REDSHIFT TO RADEON PRORENDER CONVERSION REPORT

Version 2.12, 25 December 2018 (all reports)

This report summarizes results of tests made to convert Redshift nodes to Radeon ProRender nodes.

- **Software**: Maya 2018, Redshift 2.6.29, RPR 2.5.245
- **Hardware**: GTX 980/GTX 1080TI (for autotests)

SUMMARY

For the report, **54** Redshift nodes within **7** node groups has been tested in total. The results of conversion are as follows:

- **CONVERTIBLE**: **10** nodes (**18%**), see details
- **PARTIALLY CONVERTIBLE**: **7** nodes (**13%**), see details
- **NOT CONVERTIBLE**: **22** nodes (**41%**), see details
- **RESEARCH IS NEEDED**: **15** nodes (**28%**), see details

Our approach to convert nodes is – we preserving original information as is. When possible we are trying to propagate input values from Redshift to RPR features.

For example:

Architectural, rsMaterial, Incandescent, VolumeScatter, PhysicalLights and IBL (Dome and Environment) – the majority of their parameters are converted as close to original, as possible.

This is a continuous process of refining the formulas, to better match render results, as more testing provides more sample data. Conversion for some of the nodes is yet to be implemented, such as lens and tone mapping effects, as well as proper SSS effects in rsMaterial.

This update is entirely about Physical lights. Now we are able to convert all types of physical lights, sans Meshes, with as close intensity values, as currently possible.

REPORT DETAILS

In this report:

WHAT'S NEW

What's new between versions 2.11 > 2.12:

1. Fix displacement conversion in Redshift Material
2. Update image unit type conversion in physical light

SCRIPT LINK

The latest version of the conversion script: download script.

KNOWN ISSUES

The following JIRA issues affecting the conversion process were identified:

- Render view doesn't conform to resolution gate in viewport (RPRMAYA-880)
- Shadow catcher render with a lot of noise and sometimes gets bad results (RPRMAYA-801)
- Textures are being downscaled by supported standard Maya nodes (RPRMAYA-848)
- [Core] Artifacts when using Displacement (RPRMAYA-329)
- [Core] Sky System issue (RPRMAYA-147)

Currently, we have several issues with how some of the values get converted. Mostly, this concerns SSS effects in rsMaterial and SubsurfaceScatter materials. RPR handles color brightness and saturation differently, so to have a better match to Redshift output, we are researching the way to bring it as close as possible.

VolumeScatter needs further refinement, to compensate for difference between RPR and RS scatter algorithms.

Physical Sky, node connections from standard Maya nodes and noises, as well as tone mapping still need implementation or refinement.

While we did implement conversion for every type of light, there are still some issues left to resolve. First, we still need a way to extract mesh lights from the rs light sources, and we also need to devise a more universal workaround for the spot light angle calculation. RPR doesn't give us control over penumbra gradient curve, so we need to find how to emulate its effect. Currently, we try to find the maximum outer cone falloff and inner cone angle through the Cone angle as an average, biased by falloff angle and curve, but this doesn't cover all cases.

There is also an issue with different reflectivity between rsMaterial and UberMaterial that gives rsMaterial more reflected light.

COMPLEX SCENES

Scene 1

Office interior. Small scene with Sun and Sky, refractive materials, and procedural maps for bump and roughness.

Known issues:

1. Noise procedural for roughness and bump got lost
2. Area light is dimmer, due to tone mapper. Manual adjustment showed, that using the Photolinear tone mapper with sensitivity between 15 and 20 could bring the image much closer to the RS. Besides that, there is still an issue with reflectivity and global area coefficients. See scene 14.

Redshift	**Radeon ProRender (script v.2.12)**
	
Radeon ProRender (script v.2.11)	**Radeon ProRender (script v.2.12)**
	

Scene 2

Tank. Object render with displacement ground.

Known issues:

1. Ground Material. Currently, the color layer node is being converted in suboptimal way. To better implement it via series of arithmetic nodes, more complex algorithm is needed.
2. Displacement, while working now, has an issue with artifacts. (RPRMAYA-329)
3. Connections between nodes for complex networks need debugging, as some connections are being lost.

Redshift	**Radeon ProRender (script v.2.12)**
	
Radeon ProRender (script v.2.11)	**Radeon ProRender (script v.2.12)**
	

Scene 3

Mustang. Object scene with MatteShadow, VolumeScatter and Carpaint.

