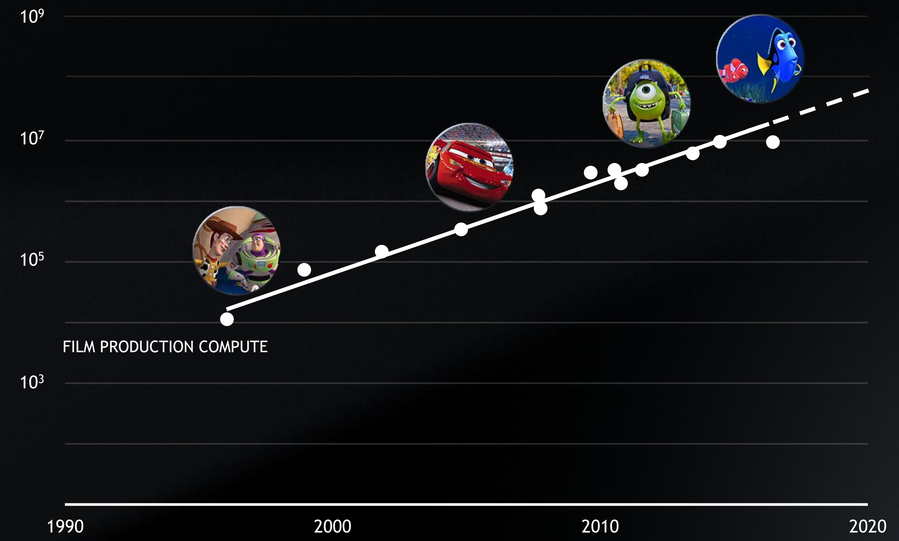
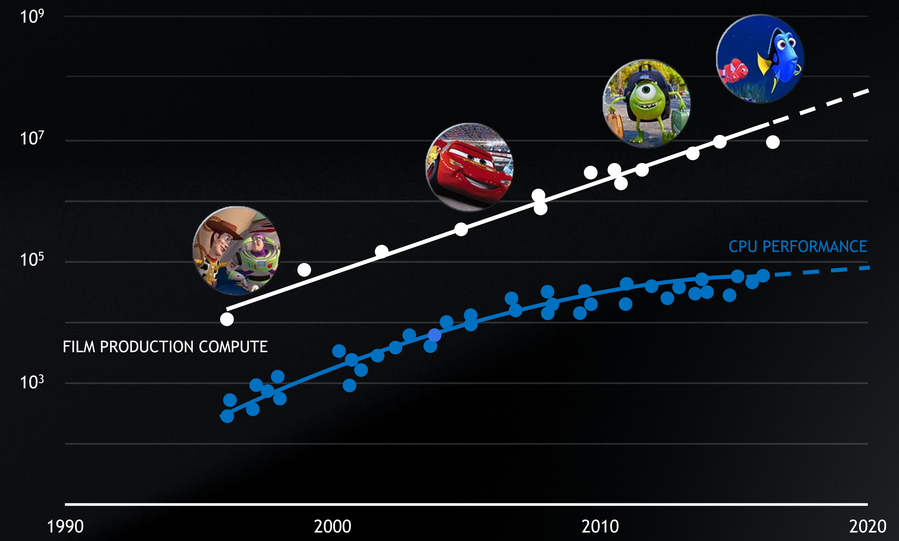
NVIDIA

