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GPU TECHNOLOGY CONFERENCE

Designed For CUDA

San Jose, California | 1 October 2009

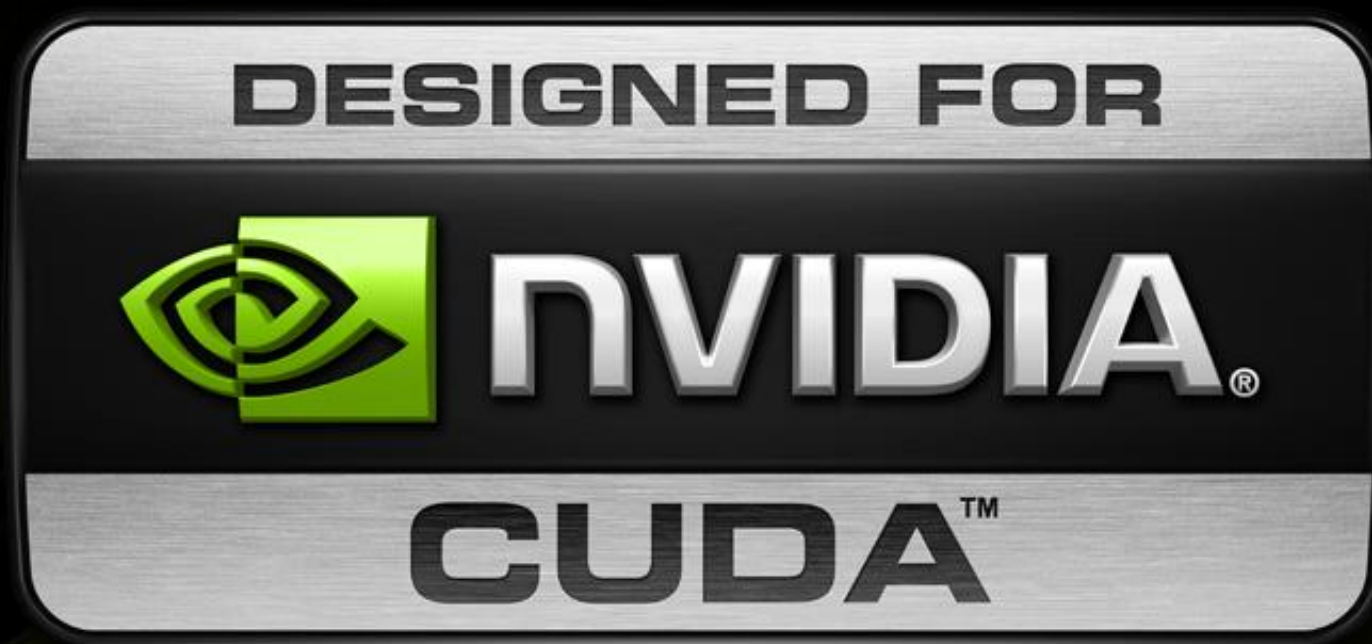
Michael Steele | GM Visual Consumer Solutions

Agenda



- The Spirit of “Designed for CUDA”
- How Do You Design for CUDA
- How “Designed for CUDA” Works
 - Development Partnership
 - Marketing Partnership
- Get “Designed for CUDA”

The Spirit of “Designed for CUDA”



The Spirit of “Designed for CUDA”



A development and marketing partnership to:

- Enable the best use of GPU computing for your app
- Deliver solutions that amaze consumers
- Build and sustain a profitable market for you and NVIDIA

“Designed for CUDA” Program



1

Development and Testing Collaboration For A Better Overall User Experience

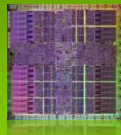
- Performance optimizations result in powerful GPU/CPU co-processing
- Stability & reliability via compatibility testing = Fewer returns and support issues
- Advanced GPU computing rewards & encourages new users of CUDA GPUs

