

INTEL® GRAPHICS TECHNOLOGY SELF-TEST METHODOLOGY

Introduction

Welcome and THANK YOU for taking the time to test your application. This is the most important step necessary to ensure that your game will run well on the 1 Billion systems out there that are using Intel Graphics. With that said, DON'T STRESS, this is probably one of the easiest tests you will take this year. One last thing, if you are worried that you won't pass please go to gameplay.intel.com to see an example of titles that have completed this process ahead of you. If you see a title there that is comparable to yours then the odds are you're fine. Please let us know if you have ANY issues. We can be reached at gamedev@intel.com. Thanks again and have fun!!!

Hardware Guidance

Any System with Intel Graphics Gen 6 or newer system would be ideal; Intel HD Graphics 620, 630 or 580. If you do not have an exact match that is fine, use what HW you have that comes the closest. We can extrapolate performance if needed. Sample configs are provided in the Appendix at the end of this document to use as a guide.

If you are still unsure or have further questions about HW, please email gamedev@intel.com. A member of the Intel Game Dev Program will respond quickly and let you know.

Notes on Hardware

- **Dual-Channel RAM:** Dual-channel RAM is best. Memory performance, especially for graphics, can be greatly affected with single-channel RAM. *If your test hardware is single-channel, please let us know when providing results so we can better review the data.*
- **Game Bar and GAME DVR:** Ensure Windows 10® Game Bar and DVR are disabled, both can have an impact on performance.
 - To disable the Game Bar, head to Settings > Gaming > Game Bar. Set the "Record game clips, screenshots, and broadcast using Game bar" option here to "Off".
 - To disable Game DVR, head to Settings > Gaming > Game DVR. Ensure the "Record in the background while I'm playing a game" option here is set to "Off"

System Performance Check

- While it is **not required**, to check the test system performance it is helpful. The score when compared to our primary test HW helps us with the data analysis. You can freely to skip this step to save time if necessary.
- Download and install World of Tanks enCore: https://wotencore.net/3343_en1.
 - Test **1920x1080** resolution with **medium** preset settings with **no anti-aliasing** (AA) for Iris® Plus graphics. Only change the resolution and Antialiasing setting, leave all other option at their defaults.
 - Test **1280x720** resolution with **medium** settings with **no AA** for Intel® HD Graphics. Only change the resolution and Antialiasing setting, leave all other option at their defaults.
- Click on **Test**, the benchmark will run automatically and generate a score.
- Run at least 3 tests directly after each other to detect any thermal issues with the system.

Drivers

The latest production graphics driver is recommended, graphics drivers are available through Windows* Update. More details available [Downloads for Graphics Drivers](#).

Note: Latest Windows updates should be installed before starting a test. No updates should be carried out during a testing.

Game Settings

Resolution: The recommended resolution for games running on Intel HD Graphics is 720p (1280x720) and for Iris Plus Graphics the recommended resolution is 1080p (1920x1080).

As a starting point, testing should begin at the recommended resolution with lowest settings and resolution scaling at 100%.

Ensure Vsync is turned off. If the game is frame locked disable if possible.

If performance exceeds 30fps consider testing at higher resolution or quality setting.

The goal is to find the best game experience on the respective platform. That is the ideal combination of resolution, settings and frame rate.

Workload

If the game includes a benchmark, use it for testing. If there is no benchmark find a repeatable & reliable location in game to test with. Below are some guidelines to help select a good scenario:

- Include indoor and outdoor settings if possible
- Do not get data in game menus and loading screens
- Ensure you can repeat the test scenario somewhat accurately
- Scenario should be 5-10 minutes in length depending if there are loading levels or checkpoints that don't allow you to measure longer
- Do not play the game through, always repeat the same section for each test run, setting and platform

Measurement

Measure the workload at least 3 times, then calculate the median to find the performance

The **median** is the middle number. To calculate the median of any set of numbers, you need to write the numbers in order. If there is an odd number of results, the median is the middle number. If there is an even number of items in the data set, then the median is found by taking the mean (average) of the two middlemost numbers.

Prior to testing open task manager to identify any processes running in the background. Some processes may impact performance.

Run the game for 5 minutes before starting testing to ensure system is not cold.

Use PresentMon to get the data, it is a free tool developed by Intel and [available for download](#).

