



# **GUIDELINES FOR GEFORCE RTX TECHNOLOGIES**

**Ray Tracing, DLSS, and NVIDIA Adaptive Shading**

## NVIDIA DLSS

Deep Learning Super Sampling (DLSS) is an NVIDIA RTX technology which uses a deep learning neural network to boost frame rates and generate beautiful, sharp images for your games. It gives you the performance headroom to maximize quality settings and increase output resolution.

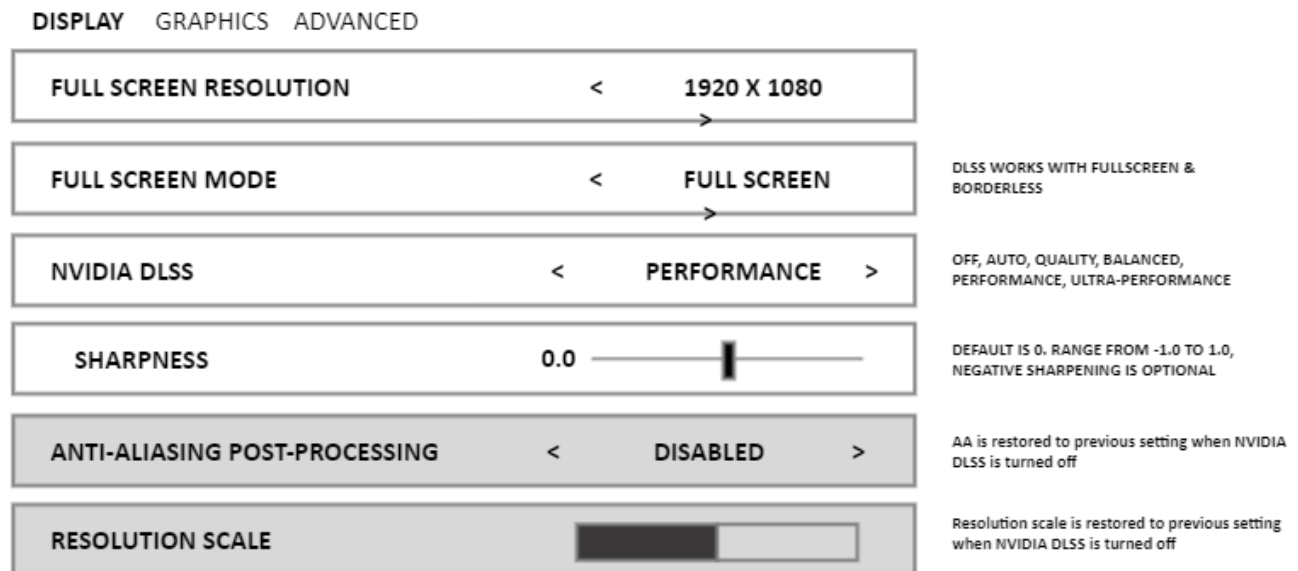
For more details on NVIDIA DLSS, see [DLSS: What Does It Mean for Game Developers?](#) as well as the [NVIDIA Turing GPU Architecture Whitepaper](#). Learn more about [DLSS 2.0](#).

### NVIDIA DLSS: Settings Options

Mode	Description	Resolution Support	GPU Support
<b>OFF</b>	Turns DLSS off.	N/A	N/A
<b>AUTO</b>	Selects the best DLSS Mode for the current output resolution.	ALL RESOLUTIONS	ALL RTX GPUs
<b>QUALITY</b>	Offers higher image quality than balanced mode.	ALL RESOLUTIONS	ALL RTX GPUs
<b>BALANCED</b>	Offers both optimized performance and image quality	ALL RESOLUTIONS	ALL RTX GPUs
<b>PERFORMANCE</b>	Offers a higher performance boost than balanced mode.	ALL RESOLUTIONS	ALL RTX GPUs
<b>ULTRA PERFORMANCE</b>	Offers the highest performance boost. <b>Recommended for 8K gameplay only.</b>	ALL RESOLUTIONS	ALL RTX GPUs
<b>ULTRA QUALITY*</b>	Offers the highest image quality.	ALL RESOLUTIONS	ALL RTX GPUs

\* This DLSS mode is a placeholder for future feature updates. It should not be visible to end users.

