“THE HOLY GRAIL” OF GRAPHICS
SIMULATING LIGHT RAYS

Turner Whitted | 1979
“Multi-bounce Recursive Ray Tracing”
1.2 Hours for 512x512 on VAX 11/780
THE GPU REVOLUTION
NVIDIA RTX
GRAPHICS REINVENTED
RTX HYBRID RENDERING

RASTERIZATION

RAY TRACING
NVIDIA RTX TECHNOLOGY
ANNOUNCED AT GDC, MARCH 2018
REVOLUTIONARY NEW GAME MACHINE

3,000 Easy Payments of $19.95*

CALL 1-889-789-2080
TURING BUILT FOR RTX
GREATEST LEAP SINCE 2006 CUDA GPU

Turing SM
14 TFLOPS + 14 TIPS
Concurrent FP & INT Execution
Variable Rate Shading

Tensor Core
110 TFLOPS FP16
220 TOPS INT8
440 TOPS INT4

RT Core
10 Giga Rays/sec
Ray Triangle Intersection
BVH Traversal
TURING BUILT FOR RTX

DGX 4-VOLTAS RT 55 ms
TURING BUILT FOR RTX

<table>
<thead>
<tr>
<th>System</th>
<th>RT</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGX 4-VOLTAS</td>
<td>RT</td>
<td>55 ms</td>
</tr>
<tr>
<td>TURING</td>
<td>RT</td>
<td>45 ms</td>
</tr>
</tbody>
</table>
TURING BUILT FOR RTX

- DGX 4-VOLTAS: RT 55 ms
- TURING: RT 45 ms
- PASCAL: RS RT 308 ms
A NEW STANDARD OF PERFORMANCE

1 TURING FRAME

- RAY TRACING
- INT32 SHADING
- FP32 SHADING
- DNN PROCESSING
A NEW STANDARD OF PERFORMANCE

1 TURING FRAME

RAY TRACING

INT32 SHADING

FP32 SHADING

DNN PROCESSING
A NEW STANDARD OF PERFORMANCE

14 FP32 TFLOPS
110 TFLOPS
(10 TFLOPS PER GIGA RAY)
A NEW STANDARD OF PERFORMANCE

14 FP32 TFLOPS
//
110 TFLOPS
(10 TFLOPS PER GIGA RAY)

14 FP32 TFLOPS
+ 14 INT32 TIPS
A NEW STANDARD OF PERFORMANCE

14 FP32 TFLOPS

110 TFLOPS

(10 TFLOPS PER GIGA RAY)

110 FP16 TENSOR FLOPS

1 TURING FRAME

RAY TRACING

INT32 SHADING

FP32 SHADING

DNN PROCESSING

14 FP32 TFLOPS

14 INT32 TIPS

78T RTX-OPS
RT CORE RAY TRACING ACCELERATOR
Turing improves raytracing up to 6X compared to Volta…
Insane workloads still manageable.

- Colin Barré-Brisebois and Henrik Halén – SIGGRAPH 2018
NVIDIA RTX
GRAPHICS REINVENTED

MDL

OptiX | DXR | Vulkan

Rasterization | Ray Tracing | Compute | AI
MAGIC OF DEEP LEARNING

COLORIZE IMAGES
UC Berkeley

SEGMENTATION
NVIDIA

COLORIZING HAIR
L’Oreal

SUPER RESOLUTION
NVIDIA

CLARA MEDICAL IMAGING
NVIDIA

SKETCH 2 FACE
NVIDIA

Muhammad Ali Photo: John Rooney/AP; color modification: Richard Zhang
MAGIC OF DEEP LEARNING

COLORIZE IMAGES
UC Berkeley

SEGMENTATION
NVIDIA

COLORIZING HAIR
L’Oreal

SUPER RESOLUTION
NVIDIA

CLARA MEDICAL IMAGING
NVIDIA

SKETCH 2 FACE
NVIDIA

Muhammad Ali Photo: John Rooney/AP; color modification: Richard Zhang
MAGIC OF DEEP LEARNING

COLORIZE IMAGES
UC Berkeley

SEGMENTATION
NVIDIA

COLORIZING HAIR
L’Oreal

SUPER RESOLUTION
NVIDIA

CLARA MEDICAL IMAGING
NVIDIA

SKETCH 2 FACE
NVIDIA

Muhammad Ali Photo: John Rooney/AP; color modification: Richard Zhang
MAGIC OF DEEP LEARNING

