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Maximizing Performance in a Space



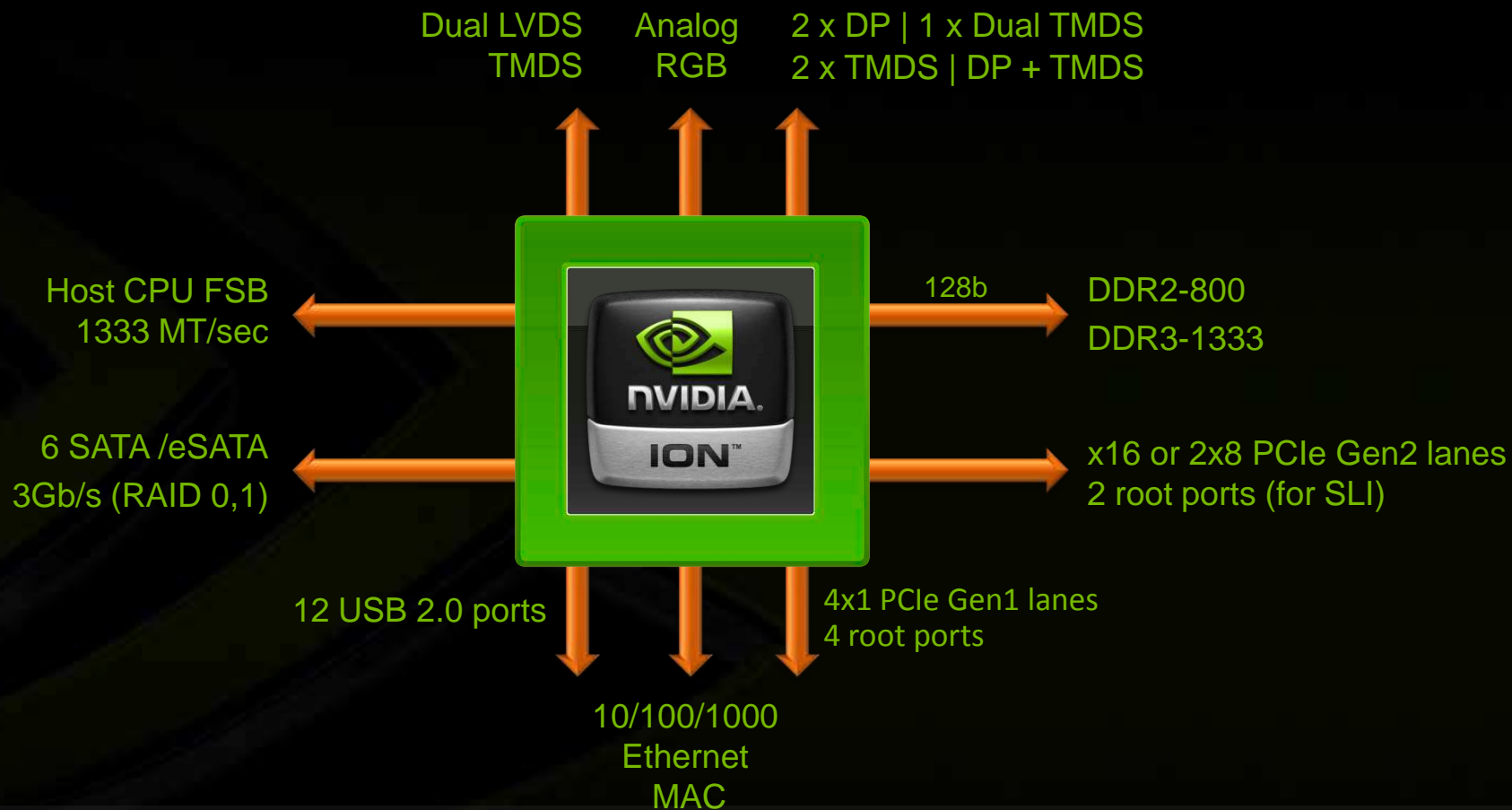
...or in a “bottle”