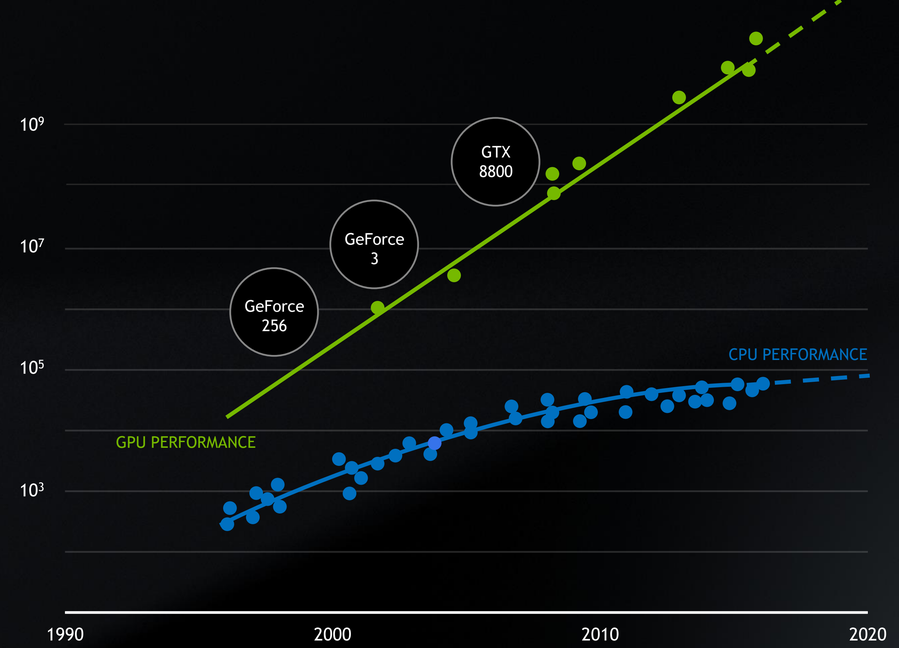
A HISTORIC MOMENT



A HISTORIC MOMENT



A HISTORIC MOMENT



THE ROAD TO REAL-TIME PHOTOREAL

GEOMETRY

Rens

THE ROAD TO REAL-TIME PHOTOREAL

GEOMETRY
Rens

PHOTOGRAMMETRY
Rens

THE ROAD TO REAL-TIME PHOTOREAL

GEOMETRY
Rens

MATERIALS
NVIDIA

PHOTOGRAMMETRY
Rens

THE ROAD TO REAL-TIME PHOTOREAL

GEOMETRY
Rens

MATERIALS
NVIDIA

PHOTOGRAMMETRY
Rens

SIMULATION
NVIDIA

THE ROAD TO REAL-TIME PHOTOREAL

GEOMETRY
Rens

MATERIALS
NVIDIA

CHARACTER ANIMATION
University of Edinburgh

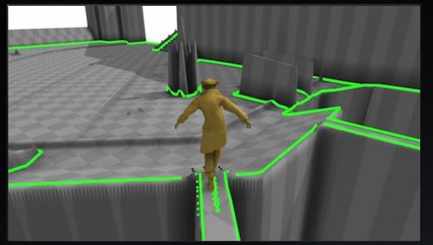
PHOTOGRAMMETRY
Rens

SIMULATION
NVIDIA

THE ROAD TO REAL-TIME PHOTOREAL

GEOMETRY
Rens

MATERIALS
NVIDIA



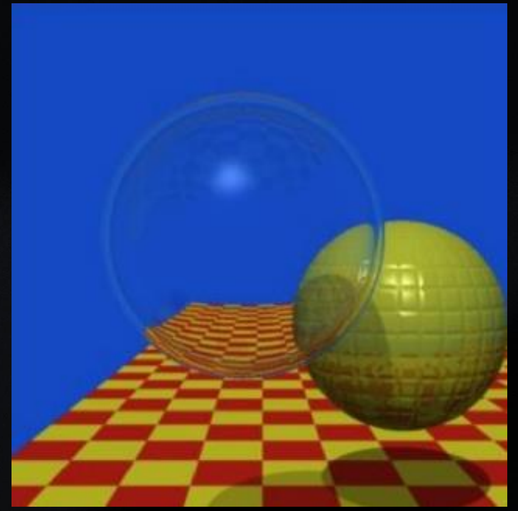
CHARACTER ANIMATION
University of Edinburgh

PHOTOGRAMMETRY
Rens

SIMULATION
NVIDIA

FACIAL ANIMATION
Digital Domain

THE HOLY GRAIL OF COMPUTER GRAPHICS



Turner Whitted
1979
“Multi-bounce Recursive Ray Tracing”
1.2 Hours for 512x512 on VAX 11/780

