



Image courtesy of Amaru Zeas

Introducing Maya 2022

Maya 2022 empowers artists to work more efficiently and collaboratively than ever before. The wait is over for USD in Maya. With this update, USD is now seamlessly integrated, enabling artists to load and edit large data sets at lightning speed and work directly with data using native tools. Maya's animation, rigging, and modeling toolsets also see significant updates to get artists working faster and with more precision, and the latest version of Arnold brings even more speed and flexibility to rendering workflows.

CHALLENGES



Growing audience demands for more high-quality content puts enormous pressure on VFX and animation studios to produce content faster and more efficiently. Studios are constantly looking at how they can enhance their pipeline with the latest, cutting edge technology to tackle increasing complexity and push their creative limits.



Massive data sets that require quick loading can be challenging for studios to manage. Dealing with huge, complex files and libraries can slow down productivity, causing an onset of delays and missed deadlines. Studios need a way to handle large data sets without causing production delays.



Seamless asset collaboration between artists, disciplines, and studios can be difficult. Artists need a tool for non-destructive, collaborative editing to tackle complex projects.

SOLUTIONS IN MAYA 2022

USD, now seamlessly integrated

Pixar's Universal Scene Description, also known as USD, is a framework for the interchange of 3D data with a focus on collaboration, pipeline efficiency, and scale. With Maya 2022, USD has been seamlessly integrated, allowing artists to not only load and edit massive data sets at lightning speed, but to also work directly with the data using Maya's native tools. Additional benefits include robust referencing functionality, nondestructive data editing workflows, and support for complex variants.

Load and edit massive data sets at lightning speed

One of the many benefits of USD in Maya is the raw speed at which you can bring in massive data sets. Artists can now load multiple gigabytes of data into Maya in a matter of seconds.

Seamlessly import and export USD data

A new round-trip import and export workflow lets artists take USD data and import it as native Maya data, or take native Maya data and export it as USD data. This allows artists to rely on USD as a simple, high speed format for transferring data between Maya scenes or other applications that support USD.

Preview USD scene structure

A new USD Hierarchy View Window gives artists a lightweight preview of the USD scene structure. This can be used to see the contents of a USD file, as well as to set the state of the scene, including variants, before import.

Support for in-memory USD stages

A USD stage is an in-memory container of the composed USD scenegraph. The new `mayaUsdProxyShape` node enables native Maya workflows directly on USD stages. This means artists can now work directly with USD data in common Maya editors, enabling native support for the Viewport, Outliner, Attribute Editor, Manipulators, Snapping, and more.

An Outliner experience tailored to USD

There are several new features in the Outliner intended to complement USD workflows. With these improvements, artists can quickly and easily identify and manipulate USD data in the Outliner alongside standard Maya objects.

- **Data Branch Colors** allow artists to distinguish between Maya and non-native USD data in the Outliner at a glance.
- **Unique USD icons and badges** help recognize Prim data types and Composition Arcs.
- **Right-click contextual menus** provide easy access to common Prim-based operations.

USD in the Viewport

Artists can now see USD natively alongside Maya data in the Viewport. A new Selection by Kind setting provides users with granular control over Viewport-based selection of USD hierarchies. For example, setting selection to "Prim" will allow an artist to select the clicked Prim, whereas setting selection to "Model" will traverse up the hierarchy until a Prim of Kind Model is found.

New USD Layer Editor

The new USD Layer Editor allows artists to intuitively create, view, and manage a USD Stage's complex LayerStack.

Open source and customizable

In addition to shipping with Maya out-of-the-box, the Maya USD plugin is available as an opensource project for studios to customize as needed.

Python 3

Python 3 is available and is the new default for Maya on all platforms (Windows, Linux and Mac OS). On Windows and Linux, Maya can still be started in Python 2 mode either by setting an environment variable or with a command line flag.

Powerful animation tools

The latest updates to Maya's animation toolset help artists animate faster and in fewer clicks. With continued focus on performance and efficiency, a new Ghosting Editor allows artists to quickly see animation spacing over time, making it easier to pinpoint where edits need to be made and how their poses work together in animations. A number of improvements to the Time Editor, including support for cached playback, and new filters in the Graph Editor, simplify animation workflows and save artists' time.

