

Houdini

Light, Shade, Render

M02: Modifying the Mantra Surface Shader

Agenda

▶ This Week

- ▶ Creating a Material Tester OTL
- ▶ Quick Review of Material Palette
- ▶ Quick Review of the Mantra Surface Shader
- ▶ Limitations of the Mantra Surface Shader

▶ Goals

- ▶ Building a VOP Network using the Material Shader Builder

▶ Next Week

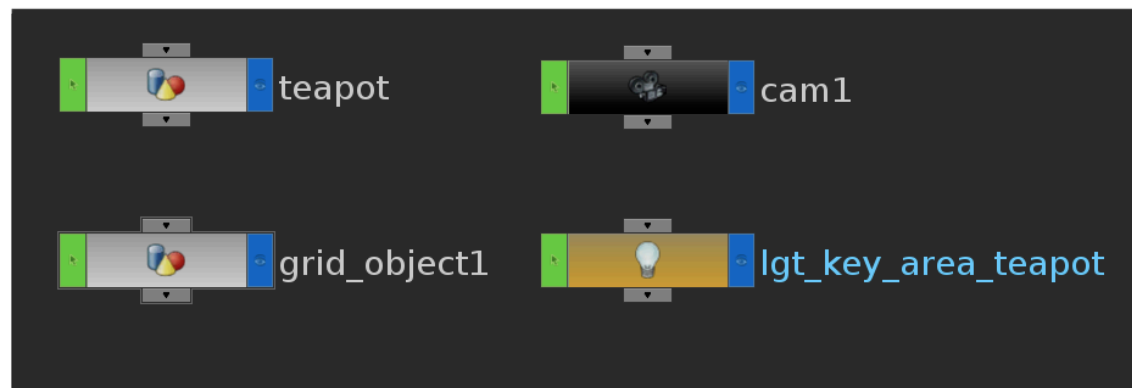
- ▶ Setting up the Parameter Interface
- ▶ Creating a VOP OTL
- ▶ Adding Parameters after the creation of an OTL
- ▶ Modifying the Mantra Surface Shader to suit your Needs



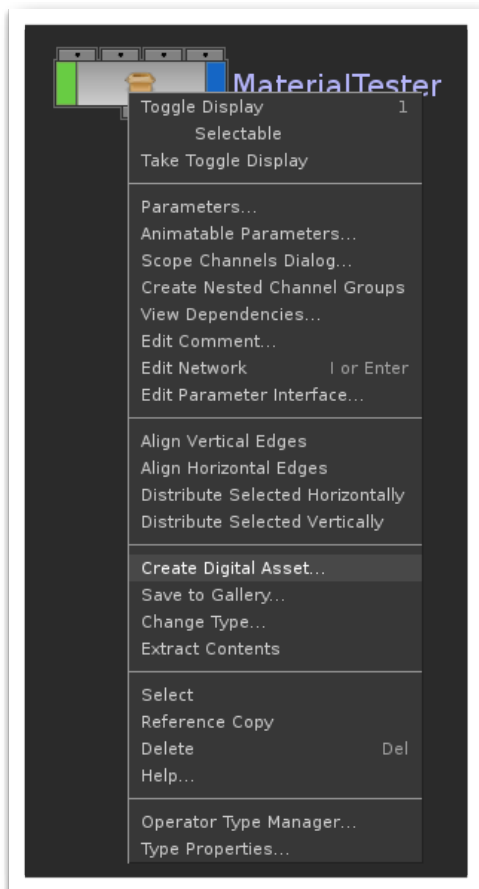
Creating a Material Tester OTL

Creating the Geometry, Lights, & Camera

- Create a new project folder
- Drop down a platonic teapot
- Drop down a grid
- Translate the teapot on top of the grid
- Make the grid very large (100x100)
- Zoom in on teapot and place Camera
- Drop down an area light with a nice orientation



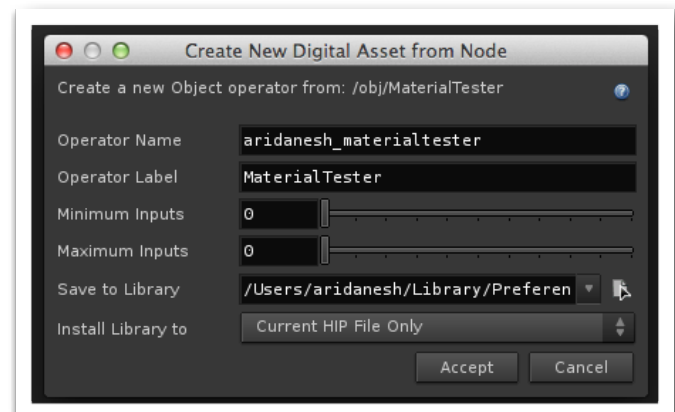
Creating the Digital Asset



- ▶ Create a Subnet for all the items
- ▶ Name it MaterialTester
- ▶ Right Click on Material Tester and select “Create Digital Asset...”

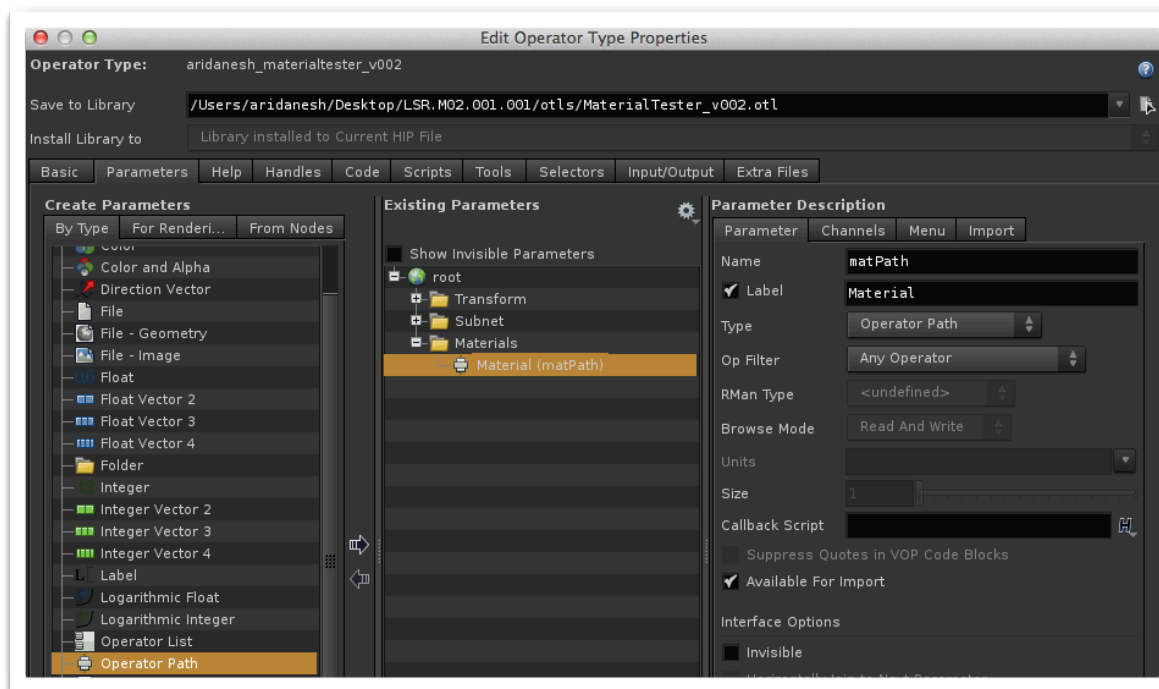
Creating the Digital Asset (cont.)

