ARNOLD TO RADEON PRORENDER CONVERSION REPORT

Version 2.3, 8 February 2019 (all reports)

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

- **Software**: Maya 2018, Arnold 3.1.1.1, ProRender 2.5.245
- **Hardware**: Ryzen 1700x, i5 7500, i7 6700k

SUMMARY

For the report, **108** Arnold nodes within **7** node groups has been tested in total. The results of conversion are as follows:

- CONVERTIBLE: **22 nodes** (**20%**), see details
- PARTIALLY CONVERTIBLE: **16 nodes** (**15%**), see details
- NOT CONVERTIBLE: **44 nodes** (**41%**), see details
- RESEARCH IS NEEDED: **26 nodes** (**24%**), see details

This week we focused on bug fixes and including additional aiNodes in the conversion script. Issues with bump and normal maps are fixed: maps can now be connected to the Diffuse, Reflection, Refraction, and Coat normal inputs. We also made some fixes regarding the aiAtmosphere to ProRender Volume material with density values. Next week, we plan to include additional materials and utility nodes to the conversion script and fix any existing bugs.

REPORT DETAILS

In this report:

HISTORY

v.1.0 - first version.

v.1.1 - aiStandartSurface support.

v.1.2 - displacement, bump2d conversion.

v.1.3 - aiSkyDomeLight and aiAreaLight support.

v.1.4 - Opacity reverse node, rotate IBL and aiPhysicalSky support.

v.1.5 - aiPhotometricLight support.

v.1.6 - Fix ies light position; aiStandartVolume, aiMixShader, aiFlat, aiSky, aiAdd, aiSubstract, aiDivide, aiMultiply support.

v.1.7 - Fix bug with channel converting, fix bug with creating extra materials.

v.2.0 - Rewritten to python, update material conversion.

v.2.1 - aiMath nodes support, aiImage and aiFacingRatio conversion support, aiAmbientOcclusion material conversion support, Improve metalness, coat, subsurface and normal map conversion in aiStandartSurface, improve displacement conversion, fixed issue with group of lights, fixed issue with unassigned materials with shadow catcher

v.2.2 - Fixes for aiSkyDome intensity, fixes for Maya 2d bump not being converted to correct ProRender Bump or Normal nodes, fixed thickness Values and color when converting aiStandardSurface material using Coat, added aiColor convert utility node, converts to Maya RGB to HSV and HSV to RGB utility nodes, added conversion of aiShadowMatte to ProRender shadow catcher, added aiFog and aiAtmosphere to ProRender Volume material (note a user may have to do some changes in Volume material to get correct results), added aiCarPaint to ProRender Uber material with exceptions of Flakes.

v.2.3 - aiVectorMap conversion support, aiCellNoise and aiNoise conversion support, aiStandartSurface cameraMap conversion, Volume materials update, aiBlackbody conversion supports, aiCurvature conversion support, Maya Ai atmosphere to object with rpr volume material.

SCRIPT LINK

The latest version of the conversion script: download script.

KNOWN ISSUES

The following JIRA issues affecting the conversion process were identified:

- [RPRMAYA-893] Passthrough brdf node is needed
- [RPRTOOL-68] Lights gets converted with Incorrect brightness
- [RPRMAYA-880] Render view doesn't conform to resolution gate in viewport
- [RPRMAYA-216] IES lights no longer work after adding a new more powerful IES light
- [RPRMAYA-938] Texture Data lost when using RGB to HSV or HSV to RGB maya nodes
- [RPRTOOL-79] Maya Photometric lighting has incorrect Positions in scene and renders way to bright
- [RPRMAYA-887] CarPaint material
- [RPRMAYA-918] (Standard nodes) Several standard nodes work only with maps
- [RPRMAYA-920] Add Min, Max, Mod, Floor and Abs operations into RPR Arithmetic node
- [RPRMAYA-919] Add support for Clamp node (or make a new node)
- [RPRMAYA-931] Maya Projection node gives incorrect render results

Currently, we are having issues when adding aiLightMesh to RPR Physical light mesh type. Probably, the issue is in the API. We also have issues with IES lights not showing when more powerful lights are in the scene. This is an old issue with in the plugin.

