

# Intel® Graphics Performance Analyzers (Intel® GPA) Release Notes – 2020.3 Archive

## 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 in This Release

### New Features for Analyzing Graphics APIs

## All Tools

- Future support is already enabled for the recently announced 11th Gen Intel® Core™ processors with Intel® Iris® Xe graphics

## Graphics Frame Analyzer

- Variable Rate Shading Tier2 support in *Multi-frame Profiling View* mode. This includes screen-space visualization of the VRS image
- Alpha support for Microsoft DirectX\* Raytracing in *Multi-frame Profiling View* mode
- Initial support for Multi-GPU applications in *Multi-frame Profiling View* mode
- The following improvements were added for DirectX 12 Stream mode, as observed in *Multi-frame Profiling View*
  - Added Microsoft Direct3D\* 12 Command List debug regions and markers to the API Log and the Bar Chart
  - Debug names of resources are now shown in the Resource Viewer and in the API Log
  - Added support for Execute Indirect calls
  - Improved frame opening time by loading resource data on resource selection
- Different types of Direct3D 12 Command Queues are now explicitly shown in *Multi-frame Profiling View*
- Added Direct3D 12 Command Queue debug regions and markers to the *Multi-frame Profiling View*
- We have Increased the precision for floating point data buffers
- Added the ability to export buffer data to CSV with a user-defined layout

## Graphics Trace Analyzer

- DirectX Raytracing calls are now displayed in the thread tracks
- Added auto-highlighting of events to make CPU and GPU synchronization more transparent. When you select a synchronization event, all events that are related to it are highlighted as well
  - CPU synchronization with SetEvent and WaitForSingle(Multiple)Object(s)
  - GPU synchronization with DirectX 12 command queue Signal/Wait calls

- See our first two [Trace Analyzer Deep Dive videos](#) - more to come!

## System Analyzer

- Increased the quality of CPU metrics on Windows by significantly increasing the granularity of CPU counters for Intel hardware

## New Features for Intel® GPA Framework

- Added support for DirectX 12 Variable Rate Shading Tier2
- Introduced support for DirectX Raytracing (Alpha)
- Added support for DirectX 12 Multiple GPUs (Beta)
- Added support for DirectX 12 the ExecuteIndirect method
- Extended deferred capture support for Vulkan\* to cover more Unity\* and Unreal\* based workloads
- Added support for Vulkan and Direct3D 12 view-info structs in resource metadata
- Added initial support for compute queues to the Direct3D 12 Pipeline Statistics and Timestamp QueryManager. This prevents the former behavior where the use of the compute queue caused invalid queries to be performed.

## Known Issues and Limitations

### For Intel® GPA Framework

- User input for keyframes and deferred stream capture may not be registered in certain applications. Please use time-interval keyframes and capture layer parameters for deferred stream capture.
- When using the AMD\* RX Vega card to capture a stream on a Hades Canyon machine the argument "--page-tracker-mode 2" must be added to any ./gpa-injector command in order to properly capture the stream. Note that this does not apply to the iGFX card.
- Intel® GPA Framework has been released for Vulkan, but there is also functionality for other graphics APIs that has been exposed and can be utilized.
- At present, the Intel® GPA Framework contains only Release builds (no debug builds of libraries).

- The capture layer supports only 64-bit applications. However, the injection mechanism will work with 32-bit processes for the purpose of allowing the capture of applications that require 32-bit launchers.
- A modification of shaders in HLSL representation can cause the gpa-player to crash if the original shader representation was different from HLSL (Vulkan).
- Support for MetricsExtractor metrics collection from compute queues is preliminary using the D3D12 and Vulkan Pipeline Statistics and Timestamp Query Managers. There is no support provided for copy/transfer queues.

