# NVIDIA Introduces DLSS 3 With Breakthrough AI-Powered Frame Generation for up to 4x Performance

## DLSS 3 Generates Entire Frames in Real Time With AI, Benefiting GPU- and CPU-Limited Games and Apps

**GTC—**NVIDIA today announced NVIDIA® DLSS 3, an AI-powered performance multiplier that kicks off a new era of NVIDIA RTX™ neural rendering for games and applications.

DLSS 3 builds on the company's lead in AI-accelerated super-resolution techniques to deliver outstanding image quality and up to 4x the performance of brute-force rendering, plus the quick responsiveness that defines a comprehensive gaming experience.

The technology debuted today during the GeForce® Beyond: Special Broadcast at GTC, which also introduced GeForce RTX® 40 Series GPUs based on the new NVIDIA Ada Lovelace architecture.

"DLSS is one of our best inventions and has made real-time ray tracing possible. DLSS 3 is another quantum leap for gamers and creators," said Jensen Huang, founder and CEO of NVIDIA. "Our pioneering work in RTX neural rendering has opened a new universe of possibilities where AI plays a central role in the creation of virtual worlds."

DLSS 3 is already receiving widespread support from the gaming ecosystem, with over 35 games and applications integrating the technology.

### DLSS 3: The Performance Multiplier, Powered by AI
The combination of ray tracing and AI technologies has revolutionized video games by simultaneously delivering dramatic improvements in image quality along with massive uplifts in performance — a feat unheard of before GeForce RTX.

Powered by new fourth-generation Tensor Cores and a new Optical Flow Accelerator on GeForce RTX 40 Series GPUs, DLSS 3 is the latest iteration of the company's critically acclaimed Deep Learning Super Sampling technology and introduces a new capability called Optical Multi Frame Generation.

Optical Multi Frame Generation generates entirely new frames, rather than just pixels, delivering astounding performance boosts. The new Optical Flow Accelerator incorporated into the NVIDIA Ada Lovelace architecture analyzes two sequential in-game images and calculates motion vector data for objects and elements that appear in the frame, but are not modeled by traditional game engine motion vectors. This dramatically reduces visual anomalies when AI renders elements such as particles, reflections, shadows and lighting.

Pairs of super-resolution frames from the game, along with both engine and optical flow motion vectors, are then fed into a convolutional neural network that analyzes the data and automatically generates an additional frame for each game-rendered frame — a first for real-time game rendering. Combining the DLSS-generated frames with the DLSS super-resolution frames enables DLSS 3 to reconstruct seven-eighths of the displayed pixels with AI, boosting frame rates by up to 4x compared to without DLSS.

Because DLSS Frame Generation executes as a post-process on the GPU, it can boost frame rates even when the game is bottlenecked by the CPU. For CPU-limited games, such as those that are physics heavy or involve large worlds, DLSS 3 allows the GeForce RTX 40 Series GPUs to render the game at up to twice the frame rate that the CPU is able to compute the game.

DLSS 3 integrations also incorporate NVIDIA Reflex, which synchronizes the GPU and CPU, ensuring optimum responsiveness and low system latency.

### Game Developers Embrace DLSS 3, Over 35 Games, Applications Coming Soon
The revolutionary power of DLSS 3 is a boon for game developers who want to express their artistic vision. The technology is coming to the world's most popular game engines, such as Unity and Unreal Engine.

DLSS 3 has also received support from many of the world's leading game developers, with more than 35 games and applications announcing support, including:

- *A Plague Tale: Requiem*
- *Atomic Heart*
- *Black Myth: Wukong*
- *Bright Memory: Infinite*

- *Marauders*
- *Microsoft Flight Simulator*
- *Midnight Ghost Hunt*
- *Mount & Blade II: Bannerlord*

- *Chernobylite*
- *Conqueror's Blade*
- *Cyberpunk 2077*
- *Dakar Rally*
- *Deliver Us Mars*
- *Destroy All Humans! 2 - Reprobed*
- *Dying Light 2 Stay Human*
- *F1® 22*
- *F.I.S.T.: Forged In Shadow Torch*
- *Frostbite Engine*
- *HITMAN 3*
- *Hogwarts Legacy*
- *ICARUS*
- *Jurassic World Evolution 2*
- *Justice*
- *Loopmancer*
- *Warhammer 40,000: Darktide*
- *Naraka Bladepoint*
- *NVIDIA Omniverse™*
- *NVIDIA Racer RTX*
- *PERISH*
- *Portal With RTX*
- *Ripout*
- *S.T.A.L.K.E.R 2: Heart of Chornobyl*
- *Scathe*
- *Sword and Fairy 7*
- *SYNCED*
- *The Lord of the Rings: Gollum*
- *The Witcher 3: Wild Hunt*
- *THRONE AND LIBERTY*
- *Tower of Fantasy*
- *Unity*
- *Unreal Engine 4 & 5*

Since DLSS 3 builds on top of DLSS 2 integrations, game developers can quickly enable it in existing titles that already support DLSS 2 or NVIDIA Streamline.