New Ghosting Editor

Ghosting in Maya 2022 now takes full advantage of Cached Playback, displaying the information already stored in the cache. The new Ghosting Editor lets artists create images that echo their animations, so they can visualize movement and manage how and what parts of their characters they would like to see in the Viewport.

Cached Playback support for simulations and dynamics

Maya 2022 also improves the speed and performance of simulation and dynamics caching, enabling artists to stay in flow and iterate their work in real-time at final frame quality.

Cached Playback support in the Time Editor

The Time Editor now fully supports Cached Playback allowing animators to work and hit play without needing to playblast. When loading a scene with Time Editor clips, Cached Playback is no longer automatically disabled.

Additive Animation Clips in the Time Editor

Animators can now set clips to be additive, allowing them to mix two clips together seamlessly. For example, a clip of an arm waving can be blended with a clip of someone walking, even as the animation moves forward in space. If a clip is set to 'additive', it will be evaluated relative to its first frame of animation and added on top of the underlying clip animation.

Graph Editor Improvements

Maya 2022 also adds several improvements to the Graph Editor, bringing artists a smoother animating experience. A new Peak Removal filter in the Graph Editor Curves menu enables artists to clean up unwanted spikes and peaks in their animation curves by averaging their values based on neighboring keys. An improved alternative to the legacy Resample filter, the new Smooth (Gaussian) filter gives animators more control over the range and width of blur effects. The Preserve Tangent Type option, formerly only available for the Insert Keys tool in the Graph Editor, is now also available in the Add Keys tool, helping to reduce the amount of time needed to craft curve shapes.

New Auto Tangent Types

New options for Auto Tangents in the Graph Editor offer an improved algorithm, giving animators better control and more predictable results.

Modern rigging workflows

Maya 2022 introduces several procedural, topology-independent rigging workflows. Component Tags and Deformer Falloffs bring artists modern methods for defining membership and weighting, as well as seamlessly sharing that data between geometry and deformers. Building on Maya's already extensive deformation toolset, the release also adds powerful new Solidify and Morph deformers.

Component Tags

Component Tags allow geometry to store named sets of components directly on a shape node. These sets can then be passed to and used by other nodes.

Component tags benefit riggers in several ways:

- **Topology independence:** Deformers can use component tags along expressions to define deformation membership in a topologically independent way.
- **Cleaner, more efficient deformer graphs:** Component Tags can simplify the deformer graph by significantly reducing the number of nodes and connections required for deformation.

Deformer Falloffs

Deformer falloffs provide a new method for defining deformation weighting. Unlike traditional deformer weighting, once defined, falloffs can be shared and reused in a topologically independent way. Riggers can take advantage of deformer falloffs with many of the most commonly used deformers, including Skin Cluster, Cluster, BlendShape, Proximity Wrap, Tension, Lattice, Wire, Delta Mush, and all nonlinear deformers.

EvalFalloff Node

A new evalFalloff node can be used to expand the falloff system to support legacy deformers. Riggers can use this node to evaluate falloffs on geometry to drive traditional weighting on deformers such as BlendShape targets.

Solidify Deformer

In conjunction with Component Tags, the new Solidify deformer enables artists to create areas of geometry that appear more solid when deformed. For example, this new technique can be used by riggers to define rigid parts of a character (such as spikes or claws) that should be preserved when the character is being deformed by a skeleton.

Morph Deformer

With the new Morph deformer, riggers can seamlessly blend from one shape to another. Using the component lookup feature, it is now possible to morph a shape using only a subset of its components. This provides a modern alternative to the BlendShape deformer with benefits that include GPU acceleration and topology independence.

Always Draw on Top attribute

When the new Always Draw on Top attribute is enabled on a Curve shape node, the curve will be visible in the Viewport even when occluded by other objects in the scene. This is particularly useful for control rigs. Curves that are used as rig control objects can now be displayed in the Viewport on top of other objects, improving visibility of the rig.

