

Intel® VTune™ Amplifier 2016 for Systems Release Notes for FreeBSD* OS

Installation Guide and Release Notes

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1 Introduction

Intel® VTune™ Amplifier 2016 for Systems provides an integrated performance analysis and tuning environment with graphical user interface that helps you analyze code performance on systems with IA-32 or Intel® 64 architectures.

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

VTune Amplifier 2016 for Systems has a standalone graphical user interface (GUI) as well as a command-line interface (CLI).

VTune Amplifier 2016 for Systems includes the Intel® Energy Profiler to optimize energy and power use.

2 What's New

VTune Amplifier 2016 for Systems

For **FreeBSD*** targets:

- Command line interface `amplxe-cl` tool for local event-based sampling analysis on FreeBSD targets
- Event-based sampling with the frame-pointer-based stacks analysis

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 for Systems 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 for Systems, 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

1. At least 2 GB of RAM

Disk Space Requirements

2. 650 MB free disk space required for all product features and all architectures

Software Requirements

- Supported Linux distributions:
 - Red Hat* Enterprise Linux 5 and 6 [1]
 - CentOS* versions equivalent to Red Hat* Enterprise Linux* versions listed above
 - SUSE* Linux* Enterprise Server (SLES) 11 and 12
 - Fedora* 20 and 21
 - Ubuntu* 12.04, 14.04 and 14.10 [2]
 - Debian* 6.0 and 7.0
- Supported compilers:
 - Intel® C/C++ Compiler 11 and higher
 - Intel® Fortran Compiler 11 and higher
 - GNU C/C++ Compiler 3.4.6 and higher
- Application coding requirements
 - Supported programming languages:
 - Fortran
 - C
 - C++
 - Java*
 - OpenCL*
 - Concurrency and Locks and Waits analysis types interpret the use of constructs from the following threading methodologies:
 - Intel® Threading Building Blocks
 - Posix* Threads on Linux*
 - OpenMP*[4]
 - 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
- Power analysis requirements
 - Intel Xeon® processors based on Intel® microarchitecture code named Nehalem or above
 - Linux kernel version 2.6.32 or above
- Hardware event-based sampling analysis with stacks requirements
 - Linux kernel version 2.6.32 or above
- To view PDF documents, use a PDF reader, such as Adobe Reader*.
- To enable automatic product updates with the Intel Software Update Manager, use Java* version 1.6 or higher.

Notes:

1. **Red Hat Enterprise Linux 5* is deprecated.** Support for this operating system version is deprecated, and support may be removed in a future release.
2. VTune Amplifier for Systems supports Ubuntu* 11.04 and Ubuntu* 11.10 default configuration only for event-based sampling analysis in the command line mode. To learn how to enable all other types of analysis and GUI results, please see the solutions described in the Known Limitation section, items 200197559, 200197563, of this document.
3. VTune Amplifier for Systems supports analysis of OpenMP* applications built with Intel Fortran Compiler Professional Edition version 11.0 or higher, Intel C++ Compiler Professional Edition version 11.0 or higher, or GNU* C/C++ Compiler 4.2 or higher.

Target Requirements for Embedded Linux

The target platform should be based on one of the following environments:

- Yocto Project* 1.5, 1.6 and 1.7 based environment
- CE Linux* PR35 based environment
- Tizen* IVI 3.0
- Wind River* Linux* 4, 5, 6 based environment

Target Requirements for Android

Target Processor Requirements

- 4th Generation Intel® Core™ Processors (based on Intel® Microarchitecture code name Haswell)
- Intel® Atom™ Z25XX (code name CloverView+)
- Intel® Atom™ Z34XX (code name Merrifield)
- Intel® Atom™ Z35XX (code name Moorefield)
- Intel® Atom™ Z37XX (code name Bay Trail)
- Intel® Atom™ x7 Z8700 & x5 Z8500/X8400 processor series (code name Cherry Trail)

Operating System Requirements

- Android 4.x or higher based environment

All versions of the Android 4.x and higher are supported. For your information, VTune Amplifier was qualified on Android 4.2.X, 4.3.x, and Android 4.4

Supported Compilers for Android

- Intel C/C++ Compiler 12.1 for Android and higher
- GNU* C/C++ Compiler 4.2 and higher for Intel architecture

Application Coding Requirements for Android

- Supported programming languages:
 - C
 - C++
 - Java (Dalvik and ART*)

NOTE: Intel VTune Amplifier can collect samples for any language running on the system but you can view the code source with the VTune Amplifier only for the above languages.

