

Introduction

Intel® Graphics Performance Analyzers (Intel® GPA) provides tools for graphics analysis and optimizations for making games and other graphics-intensive applications run even faster. The tools support the platforms based on the latest generations of Intel® Core™ and Intel Atom® processor families, for applications developed for Windows*, Ubuntu*, or macOS*.

Intel GPA provides a common and integrated user interface for collecting performance data. Using it, you can quickly see performance opportunities in your application, saving time and getting products to market faster.

For detailed information and assistance in using the product, refer to the following online resources:

- [Home Page](#): view detailed information about the tool, including links to training and support resources, as well as videos on the product to help you get started quickly.
- [Get Started Guide](#): get the main features overview and learn how to start using the tools on different host systems.
- [Training and Documentation](#): learn at your level with Getting Started guides, videos and tutorials.
- [User Guide for Windows* Host](#): get details on how to analyze Windows* and Android* applications from a Windows system.
- [User Guide for macOS* Host](#): get details on how to analyze Android or macOS applications from a macOS system.
- [User Guide for Ubuntu* Host](#): get details on how to analyze Android or Ubuntu applications from an Ubuntu system.
- [Support Forum](#): report issues and get help with using Intel® GPA.

What's New

Intel GPA 2019 R2 includes functional and security updates. Users should update to the latest version.

Intel GPA 2019 R2 offers the following new features:

New Features for Analyzing All Graphics APIs

All Tools

- Support for 10th Generation Intel® Core™ Processors

Graphics Trace Analyzer

- Additional information for GPU/CPU queue packages

- Application-defined thread names

New Features for Analyzing Vulkan* Applications

Graphics Frame Analyzer

- Support for Ubuntu*, read the [enabling instructions](#) to view metrics on Ubuntu platforms
- Off-screen stream playback
- Queue calls in the Graphics Frame Analyzer Multiframe View
- Ability to open contiguous ranges of queue calls in the Graphics Frame Analyzer Multiframe View
- Remote stream analysis
- View and modify SPIR-V and HLSL code
- View Additional Resource Types:
 - Multisample textures
 - Stencil buffers
 - Sampler state

New Features for Analyzing Microsoft DirectX* 12 Applications

Graphics Frame Analyzer

- Stream capture with Key Framing
- Variable Rate Shading Tier1
- Primitive Replication Tier1
- Render Passes

System Requirements and Supported Platforms

The minimum system requirements are:

- Host Processor: Intel® Core™ processor
- Target Processor: See the list of supported Windows and Android devices below

- System Memory: 8 GB RAM
- Video Memory: 512 MB RAM
- Minimum display resolution for client system: 1280x1024
- Disk Space: 300 MB for minimal product installation

The table below shows platforms and applications supported by Intel® GPA 2019 R1

Target System (the system where your game runs)	Host System (your development system where you run the analysis)	Target Application (types of supported applications running on the target system)
Windows 7 SP1/8.1/10	Windows 7 SP1/8.1/10	Microsoft* DirectX* 9, 9Ex, 10.0, 10.1, 11.0, 11.1, 11.2, 11.3, 11.4
Windows 10	Windows 10	Microsoft* DirectX* 12, 12.1, Vulkan* 1.1
Ubuntu 16.04, 18.04	Ubuntu 16.04, 18.04	OpenGL* 3.2, 3.3, 4.0, 4.1 Core Profile
macOS 10.12, 10.13, and 10.14	macOS 10.12, 10.13, and 10.14	OpenGL* 3.2, 3.3, 4.0, 4.1 Core Profile and Metal* 1 and 2

Intel GPA does not support the following Windows configurations: All server editions, Windows 8 RT, or Windows 7 starter kit.

Although the tools may appear to work with the OpenGL API on the Windows platform, this API is not officially supported on Windows platforms. Some features and metrics may not be available on unsupported platforms.

Supported Windows Graphics Devices

Intel GPA supports the following graphics devices as targets for analyzing Windows workloads. All these targets have enhanced metric support:

Target	Processor
Intel® UHD Graphics 630	10th generation Intel® Core™ processor
Intel® UHD Graphics 630	9th generation Intel® Core™ processor
Intel® UHD Graphics 630	8th generation Intel® Core™ processor

Target	Processor
Intel® UHD Graphics 630	7th generation Intel® Core™ processor
Intel® UHD Graphics 620	7th generation Intel® Core™ processor
Intel® HD Graphics 620	7th generation Intel® Core™ processor
Intel® HD Graphics 615	7th generation Intel® Core™ m processor
Intel® HD Graphics 530	6th generation Intel® Core™ processor
Intel® HD Graphics 515	6th generation Intel® Core™ m processor
Iris® graphics 6100	5th generation Intel® Core™ processor
Intel® HD Graphics 5500 and 6000	5th generation Intel® Core™ processor
Intel® HD Graphics 5300	5th generation Intel® Core™ m processor family
Iris® Pro graphics 5200	4th generation Intel® Core™ processor
Iris® graphics 5100	4th generation Intel® Core™ processor
Intel® HD Graphics 4200, 4400, 4600, and 5000	4th generation Intel® Core™ processor

Although the tools may appear to work with other graphics devices, these devices are unsupported. Some features and metrics may not be available on unsupported platforms. If you run into in an issue when using the tools with any supported configuration, please report this issue through the [Support Forum](#).

