

New in Maya®



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## New in Maya 5

Academy Award® winning Maya 3D animation and effects software from Alias|Wavefront™ is at the forefront of technological innovation. The development of Maya has been inspired by the film and video artists, computer game developers and design professionals who use it daily to create engaging digital imagery, animation and visual effects.

### **Maya 5 delivers unique image creation possibilities!**

Maya 5 software continues to place the emphasis on customer-focused development. Numerous areas of the product have been fine-tuned and streamlined in order to increase user productivity. Maya 5 also delivers unique new image creation possibilities and more creative resources through the addition of key new tools as well as through the evolution of many of the Maya software's de facto industry-leading technologies.

Ongoing collaboration with industry leaders ensures Maya capitalizes on the latest technology advances. This is seen not only in tighter support for the four popular graphics operating systems with which Maya is compatible, but also in significant data transfer enhancements and the revolutionary new Hardware Renderer that takes advantage of the ever-increasing power of next-generation graphics cards.

### **New Feature Highlights**

#### **Increased Productivity**

Numerous fine-tuned features in areas such as character animation, polygonal modeling, dynamics, and in the Maya Fur and Maya Fluid Effects technology make production workflows more efficient. Animation constraints -- one of the most widely used tools in character animation -- have functionality and workflow improvements to save you more time and give you more control. The ability to easily blend forward and inverse kinematics in the same character presents you with new levels of flexibility and productivity. Maya tool developers will find a number of major new classes in the Maya API. These include one that exposes high-level polygon operations and another that gives developers access to the Maya rendering framework.

#### **Unique Image Creation Possibilities**

Ground-breaking advances in rendering technology and workflow give you the ability to create the right look for the job, whether it's the creation of photo-realistic film imagery or a simple vector graphic for the web. Maya software's new Hardware Renderer takes advantage of the power of next-generation graphics cards to generate images significantly faster than traditional software renderers. With this new tool you can quickly produce images for pre-visualization and broadcast-quality final output. A new Vector Renderer readily transforms 3D content into web-ready 2D graphics or outputs them to such popular graphics applications as Flash™ MX, Adobe Illustrator® and Go Live®. With Maya 5, all Maya rendering options are now unified through a consistent rendering UI and workflow that allows you to readily switch between the various rendering options.

#### **More Creative Resources**

New features and functionality have been added throughout Maya 5 to expand your creative potential. Enhancements to Maya software's unique brush-based toolsets amount to a new paradigm in organic modeling. The latest advancements to Maya Paint Effects technology enable you to achieve almost any look, from a rose with thorns to natural-looking hair, chrome, bowling pins and buildings. What's more, Maya Paint Effects can now be drawn as, or converted to, polygons. Maya Unlimited software artists can enjoy a whole new range of looks such as wet fur or dirty fur, through the new Fur Clumping feature in Maya Fur, and boat wakes and rippling ponds, through recent enhancements to Maya Fluid Effects.





## Two Options: Maya Complete and Maya Unlimited

Maya Complete technology makes the foremost 3D content creation tools accessible to a broad range of computer graphics professionals in the film, broadcast, industrial design, visualization, game development and web design industries. It is the leading full 3D production solution.

Maya Unlimited incorporates all the functionality of Maya Complete for 3D modeling, character animation and visual effects, coupled with the computer graphics industry's most innovative animation and digital effects technology -- Maya Cloth™, Maya Fur, Maya Live™ and Maya Fluid Effects – for the creation of advanced digital content.

Maya Complete and Maya Unlimited are available for SGI® IRIX®, Red Hat® Linux®, and Windows® operating systems. Maya Complete is also available on Mac® OS X operating system.

## Increased Productivity

Numerous fine-tuned features throughout Maya 5 make production more efficient, whether you are visualizing a design model, animating a game character or rendering out feature film scenes.

### ***Character animation and setup***

#### **Improved Constraints**

Constraints are one of the most widely used tools in everyday character animation. Because they automate some of the animation process -- allowing you to control the position, orientation, or scale of one object, based on one or more target objects -- constraints can save you valuable time. New features such as animation/constraint blending and Parent Constraint, as well as enhancements to previously existing constraints -- Maintain Offset and Selectable Constraint Axes -- will give you greater flexibility when creating, rigging and working with characters.