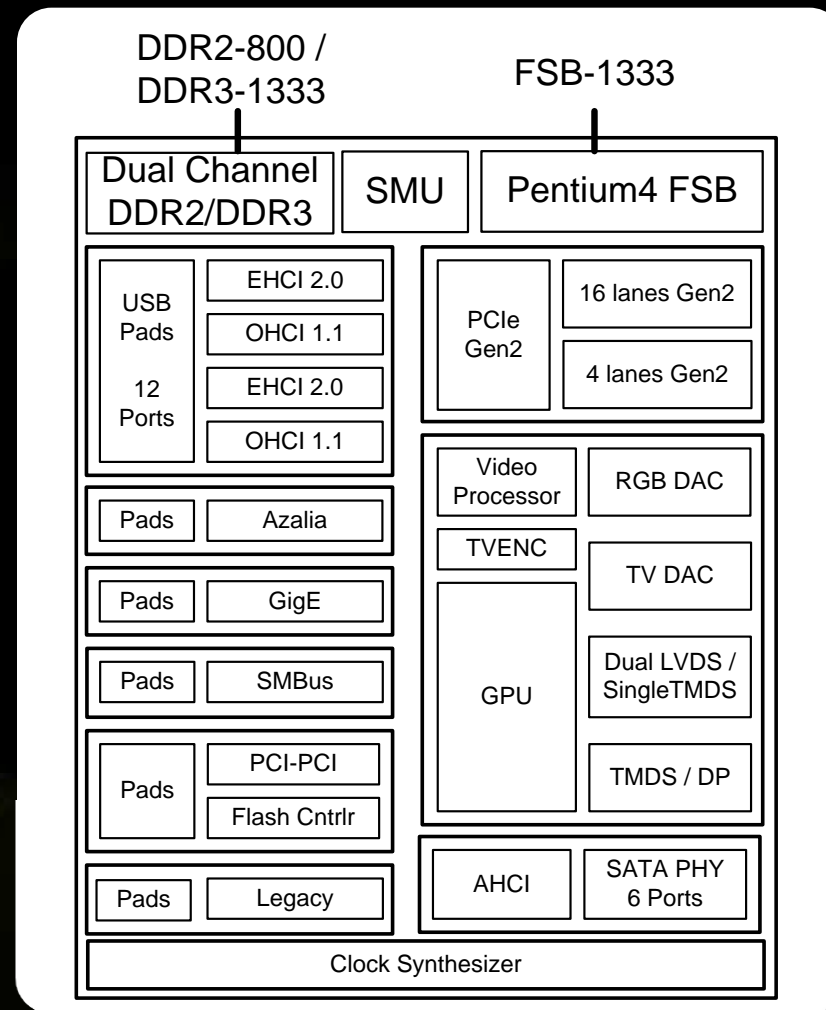
ION enables an unobtrusive PC



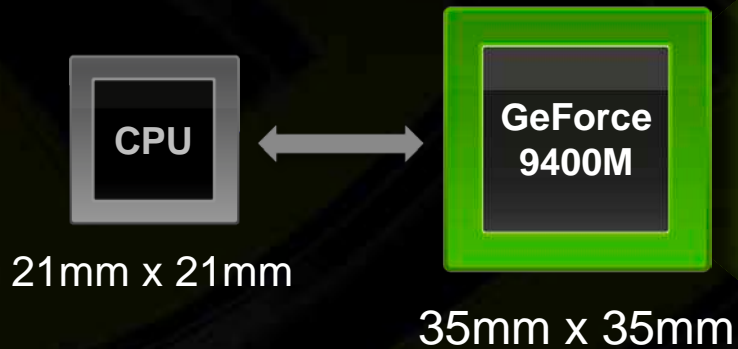
ION Overview



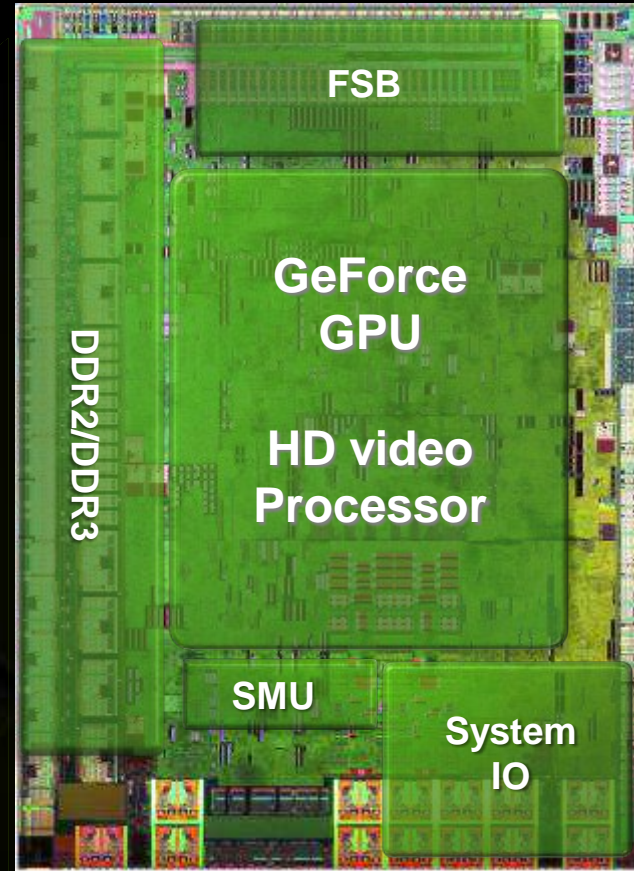
Versatility ...Full PC Feature Set



Board Space ...Two Chip System Solution



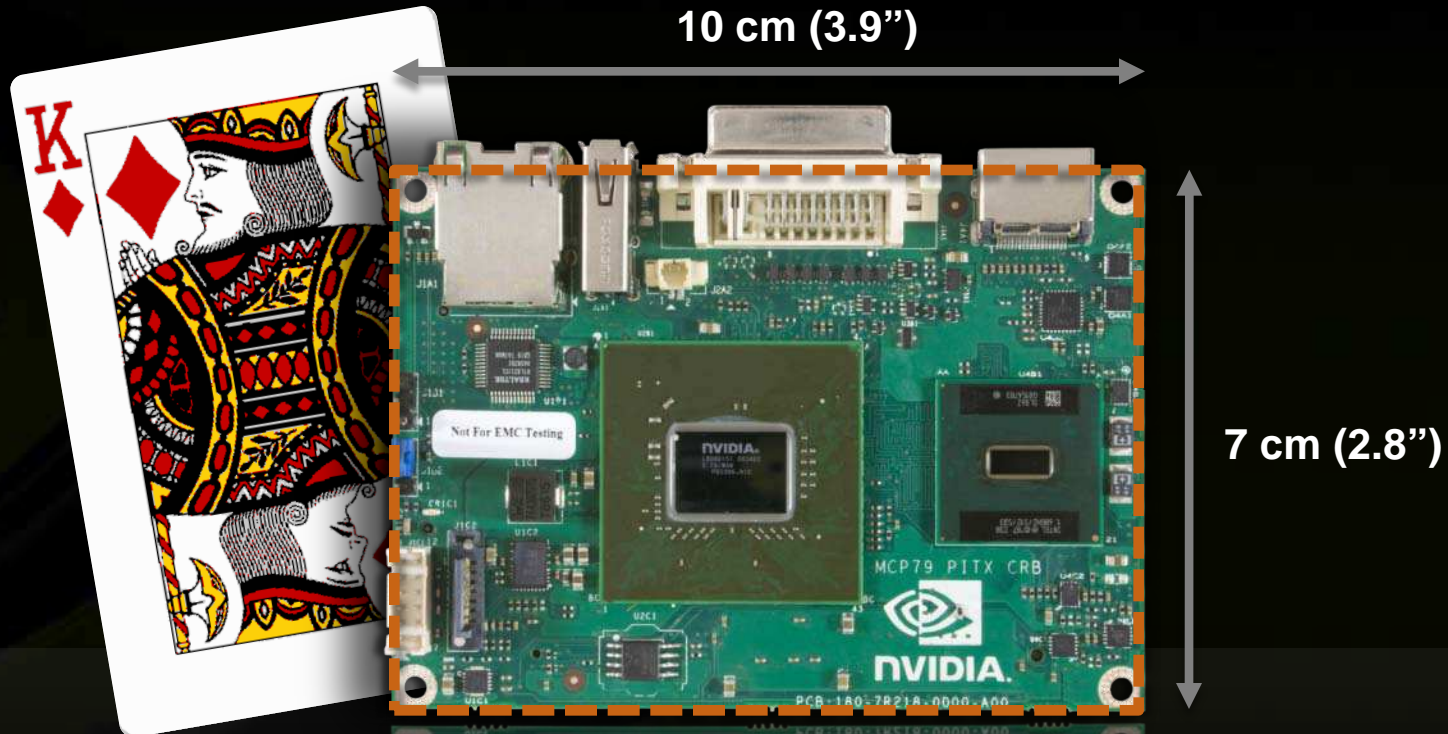
Board Space = 1665 mm²
(Competition = 2555 mm²)



