may be erroneously attributed to the source line AFTER the actual hot line.
  - In case the inline mode is ON and the program has small functions inlined at the hotspots, this can cause the running time to be attributed to a wrong function since the next instruction can belong to a different function in tightly inlined code.

- **Thread stack size limitation** (200108571)
  - The VTune™ Amplifier XE may crash with the following error message: Error: failed to create a sampling thread: not enough storage is available to process this command. This happens when the profiled application has big reserved and committed thread stack size (/STACK:reserve[,commit] command line switch of link.exe). The suggested workaround is reducing the reserved/committed thread stack size to profile the target.

- **Results not collected for processes terminated with TerminateProcess()** (200108689)
  - No results are displayed for any process being profiled that is terminated by a different process calling TerminateProcess(). Instead, a different method should be used to terminate the process.

- **Incorrect timing results when running on a 32-bit virtual machine** (200137061)

- VTune Amplifier XE may fail to collect correct timing data when running on a virtual machine with problematic virtualization of time stamp counters. In this case the VTune Amplifier XE throws a warning message:
- "Warning: Cannot load data file '<path_to_a_trace_file>.trace' (syncAcquiredHandler: timestamps aren't ascended!)"

- **An application that allocates massive chunks of memory may fail to work under VTune Amplifier XE** (200083850)
  - If a 32-bit application allocates massive chunks of memory (close to 2 GB) in the heap, it may fail to launch under the VTune Amplifier XE while running fine on its own. This happens because the VTune Amplifier XE requires additional memory when profiling an application. The workaround could be in using larger address space (for example, converting the project to 64-bit).

- **Results lost when console application under profile is closed using system Close button [x]** (200084121)
  - Sometimes, if profiling is started on a console application and the app is closed by pressing the system Close button [x] in the console's caption bar, Parallel Amplifier will not save any results. The workaround is to use the "Stop" button of Parallel Amplifier to close the application and stop data collection.

- **.NET modules loaded dynamically via Reflection API are displayed as "unknown" hotspots** (200088121)
  - If dynamic .NET modules (e.g. loaded via Assembly.LoadFrom) are used in target application, VTune Amplifier will show them as "unknown" functions and modules in hotspots list.

- **Hardware event-based analysis may crash certain Intel® Core™ i7 processor-based systems when deep sleep states are enabled** (200149603)
  - On some Intel® Core™ i7 processor-based (code named Nehalem) systems with C-states enabled, sampling may cause system hanging due to a known hardware issue (see errata AAJ134 in http://download.intel.com/design/processor/specupdt/320836.pdf). To avoid this, disable the "Cn(ACPI Cn) report to OS" BIOS option before sampling with the VTune Amplifier XE analyzer on Intel Core i7 processor-based systems.

- **Link to instruction guide: instruction set reference document is not positioned on description of proper instruction.** (200091200)
  - The reference information for assembly instructions can be opened in any PDF viewer, but only Adobe Acrobat Reader* supports positioning the instruction reference document on the required page. To ensure correct functionality of this feature, you are recommended to install the latest available version of Adobe Acrobat Reader.

- **Uninstalling limitation: pin.exe stays running after detaching.** (200092295)
  - The VTune™ Amplifier XE cannot be uninstalled after attaching to the target to be profiled until running the target is over. The cause is that pin.exe keeps

working after detaching from the target and exits only after the profiled application/process execution finishes.

- **VTune™ Amplifier XE does not support profiling an application launched under debugger** (200092508)
    - The Hotspot, Concurrency or Lock and Waits analysis types provide incorrect results when analyzing an application launched under a debugger. VTune Amplifier XE does not detect whether a debugger is attached to a profiled application. Make sure that no debugging tools are attached to the application that is profiled with the VTune Amplifier XE.

- **Second attach to the same application should print an error and exit immediately.** (200092650)
    - The VTune™ Amplifier XE allows running the analysis while the previous one is in progress but does not store any data for the second analysis run.

- **Intel® Compiler only produces first level of inlines. The nested inlines are not emitted into the debug information.** (200164310)
    - Intel® Compiler currently generates debug information only for the first level of inline functions. So, you cannot see performance data attributed to functions inlined to other inline functions. Instead, this performance data are attributed to corresponding functions inlined to regular (not inline) functions. This may also cause wrong source line attribution of performance data in the source view.

- **Timeline pane displays incorrect concurrency and thread states for a paused region in the Concurrency and Locks and Waits analyses.** (200204715)
    - Concurrency and thread state data may be incorrect in the Timeline pane for a region corresponding to the time when data collection was paused. Ignore the timeline data in a paused region during result analysis.