In addition, we have issues on the plugin side with some Maya standard nodes, such as Maya RGB to HSV and HSV to RGB where we lose texture data when rendering. For CarPaints, we won’t be able to get the exact results without some kind of Flakes generator (work around is that users create their own custom flakes textures).

We also ran into some issues when trying to convert aiBlackBody: we were getting incorrect render results, and will have to think how to better convert this node.

COMPLEX SCENES

Scene 1

Happy Buddha scene.

Happy Buddha scene using SSS material. For SSS, users may have to tweak the backscattering attributes to get a similar result. aiStandard material uses SSS without backscattering settings.

Arnold	**Radeon ProRender v2.3**
	
Radeon ProRender v2.2	**Radeon ProRender v2.3**
	

Scene 2

Porsche car scene.

Porsche car scene with metal and roughness maps, aiSkyDome light, and aiShadowMatte material. With some Adjustments like Ray depth settings, the glass material gives closer results. Shadow matte now gets converted to the ProRender Shadow Catcher material. Added the New feature aiCarPaint to the scene. Ray Depths may need some tweaks to get the same results as glass materials.

Currently there is no way to convert aiCarPaint flakes. Current work around is that users will have to create their own custom texture map for flakes. We also have a plugin issue regarding Refraction, Transparency and Shadow Catcher. This is a very old issue we've had for a long time in the plugin: [RPRMAYA-73].

Arnold	Radeon ProRender v2.3
	
Radeon ProRender v2.2	**Radeon ProRender v2.3**
	

Scene 3

Rifle and Pistol scene.

Gun scene: using the newest addition of Arithmetic nodes. aiAbs, aiAtan aiDot, aiPow and aiTrigo, alongside with aiDivide, add subtract and Maya standard Multiply/Divide node.

Arnold	Radeon ProRender v2.3
	
Radeon ProRender v2.2	**Radeon ProRender v2.3**
	

Scene 4

Emissive city scene.

Arnold	Radeon ProRender v2.3
	
Radeon ProRender v2.2	**Radeon ProRender v2.3**
	

Scene 5

Laptop scene.

Emissive with Ramp nodes and Texture maps using ai standard surface shader. Lighting setup is with aiSkyDome with IBL image.

Arnold	Radeon ProRender v2.3
	
Radeon ProRender v2.2	**Radeon ProRender v2.3**
	

Scene 6

Interior room scene.

Interior room using aiSky, aiSkyDome, Maya directional light with some Materials and textures aiStandardSurface Shader.

Tweaking Tone mapping in ProRender slightly helps with the brightness issue. But there's still a main issue that we are not converting the intensity brightness for all lights correctly. There is an issue with brightness between Arnold and ProRender, with Maya standard lights intensity.

We have an issue with in the plugin for some time were more powerful lights over ride IES lights in the scene. Work around is that users can slightly increase the intensity of ProRender IES lights.

- [RPRMAYA-216]
- [RPRTOOL-79]

Arnold	Radeon ProRender v2.3
	
Radeon ProRender v2.2	**Radeon ProRender v2.3**
	

Scene 7

IES test scene.

Scene using Photometric lighting with multiple IES lights.

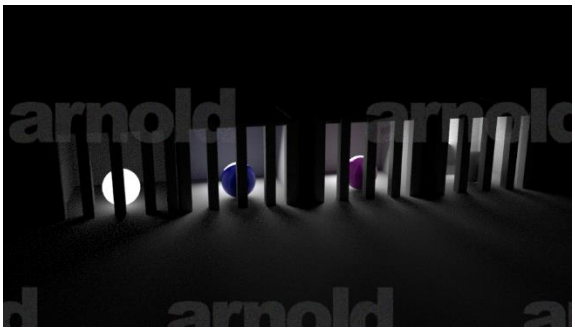
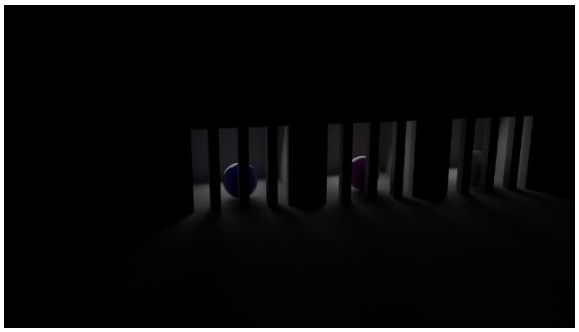
Arnold	Radeon ProRender v2.3
	
Radeon ProRender v2.2	**Radeon ProRender v2.3**
	

Scene 8

Light test scene.

