# Autodesk Maya 2017

With big enhancements to existing workflows and exciting new tools, Autodesk® Maya® 2017 software helps artists work faster than ever.

Maya now comes with Arnold, one of the best renderers available, to help make the rendering process faster and deliver better results. The animation workflow in Maya has seen some big changes the past few releases, and now, with a new Time Editor plus an improved Graph Editor, animating in Maya is faster and more artist-friendly. Maya 2017 also has a brand new motion graphics toolset, first introduced in Maya 2016 extension 2, that helps motion graphics designers create unique animations quickly and easily.

## Rendering in Maya 2017

Rendering great images can be a challenge. Optimizing image quality, managing complexity, and getting just the right look can consume and create serious workflow bottlenecks for artists and studios.

Maya 2017 comes integrated with the renowned Arnold renderer, used by the biggest names in visual effects and animation to solve the most complex rendering problems. Now Maya makes it simple to render great images, quickly and efficiently.

**Arnold and Maya—better together.**

Arnold lets you render high-quality images right out of the box, scaling with your processing power as project complexity demands. And Arnold's sophisticated sampling reduces the number of iterations it takes to get the perfect result, so artists can spend less time on rendering and more time making art.

Maya 2017 comes with improvements to Viewport 2.0 that allow artists to better visualize Arnold results, as well as the new Arnold RenderView, which offers fast interactive rendering along with other great features. A new sequence-rendering feature allows artists to preview frame sequences right in Maya. And scaling to larger jobs is simple: just add Arnold licenses if you want to render on local resources, or render projects on the cloud using a popular service such as Google Cloud Platform ZYNC Render.

Arnold adapts readily to your existing pipeline. You get compositing-friendly rendering, robust rendering features, and ease of use. For technical users, Arnold is fully customizable, with a powerful API for creating custom rendering solutions.

With Arnold plus Maya's Render Setup system, which lets you automate the laborious task of setting up renders within a single window, Maya provides an unparalleled rendering experience. Whether

you're working on your latest film or quickly turning around motion graphics projects, it's easier than ever to create renders, then deliver everything for compositing and finishing—including an industry-standard set of AOV outputs, for example—to achieve great final results.

For those using other renderers, Maya remains an open rendering platform of choice, with continued collaboration with, and support for, third-party renderers to improve support for new Maya features.

The replacement of mental ray with Arnold in Maya changes the way render licenses are handled; please see our **mental ray FAQ** for more details.

# Maya for motion graphics. And a whole lot more.

Maya 2017 includes MASH, first introduced in Maya 2016 extension 2. This procedural, node-based toolset allows designers and artists to combine nodes to quickly create unique animations and effects. Its intuitive and easy-to-use procedural instancing and animation toolset is ideal for creating complex motion graphics, UI design, environments, animation, and effects.

Improvements to MASH in Maya 2017 make it easier than ever to create complex procedural animations and effects. A new UI makes using MASH more intuitive for 3D motion designers and Photoshop users alike, so it's simple to add, reorder, and experiment with MASH nodes. New nodes and improved features (including a revamped audio node, which can drive anything in Maya with selectively filtered audio) make MASH faster and easier to use, and enable artists to create brand-new effects. You also get an improved 3D Type tool, an easy copy-paste workflow for SVG files, a new curve warp tool, and more.