- **Java source line may be shown incorrecly for Oracle JDK 6u25 x64** (200167001)
    - Drilling down to Java source code from VTune Amplifier XE results may show incorrect source line. The issue occurs with Java applications built with Oracle JDK 6u25 x64. This is the JDK problem, refer to issues JDK-7051767 and JDK-7047624 in Oracle bug database.

- **Result finalization may be slow if results are located in a remote network directory** (200169322)
    - The problem is caused by slow network access. To improve performance use local directory for result storage.

- **VTune™ Amplifier XE does not resolve symbols correctly on Windows XP SP1 operating system** (200216358)
    - When VTune™ Amplifier XE is ran on Windows XP Service Pack 1 operating system, a problem may be observed that symbols are not resolved correctly but instead are shown as "[foo.dll]" names. This happens because VTune™ Amplifier XE uses Microsoft DIA library version which requires Service Pack 2 to be installed. Please install the service pack to resolve the issue.

- **Information collected via ITT API is not available when attaching to a process.** (200172007)
    - When collecting statistics data using ITT API injected into a source code, like Frame Analysis or JIT-profiling, attaching to a process will not bring expected results. Use the VTune Amplifier XE analysis to start an application instead of attaching to a process.

- **Limited support of machines with more than 32 logical CPUs** (200172671)
    - User mode sampling and tracing based analysis types (Hotspots, Concurrency, Locks and Waits) do not support profiling on Windows based system with more than 32 logical CPUs. Collection will run but data opening will fail with assert.

- **Only one stack frame is shown in Java code if IBM* J9* JVM is used** (200227950)
    - Currently Java stack unwinding is not supported for IBM* J9* JVM.

- **VTune Amplifier XE can show [unknown stack frame(s)] as a hotspot in EBS analyses in Windows* 2008 R2** (200173627)
    - Workaround is to start VTune Amplifier XE under the explicit “Run as administrator” option, even if current user has administrator credentials.

- **Attachment as Administrator to a process that launched by the 'System' user fails** (200259643)
    - You may use a utility from http://technet.microsoft.com/en-us/sysinternals/bb897553 to profile a system service (e.g. w3wp.exe-based code) from the command line using amplxe-cl.exe that is located in <product_install_dir>/bin32. Do the following:
    - 1. Configure the w3wp service to run with the permissions you use to log in: Open IIS Manager, right-click an application pool you are using and set “Process model:Identity” to the account under which w3wp needs to be run.
    - 2. Run the w3wp service and make sure you run it with proper credentials and remember its PID.
    - 3. Start data collection:
    - psexec -i 0 /path/to/amplxe-cl.exe -c=hotspots -r /path/for/your/data_dir --target-pid=PID
    - 4. Run your workload.
    - 5. Stop data collection:
    - psexec -i 0 /path/to/amplxe-cl.exe -command detach -r /path/for/your/data_dir
    - 6. Open /path/for/your/data_dir in GUI:
    - <product_install_dir>/bin32/amplxe-gui /path/to/your/data_dir

- **Do not use -ipo option since it causes the inline debug information to switch off.** (200260765)
    - If using the Intel® compiler to get performance data on inline functions, use the additional option “/debug:inline-debug-info”, but avoid using the /Qipo option. Currently this option disables generating the inline debug information in the compiler. Note that the Intel compiler integrated into the Microsoft Visual Studio* IDE uses the /Qipo by default in the Release configuration.

- **Intel® Compiler 13.0 and earlier doesn't support function split ranges in debug info which may lead to wrong performance data attribution in case function ranges are overlapped (e.g. performance data attributed to one function, but should have been split by two).** (200260768)
    - In some cases the Intel® Compiler 13.0 and earlier generates imprecise debug information about ranges of inline functions. This may lead to wrong performance data attribution when the Inline mode is turned on, for example: instead of two functions performance data is attributed just to one of them.

- **Call stack can't be unwound via no return functions** (200263851)
    - If analyzed application contains functions without ret instruction, e.g. calling exit(), unwinding call stack to its caller and higher may fail (no stack frames shown).

- **Attaching the VTune Amplifier XE to a process may take some time** (200276420)
    - Your target application may complete before the data collection starts, so the VTune Amplifier XE may report an error. Increase the duration of your test application if necessary.

- **Command "status" is not supported for hardware event-based analysis types** (200281661)
    - Command line option "$ amplxe-cl -command status" is currently supported only for user mode sampling and tracing based analysis types, but not for EBS analysis types.

- **Limited event description for Intel® Xeon® processor E5-XXXX and the 2nd Generation Intel® Core™ processor family desktop processors.** (200285238)
    - Developers can find more details on events by checking the Intel® 64 and IA-32Architectures Software Developer's Manual http://download.intel.com/products/processor/manual/325462.pdf, Tables 19-3, 19-4 and 19-5.

