

# Porównanie wydajności i moliwoci współczesnych silników do gier komputerowych

Krzysztof Rudnicki

**Promotor**

dr in. Micha Chwesiuk

28 stycznia 2025

# Plan prezentacji

# Gra komputerowa

Aplikacja dostpna na  
platformie "Steam" oznaczona  
typem "Game"

# Silnik do gier

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zaprojektowane i stworzone do  
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
Ponad 1000 gier w tej  
dekadzie na platformie "Steam"

# Database of everything on Steam.

This third-party website gives you better insight into the [Steam](#) platform and everything in its database.

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## Most Played Games →

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## Trending Games

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	Age of Wonders 4		5,574
	PICO PARK		2,253
	Mount & Blade: Warband		15,413
	Middle-earth™: Shadow of Mordor™		1,315
	Smudge Coin Run	Trending on SteamDB	
	BRoS - Battle Royale of Survival	Trending on SteamDB	

## Popular Releases →

		24h Peak	Price
	Astral Party	24,297	Free

## Hot Releases

		Rating	Price
	Mina's Lagoon	88.23%	23.99

▼ **Type**

<input checked="" type="checkbox"/> Game	103615
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▼ **Release Year**

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Show more



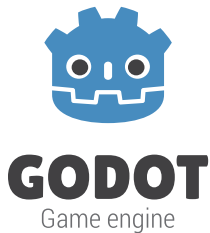
▼ **Technologies**

? SteamDB detects used tech

Engine.

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# Wybrane silniki - start



Ren'Py





# Wybrane silniki

- Wyeliminowanie nie generycznych - Ren'Py, RPGMaker
- Wybór najpopularniejszych - Unity, Unreal

# Wydajno silnika

- Klatki na sekund (FPS)
- Zużycie CPU, GPU, RAM i VRAM
- Liczba draw calls
- Czas adowania assetów
- Czas odpowiedzi na interakcj gracza

# Moliwoci Silnika

- Renderowanie grafiki
- Silnik Fizyczny
- Multiplatformowo (VR)
- Skryptowanie logiki gier (AI)
- Gry online
- Sklepy z assetami



