



Intel[®] VTune[™] Profiler

Installation Guide - Windows* OS

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Introduction

Use VTune Profiler to locate or determine:

- The most time-consuming (hot) functions in your application and/or on the whole system
- Sections of code that do not effectively utilize available processor time
- The best sections of code to optimize for sequential performance and for threaded performance
- Synchronization objects that affect the application performance
- Whether, where, and why your application spends time on input/output operations
- Whether your application is CPU or GPU bound and how effectively it offloads code to the GPU
- The performance impact of different synchronization methods, different numbers of threads, or different algorithms
- Thread activity and transitions
- Hardware-related issues in your code such as data sharing, cache misses, branch misprediction, and others

This document explains how to install and configure Intel VTune Profiler on a Windows* system.

To install VTune Profiler, you can use:

- Graphical user interface (GUI) installer: Presents installation options and allows you to choose product components.

NOTE

A 64-bit operating system host is required to use VTune Profiler. You can use VTune Profiler to analyze both 32-bit and 64-bit applications.

Prerequisites

The following information is important to consider before beginning to install Intel® VTune™ Profiler.

System Requirements

Review the full list of system requirements listed in the [Release Notes](#).

NOTE

A 64-bit operating system host is required to use VTune Profiler. You can use VTune Profiler to analyze both 32-bit and 64-bit applications.

User Permissions for Install

Administrative privileges are recommended to install, change, or uninstall the product. Users without administrative permissions can install the product, but not all collectors will be available. For more information, see [Profiling Hardware Without Intel Sampling Drivers](#) Cookbook recipe. For information on building and setting up the drivers, see [Sampling Drivers](#).

Previous Versions of Intel VTune Profiler

You do not need to uninstall previous versions or updates of VTune Profiler before installing a newer version. However, if you do not remove older updates before installing a newer version, all product components that belong to the same major release will be replaced with the latest version for each major release update.

For example, if you are installing Update 2 of the VTune Profiler 2020, the VTune Profiler 2020 Update 1 version will be uninstalled and replaced with the new content for the next update. If you are installing VTune Profiler 2020 on top of VTune Amplifier 2019, your installation of VTune Amplifier 2019 will remain on your system and VTune Profiler 2020 will be installed beside the old version, duplicating common files, documentation, samples, and product components.

Installing in a Cluster Environment

If you are installing in a cluster environment, you can install and use multiple versions of the product on the same system. However, kernel driver usage is limited to a single version of VTune Profiler. This means you can have multiple copies of VTune Profiler installed without the Intel sampling drivers and a single version of the product with the drivers installed. The latter would be enabled with the advanced types of analysis using hardware event based sampling analysis data collection.

Installation Steps

The Intel® VTune™ Profiler installation package contains all components of the product in a downloadable file. The installer can be run as an administrator from a GUI.

You can choose between these types of installation when installing VTune Profiler:

- [Intel® VTune™ Profiler graphical user interface installer](#)
- [Install from the Intel® oneAPI Base Toolkit \(Beta\) or Intel® System Bring-Up Toolkit \(Beta\)](#)
- [Virtual machine installation](#)

Install with the VTune Profiler Installer Graphical User Interface

NOTE

Refer to the [Prerequisites](#) before you begin the installation.

Launch the `VTune_Profiler_<version>_setup.exe` executable to begin installation. A user interface launches with panels that guide you through the installation process.

Tip

If you plan to make modifications to your VTune Profiler installation in the future, do not select the **Remove temporarily extracted files after installation** checkbox. Selecting this checkbox limits the type of modifications you can make. For example, you cannot integrate with a new version of Microsoft Visual Studio* after completing the installation if this checkbox is selected.

You can install VTune Profiler in the following ways:

- **Recommended Installation**

Fully installs the product with commonly used features. Uses the default path and options.

- **Custom Installation**

Guides you through setting various options for your installation:

- 1. Component Selection**

Select the components to install. If a component is already installed, you will be offered to upgrade the component.

- 2. Install Location**

Specify the path for component installation.

- 3. IDE Integration**

If a supporting IDE is detected, the installer offers to integrate VTune Profiler with the IDE.

- **Download Only**

Downloads the files required for the installation for later use.

Install from the Intel® oneAPI Base Toolkit (Beta) or Intel® System Bring-Up Toolkit (Beta)

To install VTune Profiler from Intel® oneAPI Toolkits, follow the [Installation Guide for Intel® oneAPI Toolkits](#).

Virtual Machine Installation

Intel VTune Profiler can be installed and used with a variety of virtual machines. For more information, see the [Targets in Virtualized Environments](#) page of the online User Guide.