COLORIZE IMAGES
UC Berkeley

SEGMENTATION
NVIDIA

COLORIZING HAIR
L’Oreal

SUPER RESOLUTION
NVIDIA

CLARA MEDICAL IMAGING
NVIDIA

SKETCH 2 FACE
NVIDIA

Muhammad Ali Photo: John Rooney/AP; color modification: Richard Zhang
MAGIC OF DEEP LEARNING

COLORIZE IMAGES
UC Berkeley

COLORIZING HAIR
L’Oreal

SUPER RESOLUTION
NVIDIA

SEGMENTATION
NVIDIA

CLARA MEDICAL IMAGING
NVIDIA

SKETCH 2 FACE
NVIDIA

Muhammad Ali Photo: John Rooney/AP; color modification: Richard Zhang
BREAKTHROUGH IN HIGH-QUALITY MOTION IMAGE GENERATION

NVIDIA DLSS

Temporally Stable Convolutional Autoencoder
~500 Billion FP16 Ops

Ground Truth Super High Quality Image
64 Jittered Sample Rendering
NVIDIA NGX
NEURAL GRAPHICS FRAMEWORK FOR AI IMAGE PROCESSING

NGX WORKFLOW CREATES AI MODELS

- GENERATE GROUND TRUTH
- TRAIN AI MODEL
- TEST & OPTIMIZE

AI MODEL
NGX
NGX
DRIVER
**NVIDIA DGX-2**

**THE LARGEST GPU EVER CREATED**

- 16x Tesla V100 32GB
- 12x NVSwitch
- 30TB NVME SSDs
- NVLink Plane Card
- 8x EDR IB/100 GigE
- 2x Xeon Platinum
- 1.5TB System Memory
- PCIe Switch Complex

**Specifications:**
- 2 PFLOPS
- 512GB HBM2
- 10 kW
- 350 lbs
SHADOW OF THE TOMB RAIDER™
EARLY ACCESS STARTS
SEPTEMBER 4

AVAILABLE FOR EVERYONE
SEPTEMBER 6
RTX GAMES COMING SOON

Ark: Survival Evolved
Assetto Corsa Competizione
Atomic Heart
Battlefield V
Control
Dauntless
In Death
Entitled
Final Fantasy XV
The Forge Arena
Fractured Lands
Hitman 2
Justice
JX3
Mechwarrior V: Mercenaries
Metro Exodus
PlayerUnknown’s Battlegrounds
Remnant from the Ashes
Serious Sam 4: Planet Badass
Shadow of the Tomb Raider
We Happy Few
ANNOUNCING GEFORCE RTX
GEFORCE RTX

RTX 2070
6 Giga Rays/s
45T RTX-OPS
8 GB

RTX 2080
8 Giga Rays/s
60T RTX-OPS
8 GB

RTX 2080 Ti
10 Giga Rays/s
78T RTX-OPS
11 GB
GEFORCE RTX

from

$499
GEFORCE RTX

preorder TODAY!
GEFORCE RTX

on-shelf
September 20
NVIDIA RTX FAMILY

QUADRO RTX 8000 (DUAL)
48+48 GB | 166T RTX-OPS | 20 GIGA RAYS

GEFORCE RTX 2080Ti
11GB | 78T RTX-OPS | 10 GIGA RAYS

GEFORCE RTX 2080
8GB | 60T RTX-OPS | 8 GIGA RAYS

GEFORCE RTX 2070
8GB | 45T RTX-OPS | 6 GIGA RAYS

QUADRO RTX 8000 (DUAL) $20,000
FROM $999
FROM $699
FROM $499
HUGE LEAP

RTX 2080 Ti
RTX 2080
RTX 2070
GTX 1080 Ti
GTX 1080

PASCAL
TURING
RTX-OPS
GRAPHICS REINVENTED

NVIDIA RTX
REAL-TIME RAY TRACING
HYBRID GRAPHICS
RASERIZATION, RAY TRACING, COMPUTE, AND AI

TURING
78T RTX-OPS

GEFORCE RTX 20 SERIES
STARTING FROM $499
AVAILABLE FROM SEPT. 20