



NVIDIA Quadro

The Power of 10 Launch

Spring 2009

Agenda

Decade of Innovation

New Quadro FX and NVS Line Up Overview

NVIDIA SLI Multi-OS

HP Configurations

Quadro CX

Built For Professionals update

Key Contacts



A Decade of Innovation



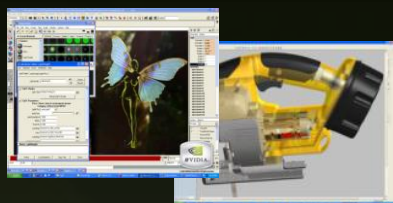
1999 – 2000



Quadro Launched

- 1st Hardware T & L
- 1st Mobile WS Launched
- 1st Professional Linux Drivers

2001 – 2002



GPU Cg Adoption

- 1st Real Time Rendered Movie (Final Fantasy)
- 1st Pro Apps with GPU Cg: Softimage, CATIA, SolidWorks, Maya
- 1st 64-bit Graphics Drivers (IA64)

2003 – 2004



Solutions Focus

- 1st Blade GPU
- 1st GPU GSync
- 1st GPU HD SDI solution
- 1st GPU based Scene Graph – NVSG 1.0

2005 – 2006



Scalability

- 1st GPU- based Scalable graphics solution QuadroPlex
- 1st 64-Bit WinXP / Server '03 Drivers
- 1st OpenGL 2.0 Drivers
- 1st Vista OpenGL Drivers

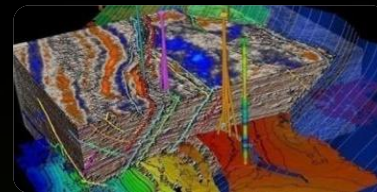
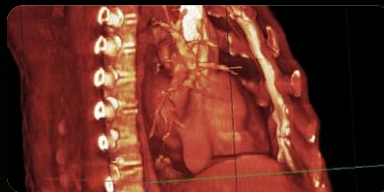
2007 – 2008



Middleware

- 1st GPU HPC Architecture CUDA
- mental images
- 1st Real-Time HD-SDI Virtual Sets
- 1st Interactive GPU Ray Tracer
- 1st Transparent GPU Display Scalar
- 1st 4GB GPU memory

