High-performance graphics in 7 years will be ...

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Technology

GPUs continue to be more and more flexible while being optimal for graphics

- GPUs will continue to maintain high perf/watt and perf/mm^2

Type	Perf/mm^2	Perf/watt
Barcelona	2GF	1GF
GPU SIMD	~25GF	~50GF

- GPUs will continue to evolve to tackle new forms of parallelism beyond data parallelism, while keeping high perf/mm^2 and perf/watt both in graphics and in heterogeneous compute

What can you get for 80 W?

- The power envelope limits the *small core + SIMD* count to a total of 5

    - Not much opportunity for parallelism with this few cores

- With *small core + SIMD*, 1 TFLOP dissipates 168 W, well above the limit

- With *GPU SIMD*, over 1.5 TFLOPS is obtainable within the power envelope
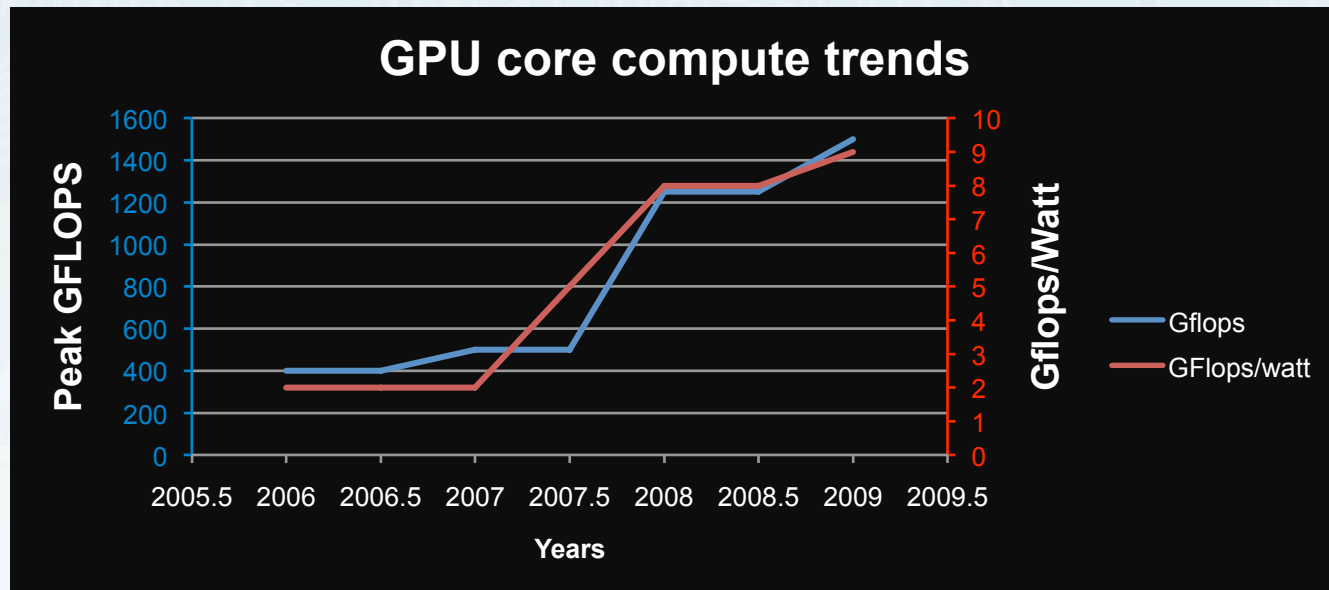
Out of Order (OOO) Processors

- OOO Processors can handle all type of algorithms

  - spanning the gamut from single threaded all the way to data parallel.

- OOO Processors have hit the wall in terms of single thread performance

  - Innovation in this space has switched to adding cores and adding threads

- The future is optimal processing across the platform

  - merged OOO processors and parallel processors work together to deal with the full gamut of algorithms out there.

Platforms

- Desktop Market is saturated

- Notebook and Netbook market is growing at the expense of desktop or tethered PCs:

  - Power and cost sensitive

- Consoles : Power and cost sensitive

- Handheld : The fastest growing market

  - Billion of install base, Highly power and cost sensitive

Consumers

- Technology is Deflationary

  - Consumers pay less for more each year

    - Most popular : Handhelds, consoles and notebooks/Netbooks

  - Process technology below 32 nm is going to be very expensive (cost and leakage power)

    - Will drive more focus on perf/mm^2 and perf/watt

Summary

- Majority of the market segment will be using increased programmable GPUs with fixed functions (Heterogeneous Platform) with high perf/mm^2, perf/watt

    - ISVs develop games for most common platform (Especially Consoles)

    - Mostly DX11 level Programming, some DXNext

- We expect to see mixture of classic rendering and Ray tracing as ISVs differentiate themselves by the "look" from new rendering techniques

    - IHV will work closely with them (StudioGPU developing RT on our latest hardware)