Content

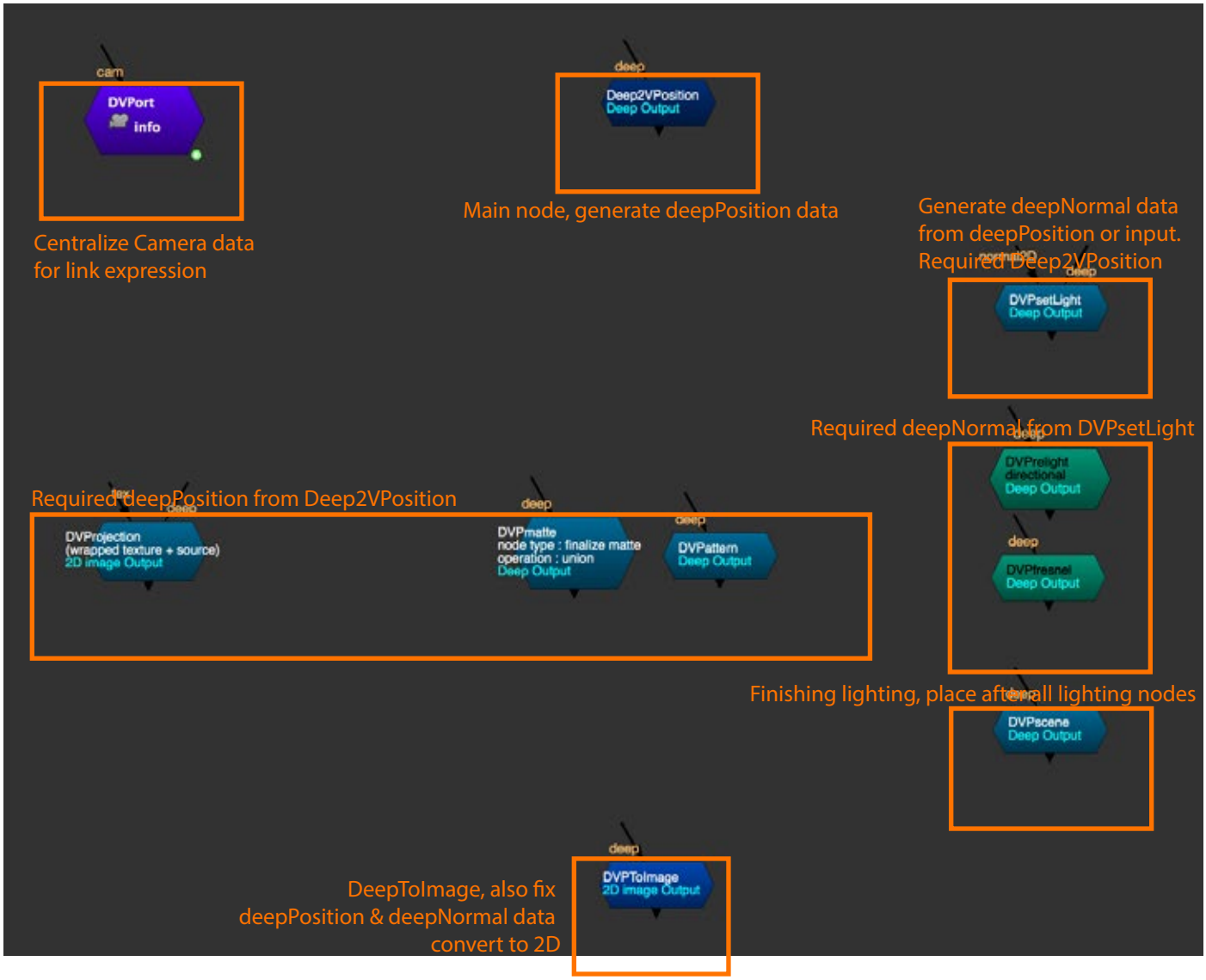
Introduction

The principle of Deep2VP is convert deep data to real 3D position data and provide various toolset under deep position data. All the tools process in deep without losing the advantage of deep, such as volumetric and pixel filter.

Deep compositing can be very heavy if not well manage samples and channels, so this toolset will not increase the amount of samples. Some tools will reduce samples instead, e.g. DVPmatte and DVPattern. Due to some operations, this tool will generate 2-3 extra channels, such as ‘deepPositon’, ‘deepNormal’ & ‘deepRawColor’.

All Deep2VP nodes has its own specify settings, some required deepPosition only, some required deepNormal. The color of the node can tell its own specialties.

Here is a simple diagram for the explaination :

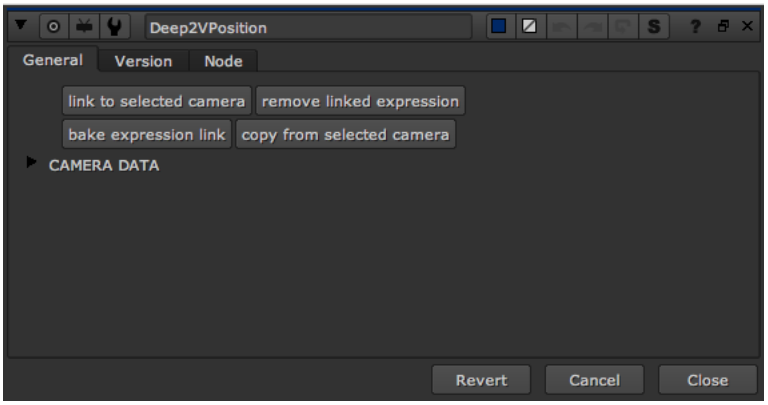


Deep2VPosition

IN Deep OUT Deep

Deep2VPosition is a main node in this entire toolset. It converts deep data to 3D position data and process all the nodes in this toolset. So this node needs to go before any nodes. Once gather the camera data, and it will generate position data under a new channel, called ‘deepPosition’. After this channel had been created, then you don't have to add this node anymore in downstream.

‘deepPosition’ also able to use on any position tools in 2D. Use ‘DVPToImage’ converts to this channel to 2D can fix all the semi-transparent pixels and pixel filter.



Linked to selected camera
All required camera data will be linked to this node by expression. Some companies have their own camera node with a different node class or different knob name, so this button is not limited to specify node class. When default camera knob name cannot find in selected node, it will prompt up a window to let user selected relevant knobs.
You can find the world space position data under *'deepPosition'* channel after this node. It supported volumatric deep data. If want to bring the position data to 2D in downstream. Please only use *DVPToImage* which comes along with this toolset.

Removed linked expression
Removed linked expression in this node. All the values remain unchanged, but no animation will be baked.

