



## Realtà Virtuale – Politecnico di Torino

GRUPPO 8

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# CHE COS'È VULKAN?

- API di basso livello per rendering 2D e 3D
- Erede di OpenGL «Next Generation OpenGL Initiative»
- Sviluppato da KHRONOS GROUP
- Dna di AMD Mantle



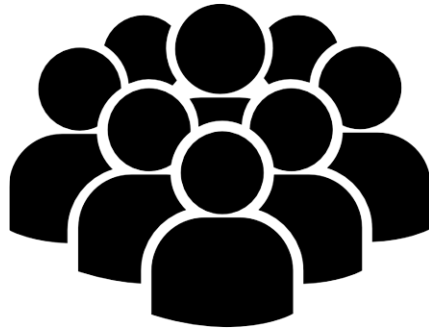
# KHRONOS GROUP



Marzo 2015: prima presentazione di Vulkan



# STRUTTURA MODULARE



Architettura comune per:

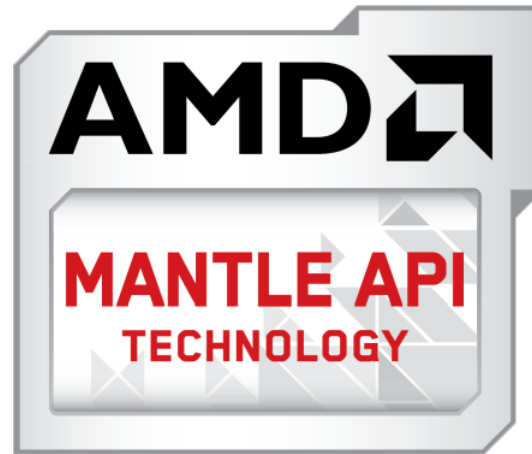
- Code Validation
- Debugging
- Profiling



# AMD MANTLE

Low overhead

Multi-Architettura

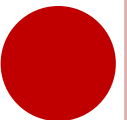


Controllo  
diretto GPU



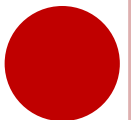


# THE THALOS PRINCIPLE



# FEATURES PRINCIPALI

1. Multithreading
2. Controllo diretto della GPU
3. SPIR-V



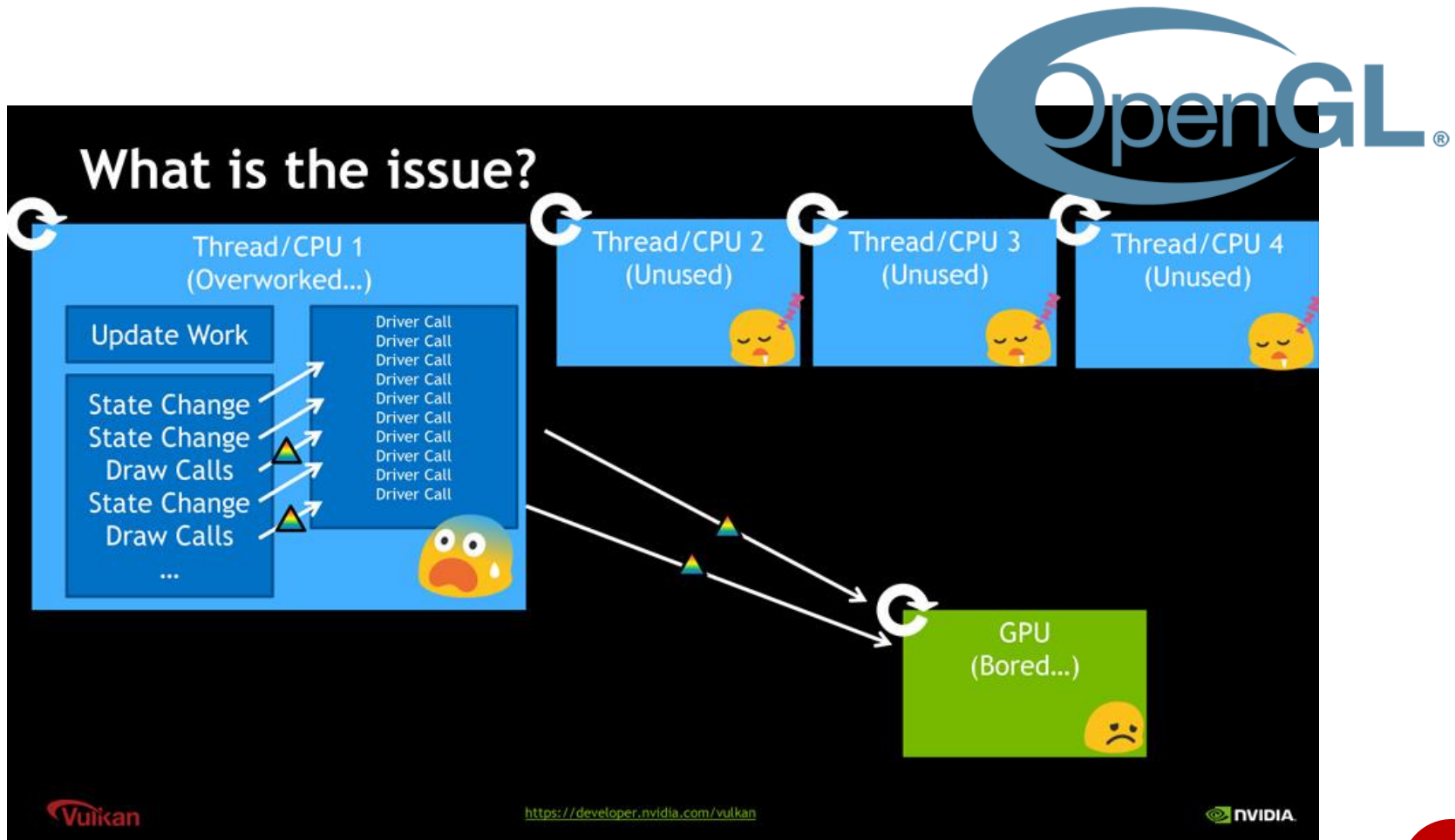
# 1. MULTITHREADING (I)