Scene with aI standard surface materials using SSS skin preset and Procedural math nodes like aiAdd, subtract, multiply and divide. Did some minor changes to the scene replacing aiFlat color to aiStandardSurface with emissive (the reason behind the change is that the official build 2.5.245 1.321 does not have RPR flat color node).

ProRender Flat color is not present in build 2.5.245. It works correctly in the latest master build 2.5.255.

Arnold	Radeon ProRender v2.3
	
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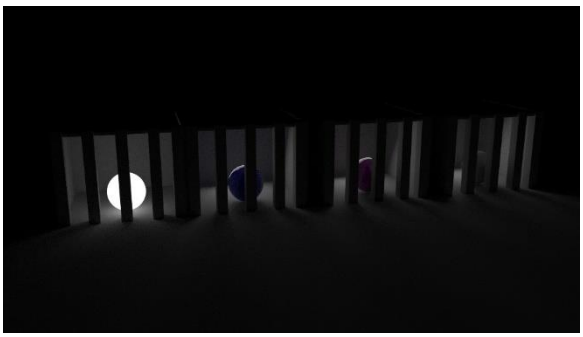	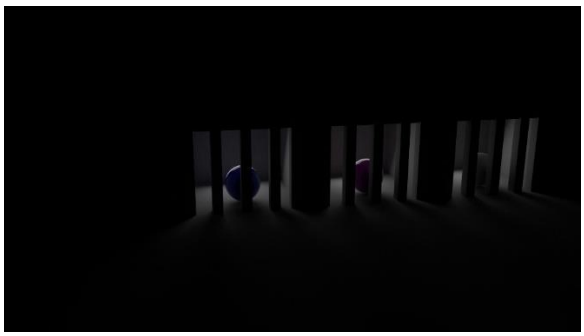

Scene 9

Dragon Scene.

Dragon using aiImage, ai2dbump, aiSkyDome, as well as TIFF and TGA file types.

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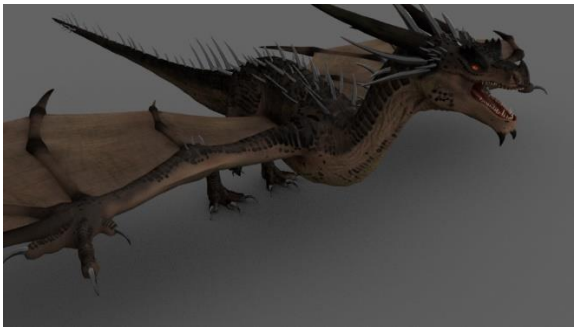	
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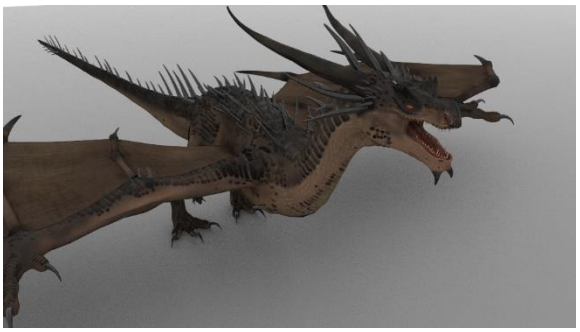
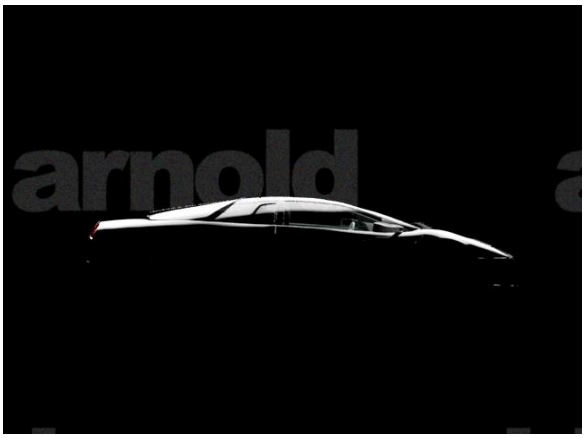
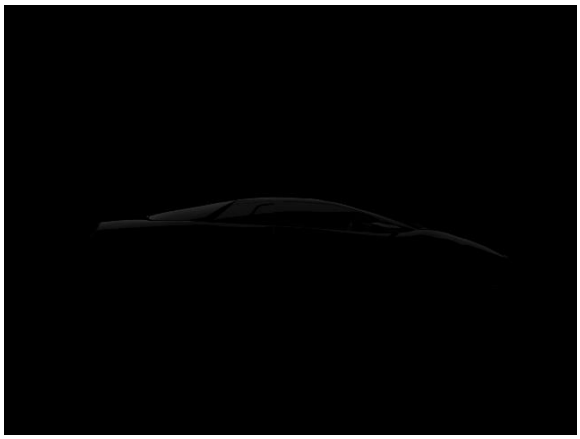
	

