Intel® VTune™ Amplifier XE 2011 Release Notes for Linux

Installation Guide and Release Notes

Document number: 323591-001US

9 December 2010

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1 Introduction

The Intel® VTune™ Amplifier XE 2011 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.

The Intel® VTune™ Amplifier XE 2011 has a standalone graphical user interface (GUI) as well as a command-line interface (CLI).

2 What's New

The Intel® VTune™ Amplifier XE 2011 Update1:

- Red Hat* Enterprise Linux 6 support
- CentOS* 5.5 support

- Ubuntu* 10.04 support
- Data export to CSV file format
- Source / assembly toggling button
- Several bugs were fixed.

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 Intel® 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 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 requires a non-virtual machine to ensure access to the on-chip PMU. EBS is not supported within a virtual machine environment.

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

Mobile processors
Intel® Core™ i7 Mobile Processor Extreme Edition
Intel® Core™ i7, i5, i3 Mobile Processors
Intel® Core™2 Extreme Mobile Processor
Intel® Core™2 Quad Mobile Processor
Intel® Core™2 Duo Mobile Processor
Intel® Core™ Duo Processor
Intel® Core™ Solo Processor
Intel® Pentium® Mobile Processor

Desktop processors
Intel® Core™ i7 Desktop Processor Extreme Edition
Intel® Core™ i7, i5, i3 Desktop 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 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

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

Software Requirements

- Supported Linux* distributions:
  - Red Hat* Enterprise Linux 4 (starting from Update 8)
  - Red Hat* Enterprise Linux 5 and 6
  - SUSE* Linux* Enterprise Server (SLES) 10 and 11
  - Fedora* 12 and 13
  - CentOS* 5.5
  - Ubuntu* 10.04
  - Ubuntu* 10.10†

†VTune™ Amplifier XE supports Ubuntu* 10.10 only for event-based sampling analysis in the command line mode. All other types of analysis and GUI results analysis are not supported and may lead to unexpected behavior.

- We support all OS distributions above. For your information, VTune™ Amplifier XE was qualified on the builds listed below:
  - Red Hat* Enterprise Linux 4 Update 8
  - Red Hat* Enterprise Linux 5 Update 4 and 5
  - SUSE* Linux Enterprise Server 10 Service Pack 2 and 3
  - SUSE* Linux Enterprise Server 11 Service Pack 1
  - Fedora* 12 and 13
  - CentOS* 5.5
  - Ubuntu* 10.04
- 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++
  - Supported threading methodologies:
    - Intel® Threading Building Blocks
    - Posix* Threads on Linux*
    - OpenMP*[1]
    - Intel's C/C++ Parallel Language Extensions

- Adobe* Reader* 7.0 or later to read installed documentation,

Notes:
1. 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, or GNU C/C++ Compiler 3.4.6. Applications that use OpenMP* technology and are built with the GNU compiler must link to the OpenMP* compatibility library as supplied by an Intel® 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
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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. Both 32-bit and 64-bit versions of the software are automatically installed on an Intel® 64 system.

To begin installation, do the following:

1. *gunzip* and *untar* to retrieve the installation packages.
2. Execute the `./install.sh` script file (available at the top level in the untarred contents) as a root user. Activation is required.

Note:

1. 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`
2. The install can be run as a non-root user, but in this case not all collectors will be available to the user.
3. For successful installation you should have read and write permissions for the `/tmp` directory.

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 collecting data remotely. Data collection on 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. Copy the `CLI_install` folder (found at the top level in the untarred product install package) to the remote machine.
2. Execute `./install.sh` script file (this file is located inside the CLI_install folder). No activation will be required.

Default Installation Directories

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

- `/opt/intel/vtune_amplifier_xe_2011/`

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

- `/opt/intel/vtune_amplifier_xe_2011/`
  - `bin32`
  - `bin64*`
  - `config`
  - `documentation`
  - `include`
  - `lib32`
  - `lib64*`
  - `man`
  - `message`
  - `resources`
  - `sepdk`
  - `samples`

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

Establishing the VTune™ Amplifier XE Environment

The `amplxe-vars.sh` script is used to establish VTune™ Amplifier XE the environment.

The command takes the form:

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

Advanced Installation Options

VTune™ Amplifier XE uses a kernel driver to enable event-based sampling (EBS) analysis. If you are not using a default kernel on the supported Linux* distributions listed above, use the SEP Driver Kit in VTune™ Amplifier XE to compile drivers for your kernel. The SEP Driver Kit software can also be obtained via Intel® Premier Support. See Technical Support section for more information on the Intel® Premier Support.