The frame time is called MsBetween Presents in the .csv generated by PresentMon. Frame time can be converted to frames per second (FPS) with this calculation: $1000/\text{Frametime in ms}$

PresentMon tips:

- Use -process_name flag for the process you want to measure
- -hotkey to trigger measurement with F11 key
- -timed [seconds] to set your measurement duration

Record the game settings by taking a screen capture of the in-game settings menu.

Provide a gameplay screenshot at each setting tested.

Get a dxdiag report for each system:

- In Windows, select **Start** and enter **dxdiag** into the search box on the taskbar. Select **dxdiag** from the results. In the tool, select **Save All Information**.

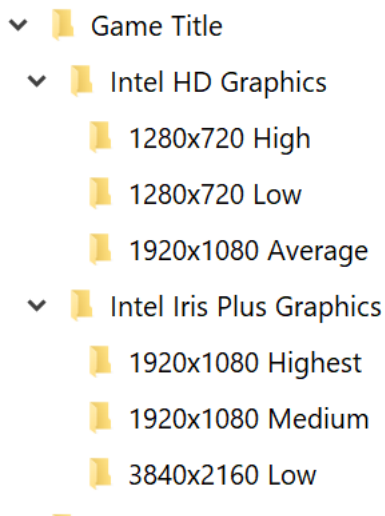
Saving Data

The PresentMon log files must be submitted to Intel. The data will be reviewed and stored. The log files must be provided in a compressed file (.zip preferred) using the format below. No final excel report is required by Intel, just the rollup email and logs.

Collect your data and use the following data structure:

- Game Title
 - System – **Intel HD Graphics** or **Iris Graphics**.
 - DxDiag Report for the system
 - Game setting / workload folders (there can be multiple settings or workloads per system). Examples: [1280x720 Low](#), [1920x1080 Medium](#).
 - This folder contains Settings Screenshots and Gameplay screenshots. Gameplay screenshots should be named “gameplay.<extension>”.
 - PresentMon logfiles in a folder called **PresentMon**.
 - PresentMon logs should follow this naming convention (case matters):
 - PresentMon-<Game Title>-<File Number(1,2, etc.)>.csv
 - Example: [PresentMon-Doom-1.csv](#).

- Example structure:



Submitting Test Results

1. Fill in the table below and copy into an email.
2. Attach the compressed file containing the results (see Saving Data section above)
3. Title the email: **Intel Game Dev Self-Test Submission for <Game Title>**
4. Send the email to IntelGameDev_TestSubmission@intel.com
5. Once submitted, the results will be reviewed, and you will be notified in 2 weeks from send date.

Game Developer:	
Game Title	
Code Level (Alpha, Beta, Gold, RTM):	
Game Build Number:	
API:	
Release Window/Date (quarter, month, or date)	
Test System 1 Information	
System	
CPU SKU	
GPU SKU	
System BIOS Version	
Operating System	
Operating System Version	
World of Tanks* enCore score	
Test System 2 Information	
System	
CPU SKU	
GPU SKU	
System BIOS Version	
Operating System	
Operating System Version	
World of Tanks* enCore score	

Welcome to Intel® Game Dev

Access powerful developer tools and professional tutorials to help you imagine, plan, and design your next game. The [Intel® Game Developer program](#) is a resource offering free libraries, performance analyzers, and other features to help more efficiently code and optimize your game for Intel® architecture. See all the [benefits](#), including access to exclusive code samples, and get inspired by go-to-market guides written by game developers.

Appendix:

<i>System</i>	Intel® HD Graphics	Iris® Plus Graphics
Intel® Core™ i7 Processor <i>(click SKU for details)</i>	i7-8550U Base Freq: 1.80GHz Max Freq: 4.0GHz	i7-6770HQ Base Freq: 2.60GHz Max Freq: 3.5GHz
Intel® Graphics Technology	Intel® HD Graphics 620 Base Freq: 300MHz Max Freq: 1.15GHz	Iris® Plus graphics 580 Base Freq: 350MHz Max Freq: 950MHz
RAM	2x8GB 1867MHz Dual Channel LPDDR3	2x8GB DDR4-2400
Channels	Dual	Dual
OEM Examples	Dell XPS 13 9360	Intel® NUC Kit NUC6i7KYK
OEM Link	http://www.dell.com/ If the 9360 is not available, then we recommend the 9370	http://www.intel.com/content/www/us/en/nuc/nuc-kit-nuc6i7kyk-features-configurations.html
Reference World of Tanks* enCore Score	8211	8441
Minimum Recommended Resolution	1280x720	1920x1080