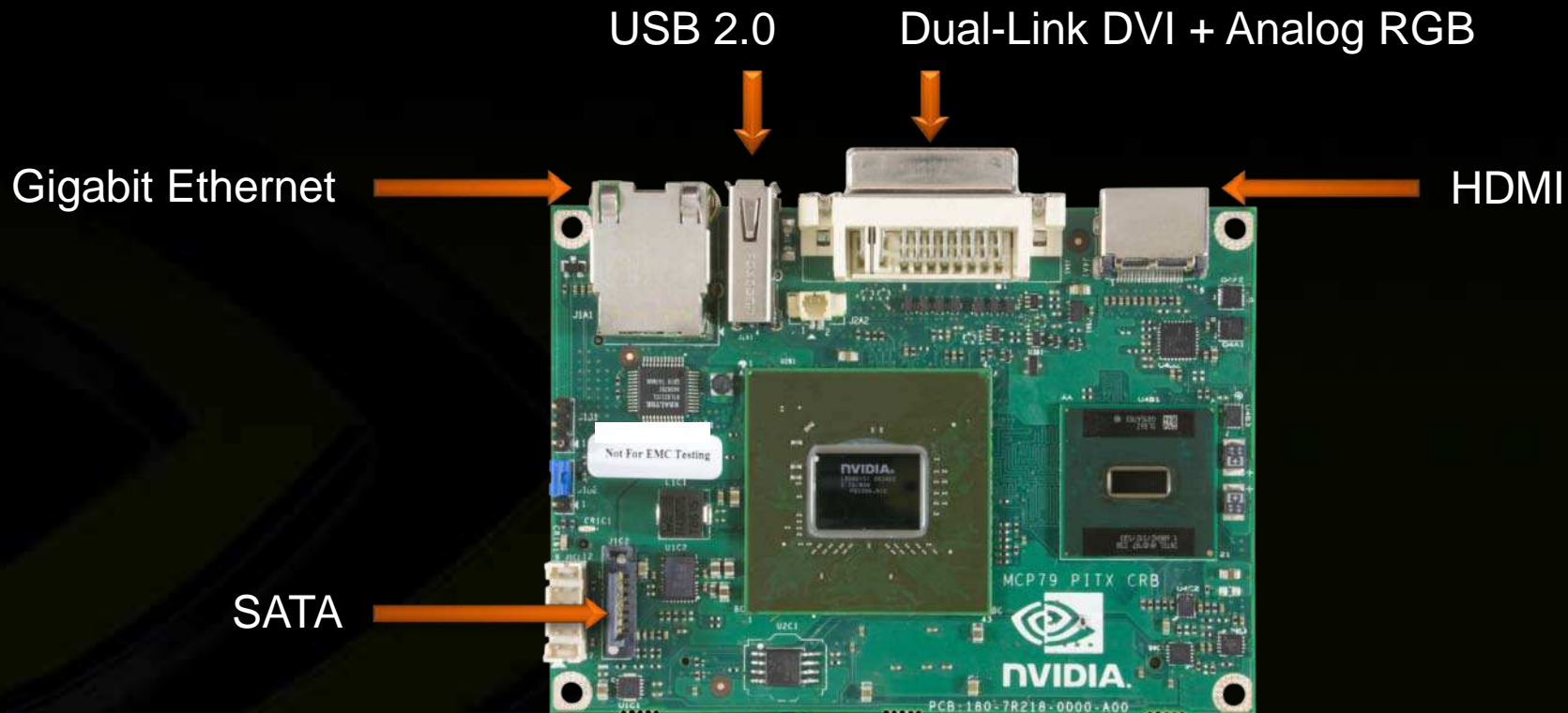
Die = 158 mm²
65nm TSMC

Size

...NVIDIA ION picoITX Platform



ION Reference Motherboard IO



Size

...NVIDIA ION Reference PC



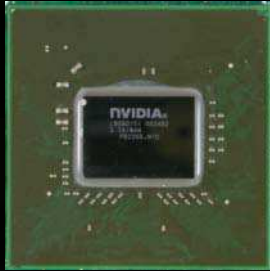
Total Power = 25W!
~1/2 Liter case!



