# RenderMan 26.0 beta1



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Inside Out 2 © Disney/Pixar

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## Welcome to RenderMan 26.0 beta1

This release features major updates to interactivity and scalability, thanks to significant advancements to Pixar's state-of-the-art renderer, RenderMan XPU. RenderMan 26 also features an interactive version of the advanced Denoiser from Disney Research which uses machine learning to significantly accelerate the rendering process. Improvements to the features and user experience of Stylized Looks, significant speedups for instancing workflows, and support for the latest 3D applications, round off this new release. Here are some of the highlights:

## XPU

Pixar's GPU + CPU hybrid renderer receives major updates. Highlights include improvements in sampling, an expanded lighting and camera toolset, as well as light selection, significantly speeding up rendering in a wider range of production use cases.

- **Analytic Lights** — RenderMan XPU now supports most lighting features, including IES profiles and light temperature, giving artists a key and shot lighting toolset of production complexity. Mesh lights will be coming in a future release.
- **Light Linking** — A lighter's bread and butter! Light and shadow linking is now fully supported in RenderMan XPU, allowing artists to isolate lighting to particular geometry sets for maximum creative control.
- **Light Filters** — XPU now supports all light filters, including gobos and cookies, maximizing artist control for shot lighting. You can light link them too!
- **Camera Controls** — XPU has greatly expanded support for Pixar Camera, including tilt shift, lens aberrations, vignetting, split diopter, shutter controls, and many other features which have made Pixar's camera system a comprehensive cinematography tool.
- **Interactivity** — Progressive Pixels, a feature which displays fractional iterations for improved interactivity in XPU, can now be dialed in, allowing artists to find the sweet spot between speed and fidelity for their given project, be it a single asset, tens of volumes, or a citiscape.
- **Adaptive Sampling**  — XPU can now render images to an acceptable variance metric instead of fully converging to a given sample count, greatly speeding up render times.
- **Light Selection** — Scenes with many lights can now be efficiently rendered in XPU, significantly expanding interactivity for layout, as well as key and shot lighting.

For further details about RenderMan XPU™, see the following documentation sections:

- XPU Guide - Overview of XPU in RenderMan.
- Shader & Look Development with XPU - Details on lookdev with XPU.
- Features & Limitations - Understand the differences between XPU and RIS and known limitations.

## RIS

- **Interactive Denoising** — Now available interactively in Katana and Blender when using RIS, the RenderMan Denoiser is a completely new state-of-the-art denoising technology developed by Disney Research, which takes a new approach to denoising, using machine learning and training data from Disney, ILM, and Pixar. The interactive Denoiser can significantly reduce artist iteration times for both feature animation and VFX, by producing results predictive of the offline denoiser during an interactive rendering session.
- **Stylized Looks** — Continued improvements to the Stylized Looks toolset give artists new ways to express line work, hatching, and toon effects, as well as a new Canvas layer, which simplifies an important step in the process.

## Core Enhancements

RenderMan XPU and RIS receive a series of core updates which dramatically speed up time to first pixel and advance support for USD pipelines.

- **Faster Instancing** —  RIS and XPU have greatly improved performance when creating and editing scenes with many instances.
- **Faster Textures** — Texture read parallelism has been dramatically improved, resulting in significantly faster texture lookups in all scenarios, especially when using EXR textures. This greatly improves time to first pixel.

## Stylized Looks

RenderMan's Stylized Looks toolset in version 26 offers more creative control for artists to create non-photorealistic images. Highlights include better smoothing of stylized results, new controls for color remapping, as well as expanded compositing modes and detection methods, offering artists new ways to stylize their Toon, Hatching, and Lines. The user experience has also received an update to be more intuitive, and artist friendly.

Highlights:

- **Lines** — RenderMan Stylized Looks now features easier line detection, remapping controls, and added filtering controls, for smoother looking lines.
- **Toon** — The Stylized Control toolset now includes an artistic style toon mode, which is not physically based, expanding the range of stylization achievable.
- **UX Improvements** — The user experience for Stylized Looks continues to improve for better artist workflows, including a reorganization of attributes, a new Canvas layer, better AOV organization, as well as better filtering and smoothing effects.

## Artist Tools

Many updates have been implemented to plugin usability and stability. Ongoing collaboration with the USD and Hydra teams continue to accelerate RenderMan's support for the industry standard format. The enhancements provide a more seamless workflow for artists using RenderMan in their production pipeline.

- **Updated Bridge Tools** — The latest 3D apps are now supported by RenderMan: Houdini, Solaris, Katana, Maya, and Blender.
- **New Preset Libraries** — The Library of assets that ship with the Preset Browser expands with several new collections for Stylized Looks.
- **New Stats Portal Tool** — There is a new stand-alone Stats Portal application for interfacing with RenderMan's new stats system.

## Additional Features

RenderMan also includes:

- **VFX Reference Platform 2023** — All plug-ins are now updated to conform to the standard.
- **CUDA for XPU** – Updated to Version 12
- **Enterprise Linux 7** – For those of you using Linux, RenderMan provides builds for Enterprise Linux 7.  Enterprise Linux 9 support will arrive in a future release.

## Application Compatibility and Requirements

RenderMan RIS requires CPUs capable of running the AVX instruction set or better. A minimum of 8GB of RAM is recommended for RIS.