- Create a Subnet for all the items
- Name it MaterialTester
- Right Click on Material Tester and select “Create Digital Asset...”
- In the Dialog Box that pops up:
 - Operator Name: materialtester
 - Operator Label: Material Tester
- Click on “Save to Library” to open file chooser
 - Save to - \$HIP/otls/MaterialTester_v001.otl



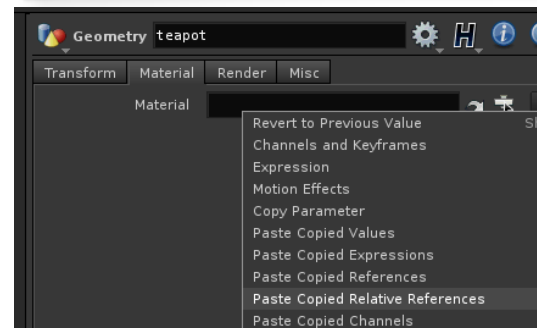
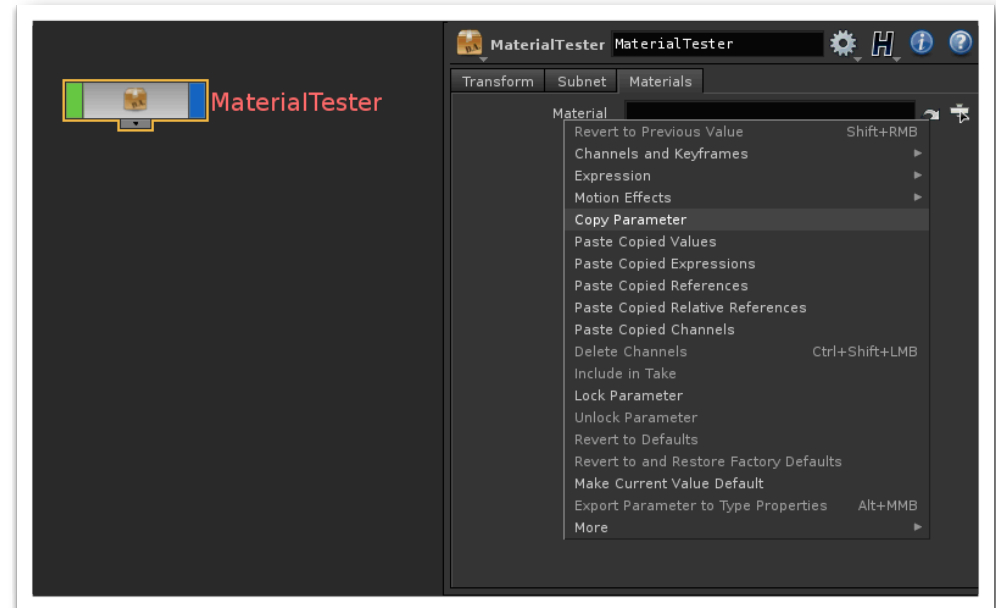
Creating the Digital Asset (cont.)

- In the Parameters Window that opens up
 - Add a new folder
 - Label it Materials
 - In the Materials Folder
 - Add an Operator Path
 - name matPath
 - Label Material
 - Click Accept



Creating the Digital Asset (cont.)

- ▶ Click on the Materials Tab of the MaterialTester Asset
 - ▶ Right Click on the Material Label and Copy Parameter
- ▶ Dive into the Asset and Select the Teapot
- ▶ Click on the Material Tab
- ▶ Right Click on the Material Parameter
- ▶ You will see the expression
 - ▶ ``chsop("../matPath")``



Creating the Digital Asset (cont.)

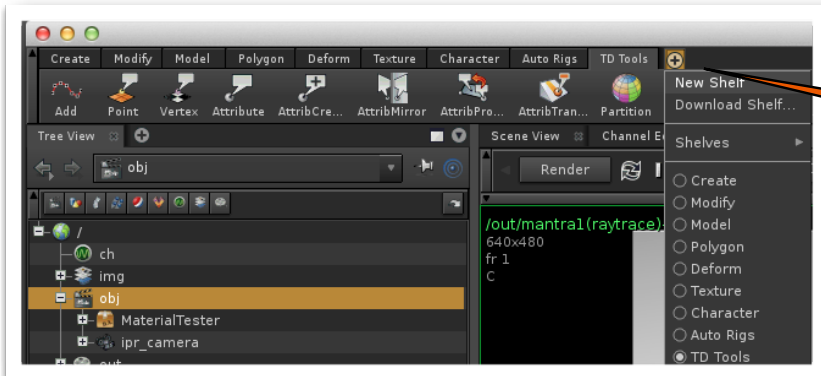


- Go back up to the /obj level
- Select the MaterialTester
 - Right Click and “Save Operator Type”
 - Right Click and “Match Current Definition
- Text on node changes from red to blue



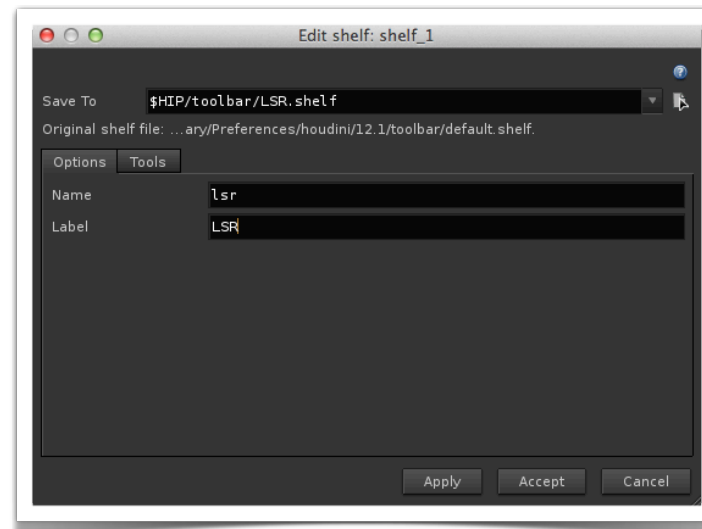
Making Asset into Shelf Tool

Creating a Toolbar

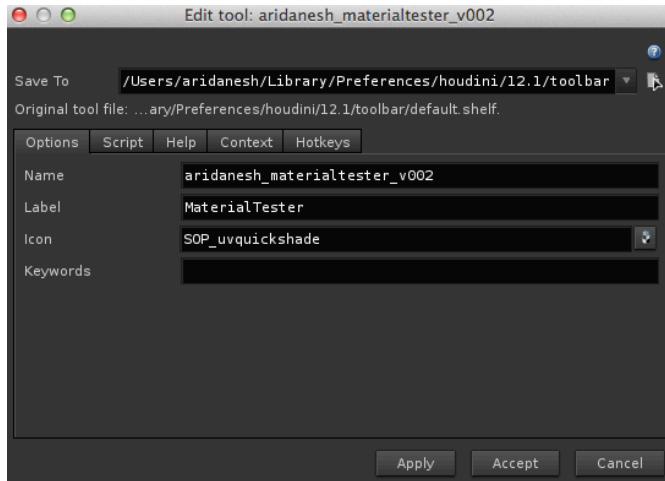


Click on “+” and
select New Shelf

- ▶ Click the plus sign on the tool bar and select “New Shelf”
- ▶ Save to - \$HIP/toolbar/LSR.shelf
- ▶ Click Accept
- ▶ You now have a toolbar labeled LSR
 - ▶ It is EMPTY!