Size

...NVIDIA ION for Ultra small form factors

35x35 Package



Commodity Package

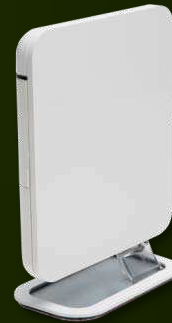
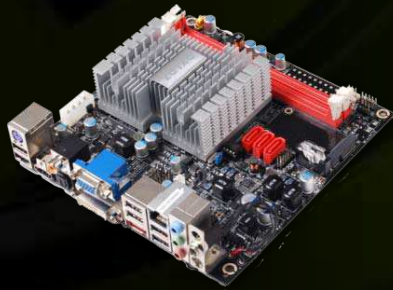
Lower cost

27x27 HDI Package



Extreme performance/board area

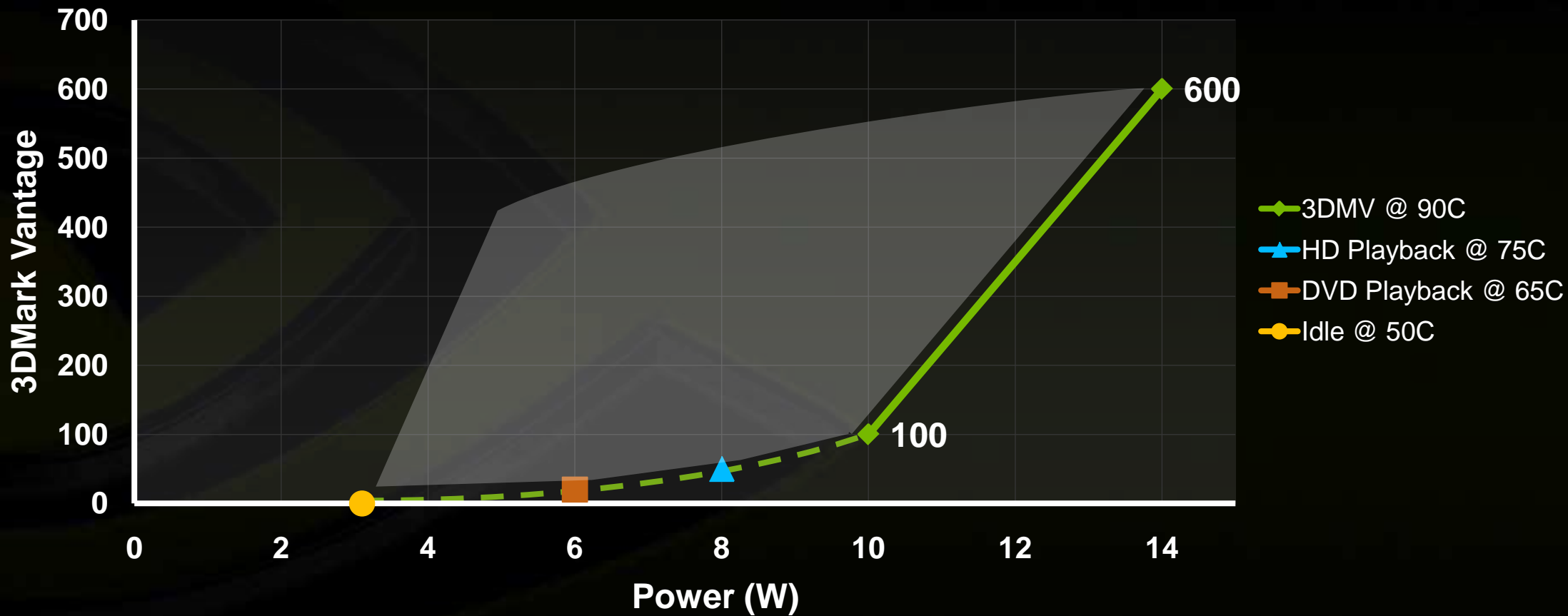
NVIDIA ION has Revolutionized Small, Low Power Desktop PCs