NVIDIA RTX TECHNOLOGY

Announced at GDC, March 2018

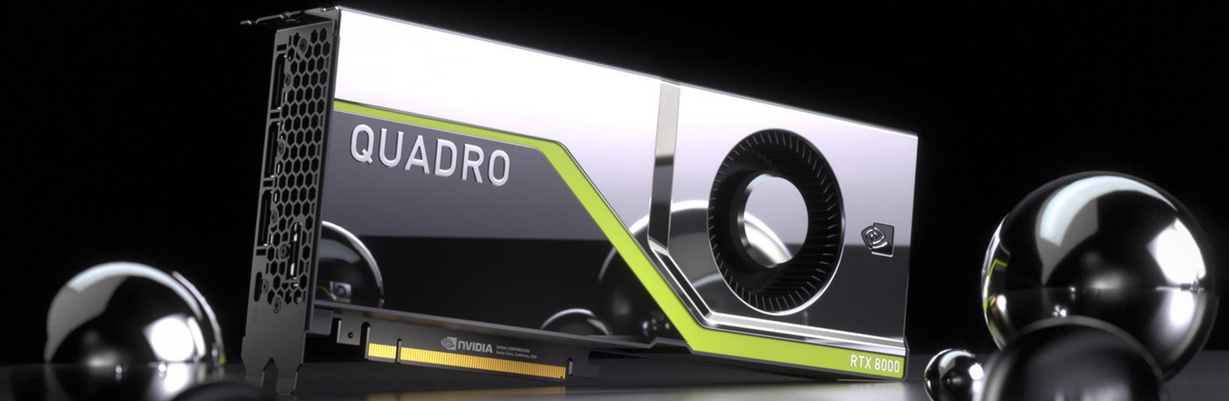
NVIDIA RTX TECHNOLOGY

Announced at GDC, March 2018

ANNOUNCING QUADRO RTX

WORLD'S FIRST RAY TRACING GPU

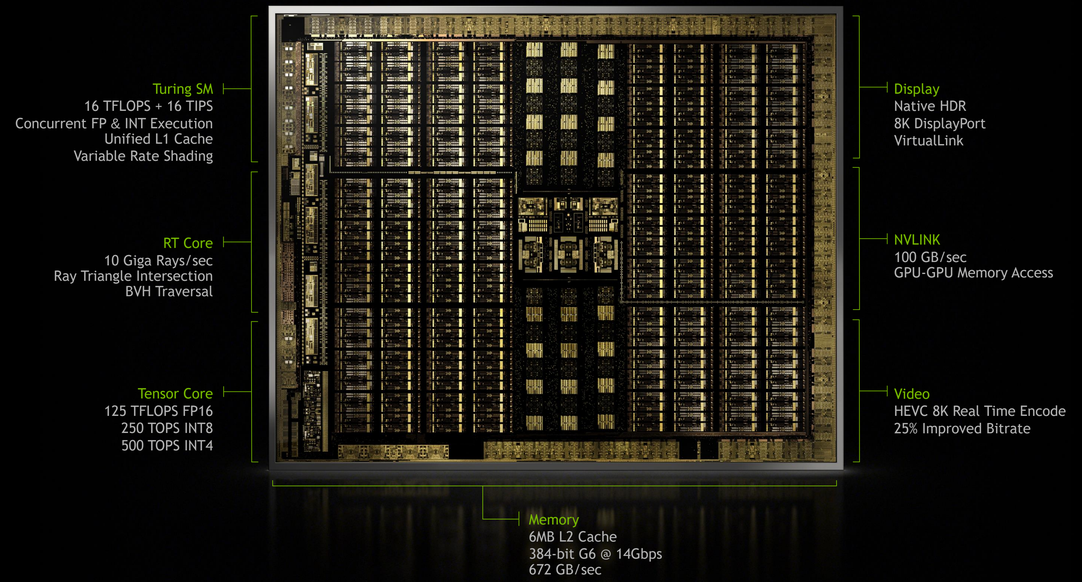
RTX Family
Up to 10 Giga Rays/sec
Up to 16 TFLOPS + 16 TIPS
Up to 500 Trillion Tensor Ops/sec
Up to 100 GB/sec with NVLink



NEW TURING GPU

GREATEST LEAP SINCE 2006 CUDA GPU

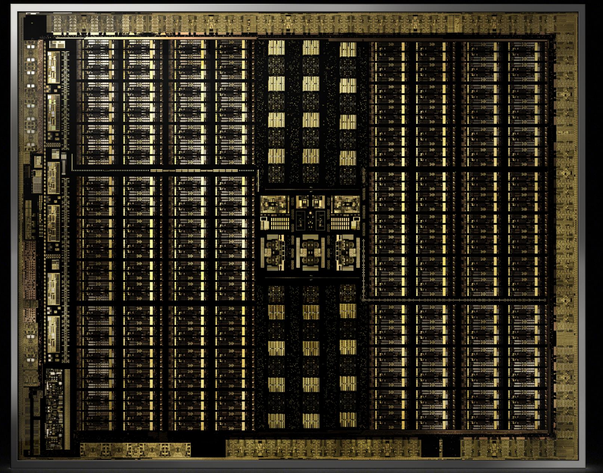
A Step-function Jump in Realism
New Hybrid Rendering Model
Interoperable Rasterization, Ray Tracing, Compute, and AI
Amazing for Today's — Awesome for Tomorrow's Content