Known issues:

1. Car paint doesn't store the edge falloff color for now. Color mixing through the Fresnel node will be needed, with additional testing for map mixing.
2. RPRVolume is not dense enough for this scene, and it isn't visible against the shadow catcher, with very hard border between what's covered with RPRVolume, and what's outside with ShadowCatcher. Possible RPR bug needs investigation.
3. Unable to render error sometimes appears on nVidia GPUs: RPRMAYA-842

Redshift	**Radeon ProRender (script v.2.12)**
	
Radeon ProRender (script v.2.11)	**Radeon ProRender (script v.2.12)**
	

Scene 4

Complex baked maps.

Known issues:

1. DoF needs to be implemented with the default camera parameters. Possible tone mapper needs to compensate for bokeh.

Redshift	**Radeon ProRender (script v.2.12)**
	
Radeon ProRender (script v.2.11)	**Radeon ProRender (script v.2.12)**
	

Scene 5

Simple interior, part 1

Known issues:

1. Physical sky needs to have more brightness with conversion.
2. Portal lights are converted to area light with white color.
3. DoF, as above.

Redshift	Radeon ProRender (script v.2.12)
	
Radeon ProRender (script v.2.11)	**Radeon ProRender (script v.2.12)**
	

Scene 6

Simple interior, part 2

Known issues:

1. Metal for Architectural material gets converted into too dark reflection color.
2. Reflections for Architectural non-metals needs compensation for more effect.
3. DoF and Portal lights as above.

Redshift	Radeon ProRender (script v.2.12)
	
Radeon ProRender (script v.2.11)	**Radeon ProRender (script v.2.12)**
	

Scene 7

Shoes

Known issues:

1. Tonemapper as above.
2. Some of the shading network connections got lost, and there is also issue with black reflectivity value, that Redshift ignores, but our values get damaged because of that.

Redshift	**Radeon ProRender (script v.2.12)**
	
Radeon ProRender (script v.2.11)	**Radeon ProRender (script v.2.12)**
	

Scene 8

Small object render, lit by Physical Sun and area lights.

Known issues:

1. Translucency->Backscatter conversion issue, need to find more accurate formulas to convert
2. Translucent lamp cover doesn't let the light out, needs adjustment in materials
3. Grey color gets too light. Needs investigation.
4. Sun currently doesn't convert to the Directional light, TBD.
5. rs Sun and Sky go paired with photo exposure node. Tone mapper needs to be adjusted accordingly.

Redshift	**Radeon ProRender (script v.2.12)**
	

Radeon ProRender (script v.2.11)	**Radeon ProRender (script v.2.12)**

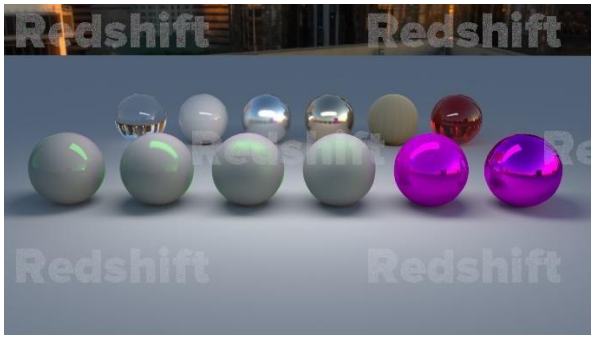
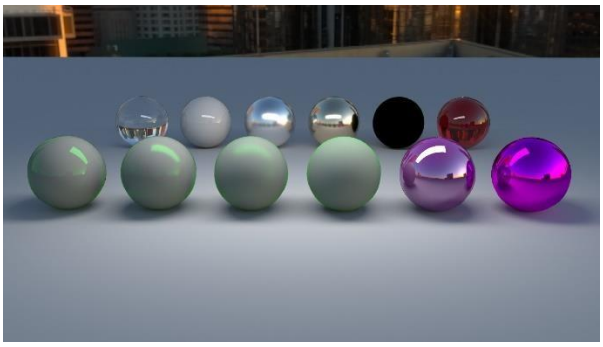
	

Scene 9

Shaderballs scene with color reflections and metalness variants Known

issues:

1. Diffuse weight 0.5 gives more saturated color in Redshift. Possibly expected behavior?
2. Material with milky coffee preset is currently unsupported. We are researching ways to properly preserve colors and values for extinction mode

Redshift	**Radeon ProRender (script v.2.12)**
	
Radeon ProRender (script v.2.11)	**Radeon ProRender (script v.2.12)**
	

Scene 10

Shaderballs scene with set of rsMaterials, CarPaints, Incadescents and Subsurface scatter materials, including materials from previous scene.