Optimizing Power ... per Use-Case

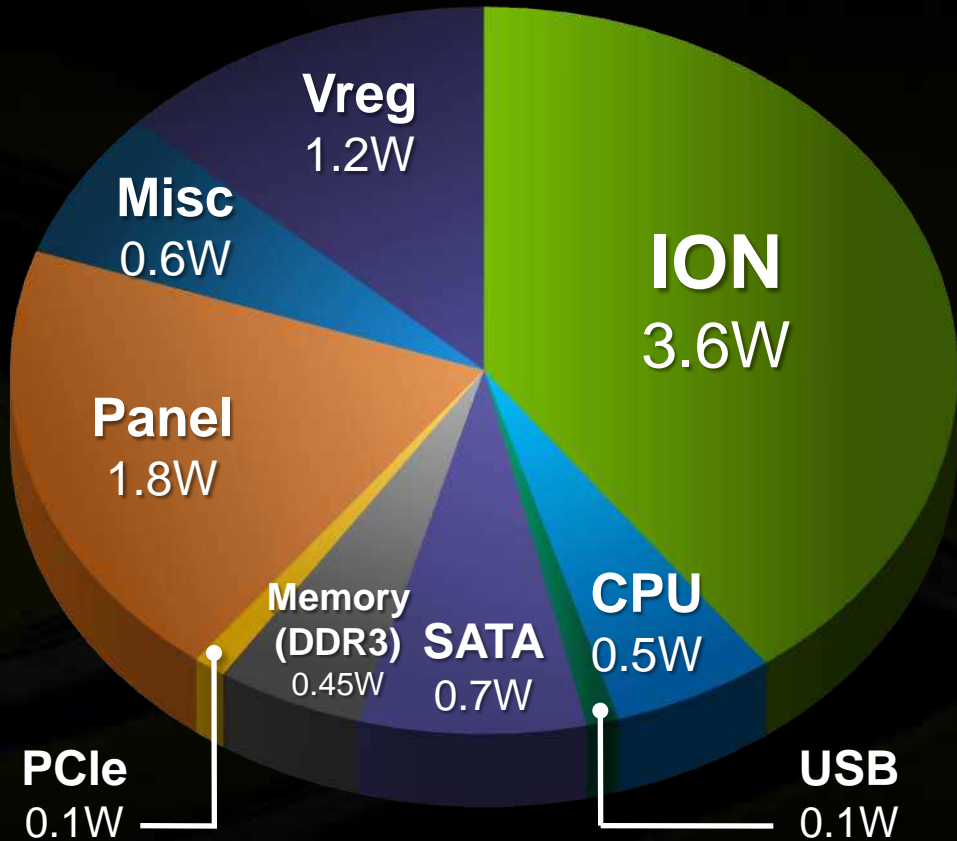


Performance vs Power



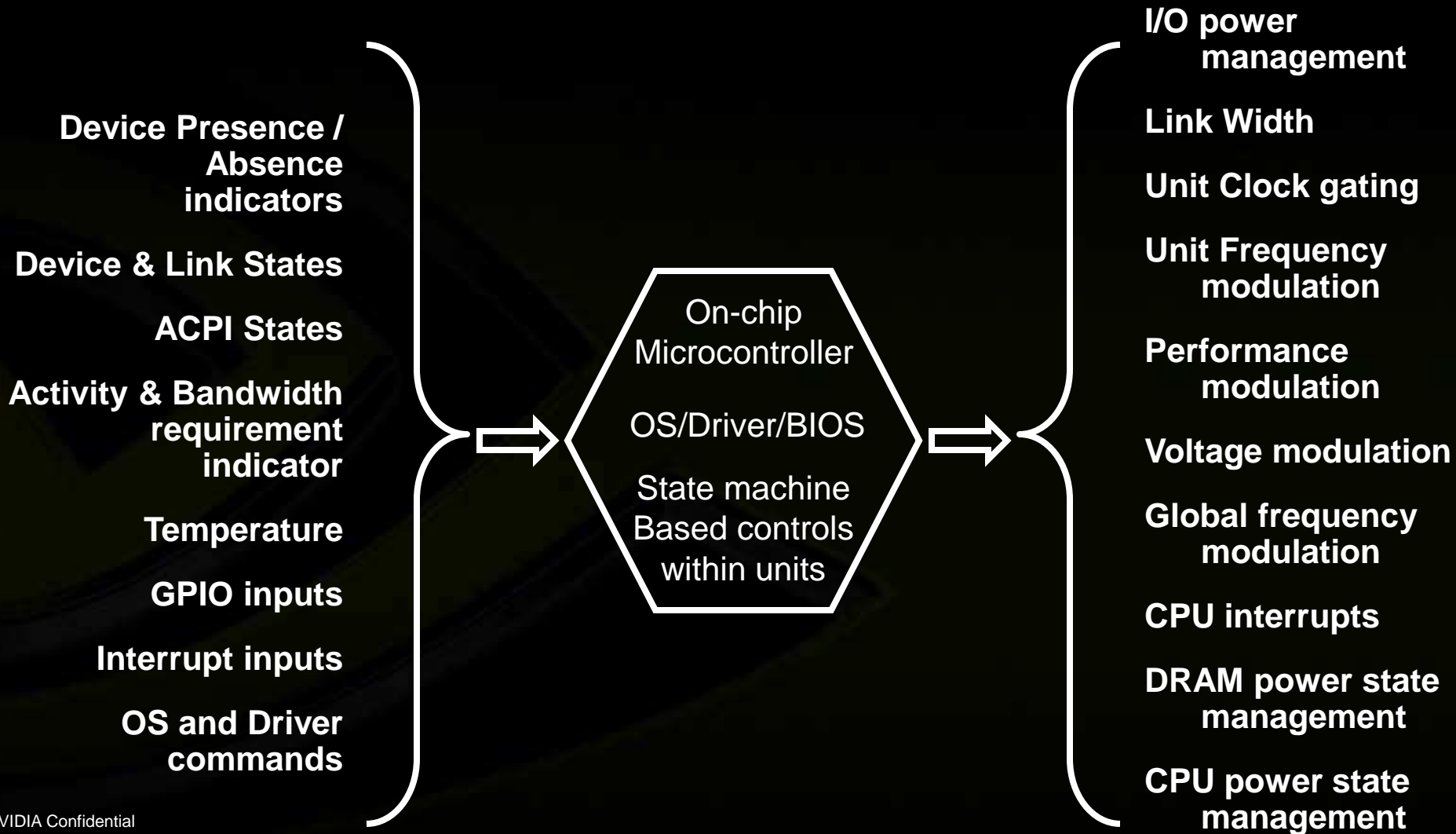
Battery Life

... >6 Hrs (MobileMark'07)



Component	Power (W)
ION	3.6
CPU	0.5
USB	0.1
SATA	0.7
Memory (DDR3)	0.45
PCIe	0.1
Panel	1.8
Misc	0.6
Vreg	1.2
Total	9.0
<hr/>	
Battery Life with 56 Whr	6.2 hr

Power Management: combination of hardware and software



Key Power Management techniques



- **Minimize/coalesce memory traffic**
 - Large on-die display buffer
 - Display Compaction
 - Request aggregation
 - Main Memory is in self refresh > 96% of the time under idle conditions
- **Activity based Frequency/Voltage scaling**
- **Power-optimized circuits**
 - Aggressive power down modes for I/O and custom cells
 - Fast entry/exit from low-power modes
 - Low-leakage cells where speed is not a concern
- **Core Logic Power States software abstraction**



Now ION™ Revolutionizes Small, Low Power Notebooks

SMALL SIZE. BIG PERFORMANCE.