Quadro Visual Computing Platform



NVSG
Scene Graph

C CUDA
OpenCL

SLI
Mosaic Mode

SLI
Multi OS

30-bit
Color

mental
ray

reality
server

PhysX

NVScale
Multi-GPU

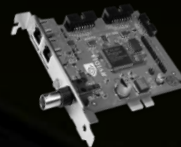
NViRT
Interactive
Ray Tracing



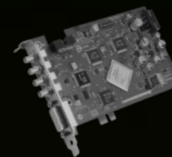
NVIDIA
SLI



NVIDIA
CUDA



NVIDIA
G-Sync



NVIDIA
HD SDI



NVIDIA
Quadro Plex VCS



Market: Product & Industrial Design

Challenge: Real-time graphics generation & composite



NVSG
Scene Graph

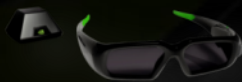
C CUDA
OpenCL

SLI
Mosaic Mode

PhysX

NVScale
Multi-GPU

NViRT
Interactive
Ray Tracing



NVIDIA
3D Vision



NVIDIA
SLI



NVIDIA
G-Sync



Quadro FX
5800



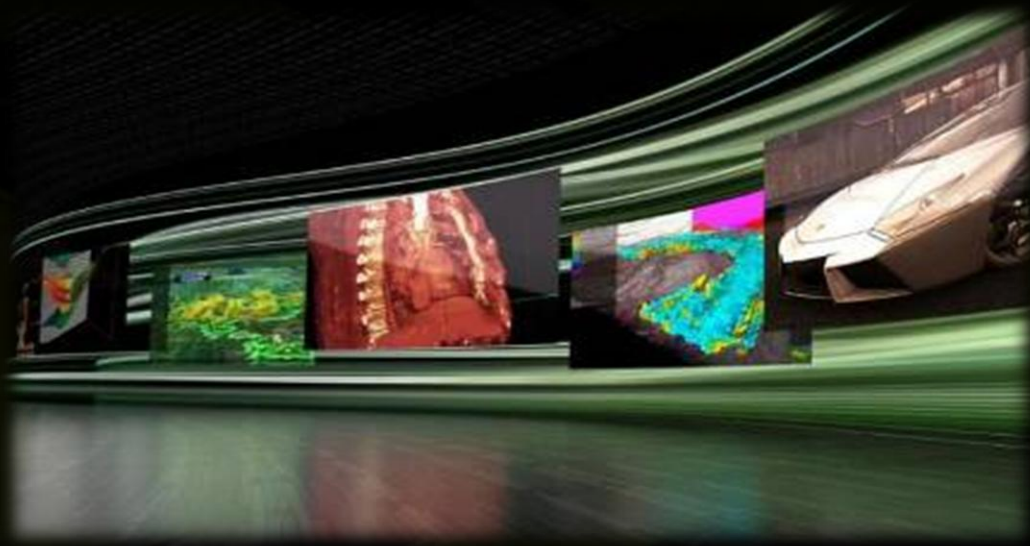
NVIDIA
Quadro Plex VCS

Quadro Solution:

Transparently scale applications across multi-displays for large scale visualization of photorealistic models

Solutions Enablement: DevRel / Apps
Engr

Solving the Worlds Most Complex Visual Computing Challenges



- ✓ World-Class Partnership and Support
- ✓ The Trusted Solution for the Most Mission Critical Applications
- ✓ Required and Specified by over 90% of Fortune 1000 Companies







Introducing the 10th Generation Quadro Professional Solutions Family









Strongest Professional Graphics Lineup in History
Unprecedented Performance, Features and Capabilities
Solutions for Every User and Application

Quadro FX Family






Product Segment	Target Audience	Key Additional Relevant Features	Quadro Solution	Estimated Street Price	
Ultra High-End	4D Seismic Analysis 4D Medical Imaging	+ 4GB GPU Memory + 240 CUDA Parallel Cores	Quadro FX 5800	\$ 3,299	
High-End	Digital Special Effects Product Styling	+ G-Sync + SLI Frame Rendering	Quadro FX 4800	\$ 1,799	
High-End	High End MCAD Digital Effects Broadcast	+ SDI + Stereo + SLI Multi-OS	Quadro FX 3800	\$ 899	
Mid-Range	Midrange CAD Midrange DCC	+25% better Perf than FX 580	Quadro FX 1800	\$ 599	
Entry	Volume CAD Volume DCC	+30% better performance than FX 380 + 30-bit Color	Quadro FX 580	\$ 149	
Entry	Volume CAD Volume DCC Productivity Apps	+50% Better Performance than FX 370	Quadro FX 380	\$ 99	

	FX 380	FX 580	FX 1800	FX 3800	FX 4800	FX 5800
						
CUDA Parallel Processors	16	32	64	192	192	240
GPU Memory	256 MB	512 MB	768 MB	1.0 GB (1024 MB)	1.5 GB (1536 MB)	4.0 GB (4096 MB)
Memory Width	128-bit	128-bit	192-bit	256-bit	384-bit	512-bit
Memory Bandwidth	22.4 GB/s	25.6 GB/s	38.4GB/s	51.2GB/s	77 GB/s	102 GB/s
PCI-Express	Gen2	Gen2	Gen2	Gen2	Gen2	Gen2
Precision	FP32	FP32	FP32	FP64 IEEE 754	FP64 IEEE 754	FP64 IEEE 754
Display I/O	Dual-Link DVI (2)	Dual-Link DVI + DP (2)	Dual-Link DVI + DP (2)	Dual-Link DVI + DP (2) + ST	Dual-Link DVI + DP(2) +ST	Dual-Link DVI (2) + DP (1) + ST
TDP	34W	40W	59W	107W	150W	189W
Gsync / SDI	No / No	No / No	No / No	No / Yes	Yes / Yes	Yes / Yes