- **Hardware event-based analysis may cause unpredictable system behavior on processors based on Intel® microarchitecture code named Sandy Bridge** (200285401)
    - On processors based on Intel microarchitecture code named Sandy Bridge, hardware event-based sampling may cause unpredictable system behavior due to a known hardware issue (see erratum BK105 in http://www.intel.com/content/dam/www/public/us/en/documents/specification-updates/2nd-gen-core-family-mobile-specification-update.pdf). To avoid this, you are not recommended to run General Exploration, Client Analysis, Cycles and Uops, Loop Analysis or Custom Hardware event-based analysis with precise events on these systems unless a BIOS workaround for the erratum is provided.

- **Installing VTSS++ driver on the system where SEP and VTSS++ drivers have been already registered may fail** (200292274)
    - Running the following command may cause an error:
    - >amplxe-sepreg.exe -i

    - Installing and starting sepdrv3_8...OK
    - Installing and starting sepdal...OK
    - Installing and starting VTSS++ driver...FAILED
    - This can happen due to insufficiency of available memory. Rebooting the system helps to get resources cleaned so registration after reboot should work.

- **Hardware event-based analysis doesn't work if more than 128 events are gathered simultaneously** (200293868)
    - Decrease number of PMU events in analysis settings to resolve it.

- **Results should be closed before comparing them** (200236090)
    - VTune Amplifier XE doesn't support opening same result twice. Due to that limitation it is not possible to compare (via "Compare" button) results if one of them is already opened. You should close results first then compare them.

- **Limited support of Windows Store* applications** (200299329)
    - VTune Amplifier XE supports attaching to Windows Store* applications, but not launching them. Only hardware event-based analysis types are supported.

- **Microsoft* Visual Studio* 2012 help may be displayed incorrectly** (200300692)
    - On Microsoft* Windows Server 2012* systems, if you have problems viewing Microsoft* Visual Studio* 2012 help, check the settings for Internet Explorer in Tools > Internet Options > Security. To allow correct display of help, in the Internet zone enable MIME Sniffing and Active scripting.

- **VTune Amplifier XE analysis may fail on machine with Verdasys Digital Guardian* software installed.** (200237470)
    - User mode sampling and tracing based analysis types (Hotspots, Concurrency, Locks and Waits) run from GUI may fail if Verdasys Digital Guardian* software is installed on the machine. However it is still possible to run collection from command line.
    - Alternatively EBS collection with stacks can be used, either from GUI or command line.

- **Analyzed application may crash during analysis if "Symantec Endpoint Protection Application and Device Control" software is installed** (200237601)
    - The issue may occur with user mode sampling and tracing based analysis types (Hotspots, Concurrency, and Locks and Waits). Ways to overcome the problem:
    - 1. If user mode sampling and tracing based analysis is needed exclude the analyzed application from the list of monitored applications of "Symantec Endpoint Protection Application and Device Control" software.
    - 2. Use "Lightweight hotspots" with "Collect stacks" option turned on instead.

- **ITT API task or frame is not shown in results if its end occurs when collector is inactive** (200331811)
    - When ITT task or frame end notification occurs after collection was paused, or detach or stop command issued, the frame or task is not displayed in the result.

- **Documentation can't be opened in Microsoft Internet Explorer* 10 on Windows Server* 2012** (200340007)
    - To correct the problem modify security settings in Microsoft Internet Explorer* 10. From Tools > Internet Options > Security, add “about:internet” to the list of trusted sites.

- **Child process analysis doesn't work for EBS analysis types if process is run from script using "start" command** (200342928)
    - If a process is started from a batch file by "start" command, it doesn't have original command interpretor as a parent process. So the new process can't be identified as a child and not profiled. This is true for all Hardware event-based analyses. Possible workarounds:
    - - Use user mode sampling and tracing based analysis types instead
    - - Use "call" command in a batch file instead of "start"
    - - Use "attach to process" collection mode to connect directly to the process of interest

- **Collection of some GPU analysis metrics should be enabled in BIOS for 3rd Generation Intel® Core™ processors** (200342983)
    - Some systems disable collection of extended metrics such as L3 misses, memory accesses, sampler busyness, SLM accesses, etc. in the BIOS. On some systems, but not all, they can be enabled by changing a bios option. The presence or absence of the option and its name are BIOS vendor specific. Look for something like an “Intel(R) Graphics Performance Analyzers” option in your BIOS and set it to “Enabled ". Note that this option is BIOS vendor specific, may not always be present and may be named differently. Check the BIOS options on your system for details.

