REDSHIFT TO RADEON PRORENDER CONVERSION REPORT

Version 2.11, 19 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, Incadescent, VolumeScatter, PhysicalLights and IBL (Dome and Environment) – most of their parameters are similar in RS and RPR, so they were copied.

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 tonemapping effects, as well as proper SSS effects in rsMaterial.

Metal color conversion is currently updated to the working order, using additional blend nodes, that store both reflection (or diffuse for metalness 1) colors, and Reflectivity, giving user means to preserve original colors unchanged, and adapt for RPR Ubermaterial.

We began to implement Physical light intensity conversions, trying to bring result inensity as close to original as possible.

REPORT DETAILS

In this report:

- What's New
- Script Link
- Known Issues
- Complex Scenes
- Test Report Link
- Conversion Status by Node Group

Prepared by: QA Team Date: 19-dec-18

WHAT'S NFW

What's new between versions 2.10 > 2.11:

- 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: <u>download script</u>.

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 (<u>RPRMAYA-329</u>)
- [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, we are developing an approach how to convert these settings

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 tonemapping still need implementation or refinement.

We began implementing area light intensity conversions for different units, but formulas need refinement to properly handle differences between light sources dependent on area size, and those that don't.

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 tonemapper and wrong formula that converts RS radiance unit to RPR radiance. Needs more research on this difference in values, as well as overall improvement for physlight intensity.



Radeon ProRender (script v.2.11)



Radeon ProRender (script v.2.10)

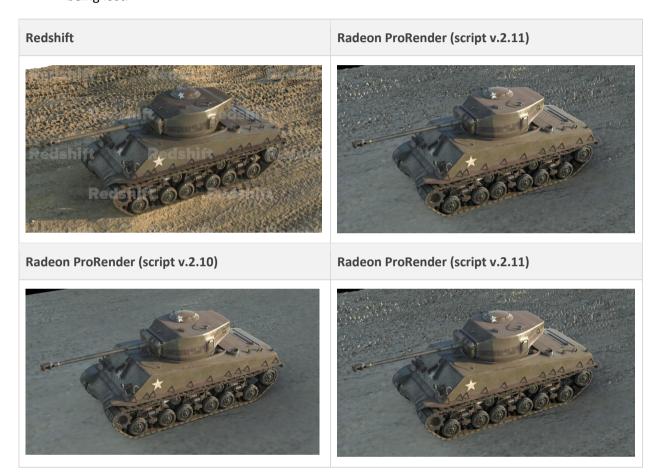


Radeon ProRender (script v.2.11)



Tank. Object render with displacement ground.

- 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.



Mustang. Object scene with MatteShadow, VolumeScatter and Carpaint.

- 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.





Radeon ProRender (script v.2.11)



Radeon ProRender (script v.2.10)



Radeon ProRender (script v.2.11)



Complex baked maps.

Known issues:

- 1. DoF needs to be implemented with the default camera parameters. Possible tonemapper needs to compensate for bokeh.
- 2. Area light intensity coefficient needs adjustment, refer to Scene 9.



Radeon ProRender (script v.2.11)



Radeon ProRender (script v.2.10)



Radeon ProRender (script v.2.11)



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.
- 4. Area light intensity, refer to Scene 9.



Radeon ProRender (script v.2.11)



Radeon ProRender (script v.2.10)



Radeon ProRender (script v.2.11)



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, Portal and Area lights as above.



Radeon ProRender (script v.2.11)



Radeon ProRender (script v.2.10)



Radeon ProRender (script v.2.11)



Shoes

- 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

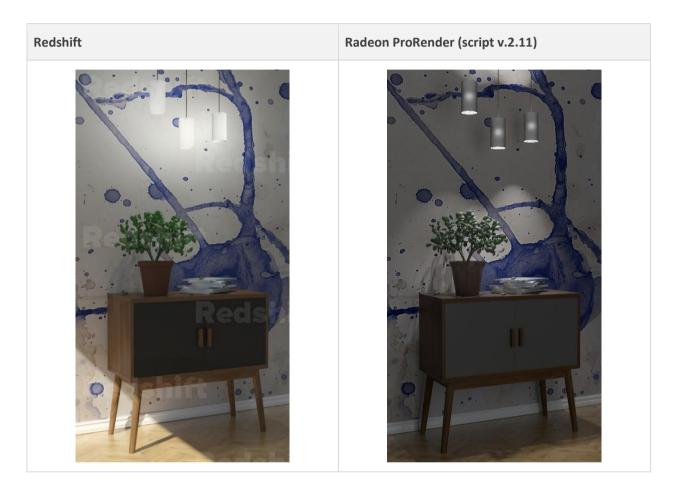
Radeon ProRender (script v.2.11)

Radeon ProRender (script v.2.11)

Radeon ProRender (script v.2.11)

Small object render, lit by Physical Sun and arealights.

- 1. Translucency->Backscatter conversion issue, need to find more accurate formulas to convert.
- 2. Area lights have less intensity, because they convert watts to watts, which needs adjustment in the formula
- 3. Grey color gets too light. Needs investigation.
- 4. Sun currently doesn't convert to the Directional light, TBD.