Post-Installation Steps

The table below details the suggested reading paths based on your analysis needs:

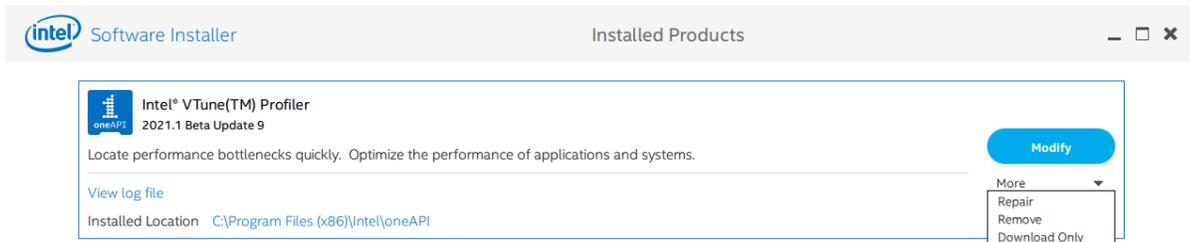
Analyze performance on a remote Linux* system	<p>Install the remote collectors and configure SSH access on a remote Linux* system. If the remote collector installation fails to install the appropriate sampling drivers, the drivers can be installed manually.</p> <ol style="list-style-type: none"> 1. Configure SSH Access for Remote Collection 2. Prepare a Target Linux* System for Remote Analysis 3. Build and Install the Sampling Drivers for Linux* Targets (optional)
Analyze performance on a remote Android* system	<p>Configure the Android* device for analysis and connect via ADB. If the appropriate sampling drivers are not available, the drivers can be installed manually. Compile the Android* application for analysis. Specify the project search directories.</p> <ol style="list-style-type: none"> 1. Set up Android* System 2. Build and Install Sampling Drivers for Android* Targets (optional) 3. Prepare an Android* Application for Analysis 4. Search Directories for Android* Targets
Analyze performance on a FreeBSD* system	<p>Install VTune Profiler collectors and drivers on a FreeBSD* system. A FreeBSD license for Intel® System Studio is required. For more information, see Set Up FreeBSD* System.</p>
Analyze performance on embedded Linux* systems	<p>Review the list of supported embedded Linux* systems. Configure the embedded Linux* environment for performance analysis. Begin with Embedded Linux* Targets.</p>
Monitor a virtual machine	<p>Review the list of supported virtual machine managers and analysis type limitations. Configure the virtual machine for performance analysis. Begin with Targets in Virtualized Environments.</p>
Analyze a target installed on the cloud	<p>Review the list of supported cloud environments and learn how to configure the cloud target for remote analysis. For more information, see Targets in a Cloud Environment.</p>

Modifying the Intel® VTune™ Profiler Installation

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You can modify an existing Intel VTune Profiler installation the following ways:

- Using the **Modify** action from the **Apps** section of Windows **Settings**. Select Intel VTune Profiler from the list of programs and click **Modify**. A GUI Dashboard launches that lists your installed products and offers options for your installed product:
 - Modify
 - Repair
 - Remove
 - Download files
- Re-launch the Intel VTune Profiler installer and select the product you want to modify. Then, select the desired action. The installer guides you through the process.



Intel® VTune™ Profiler Installation FAQs

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The following topics include answers to frequently asked questions about the Intel VTune Profiler installation and configuration process.

How do I install the drivers required by Intel® VTune™ Profiler?

Intel VTune Profiler automatically installs the required sampling drivers when the product is installed, assuming the user who installed the product has the appropriate permissions (administrative/root/sudo access). Drivers are installed on a target system when VTune Profiler connects to the target system during analysis configuration (administrative/root/sudo access required via a passwordless SSH connection). If the drivers fail to install, they can be configured manually.

The [Sampling Drivers](#) page of the online User Guide includes detailed information about installing the drivers for Linux*, Windows*, or Android* systems.

Error Message: Installing and Starting VTSS++ Driver...FAILED

Problem

When you [install the drivers manually](#), the Intel® VTune™ Profiler may display this message if memory in the system is insufficient.

Solution

Try rebooting the system.

Error Message: No Pre-built Driver Exists for This System

When executing the `build-driver` script on Linux*, you may see a warning message similar to the following if the kernel sources are not configured properly (they do not match the kernel that is running):
Warning: Current running kernel is version 2.4.18-e.31smp. After successfully building the driver and running the `insmod-sep3` or `insmod-sep` command, the following message appears: No pre-built driver exists for this system.

Solution

To resolve this issue, execute the following commands to configure the kernel sources:

```
$ cd /usr/src/linux
$ make mrproper
$ cp /boot/config-'uname -r' .config
$ vi Makefile
```

Make sure that `EXTRAVERSION` matches the tail of the output of `uname -r`. The resulting `/usr/src/linux/include/version.h` should have a `UTS_RELEASE` that matches the output of `uname -r`. Once that is true, run the following commands:

```
$ make oldconfig
```

```
$ make dep
```

After completing these steps, run the `build-driver` script to build the sampling driver against the kernel sources in `/usr/src/linux`

What features are available if I install Intel® VTune™ Profiler as a non-root or non-administrator user?