- **VTune Amplifier doesn’t resolve symbols for .NET applications using NGEN** (200248497)
    - Symbol resolution is not supported for .NET applications built using Native Image Generator (NGEN) if results are collected using Event Based Sampling analysis types. You can find details how to resolve it in “Windows Store Applications Analysis” topic of VTune help document.

- **An application may experience the stack overflow exception when running under the VTune Amplifier** (200249394)
    - An application allocating massive chunks of memory on a thread stack may experience the stack overflow exception and fail when running under the VTune Amplifier, while running flawlessly on its own. This happens because the VTune Amplifier requires additional space on an application thread stack for profiling needs. To work around this problem, consider using larger thread stack space.

- **Results may contain process name cut on the 14th character** (200401361)
    - VTune may cut long process name on the 14th character in results collected with EBS analysis types with stacks. E.g. the result should contain "find_hotspots.exe", but it contains only "find_hotspots.". This is operating system limitation.

7 Attributions

The following are licenses for third party software that was used to develop the Intel® VTune™ Amplifier XE 2015 for Windows* OS. These licenses are listed due to attribution requirements in these license agreements. For the avoidance of doubt, the Intel VTune Amplifier XE is solely governed by the terms and conditions of the End User License Agreement for Intel® Software Development Product that accompanies the Intel VTune Amplifier XE.

```
libjpeg license

We welcome the use of this software as a component of commercial products.
No royalty is required, but we do ask for an acknowledgement in product
documentation, as described under LEGAL ISSUES.


LEGAL ISSUES
============

In plain English:

1. We don't promise that this software works.  (But if you find any bugs,
   please let us know!)
2. You can use this software for whatever you want.  You don't have to pay
us.
3. You may not pretend that you wrote this software.  If you use it in a
   program, you must acknowledge somewhere in your documentation that
   you've used the IJG code.

In legalese:

The authors make NO WARRANTY or representation, either express or implied,
with respect to this software, its quality, accuracy, merchantability, or
fitness for a particular purpose.  This software is provided "AS IS", and
you,
its user, assume the entire risk as to its quality and accuracy.

This software is copyright (C) 1991-1998, Thomas G. Lane.
All Rights Reserved except as specified below.

Permission is hereby granted to use, copy, modify, and distribute this
software (or portions thereof) for any purpose, without fee, subject to these
conditions:
(1) If any part of the source code for this software is distributed, then
this
README file must be included, with this copyright and no-warranty notice
unaltered; and any additions, deletions, or changes to the original files
must be clearly indicated in accompanying documentation.
(2) If only executable code is distributed, then the accompanying
documentation must state that "this software is based in part on the work of
the Independent JPEG Group".
(3) Permission for use of this software is granted only if the user accepts
```

full responsibility for any undesirable consequences; the authors accept
NO LIABILITY for damages of any kind.

These conditions apply to any software derived from or based on the IJG code,
not just to the unmodified library. If you use our work, you ought to
acknowledge us.

Permission is NOT granted for the use of any IJG author's name or company
name
in advertising or publicity relating to this software or products derived
from
it. This software may be referred to only as "the Independent JPEG Group's
software".

We specifically permit and encourage the use of this software as the basis of
commercial products, provided that all warranty or liability claims are
assumed by the product vendor.

ansi2knr.c is included in this distribution by permission of L. Peter
Deutsch,
sole proprietor of its copyright holder, Aladdin Enterprises of Menlo Park,
CA.
ansi2knr.c is NOT covered by the above copyright and conditions, but instead
by the usual distribution terms of the Free Software Foundation; principally,
that you must include source code if you redistribute it. (See the file
ansi2knr.c for full details.) However, since ansi2knr.c is not needed as
part
of any program generated from the IJG code, this does not limit you more than
the foregoing paragraphs do.

The Unix configuration script "configure" was produced with GNU Autoconf.
It is copyright by the Free Software Foundation but is freely distributable.
The same holds for its supporting scripts (config.guess, config.sub,
ltconfig, ltmain.sh). Another support script, install-sh, is copyright
by M.I.T. but is also freely distributable.

It appears that the arithmetic coding option of the JPEG spec is covered by
patents owned by IBM, AT&T, and Mitsubishi. Hence arithmetic coding cannot
legally be used without obtaining one or more licenses. For this reason,
support for arithmetic coding has been removed from the free JPEG software.
(Since arithmetic coding provides only a marginal gain over the unpatented
Huffman mode, it is unlikely that very many implementations will support it.)
So far as we are aware, there are no patent restrictions on the remaining
code.