Scene 10

Car-Side scene.

Arnold	Radeon ProRender v2.3
	
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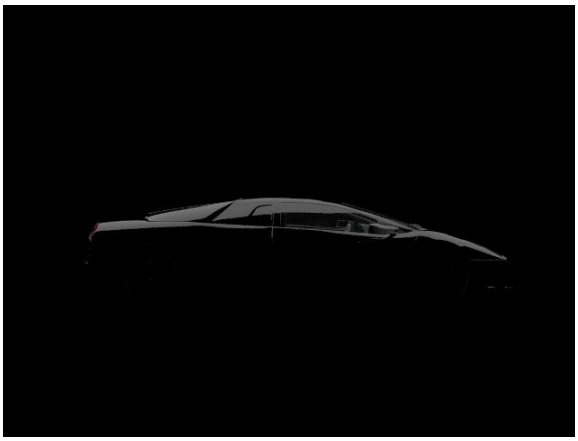	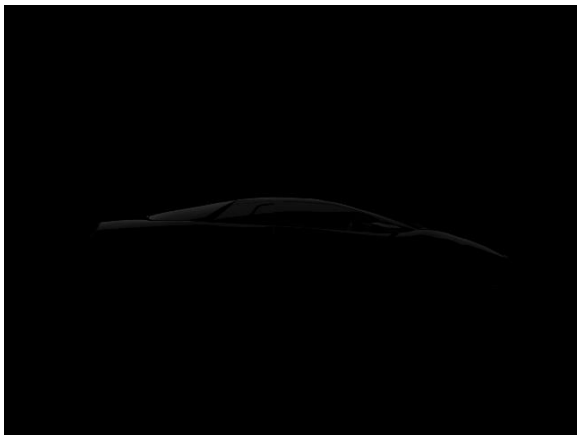

Scene 11

Car-Rear scene.

Light conversion error/invalid RPR parameters.

Arnold	Radeon ProRender v2.3
	
Radeon ProRender v2.2	**Radeon ProRender v2.3**
	

Scene 12

Car_Top scene.

Arnold	Radeon ProRender v2.3
	
Radeon ProRender v2.2	**Radeon ProRender v2.3**
	

Scene 13

Mercedes scene.

Using aiNormal and aiImage files nodes. A combination of Emissive, metal, and glass materials. Added to the scene a new feature – aiCarPaint material.

Currently, there is no way to convert aiCarPaint flakes. A work around is that users will have to create their own custom texture map for flakes.

- [RPRMaya-887]

Arnold	Radeon ProRender v2.3
	
Radeon ProRender v2.2	**Radeon ProRender v2.3**
	

Scene 14

Bump scene.