Gnome Horde Android Game, run on a Intel-based Nexus Player



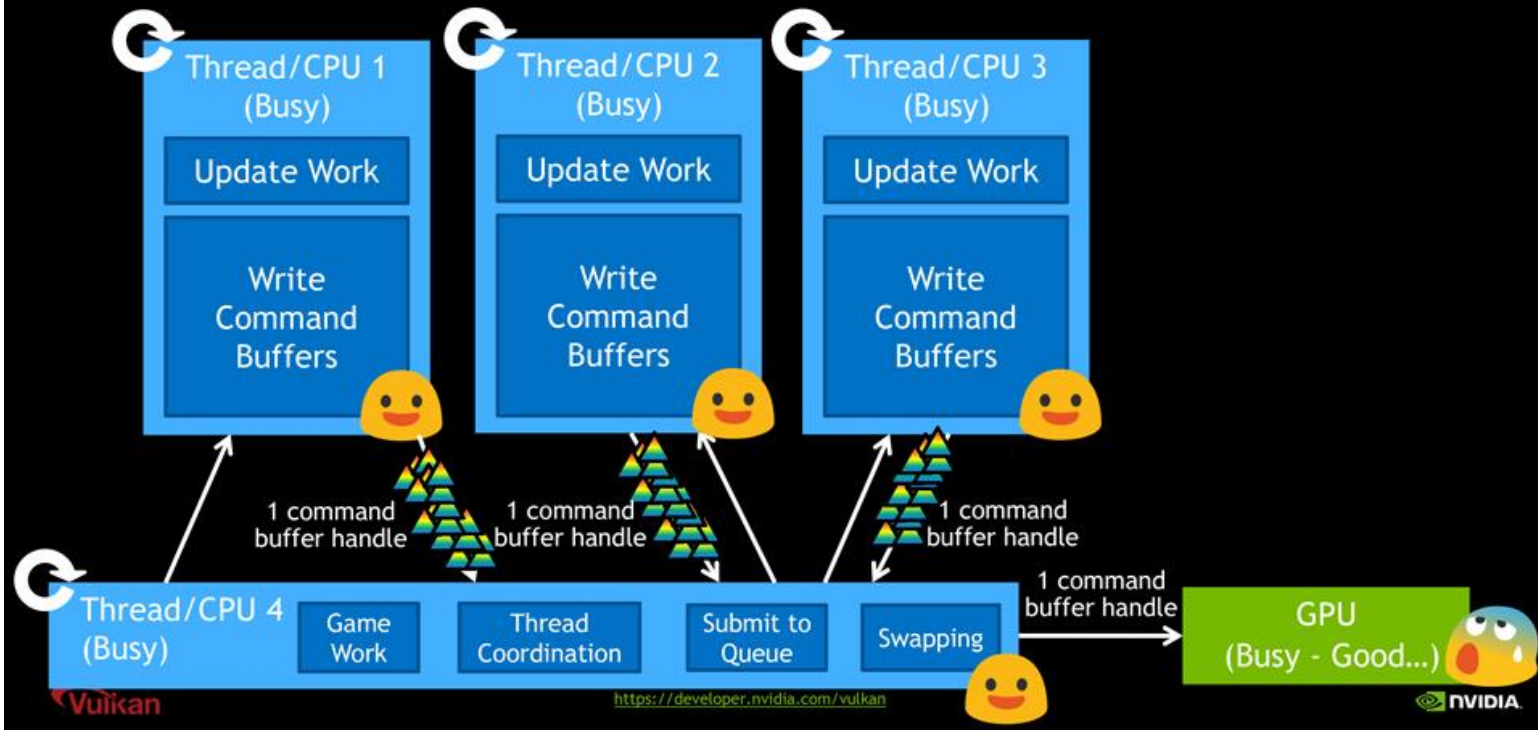
# 1. MULTITHREADING (II)