Quadro NVS

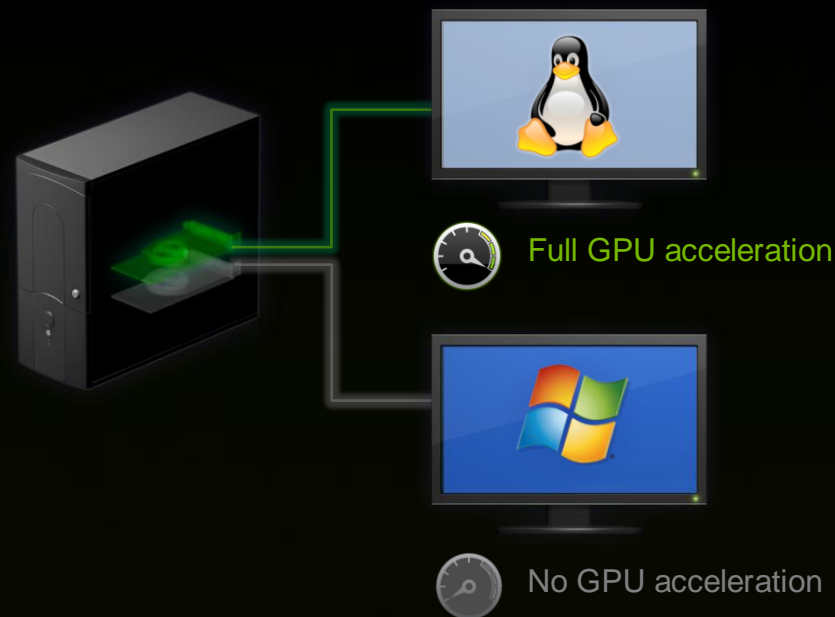
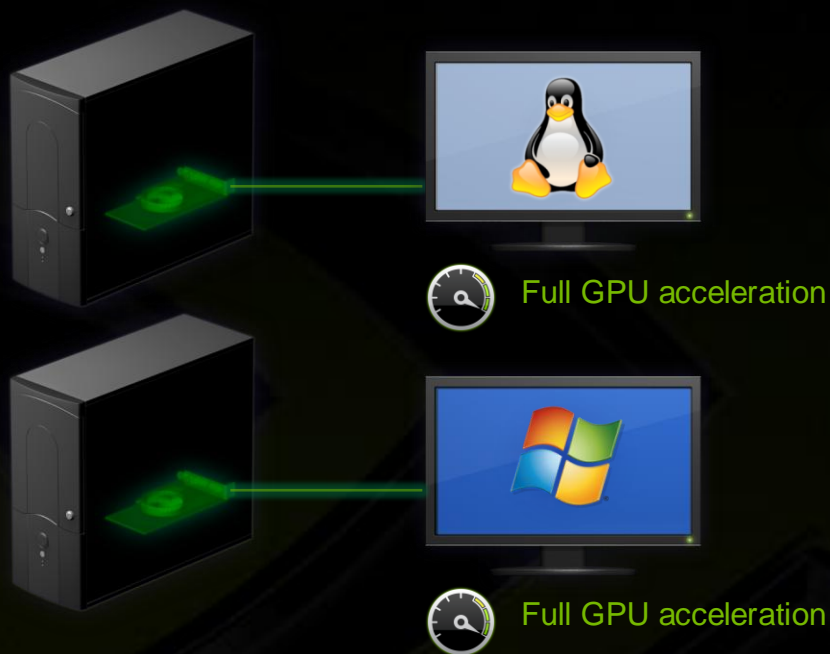


Form Factor & Display	Target Applications	Key Features	GPU	Estimated Street Price	
Full Height Quad Head	Financial Trading General Business Applications (Vista) Call Center Digital Signage	4 x Native DisplayPort Heads Passive Cooling	Quadro NVS 450	\$ 450	
Low Profile Quad Head		4 x Display Heads Low Profile Form Factor High MTBF, Variable Speed Fan	Quadro NVS 420	\$ 450	
Low Profile Dual Head		2 x Native DisplayPort Heads Low Profile Form Factor Passive Cooling NVIEW	Quadro NVS 295	\$ 100	

HP Z series unleashes breakthrough Quadro GPU Features

- Dual PCI Express Graphics Top-to-Bottom
 - NVIDIA Quadro SLI-enabled workstations
 - Multi-GPU-enabled workstations
- Virtualization Technology VT-d
 - NVIDIA SLI Multi-OS
 - Full hardware GPU support for combinations of host and guest Operating Systems
- Intel® QuickPath Nehalem EP Architecture
 - Higher GPU Performance
 - Full throttle Multi-threaded driver support
- Larger Main System Memory
 - Standard DDR enables larger (144GB), faster, lower power
 - Support for massive GPU memory footprint

System Virtualization - The Situation Today



Deploy and manage two workstations to get full GPU acceleration on two different OS's at the same time

Utilize system virtualization, but the GPU can only work with one OS; even if the workstation has two GPUs installed