**DLSS 3 Coming Oct. 12**
DLSS 3 is supported in GeForce RTX 40 Series GPUs and will debut on Wednesday, Oct. 12, with the availability of GeForce RTX 4090 GPUs. More details are available on GeForce.com and NVIDIA.com, including details on GeForce RTX 40 Series GPUs and NVIDIA DLSS technology.

**About NVIDIA**
Since its founding in 1993, NVIDIA (NASDAQ: NVDA) has been a pioneer in accelerated computing. The company's invention of the GPU in 1999 sparked the growth of the PC gaming market, redefined computer graphics and ignited the era of modern AI. NVIDIA is now a full-stack computing company with data-center-scale offerings that are reshaping industry. More information at https://nvidianews.nvidia.com/.

**Game Engine Support for NVIDIA DLSS 3**
"Frostbite will be utilizing DLSS 3 artificial intelligence to accelerate advanced 3D graphics rendering for EA games on PCs. We're eager to see what NVIDIA and Frostbite can achieve together for our players with this exciting new technology."

Tim Leland, senior vice president and general manager of Frostbite and engine technology at Electronic Arts
*Frostbite Engine*

"The NVIDIA GeForce RTX 40 Series sets a new bar for real-time rendering and ray tracing features and performance. We are working closely with NVIDIA to enable Unreal Engine developers to leverage the DLSS 3 plugin and use the Ada

Lovelace architecture to its fullest potential."

Nick Penwarden, vice president of engineering at Epic Games
*Unreal Engine*

"The raw power of the RTX 40 Series GPU unleashes idTech to achieve a scale of performance that is inspiring. Whether screaming through *DOOM Eternal*, or looking ahead to our next big game, our players always expect an uncompromising blend of cutting-edge visuals and low-latency, high-frame-rate game play. idTech scales extremely well with this new hardware and the pure performance improvements that we see for ray-tracing workloads on the RTX 40 Series GPUs are phenomenal. Extend that with all DLSS brings to the table and we're truly seeing a next level of performance capability."

Billy Khan, director of engine technology at id Software
*idTech*

"DLSS 3 uses the power of AI to deliver the gaming trifecta of boosting frame rates, maximizing responsiveness and improving image quality. We continue to work closely with NVIDIA to enable Unity creators access to the tech in the future."

Ralph Hauwert, senior vice president and general manager of Core Unity and Cloud at Unity
*Unity*

**Game Developers for 40 Series and DLSS 3**
"Here at CD Projekt Red, we are very proud to be technology innovators, and DLSS 3 gives us meaningful performance gains to tackle the addition of even higher levels of ray tracing to deliver a visually rich experience for our gamers."

Jakub Knapik, art director at CD PROJEKT RED
*Cyberpunk 2077*

"The GeForce RTX 40 Series gives players ultra-high image quality and performance at the same time, without any compromises."

Julian Thomas, technical director (*F1* Franchise) at Codemasters
*F1 2022*

"Using AI to generate entirely new frames is a really great way to leverage their RTX Tensor Cores, and the performance boost is remarkable. DLSS 3 makes a great leap in terms of performance for gaming technologies."

Rikard Blomberg, chief technology officer at Fatshark
*Warhammer 40,000: Darktide*

"The two technologies that have made the most difference in gaming graphics over the last five years are ray tracing and DLSS, and NVIDIA is driving both with GeForce RTX."

Robert Bagratuni, chief executive officer at Mundfish
*Atomic Heart*

"DLSS 3 is creating high-quality frames for THRONE AND LIBERTY with the power of AI, boosting performance in a huge way, and I am so impressed with the results."

Jintae Kim, chief technical director at NCSOFT
*THRONE AND LIBERTY*

"The two technologies that have made the most visual difference in *Justice* are ray tracing and DLSS, and now we are pushing graphics fidelity to new levels with path tracing. DLSS 3 is giving us performance increases we've never seen before. It can even alleviate CPU bottlenecks for GeForce RTX 40 Series gamers — that's insane."

Dinggen Zhan, *Justice* lead programmer and senior expert at NetEase
*Justice*

"Until now, it simply was not possible to fully ray trace all of the lighting in a dense open-world game like Icarus. The GeForce RTX 40 Series series makes that possible and really opens the door for RT technology."

Dean Hall, gamerunner at RocketWerkz
*Icarus*

"Creating a lifelike digital twin of our entire planet is incredibly CPU intensive. DLSS 3 is a GPU technology that tackles the performance limitations of the CPU, making it the perfect way to experience *Microsoft Flight Simulator*."

Jorg Neumann, head of *Microsoft Flight Simulator* at Xbox Game Studios
*Microsoft Flight Simulator*

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