Baked expression link
Will baked all the animated value from expression, no more connection with any nodes.

Copy from selected camera
Select a camera and this will copy all the animated values to this node without any connection with any nodes.

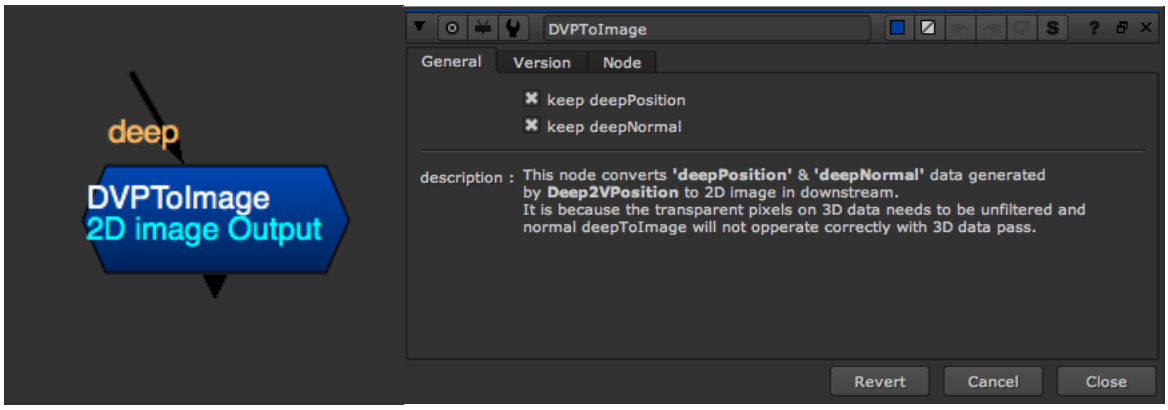
User can also copy or linked the camera data manually to the knobs in ‘CAMERA DATA’ group.

This node will also create another channel called ‘deepRawColor’ . Casual user doesn’t need to understand what this channel does. This channel will be removed when you use ‘DVPToImage’ to convert 2D image. It is only for operation in this toolset. Check out Notes section if you want to understand how the tools use this channel.

* This node supported animated or non-animated re-rack camera since 3.0
** This node supported pixel aspect in project setting since 3.3 (esp for anamorphic project)

DVPToImage

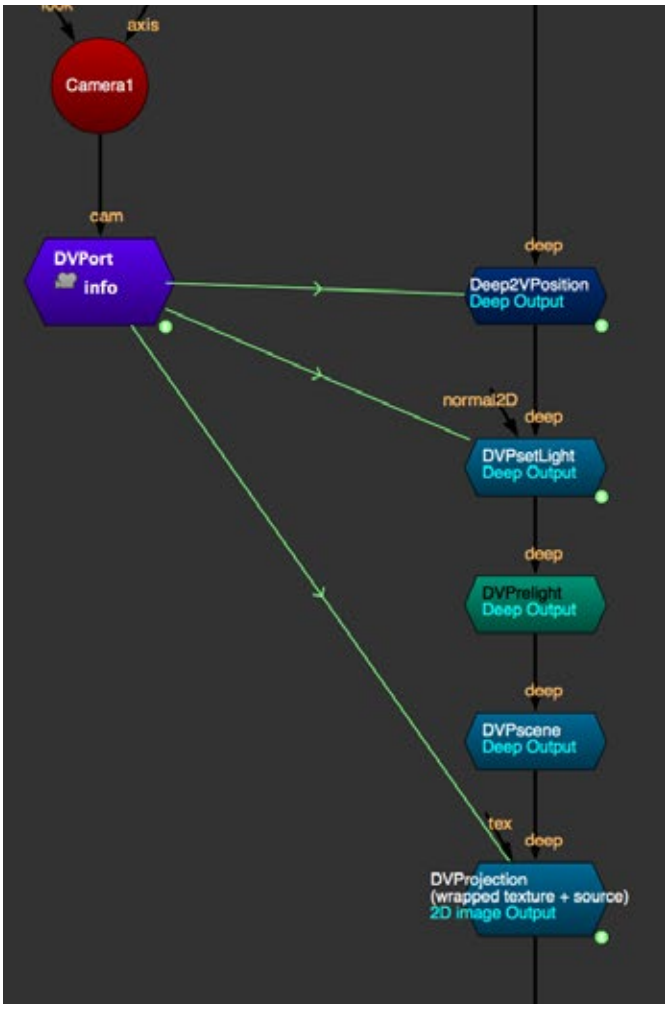
IN Deep OUT 2D image



This node helps to output ‘deepPosition’ and ‘deepNormal’ channel to 2D. Due to 3D data supposed to be non-filtered data, all transparent, semi-transparent and filtered pixel will be fixed to raw non-filtered 3D data. That is regular ‘DeepToImage’ cannot do beside deep.front and depth.z. If want to keep deepPosition and deepNormal in 2D, required this node to process.

DVPort

IN Camera OUT ----------



This node will centralize the camera data in one place. Due to the limitation in TCL and speed in python, I choose expression link to camera in this toolset. But one of the requests is get camera input for the tool instead of link with expression. The request concern is when the camera node changed, all the Deep2VP nodes need to re-link again. So the purpose of this node is centralize all the camera data in this node, and set link to this node instead. So when the camera change, just connect the new camera to this node.

The camera can stack with axis nodes, the toolset will only gather world matrix for any camera transformation (beside DVProjection) . It doesn’t expect any nodes between camera and this node. It’s because it is using ‘input.xxxxx’ TCL to fill up the camera information.

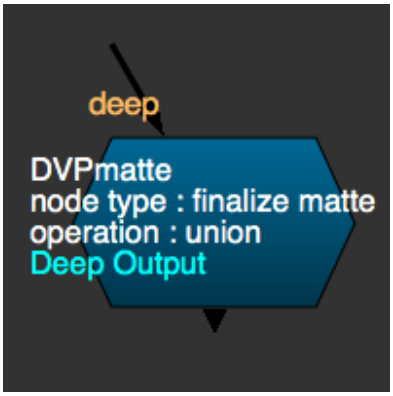
* I don’t use [topnode] because concern axis stack. ‘KnobChanged’ on parent node will slow down the nuke script.