The IJG distribution formerly included code to read and write GIF files.
To avoid entanglement with the Unisys LZW patent, GIF reading support has
been removed altogether, and the GIF writer has been simplified to produce
"uncompressed GIFs". This technique does not use the LZW algorithm; the
resulting GIF files are larger than usual, but are readable by all standard
GIF decoders.

We are required to state that
    "The Graphics Interchange Format(c) is the Copyright property of

CompuServe Incorporated. GIF(sm) is a Service Mark property of
CompuServe Incorporated."

LibTIFF license

Copyright (c) 1988-1997 Sam Leffler
Copyright (c) 1991-1997 Silicon Graphics, Inc.

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that (i) the above copyright notices and this permission notice appear in all copies of the software and related documentation, and (ii) the names of Sam Leffler and Silicon Graphics may not be used in any advertising or publicity relating to the software without the specific, prior written permission of Sam Leffler and Silicon Graphics.

THE SOFTWARE IS PROVIDED "AS-IS" AND WITHOUT WARRANTY OF ANY KIND, EXPRESS, IMPLIED OR OTHERWISE, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT SHALL SAM LEFFLER OR SILICON GRAPHICS BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY KIND, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER OR NOT ADVISED OF THE POSSIBILITY OF DAMAGE, AND ON ANY THEORY OF LIABILITY, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

---

libpng license, June 14, 2012

This copy of the libpng notices is provided for your convenience. In case of any discrepancy between this copy and the notices in the file png.h that is included in the libpng distribution, the latter shall prevail.

COPYRIGHT NOTICE, DISCLAIMER, and LICENSE:

If you modify libpng you may insert additional notices immediately following this sentence.

This code is released under the libpng license.

libpng versions 1.2.6, August 15, 2004, through 1.5.11, June 14, 2012, are Copyright (c) 2004, 2006-2012 Glenn Randers-Pehrson, and are distributed according to the same disclaimer and license as libpng-1.2.5 with the following individual added to the list of Contributing Authors

Cosmin Truta

libpng versions 1.0.7, July 1, 2000, through 1.2.5 - October 3, 2002, are Copyright (c) 2000-2002 Glenn Randers-Pehrson, and are distributed according to the same disclaimer and license as libpng-1.0.6 with the following individuals added to the list of Contributing Authors

Simon-Pierre Cadieux
Eric S. Raymond
Gilles Vollant

and with the following additions to the disclaimer:

There is no warranty against interference with your enjoyment of the library or against infringement. There is no warranty that our efforts or the library will fulfill any of your particular purposes or needs. This library is provided with all faults, and the entire risk of satisfactory quality, performance, accuracy, and effort is with the user.

libpng versions 0.97, January 1998, through 1.0.6, March 20, 2000, are Copyright (c) 1998, 1999 Glenn Randers-Pehrson, and are distributed according to the same disclaimer and license as libpng-0.96, with the following individuals added to the list of Contributing Authors:

Tom Lane
Glenn Randers-Pehrson
Willem van Schaik

libpng versions 0.89, June 1996, through 0.96, May 1997, are Copyright (c) 1996, 1997 Andreas Dilger
Distributed according to the same disclaimer and license as libpng-0.88, with the following individuals added to the list of Contributing Authors:

John Bowler
Kevin Bracey
Sam Bushell
Magnus Holmgren
Greg Roelofs
Tom Tanner

libpng versions 0.5, May 1995, through 0.88, January 1996, are Copyright (c) 1995, 1996 Guy Eric Schalnat, Group 42, Inc.

For the purposes of this copyright and license, "Contributing Authors" is defined as the following set of individuals:

Andreas Dilger
Dave Martindale
Guy Eric Schalnat
Paul Schmidt
Tim Wegner

The PNG Reference Library is supplied "AS IS". The Contributing Authors and Group 42, Inc. disclaim all warranties, expressed or implied, including, without limitation, the warranties of merchantability and of fitness for any purpose. The Contributing Authors and Group 42, Inc. assume no liability for direct, indirect, incidental, special, exemplary, or consequential damages, which may result from the use of the PNG Reference Library, even if advised of the possibility of such damage.

Permission is hereby granted to use, copy, modify, and distribute this

source code, or portions hereof, for any purpose, without fee, subject
to the following restrictions:

1. The origin of this source code must not be misrepresented.

2. Altered versions must be plainly marked as such and must not
   be misrepresented as being the original source.

3. This Copyright notice may not be removed or altered from any
   source or altered source distribution.

The Contributing Authors and Group 42, Inc. specifically permit, without
fee, and encourage the use of this source code as a component to
supporting the PNG file format in commercial products. If you use this
source code in a product, acknowledgment is not required but would be
appreciated.