Known issues:

1. Same as above, extinction mode is not supported.
2. Subsurface materials have darker colors than they should, needs research for proper formula.
3. Anisotropic effects in RS are more prominent, than in RPR. Either an expected behavior, or we need value adjustment beyond inputs from RS. Needs research.

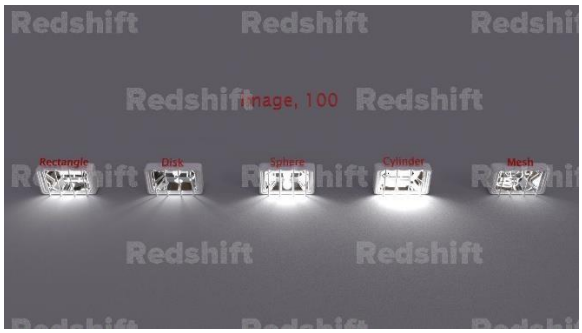
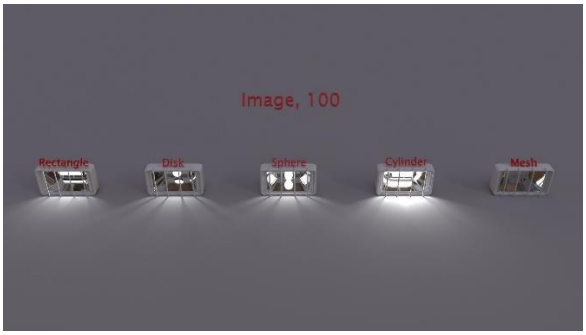
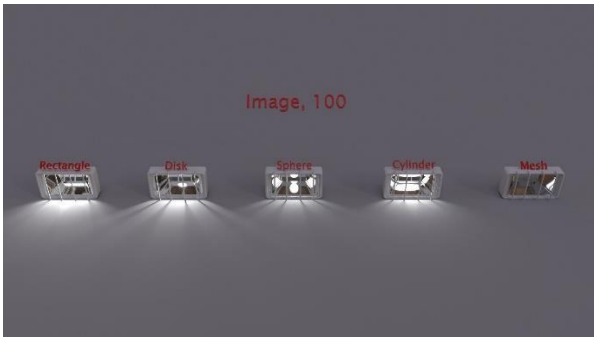
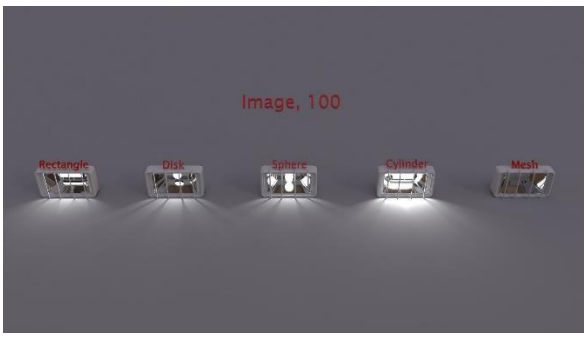
Redshift	**Radeon ProRender (script v.2.12)**
	
Radeon ProRender (script v.2.11)	**Radeon ProRender (script v.2.12)**
	

Scene 11

Area light shapes Known

issues:

1. Light intensity is being affected by material reflectivity (stronger in RS) and area light intensity falloff difference (refer to 14)
2. Mesh light conversion isn't supported yet.

Redshift	Radeon ProRender (script v.2.12)
	
Radeon ProRender (script v.2.11)	**Radeon ProRender (script v.2.12)**
	

Scene 12

Physical light types Known

issues:

1. Light intensity is being affected by material reflectivity (stronger in RS)

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	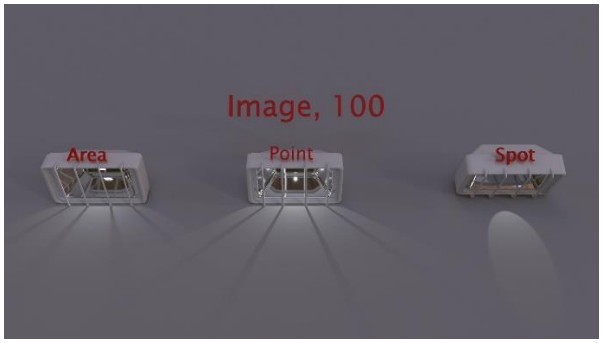
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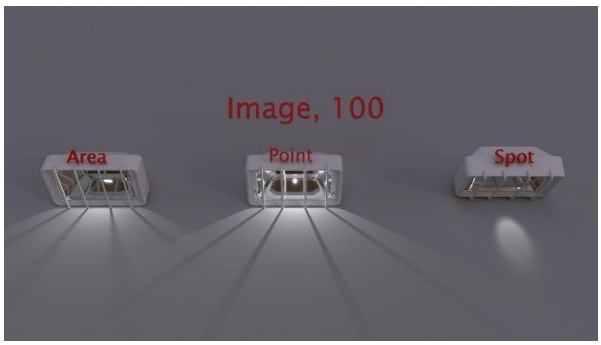	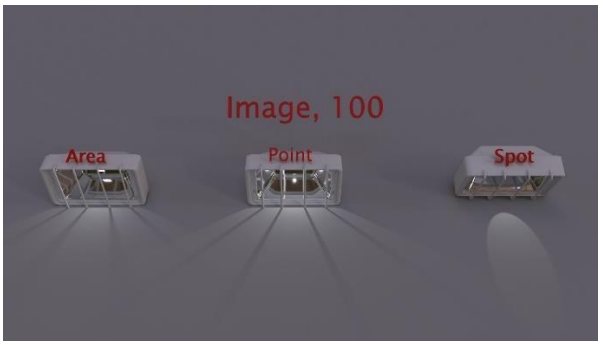

Scene 13

Light units

Known issues:

1. Light intensity is being affected by material reflectivity (stronger in RS)

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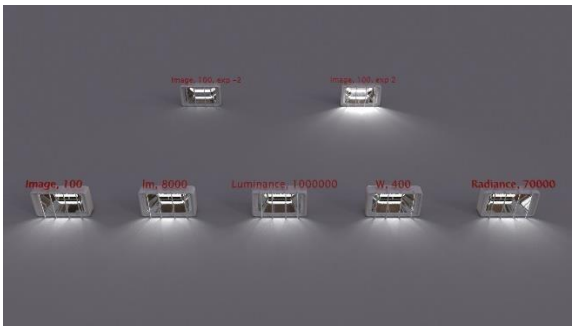
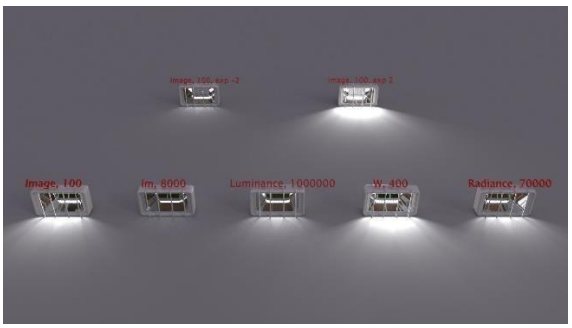
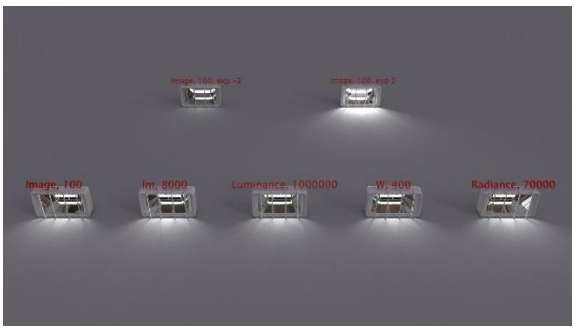
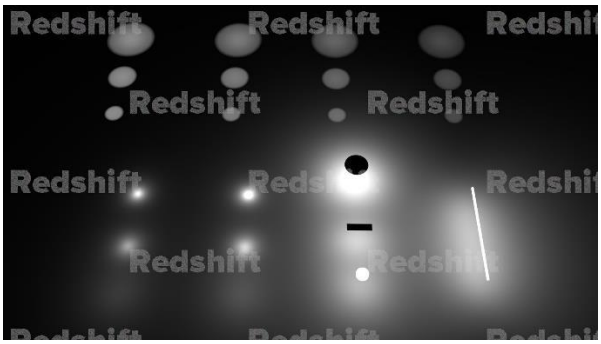
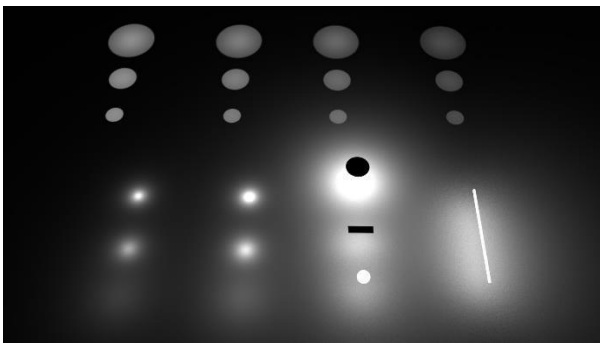
	
Radeon ProRender (script v.2.11)	**Radeon ProRender (script v.2.12)**
	

Scene 14

Light array. All physical lights (sans mesh and directional) Known

issues:

1. Spot light angle is calculated very approximately, due to lack of control over penumbra curve.
2. Intensity for area-dependent light sources have a bit different falloff for RPR, which makes light sources close to surfaces to be brighter by 20-25%. This issue doesn't present itself for light units that do not depend on source area. This could be possibly amended by including 2 redshift render config values into the formula.