# 1. MULTITHREADING (III)

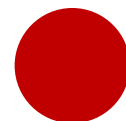
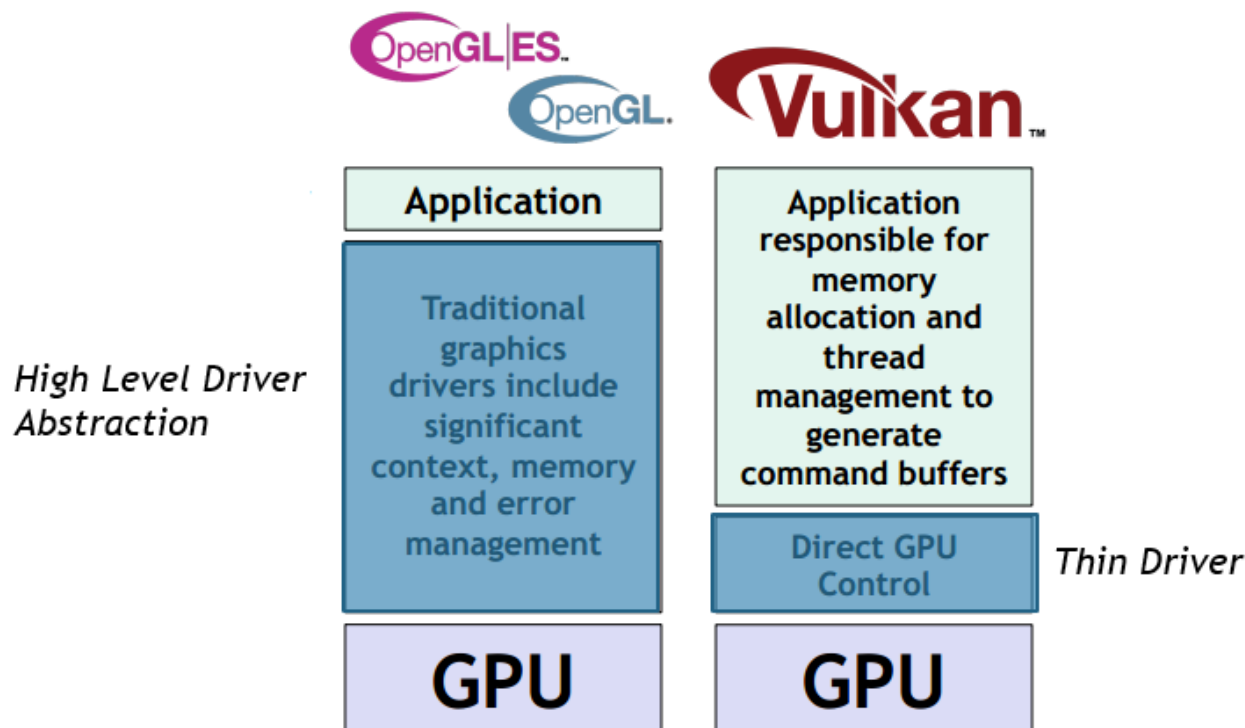


## Threaded Command Buffer Generation



## 2. CONTROLLO DIRETTO DELLA GPU

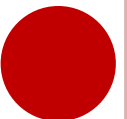
Il controllo e la gestione della GPU sono spostate dai driver alle applicazioni. Questo permette l'utilizzo di MultiGPU a livello applicazione.



