Release Notes

Version 5.0.1

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1   Introduction

In Maya 5.0.1 we corrected some issues in the Maya 5 software that were reported by our customers. While this release is primarily to address issues that were discovered soon after release, there are a few extensions to existing features that we want to bring to your attention, in particular:

*   the pre-lighting workflow with the mental ray renderer and

*   changes to the UV texture placement workflow.

To learn about the changes we've made, read the following:

*   Chapter 2, "What's fixed and improved"

*   Chapter 3, "Release notes"

For more information about using Maya, see the Maya 5 online help (Help > Contents and Search), including the Maya 5 Release Notes.

1 | Introduction

>

2   What's fixed and improved

The following lists the software limitations that were fixed for Maya 5.0.1.

- "General UI and miscellaneous"
- "Improvements to file referencing"
- "Modeling"
- "Animation and Character Setup"
- "Dynamics"
- "Fluid Effects"
- "mental ray renderer"
- "Baking in mental ray"
- "Hardware renderer"
- "Vector renderer"
- "Artisan"
- "Paint Effects"
- "3D Paint"
- "Fur"
- "DWG/DXF"
- "IGES"
- "MEL"
- "API"
- "Documentation"

General UI and miscellaneous

The following lists general UI and miscellaneous limitations that were improved or fixed for Maya 5.0.1.

Importing multiple files with the same shaders

When importing multiple files with the same shaders, the shaders get duplicated. To prevent duplication, turn on Remove Duplicate Networks in the File Import Options.

(Linux) Maya corrupted when shelves loaded

When loading shelves in Maya for Linux, the Maya interface may become corrupted. This has been fixed.

Instanced geometry

In Maya 5.0 in some cases instanced geometry had a bad DAG path, when written out to ASCII files. This has been fixed.

Underworld nodes

Occasionally when creating underworld objects in complex situations, they were not visible in the Attribute Editor. This has been fixed.

Objects disappearing from Outliner and Attribute Editor

After baking a simulation, objects may have disappeared from the Outliner or Attribute Editor. This is now fixed.

(Linux) wrl2ma not loading

A wrapper script was created to ensure proper library loading before running wrl2ma.bin.

Hypergraph performance

Performance regression in Hypergraph has been fixed.

Improved memory management when loading Maya ASCII (.ma) scenes with many objects

We've improved memory management when loading Maya ASCII (.ma) scenes with many objects.

Zero-size swatch files

Maya would crash with a zero-size swatch file. This has been fixed.

Improvements to file referencing

The following lists the many improvements made to file referencing for Maya v5.

- Ability to unload a reference that contains compound connections
- Ability to load and unload references at an arbitrary depth without unloading nested references
- Performance improvements to unloading and reloading references
- New `parentNamespace` and `flushReference` flags added to the file command

Modeling

The following lists modeling limitations that were improved or fixed for Maya 5.0.1.

Improvements to Texture Editor

We've added an alternative display option in the UV Texture Editor to provide a workaround for some resolution and cropping limitations in the texture display. For details, see C, "UV Texture Editor."

Option to bake using "sample plane"

In order to create an image map for layered shaders or other non directly supported shading networks properly without having the image cropped based on an object's UVs, we've added the Bake Using Virtual Plane option to the Convert to File Texture Options window (Hypershade > Edit > Convert to File Texture > ❒). This bakes out a sample image using a virtual plane with UVs from 0,0 to 1,1 square.

CV/EP/Pencil Curve Tool Settings window controls missing

In Maya 5.0 if you set Open Tool Settings to In Separate Window in the Preferences window, the window controls (options) would not appear for the following tools: CP Curve Tool, EP Curve Tool, and Pencil Curve Tool. However this problem did not exist when Open Tool Settings was set to In Main Maya Window. This is now fixed.

Projection texture on polygons breaks display

In Maya 5.0 if you applied a texture as a projection on to a polygon the display may have become broken. This has been fixed.

Problem using Bonus Tools

In Maya 5.0 if you may have experienced problems if you used Bonus Tools > Select Components > Select Poly Projection Node Faces. This has been fixed.

Animation and Character Setup

The following animation and character setup limitations were fixed for Maya 5.0.1.

Spline IK twist controls

We've enhanced Maya's spline IK handle to allow better control over twisting along the joint chain. For details, see A, "Advanced Spline IK twist controls."

Enable IKFK now off by default

Enable IKFK Control was introduced in Maya 5.0 and it was set to "on" by default. To preserve some character IK-rig behaviors from Maya 4.5 to Maya 5.0.1, the menu option Enable IKFK Control has been set to "off" by default for 5.0.1.

If you try to run Maya 5.0 after upgrading to and running Maya 5.0.1, Maya 5.0 will not understand the newer version of the preferences, and will create default UI prefs. If you think you may be running both Maya 5.0 and 5.0.1 and have custom preferences, window positions, etc., you may want to create a back-up copy of your 5.0 prefs folder. If you are using Maya 5.0.1 exclusively, this is not applicable.

IK handle creating causing unwanted rotations

The problem where adding an ik handle sometimes caused the joints to rotate randomly has been fixed.

(Linux) Animation curves

Selection of animation curves in the Graph Editor now works as expected on Linux.

Random crash on file open

Crashes occurred in some cases where the Hypergraph had been open in the previous session with the file. This has been fixed.

Can't bake animation to vertices on heavy geometry

Since Maya 4.5 baking animation to vertices could crash if the geometry was heavy. This has been fixed in Maya 5.0.1.

Rotation flipping on constraints

A change in Maya 5.0 from Maya 4.5 resulted in rotation flipping on some constraints, in cases where not all the rotation channels were controlled by the rotation constraint. This has been fixed in Maya 5.0.1.

(Mac OS X) Launching fcheck from a playblast

On Macintosh machines, when fcheck is the designated program to use for a playblast, fcheck is now launched successfully.

Crash upon new file after baking animation

Maya may crash when creating a new file after baking animation. This has been fixed.

Crash when loading file

In Maya 5.0 a crash may occur when loading files containing character nodes for which no clips are defined. This has been fixed in Maya 5.0.1.

Constrained camera attributes are editable

Changes to Maya 5.0 caused constrained camera attributes to be editable. This has been fixed.

lookAt nodes

In Maya 5.0, "lookAt" nodes could occasionally be incorrectly deleted when deleting other related nodes from a Maya scene. In Maya 5.0.1, they persist appropriately.

Two-node camera problems

Problems with two-node cameras in Maya 5.0 have been fixed in Maya 5.0.1.

(IRIX, Linux) Alternate Expression Editor

You may have experienced problems using the alternate Expression Editor in Maya on IRIX and Linux. This is now fixed.

Maya hangs when adding attributes to a Character Set

Maya would hang under some conditions when adding attributes to a Character Set. This problem occurred if an attribute being added to the Character Set was one for which there was blending between keyframed animation and a constraint. This has been fixed.

Keyframes missing on file reload

When combining keyframed animation and constraints on IK handles, you could encounter a situation where everything seemed to work fine until you saved your scene. The next time you loaded the scene, the keyframes would be missing. This has been fixed.

Dynamics

The following dynamics limitations were fixed for Maya 5.0.1.

Maya 4.5 Linux Particle Disk caching

In Maya 4.5 for Linux Particle Disk cashing did not work. This was fixed in Maya 5.0.

Particle Expression Corruption on scene save

You may have experienced corruption of particle expressions in Maya 5.0. This occurred in expressions that contained newline characters. This has been fixed.

Fluid Effects

The following Fluid Effects limitations were fixed for Maya 5.0.1.

Fluids caching

We've enhanced fluids caching for Maya 5.0.1. For details, see B, "Fluids caching."

(Windows) Creation of cache on instanced fluid

You may have experienced problems with the creation of cache on instanced fluids on Windows. This has been fixed.

Incorrect fluids cache info created

Occasionally when saving a new version of a file already containing cached fluids, the info in the fluid cache node will be written incorrectly. Maya was incorrectly prepending fluid cache file names with a "." prefix. This has been fixed.

Surface locators incorrect

In Maya 5.0 if ponds were scaled or transformed the positioning of buoys and locators on the pond surface may not have been correct. This has been fixed.

Turbulence speed on fluid emitters

You may have experienced problems with turbulence speed on emitters. This has been fixed.

mental ray renderer

The following mental ray rendering limitations were fixed for Maya 5.0.1.

Loading/unloading mental ray plug-in

In Maya 5.0 you may have experienced a crash while loading or unloading the mental ray plug-in. This has been fixed.