GIANT LEAP

PASCAL

11.8 Billion xtors | 471 mm^2 | 24 GB 10GHz



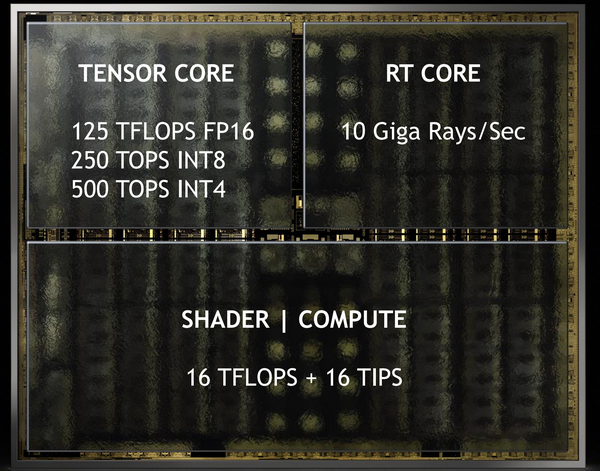
TURING

18.6 Billion xtors | 754 mm^2 | 48+48 GB 14GHz

GIANT LEAP

PASCAL

11.8 Billion xtors | 471 mm^2 | 24 GB 10GHz



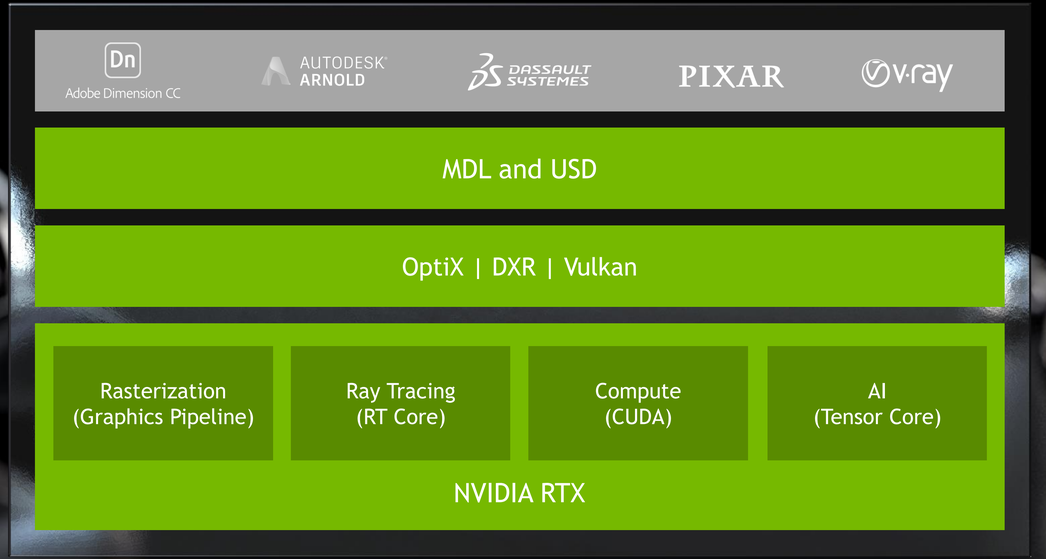
TURING

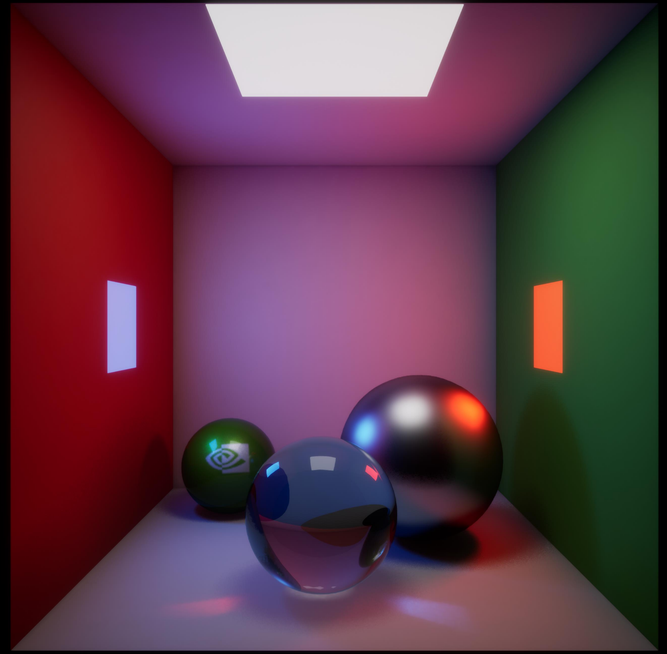
18.6 Billion xtors | 754 mm^2 | 48+48 GB 14GHz

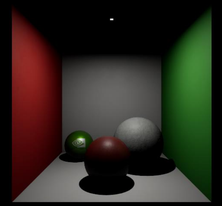
NVIDIA RTX

NEW GENERATION OF HYBRID RENDERING

Interoperability Between Rasterization, Ray Tracing, Compute, AI
New Turing Ray Tracing Acceleration in OptiX, DXR, Vulkan
New NGX SDK for DNN Plug-Ins
New NVIDIA MDL Materials Open Source
New Support for Pixar Universal Scene Description (USD)