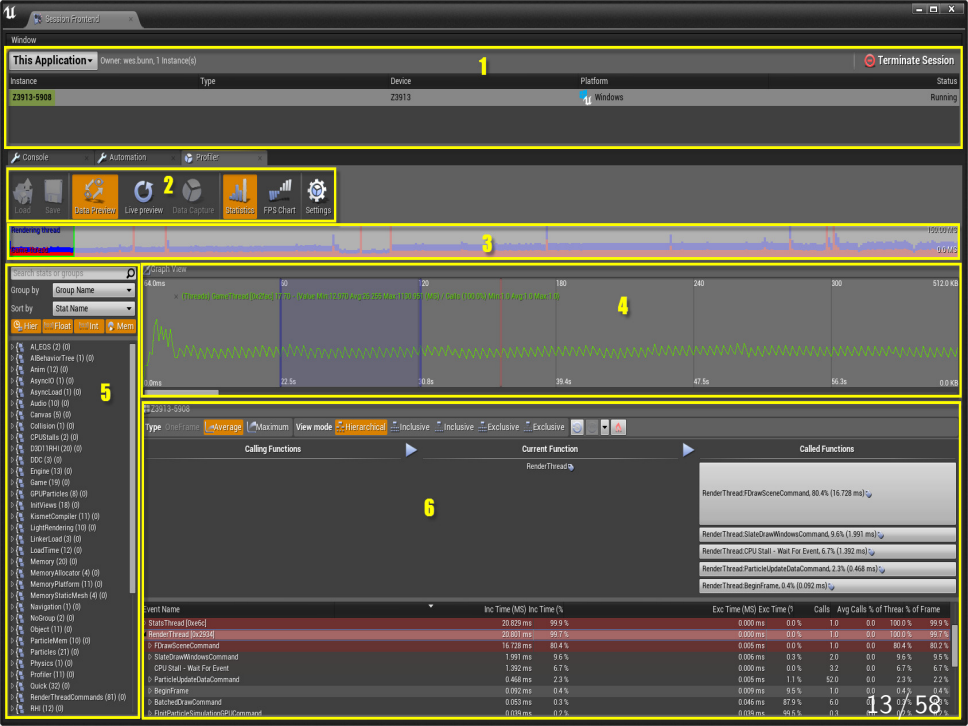
Hierarchy

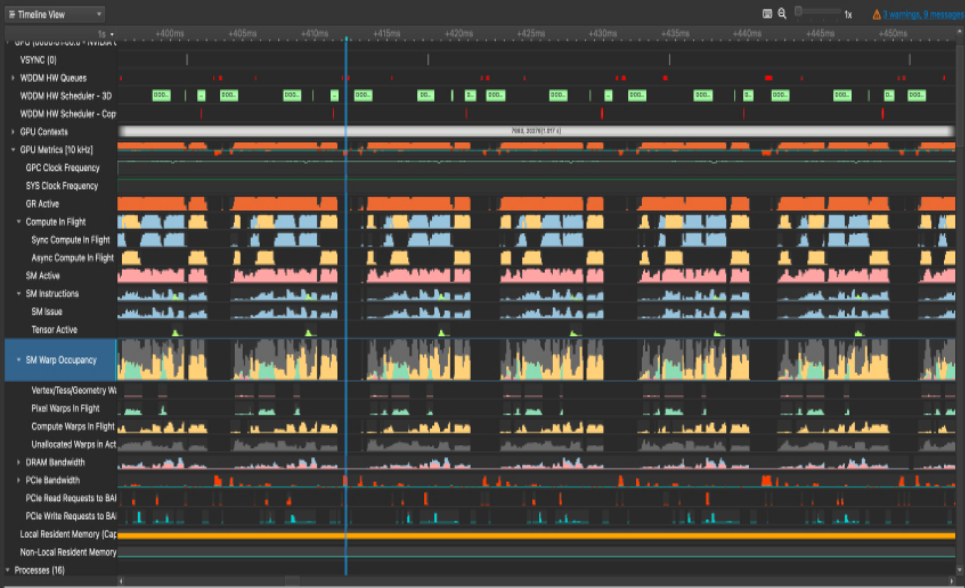
CPU:11.53ms GPU:0.00ms Frame Debugger

Overview

	Total	Self	Calls	GC Alloc	Time ms	Self ms
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Overhead	11.6%	11.6%	1	0 B	1.33	1.33
UIPanel.LateUpdate()	3.8%	3.8%	2	64 B	0.44	0.44
▶ Physics.Processing	3.7%	2.2%	2	0 B	0.43	0.26
TextRendering.Cleanup	1.2%	1.2%	19	0 B	0.14	0.14
▶ GUI.Repaint	0.8%	0.2%	1	0.9 KB	0.10	0.02
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Select Line for per-object breakdown





Expert System View

Settings

CUDA Async Memory with Pageable Memory

The following APIs use PAGEABLE memory which causes asynchronous CUDA memory operations to block and be executed synchronously. This leads to low GPU utilization.

Suggestion: If applicable, use PINNED memory instead.

CL command:

SKIPPED: /Users/hnd/Downloads/Vulkantrace.sglite could not be analyzed because it does not contain the required CUDA data. Does the application use CUDA runtimes?

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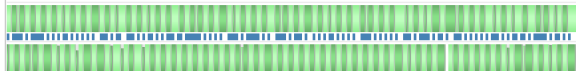
# Nsight - Analiza FPS

▼ Frame duration (Target FPS: 30 Hz)

Showing 108 of 2113 CPU frames | avg 4.08ms | min 2.82ms | max 6.98ms | FPS 245.09 | 99%<6.64ms

▶ CPU frame duration

GeForce RTX 2080 Ti



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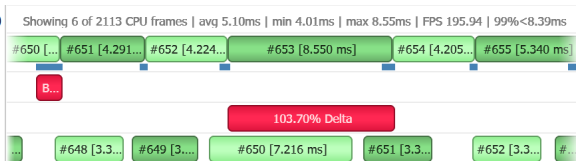
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Frame health

Stutter

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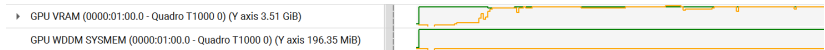