Network rendering with mental ray

- Previously, Maya may have crashed when mental ray network rendering was used. It happened when mental ray couldn't connect to the slave host or when the mental ray server emitted errors to the master. This particular issue has been corrected, but slave errors during rendering still affect the Maya master rendering.

- In Maya 5.0 you may have experienced crashes when network rendering with more then 3 machines. In Maya 5.0.1 the mental ray for Maya renderer is based on the mental ray standalone core version 3.2.6. This version fixes a number of limitations, including this one.

(Mac OS X) Network rendering with mental ray

Network rendering with mental ray for Maya will be set up for the user who installed Maya. Other users should do the following setup (only once) to run network rendering.

To install settings for a new user, that user should type in a shell (Terminal window):

```
sh /Applications/AliasWavefront/maya5.0/bin/setup_defaults.sh install
```

To remove settings for a user, that user should type in a shell (Terminal window):

```
sh /Applications/AliasWavefront/maya5.0/bin/setup_defaults.sh remove
```

(Mac OS X) mental ray batch rendering

Render > Show Batch Render and Render > Cancel Batch Render now work properly on Mac OS X.

(Linux) Maya -batch -preframe export (.mi) results in fatal error

In the previous version of Maya you may have experienced a fatal error when batch rendering per frame on Linux. This has now been fixed.

(Windows, IRIX, and Linux) Render layers

In Maya 5.0 render layers were not respected by the mental ray renderer. This has been fixed.

MayatomrJob -startFrameCallback

Now the script specified by the "MayatomrJob -startFrameCallback" command is executed after the frame number is set.

Error: No object matches name: mentalrayGlobals.outputPath

We have fixed mental ray so you won't get an error message like this:

```
// Error: file: /Applications/AliasWavefront/maya5.0/ApplicationSupport/
scripts/others/mentalrayUI.mel line 1715: No object matches
name:mentalrayGlobals.outputPath //
```

Render menu

If you added custom menu items or a submenu to the Maya Render menu, after you load the mental ray plug-in, your custom items will now appear correctly.

Subdivision surfaces

mental ray now renders subdivision surfaces as expected.

Pre Render MEL and Post Render MEL

- The mental ray tab of the Render Global Settings window now takes the values for Pre Render MEL and Post Render MEL and passes them on to mental ray correctly.

- Pre Render MEL and Post Render MEL now work correctly in mental ray batch render mode.

- The Pre Render MEL and Post Render MEL text fields used to have problems handling MEL scripts with quotation marks in them, such as printery"); this is now fixed. These text fields can pass MEL scripts with quotation marks on to mental ray correctly.

Motion Blur Shadows

In the mental ray tab of the Render Global Settings window (Window > Rendering Editors > Render Globals) Motion Blur Shadows are now turned on when Shadow Maps are turned on.

Turning Receive Shadows off in mental ray

The mental ray renderer's Receive Shadows flag is now respected by the renderer.

Lightmap shader performance

The performance of the mental ray lightmap shader has improved.

Shadowmaps and volumes

When using shadowmaps with volumes and mental ray you should override (increase) the volume samples settings on the volume shape. You may also need to enable depth jittering and tune up mental ray shadow map settings on light sources, such as Softness and Samples.

Connections to U and V coordinate attributes

Previously, creating connections to a U or V coordinate attribute in a texture node would cause mental ray to crash. A node cycle detection has been implemented to avoid endless loops and crashes when translating such DG graphs. The performance impact grows with the depth of the visited shading graph. The cycle detection is enabled by default, but can be disabled by adding a dynamic attribute nodeCycleCheck (boolean) to the render globals node.

Light linking and lighting for particle instanced geometry

Due to limitations in the Maya API, particle instanced geometry was previously only illuminated by the default light. This situation has been improved in that shading groups containing particle instanced geometry are *excluded* from light linking. Particle instances are now illuminated by all lights if the material used for the particle instances is not used elsewhere in the scene and the original instanced object is hidden.

Animated displacement maps

Animated displacement is now rendered properly for all types of displacement approximations. This includes detecting animated displacement shaders and marking objects with such shaders attached as "dirty."

HDR images

HDR images now behave as expected.

Animated energy values

Previously animated energy values on light sources were not recognized and didn't change in subsequent frames of an animation. This has been fixed.

Software particle cloud caused Maya to crash during mental ray render

In the previous version of Maya there was a hard-coded limit on the number of particles that any ray could intersect. If the number of particles in a ray's path exceeded that limit, a crash occurred. In Maya 5.0.1, there is no longer a hard-coded limit.

Color blending tab index off by 1

In Maya 5.0 the Color Blending tab inside the Vertices bake set option was off by 1. Subtract appears to be Add, Multiply is Subtract, etc. This has now been fixed in Maya 5.0.1.

Mental Ray fatal error: out of array bounds in mayabase

Mayabase had an access violation error in some cases when the noise function was used. This has been fixed.

Imageplane

Imageplane now moves with the camera if the camera is animated.

Baking in mental ray

The following baking in mental ray limitations were fixed for Maya 5.0.1.

mental ray baking hierarchies of geometry

When baking hierarchies of geometry, mental ray now behaves as expected.

Vertex/Texture baking using mental ray

When temporary objects sets are created during mental ray baking operations (for example: selObjFaceSet, selObjFaceSet1), they are now removed automatically. Previously they had to be manually deleted or cleaned up using File > Optimize Scene.

Light linking

Baking now respects light linking.

Baking and shadow results

Baking with mental ray now produces expected shadow results.

Min/Max clamping of Batch Bake Pre-light

Min/Max clamping of Batch Bake Pre-light now behaves as expected.

Overbake algorithm improved

Pre-light to texture has an improved overbaking algorithm. Edges along UV borders are less noticeable.

Bake to color per vertex

Baking objects with per face material no longer crashes.

Batch bake and per-face material assignment

"per-face material" and "bake to one map" is now supported by baking. To generate one texture per mesh with per-face material assignment, assign a texture bakeset to the object and turn on Bake To One Map in the Baking Attribute Editor.

Alpha Mode for Bake Alpha

When you turn on Bake Alpha in the Baking Attribute Editor, the Alpha Mode, specifically Pass Through, now behaves as expected.

Hardware renderer

The following lists the Hardware rendering limitations that were fixed for Maya 5.0.1.

2D Texture Placement

Placement has been fixed so various options, including WrapU and WrapV, provide the correct result. Also, problems related to rendering surfaces that do not have complete texture space coverage (i.e., 0,0 -> 1,1) have now been fixed.

Note   Files may take longer to hardware render compared to Maya 5.0 because some texture placement configurations cause the renderer to bake the associated file texture. This may also result in a decrease in image quality if the file texture's resolution is larger than the color texture resolution in Render Global Settings. You are encouraged to use render diagnostics to identify those file textures that will be baked and, if possible, adjust the placement parameters to avoid the baking process.

Specular, incandescence and environment map reflection

The calculation for this now matches software rendering more closely. In software rendering, the transparency of a surface does not affect the specular highlight intensity, incandescence and environment map reflection. The Hardware renderer now behaves similarly.

Render layers

Multiple cameras or render layers will now render correctly. In Maya 5.0, only the first camera or first render layer would render.

Vector renderer

The following lists the Vector rendering limitations that were fixed for Maya 5.0.1.

When Highlights are on

When Highlights are on, making changes to your scene (for example, changing the Highlight Level value, adding a new object to your scene, adding a glow to a light) no longer causes surface fills to become lighter (if the surface material shininess is greater than 0).

Error during rendering a camera which is constrained to two locators

Vector renderer now handles cameras constrained with locators.

Shadows gray instead of black

Shadows no longer appear gray instead of black. They behave as expected.

Artisan

The following Artisan limitations were fixed for Maya 5.0.1.

Paint Vertex Color Tool

After exporting color per vertex maps multiple times from the Paint Vertex Color Tool, Maya may crash. This has been fixed.

Paint Skin Weights Tool

The list of joints in the Influence section of the Paint Skin Weights Influence Tool settings window used to update incorrectly for operation selection, brush size changes, etc. This has been fixed. Now the list updates only when it is necessary.

Paint Effects

The following Paint Effects limitations were fixed for Maya 5.0.1.

Paint Effects to Polygons

In Maya 5.0 Paint Effects to Polygons may have failed to create a shader for some brush settings. This has been fixed.

3D Paint

The following3D Paint limitations were fixed for Maya 5.0.1.

Polygon or Subd with multiple shaders assigned to multiple faces

Create a polygon or subdivision surface with multiple shaders assigned to different faces. Then delete one of the shaders and start the 3D Paint Tool. Maya crashes. This has been fixed.