Placing an Asset in the Toolbar

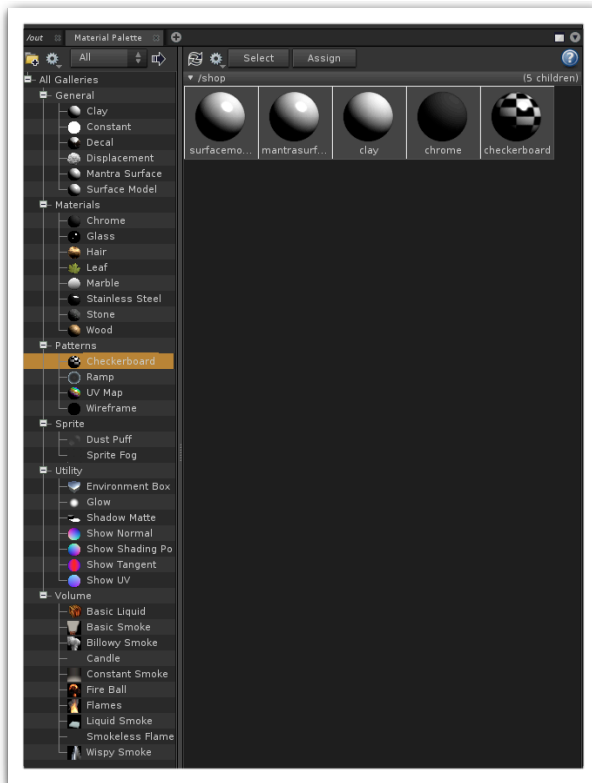


- Drag the MaterialTester Asset Node into the Toolbar
- Right Click on the Toolbar item
 - Select Edit Tool
- Save to \$HIP/toolbar/LSR.shelf
- Make the icon - SOP_uvquickshade
- Click Accept



Material Palette

Material Palette



- Drop down a teapot (platonic)
- Drop down an area light & camera
- Go to render view
- Select the Material Palette tab
- Create Several Materials Including the checkerboard
- Drag the Checkerboard material on top of the teapot
- Play with the parameters

Creating a New Material

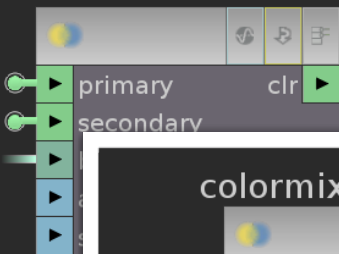
by modifying the Checkerboard material...



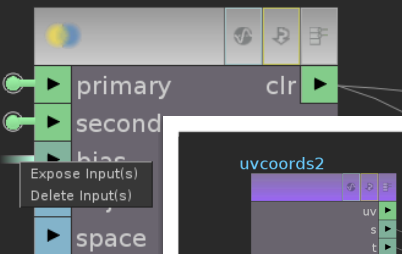
- Duplicate the Checkerboard Material
- Drag the duplicate onto the teapot
- Double Click on the material to get into VOPS
- Examine the Network

Creating a New Material (cont.)

colormix1

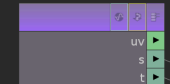


colormix1

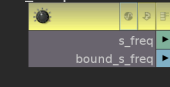


- ▶ Notice the peg that does not have a round end
- ▶ Click on the peg to select it and then right click for menu
- ▶ Select Expose inputs (several new nodes appear)

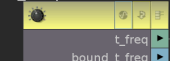
uvcoords2



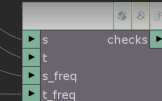
s_freq



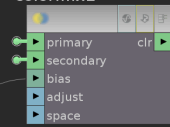
t_freq



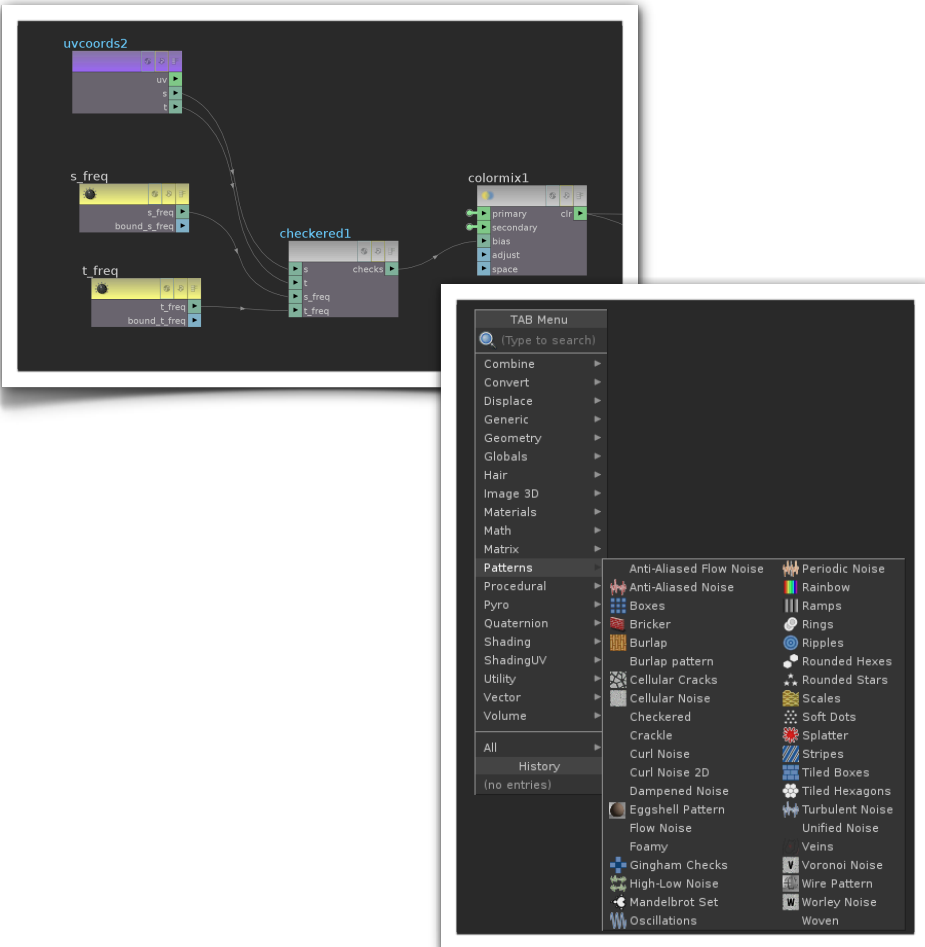
checkedred1



colormix1

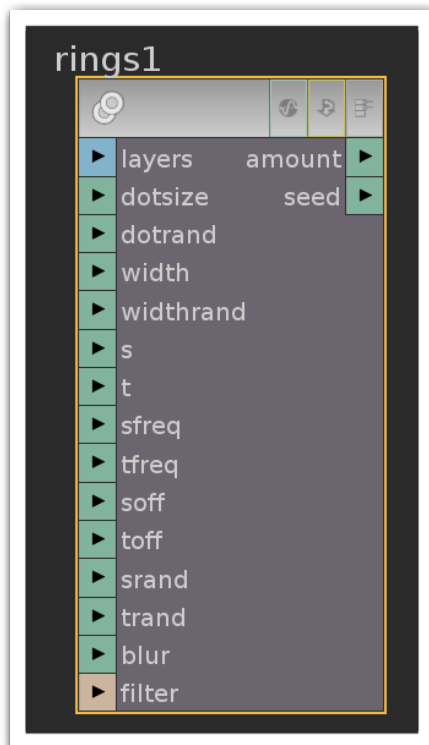


Creating a New Material (cont.)