# NVIDIA DLSS: UI



## DLSS UI Checklist:

- NVIDIA DLSS is disabled when on unsupported hardware or driver
- When NVIDIA DLSS is turned on, make sure the anti-aliasing settings are disabled (both UI, as itself)
- When NVIDIA DLSS is turned on, make sure the resolution scale settings are disabled (UI disables, the application uses render target size from DLSS optimal settings)
- When NVIDIA DLSS Sharpening feature is on, make sure other sharpening features are disabled

## Order of DLSS Modes

When the UI shows the DLSS modes horizontally or in a left-right scrolling list, the order should be:

- Off, Auto, Quality, Balanced, Performance, Ultra-Performance

When the UI shows the DLSS modes vertically or in an up-down scrolling list, the order should be:

1. Off
2. Auto
3. Quality
4. Balanced
5. Performance
6. Ultra-Performance

## DLSS Auto Mode

The DLSS mode titled "Auto" should be the first option in the UI after Off and be enabled by default when NVIDIA RTX hardware is detected. The Auto mode isn't itself a true mode and

should select the appropriate default mode from the table below depending on the current output resolution.

## DLSS Mode Defaults

These are the default DLSS settings based on output resolution:

Default DLSS Mode	Output (Resolution)	Output (Megapixels)
Disabled	Below 1920x1080	Below 2.03
Quality mode	Equal to 1920x1080, equal or below 2560x1440	Up to 3.68
Performance mode	Greater than 2560x1440, equal or below 3840x2160	3.69 - 8.29
Ultra Performance mode	Greater than 3840x2160 (e.g. 5120x2880 and 7680x4320)	8.30+

### Notes:

NVIDIA DLSS currently has five (5) modes that are available for any game or application but are not necessarily all enabled for a given game. DLSS Modes should only be visible in the UI if it is confirmed available via a call to `GetOptimalSettings`. Please see the DLSS Programming Guide for further details.

## DLSS and Dynamic Resolution Systems

As detailed in the DLSS Programming Guide, DLSS can support dynamically varying input sizes if the renderer has a Dynamic Resolution System (DRS).

If DRS is enabled, the game UI should:

1. Present only two options for DLSS: "Off" and "On"; or
2. If the UI system does not allow the DLSS options to change, disable (hide or gray out) all DLSS Modes and only allow the user to select "Off" or "Auto".

## NVIDIA DLSS: UI tooltip or setting description

- **NVIDIA DLSS** *NVIDIA DLSS uses AI Super Resolution to provide the highest possible frame rates at maximum graphics settings. DLSS requires an NVIDIA RTX graphics card.*
  - **Japanese version:** NVIDIA DLSSは最大のグラフィック設定で可能な限り最高のフレームレートを実現するように使用されます。DLSSを使用するにはRTXグラフィックカードが必要です。

## NVIDIA DLSS: Localization Guidelines

- **NVIDIA DLSS** - *The DLSS package contains a "RTX Developer Localization Strings.zip" file. Inside the zip, there is a READ\_ME.txt that has instructions on how to use the localized strings.*
  - *Here are the following languages localized: ar-SA, cs-CZ, da-DK, de-DE, el-GR, en-GB, es-ES, es-MX, fi-FL, fr-FR, he-IL, hu-HU, it-IT, ja-JP, ko-KR, nb-NO, nl-NL, pl-PL, pt-BR, pt-PT, ru-RU, sk-SK, sl-SI, sv-SE, th-TH, tr-TR, zh-CN, zh-TW*

## RAY TRACING

Ray tracing is the holy grail of gaming graphics, simulating the physical behavior of light. [GeForce RTX graphics cards](#) have dedicated RT Cores to accelerate ray tracing, enabling higher quality and performance.