Fur

The following Fur limitations were fixed for Maya 5.0.1.

Rendering with Fur shading

In Maya 5.0, the fur render could fail after adding a light with fur shading until a new session of Maya was started. This is now fixed.

Reading Equalizer Maps with referenced files

Reading Equalizer Maps used to fail when a scene was referenced with *Use Namespaces* turned on or when name clashes were resolved using a string. This is now fixed.

Batch rendering when file with Fur is referenced

Batch Render now renders fur when the file with fur is referenced. In the previous version of Maya this did not render when Batch Render was invoked from the Maya application window (not the command line).

Equalizer Maps

In the previous version of Maya if the Equalizer map was created using Read Equalizer Map in the Fur Globals window and batch rendered, Fur would not show up in the output. This has been fixed.

Rendering Fur through the entire range of frames

In Maya 5.0 Fur may not always render on the surface through the entire range of frames. Memory improvements to Fur in Maya 5.0.1 have fixed this.

Spotlights and Auto Shading

In Maya 5.0, we changed the default behavior for spotlights so that fur growing on the side of an object away from the light would not be lit. However, this behavior prevents Auto Shading parameters such as Back Shade Darkness and Back Shade Factor from being used. Consequently, we have now made this behavior optional. A new option in Fur > Fur Globals > Fur Render Options > Advanced Options, called Auto Back Shade Spotlights, controls whether or not fur growing on the side of objects away from spotlights is automatically excluded from the lighting effect, regardless of any Fur Shading applied to the light. The default is now off, which is equivalent to the behavior in Maya 4.5 and earlier.

DWG/DXF

The following lists DWG/DXF limitations that were improved or fixed for Maya 5.0.1.

(IRIX, Linux) DWG/DXF Options box

(IRIX, Linux) When you import a DWG/DXF file, the Options box can now be opened.

Extrusions fully supported

All extrusions in AutoCAD are mapped to Maya correctly.

Invisible edges supported

Invisible edges within AutoCAD Polymeshes are now supported.

Traces supported

Traces within AutoCAD are mapped to Maya correctly.

Instances supported

Maya Instances are supported.

Block references support

Block references are now supported.

Shader assignments + xform

Shader/Layer assignments are now more robust.

IGES

The following IGES limitations were fixed for Maya 5.0.1.

Rendering IGES imported models

Now after importing via IGES, the geometry is assigned a default shader.

Catia IGES files

Catia v5 and v4 IGES files no longer cause Maya to crash on import.

MEL

The following lists MEL limitations that were improved or fixed for Maya 5.0.1.

Path containing "/" and "\" slashes

In certain circumstances we would create a path containing both a "/" and a "\". We've fixed this so it's consistent.

String quoting broken in batch mode

In Maya 5.0 you may have experienced problems if you used the command `maya -batch -prompt` followed by a long string (>256 characters). This is now fixed.

file command having trouble with like named referenced files

The mel command "file" was unable to distinguish between two referenced files with the same name, but different paths. This has been fixed.

Cannot source script in current working dir

If you launched Maya from a directory that's not in MAYA_SCRIPT_PATH and you tried to source a MEL script that's in there, Maya 5.0 would not source the script. This is now fixed.

API

The following lists API limitations that were improved or fixed for Maya 5.0.1.

• A memory problem when calling the addPlugToManipConversionCallback() or addManipToPlugConversionCallback() of the MPxManipContainer class has been fixed.

• The MLibrary::initialize() method will not cause an exception if called more than once.

• The MPxDeformerNode class now works on Mac OS X.

• The MPxTransform::resetTransformation() method now respects attribute locking.

• A problem retrieving the local transformation matrix using the MFnTransform class on an MPxTransform node has now been fixed.

Documentation

The following lists documentation limitations that were improved or fixed for Maya 5.0.1.

Docs server on Mac not working between logins

There was a problem where the online help was not available after a logout on Mac. The problem arose because of the default permissions on a log file that was being created by the docs server. The docs server startup script now creates the logfile with global write permissions. This is fixed in the CD-ROM version only; the download version will not update the docs server.

Online help on Mac/Linux 5.0 on Mozilla-based browsers

The table of contents on the left side of the online help sometimes would not work as an expanding hierarchy (instead, the different levels would load as separate pages). This was caused by the limit on how long the page would wait for the new level to load being set too low. This is now fixed if you installed 5.0.1 from a CD-ROM. If you install 5.0.1 from the download, you must do the following to fix this:

1   Go to where Maya is installed.

2   Open docs/Documents/Maya5.0/en_US/style.

3   Open the toc.js file in a text editor.

4   Find the line that begins "if (count".

5   Change number after the less-than sign (<) to 20. This number controls how long the page will try to load the next level in the hierarchy before falling back to loading the page directly.

    The expanding hierarchy only works on modern browsers. Older browsers such as Netscape 4.x and OmniWeb 4 will always show separate pages.

Selecting the location of Japanese manual

For Maya 5.0.1 the ja_JP docs installer (as well as the doc server installer that will ship on the CD-ROM) will permit the user to select the install location. The install will default to sane values (usually relative to the Maya install path).

3   Release notes

In this chapter we list new release notes or additional information you should know about using Maya 5.0.1.

- "(Linux) Maya 5.0.1 may not run"
- "(Linux) Maya may crash when unloading plug-ins"
- "(Mac OS X) File type and launching fcheck"
- "(Win XP) Installing Maya 5.0.1"
- "Camera film back display options"
- "(Linux) Wacom stylus and tablet"
- "Dynamic compound attribute"
- "Referenced Fluids, Particles, and Jiggle deformers will not cache if Use Namespaces is turned on"
- "Attributes driven by keyframes and constraints may behave unexpectedly"
- "Paint Effects Mesh brushes"
- "Fur shadows and Dmap Auto Focus"
- "General rendering"
- "Hardware renderer"
- "mental ray renderer"
- "Baking in mental ray"
- "API"
- "Online Help"

(Linux) Maya 5.0.1 may not run

Maya 5.0.1 for the Linux platform will not run. This version of Maya is dependent on the shared library named *libfam.so*. This is the File Alteration Monitor (FAM) library.

Workaround

Install the runtime FAM rpm from the Red Hat 7.2/7.3/8.0 CD.

(Linux) Maya may crash when unloading plug-ins

Plug-ins compiled on Red Hat 7.3 with gcc 3.2.2 may not unload properly when running on later versions of Red Hat (8.0/9.0).

Workaround

Compile plug-ins with the `-Wl, -Bsymbolic` linker option.

(Mac OS X) File type and launching fcheck

Importing certain file formats—such as obj, iges, and dwg—when the file type option of the import command is set to "best guess" may cause fcheck to launch instead of importing the file.

Workaround

If this happens, set the file type to the format of the file you are importing.

(Win XP) Installing Maya 5.0.1

Maya 5.0.1 won't install to a path containing a mapped drive.

Workaround

Specify the full directory path (not the mapped path) when installing Maya 5.0.1. Alternatively, install to the default location.

Camera film back display options

We've provided options to display in the viewport the film pivot and film origin for a camera. Turn these on to see where the filmback pivot and filmback origin are located in the viewport (the origin of the filmback prior to translating or offsetting the filmback). Turn these on and off using either the Camera Attribute Editor > Display Options section or using the panel's View > Camera Settings > Film Origin, and Film Pivot menu items. By default, these options are turned off.

(Linux) Wacom stylus and tablet

When you paint strokes in Paint Effects on Linux, your Wacom stylus and tablet may have no pressure sensitivity. Select an Artisan tool (for example, the Paint Selection Tool) and open the Tool Settings editor. Expand the Stylus Pressure section. If the Stylus Pressure options are disabled, Maya cannot find your Wacom tablet. Your tablet may be installed under the generic name "tablet."

Workaround

To fix this, go to the Wacom web site (www.wacom.com) and read the product support information for Linux.

Dynamic compound attribute

If you add a dynamic compound attribute to a node with other dynamic attributes, and then delete the compound attribute, you will not be able to recreate another dynamic attribute with the same name.

Workaround

Do one of the following:

- Save your scene and reload it.
- Duplicate the object, delete the original, and rename the duplicate to match the original.

Referenced Fluids, Particles, and Jiggle deformers will not cache if Use Namespaces is turned on

You can not cache Fluids, Particles, or Jiggle objects if they are referenced using the Use Namespaces option, due to the colon this writes into the cache name.

Workaround

Use another method to resolve name clashes when referencing Fluids, Particles, and Jiggle deformers, such as prepending the filename (the default method) or a chosen string.