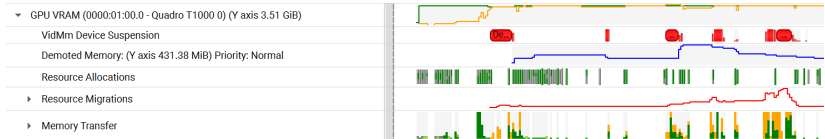
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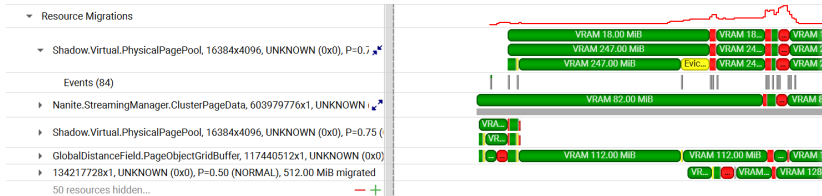
# Nsight - Zuycie VRAM



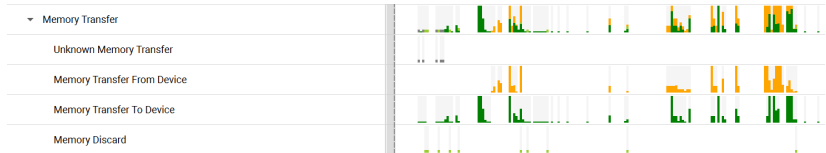
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# Jak porównywa?

- Stworzenie gry na obu
- Porównywanie istniejących gier
- Porównanie samych edytorów



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# Wybór gatunku

FPS:

- Wystarczająco skomplikowany
- Grafika
- Fizyka
- Klasyczny benchmark



# Problem

## Inklinacja Silnika

- $\frac{2478}{39713} \approx 6\%$  gier Unity to FPS
- $\frac{1765}{11158} \approx 15\%$  gier Unreal to FPS

ródo: [steamdb.info](http://steamdb.info)

# Wybór gatunku

Bullet hell:

- Wystarczająco skomplikowany
- Grafika
- Czas jest warty



2,270,270

HIGH SCORE

50,000,000

B' B' B'



# Wyzwania

- Sprzt
- Umiejsnoci
- Podobne wersje silnika
- Inklinacja Silnika  
(3% Unity, 2.4% Unreal)

