GUIDELINES FOR GEFORCE RTX TECHNOLOGIES

Ray Tracing, NVIDIA DLSS, NVIDIA Image Scaling, and NVIDIA Adaptive Shading

NVIDIA DLSS

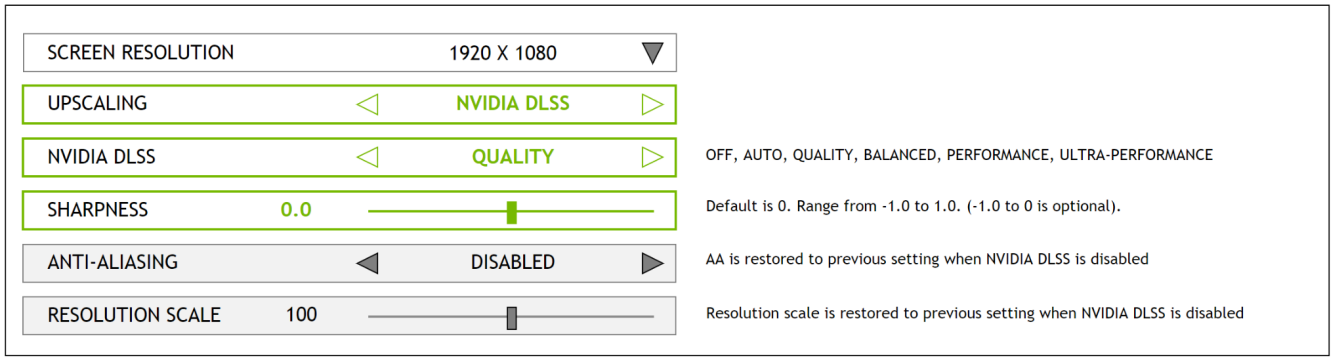
Deep Learning Super Sampling (DLSS) is an NVIDIA RTX technology which uses a deep learning neural network to boost frame rates and generate beautiful, sharp images for your games. It gives you the performance headroom to maximize quality settings and increase output resolution.

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

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+

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達成するように使用されます。DLSSを使用するのには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*

NVIDIA IMAGE SCALING

NVIDIA Image Scaling enables developers to complement their NVIDIA DLSS integrations, so they can provide the best image quality with NVIDIA DLSS, and cross-platform support with NVIDIA Image Scaling. NVIDIA Image Scaling offers best-in-class spatial scaling and sharpening and supports all GPUs.

Naming Guidelines

Recommended UI names for NVIDIA Image Scaling.

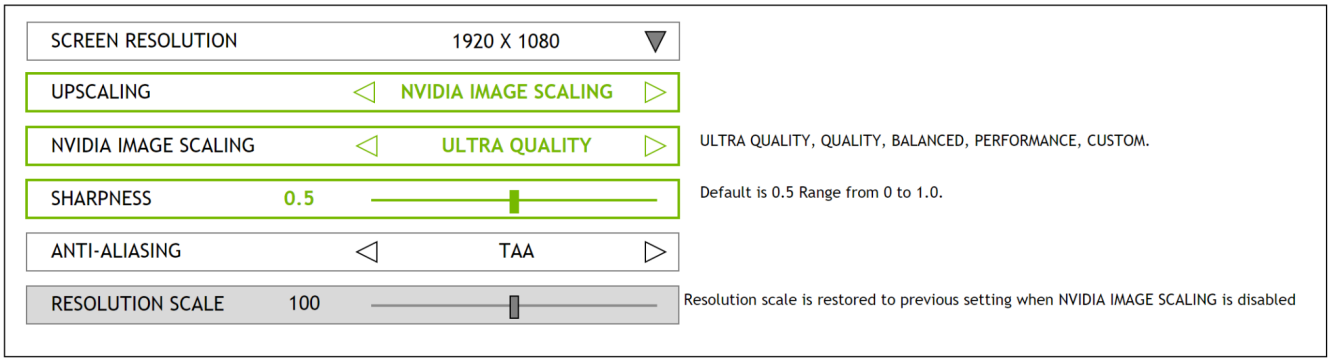
- "NVIDIA Image Scaling"
- "Image Scaling."