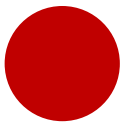
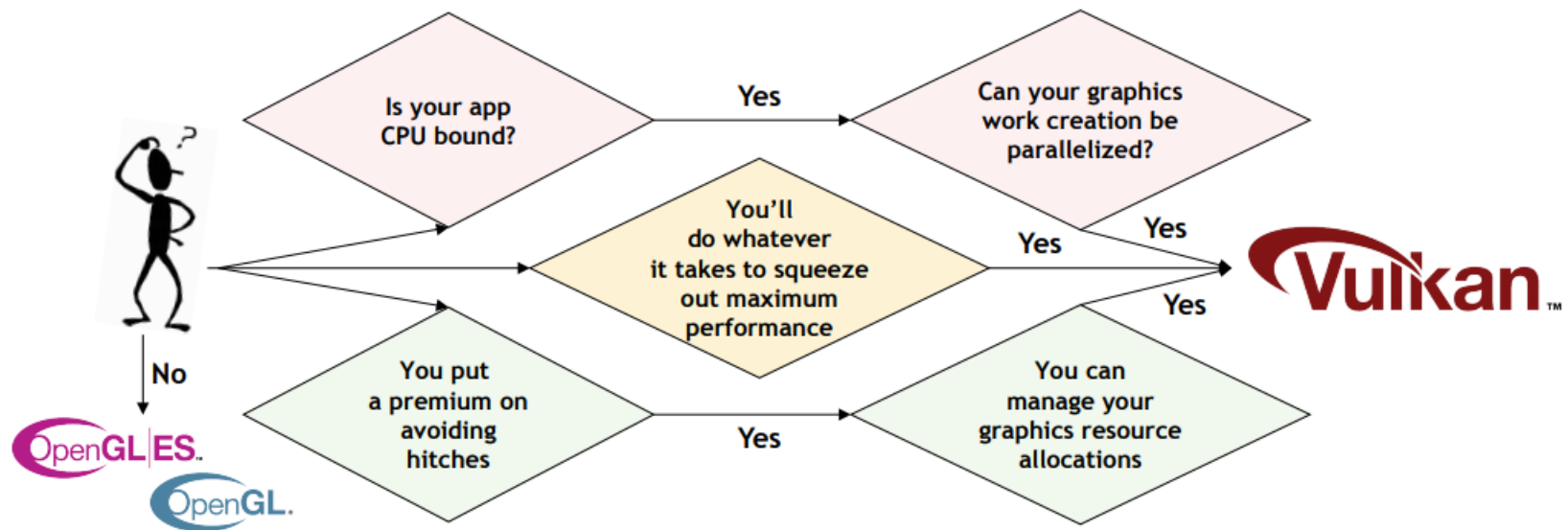
### 3. SPIR-V

Innovativo linguaggio intermedio binario e platform-independent usato da Vulkan perchè:

- Permette di precompilare gli shader
- Permette di scrivere shader in linguaggi diversi da GLSL
- Alleggerisce il carico di lavoro sui driver della GPU