For example, if you create a particle system called *spark1*, save it in the file *bonfire.ma*, and then reference the particle system from another file, the system would be called *bonfire:spark1* with the namespace option and *bonfire_spark1* without the namespace option.

Attributes driven by keyframes and constraints may behave unexpectedly

You may encounter unexpected behavior when dealing with attributes that have both keyframes and constraints driving them. This problem arises when using such attributes in Characters Sets and clips in Trax.

Paint Effects Mesh brushes

The interpolation for Paint Effects triangles with Mesh brushes may result in distorted textures where the triangle count is low.

Workaround

Increase the triangle density on the brush or convert the Paint Effects strokes to polygons to render.

Fur shadows and Dmap Auto Focus

Fur Shadows can be incorrectly placed when Dmap Auto Focus is turned on. We suggest you turn off Dmap Auto Focus for all spotlights that have Fur Shadow Maps enabled, and instead set the Dmap Focus value to Cone Angle + (Penumbra * 2).

General rendering

The following lists any new release notes or additional information you should know about rendering in general in Maya 5.0.1.

Frame/Animation Extension

Frame/Animation Extension is now consistent between Software, Vector, and Hardware rendering. All three renderers support single frame rendering, and single file multi-frame rendering for AVI and Quicktime. The mental ray renderer still has the same limitations; for more information, see the Maya 5.0 Release Notes in the Maya 5.0 online help.

Using Maya Batch Renderer

When using the Maya Batch Renderer on a remote machine the User Account information (i.e. username) must be consistent between the machines to ensure that User Authentication will function correctly.

Multiple batch file render

Only the first command gets executed when trying to launch multiple mayarender_with_mr, mayaexport_with_mr or mayaVectorRender commands in a batch script on Windows.

Workaround

Use the call command on each line, for example:

```
call mayarender_with_mr -file sceneA.mb
call mayarender_with_mr -file sceneB.mb
call mayarender_with_mr -file sceneC.mb
call mayarender_with_mr -file sceneD.mb
```

Hardware renderer

The following lists any new release notes or additional information you should know about using the Hardware renderer in Maya 5.0.1.

Quality Presets

Existing files created in Maya 5.0 loaded into Maya 5.0.1 will render the same as they did before. New scenes created in Maya 5.0.1 will have Intermediate quality set as their default quality setting in the Render Global Settings window.

New scenes have the following differences:

- There is a new attribute called enableAcceleratedMultiSampling that improves image quality if the video card supports hardware multi-sampling. It is enabled for newly-created 5.0.1 scenes. With the Preview quality setting, this attribute is turned off. If a 5.0 scene is loaded into 5.0.1, this attribute takes its value from whatever enableEdgeAntiAliasing was set to. The enableEdgeAntiAliasing attribute from Maya 5.0 is now ignored in 5.0.1.

- There is a new attribute called enableHighQualityLighting. Existing Maya 5.0 scenes and newly created 5.0.1 scenes both have this attribute enabled. When Preview quality preset is used, this attribute is turned off.

- Low quality lighting is now an option in 5.0.1. This option can produce images orders of magnitude faster than before. However there are numerous limitations with this option due to the per vertex calculations being used for all lighting effects.

Pros	Cons
• Render time can be 8 to 10 times faster, due to fewer passes. • Lighting looks similar or better than what can be obtained in the 3D viewport or Hardware Render Buffer.	• If the surface is not highly tessellated, specular highlights and spot light penumbras will have significant image artifacts due to interpolation of lighting between vertices. • The lighting is clamped after rendering up to eight lights (vs. one light for high quality lighting) for each pass. This means that scenes may often be too dark, and adding lights will not help consistently. • Shadows, bump, and projective light textures are not supported.

- The default image quality preset in 5.0.1 has been changed to Intermediate. As a result, new 5.0.1 scenes have the color and bump resolution (used to bake textures before a Hardware render is performed) set to 256 and 512 respectively. By comparison, new scenes in 5.0 had default color and bump resolution settings of 128 and 256.

Texture Compression

There is a new attribute called textureCompression. When enabled, hardware-assisted image texture compression is used to reduce texture memory usage with typically unnoticeable image artifacts. Newly-created 5.0.1 scenes render using hardware texture compression. Existing Maya 5.0 scenes loaded into 5.0.1 do not use texture compression, to avoid any image differences.

Improved Hardware rendering interruptability

We've improved the Hardware renderer so that it is more "interruptable" than before. In Maya 5.0, the renderer only checked for interrupts for each frame of an animation. In Maya 5.0.1 it now checks for interrupts at several points during the translation and draw process.

AVI output

An AVI output has been added in the Hardware renderer's file formats on Windows.

Performance

There are new culling methods, which improve the performance of hardware rendering when there are many lights or many non-visible objects in the scene. The following culling methods are now be used:

- camera frustum per particle systems
- point frustum and spotlight frustum per scene object
- radial decay (sphere of influence) per object. This only applies to graphic cards that fully support NV fragment programs or ARB fragment programs.
- camera frustum per object culling during processing. This will help improve render time per frame as well as the amount of resources used.

Point light shadows

Point light shadows are now supported on non Quadro FX cards (NV30GL).

Support for more rendering flags

The Hardware renderer now supports Cast/Receive Shadow rendering flags, Ignore When Rendering property of connections on the shading nodes, and Matte Opacity.

Support for Use Background Shader

Support for the functionality of shadow catching has been added, but not reflections. This is to help support compositing with live action backgrounds. For shadow catching, shadows from spot lights and directional lights are supported. Neither intensity, decay on lights, nor non-shadow casting lights have any affect on the alpha mask. For color output, only black backgrounds are supported. Image planes are not supported, so they will not show up for objects using this shader. All new rendering flags are supported for Use Background shader.

Enable Geometry Mask

We've added Enable Geometry Mask in the Hardware Render Global Settings. When off, surfaces are hardware rendered as usual. When this option is turned on, opaque geometry objects are not drawn, but mask out particle objects, while transparent geometry do not get drawn. This is especially useful when compositing particles over geometry rendered in different passes. Geometry Mask is off by default.

Shadow quality

Point particles now cast round shadows versus square shadows. Also, there is a new option to have totally transparent areas on an object not cast shadows from those areas. This applies for both surface and particle types, such as sprites.

mental ray renderer

The following lists new release notes or additional information you should know about using the mental ray for Maya renderer in Maya 5.0.1.

mental ray standalone

The mental ray for Maya renderer is based on the mental ray standalone core version 3.2.6. This version fixes a number of limitations, but it doesn't introduce new features.

Floating licenses

The following limitation is related to licensing mental ray for Maya. In Floating License environments that have both Maya Unlimited and Maya Complete licenses, the mental ray for Maya plug-in may not load if the MAYA_LICENSE environment variable is set to `-unlimited`.

Workaround

To correct this, set this environment variable to `complete` and remove any MAYA_LICENSE setting from the `Maya.env` file.

mental ray online documentation

We provide two mental ray guides in the Maya 5.0 online help (Help > Contents and Search > Reference section). These two guides are mental ray reference and mental ray shader reference. These two documents are currently not searchable using the Search field in the online help.

Default approximation change

In Maya 5.0.1, the default for displacement mapping has changed from fine displacement approximation to parametric approximation. This results in less memory used, but may produce different results than in Maya 5.0. To get the same results as in Maya 5.0, explicitly set the approximation node to fine displacement approximation.

Shadow maps on scaled lights

mental ray does not handle shadow maps on scaled light sources very well. Proportional scaling for the light should be used.

Light linking shadows

Light linking does not take shadows into account.

Caustics and directional lights

Caustics are not created when using directional lights. Directional lights are not recommended for emitting photons.

Workaround

Use a spotlight instead.

Converting .hdr images to tiled .map texture

In some cases when converting an .hdr (rgbe) image to a tiled .map texture to be used for rendering, artifacts may appear. To avoid this, first convert the .hdr image to a .tif (rgb_fp) image, then convert the .tif to a tiled .map (rgb_fp) image. For example:

```
imf_copy -v texture.hdr texture.tif tif rgb_fp
```

```
imf_copy -v -r texture.tif texture.map map rgb_fp
```

Additionally, this problem does not occur if a non tiled .map texture is used. Use the following command:

```
imf_copy -v -p texture.hdr texture.map map rgb_fp
```

16-bit RLA texture

Maya may crash when rendering a 16-bit RLA texture with alpha in Maya's mental ray renderer.

Workaround

Use any other (8-bit) image format such as .tga, .tiff, .iff, etc.