For more details on GeForce RTX Technology, see the [NVIDIA Turing GPU Architecture Whitepaper](#). Additional details on Ray Tracing Best Practices can be found [here](#).

### Ray Tracing: Settings Options

The recommended RT settings are “**ON**”, “**HIGH**”, and “**ULTRA**.” When ray tracing is “ON,” there should be a noticeable image quality difference. Additionally, there should be a very noticeable difference between each quality level, otherwise fewer setting options are appropriate.

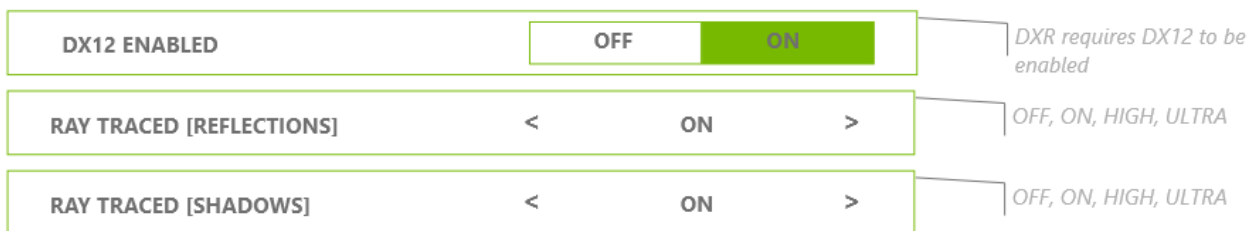
### Ray Tracing: Target Performance

We recommend the following targets for 60 fps average gameplay in your benchmark or areas of the game that are relatively heavy for ray tracing effects.

- **GeForce RTX 2060:** Ray tracing set to “**ON**” at 1920x1080 with DLSS enabled
- **GeForce RTX 2080 Ti:** Ray tracing set to “**HIGH**” at 2560x1440 with DLSS enabled

### Ray Tracing: Recommended UI

DISPLAY **GRAPHICS** ADVANCED



### Ray Tracing: UI tooltip or setting description

- **DXR:** Enable DirectX Raytracing (DXR) for life-like [EFFECT NAME] (i.e., Shadows, Reflections, etc)
- **NON-DXR:** Enable ray tracing for life-like [EFFECT NAME] (i.e., Shadows, Reflections, etc)

## NVIDIA ADAPTIVE SHADING (NAS)

NVIDIA Adaptive Shading (NAS) boosts performance by selectively lowering pixel shading rate, without affecting perceived image quality. Screen regions without high contrast details or with fast motion speeds are identified and shaded in lower rate, using the Variable Rate Shading (VRS) feature introduced on Turing.

For more details on GeForce RTX Technology, see the [NVIDIA Turing GPU Architecture Whitepaper](#)

### NAS: Game Options

The recommended NAS settings are “**OFF**”, “**BALANCED**”, “**PERFORMANCE**,” and **CUSTOM**.

### NAS: Recommended UI

DISPLAY GRAPHICS **ADVANCED**

NVIDIA ADAPTIVE SHADING (NAS)	<	BALANCED	>
DETAIL SENSITIVITY	50%	<div><div></div></div>	
LOW-LIGHT SENSITIVITY	50%	<div><div></div></div>	
MOTION SENSITIVITY	50%	<div><div></div></div>	

OFF, PERFORMANCE, BALANCED,  
QUALITY, AND CUSTOM

#### Notes:

NAS changes to Custom mode when user changes the default settings (Detail sensitivity, low-light sensitivity, and motion sensitivity).

### NAS: UI COPY

- **NVIDIA ADAPTIVE SHADING:** Boost frame rates by adapting shading rate based on content and motion information. This will disable deferred rendering.
- **DETAIL SENSITIVITY:** Shading rate sensitivity to image details
- **LOW-LIGHT SENSITIVITY:** Shading rate sensitivity to dark regions
- **MOTION SENSITIVITY:** Shading rate sensitivity to motion

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