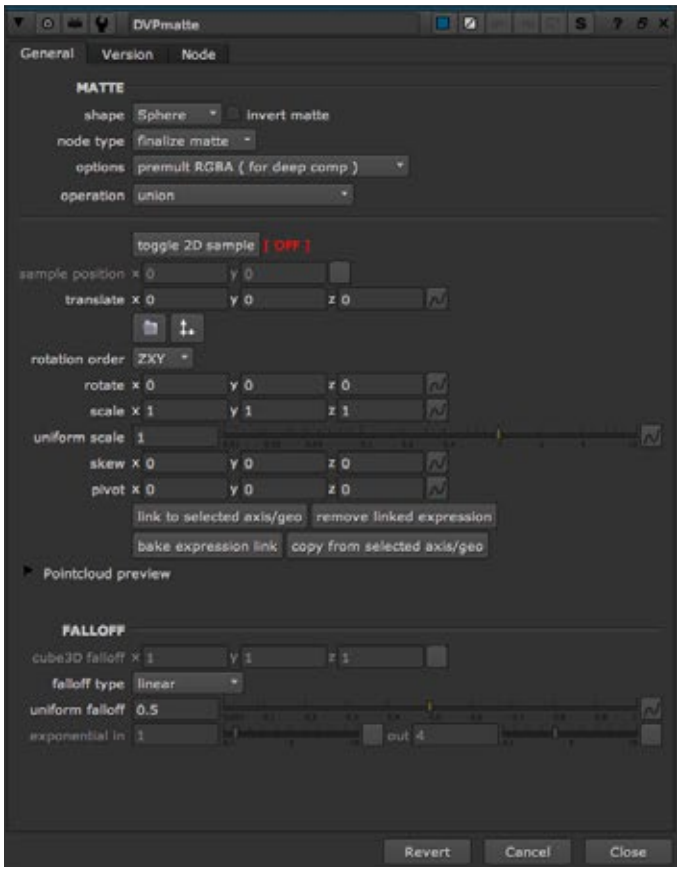
DVPmatte

IN Deep OUT Deep

Position matte is very common in CG compositing. DVPmatte is same as position matte but with deep in real 3D space. It is taking advantage of using deep to get real z matte and separate non-filtered deep samples and pixel filter in alpha. In 3.5, this tool can combine with multiple matte with different operation, so it can generate more shape than just sphere, cube and cylinder shape.

This tool has 4 different ways to sample the position where you want to apply. 2D sample, transform preview geo in 3D, link selected axis and import chan file.





Matte shape
Select the 3D shape of the matte. 3D shape can be preview under 3D view when the panel of this node is active.
Sphere : only support uniform falloff.
Cube : support separate 3-axis falloff.
Cylinder : only support uniform falloff.

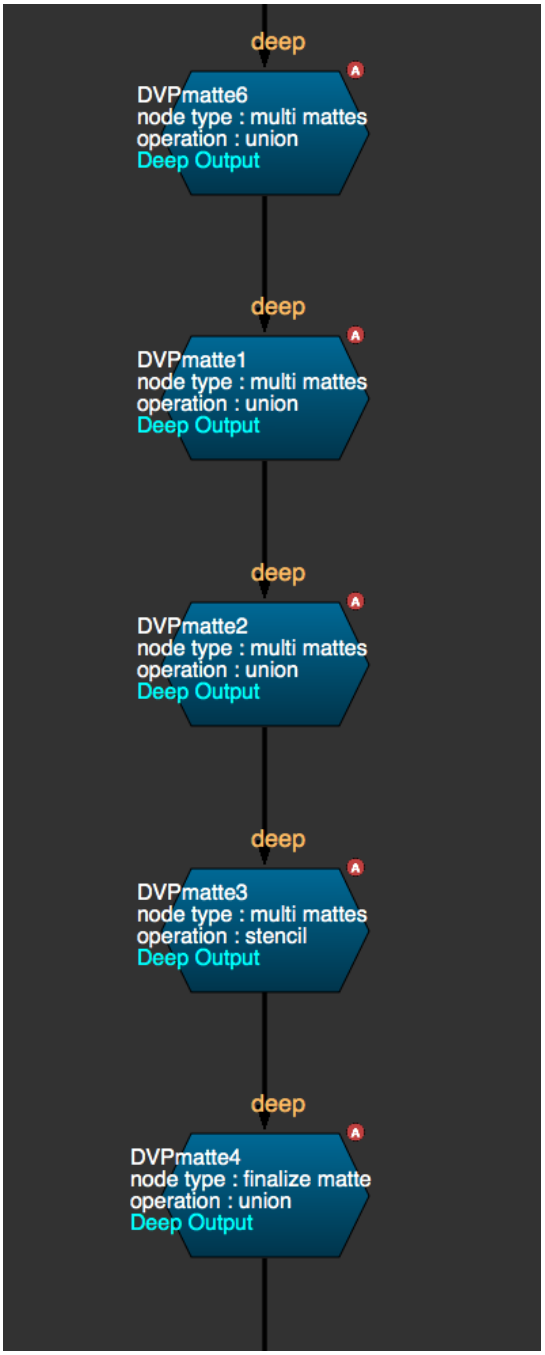
Invert matte
Invert the matte of the shape. Same as deepHoldout but with falloff support (soften matte).

Node type
finalize matte
Premult all the mattes in the 'DVPmatte' stack to get the final matte.
multi matte
Keep the matte and pass along to downstream for multi mattes purpose. It will only premult RGB for 2D preview.

Options
premult RGBA
Premult RGBA in volumetric deep. It good to carry for deep comp in down stream. May find some edges has stronger alpha in 2D view. That is because of the samples overlap in front and back, but the data per sample are accurate.
black & white matte
This will fix the samples overlap look, but not good for deep comp. Recommend convert it back to 2D and shuffle the black & white to alpha for 2D comp purpose.

Toggle 2D sample
By default, this option is off. Turn this on, then you can sample the image in 2D view. When you are done, remember to turn this off again. Otherwise it will sample the value in every frame.

Sample position
This knob is disable by default. Active when 'Toggle 2D sample' is on.



Multi matte workflow needs to set all the node type to multi matte, but the last one set to finalize matte. The first multi matte node's operation must be 'union'.

Transformation
Then this node is active (shown in panel), user switch to 3D view to preview the matte in 3D space. Snap the pointcloud or move the preview geo manually.

Linked to selected axis/geo
Use this function to link the transformation of 3D node to this node.

Remove linked expression
Removed linked expression in this node. All the values remain unchanged, but no animation will be baked.

Baked expression link
Baked out the existing expression link back to this node itself. After that, the linked node is not required for this node anymore. Baked value is base on the frame range in project setting of the nuke script.

Copy from selected axis/geo
Select the axis/geo, then this will process 'link to selected axis/geo' and 'bake expression link' in once.

Pointcloud
When this node panel is active, pointcloud will be shown under 3D view.
none
will not show the pointcloud in 3D
raw pointcloud
show the pointcloud from input data, without any effects from this node
with matte applied
This can show the instant result. Since it feedback in real time, it might slow down the progress in 3D space.