Target Requirements for FreeBSD*

Target Processor Requirements

Intel® Xeon® processors E7 family
Intel® Xeon® processor E5 family

Operating System Requirements

- FreeBSD v10.1 x64 based environment

Notes:

- For collection:
 - The collection utilities make use of the Performance Monitoring Unit (PMU) and Architectural Model Specific Registers (MSR) and therefore require a genuine Intel Atom processor for collection.
 - Collected results can be analyzed using any system meeting the less restrictive general operation requirements.
 - Collection requires a non-virtual machine to ensure access to the on-chip PMU and Architectural Model Specific Registers (MSR). The collection utilities are not supported within a virtual machine environment or on the Android emulator.

Target Requirements for Intel® Energy Profiler on Android

- Hardware Compatibility: Drivers needed for Intel® Energy Profiler on the Android device need to be compiled with system signature, if you do not have access to system signature for driver build and root access for install then you will need to utilize a device with OEM installed drivers.
 - Intel's microarchitecture code named Moorefield
 - Intel's microarchitecture code named Broadwell

- 4th Generation Intel® Core™ Processors (based on Intel's microarchitecture code name Haswell)
- Intel's microarchitecture code named Merrifield
- Intel's microarchitecture code named BayTrail
- Intel's microarchitecture code named Minnowboard Max
- Intel's microarchitecture code named Tangier
- Intel's microarchitecture code named ValleyView2
- Intel's microarchitecture code named CloverTrail+
- Existing Drivers on Production Devices:
 - Dell Venue 8 (3830 CloverTrail+)
 - (http://opensource.dell.com/releases/Venue_8_3830_CloverTrail_plus/developer-edition/ for installation notes and product specific information)
 - <https://software.intel.com/en-us/articles/how-to-use-the-intel-vtune-amplifier-2014-for-systems-on-a-dell-venue-8>
 - Dell Venue 8 (3840 Merrifield)
 - (http://opensource.dell.com/releases/Venue_8_3840_Merrifield/developer-edition/ for installation notes and product specific information)
 - Some drivers and instructions from 3830 directory may still be applicable/necessary.

Target Requirements for Intel Energy Profiler™ on Linux

Hardware Compatibility: To use the Intel Energy Profiler on Linux both of the following requirement must be met:

- Intel Xeon® processor code named Nehalem or greater.
- Intel Xeon® processor earlier than Intel microarchitecture code named Haswell.

Note: Intel® Atom™ based processor are not currently supported.

Software Compatibility:

Linux* kernel version greater than 2.6.32

Target FreeBSD* collection

Running VTune Amplifier 2016 for Systems on FreeBSD is similar to other Linux* distributions but it also has many important differences that affect the usage model. The model we use for FreeBSD is the standard embedded paradigm of collecting trace data on your FreeBSD target and visualizing this data on a Linux* system where you have installed VTune Amplifier.

VTune Amplifier 2016 supports the following usage modes for **event-based sampling analysis** and **frame-pointer-based stacks analysis** on FreeBSD, see product help topic “*Remote Performance Analysis Workflow for Linux Systems*” for detailed description of each mode:

1. **Remote CLI (amplxe-cl) or GUI (amplxe-gui)** for remote analysis from Linux, Windows or OS X host to FreeBSD x86_64 target
2. **Native CLI** with running collection via **amplxe-cl** directly on a FreeBSD system. Results can be viewed via amplxe-cl or amplxe-gui on a host system.
3. **Native SEP** with running **sep** directly on a FreeBSD system. Results can be imported and viewed via amplxe-cl or amplxe-gui on a host system.

The steps you need to take to configure your FreeBSD target for EBS analysis:

1. Copying data collectors

Copy and unpack the **vtune_amplifier_2016_*_for_systems_FreeBSD_zip.gz** target package archive to the target device using ftp, sftp or scp.

2. Building and Installing the SEP driver

In the unpacked FreeBSD target package on the device:

1. Build the sep and pax device drivers
 - a. cd sepdk/fbsd_kernel/modules
 - b. make install
2. Install the drivers
 - a. You need to install the drivers as root
 - b. kldload sep pax
 - i. If you need to unload a driver the command is kldunload sep pax

3. Configure and run EBS analysis by following instructions in the VTune Amplifier help depending on chosen mode:

- Native Sampling Collector (SEP) Usage mode
- Remote Performance Analysis Workflow for Linux Systems

Additional tips

By default sep put temporary files in /tmp. The files can get quite large during sampling. Users can specify SEP_TMP_DIR to specify a different temp file directory.