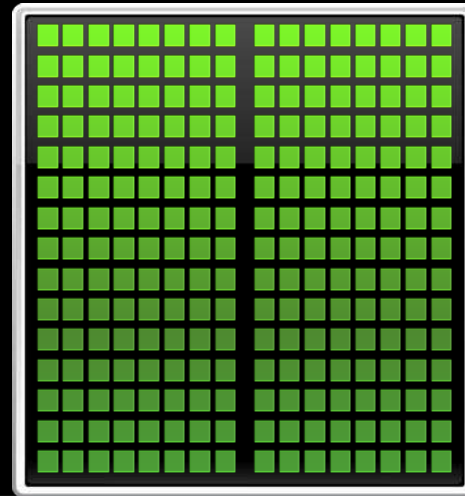
Lenovo Ideapad S12 with NVIDIA ION



Co-Processing



+

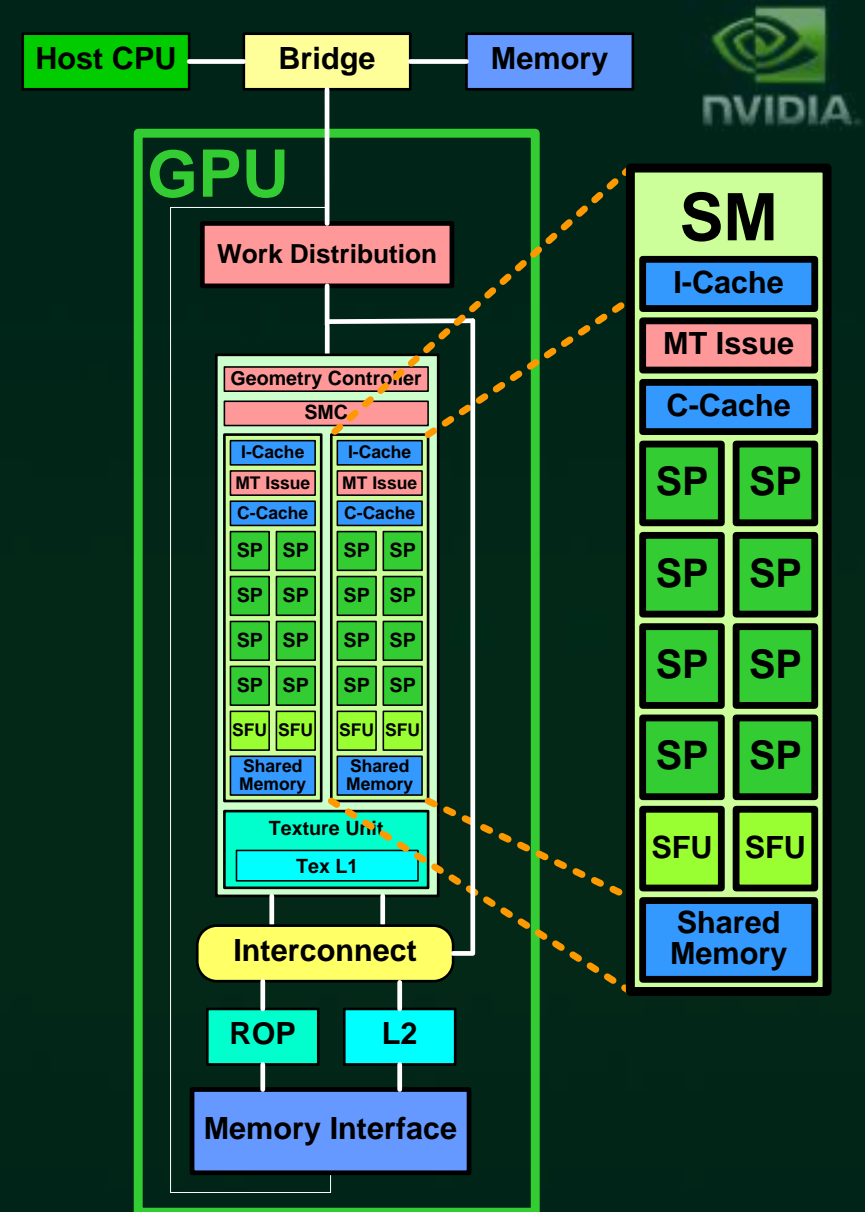


CPU

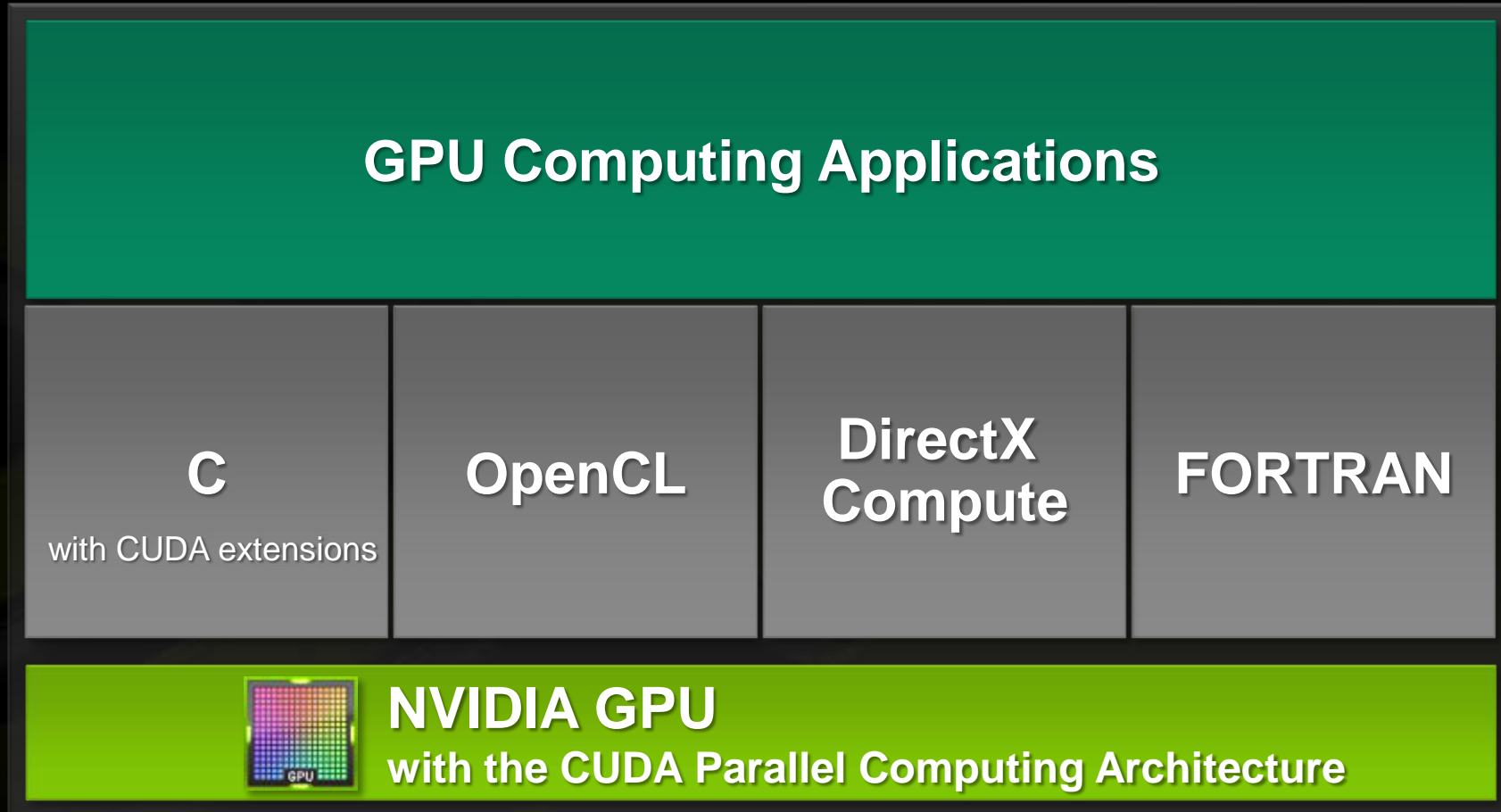
GPU

Consumer Experience ...NVIDIA ION GeForce GPU

- 16 Streaming Processors
- 1.1 GHz processor clock
- DX 10.1 Graphics
- DX Compute