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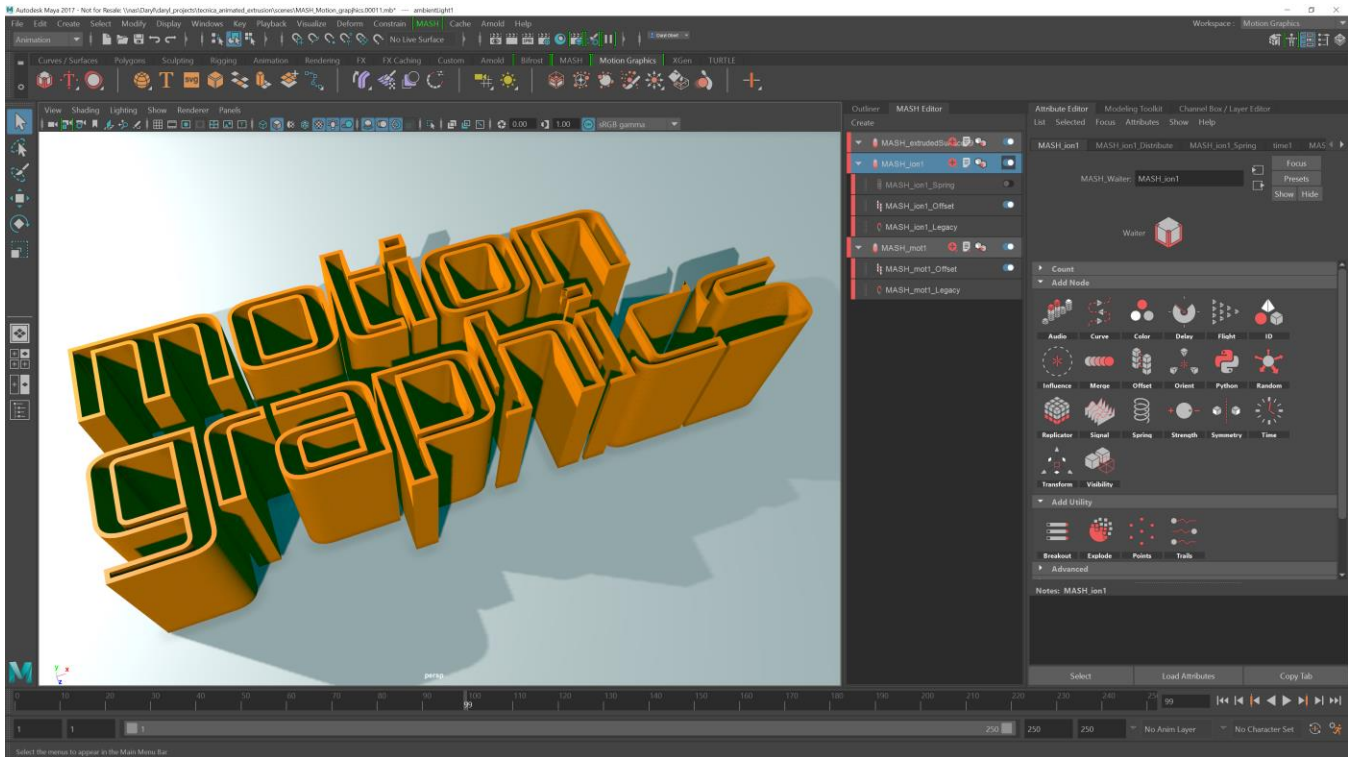
In addition, Maya 2017 now includes the Arnold renderer, bringing advanced, film-quality rendering to the world of motion design. Arnold makes it simple to render all Maya effects, such as hair and volumes, combining artist-friendly ease of use and customizability with performance that's robust and stable in even the most complex situations. Motion designers can quickly and interactively render images of stunning quality—and produce images with embedded channels, enabling flexible reworking in compositing applications including Adobe After Effects. Clear, straightforward documentation and a passionate user community make it easy to get started.

Finally, Viewport 2.0 in Maya 2017 provides faster performance and greater image fidelity than you get with other 3D tools. Viewport 2.0 gives artists a better understanding of what their final scenes will look like, without wasting time on preview renders—making it easier than ever to do great work while meeting the tight deadlines typical of motion-graphics projects. Viewport 2.0 can also be used as a real-time render engine for design-oriented work.

# Animation in Maya 2017

Maya 2017 is built for speed, with new, more artist-friendly tools and performance improvements that make animating in Maya faster and more intuitive than ever before.