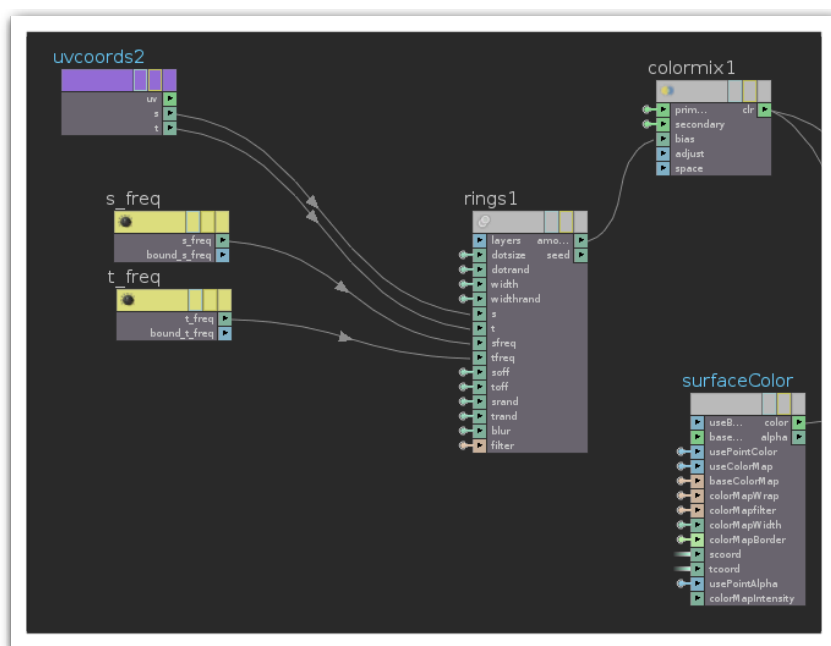
- The key node here is checkered
- Is is part of the Pattern Family of nodes
- Let us make a circle pattern material instead
- Drop down a Rings node

Creating a New Material (cont.)



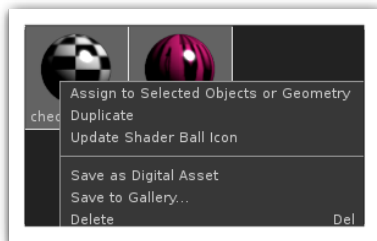
- ▶ Notice it has the same s, t, sfreq, and tfreq as the checkered node

Creating a New Material (cont.)

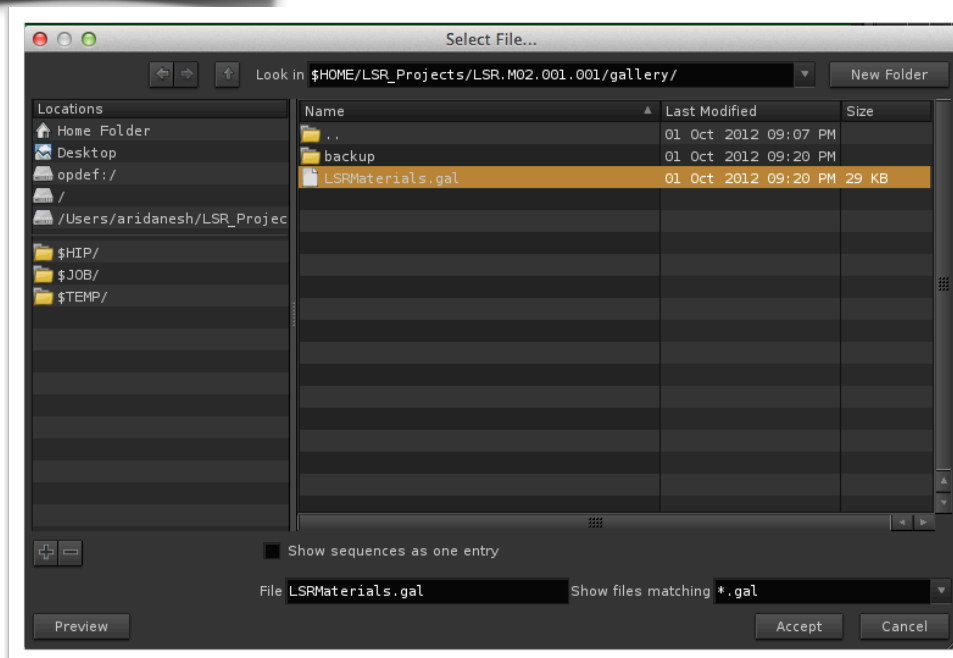


- ▶ rewire the network using the rings node
- ▶ delete the checkered node
 - ▶ Now promote all of the parameters in the rings node except for layers
- ▶ Go up one level and play with the parameters
- ▶ Notice the user interface is not great
 - ▶ Go into render interface editor and move parameters under patter and click accept
 - ▶ Much better

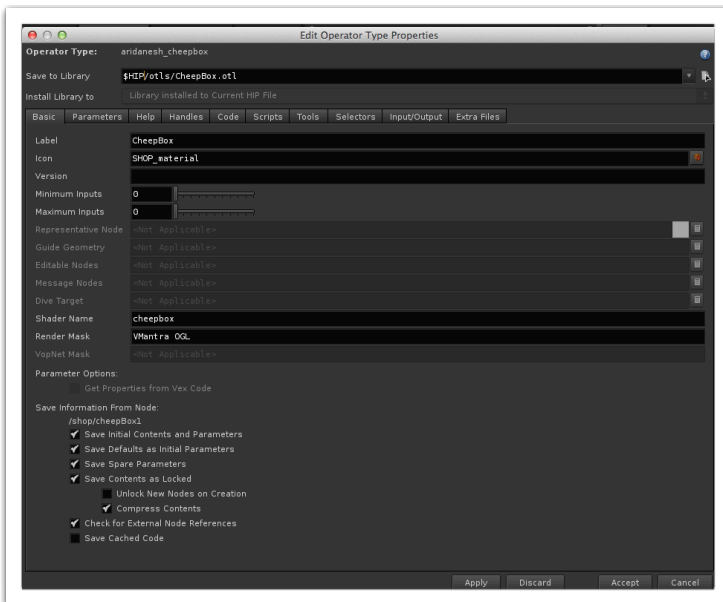
Making a Gallery



- ▶ Select the Material in the Material Palette
- ▶ Right Click on it and choose “Save to Gallery”



Making a Digital Asset

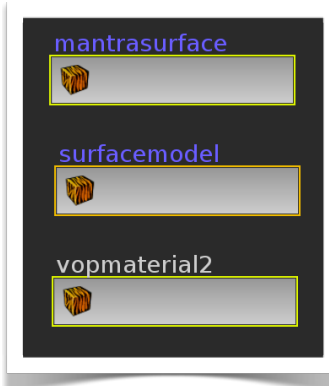


- ▶ Same steps as making Gallery Item but..
 - ▶ Right click on material and click on Create Digital Asset
 - ▶ Save to Library
 - ▶ \$HIP/otls/CheepBox.otl
- ▶ To use Digital Asset
 - ▶ Create SHOPNET
 - ▶ Hit Tab Key
 - ▶ Under Digital Assets - Choose your material