System Virtualization - With Quadro SLI Multi-OS



IT/IS: Optimizing TCO
Hardware
Management
Power















User: Intuitive & Ergonomic Workflow
Single System / multi-app
Lower noise, heat

With Quadro SLI Multi-OS and system virtualization software both the host and guest operating system are assigned their own Quadro GPU

NVIDIA Quadro on HP

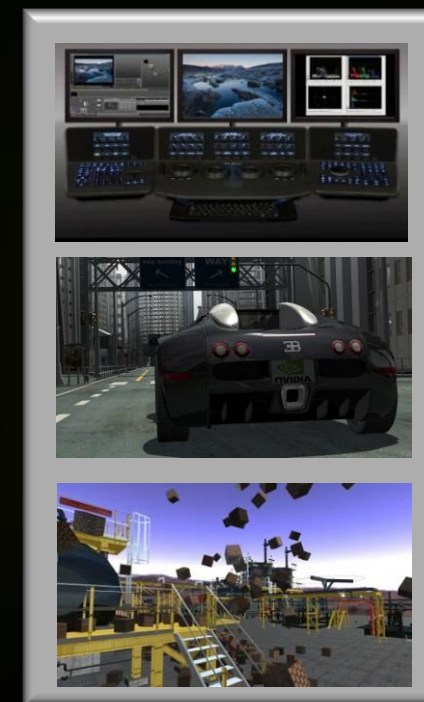


					
		HP Z400	HP Z600	HP Z800	HP xw9400
Quadro FX 5800		Not Available	Not Available	Single and Dual SLI	Single and Dual SLI
Quadro FX 4800		Single	Single	Single and Dual SLI	Single and Dual SLI
Quadro FX 3800		Single	Single	Single and Dual	Single and Dual
Quadro FX 1800		Single and Dual	Single and Dual	Single and Dual	Single and Dual
Quadro FX 580		Single and Dual	Single and Dual	Single and Dual	Single and Dual
Quadro FX 380		Single and Dual	Single and Dual	Single and Dual	Single and Dual
Quadro NVS 450		Single and Dual	Single and Dual	Single and Dual	Single and Dual
Quadro NVS 295		Single and Dual	Single and Dual	Single and Dual	Single and Dual

NVIDIA Quadro with CUDA



- CUDA - Parallel Computing Architecture for NVIDIA GPUs
 - standard languages - C, C++, FORTRAN
 - standard compute APIs - OpenCL and DX Compute
 - standard OS's – Windows, Linux
- Professional Application of CUDA
 - Image Processing – CUDA based pipelines
 - Raytracing – photorealistic and “photon correct” lighting
 - Physics – dynamic simulation
- Applications converging visualization capabilities of Quadro with compute capabilities of CUDA
 - Interop allows fast data transfer between Graphics and Computing contexts on the GPU



Dassault CATIA – The Truth about VBOs



- **Vertex Buffer Objects (VBOs) shift raw geometry processing to the GPU, resulting in 2-3x better performance.**
- **For CATIA V5 Release 18 and Release 19 VBOs will NOT be turned 'ON' as the default (customers need to enable via an environment variable)**
- **For Quadro, it doesn't matter....**

	Quadro FX 1800 vs FirePro v5700	Quadro FX 3800 vs FirePro v7700
CATBench R18 (VBOs OFF)	+46%	+46%
CATBench R18 (VBOs ON)	+28%	+28%

CATIA

Real World Test by CATIA App Engineers

“...[tested] both the Quadro FX 3700 and ATI FirePro V7700 by performing a series of random pans, zooms and rotates on the large combined assembly.

...both application engineers voted in favour of NVIDIA saying they had a much better 3D experience with the Quadro FX 3700.”

*- Greg Corke
Develop3D*



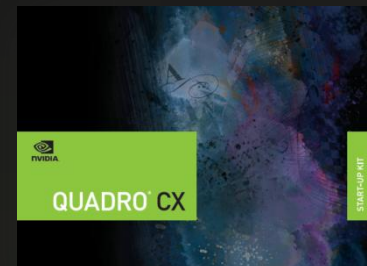
NVIDIA® Quadro® CX for HP:

The Accelerator for Adobe Creative Suite 4



- Fluid Interactive Canvas
- Lightning Fast H.264 CUDA-enabled video encoding
- Specialized Plug-ins
- Extended Color Fidelity
- Advanced Multi-Display Management Tools
- Designed and Optimized for Adobe CS4

HP Smart Buy avail now!
CS4 Bundle launches this month!