If no pre-built drivers are provided for your kernel, VTune™ Amplifier XE installer will automatically use the SEP Driver Kit to try and build a driver for your kernel. The driver can also be built manually after the product is installed using the SEP Driver Kit.

Note: additional software may be needed in order to build and load the SEP kernel driver on the Linux* operating system. For details, see the README.txt file in the `sepdk/src` directory.

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

- `Driver install type [ use pre-built driver (default) / build driver / driver kit files only ]`

If no pre-built driver for this system is found, the option will be set to 'build driver'.

You may change the option to 'driver kit files only' if you don't 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` directory.

- `Load driver [ yes (default) ]`

By default installation loads the driver into kernel.

- `Install boot script [ yes (default) ]`

By default installation sets up a boot script which 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` directory.

How to activate your evaluation software after purchasing

Users of evaluation versions of Intel Developer Products have a new tool that allows converting evaluation-licensed products to fully licensed products once the product is purchased and a serial number is obtained. The “Activation Tool” is a utility that allows users of evaluation products to enter a valid product Serial Number to convert the product to fully licensed status.

Run the `/opt/intel/ActivationTool/Activate` script, and provide your purchased product serial number, either as an argument to the program, or when prompted. For example:

```
/opt/intel/ActivationTool/Activate ABCD-123AB45C
```

Be sure to login or "su" to root if you want the product license to be available to all system users.

Removing the Product

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

6 Issues and Limitations

Known Issues and Limitations

- **GUI may not be responsive when filtering results** (200052892)
  - When filtering large results, changing the filtering selection can take some time to process. This problem may cause the GUI to appear to hang.

- **Running time is attributed with a skid of 1 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 the instruction occurred AFTER the one that is actually consuming most of the time. This leads to the skid of one instruction for running time distribution 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.

- **Re-finalized Hotspots analysis result may contain <unknown> items** (200109010)
  - Re-finalized results for the C++ projects with the active build or target configurations different from those used during collection may contain incorrect function/source files names. To resolve this problem, re-finalize results using the same active build and target configurations as for the collection.

- **SEP may crash certain NHM systems when deep sleep states are enabled** (200149603)
    - On some Intel® Core™ i7 processor-based systems with C-states enabled, sampling may cause system hanging due to a known hardware issue (see errata AAJ134 inhttp://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.

- **Specifying too low "Sampling After Value" for some events may cause system hang due to frequent events triggering during the collection** (200093394)
    - Use reasonable "Sampling After Value" that result in about 1000 events triggering per second. This is statistically sufficient for the data analysis. For more fine grained analysis of sampling results, decrease the "Sampling After Value" gradually observing the system responsiveness slowdown due to frequent interruptions.

- **Security-enhanced Linux* is not supported** (200155374)
    - Security-enhanced Linux* settings (SELinux) are currently not supported by the Intel® VTune™ Amplifier XE 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/

- **The tool may not be able to parse correctly certain characters in an application's command arguments passed though a shell script** (200155871)
  - Using quotes and double quotes in the application's command arguments may not be parsed correctly. To work around the problem, use double quotes and backslashes to screen double quotes inside.
  - Incorrect: 'this "style" text'
  - Correct: "this \"style\" text"

- **VTune™ Amplifier XE does not show collected results if installed into the directory with non-English characters** (200185779)
  - When you install the product on a system with language localization, make sure the path to the installation directory does not contain non-English characters.

- **Event-based sampling collection cannot start if the result directory path contains non-English characters** (200185851)
  - When you install the product on a system with language localization, make sure the path to the result directory does not contain non-English characters.

- **GUI may crash when opening results collected on a machine with processor supporting Intel(R) AVX instruction set.** (200195265)
  - The VTune(TM) Amplifier XE standalone GUI may crash when opening sampling collection results collected on a machine with processor supporting Intel(R) AVX instruction set. This is due to the glibc version 2.12 issue #12113: http://sourceware.org/bugzilla/show_bug.cgi?id=12113 and it affects the analysis on the Fedora* 12, 13 and Red Hat* Enterprise Linux 6.0 for Intel(R) 64 architecture.
  - To workaround this problem set the environment variable LD_BIND_NOW=1 before starting the VTune(TM) Amplifier XE GUI.

7 Attributions

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

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```
/* 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

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This document contains information on products in the design phase of development.