You get the supercharged animation performance and accelerated interactive playback and rig manipulation introduced in Maya 2016, plus new performance enhancements that drive animation productivity even as character complexity grows.
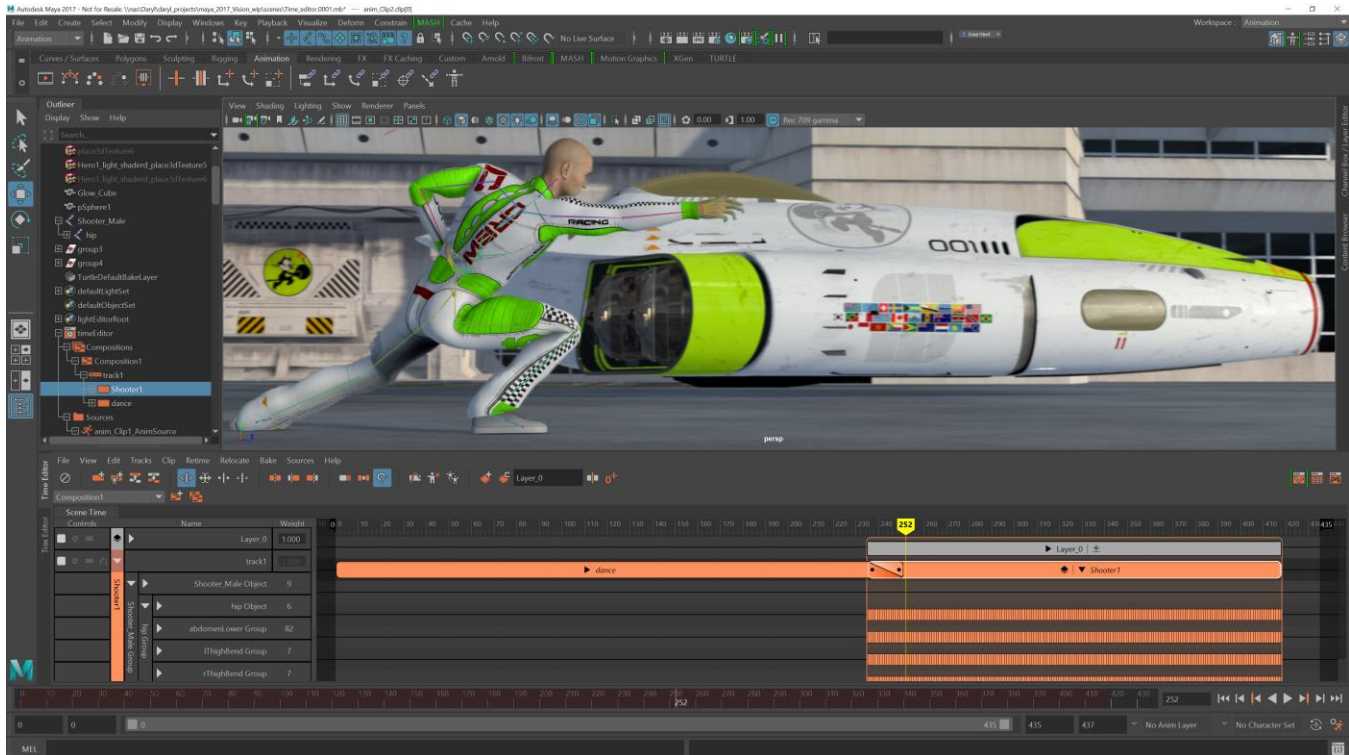


Maya 2017 uses smarter evaluation methods to improve the parallel evaluation mode. For example, playback visibility improvements help animators focus on the important parts of their scenes—and avoid sacrificing performance on less-important parts. Add in a comprehensive suite of diagnosis and introspection tools, and it's easy to understand why users find it simpler than ever to animate characters in Maya.

The new Quick Rig tool lets you rig characters in seconds, making it easier for artists of all levels to bring sophisticated character animation to life. For more technical users, a new custom evaluator API gives you full control of what's happening under the hood, allowing you to integrate custom tools into Maya—and Maya into your pipeline.

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Maya 2017 also includes the new Time Editor, a more flexible and powerful nonlinear animation editing system that replaces Maya software's Trax editor. Artists can work nondestructively with any kind of motion as they bring scenes to life. Rearrange, remix, and experiment with animation, pose, and audio clips.

The Graph Editor has been overhauled for Maya 2017, with a more modern look and feel, cleaner curve display, improved interactivity with many visual elements, and streamlined views for easier curve organization. A new GPU back end keeps it fast and interactive even when working with many densely keyed curves. Together, the Time Editor and Graph Editor give you a unified animation experience that's faster and easier to use than ever.

Finally, Maya 2017's MASH animation toolset is about more than just motion graphics. MASH's layer-based UI makes it easy to apply procedural, nondestructive animation effects to practically anything you do in Maya, with dynamic drag-and-drop functionality that makes it fun to experiment and iterate until you've created exactly the right effect. More advanced users can access the nodes directly.