A "png_get_copyright" function is available, for convenient use in "about"
boxes and the like:

   printf("%s",png_get_copyright(NULL));

Also, the PNG logo (in PNG format, of course) is supplied in the
files "pngbar.png" and "pngbar.jpg (88x31) and "pngnow.png" (98x31).

Libpng is OSI Certified Open Source Software. OSI Certified Open Source is a
certification mark of the Open Source Initiative.

Glenn Randers-Pehrson
glennrp at users.sourceforge.net
June 14, 2012

   Apache License
   Version 2.0, January 2004
   http://www.apache.org/licenses/

   TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

   1. Definitions.

      "License" shall mean the terms and conditions for use, reproduction,
      and distribution as defined by Sections 1 through 9 of this document.

      "Licensor" shall mean the copyright owner or entity authorized by
      the copyright owner that is granting the License.

      "Legal Entity" shall mean the union of the acting entity and all
      other entities that control, are controlled by, or are under common
      control with that entity. For the purposes of this definition,
      "control" means (i) the power, direct or indirect, to cause the
      direction or management of such entity, whether by contract or
      otherwise, or (ii) ownership of fifty percent (50%) or more of the

outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable

(except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

   (a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

   (b) You must cause any modified files to carry prominent notices stating that You changed the files; and

   (c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

   (d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

   You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise,

any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

Boost Software License - Version 1.0 - August 17th, 2003

Permission is hereby granted, free of charge, to any person or organization obtaining a copy of the software and accompanying documentation covered by this license (the "Software") to use, reproduce, display, distribute,

execute, and transmit the Software, and to prepare derivative works of the Software, and to permit third-parties to whom the Software is furnished to do so, all subject to the following:

The copyright notices in the Software and this entire statement, including the above license grant, this restriction and the following disclaimer, must be included in all copies of the Software, in whole or in part, and all derivative works of the Software, unless such copies or derivative works are solely in the form of machine-executable object code generated by a source language processor.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE AND NON-INFRINGEMENT. IN NO EVENT SHALL THE COPYRIGHT HOLDERS OR ANYONE DISTRIBUTING THE SOFTWARE BE LIABLE FOR ANY DAMAGES OR OTHER LIABILITY, WHETHER IN CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Libxml2

Except where otherwise noted in the source code (e.g. the files hash.c,list.c and the trio files, which are covered by a similar license but with different Copyright notices) all the files are:

Copyright (C) 1998-2003 Daniel Veillard. All Rights Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE DANIEL VEILLARD BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHERIN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of Daniel Veillard shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from him.

Libunwind

Copyright (c) 2002 Hewlett-Packard Co.

Permission is hereby granted, free of charge, to any person obtaining
a copy of this software and associated documentation files (the
"Software"), to deal in the Software without restriction, including
without limitation the rights to use, copy, modify, merge, publish,
distribute, sublicense, and/or sell copies of the Software, and to
permit persons to whom the Software is furnished to do so, subject to
the following conditions:

The above copyright notice and this permission notice shall be
included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND,
EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF
MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND
NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE
LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION
OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION
WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except where otherwise noted in the source code (e.g. the files hash.c,
list.c and the trio files, which are covered by a similar licence but
with different Copyright notices) all the files are:

 Copyright (C) 1998-2003 Daniel Veillard. All Rights Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy
of this software and associated documentation files (the "Software"), to deal
in the Software without restriction, including without limitation the rights
to use, copy, modify, merge, publish, distribute, sublicense, and/or sell
copies of the Software, and to permit persons to whom the Software is fur-
nished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in
all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FIT-
NESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE
DANIEL VEILLARD BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER
IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CON-
NECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of Daniel Veillard shall not
be used in advertising or otherwise to promote the sale, use or other deal-
ings in this Software without prior written authorization from him.

PYTHON SOFTWARE FOUNDATION LICENSE VERSION 2

1. This LICENSE AGREEMENT is between the Python Software Foundation
("PSF"), and the Individual or Organization ("Licensee") accessing and
otherwise using this software ("Python") in source or binary form and
its associated documentation.

2. Subject to the terms and conditions of this License Agreement, PSF
hereby grants Licensee a nonexclusive, royalty-free, world-wide
license to reproduce, analyze, test, perform and/or display publicly,
prepare derivative works, distribute, and otherwise use Python
alone or in any derivative version, provided, however, that PSF's
License Agreement and PSF's notice of copyright, i.e., "Copyright (c)
2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008 Python Software Foundation;
All Rights Reserved" are retained in Python alone or in any derivative
version prepared by Licensee.