## For DirectX Applications

- *Parallel Execution View* is not supported on Skull Canyon platforms.
- Applications that are dynamically linked to Microsoft\* Visual C++ Runtime Library, Version 14.0 or higher cannot be launched on Windows 7 platforms with *Auto-Detect Launched Applications* mode enabled. You can start the application directly from Graphics Monitor or the command line.
- To collect stable metrics on third party graphics solutions, enable Developer Mode in Microsoft Windows OS settings.
- A few DirectX 11 applications that create a temporary Direct3D\* 11 device may crash if started from Graphics Monitor. To resolve this issue, please enable the System-wide Time-based GPU Metrics option in the Metrics tab of the Graphics Monitor options.
- In rare cases, a DirectX 12 frame opened on 11th generation Intel® Core processors may display an incorrect value for the DirectX 12 PS Invocation metric for events that are preceded by a SetPipelineState call.
- Graphics Frame Analyzer does not display the DirectX 12 Pipeline Statistics metrics for frames that contain ClearState or SetProtectedResourceSession calls.
- In rare cases, a DirectX 12 frame opened on 11th generation Intel® Core processors may display an incorrect value for the EU Thread Occupancy metric for Dispatch events.
- Collection of CPU hardware metrics is not available in Intel® VTune™ Profiler when Graphics Monitor is running.

## For Vulkan Applications

- To profile Vulkan titles, make sure to download the latest [Vulkan runtimes](#) and [SDK](#).

- To enable Ubuntu support, please read the [enabling instructions](#) to view metrics on Ubuntu platforms.
- Vulkan applications that run on multi-GPU machines and explicitly enumerate graphics adapters to render on the non-default adapter may produce stream files that cannot be analyzed in the Profiling View of Graphics Frame Analyzer. Please only keep one GPU active in Windows Device Manager to resolve the issue.
- Graphics Frame Analyzer may show incorrect content of swap chain images if the application does not use intermediate render targets and renders directly into the swap chain image.

## For Metal Applications

- To run and profile applications from Steam\*, manually download and update to the latest 64-bit version of Steam.
- 32-bit applications are not supported for profiling.
- 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

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

3. 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
```

4. 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. Intel® GPA will now be injected into the executable, allowing for live profiling and Trace/Frame/Stream Capture

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### [Intel GPA Main Page](#)

### [Intel GPA Framework](#)

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## Product and Performance Information

Performance varies by use, configuration and other factors. Learn more at [www.Intel.com/PerformanceIndex](http://www.Intel.com/PerformanceIndex).

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- Added initial support for compute queues to the Direct3D 12 Pipeline Statistics and Timestamp QueryManager. This prevents the former behavior where the use of the compute queue caused invalid queries to be performed.

### System Requirements and Supported Platforms

The minimum system requirements are:

The table below shows platforms and applications supported by Intel® GPA 2020.3

Target System (the system where your game runs)	Host System (your development system where you run the analysis)
Windows 10	Windows 10
Windows 7 SP1/8.1/10	Windows 7 SP1/8.1/10
Ubuntu 18.04	Ubuntu 18.04, 20.04
macOS: 10.15	macOS: 10.15

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

### Windows 7 and Windows 8.1 will be deprecated in the Intel® GPA 2021.1 release.

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 Intel® Graphics devices found in these Intel® processor generations as targets for analyzing Windows workloads. All these targets have enhanced metric support:

- 11th generation Intel® Core™ processors
- 10th generation Intel® Core™ processors
- 9th generation Intel® Core™ processors
- 8th generation Intel® Core™ processors
- 7th generation Intel® Core™ processors
- 6th generation Intel® Core™ processors
- 6th generation Intel® Core™ m processors
- 4th generation Intel® Core™ processors



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 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.

To profile Vulkan applications, make sure to download and install the latest [Vulkan SDK and runtimes](#).

For DirectX applications, download and install the [DirectX End-User Runtime](#).

### **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.

Read the [enabling instructions](#) to view metrics for Vulkan applications on Ubuntu platforms.

### **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](#).

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