#### **Parent Constraint**

This new feature allows you to relate the translation and rotation of one object to another. As with other constraints, an object's hierarchy can now also be constrained by the average position of multiple objects. Thus, an object behaves as if part of a parent-child relationship, yet can still be easily and smoothly moved from parent to parent, such as when a ball is being thrown between two characters and each character is a parent constraint for the ball.

#### **Animation/Constraint Blending**

This new functionality allows you to apply constraints and key-framed animation to the same object and smoothly blend between them. This feature can also be used with other animation inputs such as motion paths, expressions and *Set Driven Keys*.

#### **Maintain Offset**

The improved Maintain Offset feature, which preserves the original relative translation, rotation and/or scaling of a constrained object to its target, is now available for most constraints, including: *Point*, *Parent*, *Aim*, *Orient* and *Scale*. The result is a much cleaner workflow.



## Workflow

The workflow for constraining only selected axes becomes more intuitive and direct with *Selectable Constraint Axes*: a feature which enables you to select which axes of a constraint object are influenced by the target object. In addition, the *Modify Constrained Axis* tool will give you the flexibility to change, after initial setup, which axes of a constrained object are influenced by the target object. You now also have the option to sever the connection between a target object and a constrained object without deleting the constrained node, via the *Remove Target* tool.

## Forward and Inverse Kinematics (FK and IK)

FK and IK are the backbone tools of character movement and the ability to work easily with both in the same character gives you more options. FK is used for direct and precise control of individual joints in a character's skeleton. IK allows for the manipulation of a series of joints with a single control: the software calculates the movement of the rest of the joints. Thus, IK might be used to animate a character raising its hand over its head; FK would be used to bend the elbow.

## Blending

Maya 5 offers FK/IK blending: a highly requested feature that allows you to blend between animation applied directly to joints and animation controlled through IK chains. Visible references to the full IK and FK positions during blending help you evaluate a sequence and create smooth animation transitions.

## Other Animation Enhancements

### Ghosting

Improvements to *Ghosting*, which allow you to view animation prior to and after the current frame, give you greater ability to evaluate and produce flowing animation. In addition to individual objects, *Ghosting* can now also be applied to entire skeletons or object hierarchies, or used as an immediate indicator of which frames contain keyed data.

### Muting

Channel animation, via the Graph Editor and Channel Box, has become easier with Maya 5, due to the addition of a *Muting Animation and Dynamics* tool. Much like the feature on an audio mixing board, muting silences or disables the animation on the selected channel without removing its data from the animated object. This functionality also applies to objects that are driven by dynamic simulation.

### Polygonal Modeling

You can vastly improve your polygonal modeling workflow with an expanded range of tools available for creating and editing polygon meshes. These tools include an improved polygon reduction method and enhanced UV creation and editing tools.

### UV Creation and Editing

The creation and editing of UV texture coordinates is traditionally one of the most time-consuming areas of polygon modeling. New tools include *Isolate Select for UVs*, *Copy UVs to Another UV Set*, *Split UVs*, *Cycle UVs*, and *Align UVs*. These new tools, along with a new *UV Texture Editor Toolbar*, an *Alpha Display of Textures* feature, a *Direct Entry of UV Values* option and improved UV copy and paste functionality, provide many highly beneficial workflow improvements.



## New Polygon Modeling Tools

Complex shapes, such as a dragon's tail or subway tunnel are now readily attainable. The new *Extrude Along Curve* tool enables you to extrude polygon edges or faces along a path curve and then edit them using the construction history; while the *Extrude Polygon Vertex* tool allows for the extrusion of a selected vertex along its normal, creating additional faces for each face that shares the vertex. The *Chamfer Vertex* tool removes a vertex and creates a chamfered corner in its place, it's an easy way to turn a cube into a die. If you're looking to shape an extrusion along its length (to create a bicep bulge on a character, for example) you can now do so in a single extrude operation through the Maya 5 *Extrude Graph Widget* tool. The tool allows you to control tapering along the extrude path of any extrude operation.