Cube 3D falloff
This will only applied when matte shape selected as cube.

Falloff type
6 different falloff types

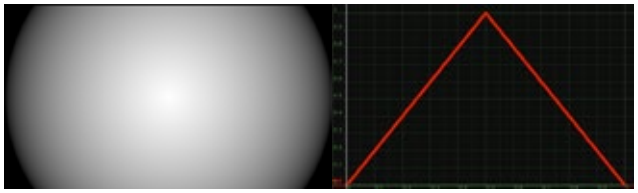
Uniform falloff
This is a globel falloff value. Support for any shape of matte.

Exponential
This knob will enable when exponential had been selected in falloff type.

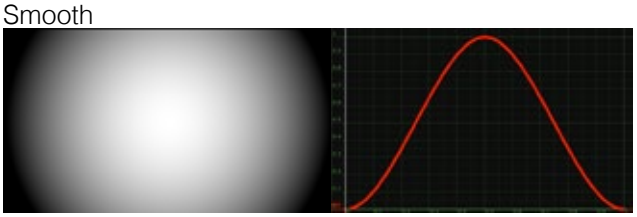
What are the difference of those falloff type?

None

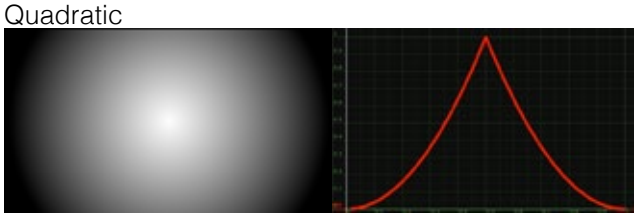
Linear



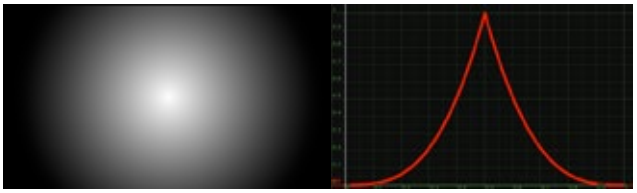
Smooth



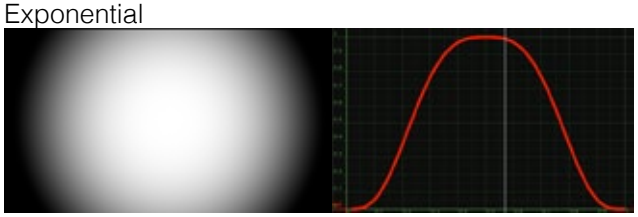
Quadratic



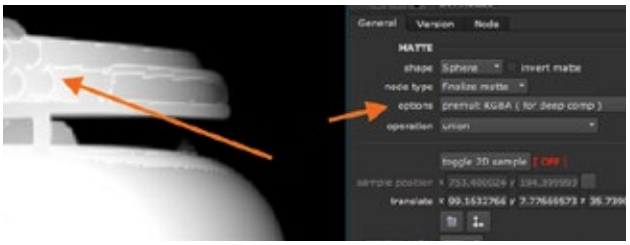
Cubic



Exponential

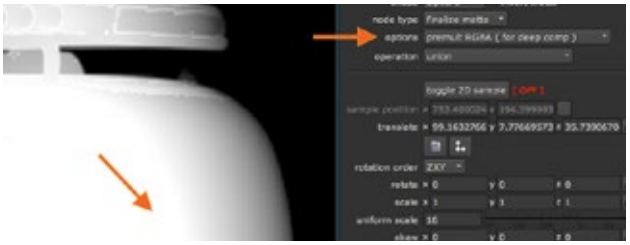


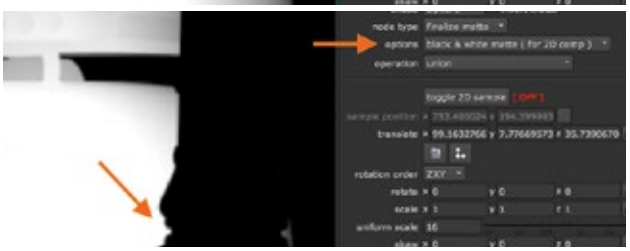
Output options



Matte on deep, you might see this kind of edges on semi-transparent pixel. That's because of multi sample layers in the same screen space coordinate, but it does make sense and correct in 3D space. So if compositing in deep, it all works fine.

If you want to output the matte in 2D, it might give you edge issue. So 'DVPmatte' options can give you a black & white matte that can be use in 2D comp.



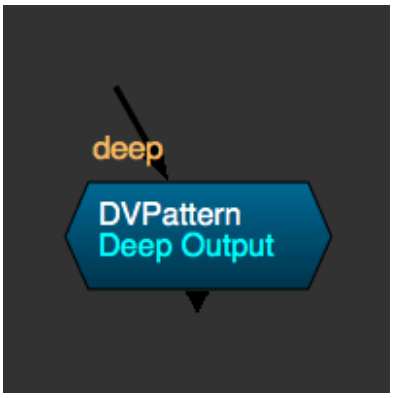


But black & white matte will makes you loss the possibilities matte in z axis. Be consider what the needs in your comp.

DVPattern

IN Deep OUT Deep

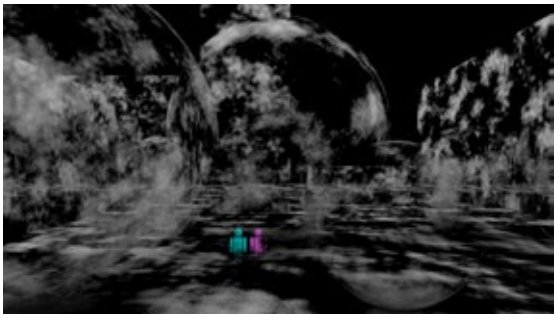
Position noise is one of the common nodes in CG compositing. DVPattern is also doing the same thing in deep, has 7 different patterns.
They are : fBm, turbulence, noise, random, stripes, ripple and rays.



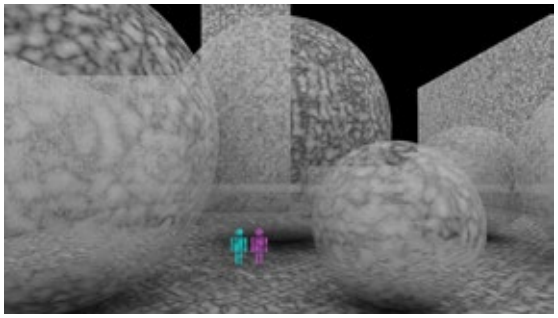
Pointcloud
When this node panel is active, pointcloud will be shown under 3D view.
none
will not show the pointcloud in 3D
raw pointcloud
show the pointcloud from input data, without any effects from this node
with pattern applied
This can show the instant result. Since it feedback in real time, it might slow down the progress in 3D space.