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.

This product package can be used to install the software on both IA-32 systems and Intel® 64 systems. The installer determines the system architecture and installs the appropriate files.

To begin installation, do the following:

1. *gunzip* and *untar* to retrieve the installation package.
2. Execute the `./install.sh` script file (available at the top level in the extracted contents) as a root user. Activation is required. You may run `./install_GUI.sh` script file for installation in graphical mode.

Notes:

- To install all components to a network-mounted drive or shared file system, execute the following command in place of the one in step 2 above: `./install.sh -- SHARED_INSTALL`
- The install can be run as a non-root user, but in this case not all collectors will be available to the user.
- For successful installation you should have read and write permissions for the `/tmp` directory.

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.
- Remote activation using serial number. Used when your computer is not connected to the internet. You can use another computer with internet access.
- Activation using license file.
- Activation using license server.

Default Installation Directories

The default top-level installation directory for the VTune Amplifier installed as a part of Intel System Studio:

- `/opt/intel/system_studio_2016.0.xxx/vtune_amplifier_2016_for_systems/` - for root user;
- `~/intel/system_studio_2016.0.xxx/vtune_amplifier_2016_for_systems/` - for regular users

The default installation directory for the standalone VTune Amplifier installed on a system without Intel System Studio:

- `/opt/intel/vtune_amplifier_for_systems_2016.xxx` - for root user;
- `~/vtune_amplifier_for_systems_2016.xxx` - for regular users

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

- `<install-dir>`
 - `bin32`
 - `bin64*`
 - `config`
 - `documentation`
 - `include`
 - `lib32`
 - `lib64*`
 - `man`
 - `message`
 - `powerdk`

- o resources
- o samples
- o sdksepdk
- o target

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

Establishing the VTune Amplifier for Systems Environment

Use the `amplxe-vars.sh` or `amplxe-vars.csh` script to establish the VTune Amplifier for Systems environment, depending on used command interpreter (bash or csh/tcsh).

The command takes the form:

```
source <install-dir>/amplxe-vars.sh OR
```

```
source <install-dir>/amplxe-vars.csh
```

Advanced Installation Options

VTune Amplifier for Systems uses kernel drivers to enable event-based sampling (EBS) analysis and power analysis.

The VTune Amplifier installer will not automatically use the SEP Driver Kit and the PWR Driver Kit to try and build a driver for your kernel on your host system. The driver must be built manually after the product is installed using the SEP Driver Kit and the PWR Driver Kit.

Note: Kernel header sources and other additional software may be needed to build and load the kernel drivers on the Linux* operating system. For details, see the README.txt files in the `sepdk/src` and `powerdk/src` directories.

When the Advanced installation is chosen, the following options are available:

- Sampling driver install type [build driver (default) / driver kit files only]
- Power driver install type [build driver (default) / driver kit files only]

You may change the option to `driver kit files only` if you do not want to build/install driver or want to do it manually after installation.

- Driver access group [vtune (default)]

Setting the driver access group ownership is a security feature and is used to control access to the kernel module. By default, the group for accessing the driver is “vtune”. You may set your own group during installation or change it manually after installation by executing `./boot-script --group <your_group>` from the `sepdk/src` and `powerdk/src` directories.

- Driver permissions [660 (default)]

You may change permissions for the driver.

- Load driver [yes (default)]

By default, installation loads the driver into the kernel upon successfully building it.

- Install boot script [yes (default)]

By default, installation sets up a boot script that loads the driver into the kernel each time the system is rebooted. The boot script can be disabled later by executing `./boot-script --uninstall` from the `sepdk/src` and `powerdk/src` directories, as well as enabled via `./boot-script --install`.

- Enable per-user collection mode [no (default) / yes]

When the per-user collection mode is on, the collector gathers data only for the processes spawned by the user who started the collection. When it is off (default), samples from all processes on the system are collected.

- Driver build options ...

With this option you may specify the location of the kernel header files on this system, the path and name of the C compiler to use for building the driver, the path and name of the make command to use for building the driver. Otherwise, installation will attempt to locate these by looking in the default directories.

Note: While a number of Linux* OS distributions are supported, the product testing has been limited to the stock Linux* kernel version associated with a distribution release. Updating the kernel to a newer version after the VTune Amplifier for Systems has been installed will require rebuilding its sampling (SEP) driver. Since the kernel is updated, the driver may not build due to changes in the kernel. You are recommended to back out the kernel updates until the kernels are officially supported in future releases of the VTune Amplifier for Systems. To check availability, please submit an issue at Intel® Premier Support (<https://premier.intel.com>).