Redshift	Radeon ProRender (script v.2.12)
	

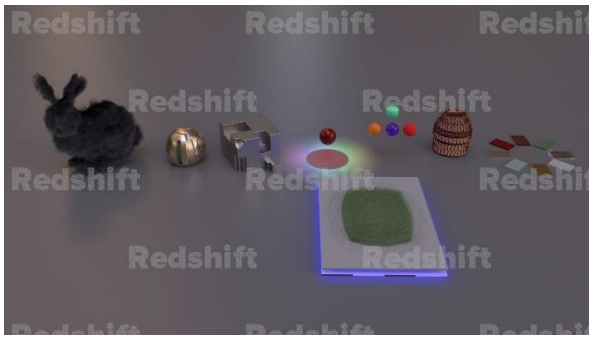
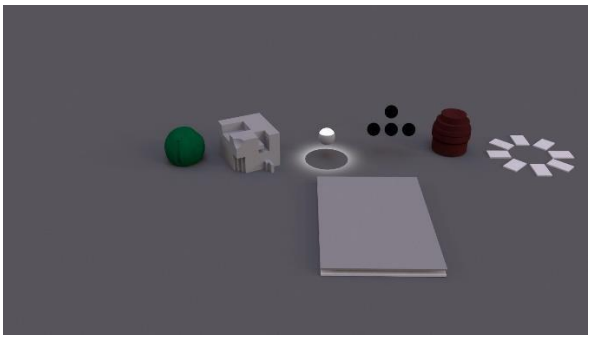
Scene 15

Unconvertable nodes.

From left, to right:

rsVolume, rsCurvature, rsRoundCorners, rsLightGobo, rsUserAttribute(color, scalar). rsWireframe, rsShaderSwitch.

On the front: rsRaySwitch on the bottom, and rsHair and rsAttributeLookUp on xGen Collection.

Redshift	**Radeon ProRender (script v.2.12)**
	
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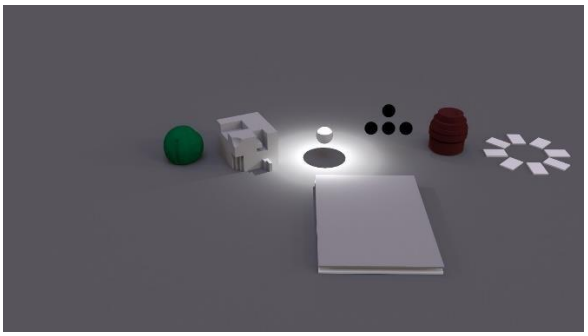	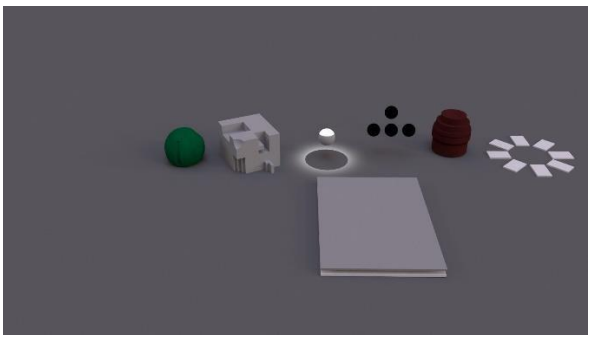

TEST REPORT LINK

For detailed comparison of rendered scenes, see Test Report.

```
Login: rpruser
Password: rpruser2017
```

Note that this is still the Alpha version of the report. The report includes 306 scenes.

CONVERSION STATUS BY NODE GROUP

Node Group	Total Nodes	Convertible	Partially Convertible	Not Convertible	Research Is Needed	Details
Environment	1	1	0	0	0	Link
Lens	3	0	0	1	2	Link
Lights	7	2	2	1	2	Link
Materials	11	2	2	2	5	Link
Physical Sky	1	0	0	0	1	Link
Utility Nodes	29	5	3	17	4	Link
Volume Scattering	2	0	0	1	1	Link
Total	**54**	**10**	**7**	**22**	**15**	Link