Different VOP Models

From Heavy to Light



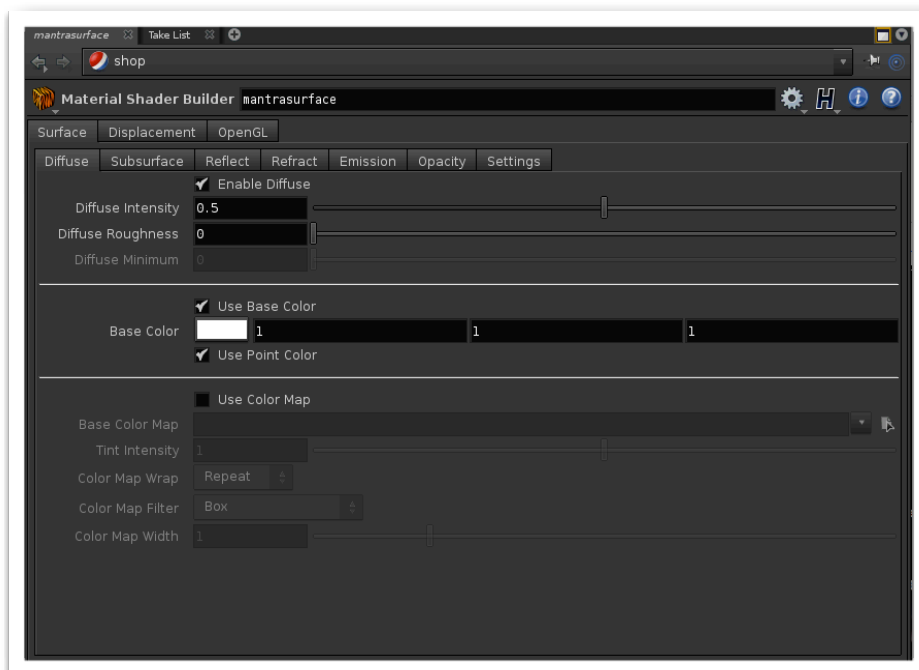
- **Every shader has to be compiled**
 - When developing pieces of a shader you do not want to be bogged down waiting for compiles
- **Mantra Surface Shader - Uber Shader**
 - Very complete shader.
 - Artist can do most of his work without diving into VOPs
 - Long compile times - When Modifying Shader in VOPs
- **Surface Model - Bare bones shader with just a surface shader built in**
 - Faster Compile Times
 - Limited functionality
 - Good place to start building your own shaders
- **Material Shader Builder - Contains only Global Variables**
 - Must build everything from scratch
 - Labeled VOPMaterial



Quick Review of Mantra Surface Shader

- Surface tab contains sub tabs for
 - Diffuse
 - Subsurface
 - Reflect
 - Refract
 - Emission
 - Opacity
- Displacement tab contains sub tabs for
 - Displacement
 - Bump
 - Normal Maps
 - Open GL Shader

Limitations of Mantra Surface Shader



- ▶ The Mantra Surface Shader is a very good starting point for the Shader Artist
- ▶ It lacks some nuances that would help the Shader Artist
- ▶ Examples
 - ▶ No Maps for Diffusion on Roughness
 - ▶ No Grunge Maps
 - ▶ No ability to blend between maps



Project for Module 02



Goals



Modify the Mantra Surface
Shader to Suit your Needs!

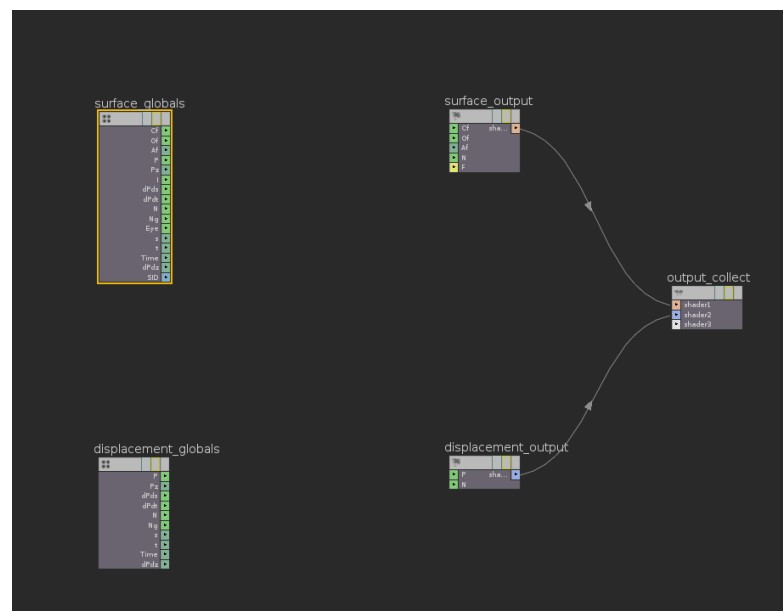
- Add the capability to incorporate
 - Diffuse Intensity Maps
 - Roughness Maps
 - Mix Color Maps with Grunge Maps
- Extract the Capability Created
 - Make it Generic
 - Wrap it up as a Digital Asset



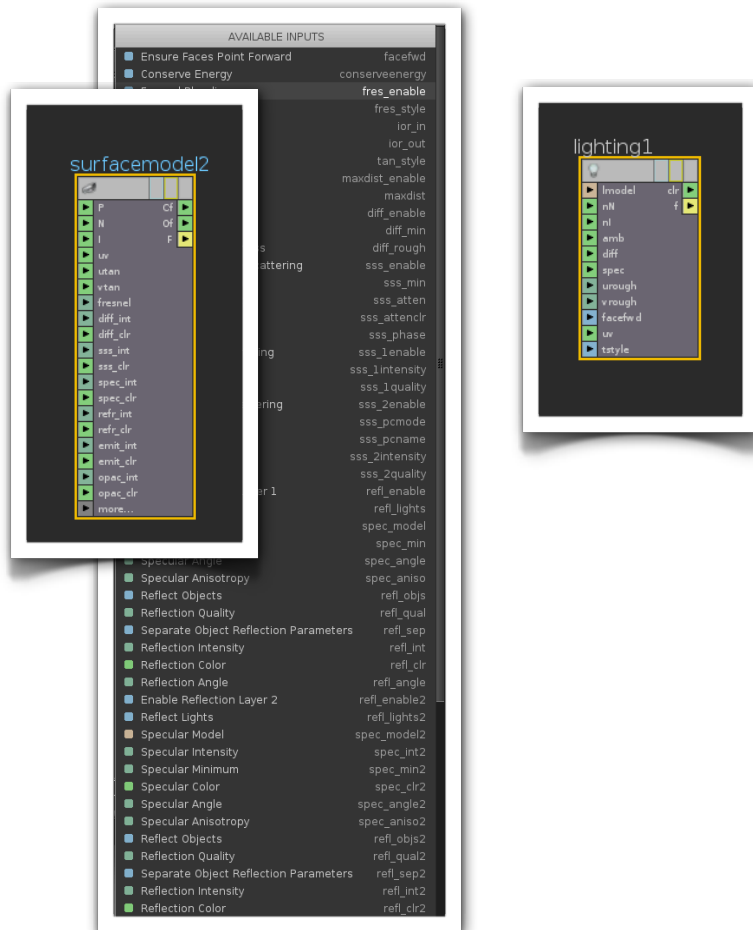
Building a VOP Network using the Material Shader Builder

Why Use the Material Shader Builder

- As stated earlier the Mantra Surface Shader is very complete
 - But making changes to it is very slow because
 - Shaders get compiled with every change
 - The shader is very large so compilation times are large
- Use the Material Shader Builder
 - Great test bed for iterating through changes quickly
 - Networks created can be copied and pasted into Mantra Surface Shader