Driver Requirements for Intel® HD Graphics

When running Intel GPA on platforms with supported Intel® HD Graphics, the tools require the latest graphics drivers for proper operation. You may download and install the latest graphics drivers from the Intel [Download Center](#).

Intel GPA inspects your current driver version and notifies you if your driver is out-of-date.

Installation Notes

Installing Intel GPA

Download the Intel GPA installer from the [Intel GPA Free Downloads](#).

If you use the product in a host/target configuration, install Intel GPA on both systems. For more information on the host/target configuration, refer to [Best Practices](#).

Installing Intel GPA on Windows

To install the tools on Windows, download the *.msi package from the [Intel GPA Free Downloads](#) and run the installer file.

Installing Intel GPA on Ubuntu

To install Intel® GPA on Ubuntu, download the .sh file from the [Intel GPA Free Downloads](#) and run the installer script.

Installing Intel GPA on macOS

To install the tools on macOS, download from the [Intel GPA Free Downloads](#) and run the .pkg installer.

Technical Support and Troubleshooting

For technical support, including answers to questions not addressed in the installed product, visit the [Support Forum](#).

Known Issues and Limitations

For Vulkan Applications

- To profile Vulkan titles, make sure to download the latest [Vulkan runtimes](#) and [SDK](#).
- When analyzing a frame for a Vulkan stream on Ubuntu systems, some metric values are reported incorrectly and will be fixed in a future graphics driver update:
 - RasterizedPixels
 - SamplesWritten
- Sampler busy and sampler bottleneck related metric values on Ubuntu systems, e.g Sampler0Busy, Sampler1Busy, Sampler0Bottleneck, Sampler1Bottleneck and SamplerBottleneck metrics are reported inconsistently. At times, these values will show a 100% bottleneck while the associated sampler is 0% busy. A future update to the kernel graphics driver will address this defect.

For Metal Applications

- For full metric support, please upgrade to macOS 10.14.
- Playback of the Metal stream files captured with earlier Intel® GPA versions is not supported. Old Metal stream files can be converted to the new stream format using the following steps:
 1. Open Terminal and change the directory to

```
cd/Applications/Intel/FrameAnalyzer.app/Contents/Resources/metal.
```

2. Capture a new stream of the old player running the .gpa_stream file that you want to convert by the following command:

```
./gen2/gpa-injector ./gpa-playback --layer capture -- <path-to-old-.gpa_stream-file
```

3. The newly converted stream is automatically added to ~/Documents/GPA/ and is displayed in the Graphics Frame Analyzer open file dialog.
- macOS users who are running OS X* El Capitan or newer must disable System Integrity Protection (SIP) in order to profile Steam* applications. If SIP is enabled on your machine, a message will appear at the top of Graphics Monitor directing you to disable it. If you would prefer not to disable SIP but need to profile a Steam* application, use the following process:
 1. Launch and sign into Steam
 2. Locate the executable of the desired application and copy the location, it typically looks something like this:

```
/Users/YOUR_USER_NAME/Library/Application\
Support/Steam/steamapps/common/YOUR_APPLICATION_BINARY
```

3. Launch Graphics Monitor
4. Paste the location of desired application in the first input box and hit start
5. GPA will now be injected into the executable, allowing for live profiling and Trace/Frame Capture

For DirectX Applications

- Applications, dynamically linked to Microsoft Visual C++ Runtime Library, Version 14.0 or higher, cannot be launched with Auto-Detect Launched Applications Mode enabled on Windows 7 platforms. You can start the application directly from Graphics Monitor or start a command line and launch the target application from it.
- To collect stable metrics on third party graphics, enable Developer Mode in the Windows Settings.

- GEN Assembly is not available in DirectX 11 applications frames on graphics driver 25.20.100.6519 and 25.20.100.6577. To analyze GEN Assembly, update your graphics driver to 25.20.100.6618.

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

** Disclaimer: Intel disclaims all liability regarding rooting of devices. Users should consult the applicable laws and regulations and proceed with caution. Rooting may or may not void any warranty applicable to your devices.