Pattern types

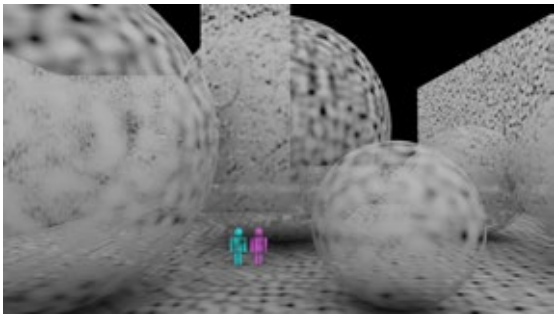
fBm



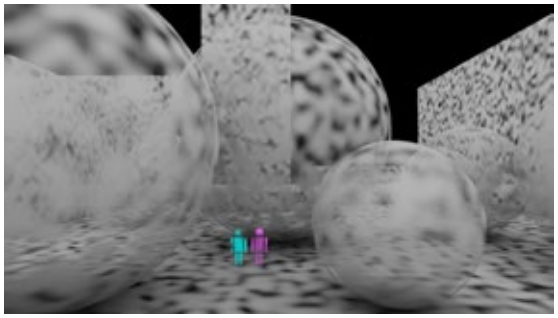
turbulence



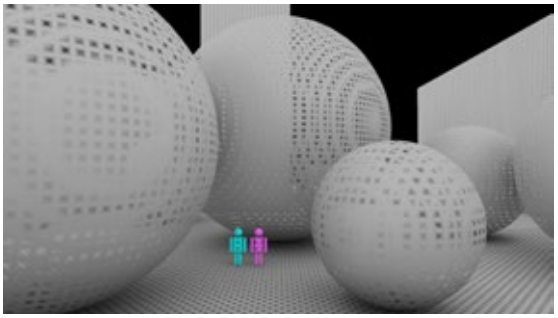
noise



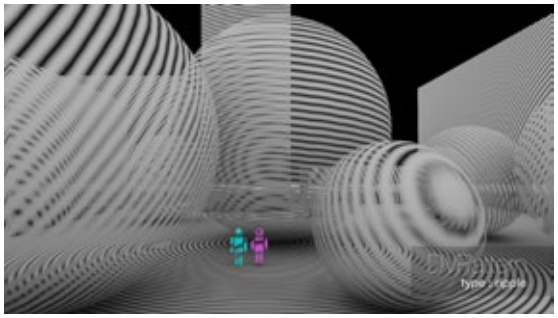
random



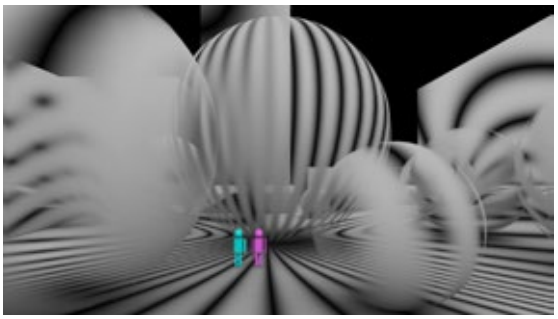
stripes



ripple



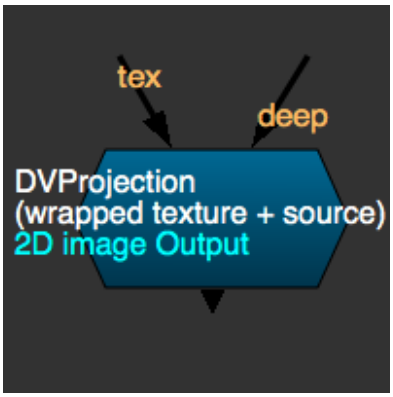
rays



DVProjection

IN Deep OUT 2D image

This node can process projection on deep. It can be used with the current shot camera, or place the camera manually. Output of this node is 2D image, so it doesn't need 'DeepToImage' or 'DVPToImage in downstream. On the other hand, the deep data will be lose after this node.



Freeze frame
Check this box to enable framehold function for animated camera

Framehold
Input the frame number and freeze the projection camera's animation

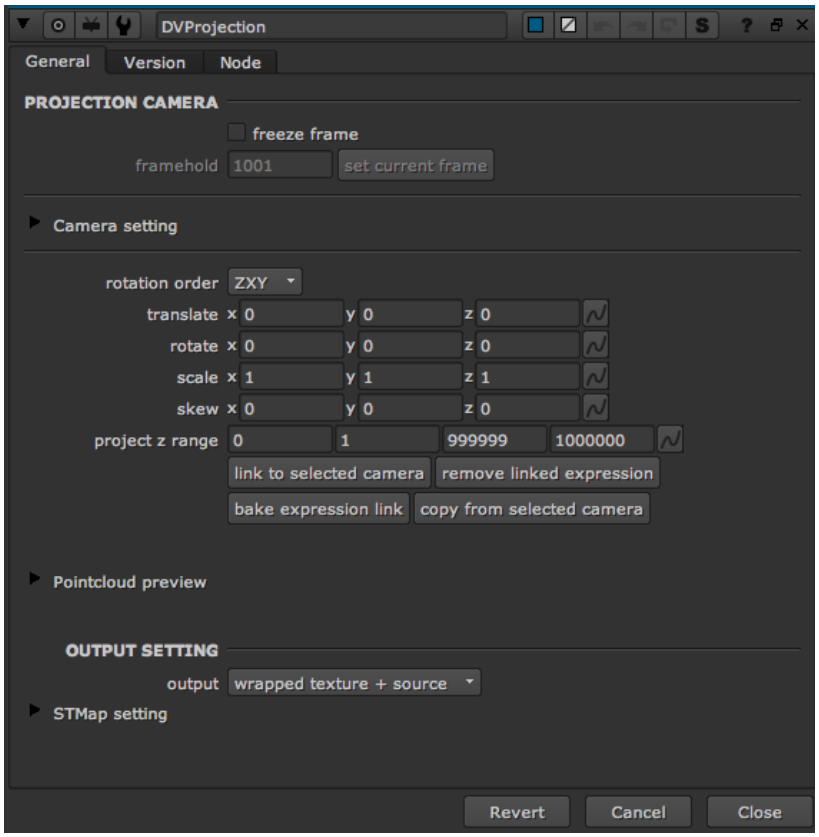
Set current frame
Automatically set frame frame into framehold knob.