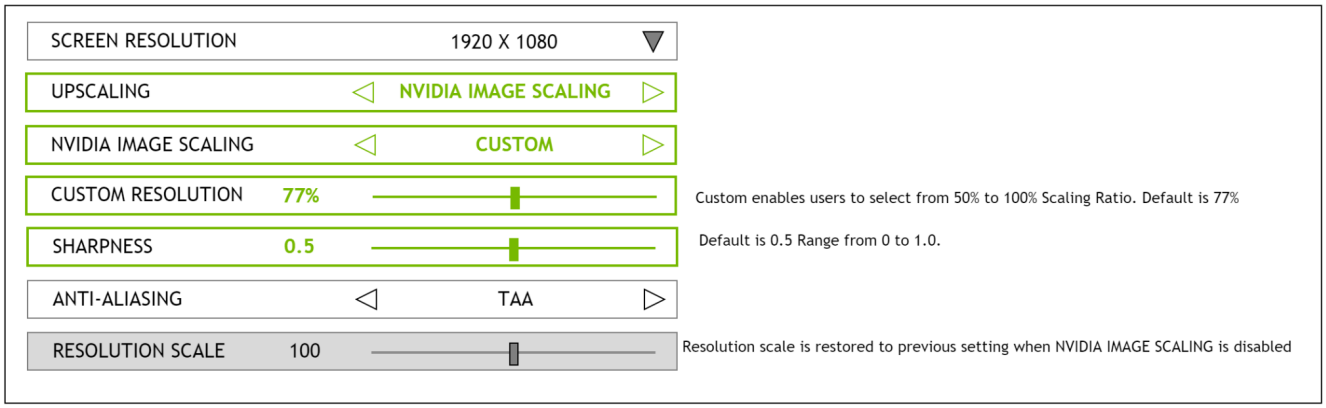
Mode Defaults

These are the default NVIDIA Image Scaling Mode settings based on output resolution:

Quality Preset	Scale Factor	Input Resolution for 2160P Output	Input Resolution for 1440P Output	Input Resolution for 1080P Output
Ultra Quality	77%	2954x1662	1970x1108	1477x831
Quality	66.667%	2560x1440	1706x960	1280x720
Balanced	59%	2259x1271	1506x847	1129x635
Performance	50%	1920x1080	1280x720	960x540
Custom	50%-100%	1920x1080 to 3840x2160	1280x720 to 2560x1440	960x540 to 1920x1080

NVIDIA Image Scaling: UI





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

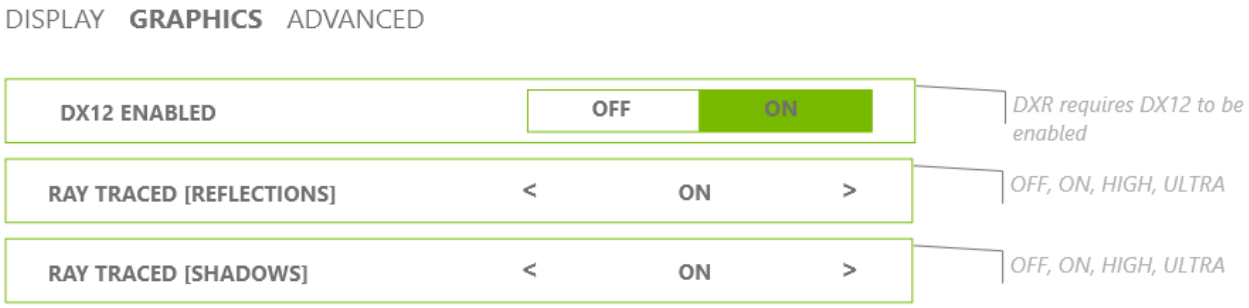
The recommended RT settings are "**ON**", "**HIGH**", and "**ULTRA**." When ray tracing is "ON," there should be a noticeable image quality difference. Additionally, there should be a very noticeable difference between each quality level, otherwise fewer setting options are appropriate.

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 3060 Ti:** Ray tracing set to "**ON**" at 1920x1080 with DLSS enabled
- **GeForce RTX 3070/3080:** Ray tracing set to "**HIGH/ULTRA**" at 2560x1440 with DLSS enabled

Ray Tracing: Recommended UI



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)

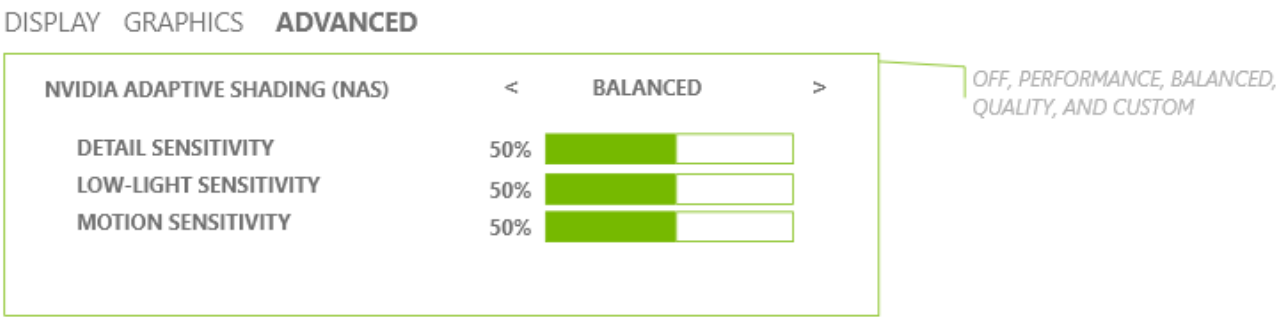
NVIDIA Adaptive Shading (NAS) boosts performance by selectively lowering pixel shading rate, without affecting perceived image quality. Screen regions without high contrast details or with fast motion speeds are identified and shaded in lower rate, using the Variable Rate Shading (VRS) feature introduced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



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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