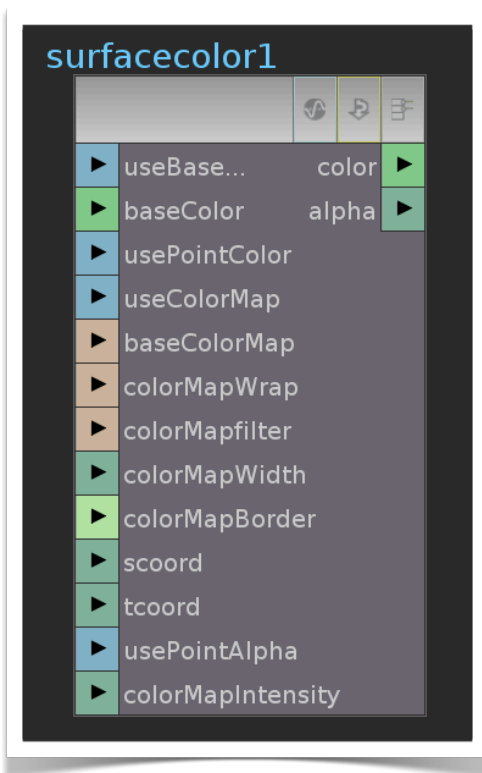


Surface Model vs Lighting Model VOP



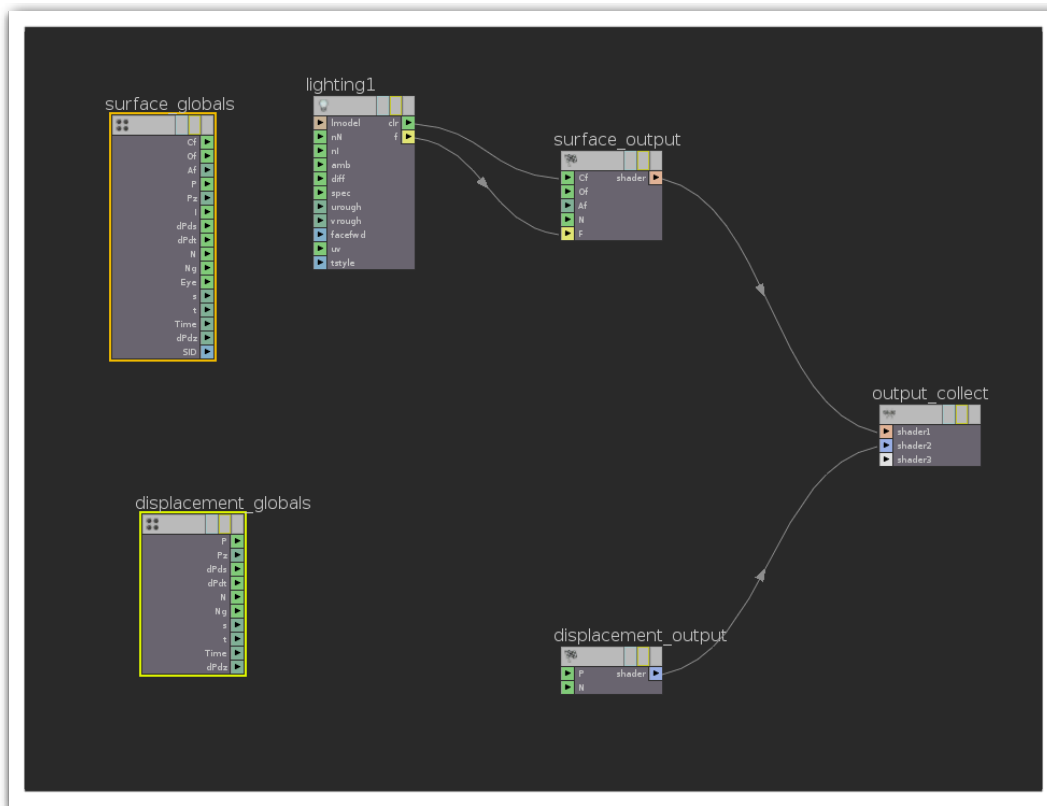
- ▶ The Surface Model is ultimately what you want to use
 - ▶ Has a huge assortment of available inputs to create your shader
 - ▶ While faster to compile then using the full Mantra Shader still sluggish
- ▶ Lighting Model is antiquated, but...
 - ▶ Very light weight
 - ▶ Compiles changes quickly
 - ▶ Great for testing shader networks

Surface Color VOP



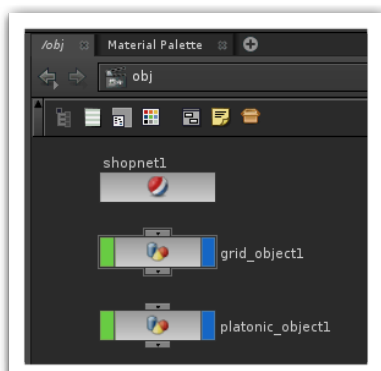
- Generates a basic color with a choice of tinting with the point color and/or a color map.

Test Bed to Work With

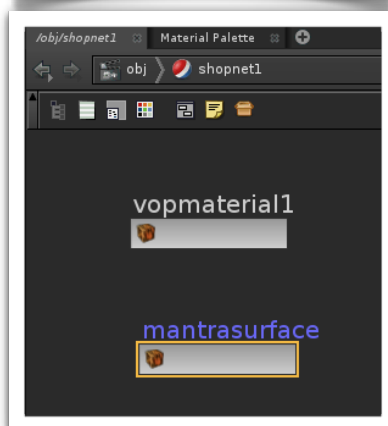


- ▶ At the Object Level (Scene)
 - ▶ Drop down a SHOPNET
 - ▶ Dive Inside the SHOPNET
- ▶ Drop down a Material Shader Builder
 - ▶ The Node will be labeled vopmaterial1
- ▶ Dive inside vopmaterial1
 - ▶ Drop down a lighting model
 - ▶ wire color out to surface output color
 - ▶ wire f out to f in

Why Work at the Scene Level

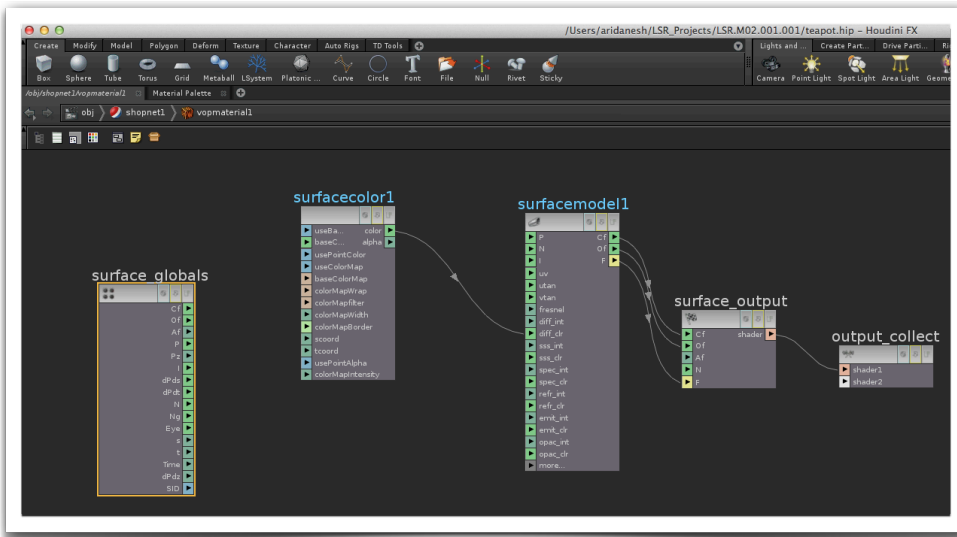


- Personal Choice
 - Like being able to package Materials and Objects into Subnets
 - Easier to make into HDA with everything at object level (for me at least)
- Dive into the SHOPNET
 - Copy and paste a Mantra Surface shader from the SHOP folder
 - Drop down a Material Shader Builder