2

NVIDIA Market Reach and Application Promotions To Build and Grow Market

Designed for CUDA - The Approach

CUDA is
An Architecture

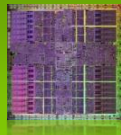


NVIDIA GPU

with the CUDA Parallel Computing Architecture

Designed for CUDA - The Approach

CUDA is
Open



NVIDIA GPU

with the CUDA Parallel Computing Architecture

Designed for CUDA - The Approach

Widest Language & API Support For GPU Computing

CUDA C

- With CUDA Extensions
- Over 60,000 developers
- SDK + Lib's + Visual Profiler and Debugger

OpenCL

- 1st GPU demo
- Shipped 1st OpenCL Conformant Driver
- Strategic developers using NV SW today

Direct Compute

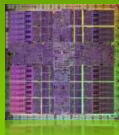
- Microsoft's GPU Computing API
- Supports all CUDA-Architecture GPUs since G80 (DX10 and future DX11 GPUs)

FORTTRAN

- PGI Compiler
- Fortran wrappers
- FLAGON

Python, Java, .NET, ...

- Compute Kernels
- API Bindings



NVIDIA GPU

with the CUDA Parallel Computing Architecture

Designed for CUDA - The Approach

Your GPU Computing Application

CUDA C

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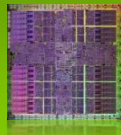
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NVIDIA GPU