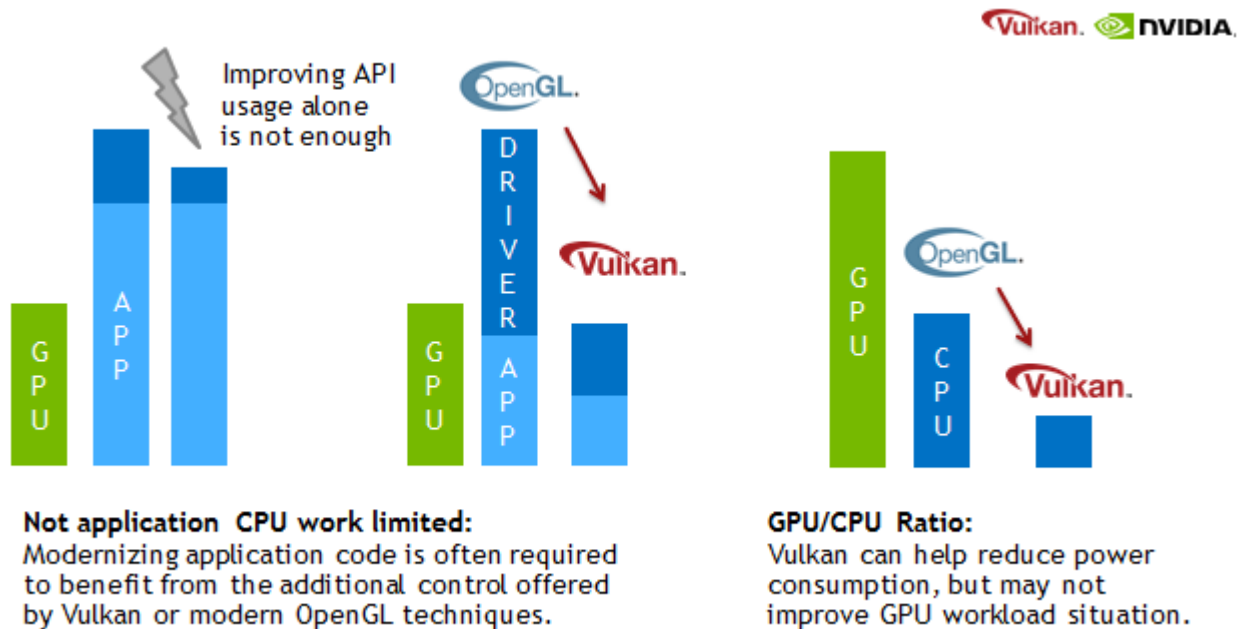


# PERCHÉ SCEGLIERE VULKAN?

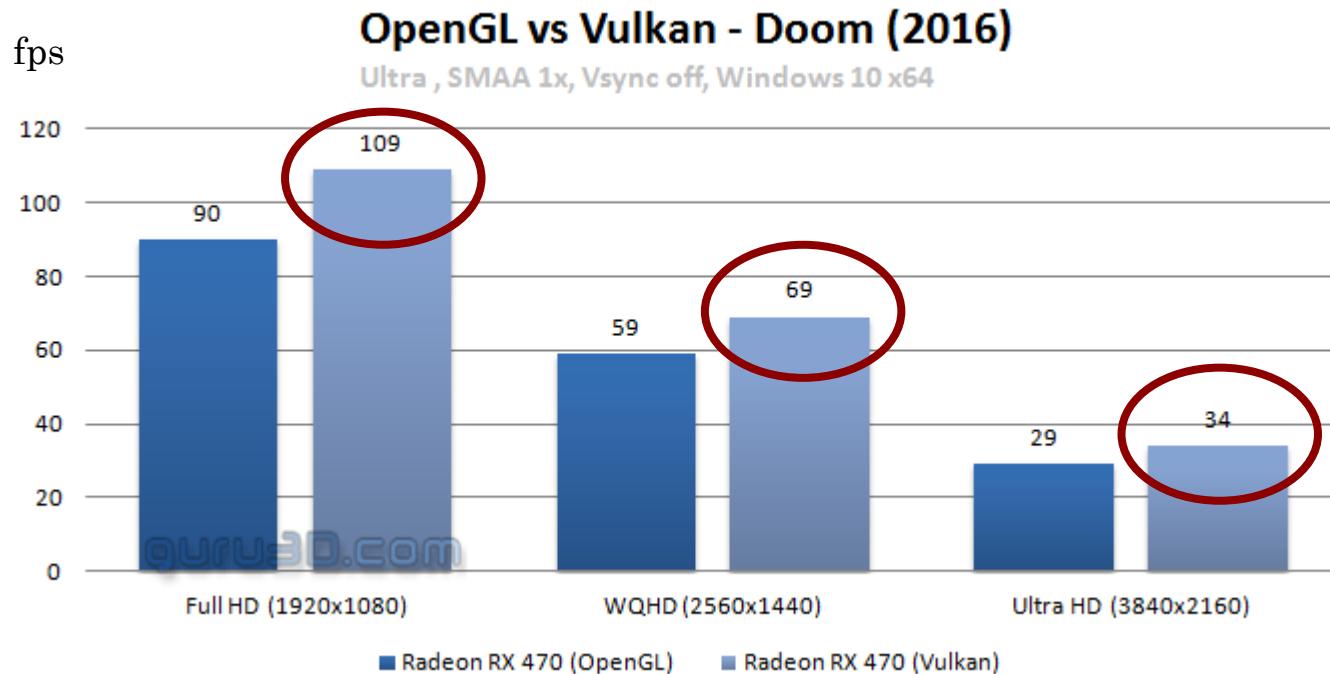




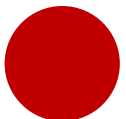
# CONFRONTO CON OPENGL (I)