## Polygon Reduction

A valuable enhancement to Maya 5, particularly for those creating game models, is the software's improved polygon reduction method. The new method allows you to better preserve important details in optimized models. Reduction may be calculated based on geometry, UV mapping, pre-lighting (i.e., color per vertex) values or via an intuitive brush interface that allows for manual weighting of detailed areas – thereby enabling you to brush back to detailed areas where desired. *Polygon Reduce* can now also be used on groups of components as well as individual objects.

## Dynamics

In the area of dynamics, computation speed on the Windows operating system has been streamlined giving you an up to 90 percent increase in performance. The ability to quickly compute complex dynamic simulations increases interactivity and allows you to iterate more freely, thereby achieving the best possible results in less time.

## Learning Resources and Sample Files

Improvements to the Maya 5 user documentation, particularly in the area of *Online Help*, will enable you to start working with new and unfamiliar features far more rapidly. Maya 5 software also ships with a valuable Learning Tools DVD to aid self-training.

## Online Help

The improved Maya 5 Online Help feature gives you instant access to a wide variety of user and reference documentation. A new search engine provides fast, ranked search results and supports phrase and Net Boolean® searching. Maya 5 software's unified Help system ensures an identical help experience on all platforms. An integrated web server now serves all Help pages.

## Learning DVD

The ever-growing collection of popular Maya Learning Tools™ continues to grow! A free learning tool is included in each shipment of Maya 5 to help you get started using the software. Those making their first-ever purchase of Maya will receive the DVD, *Learning Maya: Beginner's Guide*. Those upgrading from an earlier license of Maya (including customers on a maintenance plan) will receive *Maya Techniques: Patch Modeling for Visual Effects*, a DVD for intermediate and advanced users. Other Maya learning resources are available online at: [store.aliaswavefront.com](http://store.aliaswavefront.com)

## Documentation

Get the answers you are looking for faster and more efficiently via the improved Maya 5 user documentation and tutorials. Printed documentation which ships with Maya 5, including *Instant Maya* or *Instant Maya Unlimited*, *What's New in Maya 5*, and *Installation/Licensing* are now easier to use and more comprehensive.

## Bonus Tools and Extras

A collection of unsupported "bonus tools" are being included in Maya 5 for you to experiment with. These plug-ins and scripts which extend the

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*Maya 5 delivers unique image creation possibilities*



functionality of Maya will be available via an embedded link to the Alias|Wavefront website. Similar packages have been made available in the past as *Bonus Games Tools*.

“Extras” are located on the Documentation, Lessons and Extras CD and include sample scenes and data files which can be a starting point for developing your own original content, or simply be used to learn Maya.

## **General Enhancements**

Another new Maya 5 timesaving tool is the *dgtimer* MEL™ Command that measures computation time per dependency graph node, enabling you to identify, and then quickly eliminate bottlenecks. Universal menu items and industry-standard hotkeys for cut, copy and paste have also been added which will work with all modeling view selections, plus animation clips, keyframes and more. Improvements to multi-level referencing and hot-swapping will prove highly useful to those facilities with asset management frameworks that control scenes and their references.

Additionally, this latest version of Maya software contains a *Move Along Rotation Axes* tool, a universal hot-key for “dollying” in and out, a “locked nodes” display feature, and a choice of “*copied*” or “*default*” preferences when installing a new version of the software.

## **Unique Image Creation Possibilities**

Maya 5 software offers you more image creation possibilities than ever before. As a leader in computer graphics technology, Alias|Wavefront has long been committed to devising new and more efficient ways to realize myriad styles of imagery required by the professional marketplace. In Maya 4.5, fluid dynamics technology was introduced to help animators reproduce numerous 2D and 3D atmospheric effects and other natural phenomena. Now, with Maya 5, we introduce new rendering options and a simplified rendering workflow to give you the ability to create the right finished look for any type of professional graphics project. You can now select between the native *Maya software renderer*, a new *Hardware Renderer*, a new *Vector Renderer*, and the integrated *mental ray for Maya renderer*.