3. In the event Licensee prepares a derivative work that is based on
or incorporates Python or any part thereof, and wants to make
the derivative work available to others as provided herein, then
Licensee hereby agrees to include in any such work a brief summary of
the changes made to Python.

4. PSF is making Python available to Licensee on an "AS IS"
basis. PSF MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR
IMPLIED. BY WAY OF EXAMPLE, BUT NOT LIMITATION, PSF MAKES NO AND
DISCLAIMS ANY REPRESENTATION OR WARRANTY OF MERCHANTABILITY OR FITNESS
FOR ANY PARTICULAR PURPOSE OR THAT THE USE OF PYTHON WILL NOT
INFRINGE ANY THIRD PARTY RIGHTS.

5. PSF SHALL NOT BE LIABLE TO LICENSEE OR ANY OTHER USERS OF PYTHON
FOR ANY INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES OR LOSS AS
A RESULT OF MODIFYING, DISTRIBUTING, OR OTHERWISE USING PYTHON,
OR ANY DERIVATIVE THEREOF, EVEN IF ADVISED OF THE POSSIBILITY THEREOF.

6. This License Agreement will automatically terminate upon a material
breach of its terms and conditions.

7. Nothing in this License Agreement shall be deemed to create any
relationship of agency, partnership, or joint venture between PSF and
Licensee. This License Agreement does not grant permission to use PSF
trademarks or trade name in a trademark sense to endorse or promote
products or services of Licensee, or any third party.

8. By copying, installing or otherwise using Python, Licensee
agrees to be bound by the terms and conditions of this License
Agreement.

Changes to standard library modules:
====================================
A brief summary of changes made to Python 2.5.2 source:
 - On Windows*, the code of import, zipimport, and execfile was modified
to handle directories containing Unicode characters.

---

wxWidgets Library

This product includes wxWindows software which can be downloaded from www.wxwidgets.org/downloads.

wxWindows Library Licence, Version 3.1
==========

Copyright (C) 1998-2005 Julian Smart, Robert Roebling et al

Everyone is permitted to copy and distribute verbatim copies
of this licence document, but changing it is not allowed.

WXWINDOWS LIBRARY LICENCE
TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

This library is free software; you can redistribute it and/or modify it under the terms of the GNU Library General Public Licence as published by the Free Software Foundation; either version 2 of the Licence, or (at your option) any later version.

This library is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU Library General Public Licence for more details.

You should have received a copy of the GNU Library General Public Licence along with this software, usually in a file named COPYING.LIB. If not, write to the Free Software Foundation, Inc., 59 Temple Place, Suite 330, Boston, MA 02111-1307 USA.

EXCEPTION NOTICE

1. As a special exception, the copyright holders of this library give permission for additional uses of the text contained in this release of the library as licenced under the wxWindows Library Licence, applying either version 3.1 of the Licence, or (at your option) any later version of the Licence as published by the copyright holders of version 3.1 of the Licence document.

2. The exception is that you may use, copy, link, modify and distribute under your own terms, binary object code versions of works based on the Library.

3. If you copy code from files distributed under the terms of the GNU General Public Licence or the GNU Library General Public Licence into a copy of this library, as this licence permits, the exception does not apply to the code that you add in this way. To avoid misleading anyone as to the status of such modified files, you must delete this exception notice from such code and/or adjust the licensing conditions notice accordingly.

4. If you write modifications of your own for this library, it is your choice whether to permit this exception to apply to your modifications. If you do not wish that, you must delete the exception notice from such code and/or adjust the licensing conditions notice accordingly.

```
/* zlib.h -- interface of the 'zlib' general purpose compression library
  version 1.2.3, July 18th, 2005

  Copyright (C) 1995-2005 Jean-loup Gailly and Mark Adler

  This software is provided 'as-is', without any express or implied
  warranty.  In no event will the authors be held liable for any damages
  arising from the use of this software.

  Permission is granted to anyone to use this software for any purpose,
  including commercial applications, and to alter it and redistribute it
  freely, subject to the following restrictions:

  1. The origin of this software must not be misrepresented; you must not
     claim that you wrote the original software. If you use this software
     in a product, an acknowledgment in the product documentation would be
     appreciated but is not required.
  2. Altered source versions must be plainly marked as such, and must not be
     misrepresented as being the original software.
  3. This notice may not be removed or altered from any source distribution.

  Jean-loup Gailly jloup@gzip.org
  Mark Adler madler@alumni.caltech.edu

*/
```

```
LevelDB

Copyright (c) 2011 The LevelDB Authors. All rights reserved.

Redistribution and use in source and binary forms, with or without
modification, are permitted provided that the following conditions are
met:

   * Redistributions of source code must retain the above copyright
notice, this list of conditions and the following disclaimer.
   * Redistributions in binary form must reproduce the above
copyright notice, this list of conditions and the following disclaimer
in the documentation and/or other materials provided with the
distribution.
   * Neither the name of Google Inc. nor the names of its
contributors may be used to endorse or promote products derived from
this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS
"AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR
A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT
OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT
```

```
LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
(INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE
OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
```

```
pci.ids

#
#   List of PCI ID's
#
#   Version: 2014.11.23
#   Date:    2014-11-23 03:15:02
#
#   Maintained by Martin Mares <mj@ucw.cz> and other volunteers from the
#   PCI ID Project at http://pci-ids.ucw.cz/.
#
#   New data are always welcome, especially if they are accurate. If you have
#   anything to contribute, please follow the instructions at the web site.
#
#   This file can be distributed under either the GNU General Public License
#       (version 2 or higher) or the 3-clause BSD License.
#
```