Many Intel VTune Profiler features work when installed on a system as a user other than Root or Administrator. If VTune Profiler is installed by a user with permissions other than root/administrative, then VTune Profiler can collect some data. For example, VTune Profiler may try to use the Perf* utility and run a hardware event-based sampling analysis in the [driverless mode](#).

The following features and actions require root/administrative access:

- Analysis on an Intel Atom® processor
- Installing the [sampling driver](#)
- Running a performance analysis using an [analysis type that uses event-based sampling](#)

How do I configure remote data collection using Intel® VTune™ Profiler?

Intel VTune Profiler can collect performance data on the system on which it is installed (Windows* or Linux* only; macOS* data collection is not supported) or on a remote target system (Windows, Linux, or Android* targets). To analyze performance on a remote system, follow these general steps:

1. (Linux only) Configure password-less SSH access to the target system. Password-less SSH access is required for running a remote analysis because VTune Profiler will not prompt for a password once analysis collection begins. For detailed steps, see [Configuring SSH Access for Remote Collection](#).

NOTE

VTune Profiler will not automatically install drivers on the remote system unless you connect via SSH as the root user. If you want to run an event-based collection, but do not want to set up password-less SSH access using the root user account, manually install the drivers on the target system. For detailed steps, see [Sampling Drivers](#).

2. (Android only) Configure ADB access to the target system. For detailed steps, see [Android* System Setup](#).
3. Launch VTune Profiler and open the **Configure Analysis** window.
4. Select the appropriate target system from the **WHERE** pane. For **Remote Linux (SSH)** targets, specify the username, hostname, and port in the **SSH Destination** field.

VTune Profiler connects to the remote target and installs appropriate collectors and drivers (if root access was provided). This can take a few seconds.

5. Specify a target type in the **WHAT** pane.
 - **Launch Application:** specify the location of the process on the target system.
 - **Attach to Process:** select a process from the list of available processes running on the target system.
 - **Launch Android Package:** select an application and corresponding package (*.apk) available on the target system from the list of available packages.
6. Select an analysis type from the **HOW** pane and click **Start** to run the analysis on the remote system.

For detailed steps for setting up remote collection on a specific target system, use the following topics:

- [Windows* Targets Setup](#)

- Set Up Remote Linux* Target
- Set Up Android* System

Can I install multiple versions of Intel® VTune™ Profiler on the same system?

You can install multiple major versions of Intel® VTune™ Profiler on the same system, but you cannot have multiple installations of the same major version on the same system.

NOTE

Intel® VTune™ Amplifier has been renamed to Intel® VTune™ Profiler starting with its version for Intel® oneAPI Base Toolkit (Beta). You can still use a standalone version of the VTune Profiler, or its versions integrated into Intel Parallel Studio XE or Intel System Studio.

For example, you can have both Intel VTune Profiler 2020 and Intel VTune Amplifier 2019 Update 2 on the same system. However, installing Intel VTune Amplifier 2019 Update 3 on this system will uninstall Update 2 and replace it with the Update 3 content.

Problem: Platform Not Authorized

When attempting to use Intel® VTune™ Profiler with a floating license, you may encounter errors such as:

```
(License server does not support this feature (-18,327))
```

```
(This platform not authorized by license (-89,337))
```

Cause

This error is caused by an outdated license server.

Solution

Login to the [Intel® Registration Center](#) to download the latest license server:

NOTE

The registered owner of the license must log in. Other registered users do not get access to the license server download.

1. Log in to the Intel® Registration Center.
2. In your supported products list, look for the entry for **Intel® Software License Manager** and click the version number next to it.

You will be taken to the download page for the Intel® Software License Manager.

3. In the **Platform** box on the right, select the operating system for your license server, then download the appropriate package for your license server.
4. Install the new license server software on your license server.
5. Ensure that the new license server software is running on the license server.

This should resolve the error. If not, see the [Get Help](#) page for your support options.

Uninstalling Intel® VTune™ Profiler



Use the following steps to uninstall Intel® VTune™ Profiler from your system:

1. Open the **Control Panel** window and select the **Programs and Features** option.
2. Select **Intel VTune Profiler <version>** from the program list.
3. Select **Uninstall/Change** from the actions at the top of the table or from the right-click menu.
A window opens with installer options.
4. Select the **Remove** option and click **Next**.
5. Click the **Remove** button.

Additional Resources

The following online resources may be helpful during or after the installation of Intel® VTune™ Profiler.

- [Release Notes](#): The VTune Profiler release notes include helpful information specific to your release version, including system requirements and known issues and limitations.
- [Intel VTune Profiler User Guide](#): Learn about using VTune Profiler with the online User Guide.
- [Troubleshooting Help](#): This section of the VTune Profiler online User Guide includes solutions to common problems.
- [Download Intel® Parallel Studio XE documentation](#) | [Download Intel® System Studio documentation](#): Starting with the 2018 releases, most documentation is available on the web only. You can download a copy of all documentation for use without an internet connection.

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