RenderMan XPU requires CPUs capable of running the AVX instruction set.  It supports GPU acceleration on 64-bit Linux and Windows systems. GPU acceleration is supported on NVIDIA graphics cards from the Quadro, Tesla or Data Center GPU ranges, with the Pascal architecture or later. A minimum of 11 GB of VRAM is recommended and 24 GB of VRAM is suggested for best performance. A minimum of 16GB of system RAM is recommended for hybrid (CPU + GPU) processing. For more information on driver requirements, please consult the XPU Technical Specifications.

For utilizing the NVIDIA Optix A.I. Denoiser in "it", Optix 7 supported hardware, NVIDIA Maxwell and newer is required.

RenderMan is compatible with the following 64-bit operating systems:

- Linux CentOS/RHEL 7.2+
- Windows 10 and 11
- macOS 10.15 through 13.X. Apple Silicon is only supported with Rosetta 2. Intel version of DCCs required.

RenderMan is also compatible with the following DCCs:

- Houdini 19.0, 19.5, and 20 (production versions only).  Solaris support for 19.5 and 20 (production versions only)
- Katana 5.0, 6.0, 6.5 (7.0 support will come in a later release)
- Maya 2022, 2023, and 2024 (2024 is Windows and macOS only, support for Linux will come in a later release)
- Blender 3.0+ and 4.1+

RenderMan XPU is compatible with the following 64-bit operating systems:

- Linux CentOS/RHEL 7.2+
- Windows 10 and 11

RenderMan XPU is compatible with the following for its GPU accelerated mode:

- NVIDIA "Pascal" architectures and above.
- Driver requirement for Linux is 525.60.13 or above.  For Windows, 527.41 or above.

## Deprecations

- Python 2 support is being deprecated.  This is the last release that supports Python 2.

## Known Limitations

## Installation + Licensing

- macOS 11 and beyond: The installer can download the packages from Pixar, but can't run them to get them unpacked.  You must manually double-click on the .pkg files that the installer leaves in the Downloads folder.  RMAN-18802

## Denoiser

- macOS/Apple Silicon: The denoiser is not supported on Apple Silicon, even with Rosetta.  RMAN-20408
- If your image has NaNs from either RIS or XPU, the denoiser will fail on macOS and Windows.
- The interactive denoiser currently is not supported in XPU.

## RIS and XPU

- Color Management: Although we have upgraded to the VFX Reference Platform 2023, there are still color management limitations:
    - IT does not support OCIO 2.0 configs yet.  RMAN-19921
- MaterialX: Material layering is not supported.  RMAN-20365

## XPU

- The GPU portion of XPU can render artifacts with the trace:reflectexcludesubset.  RMAN-20393
- XPU, particularly in Solaris, has some stability issues.  We are actively working to resolve these for the general release.  Please report any stability issues you see to us.

## RenderMan for Houdini

- When batch rendering from a RIB exported from Houdini, the searchpath may contain an invalid path that causes RenderMan to load the wrong OpenVDB shared library, causing batch renders to fail.  The workaround is to edit the "procedural" searchpath in the RIB to $RMANTREE/lib /plugins instead of the one in the RenderMan for Houdini directory.  RMAN-20297
- RfSolaris: Texture memory limits are not properly respected.  RMAN-20563
- Denoise ROP does not work in H20, py3.10. In py3.9, it will work if loppath on the usdrender_rop LOP node is set to opinput('.', 0) - RMAN-21926

## RenderMan for Maya

- F-Stop is divided by 10X with PxrCamera.  RMAN-20475
- Overriding PYTHONPATH can cause denoising to fail.  RMAN-20546

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# Known Limitations - Existing

## Interactive/Live Rendering Limitations

- Bucket order or size cannot be changed during live rendering.
- Changes to Presence do not update when using the opacity cache option (RIS only).
- Objects are not re-diced during interactive camera edits.
- Mesh lights cannot be interchanged as geometry without restarting.

## RenderMan RIS

- Shading
    - PxrUnified integrator does not yet support all the standard rendering features.
    - <primstr:nameofvalue> substitution of data from a constant primvar or user attribute on an object for dynamic filename substitution is not yet working for the gettextureinfo() OSL call.
    - Using the ' **.** ' character in the handle for an OSL shader could cause unpredictable results during re-rendering.
- General rendering
    - Load on demand procedurals are not supported anymore, all procedurals are now loaded immediately.
    - RenderMan does not read point data from OpenVDB files.
    - Per-Instance baking is not supported, only the reference instance.
    - PxrBakePointCloud cannot directly render ptex.
    - Sample + Display filter plug-ins do not have access to lighting services for light dependent effects, e.g. lens flare.
    - Adding new mesh light on existing geometry during IPR results in double geometry.
    - Motion blurred polygons do not motion blur normals when deformed. Use Subdivision meshes instead.
    - When attempting to access an array primvar, you must first check the size of the array primvar and allocate the appropriate space. Not doing so may lead to a crash.
    - Points and curves cannot be used as geometric lights.
    - Analytical lights placed inside non-aggregate volumes may yield artifacts when made visible to the camera. As a work around, the light camera visibility should be turned off, and a geometry with a similar shape should be used (visible to camera, invisible to transmission and indirect rays), with the proper emissive bxdf.

- - Indirect Path Guiding in the PxrUnified integrator causes a crash.
  - Bridge Products:
    - RfH: Soloing MaterialX Lama nodes in complex shading networks can give an incorrect result.

## RenderMan XPU™

Please refer to the XPU section of the documentation for the current list of limitations.