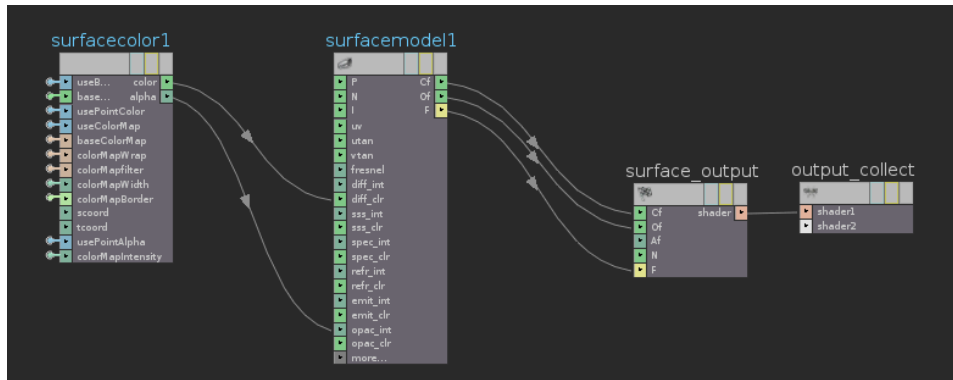


Most Basic Network

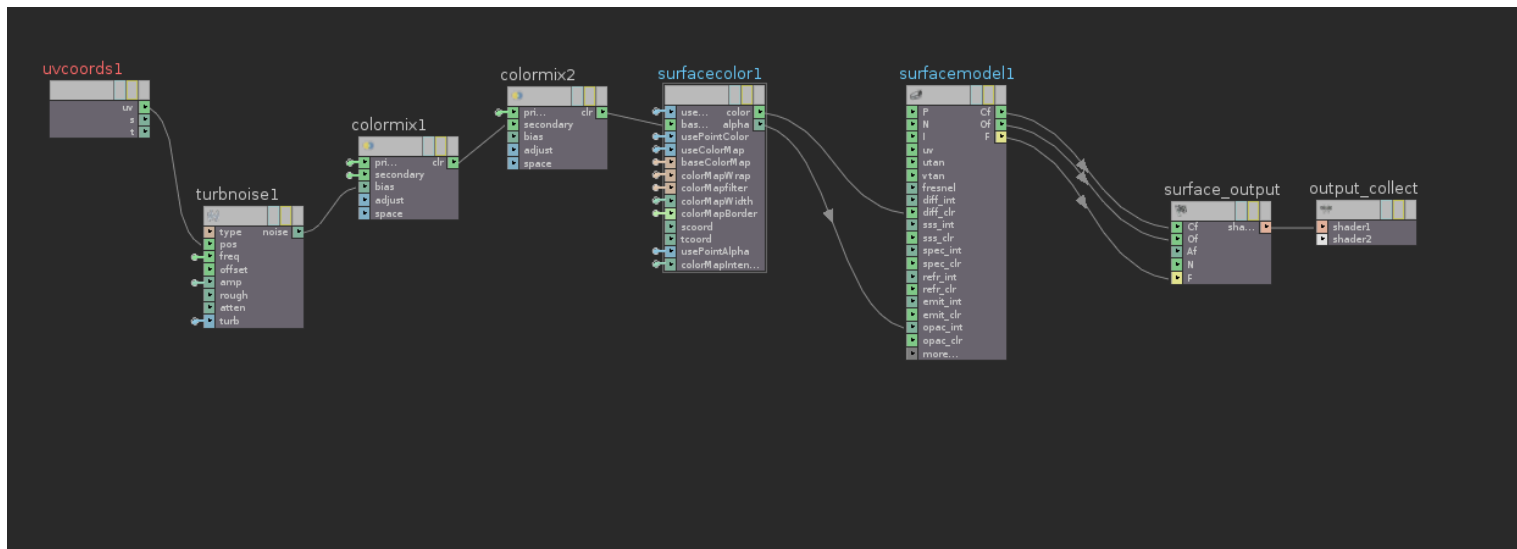


- › Drag the VOP Material onto the teapot
 - › Dive into the VOPMaterial
 - › Delete the displacement nodes
 - › Drop down a Surface Color Node
 - › Drop down a Surface Model Node
 - › Delete Displacement nodes
 - › Wire as shown
-
- › Surface Color Node - Generates a basic color with a choice of tinting with the point color and/or a color map.
 - › With this VOP the UI is already correctly setup.

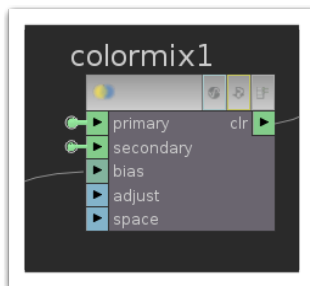
Expanding the Network



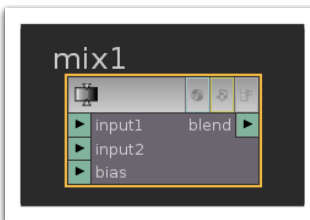
- ▶ Promote the base color parameter of the Surface Color
- ▶ In the parameters view click on the shaders view menu for base color
- ▶ Select mix with color and perlin noise