# Powerful features. Easier than ever to use.

Maya 2017 makes it easier than ever to model unique, compelling characters. New shape-authoring tools let you sculpt exactly the right expressions, no matter how subtle or intricate. And new XGen features make it easy to create characters with hair or fur, giving you the ability to groom characters directly in the viewport.

Upgrades to the integrated Bifrost toolset make it simple to create amazing fluid effects in Maya 2017, without plug-ins or complex customization. The Bifrost Ocean Simulation System (BOSS) let you create more realistic ocean surfaces, including waves, ripples, and wakes. In addition, it's now easier to set up guided liquid simulations, which let artists control the behavior of liquids. And new viscosity controls help smooth liquid flow in simulations and create viscous effects like lava or toothpaste. Whether you're creating an ocean, a glass of beer, or an abstract fluid effect, with Maya you get all the tools you need.

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UI improvements make Maya 2017 the most user-friendly version to date. Workspaces define the configuration of windows and panels, providing more flexibility to reconfigure panel layouts; you can open, close, and move windows and panels, dragging and dropping to dock and undock, almost anywhere in the interface.

A new Content Browser, which replaces the old Visor in Maya, is a one-stop shop for finding content to build your scenes—just drag files to the view panel from your Maya projects, local and network directories, and sample libraries. When used with the new Time Editor, Maya's Content Browser makes it simple and fast for artists to organize and build out pose- and animation-clip libraries to save, share, and reuse work.

# Key new features in Maya 2017

## Bifrost:

### BOSS

The Bifrost Ocean Simulation System lets you create realistic ocean surfaces with waves, ripples, and wakes. You start with a flat mesh, then layer and mix solvers and influences on top. Each element is independent of the resolution of the others, and each can be cached separately for faster playback. You can use the resulting deformed mesh directly, or transfer the result to another mesh. You can also use the cached EXR files as vector displacement maps when rendering.

### Guided liquid simulations

It is now easier to set up guided liquid simulations. You can now use a deforming plane or other flat mesh as a guide, instead of using a deforming closed volume as an emitter. In addition, you can restrict a simulation to specific regions, or simulate a layer on top of the guide for extra splashes.

### Viscosity

You can set a physically correct value for viscosity on the bifrostLiquidPropertiesContainer node. The non–physically correct Scale setting is still available as a velocity-smoothing factor, for faster results in situations where accuracy is not required.

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## Liquid churn and curvature channels

New curvature and churn channels let you see where curvature and churn are being generated in a liquid. When enabled, Bifrost computes curvature and churn values, which you can display as color channels in the viewport. That lets you visualize potential locations for foam emission in the liquid before adding a foam object. You can also use this information to determine accurate Min Liquid Churn and Min Liquid Curvature values for the foam before simulating.

## Erosion

New Erosion attributes control how closely a liquid boundary is shrink-wrapped back to the particle positions. Use these attributes to avoid problems in situations such as still water versus thin flows or energetic splashing.

- In turbulent liquids, use Erosion attributes to avoid problems such as fast particles "surfing" ahead of boat wakes, fluid repulsion, particle clumping, and particles climbing near the walls of colliders. Erosion settings can also help achieve equilibrium in still-water situations.

## Motion fields

You can now influence particle velocity directly using Motion Fields:

- Activate and control various components, including Drag and Turbulence, individually.
- Transform the field property in space. Note that the field's scaling affects its magnitude by default.
- Select a Boundary Shape to restrict an effect to a specific volume with an optional falloff, or simply to alter the axis used by the options Along Axis, Around Axis, and Away From Axis.

## Kill fields

Use kill fields to delete unwanted liquid, foam, or aero particles in a Bifrost simulation. Affect particles based on specified criteria when the particles are within a specific volume.

## UI:

## Workspaces

Workspaces define the configuration of windows and panels. You can modify a workspace by opening, closing, and moving windows and panels, or dock or undock them by dragging and dropping. These changes are automatically saved as overrides to your current workspace.

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Workspaces are more flexible than panel layouts because you can move or dock almost any window or panel almost anywhere in the interface. Workspaces are stored as separate files in your user directory instead of in scenes.