Pixel Aspect Ratio

Pixel Aspect Ratio has been added to the mental ray Render Global Settings window.

Final Gather options

Additional Final Gather options have been added to the Final Gather section of the mental ray Render Global Settings tab. These options are:

Final Gather Filter

Final gathering uses a speckle elimination filter that prevents samples with extreme brightness from skewing the overall energy stored in a final gather hemisphere. This is done by filtering neighboring samples such that extreme values are discarded in the filter size. By default, the filter size is 1. Setting this to 0 disables speckle elimination, which can add speckles but will better converge towards the correct total image brightness for extremely low accuracy settings. Size values greater than 1 eliminate more speckles and soften sample contrasts. Sizes greater than 4 or so are not normally useful.

Final Gather Falloff Start
Final Gather Falloff Stop

Limits the length of final gather rays to a distance of *stop* in world space. If no object is found within a distance of *start*, the ray defaults to the environment color. Objects farther away than *stop* from the illuminated point will not cast light. Effectively this limits the reach of indirect light for final gathering (but not photons). The *start* parameter defines the beginning of a linear falloff range; objects at a distance between *start* and *stop* will fade towards the environment color. This option is useful for keeping final gather rays from pulling remote parts of the scene, which may not affect illumination very much, into the geometry cache. This allows mental ray to render with a much smaller memory footprint.

Final Gather Trace Depth

If this is set to 0, it prevents final gather rays from spawning subrays. This means that indirect illumination computed by final gathering cannot pass through glass or mirrors, for example. A depth of 1 (where the sum must not be less than the other two) would allow a single refraction or reflection. It is not normally necessary to choose any depth greater than 2 (the default). This is not compatible with mental ray 3.1 and earlier that use the trace depth (which defaults to 2 2 4) for final gathering.

Semi-transparent shadows with caustics and global illumination

You can now produce transparent shadows with caustics and global illumination. When you turn on the Enable Semi-transparent Shadows option (Window > Rendering Editors > Render Globals > mental ray > mental ray tab > Caustics and Global Illumination), shadow shaders with photons are used. When this option is off, no transparent shadows are produced when photons are used.

Note "Optimize_Photon_Shadows" is the dynamic attribute name for the Enable Semi-transparent Shadows option in the mental ray Render Global Settings.

`mi_Export_Shadow_Shader`

This overrides the global "Optimize_Photon_Shadows" setting on a per-material basis. If this attribute is enabled, shadow shaders are used even though photons are being used. If it is disabled, the old behavior is reinstated for this specific material.

If you experience a crash

If you experience a crash while rendering a scene using mental ray, try the following to prevent the crash:

1 Put a memory limit of 800 Mb on mental ray. For a new scene in 5.0.1, the Physical Memory default value of 800 Mb already applies, but if you have an old scene, it is possible that value is still set to -1; change it to 800. To do so, select Window > Rendering Editors > Render Globals > mental ray tab > Memory and Performance > Memory Limits > Physical Memory and enter 800 as the value.

2 In addition to this memory cap, turn off Scanline rendering for mental ray, (Window > Rendering Editors > Render Globals > mental ray tab > General > Scanline).

Baking in mental ray

The following lists new release notes or additional information you should know about baking in the mental ray for Maya renderer in Maya 5.0.1.

Baking invisible, template, intermediate, reference objects

mental ray ignores bake invisible, template, intermediate, and reference objects. Baking components only supports poly faces.

Bake Set menu changes

New options have been added to the Assign Existing Bake Set menu item in the right-click pop-up menu. These two options are:

* initialTextureBakeSet allows access to the default initial texture bake set so that it may be modified

* initialVertexBakeSet allows access to the default initial vertex bake set so that it may be modified

Overriding assigned bakeset attributes

You can override baking options for selected objects to test, for example, baking options quickly without having to reassign objects to bake sets to see the results.

When you turn on the Use Bake Set Override (Lighting/Shading > Batch Bake (mental ray) > ❏), the override options can be modified. Selected objects you bake take the override settings instead of those of the bake set to which the objects are assigned.

Note	The override options are the same as those in the initial vertex bake set or the initial texture bake set.

Saving override presets

You can save override settings as a preset that you can later delete or load. To save a preset, click the Preset button, then name the Preset when prompted.

Texture/Vertex bakeset presets created using the override option are accessible through the Presets button in the Attribute Editor for vertex and texture bakesets.

Texture Bake Set attributes

We've added two attributes for texture bake sets.

- The Bake to One Map option allows you to bake several objects into one lightmap file.
- The Keep Original Shading Network option allows you to preserve the existing shaders on objects, but create the resulting lightmap file to disk.

Vertex Bake Set attributes

We've made some changes to the Vertex Bake Set attributes:

- The Shared Vertices and Alpha Mode attributes have been removed from the Vertex Bake Set Attribute Editor.
- Two new attributes have been added to the Vertex Color Filtering section of the Vertex Bake Set Attribute Editor. These attributes are:

Filter Size

Set the Filter Size value to -1 to turn filtering off. Set the value to 0 or higher to turn it on.

If final gathering is baked to vertices and the scene contains high frequency information, discontinuities in the color channel may become visible. This artifact becomes especially apparent if low final gather quality settings are used. Filtering baked vertex colors then yields the desired smooth look. Provide a small positive filter size as argument to this parameter (it is multiplied by the object's bounding box size to obtain the absolute size).

Lower final gather quality settings require larger filter sizes to get a smooth look and renders are less accurate. In general, the final gather quality should be raised as long as rendering times are acceptable; then the filter size should be increased until the desired smooth look is obtained. A tiny filter size may suffice; it enforces that baked colors are shared at vertices that have identical positions and normals. The default is no filtering.

Filter Normal Tolerance

The filter normal tolerance is in degrees (0 to 180). Vertices whose normals subtend an angle larger than this tolerance with the current vertex's normal are not considered for filtering. This avoids undesired color bleed across hard edges. The default is 0.

Vertex baking

After vertex baking, baked objects are displayed as color in shaded emission mode so that users can see the result of the bake.

Baking performance

We have improved baking performance by baking multiple objects in one command. As a result, scene translation, photon emission and final gather computation is done once per baking process. Baking uses multiple processes if the machine has more than one CPU.

API

The following lists new release notes or additional information you should know about using API in Maya 5.0.1.

Accessing the current file name

The Maya API now supports accessing the current file name in the following messages:

- pre-open
- pre-save
- pre-import
- pre-export
- pre-reference

The new methods in the MFileIO class are:

```
static MString beforeOpenFilename(MStatus * ReturnStatus = NULL);
static MString beforeImportFilename(MStatus * ReturnStatus = NULL);
static MString beforeSaveFilename(MStatus * ReturnStatus = NULL);
static MString beforeExportFilename(MStatus * ReturnStatus = NULL);
```

```
static MString beforeReferenceFilename(MStatus * ReturnStatus = NULL);
```

A sample plug-in fileIOMsgCmd.cpp is included in the devkit that demonstrates this functionality.

Building a Maya plugin on Linux

Plugins may need to be compiled with the `-Wl, -Bsymbolic` linker option on Linux.

Online Help

The following lists additional information you should know about viewing online documentation in Maya 5.0.1.

Help on Fur attractors and polygons

As of Maya 5.0 you can attach attractors to polygons. However in the online help it erroneously states that Maya's attractors only work with NURBS. Specifically, the erroneous text is found under the following topics:

- Move attractors by connecting forces to attractor particles
- Move attractors by moving the surface they are attached to

Troubleshooting the help server

This information is also available in Maya if you select Help > If Help doesn't work.

What if I can't start the help server service on Windows unless I'm an Administrator?

This is a known issue with Windows. Refer to the following Microsoft knowledge base articles for information on how to fix this.

support.microsoft.com/?kbid=256299

support.microsoft.com/default.aspx?scid=kb;EN-US;256345

What if my browser complains that "localhost" is not found? What if the server seems to be running but I can't load any pages from it?

This can happen if your computer is behind a proxy server.

Make sure the proxy configuration for your browser knows that you shouldn't be going through the proxy to access "localhost".

- On Mac OS X, open the System Preferences and click Network, click the Proxy tab and enter localhost in the Bypass proxy settings box.

- In Netscape, select Edit > preferences and click Advanced and then Proxies.

- In Internet Explorer, select Tools > Internet Options, click Connections and then LAN Settings.

You can also try using your computer's DNS name or IP address instead of localhost. In Maya, select Window > Settings/Preferences > Preferences and click Misc. Set Help Location to Remote and enter `http://<your computer's name or IP address>:4444/Maya5.0/en_US/`.