with the CUDA Parallel Computing Architecture

Designed for CUDA - The Approach

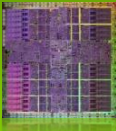


DESIGNED FOR

nVIDIA®

CUDA™

- With C...
- Over 60...
- SDK + ...
Profiler



NVIDIA GPU
with the CUDA Parallel Computing Architecture

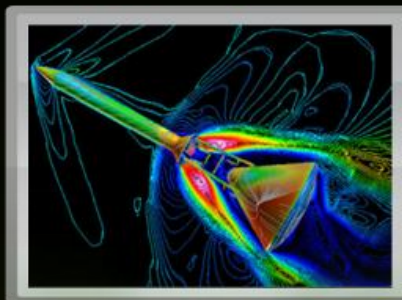
Designed for CUDA - The GPU

Over 100 Million CUDA-enabled GPUs Installed

GeForce®
Consumer



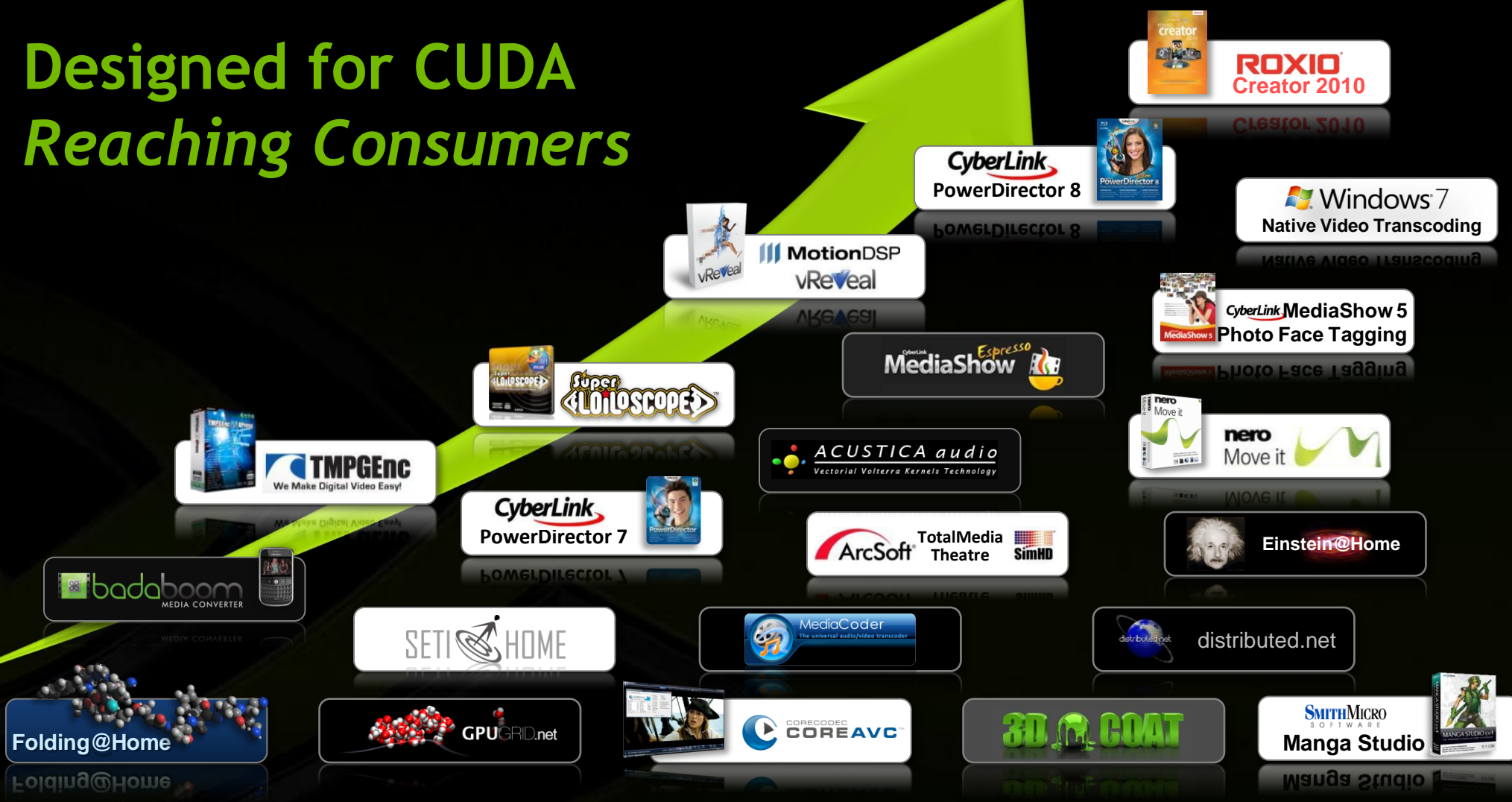
Tesla™
HPC | Server



Quadro®
Professional



Designed for CUDA Reaching Consumers



2H 08

1H 09

2H 09

Program In A Nutshell

NVIDIA Provides to ISV Partner

- **Technical info**
 - Early access to future products, tech details & roadmaps
- **Development support**
 - Implementation, optimization, bug fixes to best enable NVIDIA GPU
- **Testing support**
 - Compatibility testing, min spec analysis
- **Marketing programs**
 - Targeting 100M+ GPUs

ISV Partner Provides to NVIDIA

- **High impact CUDA technology adoption**
- **App info**
 - Tech details, release & update timing
- **Early and regular access to builds & updates**
- **Ongoing GPU computing optimization**
- **Co-marketing collaboration**

NVIDIA Value Proposition – Development

- **Extensive Technology and Tools**
 - Optimized GPU Computing support
 - Expertise in Video, Imaging, & GPU Computing
 - Advanced graphics feature support
 - Performance optimizations
- **Global Test Lab with Over 800 Systems**
 - Dedicated to pre-release app testing
Santa Clara, Moscow, Shanghai, Beijing
 - GPU scaling analysis
- **Inside Track Access**
 - NVIDIA developer website [*private*]
 - File and track bugs
 - Early access: drivers, tools, roadmaps



NVIDIA Developer Resources

DEVELOPMENT TOOLS

CUDA Toolkit

Complete GPU computing development kit

Visual Profiler

GPU hardware profiler for CUDA C and OpenGL

Nexus

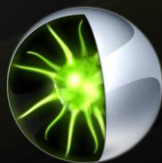
Development environment with Visual Studio integration [*beta*]