# ChatGPT

```
beamer [fontsize=20pt]fontsize  
graphicx tikz svg [polish]babel  
[]beamerthemeWarsaw
```

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


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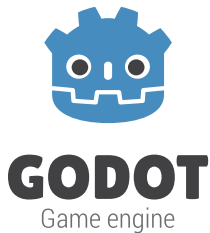
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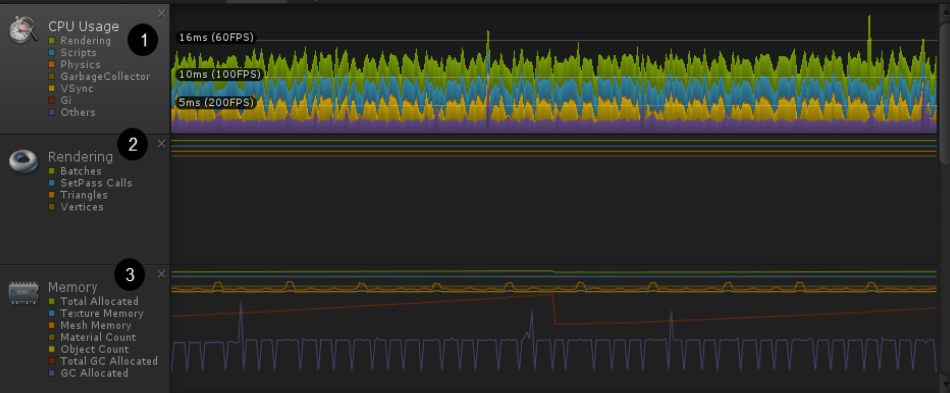
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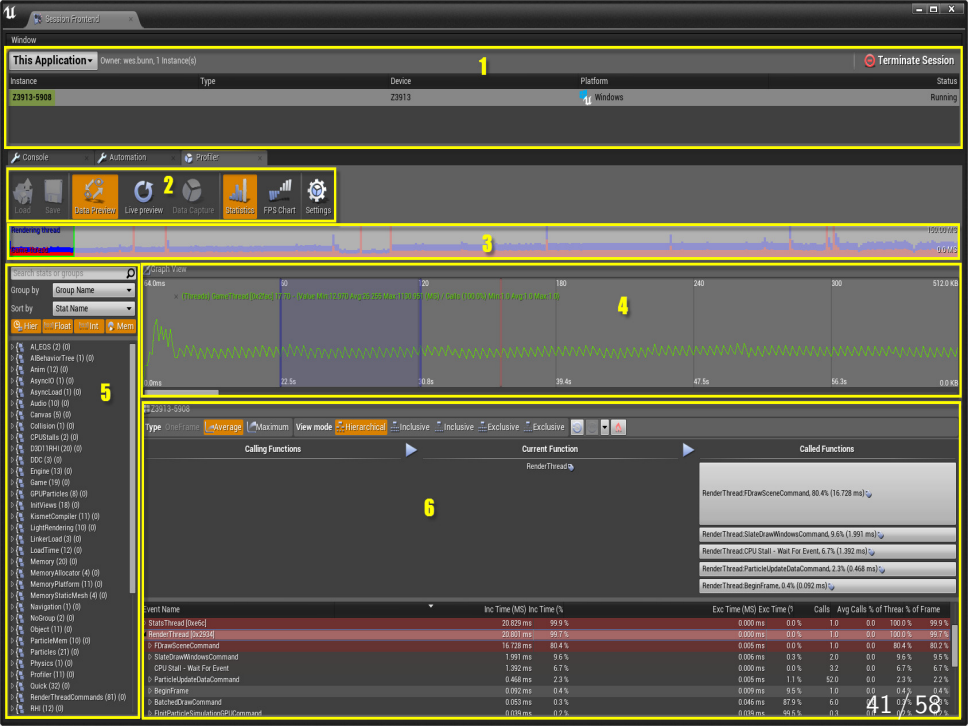
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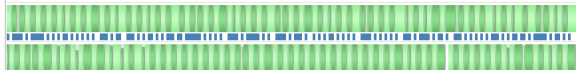
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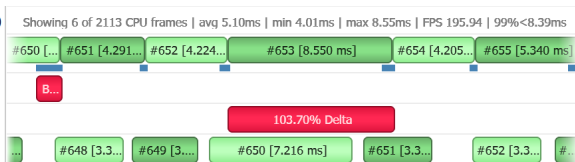
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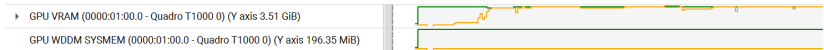
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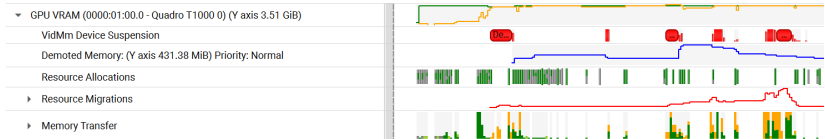
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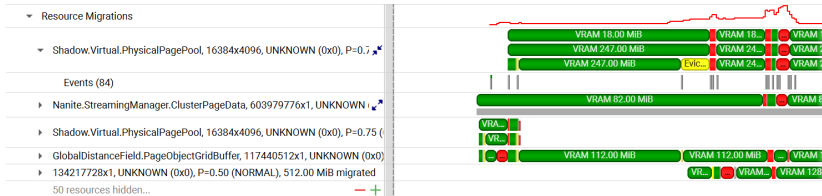
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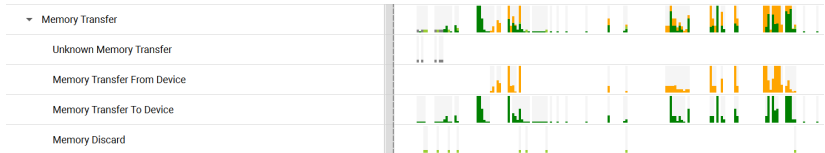


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# ChatGPT

# Po stworzeniu

Przejdź obie gry, monitoruj i używaj  
Nvidia Nsight i porównaj wyniki

- <https://steamdb.info/>
- <https://docs.nvidia.com/nsight-systems>
- An Overview Study of Game Engines, Faizi Noor Ahmad
- Game Engine Architecture, Jason Gregory

# róda obrazów

- Crysis - kana youtube Thronefull
- BulletHell - kana youtube Beat that boss