What if I can't view help from the help server? What if the Web server won't start?

There are a few conditions that may prevent the help server from starting:

- This may happen if another network service on your machine has already claimed port 4444. You can make the Maya help server use a different port number by editing `docs/port.txt` under the main Maya folder.

- This can also happen if another copy of the Maya help server is still running on the port. Try opening a page from the server in a browser (for example `http://localhost:4444/Maya5.0/en_US/`) to see if this is the case.

- On Windows the Maya help server runs as a network service, and Maya uses the `net start` and `net stop` commands to control it. It is possible for Windows to be misconfigured to the point where these commands are not available on the command line. To test this, open a command window and type `net start AWHelpServer`. If the computer responds that the net command is not a command, you need to fix your system paths to include the directory with the net command.

- On Mac OS X, IRIX, or Linux, you may get a condition, especially after uninstalling and reinstalling, where an old help server is still running and unable to serve content. Find the server process in the process list (grep for `java` and/or `vertigo`) and kill it, then restart Maya.

How do I shut down the help server?

You can use any of the following procedures to stop the server:

- When Maya is set to use a local help server, the server should shut down when you quit Maya.

- On Windows, the help server runs as a network service. Go to the control panel, double-click Administrative Tools, then open Services. Right-click the Alias Wavefront Help Server line and select Stop, or open a command window and type `net stop AWHelpServer`.

- On platforms other than Windows, you can shut down the server from the server home page. In a browser, go to `http://localhost:4444/` and click the power icon at the bottom of the left column.

Viewing the online help without using the help server

Please note before you begin: if you read the help outside the Maya help server, search is not available. For this reason you may want to consider using a centralized Maya help server instead of moving the help onto a different Web server.

The Maya help server reads the online help from inside zip files. In order to read the help files directly from the filesystem or from a Web server other than the Maya help server, you need to unzip the help content.

1 Under the main Maya folder, go to `docs/Documents/Maya5.0/en_US`. This folder contains the online help content.

2 Unzip all the zip files into directories with the same names. For example, put the contents of `Painting.zip` into a directory called `Painting/`

   Make sure you don't accidentally create a structure like `Painting/Painting/`.

3 Once you have unzipped the files you can move them to a Web server, or leave the files where they are if you just want to be able to read them directly from the file system without using a server.

4 Open Maya and choose Window > Settings/Preferences > Preferences. Click Misc. Under Help Location click Remote and enter the URL of the help's new location (either the URL of the directory on the Web server or a file: URL pointing to the docs directory. For example `file:///usr/aw/maya5.0/docs/Documents/Maya5.0/en_US`).

A   Advanced Spline IK twist controls

About   Advanced Spline IK twist controls

Spline IK handles let you pose a joint chain with a NURBS curve. When you manipulate the curve, the handle's ikSplineSolver rotates the joints in the chain accordingly.

With the new Spline IK twist control attributes, you can constrain the local rotation of the joints in a chain to a fixed worldspace *vector*. This vector is the orientation of the Spline IK NURBS curve. For example, you can use the advanced Spline IK twist controls to stabilize a snake character, the spine of a biped character, or the movements of a coil spring. Also, to fine-tune the twist along the chain, you can add additional twist to the joints with the Twist Value attributes.

By aligning the joints Up axes with a fixed worldspace vector before applying additional twist, you can achieve a more predictable and stable result than was previously possible.

Note	The Advanced Twist Control attributes are relevant only if your IK handle uses the ikSplineSolver.

How do I?   Use the advanced Spline IK twist controls

Example scenario

A snake character with Spline IK slithers across the forest floor. The snake is manipulated by translating and rotating the NURBS curve. The NURBS curve is driven by manipulation objects (in this example, they are locators) at the beginning (head) and end (tail) of the curve.

1 Select the snake character's Spline IK handle.
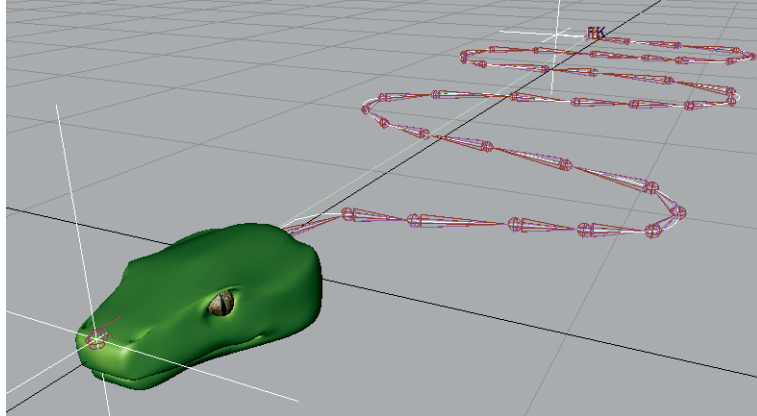
The Spline IK handle starts at the first joint and ends at the last joint of the snake's skeleton, and its NURBS curve runs through all the joints and bones.

2 In the Attribute Editor, go to ikHandle > IK Solver Attributes.

3 Click the Add Advanced Twist Control button.

The advanced Spline IK twist control attributes appear.

4 Set the World Up Type to Object Rotation Up (Start/End) and the Up Axis to Positive Y.

This constrains the start and end joint Up vectors of the snakes joints to the Y axes of the locators used to drive the NURBS curve.

Note	The Up Axis attribute specifies what local joint axis is aligned with the Up Object vectors specified in the Up Vector fields.

5 Type the name of the head locator in the World Up Object field and the tail locator in the World Up Object 2 field.

The positive Y orientation of the locators is used to calculate the Up vectors of the joints in the Snake's skeleton.

Note	You can specify a specific vector offset for the joints with the Up Vector and Up Vector 2 fields.

6 Select and move the head locator.

This moves all the joints and bones in the snake's skeleton. Notice that the joints and bones also now respect the orientation of the manipulation objects.

Reference   Spline IK twist controls

Add Advanced Twist Control Attributes

This button reveals additional attributes for the current Spline IK handle.

Enable Twist Controls

If on, Maya applies an up vector constraint to the local frame of each joint in the current Spline IK handle's joint chain.

World Up Type

Specifies the *type* of up vector constraint that is applied to the joints in the Spline IK handle's joint chain.

Scene Up	Sets the scene's up direction as the Up vector for all joints.
Object Up	Sets the Up vector of each joint as the direction from the joint to the center of a specified object.
	Type the object's name in the World Up Object field.
Object Up (Start/End)	Sets the Up vector of the first and last joints as the direction from the joints to the center of the specified start and end objects.
	Type the names of the start and end joint up objects in the World Up Object and World Up Object 2 fields. The results from the start and end of the chain are interpolated along the chain to provide up vectors for the middle joints.
Object Rotation Up	Sets a particular vector in the local space of the specified object as the Up vector for all joints.
	Type the local vectors in the Up Vector fields and the object name in the World Up Object field. The default Up Vector value is (0,1,0). This means that the object's positive Y axis is used as the Up Vector.
Object Rotation Up (Start/End)	Sets a particular vector in the local space of the specified objects as the Up vector for the start and end joints in the current chain.
	Type the local vectors and object name for the start joint in the Up Vector and World Up Object fields, and type the local vectors and object name for the end joint in the Up Vector 2 and World Up Object 2

	fields. The results from the start and end of the chain are interpolated along the chain to provide up vectors for the middle joints.
Vector	Sets a particular vector in worldspace as the up vector for all joints.
	Type the worldspace up vectors in the Up Vector fields.
Vector (Start/End)	Sets specific vectors in worldspace as the up vectors for the start and end joints.
	Type the start joint worldspace up vectors in the Up Vector fields and the end joint worldspace up vectors in the Up Vector 2 fields. The results from the start and end of the chain are interpolated along the chain to provide up vectors for the middle joints.
Relative	Sets the Spline IK to behave as in previous versions of Maya (pre-Maya 5.0.1). The up vector constraint is not applied to the joints in the chain.

Up Axis

Specifies which local joint axis is aligned with the worldspace up vector. Positive Y axis is the default.

If you select any of the *Closest* axes, either the positive or negative axis is used at each joint, depending on which is currently closer to the worldspace up vector. The Closest option lets you preserve the orientation of joint chains whose axes flip every few joints.

> **Note**   We recommend that you not use *Closest* for animation, because it is prone to cause flipping in the joint chain.

Up Vector

When the World Up Type is Object Rotation Up or Object Rotation Up (Start/End), the values in these fields specify vectors in the local space of the specified up objects.