## **Hardware Rendering**

The new Maya 5 *Hardware Renderer* enables you to quickly generate images for pre-visualization and broadcast-quality final output. Taking advantage of the ever-increasing power of next-generation graphics cards, this new rendering option uses vertex and pixel programmability to generate near software-quality images significantly faster.

High-quality hardware rendering can be up to 20 times faster than software rendering – depending on image resolution and the hardware used. Also, the range of rendering effects possible has increased significantly. For example, hardware particles and the rest of a scene can be rendered with specular highlights, reflections, bumps or shadows – all at the same time. This is a more efficient approach than rendering particles separately and then compositing them into the scene later.

Hardware rendering on the Windows and Linux operating systems supports: ATI® Fire GL™ X1, ATI Fire GL Y1, NVidia Quadro® 2 and NVidia Quadro 4 graphics cards. On Mac OS X the GeForce®4 Ti is supported.

Full support for hardware off-screen, background, batch rendering is available from both the Maya UI and the command line.



### **Vector Rendering**

New with Maya 5 is your ability to turn your 3D content into 2D graphics that can be integrated with other content in such popular packages as Flash MX, Go Live and Adobe Illustrator, very useful if you do illustration for print, design Web sites or create user-interfaces, for example. Output formats include Macromedia® Flash, Adobe Illustrator, Scalable Vector Graphics and encapsulated PostScript® as well as Maya's regular list of bitmap formats. Vector Rendering to bitmap file formats offers a wide range of new looks including hidden-line and vector style rendering -- perfect for technical illustration, film and video.

### **mental ray for Maya**

With Maya 5, the already tight integration between Maya and mental ray has been improved yet further with support for software particles, subdivision surfaces and Maya Paint Effects (see Maya Paint Effects to polygons).

Moreover, Maya 5 introduces the next iteration of the mental ray renderer – mental ray version 3.2. The team at mental images® has included a number of enhancements and optimizations in this latest version – including improvements to baking, network rendering, memory management, HDR import and export and QuickTime® output. If you develop games, then you'll be interested to know that shadows and lights (including global illumination and final gathering) can now be converted to file textures or to color per vertex. Via the newly introduced *Bake Sets*, multiple objects with different parameters – such as resolution and background color – can be baked. Additionally, multiple objects can now be baked into their individual maps in a batch process.

### **Unified Rendering workflow**

All of the new and enhanced Maya rendering options – Maya software, Maya hardware, mental ray for Maya™ and vector rendering – have been tightly integrated within Maya 5 through a consistent rendering user interface including the common use of Render Globals, Hypershade and Render View. This new unified rendering workflow facilitates learning and encourages experimentation by allowing you to readily switch between the various options, when using different renderers in the same scene, and retain and reuse your previous shading networks.

## **More Creative Resources**

Beyond new and improved rendering options, Maya 5 gives you numerous new creative resources. These include exciting enhancements to Maya Paint Effects, Maya Artisan™, 3D Paint, Maya Fur and Maya Fluid Effects. These brush-based tools deliver an intuitive, artist-friendly approach to organic modeling and animation.

### **Maya Paint Effects**

The latest advancements in the unique Maya Paint Effects technology enable you to achieve almost any look – from organic to hard-edged geometry.

New with Maya 5, Maya Paint Effects technology can be drawn as, or converted to, polygons – making this highly popular toolset far more accessible to a wider variety of users. This latest advance enables Maya Paint Effects to be viewed up close, edited with regular polygon tools and output to other renderers, including game engines and mental ray. New mesh tools that support this extension to Maya Paint Effects include the Mesh brush type, *Mesh Environment Reflections*, *Paint Effects to Polygons*, *Displacement/Bump Mapping* and *Thorns On Mesh*. Maya Paint Effects technology has also been extended to include improved hair rendering, “width” and “length” scale graph widgets, new “growth attributes” and refresh performance improvements. Workflow enhancing tools – *Select Strokes by Name*, *Flip Tube Direction*, and *Force Tube Direction Along Path* – along with a new default shelf and new brushes have been added. Maya Paint Effects wireframe redraw is also now up to 100 percent faster.