- CUDA GPU Computing



GPU Computing Programming Interfaces

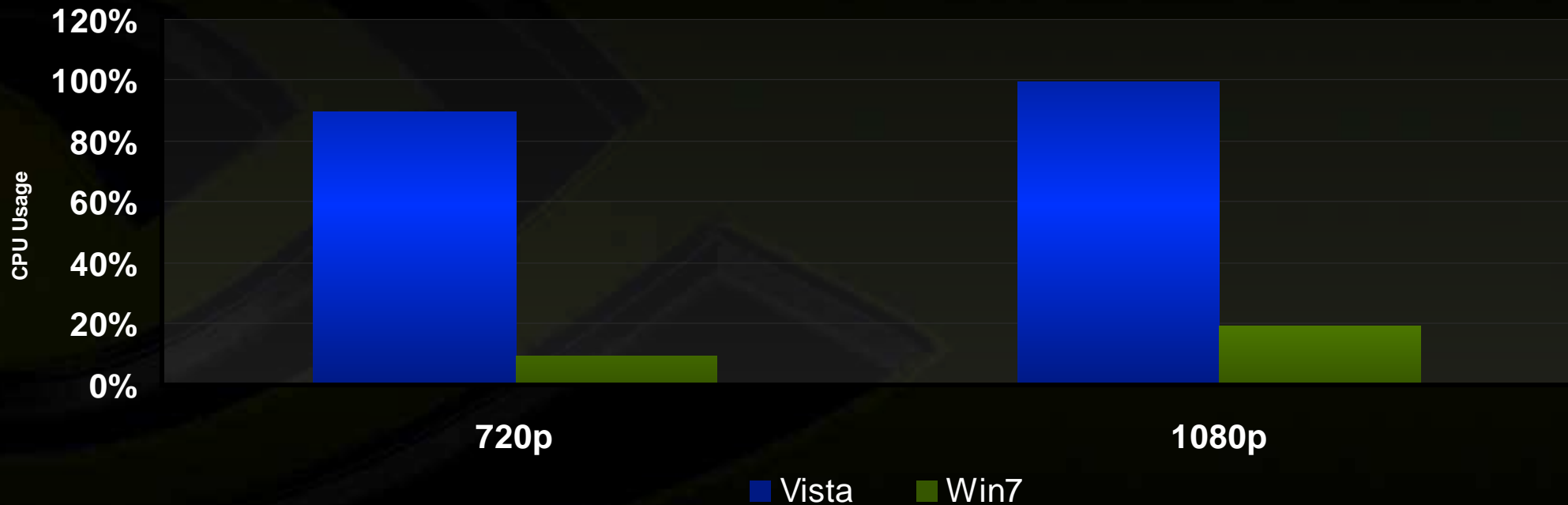


Optimized Consumer Experience

...Win7 CODEC Acceleration – Built in DX-Compute



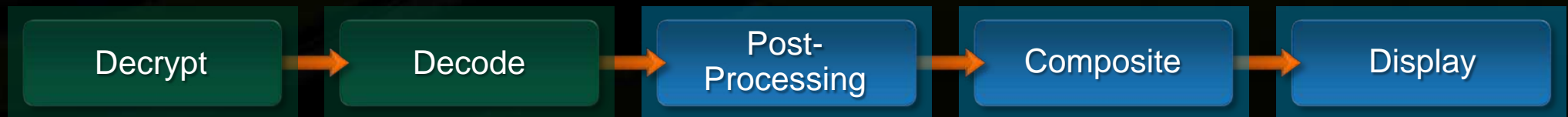
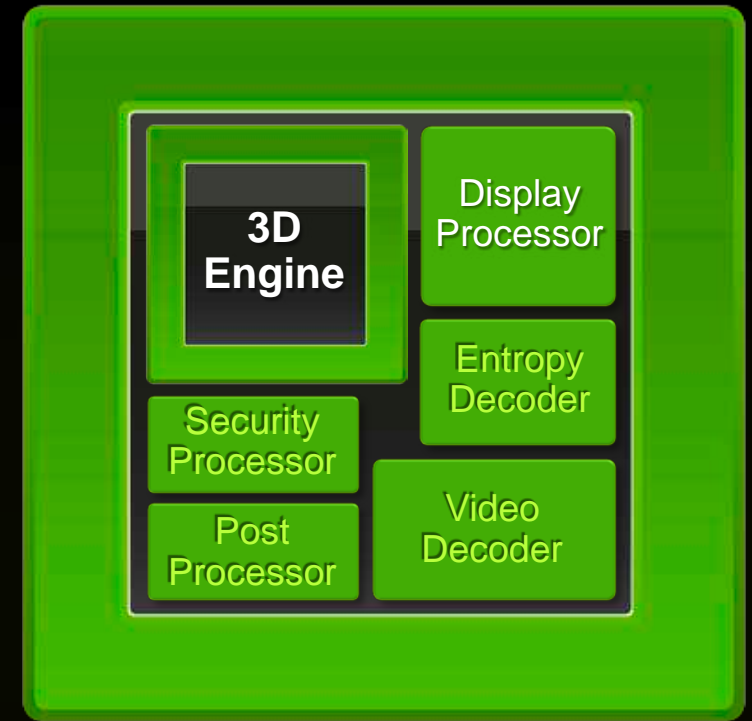
QuickTime Movie Encode on ION
(Lower is better)



