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Introducing Arnold 6

Arnold 6 can now be used for production rendering on both CPU and GPU.

From real-time look development to interactive lighting, Arnold GPU helps bring **speed** and **power** to user workflows, resulting in shorter iteration cycles and reviews. The ability to switch seamlessly between CPU and GPU rendering gives artists greater **flexibility** and provides efficiency gains for artists and studios of all kinds. Arnold 6 also introduces several new features including on-demand texture loading, improved support for Open Shading Language (OSL) and OpenVDB volumes, new USD components and a quicker, easier way to buy.

CHALLENGES

Slow iteration cycles

Artists must often work blindly, looking at an approximation of the final imagery before sending off long and costly batch renders to see the final results.

Managing complex projects

Increasingly heavy datasets and complex scene files can slow down production time, making it difficult to take on larger projects.

Complicated buying options

Slow and complicated purchase processes can be a burden, especially when working with tight production deadlines.

SOLUTIONS IN ARNOLD 6

Arnold GPU for Production Rendering

Better Interactivity

The speed of GPU-based rendering makes it possible for artists to work with near final quality renders at interactive rates.

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- **Artists** can get immediate and more responsive feedback when tweaking shaders and adjusting lighting, giving them more time for artistic iterations.
- **Look development** artists will benefit from a faster working environment, making it quicker to denoise images and get to the first presentable image or final look.
- **Lighting artists** will benefit from efficiency gains with the ability to preview lighting and uncover issues immediately, rather than waiting on overnight renders to see their work and make decisions based on feedback received.

More Flexibility

With a single click, users can switch seamlessly between rendering on the CPU and on the GPU.

- Arnold GPU is not a separate renderer but uses the same settings, interface, nodes, executables, and codebase as rendering with Arnold on the CPU.
- GPU rendering is now **pixel, feature, and API compatible** with CPU rendering in Arnold, empowering users to choose which type of rendering is best suited to their specific needs and workflow.
- Across production, artists and studios will see **optimized workflows and reduced turnaround times** between versions, making it easier to manage traditionally labor-intensive tasks.

Scalability

While CPU rendering provides studios working on larger visual effects and animation projects the flexibility to scale up quickly for final frame rendering, Arnold GPU rendering will make it easier for artists and small studios to iterate quickly and scale up rendering capacity when needed.

- Arnold users can take advantage of the latest technology and add GPUs for increased rendering power when production demands it.
- Arnold supports rendering on multiple GPUs, with NVIDIA NVLink™ technology to enable shared memory across GPUs.
- Arnold GPU is optimized to take advantage of NVIDIA RTX technology, pushing raytracing speed and power.

Improved Features and Support for Arnold GPU

First unveiled in March, Arnold GPU has seen continual updates throughout the year. The Arnold 5.4 release in July brought support for Open Shading Language and OpenVDB volumes, and this update now rounds out the toolset with a number of improvements across lights, shaders, and cameras. The latest updates to Arnold GPU include:

- **Improved support for Open Shading Language (OSL)**
- **Improved support for OpenVDB volumes**
- **On-demand texture loading:** Textures are now loaded on-demand instead of at the start of the render, helping to reduce memory usage and save time to first pixel.
- **Improved startup time:** Time to first pixel is now faster thanks to a number of improvements including more efficient NVIDIA OptiX™ caching.

- **Reduced BVH memory used by geometry:** Bounding volume hierarchy (BVH) memory used by geometry is reduced by as much as 50% for large meshes.
- **Shadow Matte shader**: A first version of the new Shadow Matte shader has been added to the GPU renderer.
- **Reduced noise:** Excessive sources of noise have been removed, such as indirect noise in refractions or reflections. GPU noise is now on par with CPU noise when using adaptive sampling, which has been improved to yield even faster, more predictable results regardless of the renderer used.
- **LPEs:** Most LPEs (39/46 and counting) are now supported on GPU, giving users all of the regular shading AOVs.
- **Lights:** The majority of lights are supported, including portals.
- **Cameras:** All cameras are now supported.
- **Shaders:** Most shaders are supported.

Note that there are still some limitations to rendering with Arnold GPU. Please visit the Arnold documentation portal for more information on supported features and known limitations, as well as hardware and driver requirements for Arnold GPU.

New Arnold USD Components

As part of Autodesk's continued efforts to accelerate the adoption of open standards to benefit the larger industry, a collection of components for Arnold in the USD ecosystem including Hydra render delegate, Arnold USD procedural, and USD schemas for Arnold nodes and properties is now available on GitHub.

Other New Features in Arnold 6

Arnold 6 delivers a number of new features and improvements to help maximize efficiency and performance:

- **Faster creased subdivs**: Hard creases are now fully supported in adaptive and multithreaded mode. This means creased surfaces will use all procs during subdivision.
- **Dielectric microfacet multiple scattering**: Rough dielectrics are now energy-preserving by accounting for multiple scattering between microfacets for both reflection and refraction.
- **Physical Sky shader improvements**: The physical sky shader now extends the color at the horizon all the way down to the bottom pole.
- **Improved roughness mapping of the Oren-Nayar diffuse BRDF**: The Oren-Nayar roughness parameter has been remapped so that values close to 1 no longer result in excessive darkening. This change also improves the Standard Surface and Car Paint shaders.
- **Improved rough thin-wall transmission in Standard Surface shader**: Refractions in thin-walled mode now appear blurry with non-zero roughness.
- **OCIO roles**: Roles can now be listed with the color manager API by querying color spaces available in the Role (OCIO) family. This makes it possible to build UIs that list all known roles.
- **Skip RGBA denoising**: Noise now accepts -ignore_rgba or -irgba to skip denoising of RGBA even if it's present.
- **OpenImageIO 2.1.4**: OIIO support is now upgraded to 2.1.4.
- **More accurate albedo AOVs**: Albedo AOVs now correspond more closely to the true albedos of the material's BSDFs.

- **New AOV Write Vector shader**: A new shader enables the writing of vector values into a vector typed AOV, for example for recording positional values.

For a complete list of updates in Arnold 6, refer to the release notes.

Plug-in Improvements

In addition to new features and improvements in Arnold 6, we have also made several updates to the Arnold plug-ins for Autodesk® Maya®, Houdini, Cinema4D, Katana, and Autodesk® 3ds Max®. Highlights include:

- X-Rite AxF support in MtoA
- Import / export of shading networks between all plugins
- Arnold License Manager to install, set up, and diagnose licensing

Full release notes for each plug-in are available in the Arnold documentation portal.

A New Way to Buy

Monthly, annual, and 3-year single-user subscriptions of Arnold are now available on the Autodesk e-store, simplifying the process of subscribing to, accessing, installing, and renewing Arnold. Moving the Arnold buying experience to the Autodesk e-store means users now get immediate access to their software when they subscribe, and no longer have to install and configure elaborate multi-user license servers when they only need a single seat.

For more information, read the Arnold single-user FAQ.

RESOURCES

Arnold can be used in Maya, Houdini, Cinema 4D, Katana, and 3ds Max. Full release notes for each plug-in are available in the **Arnold Documentation Portal.**

Arnold Answers is a technical Q&A forum for all Arnold users.

Visit the **Arnold Treasure Map** for the latest sales tools and resources, including Frequently Asked Questions.

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