# CONFRONTO CON OPENGL (II)

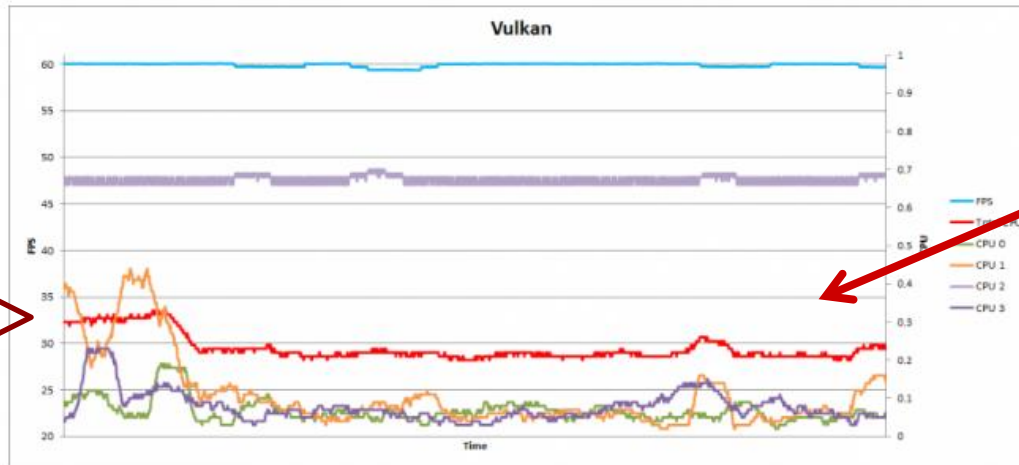


<https://www.youtube.com/watch?v=lTdMaccYAlI>



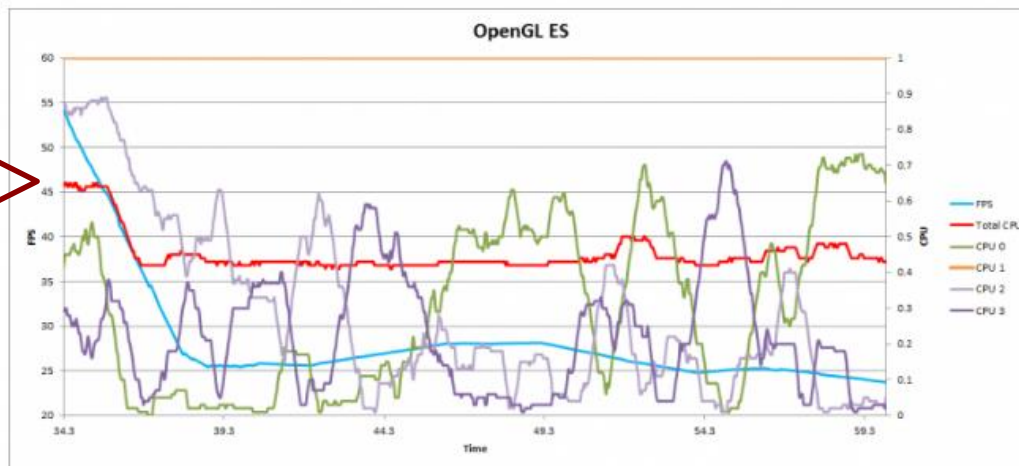
# CONFRONTO CON OPENGGL (II)

32% cpu  
peak  
workload

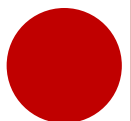


Andamento più  
lineare, meno  
picchi > **carico**  
di lavoro più  
distribuito tra i  
core

47% cpu  
peak  
workload



<https://www.imgtec.com/blog/vulkan-3d-satnav-app-powervr>



# VULKAN E VR



*“The advantage that Vulkan will deliver in the end for the software developers creating VR experiences is that they will typically be able to create experiences that are faster and typically have lower latency. Vulkan is lower latency because the driver is much thinner and there are fewer steps to go through which leads to much less glitching.”*

(Neil Trevett, Vice President at NVIDIA)



AVETE DOMANDE?



GRAZIE!