Radeon ProRender (script v.2.10)



Radeon ProRender (script v.2.10)



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

Known issues:

- 1. Diffuse weight 0.5 gives more saturated color in Redshift. Possibly expected behaviour.
- 2. Material with milky coffee preset is currently unsupported. We are looking for the solution to properly preserve colors and values for extinction mode.
- 3. Area light now appears twice as bright. Looks like an error in conversion from image to lumen, more correct proportions would be 2000:1 and multiplied by X and Y scale. We decided not to use luminance as substitute to image, as it requires more complex (i.e. proper physical) computation in relation to area size, while image appears to have a linear dependency to area size.



Radeon ProRender (script v.2.11)



Radeon ProRender (script v.2.10)

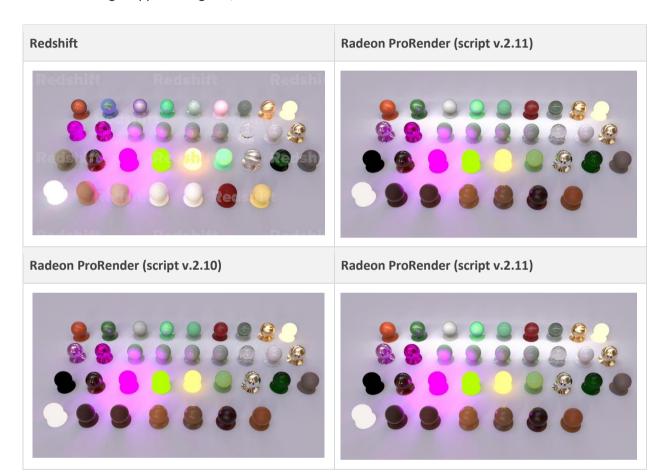


Radeon ProRender (script v.2.11)



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

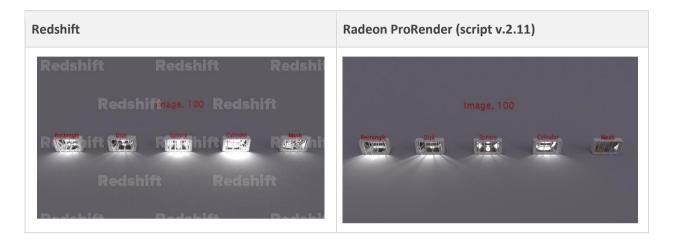
- 1. Same as above, extinction mode is not supported.
- 2. Subsurface materials have darker colors than they should, needs research for proper formula.
- 3. Anisotropic effects in RS are more prominent, than in RPR. Either an expected behaviour, or we need value adjustment beyond inputs from RS. Research is needed.
- 4. Area light appears brighter, refer to Scene 9.



Area light shapes

Known issues:

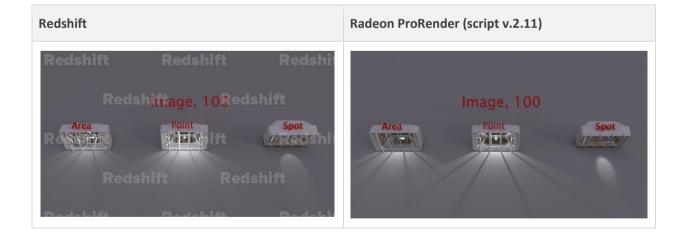
- 1. Intensity conversion for Image are being researched, refer to scene 9. There should be some static coefficient for disk and sphere shapes
- 2. Mesh light conversion isn't supported yet.
- 3. Cylinder shape has different orientation (axis along Z instead of along X)



Scene 12

Physical light types

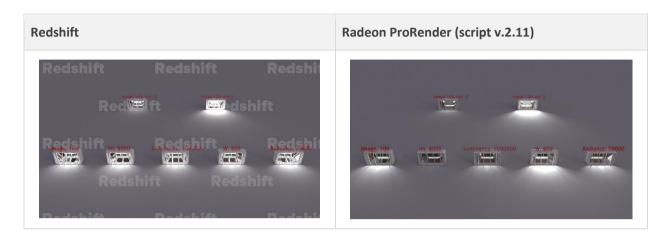
- 1. Area light intensity, refer to scene 9.
- 2. Spotlight size and falloff are smaller, and intensity is higher (watts to watts, formula is being reworked).



Light units

Known issues:

- 1. Conversion from image see scene 9.
- 2. Conversion from other units first attempt at the conversion formulas, no actual physical calculations yet applied, conversion is linear right now.

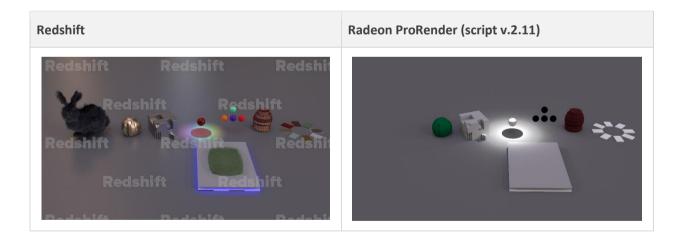


Scene 14

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.



TEST REPORT LINK

For detailed comparison of rendered scenes, see <u>Test Report</u>.

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	<u>Link</u>
Materials	11	2	2	2	5	Link
Physical Sky	1	0	0	0	1	<u>Link</u>
Utility Nodes	29	5	3	17	4	Link
Volume Scattering	2	0	0	1	1	<u>Link</u>
Total	54	10	7	22	15	<u>Link</u>

Prepared by: QA Team Date: 19-dec-18