

# 3Delight For Maya Technical Specifications

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Key technical features of 3Delight For Maya 3.0

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# 1 Rendering Features

## Integrated Maya Renderer

Simply select *3Delight* as the current renderer in *Maya's Render Settings* and launch *3Delight* renderings using usual *Maya* rendering commands. *3Delight* can seamlessly be used to render the current frame in *Maya's* render view, with *Maya's* “Batch Render” mode and also with *Maya's* “Render” command line utility - with complete control over all rendering parameters.

## Two Render Modes

Both *direct* rendering in *Maya* and RIB export are supported. Direct rendering is useful in normal lighting and rendering work while RIB export can be used for render farm rendering. RIBs exported by *3Delight For Maya* are optimized for size and can be written in compressed<sup>1</sup> binary form.

## RIB Archive Export and Import

Individual objects or groups of objects can be exported to RIB archives and loaded by the *archive reader*. This features can drastically reduce rendering time and memory consumption. *Delayed* RIB archives are automatically supported.

## HyperShade and RenderMan Shaders Support

Both RenderMan shaders and *Maya's* HyperShade nodes can be assigned to objects. HyperShade nodes are automatically converted into *human-readable* SL code and compiled for rendering. New HyperShade nodes can easily be added by providing *3Delight For Maya* with their SL code. Both *Maya* lights and RenderMan lights can be used (with the former being automatically converted to RenderMan code).

Additionally, *3Delight For Maya* comes with a `rendermanCode` HyperShade node that will enable you to include RenderMan code *inside* HyperShade networks.

## Maya Layers and Arbitrary Output Variables

A *3Delight For Maya* render pass can render any *Maya* layer and can output *as many different output variables as desired*, in a single render. All useful output variables are available (diffuse, specular, shadow, ...) and more can be added.

## Motion Blur and Depth of Field

Multi-Segment motion blur and realistic camera shutter simulation contribute to high quality rendered images. Compared to other rendering software, motion blur in *3Delight For Maya* is *fast*. Depth of field is fully supported and simulates a realistic camera *bokeh*.

## High Quality Anti-Aliasing

Edge anti-aliasing, motion blur and depth of field quality are all controlled using very simple and *predictable* controls. “Pixel Samples”, “Pixel Filter” and “Filter Width” are the most common parameters one needs to know. Contrary to other rendering packages, such as ray tracers, increasing pixel samples for higher quality anti-aliasing does not affect performance significantly.

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<sup>1</sup> `gzip` compression is used.

**Geometric Displacements**

Displacements are efficiently rendered to sub-pixel accuracy. Hypershade displacement shaders as well as RenderMan shaders can be assigned to geometry.

**Shadows**

Both ray tracing and shadow maps can be used to render shadows. Shadow maps can be rendered in “deep” mode for realistic shadows in hair and fur. Additionally, *3Delight For Maya* can automatically generate “cube shadow maps” for point lights. Contrary to other rendering packages, cube shadow maps are not stored as six separate shadow maps but in one special shadow map.

**Ray Tracing**

Reflections and refractions are accurately rendered.

**Global Illumination**

Photon maps, caustics, *final gathering* and image based lighting are supported.

**Subsurface Scattering**

Automatic subsurface scattering can be enabled on a per-object basis and delivers impressive results, fast.

## 2 Supported Geometry

*3Delight For Maya* completely supports *Maya*'s geometry. The complete list follows:

**Maya Fur, Maya Hair and Paint Effects**

Rendered using *3Delight*'s efficient `RiNuCurves` primitive.

**Polygons** All types of polygons, including those with holes, are supported. Additionally, polygonal geometry can be tagged as a subdivision surface and rendered as such.

**NURBS** (*Maya surfaces*)

All NURB surfaces are supported. Trim curves on surfaces are also fully supported and rendered to sub-pixel accuracy. All surfaces are rendered *smooth*.

**Hierarchical Subdivision Surfaces**

Fully supported, including both creasing and partial creasing on edges and vertices as well as per-level UV sets. As always, all hierarchical subdivisions are rendered smooth and to sub-pixel accuracy.

**Particles** 'Point', 'streak', 'blobby', 'sphere' and 'patch' particles are supported. 'Point' particles are rendered using *3Delight*'s efficient *lightweight particle* primitive.

**Curves** Curves can be tagged as renderable on a per object basis and rendered using *3Delight*'s `RiNuCurves` primitive.

Additionally, UV sets, texture reference objects and normals (if any) are correctly assigned to all primitives.

## 3 Workflow

*3Delight For Maya* offers a multi-pass rendering workflow that is suitable for production work. “Render Passes” can be used to render different components of a scene (as in “Render Layers” or to render different *lighting characteristics* of a scene (such as diffuse, specular or ambient occlusion). In short, a render pass can define the following parameters (please refer to the User’s Manual for a thorough description):

1. Camera and quality options
2. Render mode. Either direct render or RIB export.
3. Objects to render. *Maya* sets can be used to define groups of objects to render in a given pass. The default is to render all objects in the scene.
4. Light sources to render. *Maya* sets can be used to define the light sources that are used. The default is to use all light sources.
5. Clipping planes to use. A *3Delight For Maya* clipping plane can cut space in any desired direction to clip away geometry. Clipping is performed at sub-pixel accuracy and can be used, for example, to cut an object in two.

Additionally, a given render pass can use a certain “shader collection.” This means that objects can have different shaders assigned to them, depending on the pass being rendered. The User’s Manual provides more information about this unique feature. Note that one could simply use one render pass for the more traditional one layer rendering.

## 4 Configurability and Flexibility

As with all serious production tools, *3Delight For Maya* has been designed with flexibility in mind. In fact, no other rendering plug-in on the market achieves the same balance between integration and configurability.

1. We implemented most of the RenderMan interface in MEL, which means that you can call RenderMan commands in your MEL scripts. Other packages mainly provide “RIB boxing” capability. To illustrate the concept, here is an example snippet of MEL code that is attached to a *Maya* primitive:

```
if( $current_pass == "beauty" )  
    RiReadArchive -an "fur.rib";
```

Such MEL code can be attached in various places during scene rendering or exporting.

2. *3Delight For Maya* was written mostly using the MEL RenderMan interface, which means that one can modify it at will. Only core functionalities have been embedded in the plug-in DSO for performance reasons.

## 5 Import and Export

### Output Formats

*3Delight For Maya* can save rendered images in many file formats, including: TIFF, IFF, OpenEXR, cineon, bmp, sgi, softimage and PSD.

### Input Formats

*Maya*'s textures used in HyperShade shaders are automatically converted to *3Delight* '.tdl' textures<sup>1</sup>. When using RenderMan shaders, *3Delight*'s texture converter (`tdlmake`) can be used to convert the most common images formats to '.tdl' textures.

### HDR Images

`tdlmake` can convert high dynamic range probes (both normal and "two fish" probes) images into environment maps suitable for *image based lighting*.

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<sup>1</sup> '.tdl' files are normal '.tif' files augmented with mip mapping data.



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