CX Start-up
Kit

Quadro
FX 4800



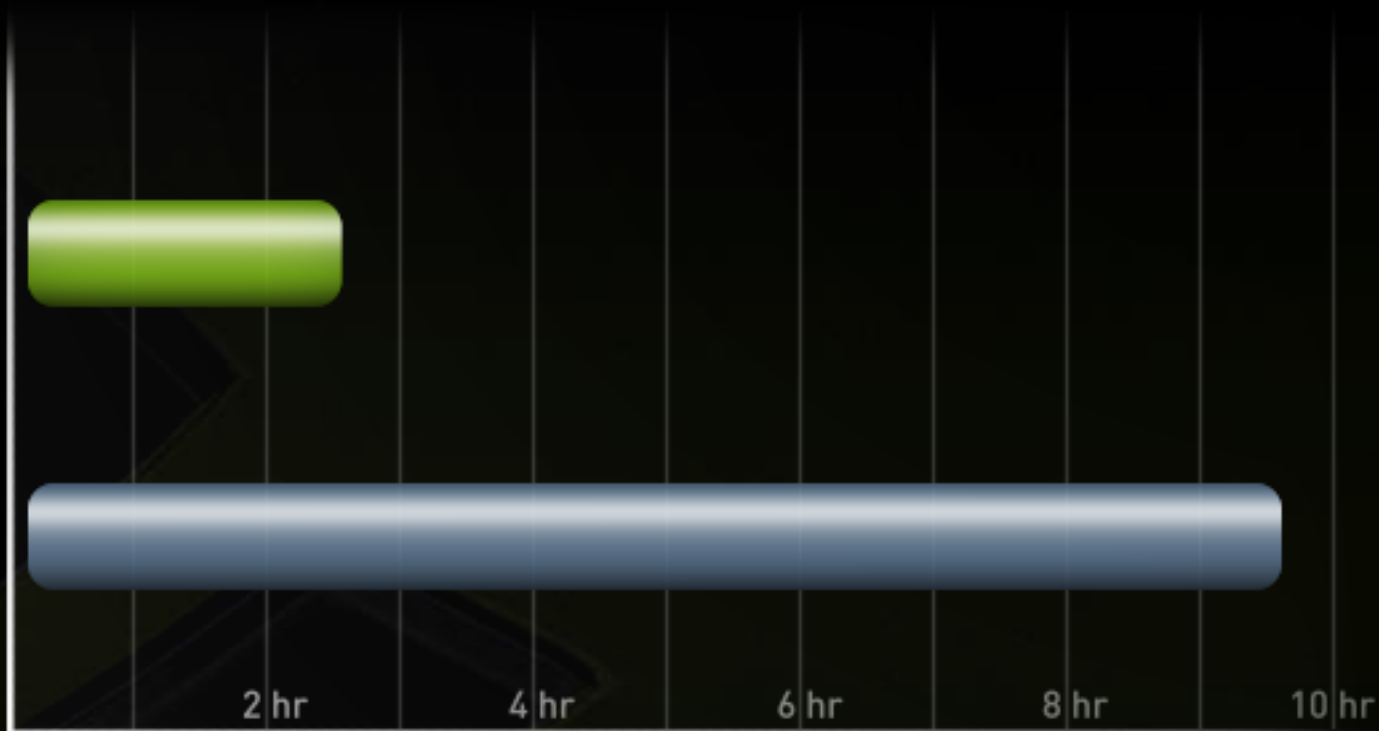
Up to 4X Faster H.264 Video Encoding



Quadro CX
2 hr 35 min



**Dual Core
CPU**
9 hr 57 min



Note: Shorter times are better

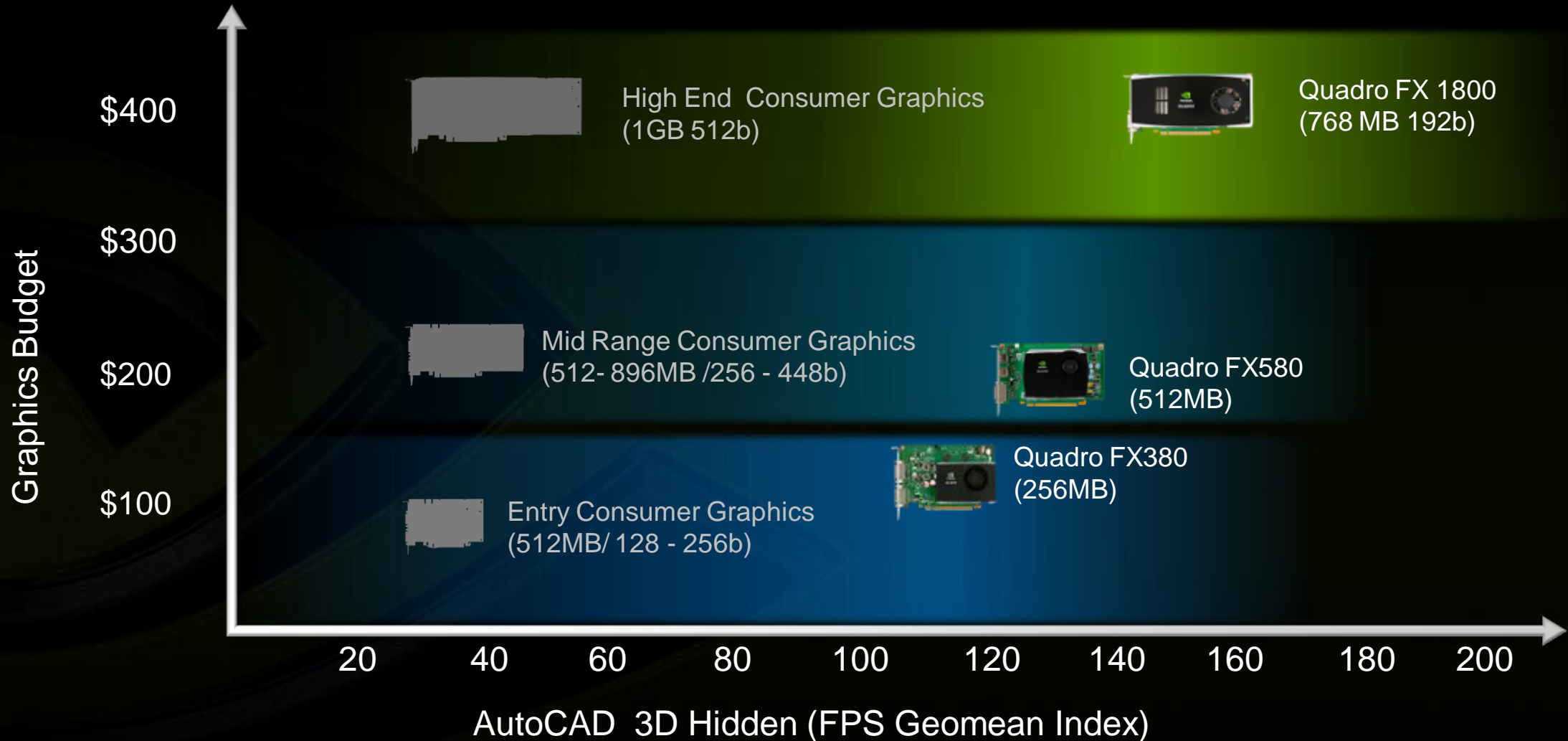
One Hour HDV Video Encoded to H.264

AutoCAD 2010



- **AutoDesk ACAD 2010 Positioning:**
See What You've Been Missing
Take your inspiration further with the new AutoCAD 2010- design more powerfully in 3D...
- **AutoDesk System Requirements:**
“A Direct3D-capable workstation-class graphics card with 128 MB or greater is required.”
- **NVIDIA's Built for Professionals**
 - ***FX 380, 580, 1800: Unbeatable Price / Performance Lineup for AutoCAD***

Unprecedented AutoCAD 2010 Performance



Big NVIDIA/HP Wins in 2008!



Industry	Customer	NV Solution	HP Solution	Details
Medical	GEHC	FX 4800C	xw8600	“True in One” CT Scanner
Government	Large Gov’t Customer	Tesla S1070	DL160	525 x DL160 + 525 x Tesla S1070
Aerospace	Lockheed Martin	Various	Various	Initially 3.5K seats parlayed into another 2K seats.
SW	Microsoft	Various	Various	1 st combines WS + QDFX standards win at MS; 13K to 14K Total Opportunity
Oil and Gas	Chevron	FX 5600	xw8600	375 systems; 50% with dual graphics
Financial	Fidelity	NVS 290 and FX 570	xw4600	Won several thousand seats

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