## Paint Effects to Polygons

With Maya 5, Maya Paint Effects strokes can be converted to, and then edited as, polygonal meshes – including the construction history. This new capability allows you to take advantage of all available rendering options including mental ray, which enables the Maya Paint Effects to show up in reflections, refractions and through transparent objects.

## Mesh Brush Type

You can now create trees and plants that are convincing even at close views, using the Mesh brush type tool in the Maya Paint Effects technology. Using triangulated tubes, as opposed to the usual brush stamps, this new brush also enables you to realize formerly impossible shapes, such as the hard edges of a building.

## Mesh Environment Reflections

Maya artists can now readily achieve such looks as chrome, water, glass and shiny paint through the new Mesh Environment Reflections tool. This simple ramp-based environment can also be used in conjunction with the Mesh brush type.

## Displacement/Bump Mapping

A greater level of organic realism can be achieved through the new Displacement/Bump Mapping tool which displaces the triangles created when using the Mesh brush type. When this tool is used in conjunction with Per Pixel Shading, a bump map is also applied along with the triangle displacement.

## Thorns on Mesh

Thorns and prickles on plants or spikes on a mace, previously very difficult to create, can now be easily generated off the surfaces of Maya Paint Effects polygons through the new Thorns on Mesh brush.

## Hair Rendering

The speed and quality of hair rendering has seen significant improvements with Maya 5 through the addition of three new features: the *Multi Streak* method, Thin Line brush type, and oversampling. The latter solution renders Maya Paint Effects at double resolution for better anti-aliasing. A weighted filter can also be applied to the over sampled image for better smoothing.

The Multi Streak method allows you to create a number of additional tubes or hairs around the original tube so as to increase render efficiency as well as to provide a wide range of new hair looks such as wet and clumping hair. Through a new brush draw type, Thin Line uses a direct anti-aliased line draw rather than a series of brush stamps, improving render speeds of large numbers of fine tubes. Used in conjunction with the *Multi Streak* method, the *Thin Line* brush type can render hair up to 100 times faster than the Paint brush type, while actually featuring better line detail.

## “Width” and “Length” Scale Graph Widgets

With Maya 5, graph widgets are available for several “width” and “length” scale attributes. Among other things, these widgets allow you to control the width of a tube from root to tip, rather than using a simple linear interpolation between two values. This new level of control means you can intuitively define previously impossible shapes such as traffic cones, the profile of a leaf or the shape of a twig.

## Growth Attributes

The range of realistic plant looks that can be achieved with Maya Paint Effects has been vastly increased through a number of new growth attributes including: *Bend*, *Curl*, *Twirl* and *Stiffness* as well as through the fact that specular control is now available on leaves, flowers and plants.



A large number of new preset brushes that demonstrate the use of these latest attributes are provided in the Visor. Additionally, commonly used Maya Paint Effects tools and a selection of sample brushes can now be easily accessed through a new default shelf.

### **Maya Artisan**

New features have been added to Maya software's renowned Maya Artisan toolset that will be of particular interest to game developers. The *Paint Vertex Color* tool has been extended to allow for the painting of face vertices, as well as vertices, thereby allowing for more precise placement of color. The selective darkening or lighting of vertices is now also possible through the addition of an *Opacity in Paint Vertex Color* tool. The *Paint Vertex Color* and *Script Paint* tools have also been converted to the new Maya Artisan architecture, providing world-space reflection, image-based brush profiles, projective paint on NURBS and many other benefits.

### **3D Paint**

Working with 3D paint has become more efficient than ever with new editing and displacement options. A *Set Erase Image* button has been added so that you can define where the current paint layer should erase back to – useful for revealing patches of an underlying layer, such as dirt or rust. A new *Edit Textures* feature makes it extremely easy to edit the size and file format of existing painted textures. Displacement is now directly available as a paintable attribute. Improvements to *Flooding* mean you can have different color and opacity settings for flooding and painting, and can rapidly switch between the two operations with minimal button clicks.