Project z range
Set the projection distance from the projection camera (in term of distance)
First value : start ramp in value
Second value : end of ramp in value
Third value : start ramp out value
Forth value : end of ramp out value

Link to selected camera
Selected any Camera nodes and this button will link the position to the projection camera.

Removed linked expression
Removed linked expression in this node. All the values remain unchanged, but no animation will be baked.

Baked expression link
Will baked all the animated value from expression, no more connection with any nodes.



Copy from selected camera
Select a camera and this will copy all the animated values to this node without any connection with any nodes.

Pointcloud
When this node panel is active, pointcloud will be shown under 3D view.
none
will not show the pointcloud in 3D
raw pointcloud
show the pointcloud from input data, without any effects from this node
with project image
This can show the instant result. Since it feedback in real time, it might slow down the progress in 3D space.

Output
Support 3 different outputs
Wrapped texture + source
which is a projected texture composite with the input.
Wrapped texture
which is only projected texture
UV
which is a uv map, can use this with STMap in downstream.

DVP Relight Setup

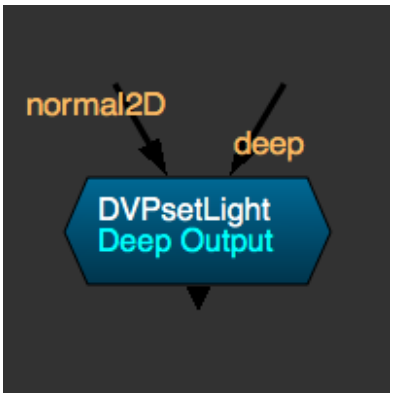
Let's introduce a basic setup for relight before I walkthrough the nodes in toolset.

For relight in deep, I breakdown 2-3 nodes in the setup for multi lights supported, raw light pass output and light with beauty output. **DVPsetLight** always be the first node for relight preparation, then add **DVPrelight** nodes as many as you need. If you need raw light only, you can convert it to 2D image directly. If you are lighting on beauty and keep the deep comp, connect **DVPscene** at the end.

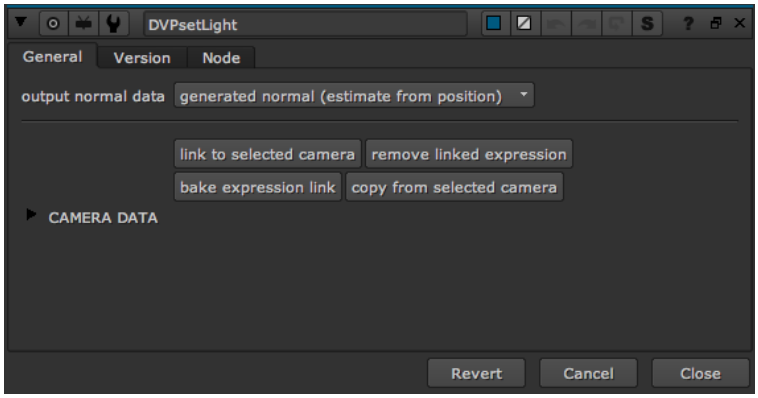
DVPsetLight

IN Deep OUT Deep

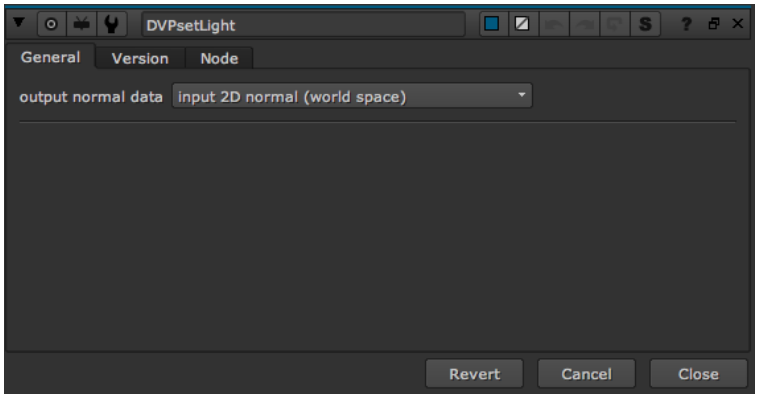
This node needs to go before DVPrelight. Setup how the normal data use in deep for relight. This node will provide 4 options to pipe in normal data into deep stream.



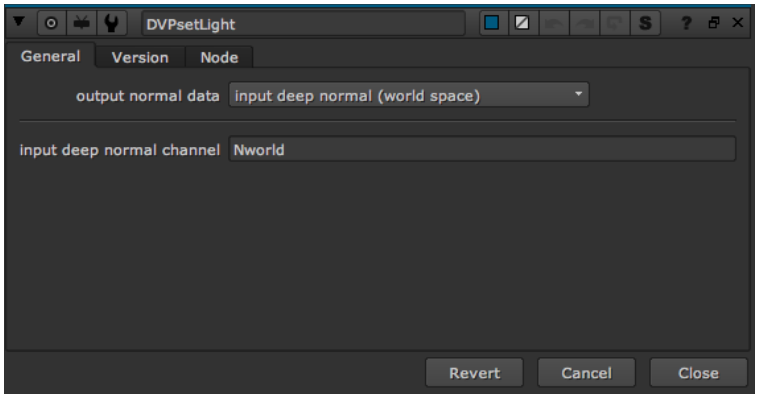
Generate normal by estimate from position
If no any normal data provide, this could be one of the options. The result might not perfect, might have some edges problem on individual objects. If deep data from scanlineRender, geo required high level subdivision.
Required camera data for this option.



Input 2D normal (world / camera space)
If have normal data in 2D data, connect the pass to this node. The resolution of normal2D input must be the same as the deep resolution. Camera space normal required camera data, but not for the world space.



Deep normal
Use deep normal data from deep input. Type in the channel contain normal data in deep.
For example : channel name is ‘Nworld.red’ , ‘Nworld.green’ , ‘Nworld.blue’. Type in ‘Nworld’ for the channel name.
* When using scanlineRender for deep output, set output vector normal, then you can have normal data in deep format.



Link to selected camera
Selected any Camera nodes and this button will link the position to the projection camera.

Removed linked expression
Removed linked expression in this node. All the values remain unchanged, but no animation will be baked.