NVPerfKit

OpenGL/D3D performance tools

FX Composer

Shader Authoring IDE



SDKs AND CODE SAMPLES

GPU Computing SDK

CUDA C, OpenCL, DirectCompute programming guide and code samples

Graphics SDK

DirectX & OpenGL code samples

PhysX SDK

Complete game physics solution

OpenAutomate

Test automation SDK



VIDEO LIBRARIES

Video Decode Acceleration

NVCUVID
DXVA
Win7 MFT

Video Encode Acceleration

NVCUVENC
Win7 MFT

Post Processing

Noise reduction / De-interlace/
Polyphase scaling / Color process



ENGINES & LIBRARIES

NPP Image Libraries

Performance primitives for imaging

Numeric Libraries

cuFFT, cuLA, cuBLAS

App Acceleration Engines

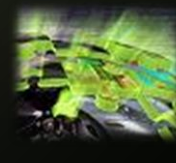
Optimized software modules for GPU acceleration

Shader Library

Shader and post processing

Optimization Guides

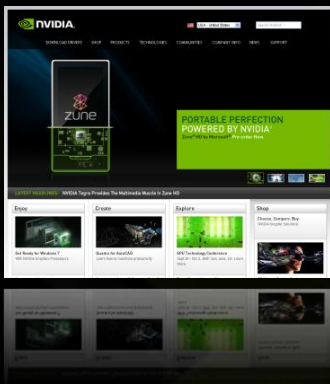
GPU computing and Graphics development best practices



Helping You Reach Over 100 Million Consumers

Leverage our Global Marketing Reach

nvidia.com



Driver Page



nZone.com



OEM & Card Bundles & Mkg



PartnerForce
WW Channel Partners

High Impact PR



"GPU computing may be coming into its own, with the first real consumer-ready apps."



"... game changing technology"



"... power of parallel computing is amazing."

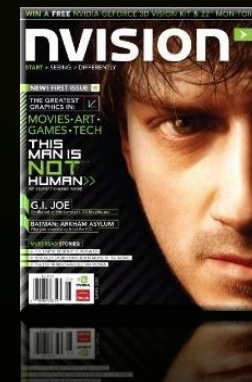
"... advantages of GPU-equipped systems will eventually become overwhelming. . . no longer recommend PCs without GPUs."



Trade Shows | Events

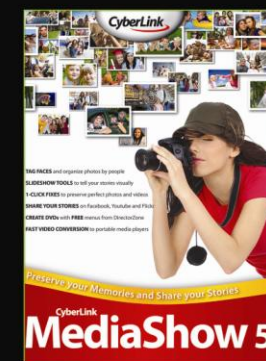


NVISION Magazine



Co-Marketing Assets

- Banner ad templates
- Print ad templates
- Mouse pad
- Monitor hats
- Shelf talkers
- Poster
- Box flap stickers



Leverage NVIDIA Partner Connections

- Leading OEM's [Desktop & Notebook]
- Over 25 add-in card partners (AIC's)
- 1,000s of resellers via "Partner Force" program
- Distributors
- Regional System Builders

Co-Market with NVIDIA Partners!

- Promo ads / flyers
- Web banner ads
- Shelf talkers
- Box promo

EVGA | Intelligent Innovation

Select Region: **U.S. - English**

PRODUCTS | SUPPORT | COMMUNITY | COMPANY INFO | MEMBER HOME

Downloaded from NVIDIA CUDA

VREVEAL CAN RUN ON ANY WINDOWS DESKTOP OR LAPTOP, AND HAS BEEN SPECIALLY TUNED TO RUN UP TO 5X FASTER ON SYSTEMS FEATURING NVIDIA GRAPHICS PROCESSORS.

Exclusively from EVGA

Get 20% Off the vReveal Video Enhancement Software with product registration.