Traditional Graphics

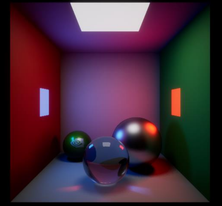
Raster

Area Lights

Raster | Ray Tracing | Compute

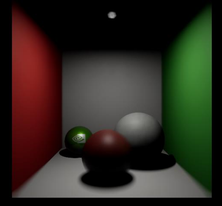
Diffuse Reflections

Raster | Ray Tracing | Compute



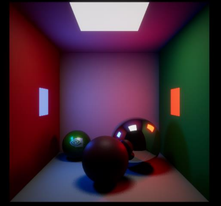
Caustics

Raster | Ray Tracing | Compute



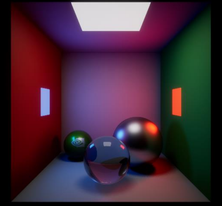
Depth of Field

Raster | Compute



Reflections

Raster | Ray Tracing | Compute

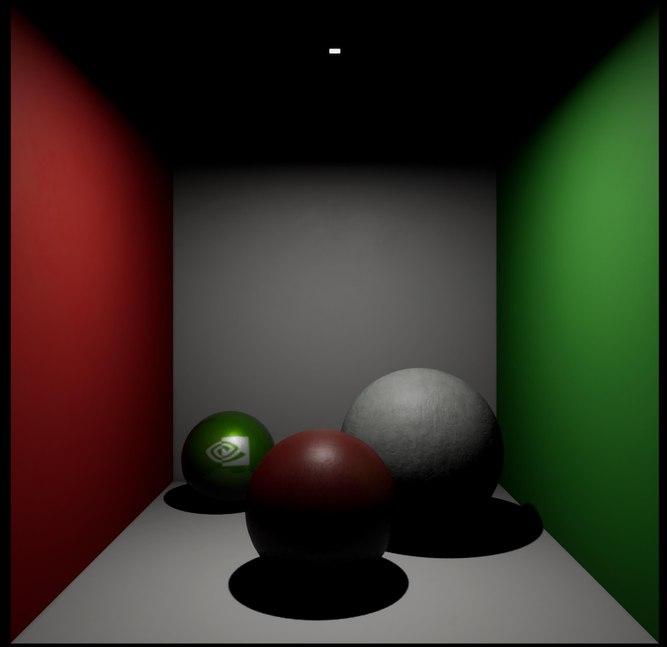


Refraction

Raster | Ray Tracing | Compute

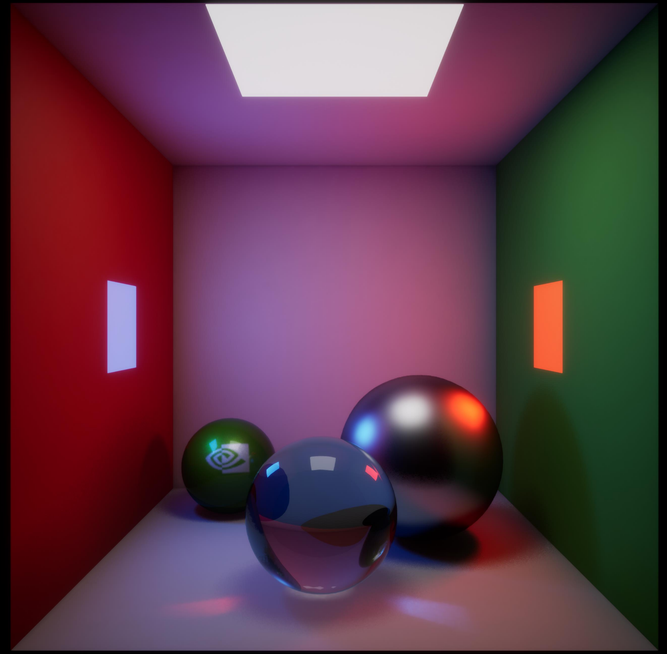
Global Illumination

Raster | Ray Tracing | Compute | AI



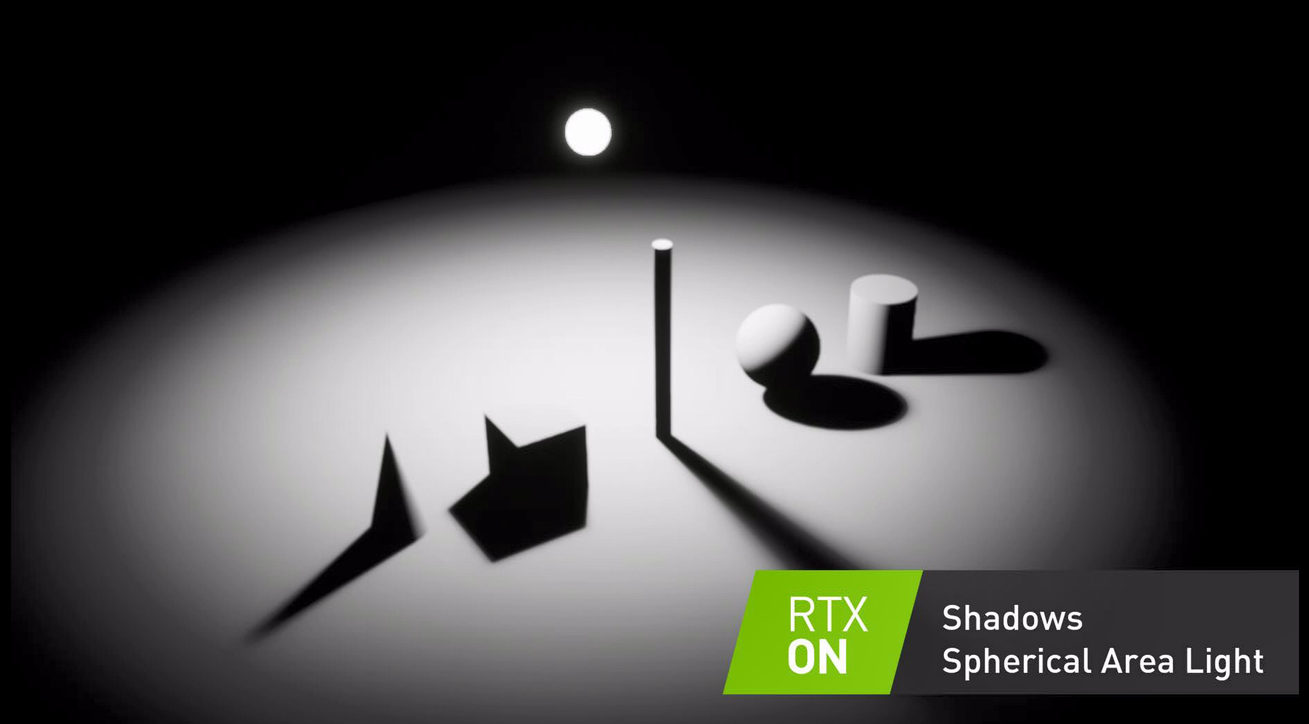
RTX **OFF** | Traditional Graphics

Raster



RTX ON Global Illumination

Raster | Ray Tracing | Compute | AI


RTX
ON
Shadows
Spherical Area Light

TURING OPENS $250B VISUAL EFFECTS INDUSTRY

DESIGN

DCC

AEC

VISUALIZATION

FILM & TELEVISION

70
PORSCHE

70
PORSCHE

"Real-time ray tracing is here years before anyone thought possible and it's going to completely change how artists and designers work."