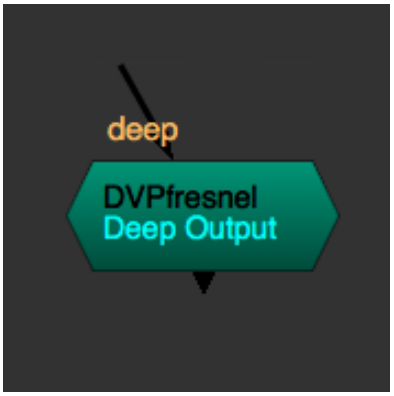
Baked expression link
Will baked all the animated value from expression, no more connection with any nodes.

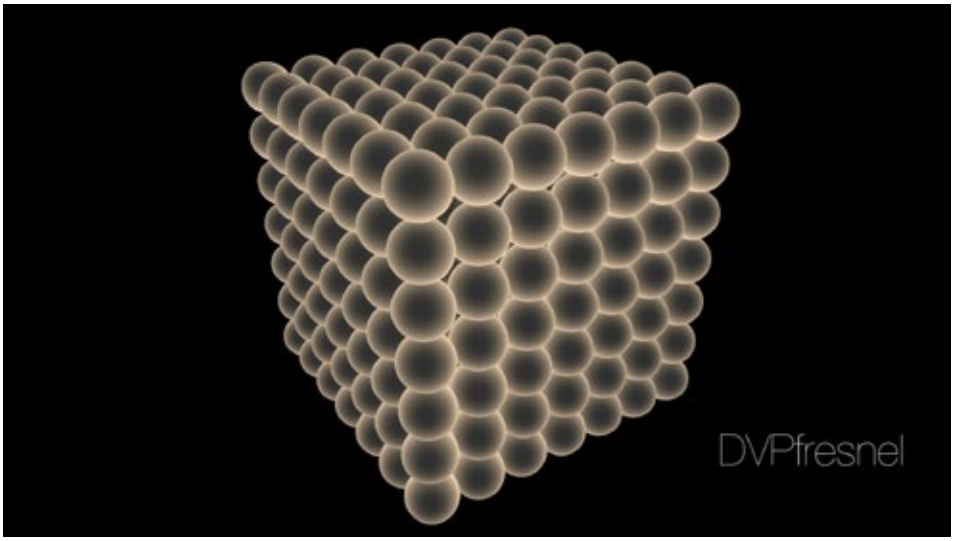
Copy from selected camera
Select a camera and this will copy all the animated values to this node without any connection with any nodes.

DVPfresnel

IN Deep OUT Deep

DVPfresnel is part of the lighting node in this toolset. It is because it required normal data. It created fresnel (aka facing ratio) to every objects in the scene. This node can stack with multiple ‘DVPrelight’ nodes together. The node itself output raw light data in deep format. Connect to ‘DVPscene’ to get this raw fresnel composite with beauty.

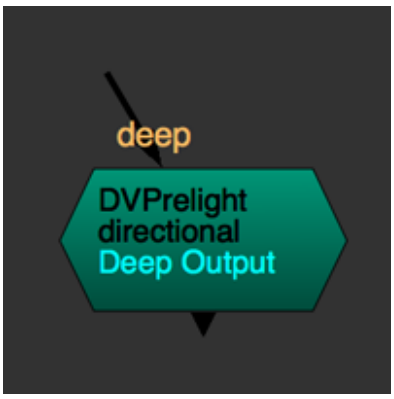




DVPrelight

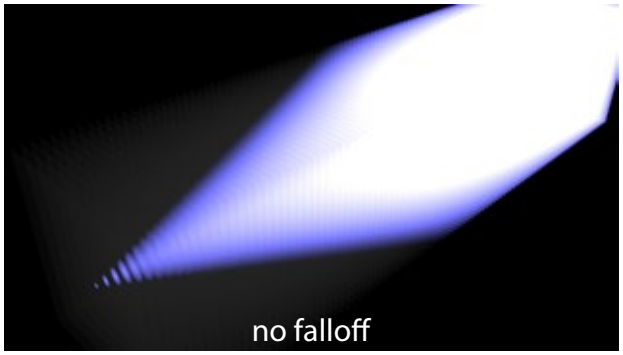
IN Deep OUT Deep

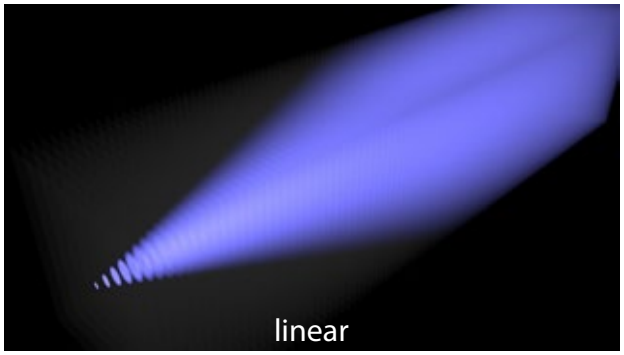
'DVPrelight' node has 3 types of light as default nuke light node. It can stack with multiple nodes together and will out raw light in deep format. Connect 'DVPscene' to composite with beauty. The setting in this node is almost same as nuke basic light node, but with extra exponential falloff type, to get a flexible result.

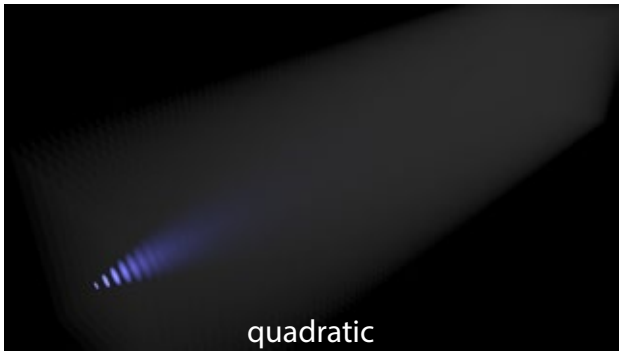


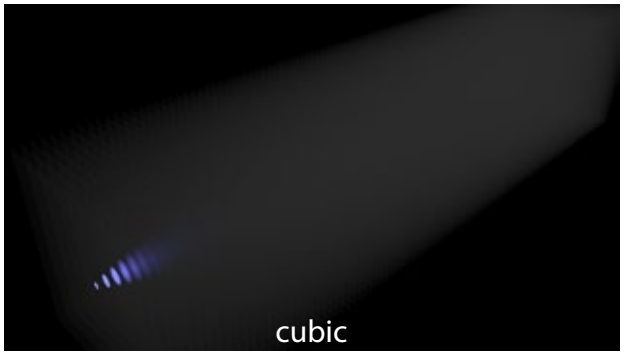
Pointcloud
When this node panel is active, pointcloud will be shown under 3D view.
none
will not show the pointcloud in 3D
raw pointcloud
show the pointcloud from input data, without any effects from this node
with light applied
This can show the instant result. Since it feedback in real time, it might slow down the progress in 3D space.

