

What's New

Intel GPA 2020 R1 includes functional and security updates. Users should update to the latest version.

Intel GPA 2020 R1 offers the following new features:

New Features for Analyzing All Graphics APIs

Graphics Monitor

- Added an ability to connect System Analyzer to a running application from Graphics Monitor with a single click.
- The new Extended Profiling Modes option allows you to explicitly select a graphics API to profile, which can be useful if your application uses more than one graphics API.
- Triggers improvements:
 - Triggers now support custom logical expressions as the condition.
 - Ability to use multiple triggers simultaneously.
 - Ability to combine CPU and GPU metrics in the trigger condition.
- Screenshots for stream files are now collected by default.

Graphics Frame Analyzer

- Metric values are now displayed immediately as they are loaded when selecting an Event or a group of events. Favorite metrics that were pinned in the Metrics pane are displayed first.
- Improvements to the Python* API:
 - Multiple frame resources can now be requested through a single API function call.
 - Final render target information can now be requested through an API call.

Graphics Trace Analyzer

- Significantly reduced CPU overhead for trace file collection.

System Analyzer

- The System Analyzer user interface has been reworked, and includes the following new features:
 - Pause mode that allows you to pause the metrics and explore them in greater detail.
 - Support for an extended set of Intel Graphics metrics.
 - Ability to combine an unlimited number of metrics with same measurement units on one track.
 - Bar chart and line chart visualization modes for metric tracks.
 - Keyword searches for metrics.
 - Hotkey support for multiple actions.

New Features for Analyzing Microsoft DirectX* Applications

Graphics Frame Analyzer

- Added the Shader Profiler feature for DirectX 11 and DirectX 12 APIs that allows you to identify the hottest sections of shader code and edit the shader with the result displayed in real-time.
- Added the Shading Rate experiment for DirectX12 applications that allows you to dynamically change the shading rate and evaluate the visual impact in real time. This feature is only supported on systems with Variable Shading Rate capable hardware running Microsoft Windows* OS 19H1 or higher.
- Added the Pipeline State Object and Root Signature views to the Resources pane for DirectX 12 applications.
- Multi-frame Profiling View for DirectX 12 that allows you to profile multiple contiguous frames simultaneously using Graphics Frame Analyzer. Note: this is a preview feature that may not work as expected. If you have any feedback, please share it using the Feedback button in any of the tools.
- Added the option to trim DirectX 12 streams, which allows you to focus on specific regions and save disk space by leaving out unimportant portions of streams.

Graphics Trace Analyzer

- CPU Tracks now support multi-context and multi-queue information for DirectX11 and DirectX12 respectively.

New Features for Analyzing Vulkan* Applications

Graphics Frame Analyzer

- Added full support for Vulkan applications in Graphics Frame Analyzer.
- Added the Pipeline Layout and Descriptor Set Layout views to the Resources pane for Vulkan applications.

Graphics Trace Analyzer

- Added full tracing support for Vulkan applications.
- CPU Tracks now support multi-queue information.

New Features for Intel® GPA Framework

- Added the ability to generate a buildable C++ project from a selected range in a stream.
- Added ability to explicitly control which API to hook at injection time via a new flag: "gpa-injector --api-hook". This allows you to profile a specific API in case your application uses several APIs.
- Added DirectX 12 Pipeline Statistics, Timer Queries, and Pixels Rendered metrics to MetricsExtractor. These metrics are available on all graphics hardware, including third-party, and can be used when metrics provided by Intel® Graphics are not available.
- Added support for extracting Descriptor Set Layout and Root Signature information available for Vulkan and DirectX 12 workloads respectively via new MetadataExtractor interfaces.
- Added a capture layer parameter to allow the triggering of deferred stream capture for a specified range of frames. You can indicate the range of frames that will be captured into a stream.
- Added the ability to extract DirectX 12 resource data including textures, buffers and shaders with MetadataExtractor.
- Added support for shader and pipeline state modification experiments for DirectX 12 applications.
- Introduced a capture layer parameter that enables you to specify a custom stream name.
- Improved playback performance for Vulkan ranges.
- Improved filtering of MultiQueueFilter callables to show keyframe markers.
- Removed deprecated metadata extraction interfaces.

- Fixes of multiple bugs that affected the capture, playback, and stream analysis of several game titles.

Known Issues and Limitations

For 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.

For DirectX Applications

- Parallel Execution View is not supported on Skull Canyon platforms.
- For Universal Windows Applications, real-time GPU metrics are not available in the Heads-Up Display and System Analyzer.
- 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.
- Few DirectX 11 applications that create a temporary D3D11Device 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.
- Frame Analyzer does not display the DirectX 12 Pipeline Statistics metrics for frames that contain ClearState or SetProtectedResourceSession calls.

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

- macOS 10.15.2 is not supported at this time, do not update to macOS 10.15.2 if you would like to continue using Intel® GPA to profile Metal apps on your macOS system.
- 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
- 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

```
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. GPA will now be injected into the executable, allowing for live profiling and Trace/Frame Capture

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

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