Intel® Energy Profiler - Optimize System Power & Energy Use – Extend Battery Life

Intel Energy Profiler identifies the system behaviors related to energy consumption on Intel® architecture-based platforms. It monitors power states, frequencies, wakeups and various other metrics. Intel Energy Profiler currently has two parts: The Intel® SocWatch collector and the viewer built into VTune Amplifier.

Intel® Software Manager

Intel® Software Manager is a utility that allows you 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.

Removing the Product

If you want to remove an installation, run the `uninstall.sh` script from the product installation folder.

6 Issues and Limitations

Known Issues and Limitations

- **Attaching to a process on FreeBSD* OS depends on procfs (process file system) mounting (200568444)**
 - VTune Amplifier fails to attach to a process on FreeBSD if *procfs* is not mounted. To resolve that, mount the */proc* file system using the following command:

```
mount -t procfs proc /proc'
```
- **VTune Amplifier collection fails on FreeBSD* OS if libiconv package is missing (200568470)**
 - To run VTune Amplifier collection on FreeBSD, the *libiconv* package must be installed on your target analysis system.
- **GPU Data collection**
 - Similar to running graphics applications with hardware acceleration, you cannot run GPU data collection via a Remote Desktop connection. To run the GPU data collection, run the VTune Amplifier from the target computer's console or access the computer via VNC. To monitor general GPU busyness over time, run the VTune Amplifier as an Administrator.
- **Can't load drivers into kernel**

- Most Android kernels only allow signed drivers. If you try and install a driver (sep3_10.ko, pax.ko, vtssp.ko, SOCWATCH1_3.ko or apwr3_1.ko), which has been built after the kernel was built, you will get an error message stating that no signing key is found. To workaround, you must build drivers with the exact signing key created when the Android OS (boot.bin) was built. The easiest way to do that is to use drivers which have been integrated into the kernel
- **Can't see Java functions/source/assembly on Android systems using Dalvik**
 - The Dalvik runtime needs to be instrumented for the VTune Amplifier to be able to see Java functions/source/assembly. The Android OS for 4th Generation Intel Core™ processors (based on Intel Microarchitecture code name Haswell) does not have the necessary instrumentation to support Java analysis. Once the necessary patches are applied to the Dalvik runtime, Java support will be available. To see Java functions/source/assembly, the target installer needs root access to the device to modify `/data/local.prop`. By default, the VTune Amplifier installs support for viewing Java functions and assembly but not for source. To enable Java source view, see *Preparing a Target Android* System for Remote Analysis: Enabling Java* Analysis* help topic or <https://software.intel.com/en-us/articles/enabling-java-analysis-on-android-using-vtune-amplifier-2014-for-systems>.
- **The event help for Intel 22 nm ultra-mobile processor (code name: Silvermont) does not include documentation on how to collect precise events.**
 - For those events that support a precise implementation (supports PEBS), you can get the precise version by referencing the event with a `_PS`. The precise events include:
 - BR_INST_RETIRED.ALL_BRANCHES_PS, BR_INST_RETIRED.CALL_PS,
 - BR_INST_RETIRED.FAR_BRANCH_PS, BR_INST_RETIRED.IND_CALL_PS,
 - BR_INST_RETIRED.JCC_PS, BR_INST_RETIRED.NON_RETURN_IND_PS,
 - BR_INST_RETIRED.REL_CALL_PS, BR_INST_RETIRED.RETURN_PS,
 - BR_INST_RETIRED.TAKEN_JCC_PS,
 - BR_MISP_RETIRED.ALL_BRANCHES_PS,
 - BR_MISP_RETIRED.IND_CALL_PS, BR_MISP_RETIRED.JCC_PS,
 - BR_MISP_RETIRED.NON_RETURN_IND_PS,
 - BR_MISP_RETIRED.RETURN_PS, BR_MISP_RETIRED.TAKEN_JCC_PS,
 - INST_RETIRED.ANY_PS, MEM_UOPS_RETIRED.DTLB_MISS_LOADS_PS,
 - MEM_UOPS_RETIRED.HITM_PS,
 - MEM_UOPS_RETIRED.L2_HIT_LOADS_PS,
 - MEM_UOPS_RETIRED.L2_MISS_LOADS_PS,
 - REHABQ.LD_BLOCK_ST_FORWARD_PS, REHABQ.LD_SPLITS_PS
- **Error in configuration for the VTune Amplifier for Systems Wind River Linux integration**