### New Content Browser

The new Content Browser replaces the Visor, serving as your one-stop center for examples, scenes, and other content used to build in Maya. Navigate for files in your Maya projects, local and network directories, and sample libraries, then drag and drop them into the view panel.

# Animation:

### Graph Editor

The Graph Editor, the backbone of the animation workflow, has a new, more intuitive interface designed to streamline the animation process.

The redesigned Graph Editor puts the emphasis on curve visibility—increasing contrast between curves and background, simplifying the stacked view, and moving the timeline to the top of the Graph Editor.

### Time Editor

The **Time Editor** is a nondestructive, clip-based nonlinear editor for high-level animation editing. Unlike the **Trax Editor**, which requires Character Sets, the Time Editor frees animators to work on any attribute with animation curves, including characters, cameras, and colors. Easily edit pre-existing animation, including motion capture (even multitake FBX files) and keyframe motion, with intuitive trim, scale, loop, split, group, and crossfade controls.

The Time Editor also lets you edit audio with clip-based workflows based on standard audio mixing software, so you can mix animations to create brand-new motion.

# Performance improvements:

### Evaluation Toolkit

The Evaluation Toolkit is a new set of inspection and debugging tools designed to help diagnose scene correctness and performance issues. It's a reworking of the previous Evaluation Manager Debugging

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Shelf (previously available as a Maya shelf and distributed with the Bonus Tools). Making these tools directly available in Maya (Windows > General Editors > Evaluation Toolkit) offers access to anyone who wants to understand the implications of new evaluation modes.

Use the Evaluation Toolkit to speed up animation, with features that let you manipulate all aspects of the Evaluation Manager, including enabling debugging modes and output.

# Modeling:

### Interactive hair grooming (XGen)

Grooming all types of hair and fur in XGen is easier and faster with Interactive Groom Splines. New intuitive brush-based tools provide greater control and accuracy for styling and posing hair and fur.

XGen also lets you create new Maya-based description, hair sculpting, and modifier nodes to adjust grooms. Use the Sculpt modifier layers to blend, layer, or key effects created by the interactive grooming tools. Other interactive grooming modifiers provide additional options for shaping hairs and enable you to animate or simulate hair grooms.

These nodes compute on your system's graphics processing unit (GPU), making brush strokes appear in real time—and providing an interactive workflow that requires no disruptive preview generation. All interactive groom spline data is saved to Maya scene files without use of additional Ptex or XPD sidecar files.

### Shape Authoring

#### Shape Editor improvements

A number of improvements have been made to Shape authoring workflows in the Shape Editor, including:

- You can now merge multiple targets on the same blend shape.
- In-between targets now have a visibility toggle button; you can target shapes so you can show and hide their effects on a mesh.
- When creating combination shapes via the Shape Editor, you can now choose the method by which the driver targets affect them.

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Note: The Shape Editor was introduced in Maya 2016 Extension 2. The new Shape Editor replaces the Blend Shape Editor as the place to create, edit, and manage shapes. New features include soloing, grouping, mirroring, flipping, duplicating, and importing and exporting shapes.

**Vertex ID transfer**

- You can modify and transfer vertex orders.
- You can now change the order of vertices on a polygon object using the Reorder Vertices or Transfer Vertex order commands.

# Rendering:

## Arnold for Maya

Maya 2017 now includes Arnold for Maya. This plug-in is autoloaded, and Arnold is set as the preferred renderer in Maya. For a list of new features, see **Arnold for Maya new features**.

- **Arnold for Maya User Guide**

## Improvements to Render Setup

New Render Setup features:

- Hierarchical collections are now supported in the Render setup system, improving performance and allowing for better organization and control. It's easier to recognize objects and nodes that have overrides applied, and more advanced workflows are now possible.
- Lights are added to render layers by default. It's no longer necessary to drag and drop a lights collection to add it to a layer.
- You can create AOV overrides to enable or disable different AOVs on each render layer, or export your AOVs and import them into another scene.
- You can batch render scene files with either render setup or legacy render layers, without having to switch the Preferred Render Setup System in your Maya preferences.

Note: Maya's Render Setup system was introduced in Maya 2016 Extension 2. It replaces the legacy render layer system, simplifying management of complex scenes. It brings a modern approach to adding shot-based overrides to scenes, letting you easily generate shot setup templates and propagate then from one shot to another.