Dramatically improve the quality of your videos.

20% off vReveal's Video Enhancement Application

All registered 9800GT and above graphics cards (see list below) will have the eligibility to download a coupon good at www.evga.com for 20% off of the full retail copy of vReveal with these powerful graphics cards. You can process your videos up to 5x faster than a CPU. You can also try it before you buy! Download the free 30 day trial to give a full test drive of this amazing software.

With vReveal, video enhancement software for Windows, you can dramatically improve the quality of your videos with just one click. The unmatched enhancement technology powering vReveal works wonders with videos that are dark, shaky, noisy, pixelated, or blurry. Plus, vReveal has been specially tuned to run up to five times faster on CUDA-enabled NVIDIA graphics processors.

DOWNLOAD FREE TRIAL

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Special sponsor links

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Laptops

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Refine your results

Price

- Less than \$600 (\$6)
- \$600 - \$700 (\$6)
- \$700 - \$800 (\$7)
- \$800 - \$900 (\$3)
- \$900 - \$1,000 (\$6)
- \$1,000 - \$1,000 (\$6)

See all prices >

Notebook type

- Thin and light (4-5 lbs.)
- Budget (247)
- Business laptop (160)
- Mid-size laptops (5-7.5 lbs.) (120)
- Ultrabooks (Under 4 lbs.) (17)

See all notebook types >

Product line

- HP Compaq Business notebook (251)
- HP Pavilion (172)
- HP EliteBook (57)
- HP Compaq Mobile workstation (42)
- Compaq Presario (27)

See all product lines >

More

- Screen size
- Weight
- Processor
- RAM technology
- Processor manufacturer

See all >

you selected

1713 results

Show: 10 results per page Sort by: Review date

COMPARE SELECTED

SPONSORED MATCH

HP Pavilion dv2400e Special Edition (Turion 64 X2 TL-60 2.1GHz, 4GB RAM, 320GB HDD, Vista Home Premium 64-Bit)

\$689 at 1 store

SPONSORED MATCH

HP Pavilion dv9700 Entertainment - Turion 64 X2 TL-60 2 GHz - 15.4" TFT

\$679 to \$899 at 7 stores

HP Pavilion dv2510nr

\$1,099

AD Feedback

SPEAK VISUAL[™]

GET GEFORCE

EVGA

EVGA | Intelligent Innovation

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PRODUCTS | SUPPORT | COMMUNITY | COMPANY INFO | MEMBER HOME

Downloaded from NVIDIA CUDA

CONVERT MEDIA for iPod and PSP up to 20x faster with your GeForce GPU

Get \$10 Off the Badaboom Media Converter with product registration.

\$10.00 Off Of Badaboom Media Converter

For a limited time only*, an EVGA community member that has an EVGA 9 series or above graphics card, registered in your myevga.com, will be able to take \$10.00 off of the full purchase price of the Badaboom Media Converter. If you view your qualified registered product, you will see the option to collect your coupon code and take that to www.evga.com/badaboom. Once in the shopping cart there, you will see the option to submit your promo code for \$10 off the normally \$29.99 price.

Badaboom[™] takes a fundamentally different approach to video format conversion from other solutions. Instead of performing format conversion on the CPU, it harnesses massively parallel GPUs from NVIDIA. By using the power of the GPU, the time required for video conversion is reduced. As an added bonus, you can still use the GPU for normal everyday tasks such as email and internet browsing. Anyone can now painlessly convert video between formats including AVCHD, saving more time to enjoy the video and eliminating the frustration of video conversion delays. Not only is the Badaboom[™] Media Converter fast and easy to use, it provides high quality output (up to 1080p) to keep your videos looking crisp and clear.