Skin Binding using Proximity Wrap

Artists can now use the Proximity Wrap deformer instead of the classic Skin Cluster node when binding a mesh to a skeleton. Unlike the legacy Skin Cluster node, Proximity Wrap allows artists to drive geometry with joints in a topologically independent way.

Community-inspired modeling updates

A number of additions to Maya's modeling toolset enable artists to have more control over their models. The Sweep Mesh tool allows artists to procedurally generate geometry and adjust attributes such as profile shape and size, with just one click. In collaboration with the Maya community, several user-requested updates have also been made to improve the overall modeling experience.

Sweep Mesh

Sweep Mesh is a new, one-click, procedural tool for generating polygon geometry from NURBS and Bezier curves. Using Sweep Mesh, artists can procedurally control profile shape, size, tapering, twisting, alignment, subdivisions, and UV creation. This feature is useful for creating a wide range of both organic and hard surface forms such as tubes, pipes, ribbons, cables, ropes, roads, horns, and hair, as well as complex architectural details such as crown molding.

Game Vertex Count plugin

A new Game Vertex Count plugin creates a game-centric alternative to Maya's standard Poly Count Heads Up Display (HUD). In-game vertex counts are often different than the standard vertex calculation in Maya. These differences can make it challenging for game artists to plan and meet set polygon budgets. Using this new plugin, game artists are able to more accurately estimate how assets in Maya impact their in-game vertex count budgets before exporting them to game engines. This feature also includes targeted settings for Unity and Unreal.

Create VR for Maya

Create VR is an immersive conceptual design tool that empowers artists to start their creative process directly in 3D. Using simple curve and surface tools, artists are able to explore form and shape while being fully immersed in virtual reality alongside their art. Sketches and models can then be easily exported to Maya for final realization.

Note: Create VR does not come out-of-the-box with Maya. To access Create VR, Maya artists need to download it from the App Store and install it separately. Once installed, Create VR can be loaded via Maya's Plugin Manager and launched in the Maya UI.

User-requested updates

Maya 2022 introduces a slew of modeling workflow improvements directly based on pro user feedback, including pivot enhancements, better extrude thickness, and performance improvements.

- **Extrude thickness:** The Extrude tool thickness option now automatically provides better, more predictable results when adding thickness to complex mesh shapes.
- **Interactive pivot improvements:** Using Interactive Pivot mode, artists can now snap or align to any unselected mesh in their scene. Previously a mesh object's components were not snap-able unless that object was also selected.
- **Match Pivots improvements:** Match Pivots now supports orientation in addition to translation. When the 'orientation' option is enabled, the rotation of the pivot will also be transferred.
- **Match translation, rotation, and scaling (TRS) improvements:** Artists now have more precise control over the transforms in their scenes. When matching translation, rotation, and scaling transforms, they can

choose to match individual XYZ axes or all axes. When matching scaling, they can also choose to match the bounding box of a target object. This enables artists to match the real-world size of any object regardless of scale values.

- **Move, Rotate, and Scale tools improvements:** Artists can now choose to Bake Pivot Orientation in the Move, Rotate, and Scale tools. When enabled, pivot orientation changes to selected objects are baked into the transform immediately. This update simplifies pivot manipulation, reducing the number of steps required to bake pivot changes to the transform.
- **UV coordinate editing and display:** New UI elements benefit modelers and texture artists by improving the readability and editability of UV coordinate values. The UV toolkit now has separate fields for relative and absolute move UV operations that display the average coordinate positions of selected UVs. Editing the UV fields moves selected UVs to the specified location. Additionally, a Heads Up Display option is available in the UV Editor for displaying the coordinate values of selected UVs.
- **Paint Vertex Color improvements:** The Paint Vertex Color tool now includes options for controlling the display of specific RGBA channels when painting vertex color on a mesh. Artists can toggle Red, Green, and Blue channels on and off in the Display, as well as choose to display alpha as either transparent or greyscale.
- **Faster Lasso Select:** Lasso selection for components in the Viewport and UV Editor is now significantly faster, improving interactivity for modelers, particularly when working with high-resolution geometry such as scan data.

Fast and flexible rendering with Arnold 6.2

Maya 2020 includes Arnold 6.2, bringing even more speed and flexibility to artist workflows with new post-processing nodes for better control of lighting effects and tools for automatic denoising after each render.