The problem is that when Vtune Amplifier for Systems is installed without Intel® System Studio then during configuration of the platform project the following error is occurred:

- ERROR: Traceback (most recent call last):

```
File "/work/WindRiver_6_workspace/intel64/bitbake/lib/bb/cookerdata.py", line 162, in
wrapped return func(fn, *args)
```

```
File "/work/WindRiver_6_workspace/intel64/bitbake/lib/bb/cookerdata.py", line 176, in
_inherit bb.parse.BBHandler.inherit(bbclass, "configuration INHERITS", 0, data)
```

```
File
```

```
"/work/WindRiver_6_workspace/intel64/bitbake/lib/bb/parse/parse_py/BBHandler.py", line 88, in
inherit
```

```
include(fn, file, lineno, d, "inherit")
```

```
File
```

```
"/work/WindRiver_6_workspace/intel64/bitbake/lib/bb/parse/parse_py/ConfHandler.py", line
94, in include raise ParseError("Could not %(error_out)s file %(fn)s" % vars(), oldfn, lineno)
ParseError: ParseError in configuration INHERITS: Could not inherit file classes/tc-
secondary.bbclass
```

The workaround is to comment the following lines in layer.conf file from wr-iss-2015/conf directory.

- <...>
SECONDARYTC = 'icc'
<...>
INHERIT += 'tc-secondary tc-sanitycheck'

- **Error building the VTune™ for Systems target package for Wind River Linux 6**

```
Computing transaction...error: Can't install intel-iss-vtune-target-2015-
r0.0@intel_x86_32: no package provides libamplxe_ivbm_core_2.5.so
```

```
...
”
```

Or similar error related to installing VTune's target package into target image

Workaround:

1. Remove package from image .

```
$ cd project_name_prj/build
```

```
$ make intel-iss-vtune-target.rmpkg
```

2. Prepare image without VTune:

```
$ cd ../
```

```
$ make reconfig
```

```
$ make usb-image (or another target for image)
```

3. Copy VTune target files to target.

If customer faced mentioned above bug – it means RPM package already built and located in the:

```
project_name_prj/build/intel-iss-vtune-target/deploy-  
rpms/<image_config_name>/intel-iss-vtune-target-2015-r0.0.intel_<arch>.rpm  
For example:
```

```
$/home/vtune/WindRiver/workspace_wrl6/test3_prj/build/intel-iss-vtune-  
target/deploy-rpms/intel_x86_32/intel-iss-vtune-target-2015-  
r0.0.intel_x86_32.rpm
```

So we need we can install it on target (as root):

```
rpm -ihv --nodeps intel-iss-vtune-target-  
2015r0.0.intel_x86_32.rpm
```

or copy it as tarball, so on **host** first:

```
$ cd project_name_prj/build/intel-iss-vtune-target/image  
$ tar czf intel-iss-vtune-target.tar.gz opt  
$ scp intel-iss-vtune-target.tar.gz root@target:/tmp # or copy in  
any other way
```

And then on target (as root):

```
$ tar xzf intel-iss-vtune-target.tar.gz -C /
```

- **SoCWatch/WuWatch Error Message: Warning: The OS is NOT configured to track kernel wakelocks; kernel wakelock data will NOT be collected! ERROR: could NOT enable user wakelock tracing! Please set wakelock.trace to 1**
 - The patches required to support wakelock tracing have not been applied to Android OS for 4th Generation Intel® Core™ Processors (based on Intel® Microarchitecture code name Haswell). Once those patches have been applied the Android wakelock feature in SoCWatch will be available
- **VTune™ Amplifier for Systems target executables do not work on Yocto Project 1.5 x64 due to different paths to ld.**

They failed with message:

```
"  
-sh: ./amplxe-runss: No such file or directory  
"
```

Usually ld is located in /lib64/ld-linux-x86-64.so.2 but on Yocto 1.5 x64 it is located in /lib/ld-linux-x86-64.so.2

- The workaround is to create "/lib64/ld-linux-x86-64.so.2" as a symlink to /lib/ld-linux-x86-64.so.2

- **Running time is attributed to the next instruction (200108041)**
 - To collect the data about time-consuming running regions of the target, the VTune™ Amplifier 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.

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

- **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 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.

- **Link to instruction guide: instruction set reference document is not positioned on description of proper instruction. (200091607)**
 - 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.

- **VTune™ Amplifier 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 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.