- Tim Sweeney, CEO, Epic Games

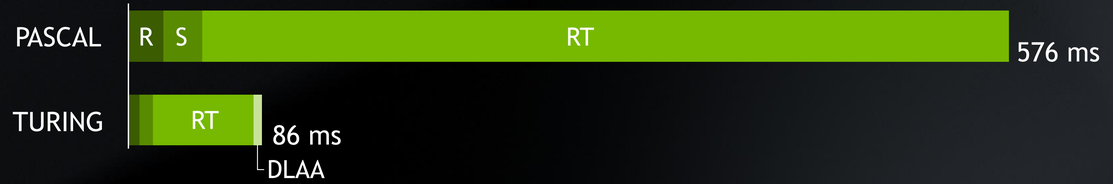
PORSCHE UNREAL ENGINE NVIDIA

TURING 6X PASCAL

EPIC UE4 RTRT ENGINE
MICROSOFT DIRECTX RAY TRACING

TURING 6X PASCAL

EPIC UE4 RTRT ENGINE
MICROSOFT DIRECTX RAY TRACING



NVIDIA DLAA

BREAKTHROUGH IN HIGH-QUALITY MOTION IMAGE GENERATION

Temporally Stable
Convolutional Autoencoder
~500 Billion FP16 Ops

Ground Truth
64 Jittered Sample Rendering
Blended

ROSEWOOD
BANGKOK

ROSEWOOD
BANGKOK

“Turing’s real-time ray tracing and AI capabilities will literally change our cities of the future.”

- Cobus Bothma, KPF

AUTODESK ARNOLD ACCELERATED BY NVIDIA RTX

ANNOUNCING
NVIDIA RTX SERVER

PRODUCTION RENDERING WITH GLOBAL ILLUMINATION

Powered by Quadro RTX 8000
Ray Traced Global Illumination up to 96 GB Scenes
Remoting and Multi-GPU Virtualization with New Quadro Infinity
Rendering Time Reduced from Hours to Minutes
Q4 Early Access – Q1 GA

TODAY’S RENDER FARM

240 Dual 12-core Skylake CPU Servers
144 kW
$2M Render Farm

NVIDIA RTX SERVERS

A FRACTION OF THE COST

4 RTX 8-GPU Servers
13 kW
$500,000

1/4 the Cost 1/10 the Space 1/11 the Power

NVIDIA RTX SERVERS

A 3-SECOND SHOT IN AN HOUR

4 RTX 8-GPU Servers
13 kW
$500,000

4X Performance 1/3 the Space 1/3 the Power

“We never expected to see results this dramatic. This will completely change how our artists work.”