When the World Up Type is Vector or Vector (Start/End), the values in these fields specify worldspace world vectors.

The Up Vector fields are for the start joints, and the Up Vector 2 fields are for the end joints.

World Up Object

When the World Up Type is Object Up, Object (Start/End), Object Rotation Up, or Object Rotation Up (Start/End), the name in this field specifies the object to use for computing the up vector. The name in this field connects the worldspace matrix of the transform with the IK handle.

The World Up Object field is for the start joint, and the World Up Object 2 field is for the end joint.

Twist Value Type

Set how the additional, user-defined twist is distributed along the joint chain.

Total	Applies an additional amount of twist to the end joint in the chain. Twist is measured in degrees.
	Twist values for the remaining joints are interpolated from 0 at the start joint. The type of interpolation used is determined by the Twist Type attribute.
Start/End	Applies an additional amount of twist to the start and end joints in the chain. Twist is measured in degrees.
	Twist values for the remaining joints are interpolated using the interpolation type specified by the Twist Type attribute.
Ramp	Connects a texture to the Twist Ramp attribute to provide explicit twist values for the entire chain. Twist is measured in degrees.
	Each joint is assigned a UV texture coordinate of $(0, j/N)$, where j is the joint index in the chain and N is the number of joints in the chain. The alpha value returned by the texture is multiplied by the value of the Twist Ramp Multiplier attribute to produce the twist for each joint.

Start/End Twist

Specifies the twist values for the start and end joints of the chain. These fields are available only when Twist Value Type is set to Start/End.

Twist Ramp

Specifies twist along the chain by connecting to a texture. This field is available only when Twist Value Type is set to Texture.

Twist Ramp Multiplier

Since textures generally return values in the [0, 1] range, this multiplier ensures that the twist values are mapped using an appropriate range. This field is available only when Twist Value Type is set to Texture.

Note	The Twist Value attributes work well with the Roll and Root Twist Mode attributes, and do not interfere with or supersede their functionality.

B   Fluids caching

How do I?   Use Fluids cache performance enhancements

Control the creation of temporary fluids cache files

Fluid caches are disk files with the extension .mcfp that are stored in your project's *data* directory. By default, when you open a scene file, Maya creates copies of a scene's fluids cache files and places them in your system's temporary file directory. These temporary files are used to store any changes to your fluids cache that occur between file saves (File > Save Scene).

Note	You can use the `diskCache -tmp` MEL command to determine the location of your temporary disk cache files.

In Maya 5.0.1, you can use the new Copy Locally attribute to turn off the creation of these local copies for any fluids playback cache file. This is useful if you are low on disk space or are using a network for distributed rendering. The Copy Locally attribute is a dynamic attribute that is automatically added to the diskCache node when you create your cache.

Warning	When the Copy Locally attribute is off, you cannot append or truncate your fluids cache.

To turn off the creation of local temporary fluids cache files

1 Save your scene.
2 Select the cached fluid in your scene and open the Attribute Editor.
3 In the Cache_*fluid*Shape*n* tab, expand the Extra Attributes section.
4 Turn off Copy Locally.
5 Save your scene once again.

Now when you open your scene, Maya does not copy your fluids cache to the temporary directory, and when you save your scene, Maya does not copy your fluids cache from the temporary directory to the permanent location.

To add the Copy Locally attribute to a pre-Maya 5.0.1 diskCache node

You need to add the diskCache node to pre-Maya 5.0.1 scenes if you want to control the temporary caches files for your fluids animation.

1 Select your fluid.

2 In the Attribute Editor, select the Cache_*fluid*Shape*n* tab and click Select.

   Only the diskCache node now appears in the Attribute Editor.

3 From the Attribute Editor's menu bar, select Attributes > Add Attributes.

   The Add Attribute window appears.

4 In the New tab, type 'copyLocally' in Attribute Name field.

5 Turn off the Make Attribute Keyable option.

6 Set the Data Type to Boolean.

7 Click OK.

   The copyLocally attribute appears in the Extra Attributes section of the diskCache node and the Add Attribute window closes.

Segment the fluids cache

Warning	• This feature is unsupported. Use at your own risk.
	• Using segmented caches can affect playback performance.

The size of a fluids cache file depends on the resolution of the fluid being cached and the properties (density, velocity, and so on) stored in the cache. Some systems impose a limit on the maximum size a file can have, and large fluid caches can sometimes exceed this limit.

In Maya 5.0.1, we have included an unsupported script that lets you segment fluids caches. With this script, you can create a fluids cache that has multiple segments or chunks, where each segment contains a specified number of frames.

Note	• When segmenting a fluid, no local temporary copies of the fluid are placed in your temp directory.
	• Fluids cache segmenting does not work if the diskCache node's Copy Locally attribute is on.

Example

For a fluids cache for frames 1 to 100 with a segment size of 30 frames, Create Cache Segment creates four different fluids cache files. Each segment is named according to the following naming scheme:

```
segmentPrefix%N_fluidShapeName__%F.mcfp
```

Where *%N* is the uniqueness identifier for segmentPrefix chosen by the system to guarantee unique file names among all diskCache nodes in the file scene and *%F* is the start frame for data in the cache file.

If the 100 frame cache in this example has a segment naming prefix of *joe,* the segmented fluids cache files might be named:

```
joe1_fluidShape12_1.mcfp      (frames  1-30)
joe1_fluidShape12_31.mcfp     (frames 31-60)
joe1_fluidShape12_61.mcfp     (frames 61-90)
joe1_fluidShape12_91.mcfp     (frames 91-100)
```

To segment a fluids cache

1 Open your Maya.env file and add the following line:

```
MAYA_SCRIPT_PATH = $MAYA_LOCATION/scripts/unsupported
```

This adds the unsupported script directory to your Maya script path.

If you already have a line in your Maya.env file that defines the MAYA_SCRIPT_PATH variable, then just add a path separator such as ':' or ';' and the value:

```
$MAYA_LOCATION/scripts/unsupported
```

to the end of the existing line.

2 Save and close your Maya.env file.

3 If Maya is running, restart Maya.

4 Open the scene that contains your fluid, and then select the fluid.

5 In the Script Editor, type:

```
performFluidsDiskCacheSegment 1
```

and press Enter on the number pad.

The Create Cache Segment Options window appears.

Hint You can drag this command from the Script Editor to the Shelf for easy access.

---

6 Create moderately sized cache segments (for example, cache segments of 50 frames each) for your fluids animation by setting the options. See "Create Cache Segment Options window" on page 56.

7 Do one of the following:

- Click Create to segment your cache using the current cache segment settings. The Create Cache Segment Options window closes.

- Click Apply to segment your cache using the current cache segment settings. The Create Cache Segment Options window remains open.

- Click Close to close the Create Cache Segment Options window.

Maya caches your fluid in segments and adds the Segment Start Frame attribute to the Extra Attributes section of the Cache_*fluid*Shape*n* tab.

8 Save your Maya scene.

To change your cache's settings when creating a segmented cache

In addition to the options available from the Create Cache Segment Options window, you can also set the options that affect the segmented fluids cache from the Create Cache Options window.

1 Select your fluid.

2 Open the Create Cache Options window and modify the settings.

3 Select Edit > Save Settings from the window and click Close.

4 Now use the Create Cache Segment Options window to create a segmented cache for your fluid. See "To segment a fluids cache" on page 55.

Create Cache Segment Options window

Segment Prefix

Specifies the naming prefix for the cache segments.

A unique identifier is automatically appended to the specified prefix.

Cache Start/End

Sets the Start and End frames that define the time range of the cache that is segmented.

Segment Size

Sets the number of frames per segment.

Limitations

- The segmentation of fluids caches is only available for caches created in Maya 5.0.1.

- You can only segment a fluids cache when the Copy Locally attribute is off. See "Control the creation of temporary fluids cache files" on page 53. This also means that you cannot edit (for example, truncate or append) segmented fluids caches.

- The segment size per fluids cache is fixed. Each fluids cache segment can only have the same number of frames.

Advanced fluids cache segmenting

When you create a segmented cache for a fluid, the Segment Start Frame attribute (segmentStartFrame) is placed in the Extra Attributes section of the diskCache node. This attribute connects to an expression node called %N_currentSegment, which uses an animation curve to determine the appropriate segmentStartFrame value for the disk cache at the current time. This attribute cannot be modified. For more information, see "Example" on page 55.

For example, in the 'Segment the fluids cache' example, segmentStartFrame has a value of 1 at frame 10 because the first cache segment contains the cache information for frame 10, and segmentStartFrame has a value of 61 at frame 75 because the third cache segment contains the cache information for frame 75.