- **Security-enhanced Linux* is not supported** (200155374)
 - Security-enhanced Linux settings (SELinux) are currently not supported by the VTune Amplifier and need to be either disabled or set to permissive for a successful tool suite installation. If your Linux distribution has SELinux enabled the following error message will be issued by the installer: "Your system is protected with Security-enhanced Linux (SELinux). We currently support only "Permissive" mode, which is not found on the system. To rectify this issue, you may either disable SELinux by - setting the line "SELINUX=disabled" in your /etc/sysconfig/selinux file - adding "selinux=0" kernel argument in lilo.conf or grub.conf files or make SELinux mode adjustment by - setting the line "SELINUX=permissive" in your /etc/sysconfig/selinux file or ask your system administrator to make SELinux mode adjustment. You may need to reboot your system after changing the system parameters. More information about SELinux can be found at <http://www.nsa.gov/selinux/>"

- **On Ubuntu* 11.04 and Ubuntu 11.10 systems, Standalone GUI silently disappears when opening the results.** (200197559)
 - You are recommended to switch visual theme to "New wave" or switch to another window manager, for example, KDE*.

- **VTune Amplifier collectors may fail to run on the Ubuntu 11.04 and Ubuntu 11.10** (200197563)
 - VTune Amplifier may fail to collect data for Hotspots, Concurrency, and Locks and Waits analysis types on the Ubuntu 10.10 and Ubuntu 11.04 operating system. Once a collection is started, the message appears in the output: "Failed to start profiling because the scope of ptrace() system call application is limited. To enable profiling, please set /proc/sys/kernel/yama/ptrace_scope to 0. See the Release Notes for instructions on enabling it permanently."
 - To workaround this problem for the current session, set contents of the /proc/sys/kernel/yama/ptrace_scope sysctl file to 0.
 - To make this change permanent, set kernel.yama.ptrace_scope value to 0 at /etc/sysctl.d/10-pttrace.conf file using root permissions and reboot the machine.

- **Concurrency analysis may provide incorrect Wait time data if Linux futexes are used** (200163557)
 - In certain cases, custom synchronization constructions based on Linux futexes are not detected by the VTune Amplifier. System libraries may also use such constructions. To ensure Wait time correctness in the Concurrency analysis, use syscall(SYS_futex, ...) API in your code.

- **VTune Amplifier collectors may crash or produce corrupted data while profiling stripped binaries.** (200165647)
 - VTune Amplifier may fail to collect data for Hotspots, Concurrency, and Locks and Waits analysis types if the main executable of an analysis target statically links some symbols from libc.so or libpthread.so (for example, pthread_create). To avoid this, do not strip the main executable. Use the -E linker switch to export the statically linked symbols to the dynamic symbol table of the main executable. For the list of symbols required for correct profiling, see the Analyzing Statically Linked Libraries topic in the online help.

- **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.

- **Running other PMU-based tools simultaneously with hardware event-based sampling collection is not supported** (200166101)
 - The Sampling Driver requires exclusive use of the PMU resources. Running multiple PMU based tools will cause incorrect results and/or system instability.

- **Hotspots, Concurrency and Locks and Waits analysis types may not work on executables that do not depend on the libpthread.so.0 library.** (200208975)
 - There is currently a limitation in the product regarding profiling application targets where the executable does not depend on the libpthread.so.0 library. The message "Link libpthread.so to the application statically and restart profiling" appears when profiling an application where program image does not depend on libpthread.so.0 but then it dlopen()-s a shared library which does depend on libpthread.so.0. The collector is not able to follow the program execution and module load/unload so the collection results are likely to be misleading. A workaround is to set "LD_PRELOAD=libpthread.so.0" before running the collection.

- **Opening results significantly delayed on Linux systems configured with "large pages"** (200215471)
 - To work around this issue make sure that you have hugectl utility and libhugectlbfs library on the system. VTune Amplifier can be started this way:
 - hugectl --heap <amplxe install dir>/bin32/amplxe-gui
 - LD_PRELOAD=libhugectlbfs.so <amplxe install dir>/bin64/amplxe-gui

- **Event-based profiling results may be incorrect if nmi_watchdog interrupt capability is enabled** (200171859)
 - If the nmi_watchdog interrupt capability is enabled on a Linux system, event-based profiling results may be incorrect. For example, when using a pause-resume scenario for event-based analysis on 64-bit Red Hat* Enterprise Linux* 6.1 with this feature enabled, no data will be collected after the collection is resumed. Before running event-based analysis on Linux systems, ensure that the nmi_watchdog interrupt capability, if available, is disabled. Disabling the

nmi_watchdog interrupt is accomplished by adding the Linux kernel boot parameter 'nmi_watchdog=0' to your system boot loader and then rebooting the system.