It's Your Move

- **Contact NVIDIA Now**

- Email - designedforcuda@nvidia.com

- **Develop**

- Enable the best experience
- Optimize to expand your market
- Ensure stability with advanced testing

- **Market**

- Reach over 100+ million CUDA users
- Tap NVIDIA partners to increase visibility
- Sell via NVIDIA online stores

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GPU TECHNOLOGY CONFERENCE

Leveraging NVIDIA's Massive Testing Resources

San Jose, California | 1 October 2009

John Spitzer | Head of NVIDIA Russia, Sr Director of GTL [Global Test Lab])

Why Do We Need Automation?

- People don't scale as well as machines
- Reproducibility
- Reduces potential for error
- Faster turnaround time

OpenAutomate

- **Purpose**
 - Automation for QA and benchmarking
 - Standard for querying/setting application parameters
 - Standard for running automated benchmarks
- **Design goals**
 - Minimal API, DLL, data structures
 - No complex file formats to parse/write
 - Virtually no footprint added to application

Benefits

Reduces customer support issues

- Manual testing allows compatibility testing on just a handful of configurations
- Automation allows testing on the full spectrum of configs in NVIDIA's lab (>500)
- Not just GPU, but CPU, memory, display, OS, etc..

Forward compatibility

- Top-to-bottom testing on pre-release drivers, compilers, runtimes and so on
- Insurance that your game will run well on future GPUs

Comprehensive reports

- Compatibility, but also...
- Suggested minimum specification
- Performance data

Benchmark Requirements

- **Type and length**
 - Key word is “representative” - meaning real-life
 - Too short (less than 30s) and timing error can become significant
 - Too long (more than 15 min) will bog down our farm
 - Many short benchmarks (3 min) is often better than one long (15 min)
- **Deterministic benchmarks are ideal**
 - 2 runs, 1 machine, identical results
 - Even better: 2 runs, 2 machines, identical results

How Does It Work?

- The app is invoked with a command-line arg
- The app call `oalnit()` with the command-line option
- `oalnit()` loads a DLL, and binds all the `oaXXX` funcs
- The app goes into a command-loop, waiting for commands from the DLL

What Are The Possible Commands?

- Enumerate available options
- Get current options
- Set options
- Enumerate available benchmarks
- Run benchmark
- Run application
- Exit

Basic Implementation:

Application

Command-line: `app.exe -openautomate OA_plugin.dll;`

1. Takes OpenAutomate command-line and starts initialization of OA:

```
oaVersion Version;  
oalnit((const oaString)OAOpt, &Version);
```

3. Enters OA command loop:

```
oalnitCommand(&Command);  
switch(oaGetNextCommand(&Command))
```

6. Once OA_CMD_EXIT command is received, the application exits

OA_plugin.dll

2. Initializes and returns function pointers for callbacks

4. DLL sends OA command stream to app:

```
OA_CMD_GET_ALL_OPTION  
OA_CMD_GET_CURRENT_OPTIONS  
OA_CMD_SET_OPTIONS  
OA_CMD_GET_BENCHMARK  
OA_CMD_RUN_BENCHMARK  
OA_CMD_RUN
```

5. Eventually the DLL will send the OA_CMD_EXIT command.

Submission Checklist

- ☐ No installation ('copy and run'), silent if former isn't possible
- ☐ Provide the entry point exe name
- ☐ No licensing needed (or if necessary, unlimited licenses with clear instructions on how to do so)
- ☐ Full OA conformance (with conformance log)
- ☐ At least 1 benchmark exposed in OA, no longer than 15 minutes in length
- ☐ No user interaction should be required while in OA mode
- ☐ Barring major errors, the application should never exit by itself unless OA_CMD_EXIT is received
- ☐ Make sure to call oaStartBenchmark and oaEndBenchmark in appropriate places

Call to Action

- Increase your testing coverage by 100x
- Insure compatibility with future drivers and GPUs
- It's easy to implement
- OpenAutomate is now public! <http://openautomate.com>
- E-mail: OpenAutomate-Support@nvidia.com

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Thank You