- Michele Sciolette, CTO, Cinesite

2 Shots a Day

7 Shots a Day

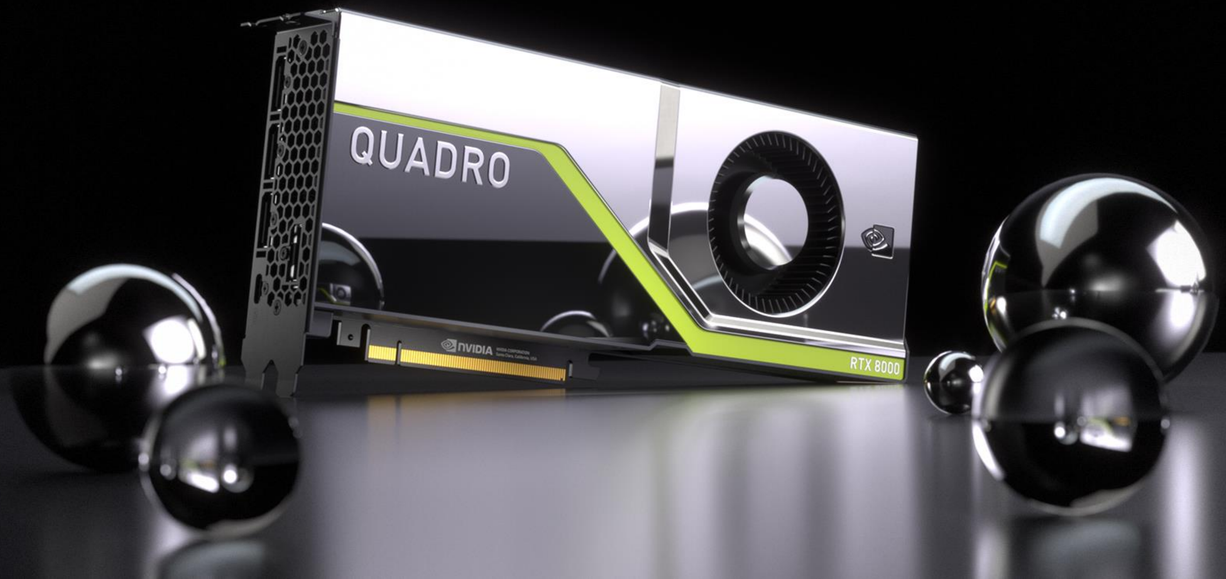
NVIDIA RTX ADOPTION

DESIGN | DCC | AEC
VISUALIZATION | FILM & TV

ANNOUNCING QUADRO RTX

WORLD'S FIRST RAY TRACING GPU

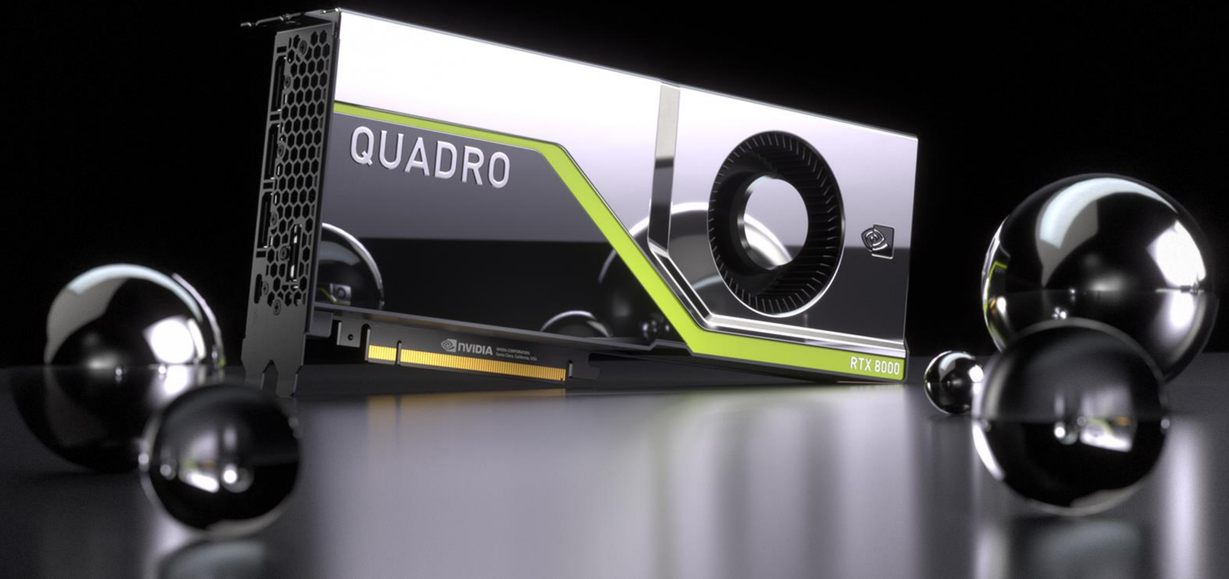
RTX 5000 16 GB / 32 GB 6 Giga Rays/sec $2,300



ANNOUNCING QUADRO RTX

WORLD'S FIRST RAY TRACING GPU

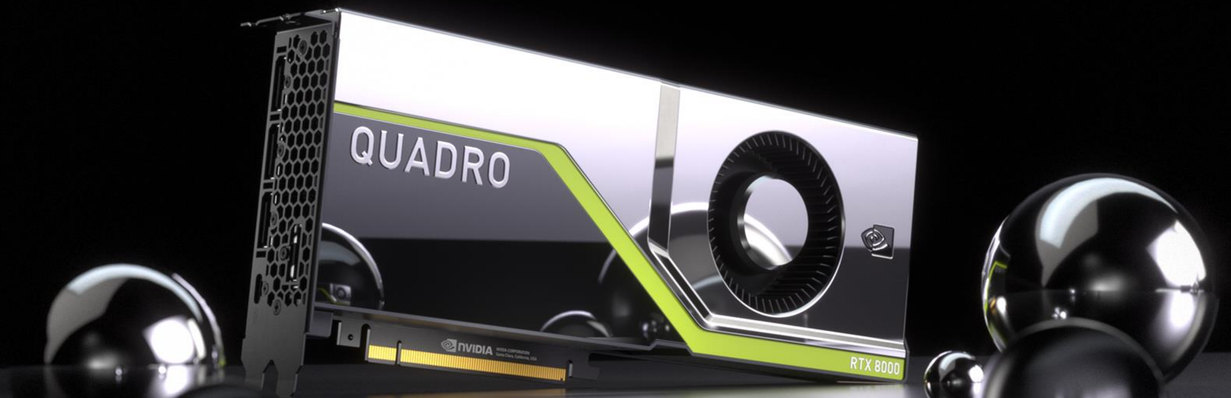
RTX 5000	16 GB / 32 GB	6 Giga Rays/sec	$2,300
RTX 6000	24 GB / 48 GB	10 Giga Rays/sec	$6,300



ANNOUNCING QUADRO RTX

WORLD'S FIRST RAY TRACING GPU

RTX 5000	16 GB / 32 GB	6 Giga Rays/sec	$2,300
RTX 6000	24 GB / 48 GB	10 Giga Rays/sec	$6,300
RTX 8000	48 GB / 96 GB	10 Giga Rays/sec	$10,000