- **Additional setup is needed to use ITT API in attach to process mode (200172007)**
 - To enable user API in attach mode, set the following environment variables before starting target application:
 -
 - INTEL_LIBITTTNOTIFY32=<install_dir>/lib32/runtime/libittnotify_collector.so
 - INTEL_LIBITTTNOTIFY64=<install_dir>/lib64/runtime/libittnotify_collector.so
 -
 - Note: the variables should contain the full path to the library without quotes.
- **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.
- **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 “-inline-debug-info”, but avoid using the -ipo option. Currently this option disables generating the inline debug information in the compiler.
- **Intel® Compiler currently 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 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).
- **Help TOC is truncated in some Linux browsers. (200272063)**
 - When using certain HTML browsers to view the VTune Amplifier documentation, if the Contents tab width appears truncated and hides some of the topic titles:
 - - Click the Index (or Search) button
 - - Click the Contents button
- **VTune™ Amplifier data collection on Intel® Xeon Phi™ coprocessor (codename: Knights Corner) currently is limited to hardware event-based sampling data collected from target units (200179057)**
 - No information on function call stacks is recorded during collection. However, you may mistake partial call chains appearing in result Groups for real call stack

information. These partial chains are the result of inline function information in debug symbol tables and can be ignored.

- **Attaching to managed run-time processes is not supported** (200179386)
 - When attaching to a Java application the information of managed run-time part of the application will not be provided in results. The resulting profile will contain only native code relevant information. This issue may be resolved in one of future releases.
- **Attaching the VTune Amplifier to a process may take some time** (200276420)
 - Your target application may complete before the data collection starts, so the VTune Amplifier may report an error. Increase the duration of your test application if necessary.
- **VTune Amplifier user APIs are not supported for static binaries** (200279211)
 - To use ITT and JIT APIs with software based collectors (Hotspots, Concurrency, Locks and Waits) user needs to link their application dynamically. Otherwise ITT and JIT API notifications will be missing in the result.
- **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-32 Architectures 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.
- **Hot functions are duplicated in the grid if inline mode is ON. When turning it off, only one entry remains but the stack for it is not resolved.** (200287043)

- Change stack unwinding mode to "After collection". For doing this create a new custom analysis and select 'After collection' in 'Stack unwinding mode' drop-down list.
- **Intel(R) VTune(TM) Amplifier may detect which timer source to use incorrectly on Intel® Xeon® processor E5-XXXX processors. (200287361)**
 - In User mode Samplign and Tracing based analysis (Hotspots, Concurrency, Locks and Waits) the following message may be displayed in command line or Debug Window:
 - Warning: Cannot load data file `C:\art\tmp\1\r003hs\data.0\18385-18389.0.trace' (SampleCallback: timestamps aren't ascended!).
 - To work around the problem collect results from command line using "-run-pass-thru" option:
 - `amplxe-cl -collect hotspots -run-pass-thru=timestamp=sys -- <application>`
- **List of hotspots may contain "Outside any known module" on systems with kernel older than 2.6.20 (200233501)**
 - Results of user mode sampling and tracing based analysis types may contain "Outside any known module" region. Those samples may actually come from vsyscall module. This is kernel problem that fixed in later versions.
- **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.
- **When installing on a Xen* virtual machine, it may happen that installation script exits claiming CPU is unsupported. (200294340)**
 - To skip the check for CPU model, add --ignore-cpu parameter to install script command line:
 - `./install.sh --ignore-cpu`
- **User-mode sampling and tracing collection may cause an error when profiling COI/SCIF application on Intel(R) Xeon Phi(TM) processor (200234639)**
 - If you get a COI buffer error with User-mode sampling and tracing collection, use hardware event-based analysis instead.
- **Decreasing sampling interval for user-mode sampling and tracing collection may lead to wrong CPU usage data (200296537)**
 - TPSS sampling technology is based on OS timers which cannot tick faster than HZ value configured during kernel compilation. Sampling interval should not be less than HZ value.
- **Results should be closed before comparing them (200236090)**
 - VTune Amplifier 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.