### **Maya Fluid Effects (Maya Unlimited)**

Maya software's revolutionary computational fluid dynamics package, Maya Fluid Effects – introduced in version 4.5 – has been enhanced in Maya 5 to include several highly requested features. Previously unobtainable effects, including ponds and wakes, are now readily achieved through a new Spring Mesh solver. New presets along with a *Set Contents Curve* and *Make Motion Field* have also been added to make the process of working with Maya Fluid Effects even more efficient.

### **Spring Mesh Solver**

The new *Spring Mesh* solver uses a 2D fluid to create dynamic wave-like motion on a 3D surface. Thus, animated mud puddles or ponds – smaller realistic bodies of water with ripples, bubbles or wakes – can be created using true dynamic waves, as opposed to the procedural waves generated by the *Ocean Shader*. This technology would allow you to quickly create an animated scene centering on a frog floating on a lily pad that bobs gently in a rippling pond. The *Spring Mesh Solver* can also be used to create realistic wakes on both oceans and ponds – for example a boat can generate a bow wave that disturbs the water under its hull as the craft passes over it.

### **Set Contents from Curve**

The new *Set Contents from Curve* tool is extremely useful for adding fluid attributes along a complex and controlled path that is difficult to paint in 3D space. The tool allows you to create a curve that defines where contents are added in a fluid container; thus, the initial velocity for a simulation could, for example, be set as a complex spiral.

### **Make Motion Field**

This new field applies a force to its parent object, so that the object then appears to move or push the fluid. This allows you to better simulate the effect of objects moving through a fluid, such as when you have a character walking through thick smoke.



## New Maya Fluid Effects Presets and Workflow Tools

Maya 5 ships with a range of new presets for Maya Fluid Effects, helpful both as the starting point for customizable effects and as learning tools.

Other workflow enhancing features have also been added including a *Set Initial State* Options window, *View Cache Contents* attributes and a new MEL command.

## Maya Fur (Maya Unlimited)

With Maya 5, an entire new range of natural fur looks is available, and working with fur is easier than ever thanks to the addition of numerous new productivity-enhancing tools.

### Fur Clumping

Previously unattainable fur looks are now at your fingertips with the addition of a new *Fur Clumping* feature. Because you can vary the degree of clumping, and the frequency and shape of the clumps by painting or mapping these attributes, you can achieve looks such as wet, matted or dirty fur.

### Attractors

Attractors are added to give lifelike movement to fur. Now, with Maya 5 attractors can be created either as a grid or on the selected faces of a polygon object, as well as on NURBS. In addition, complex attractor arrangements are now more easily and quickly set up because attractors can be created on multiple surface points, faces, or surfaces, simultaneously for both NURBS and polygons.

### Animated File Textures

Support for animated file textures means fur attributes can now be mapped to file texture sequences – thereby enabling attributes to change over time. This can create the effect of fur gradually spreading over, and growing out of a surface, for example.

### More Enhancements to Maya Fur

User-definable map sizes in the Maya Fur technology allow you to choose higher levels of detail, where complex models demand it, or in cases where lower disk and memory usage is required. Additionally, eight new fur presets have been added, and the existing presets updated, to take advantage of the *Fur Clumping* feature where appropriate.

## Maya Cloth (Maya Unlimited)

The computationally intensive job of cloth simulation has been optimized in Maya 5 through the fine-tuning of numerous Maya Cloth tools. A new user-definable iteration limit for local simulation, for example, speeds up the simulation workflow. As well, the new intermediate cache, an addition to the *Cache Save Interval* tool, allows you to save simulations in small increments. A “save” button has also been added to the *Solver Attribute Editor*, so you can save your cache at will.

## New and Enhanced Import/Export Options

Enhanced or new data support formats in the Maya 5 software facilitate the accurate transfer of data between Maya and other applications. Whether bringing models into Maya for design visualization or exporting Maya data to other software packages, you'll get the most value from your digital assets. Newly supported file formats include Flash, OpenDWG®, Adobe Illustrator, encapsulated PostScript and Scalable Vector Graphics. Enhanced support has been added for MicroDXF®, IGES, OpenFlight®, StudioTools® and OBJ. Web content designers will be pleased to note that the Maya ShockWave 3D Exporter™ technology is now included free of charge with Maya 5<sup>1</sup>.