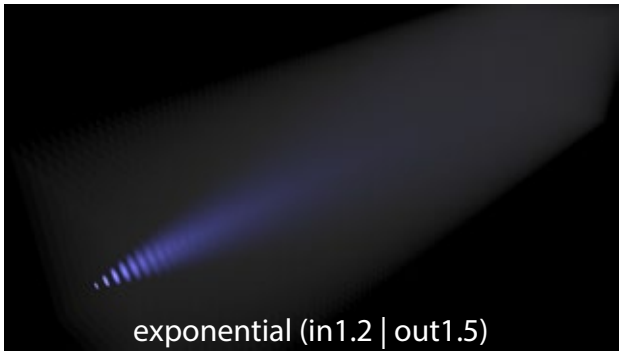
Falloff types







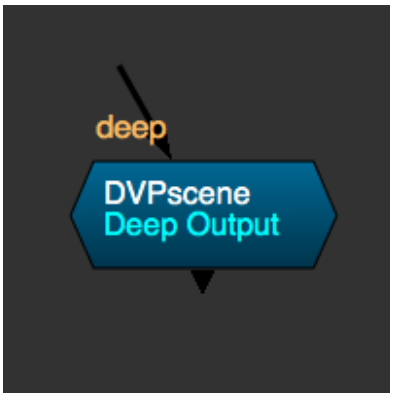




DVPscene

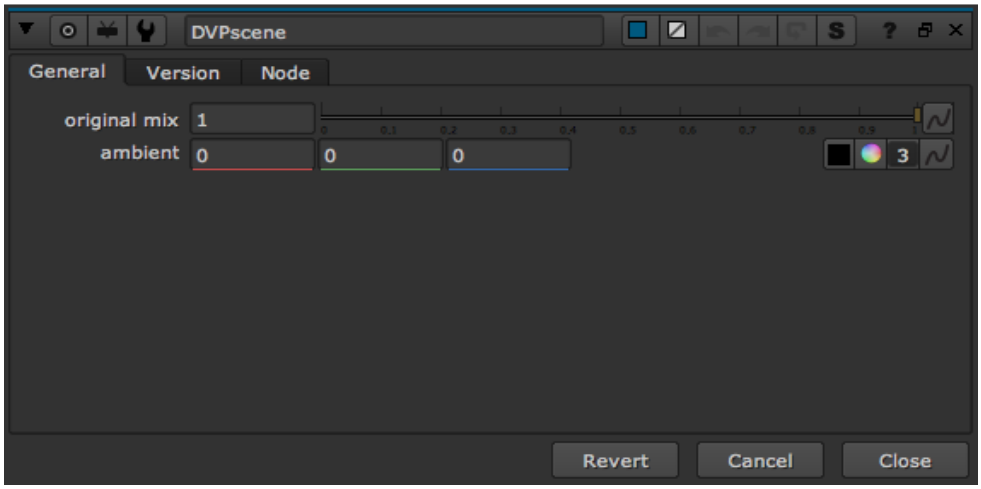
IN Deep OUT Deep

This node will composite the relight process in deep format.

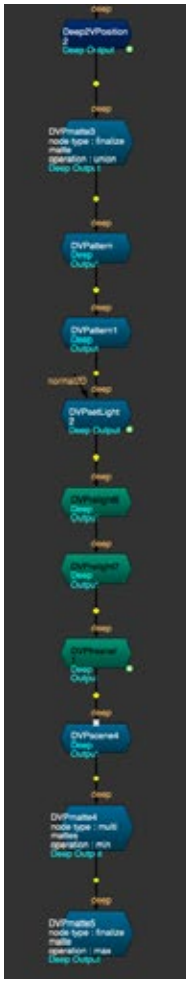


Original mix
Combine the original color in diffuse.

Ambient
Add ambient color on top of diffuse, before the rawlight



Notes



Stack DVP nodes

Stack DVP nodes

All the nodes in the toolset can stack together, only green nodes need to connect between ‘DVPsetLight’ and ‘DVPscene’. Blue nodes cannot put inside the lighting setup, otherwise will break the setup.

DeepRawColor

‘Deep2VPosition’ and ‘DVPsetLight’ will generate a channel called ‘deepRawColor’. The channel helps to pass the data from upstream to process stack operations. Regular user might not need to understand how this process. If anyone want to troubleshoot the setup, the following is the information.

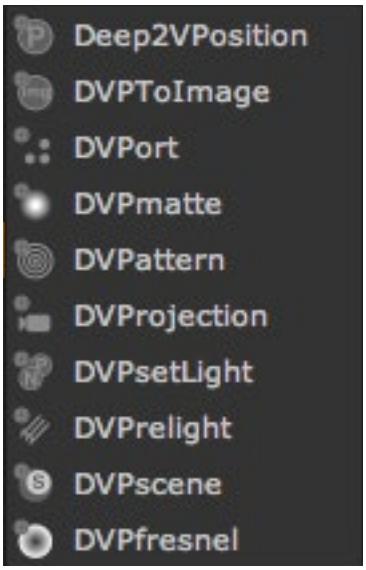
In ‘DVPmatte’, current matte processed under deepPosition.alpha, and then deepRawColor.alpha stored the matte from upstream plus current matte. When selected ‘multi mattes’, all the matte process will store under deepRawColor.alpha, but will not applied on alpha because of the premult process in deep. When selected ‘finalize matte’, the deepRawColor.alpha will process to RGBA and removed the deep samples when alpha <= 0.0 . And removed samples cannot restore anymore in downstream.

In Deep2VP lighting setup, because requested to have raw light output and concern multple light apply, so ‘DVPsetLight’ will shuffle RGB to deepRawColor.RGB and put RGB to black.

In ‘DVPrelight’ and ‘DVPfresnel’, light matte process under deepNormal.alpha and apply the matte to RGB for the raw light. ‘deepRawColor’ remain untouch until ‘DVPscene’ node connected. Current light will combine with input RGB to output the new raw light. That’s why ‘DVPsetLight’ set RGB to black.

In ‘DVPscene’, it will bring back deepRawColor.RGB and process with RGB (raw light) to return the color with new lighting. Like how diffuse color combine with raw light in AOV. The algorithm is :

(input deep color + ambient color) * raw light color



Icons

Since 3.5, the toolset has a whole new icon set.

Thanks all giving me feedback of Deep2VP!

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3.5 Showcase : https://vimeo.com/379527067
2.0 Demo : https://vimeo.com/338501133

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