- **User tasks, events and frames marked with ITT APIs may not be shown if target application is finished by Ctrl+C** (200304207)
 - Use another method to stop application, or VTune Amplifier "stop" command.
- **Functions from kernel modules do not appear in the collection results** (200311949)
 - Hardware event-based analysis results may not contain functions from kernel modules if kernel pointers were explicitly hidden by setting the "kptr_restrict" sysctl to non-zero value.
 - To workaround this problem for the current session, set contents of the `/proc/sys/kernel/kptr_restrict` sysctl file to 0.
- **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.
- **VTune Amplifier may report less data than expected on Intel Xeon Phi coprocessor due to power management settings** (200343917)
 - VTune Amplifier may show less data than expected when profiling an Intel Xeon Phi application. E.g. results may contain data collected only on a few CPUs, data collected only on a short period of time, etc. This issue does not occur on Intel® Xeon Phi™ Coprocessor 5110P. The problem is caused by interoperability with system power management.
 - As a workaround you can disable power management for the Xeon Phi card:
 1. In configuration file `/etc/mpss/mic0.conf` if exists, otherwise in `/etc/sysconfig/mic/mic0.conf`:
 - change: `PowerManagement "cpufreq_on;corec6_on;pc3_on;pc6_on"`
 - to: `PowerManagement "cpufreq_on;corec6_off;pc3_off;pc6_off"`.
 2. Issue the following commands:
 - `sudo service micras stop`
 - `sudo service mpss unload`
 - `sudo micctrl --resetconfig`
 - `sudo service mpss start`
 3. Start VTune Amplifier profiling again.
- **Analysis of applications remapped to hugtlbfs is not supported** (200244405)
 - VTune Amplifier doesn't support analyzing a process that is mapped to hugtlbfs file system, e.g. using libhugtlbfs utility.
- **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.

- **VTune™ Amplifier for Systems target executables do not work on Yocto Project 1.5 x64 due to different paths to ld** (200507491)
 - They failed with message: "-sh: ./amplxe-runss: No such file or directory"
 - Usually ld is located in /lib64/ld-linux-x86-64.so.2 but on Yocto 1.5 x64 it is located in
 - /lib/ld-linux-x86-64.so.2
 - The workaround is to create "/lib64/ld-linux-x86-64.so.2" as a symlink to /lib/ld-linux-x86-64.so.2

- **Linux systems with real time kernel versions are not fully supported** (200524374)
 - Event Based Sampling analysis with stacks and user mode sampling and tracing based analysis types are not supported on systems with real time kernel. Event Based Sampling analysis without stacks are supported if real time kernel is run on a supported Linux distribution.

- **VTune Amplifier GUI may not have scroll bars on Ubuntu 12.04** (200534347)
 - On the Ubuntu 12.04 with the overlay scrollbars style there maybe be no scrollbars available in the VTune Amplifier GUI. To get them shown - change scrollbar style by invoking the command below before running amplxe-gui:
 - gsettings set org.gnome.desktop.interface ubuntu-overlay-scrollbar false

- **Event-based sampling driver fails to build on Yocto Project 1.6 Intel x86_86 BSPs due to missing CONFIG_COMPAT #define in linux kernel headers** (200359539)
 - Sampling driver fails to build on Yocto x86_64 BSPs images which do not have "CONFIG_COMPAT=y" setting (https://bugzilla.yoctoproject.org/show_bug.cgi?id=6777)
 - To resolve the issue you need to re-build the image with the option manually.
 - Change kernel configuration according to <http://www.yoctoproject.org/docs/1.6.1/kernel-dev/kernel-dev.html#changing-the-configuration>:
 - 1. Create compat.cfg file in meta-yocto-bsp/recipes-kernel/linux/files/ directory with content:
 - CONFIG_IA32_EMULATION=y
 - CONFIG_COMPAT=y
 - 2. Add next strings to meta-yocto-bsp/recipes-kernel/linux/linux-yocto_3.10.bbappend
 - FILESEXTRAPATHS_prepend := "\${THISDIR}/files:"
 - SRC_URI += <file://compat.cfg>
 - 3. Clean and build a modified kernel according to <http://www.yoctoproject.org/docs/1.6.1/dev-manual/dev-manual.html#patching-the-kernel> and <http://www.yoctoproject.org/docs/1.6.1/dev-manual/dev-manual.html#build-the-modified-qemu-kernel-image>:
 - \$ bitbake linux-yocto -c cleansstate
 - \$ bitbake -k linux-yocto
 - 4. Build image
 - \$ bitbake core-image-sato

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June 14, 2012

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

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pci.ids

```
#
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#
# Version: 2014.11.23
# Date: 2014-11-23 03:15:02
#
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