---

8 Disclaimer and Legal Information

INFORMATION IN THIS DOCUMENT IS PROVIDED IN CONNECTION WITH INTEL PRODUCTS. NO LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS IS GRANTED BY THIS DOCUMENT. EXCEPT AS PROVIDED IN INTEL'S TERMS AND CONDITIONS OF SALE FOR SUCH PRODUCTS, INTEL ASSUMES NO LIABILITY WHATSOEVER AND INTEL DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY, RELATING TO SALE AND/OR USE OF INTEL PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

A "Mission Critical Application" is any application in which failure of the Intel Product could result, directly or indirectly, in personal injury or death. SHOULD YOU PURCHASE OR USE INTEL'S PRODUCTS FOR ANY SUCH MISSION CRITICAL APPLICATION, YOU SHALL INDEMNIFY AND HOLD INTEL AND ITS SUBSIDIARIES, SUBCONTRACTORS AND AFFILIATES, AND THE DIRECTORS, OFFICERS, AND EMPLOYEES OF EACH, HARMLESS AGAINST ALL CLAIMS COSTS, DAMAGES, AND EXPENSES AND REASONABLE ATTORNEYS' FEES ARISING OUT OF, DIRECTLY OR INDIRECTLY, ANY CLAIM OF PRODUCT LIABILITY, PERSONAL INJURY, OR DEATH ARISING IN ANY WAY OUT OF SUCH MISSION CRITICAL APPLICATION, WHETHER OR NOT INTEL OR ITS

SUBCONTRACTOR WAS NEGLIGENT IN THE DESIGN, MANUFACTURE, OR WARNING OF THE INTEL PRODUCT OR ANY OF ITS PARTS.

Intel may make changes to specifications and product descriptions at any time, without notice. Designers must not rely on the absence or characteristics of any features or instructions marked "reserved" or "undefined". Intel reserves these for future definition and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to them. The information here is subject to change without notice. Do not finalize a design with this information.

The products described in this document may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request.

Contact your local Intel sales office or your distributor to obtain the latest specifications and before placing your product order.

Copies of documents which have an order number and are referenced in this document, or other Intel literature, may be obtained by calling 1-800-548-4725, or go to: http://www.intel.com/design/literature.htm.

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more information go to http://www.intel.com/performance.

BlueMoon, BunnyPeople, Celeron, Celeron Inside, Centrino, Centrino Inside, Cilk, Core Inside, E-GOLD, Flexpipe, i960, Intel, the Intel logo, Intel AppUp, Intel Atom, Intel Atom Inside, Intel Core, Intel Inside, Intel Insider, the Intel Inside logo, Intel NetBurst, Intel NetMerge, Intel NetStructure, Intel SingleDriver, Intel SpeedStep, Intel Sponsors of Tomorrow., the Intel Sponsors of Tomorrow. logo, Intel StrataFlash, Intel vPro, Intel XScale, InTru, the InTru logo, the InTru Inside logo, InTru soundmark, Itanium, Itanium Inside, MCS, MMX, Moblin, Pentium, Pentium Inside, Puma, skoool, the skoool logo, SMARTi, Sound Mark, Stay With It, The Creators Project, The Journey Inside, Thunderbolt, Ultrabook, vPro Inside, VTune, Xeon, Xeon Inside, X-GOLD, XMM, X-PMU and XPOSYS are trademarks of Intel Corporation in the U.S. and/or other countries.

* Other names and brands may be claimed as the property of others.

Microsoft, Windows, and the Windows logo are trademarks, or registered trademarks of Microsoft Corporation in the United States and/or other countries.

Java is a registered trademark of Oracle and/or its affiliates.