HD / BD Video Playback



- **Security/DRM:** AES128 decrypt support
- **Video standards:** MPEG1/2, VC1, WMV9
H.264 main and high profile
- **Resolutions:** 1080i@60Hz, 1080p@30Hz
- **Decode performance:** 40+Mbits/sec entropy decode
Concurrent decode of one 1080i/p and one 480i/p stream
- **Post Processing:** Deinterlacing
Deblocking
Film grain technology (FGT)
Color correction
- **Composition:** Scaling
Color space conversion
Blending





Consumer Experience

...Low Power Video Playback

Low BD and SD playback power

	ION SD 480i	ION BD 1080p
CPU	N270	N270
Chipset	ION	ION
MEM	128bit DDR3-1066	128bit DDR3-1066
CPU Power ¹	0.9W	1.7W
MCP Power ²	6W	8W
Total CPU + MCP Power	6.9W	9.7W

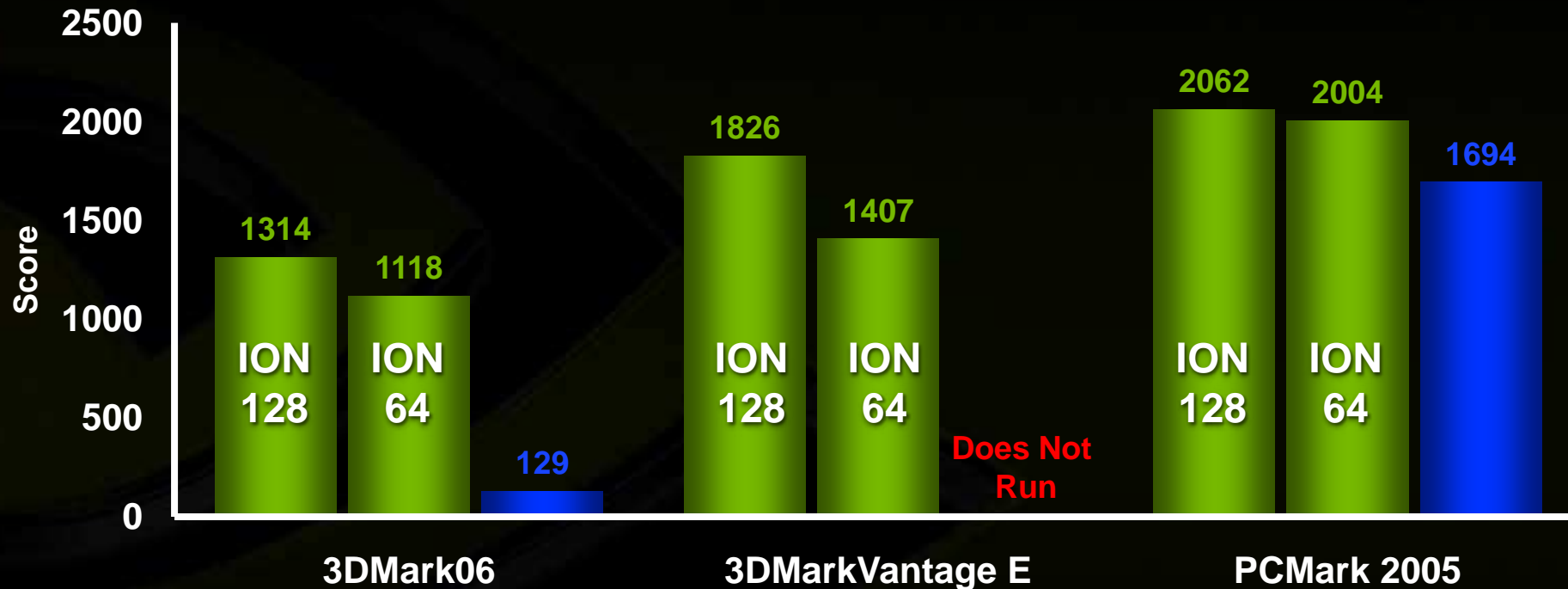
1. Based on CPU utilization during playback – SD at 20%, BD at 60%.

2. Measured ION at WC Sigma – Titanic DVD used for SD at 65C, Corpse Bride BD used for BD at 75C.

Optimized Consumer Experience ...Benchmark Performance



N270 Benchmark Perf – Ion vs. Status Quo



Ion: 128b DDR2-800 – ION + N270, 2x1GB, DDR2-800, Vista32

Ion 64b: DDR2-533 – ION + N270, 1GB, DDR2-533, Vista32

Competition: 64b DDR2-533 – 945G + N270, 1GB, DDR2-533, Vista32

NVIDIA ION an Industry Phenomenon



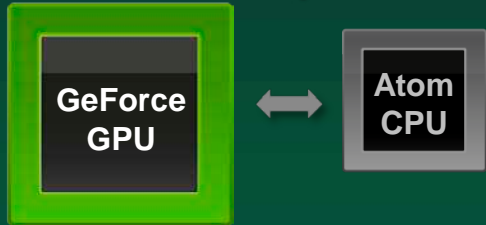
**BEST CHOICE 2009
OVERSEAS**



ION Summary



Lowest cost
Premium experience



Graphics Plus



Premium OS



Full HD



Questions?





NVIDIA®

ION™