QUADRO RTX WORKSTATIONS AND SERVERS

Dell Precision

HP Z Workstations

HPE ProLiant

Lenovo ThinkStation | ThinkSystem

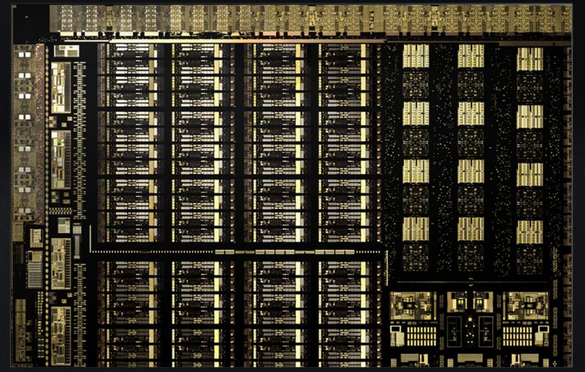
BOXX

FUJITSU

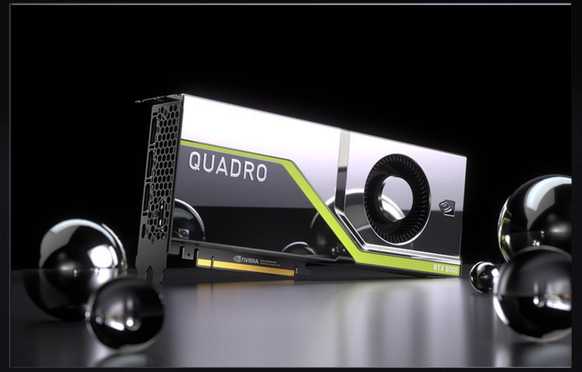
SUPERMICRO

WW Partner Network

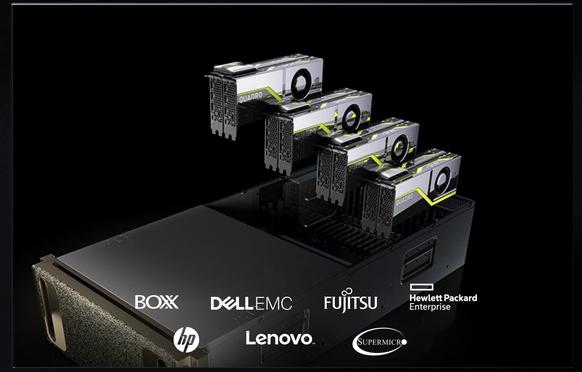
NVIDIA TURING — GRAPHICS REINVENTED



TURING
“RTRT 6X Pascal”

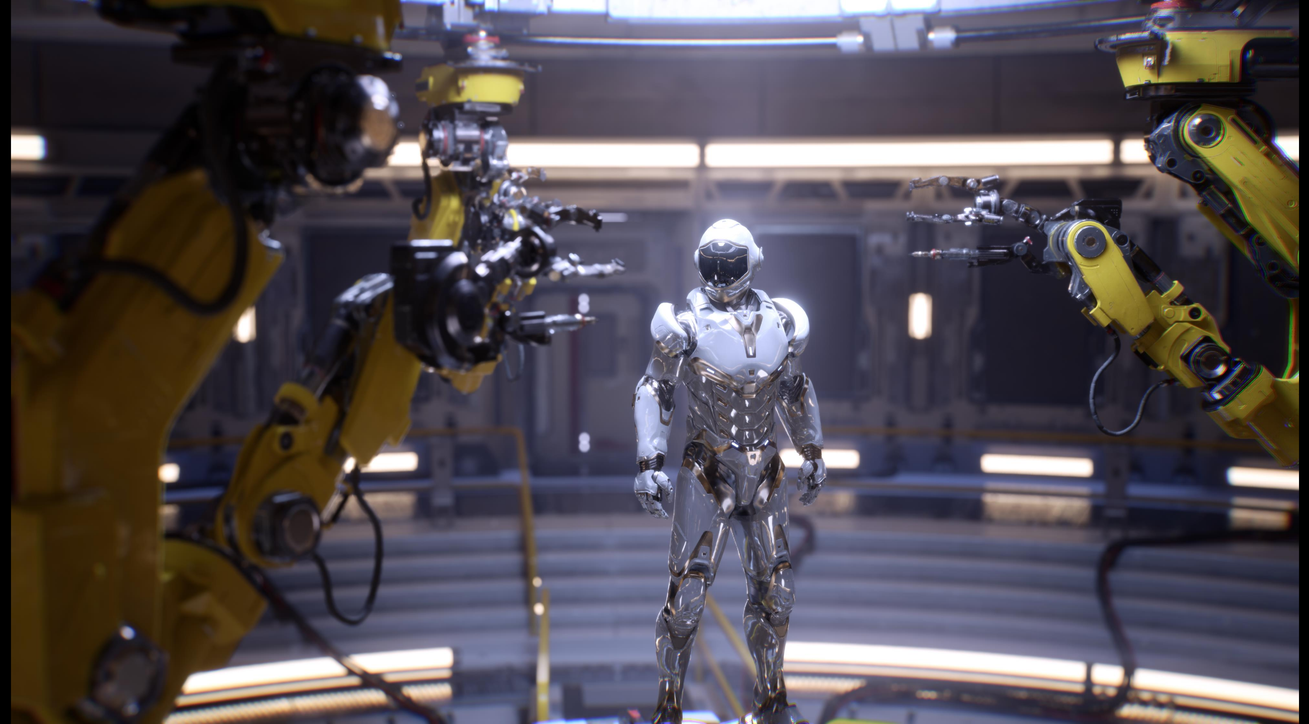


QUADRO RTX 8000 / 6000 / 5000
“World’s First Ray Tracing GPU”



QUADRO RTX SYSTEMS
“7 Shots a Day”

$250B VISUAL EFFECTS INDUSTRY
“Turing Does Photoreal VFX!”



NVIDIA
RTX
QUADRO
NVIDIA
RTX 8000