When you have a segmented cache, you cannot assign a different cache to your fluid because the Browse button for the Cache File Name attribute is disabled. Instead, you can modify the expression to swap in new cache files.

To swap in new segmented cache files for a fluid

1 Modify the naming prefix in the %N_*currentSegment* expression.

2 Open the Expression Editor for the expression node that drives the diskCache node's segmentStartFrame attribute.

3 Change the prefix of the expression to the prefix of the segmented caches you want to assign to your fluid and click Create.

Note	• When swapping segmented caches, replace only the expression's original prefix (for example, bob), not the prefix-with-uniqueID (bob1). • You can only swap-in caches that were created using the same Create Cache Segment options and the same fluids resolution.

The Expression Editor closes and Maya now correctly swaps in the new segmented cache files.

For the 'Segment the fluids cache' example, you can view the simulation of the *bob* segmented caches by replacing the *joe* prefix of the `joe1_fluidShape` expression with 'bob'. The segmented fluids cache files would then be named:

```
bob1_fluidShape12_1.mcfp      (frames  1-30)
bob1_fluidShape12_31.mcfp     (frames 31-60)
bob1_fluidShape12_61.mcfp     (frames 61-90)
bob1_fluidShape12_91.mcfp     (frames 91-100)
```

What went wrong?

Troubleshooting the Fluids cache

Maya cannot read the fluids cache

The following sections apply to both playback and initial state fluids caches.

There is not enough space in your temp directory

Maya cannot read the cache for the current fluid because your default temp directory does not have enough space. You can either make space on the drive where your temp directory is located, or you can change the path of your temp directory by editing your TEMP environment variable definition.

The default temp directories are:

(Windows)   *username*\Local Settings\Temp

(Mac OS X)   /Users/*username*/Documents/temp

(IRIX and Linux) /usr/tmp

> Note   If your temp directory is set to something other than the default, you can still locate your temporary disk cache files using the diskCache -tmp MEL command.

To make space in your temp directory

1 Browse to your temp directory.

2 Delete any nonessential files to free-up space on the disk where the directory is located.

3 Check that there is now enough space in your temp directory for your fluids cache.

To change the temp directory folder

1 Do one of the following:

(Windows)   Open the Control Panel and select System > Advanced > Environment Variables. Select TEMP from the list of *user* (not *system*) variables and click Edit. Enter a new system path for the TEMP environment variable and click OK.

(Mac OS X)   In the Maya.env file, type TEMP = *path* to define a new path for your temp directory. Save and close the Maya.env file.

(IRIX and Linux) In a UNIX shell type: setenv TMPDIR *path* and press Enter. *path* is the new path for the temp folder.

2 If Maya is running, restart Maya.

To turn off the creation of temporary cache files

See "To turn off the creation of local temporary fluids cache files" on page 53.

The fluids cache is on a remote network drive that you are unable to access

Maya cannot read the current fluid's cache because the cache is located on a remote network drive that does not have shared permissions. If this occurs, you need to make the file available again.

Maya cannot find the current fluids cache

When a Maya file and a fluids cache are copied to a new location, the path from the Maya file to its fluids cache may break. If this occurs, you need to re-establish the connection between the fluid and its cache.

To re-establish the link between the fluid and its cache data

1 Open your Maya file, select the fluid whose cache cannot be found, and then open the Attribute Editor.

2 In the Attribute Editor, select the cache or initial state node.

3 Click the folder button next to the Cache File Name field to browse (locally or over the network) for the current fluid's cache.

4 Select the cache and click Assign to re-establish the connection between the current fluid and its cache.

Maya is unable to create a playback cache for the current fluid

There is not enough space on the specified disk

The temp folder that you have designated as the destination for your fluids playback cache is on a disk that does not have enough space for the cache data.

To make more space on the disk

- Delete any unnecessary or non-essential files from the temp folder's disk to free-up space for the fluids playback cache.

- Change the destination of the fluids playback cache data. For example, you can specify a new temp folder on a different disk as the destination for the fluids playback cache.

To turn off the creation of local temp fluids cache files

See "Control the creation of temporary fluids cache files" on page 53.

When saving fluids caches on Windows or Linux systems, the resulting files are incomplete or contain blank frames.

The size of the cache file cannot exceed 2 gigabytes (GB). Cache files larger than 2GB will fail to write out completely. When saving a fluids cache file, Maya writes out up to the 2GB limit and then ignores the rest of the cache. You can work around this limitation by creating your fluids cache as segments (for example, 500MB mini caches). Each cache segment can then be rendered separately. To segment your fluids cache, see "Segment the fluids cache" on page 54.

C UV Texture Editor

About

Improvements to the UV Texture Editor

We've added an alternative display option in the UV Texture Editor to provide a workaround for some resolution and cropping limitations in the texture display.

There are two options for displaying a texture in the UV Texture Editor.

- Texture Image Display - This is the display option the UV Texture Editor has always used. Click the Display Image button or select Image > Display Image to switch to Texture Image Display.

- Editor Image Display - This is a new display option in the UV Texture Editor. Click the Editor Image button or select Image > Editor Image > Display to switch to Editor Image Display.

How do I?

Use Editor Image Display

Use Editor Image Display if you are experiencing resolution and cropping limitations in the Texture Image Display. With Editor Image Display, you can make changes and bake a texture to disk, and then reload it as a background image in the UV Texture Editor.

Click the Editor Image button or select Image > Editor Image > Display to turn on the Editor Image Display.

When you select an object or a component, Editor Image Display will attempt to load a previously baked file texture; if one does not exist the following error will be printed:

```
// Error: fileNodeName has not been baked for object:
fullPathToSelection and UV set: currentUVSet. //
```

To bake a texture to disk

1 Select the textured object or component in the modeling view.

2 In the UV Texture Editor click the Bake ⟳ button or select Image >
Editor Image > Bake.

An IFF image file is baked to disk using the `convertSolidTx` MEL
command.

The baked file is an accurate representation of the texture based on the
current Texture Editor UV Range, any resolution, size, repeat, or
coverage attributes on the file or procedural texture node, and all
attributes of the related place2dTexture node if one exists.

This file will be named according to the following template:

`fileNodeName_SelectedObject_currentUVSet.iff`

If there is no 'textureWindow' directory present in the sourceimages
subdirectory of the active project, one will be created and the file
texture will be placed inside.

The following is an example path:

```
C:/Documents and Settings/currentUser/My Documents/maya/projects/default/
sourceimages/textureWindow/file3_pPlane1_map1.iff
```

Reference   Limitations

Rebaking

Each time you make a change to the texture (File node and place2dTexture
node attributes), you have to rebake it. There isn't any notification when a
baked image becomes out of date. Whenever you bake a texture (click the
Bake ⟳ button or select Image > Editor Image > Bake) a complete list of
these of attributes is printed to the Script Editor.

File texture size

Changes to the UV Range, Repeat, and Coverage attributes directly affect
the size of the file texture. Therefore a baked file can become quite large.
Consider a 256x256 texture that is repeated twice in U and V, and
displayed over a UV range width of 2 and height of 3. The baked file will
be a 1024x1536 image (4*256x6*256). In addition, baking a file of this size
may be slow.

Due to physical memory limitations and memory fragmentation issues on
certain operating systems, Maya may not be able to bake an image file of
the requested size. To address this, the user can set upper bounds on the
image resolution by selecting Image > Editor Image > Bake > ❑. To
guarantee successful behavior, the recommended upper limits are 2048 by

2048. Additionally, if Maya detects a shortage of memory resources it may further reduce the resolution of the baked image beyond the limits set by the user.

UV Range

In the UV Texture Editor, changes to the UV Range affect all textures. However, in the Editor Image Display the UV Range is saved at the time of baking and when an image is loaded its UV Range is restored.

To revert back to the UV Range values in effect before the Editor Image was loaded, open the Image Range Options window and click Apply and Close.

Objects and components

Object level selection and component level selection require separate bakes. If you select a textured object and bake, and then select a component of the textured object, such as a face or a series of UVs, you may get an error message notifying you that you need to bake the texture. To prevent this error you will need to bake a total of two times for any object: once with an object level selection and once with a component level selection.

Pixel Snapping and Preserve Image Ratio

Pixel snapping works on the Editor Image for both square and non-square textures; Preserve Image Ratio does not. Preserve Image Ratio is ignored when in the Editor Image Display.

Multiple selections

When a selection includes more than one textured object or component the Texture Image Display and Editor Image Display may differ in which selection item's texture is displayed.