An even better post-processing experience

First introduced with Arnold 6.1, post-processing nodes (or imagers) allow artists to fine-tune post-processing effects and see them update directly in the render view.

Arnold 6.2 now introduces new imagers for light mixing, bloom effects, and denoising.

- **Light mixer:** This new imager makes it possible to edit the contribution of light group AOVs during and after rendering. This gives artists more control over each light and can save them time on rendering if changes are needed. The maximum number of light group AOVs has also been increased to 256.
- **Bloom:** This popular effect simulates the light bloom created by real-world camera lenses when exposed to bright light. The effect produces a glow around a bright object, causing the light to bleed past the object's borders.
- **OptiX and Arnold Noise denoisers:** The Arnold Noise and OptiX denoiser are now implemented as imagers allowing artists to automatically denoise every time they render a scene. The OptiX denoiser now adds additional controls to clamp values given to the denoiser and toggle the use of feature buffers given.

Continuing to build Arnold's GPU toolset

Arnold 6.1 adds several GPU Improvements including shadow linking and faster start-up. Artists can now render scenes more efficiently with added support for shadow linking. Normally, all objects in a scene are included in the calculation of shadows cast by a light. Shadow linking allows artists to link specified groups of objects to different shadow calculations, reducing the rendering time required for complex scenes.

Support for shadow groups has also been added to Arnold GPU. By default, shadow groups follow light links. With new shadow group support, artists can include or exclude a light's shadow on a per-object basis. When excluded, a specified light's shadow is disabled for that object.

The initial startup time when rendering a scene for the first time is now up to twice as fast as previous versions.

Enhanced USD support

We've collaborated with a number of studios to bring the following improvements to USD support in Arnold:

- **Hydra cameras:** The render delegate now supports physical camera parameters, including depth of field and Arnold specific camera parameters
- **Search paths:** The render delegate now exposes search paths for plugins, procedurals, textures, and OSL includes.
- **Autobump visibility:** The render delegate now supports setting autobump_visibility via primvars
- **Per-face material assignments:** The render delegate now supports per-face material assignments.
- **Cache Id:** The procedural now supports reading stages from the shared stage cache via the cache id parameter.

OpenColorIO v2 now integrated

Arnold 6.2 integrates OpenColorIO v2, enabling artists to take advantage of OCIO's native implementation of ACES (Academy Color Encoding System) and processing improvements right in the Arnold renderer.

For more information on Arnold 6.2, read the [release notes](#).

An improved first experience

Maya 2022 brings several UI improvements to get artists creating quicker and with more control.

Smoother startup

The user experience when launching Maya is now faster and more modern.

- Startup time has been significantly reduced, allowing artists to get to work in Maya much more quickly.
- An improved splash screen includes a descriptive progress bar, letting artists know where Maya is in the startup process. By popular request, the splash now also displays as soon as Maya is started and no longer steals focus from other active windows.
- The Maya UI is now only displayed and maximized when idle and ready.
- Artists can hide the Output window unless it is specifically needed.

Startup preferences

When launching a new version of Maya for the first time, artists are now given options for which preferences they would like to copy from a previous version of Maya, including hotkeys, shelves, workspaces, scripts, marking menus, and colors.

Script Editor Improvements

New options have been added to the Script Editor to make it easier to work with tabs. Similar to the tabs in a web browser, artists can now right-click a tab in the Script Editor to access options for creating, renaming, or deleting.

Updated Script Editor hotkeys are more intuitive, and artists can now close tabs by middle-clicking or clicking X. The tab options have also been moved from the Command menu to the Tabs menu.

Incredibly detailed simulations with Bifrost for Maya

As a reminder, Maya 2020.4 was released on December 8, 2020, marking a major milestone for visual programming in Bifrost for Maya. With a focus on bringing richer, procedural workflows to more areas of the pipeline, this update added powerful scattering, instancing, volumetrics, and FX capabilities to Bifrost. Usability improvements also made the visual programming environment easier to navigate.

For more information on Maya 2020.4, read the [AREA blog post](#).



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