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## Sequence rendering in UI

You can now render a sequence of frames interactively.

You can render a sequence of animation frames without batch rendering. For convenience, you can also add these images to the Render View for preview.

## Displacement preview for animators and OSD native in VP2

Use the Adaptive method in Viewport 2.0 to display the results of a displacement map, giving you a better sense of how it will look in your final render.

## Hair object in Hypershade material viewer

You can now render your hair shader using hair swatch geometry in the Material Viewer in the Hypershade.

## OCIO look support for color management

Maya 2017 includes multiple improvements and fixes for color management.
The OpenColorIO environment variables OCIO_ACTIVE_DISPLAYS and OCIO_ACTIVE_VIEWS are supported.

Maya 2017 also supports Academy/ASC Common LUT format files (.clf). These can be added as user color transforms for input, viewing, or output.

Color picking now works properly in the UV Editor. Color values are returned in the rendering space, without the effects of either the View Transform or the Exposure and Gamma settings.

# Motion graphics:

## MASH improvements

The MASH Toolkit has undergone a number of improvements, including to the MASH menu and Workspace.

MASH now has its own menu, which you can find in the Animation and FX menu sets. Everything MASH-related that used to be accessible via the Create menu is now found here.

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You can also access MASH functions from the new MASH and Motion Graphics workspaces.

## MASH Editor

The new MASH Editor is designed to help you manage the MASH networks in your scenes. From here you can select individual networks, rename or delete them, add nodes, enable/disable nodes, and reorder nodes to change their cumulative effect on the network.

## Improved channel handling

You no longer need to apply certain nodes to specific attribute channels. Instead, all nodes now affect all appropriate channels simultaneously. For example, where you previously had to create a Noise node for a network's translation and scale independently (either in local or world space), a single Noise node controls both functions.

Additionally, all nodes now have a single incoming and outgoing connection. This greatly reduces the amount of clutter in the Graph Editor.

Note: Networks created in previous versions of MASH will retain their old functionality and node interfaces but will be bridged using an additional Legacy conversion node.

## New node: Breakout

A new Breakout node replaces the old script-based method of extracting information from MASH networks.

## New node: Signal

A new Signal node combines and expands on the functionality of the old Noise and Trig nodes. It can affect the Translate, Rotate, and Scale channels simultaneously.

## New node: Strength

A new Strength node replaces and expands on the functionality of the old Mute node. It can affect the Translate, Rotate, and Scale channels simultaneously.

## Color node: UV Mesh mapping

A new UV Mesh slot has been added to the Color node, which assigns a mesh's UVs to a MASH network to help color its primitives.

## Distribute node enhancements

The Distribute node has a number of new and improved features, including:

- Support for Face and Edge selection sets, in addition to Vertex selection sets
- A new Paint Effects distribution mode
- Support for viewing wireframes of connected meshes

## Flight node: enhanced steering

New attributes in the Flight node allow points to orient themselves to their current flight direction automatically. (Previously, this required attaching an extra Orient node.)

## Trails node: color channel compatibility

Trails are now connected to the color channel. Select the Trails node and enable vertex coloring if you want trails to inherit the colors of any attached Color node.

## Time node enhancements

A Random Time Scale attribute has been added to the Time node, allowing you to randomly scale the animation loop length per particle. Also, this node is no longer added automatically when you create a MASH network with the Mesh Geometry Type.

## Audio node: improved functionality

The Audio node has a number of new and improved features, including:

- A new Smoothing attribute, which you can use to smooth out jitteriness
- A new Filtering attribute to reduce the severity of sudden amplitude changes
- A new Fourier Scaling option, which you can use to exaggerate amplitudes

## Node performance enhancements

The Explode, Flight, Random, Symmetry, and Transform nodes have been optimized for faster performance.

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## New Create MASH Network options

You can now assign default naming and distributions for the MASH network creation process, or you can force Maya to prompt for a new name at network creation. Features include:

- New UINew nodes for more FX
- Nodes support multiple channels
- Connectivity: new breakout node, Color supports UV mapping, Paint FX distribution node
- Audio enhancements: frequency selection and adjustment, audio falloff node
- Integrated physical renderer

For a full list of features included in Maya 2017, visit **What's New in Maya**.