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## OpenDWG and MicroDXF Import/Export

Full bi-directional support for the popular OpenDWG and MicroDXF formats supported by CAD and AutoCAD<sup>®</sup> applications is now available on all hardware platforms that support Maya, including Mac OS X and Linux.

## IGES and OBJ

Import and export functionality of IGES files has been optimized with Maya 5. Moreover, IGES support is now available on all of the hardware platforms – including Mac OS X and Linux – with which Maya is compatible. Also with Maya 5, bi-directional support for OBJ files, including texture, is available.

## StudioTools

Those producing 3D content using both of the Alias|Wavefront major software families will benefit from the Maya software newly improved StudioTools data transfer capabilities.<sup>2</sup> This extended functionality will prove highly advantageous to design professionals looking to take advantage of the advanced visualization capabilities of Maya. The ability to use both products gives designers the means to produce highly realistic renderings and animations, for the presentation of design intent, across all stages of the design workflow.

## Extensibility: API and Developer's Kit

Maya 5 software gives Maya tool developers access to more features and toolsets than ever before. A number of major new classes have been provided in the Maya API including one which exposes high level polygon operations and another that gives developers complete access to Maya software's rendering framework – including the ability to integrate a new renderer.

## Open Rendering Framework

While the four default Maya rendering options will prove more than enough for most production teams, Alias|Wavefront continues its philosophy of extensibility by allowing for still more Maya rendering options. With Maya 5 it becomes possible to seamlessly integrate 3rd party renderers into the user-interface, thereby enabling customers with proprietary renderers and third-party vendors to take advantage of Maya software's new unified rendering workflow and user interface.

## Exposure of High Level Polygon Operations

API developers can now access high-level polygon operations through the API. These include: *subdivideFace*, *subdivideEdge*, *collapseFace*, *collapseEdge*, *extrudeFace*, *extrudeEdge*, *duplicateFace*, *extractFace*, *splitFace* and *splitEdge*.

## Exposure of Light Data/Exposure of Shading Data

Now accessible through the API are volume lights and shading data including: diffuse reflectance, maximum specular reflection, light attenuation and hemisphere coverage.

## Exposure of Particle System Data

By making an API class for particle systems, the dynamics of a particle node can be evaluated at a given time and developers can access such information as particle name, position, age, etc.

<sup>1</sup> Available on Windows only

<sup>2</sup> Available on Windows, Linux and IRIX only





## **Ability to Create Custom Model Views/ Ability to Create Custom Editors.**

Developers can now create a user defined model editor that can be used in a window or scripted panel. Similarly, a new class for creating custom editors provides the flags and options of the model editor command.

## **Ability to Create New Types of Sets**

New kinds of sets can now be created, with access to the attributes for set members and the nodes which use the set.

## **Exposure of Ramp Attributes**

A new API class for ramp attributes can be used to add, delete and set entries for color and curve ramps. Thus, ramp attributes can be accessed and edited without the developer needing to know the details of the underlying attribute structure. This could be used to import external data onto a ramp; for example, the leaf profile curves of different plants for Maya Paint Effects presets.

## **Node/Attribute Locking and Callback Mechanism**

A new class has been added which provides a message-based interface to node and plug locking and includes a callback mechanism that allows editing changes to be approved on a per-operation or per-operand basis.

## **Improvements to MPxSurface Shape**

User defined shapes (geometry) can now have nearly the same level of functionality as internal Maya software shapes, including the ability to have deformations, control point tweaks, freeze transforms and undo operations applied.

## **Mac OS X Development Tools**

A Mac OS X plug-in wizard has been added to the developer's kit along with the ability to build plug-ins with Makefiles on the command line.

## **Film Back Roll Control**

Developers can now access and modify the transformations that control film back roll through new methods that have been added to the camera class.

## **Must Rename to Save**

Another new feature has been added in the File command and file IO class that offers protection from accidental file overwrites by prompting you to rename files before saving.