Color Mix vs Mix Nodes

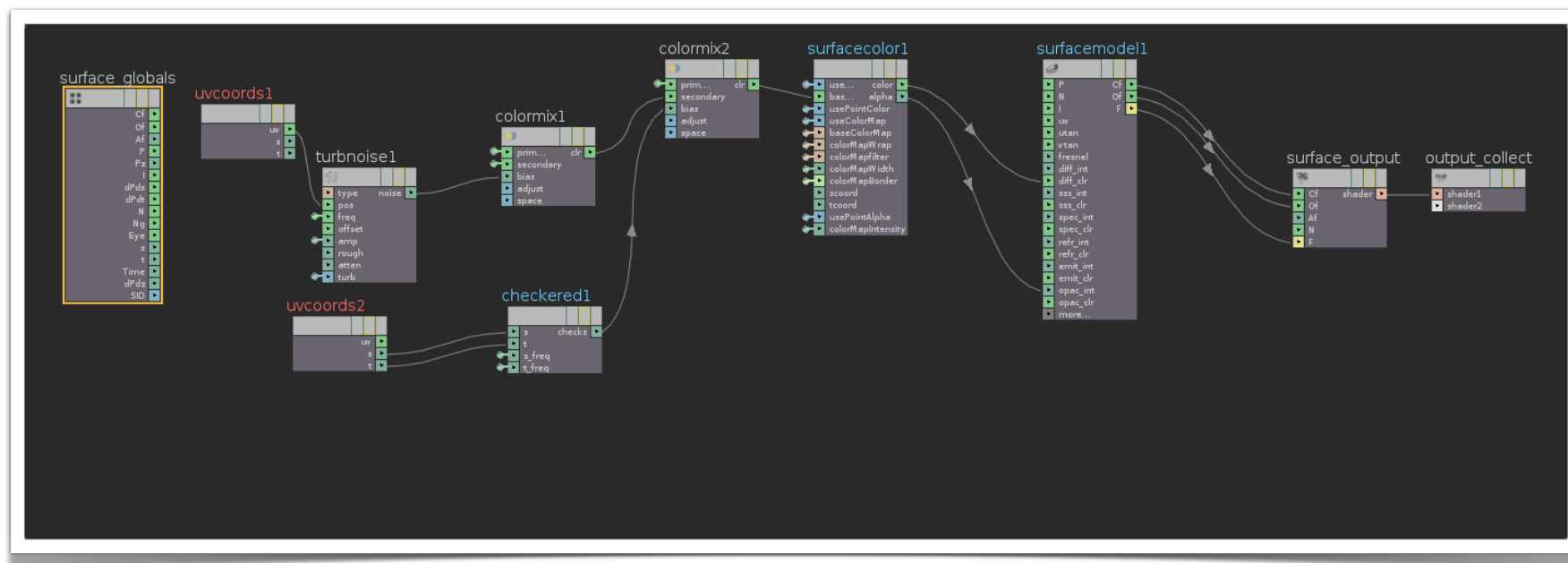


- Color Mix is used for mixing colors
- Mix for gray scale or luminance

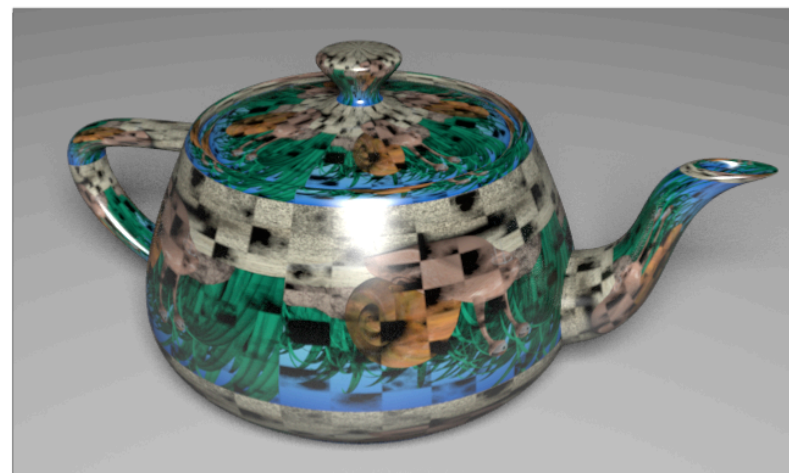


Expanding the Network (cont.)

Adding Checkered to create checkered marble..



Result so far...



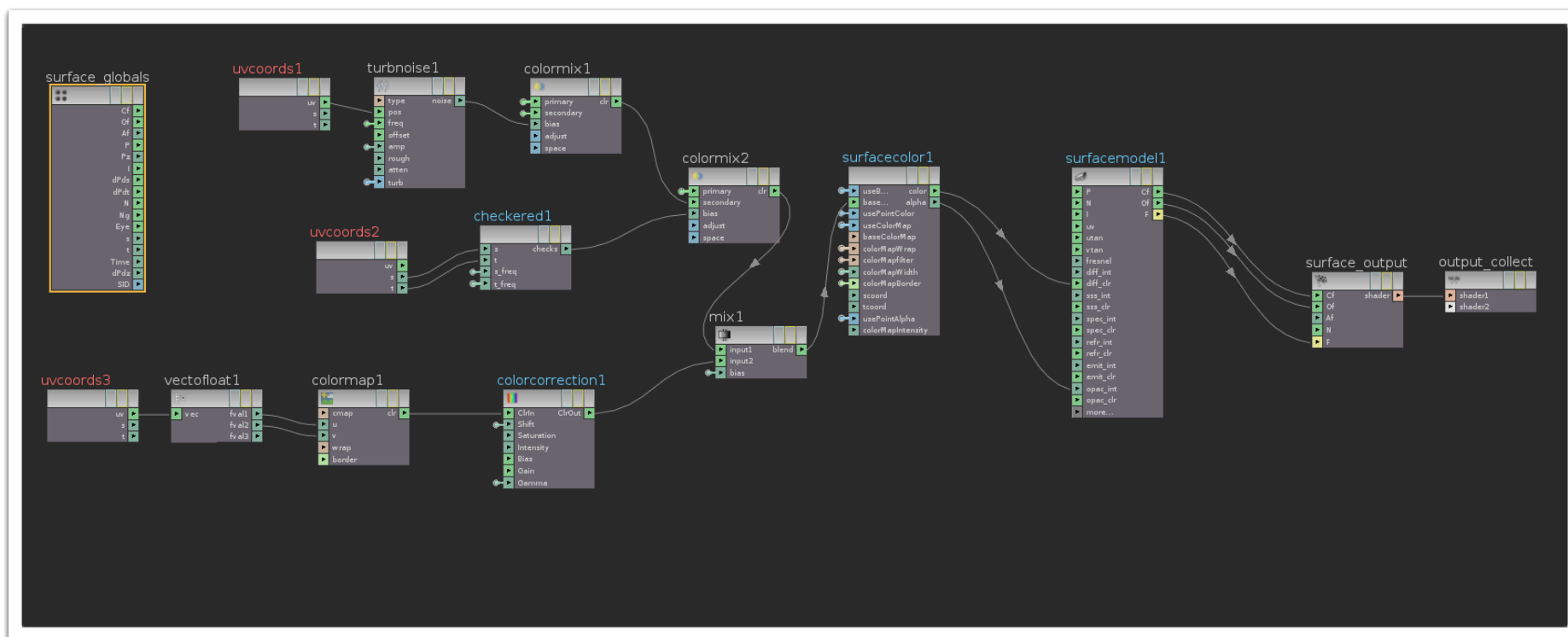
You can still use a color map and blend with patterns



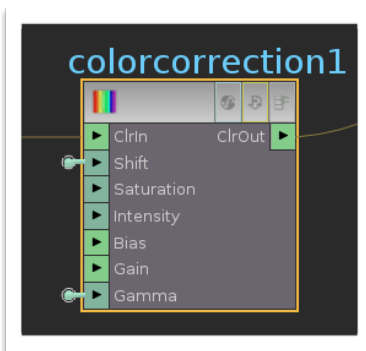
One thing I do not like...

- Where is the Gamma Control for the Texture map?
 - Last week we said we had to convert images to linear space
- Let's fix this
 - Delete the input for "useColorMap"
 - Delete the input for "baseColorMap"
 - Add a Texture VOP
 - Add a Color Correct VOP
 - Add a uv parm. Wire as shown on next slide

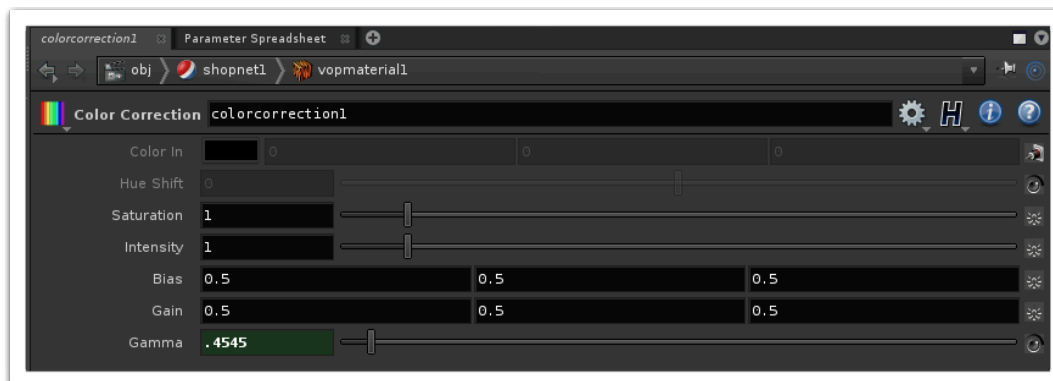
Color Corrected Network



Using the Color Correct Node



- ▶ We will use it here to correct image maps to linear color space
- ▶ If you need only to correct 2.2 Gamma to Linear workspace divide by $(1/2.2 = 0.4545)$



What is Diffuse Intensity & Diffuse Roughness



high diffusion



low diffusion

- ▶ Diffuse Intensity - The proportion of incoming light reflected back as the diffuse component, from 0 (no diffuse reflection) to 1 (all incoming light is reflected).
- ▶ Diffuse Roughness - A floating point value used to control the size or spread of the diffuse component. Higher values make the surface look less glossy with flatter color

How do I make the noise blender section into an otl?



NEXT WEEK