Bump and displacement scene using aiNormal, maya 2d bump, ai2dBump, and Displacement to SG node.

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	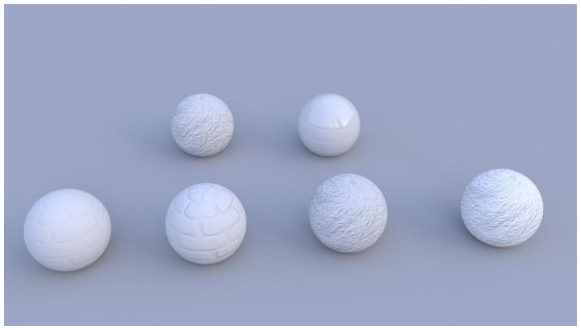
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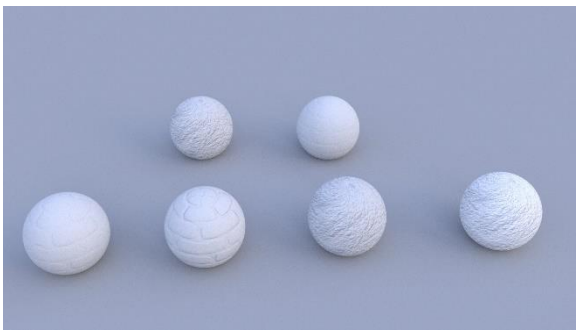	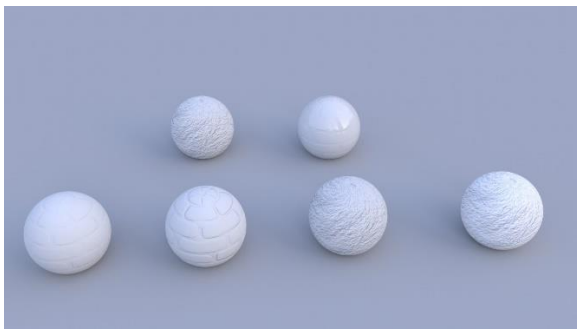

Scene 15

Complex materials scene.

Material test scene using aiCarPaint and aiStandardSurface. A variety of different material setups including SSS, glass and emissive materials.

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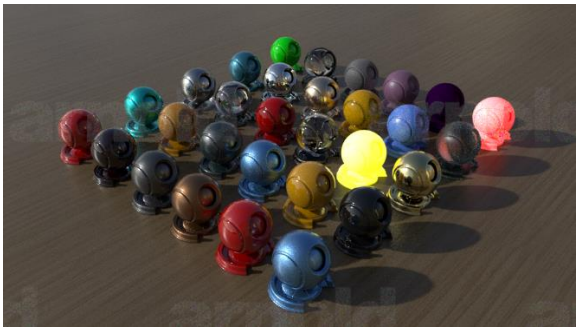	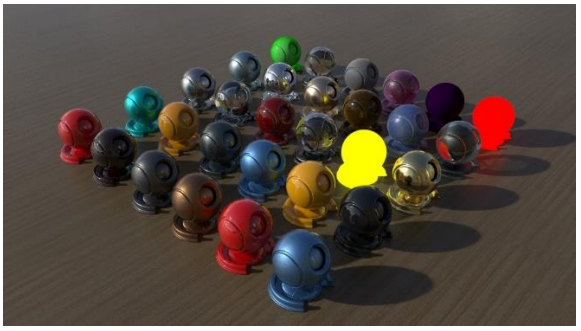
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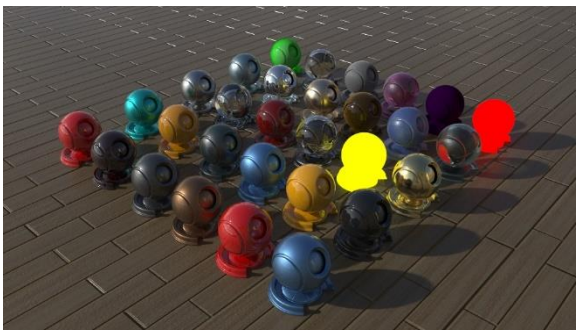
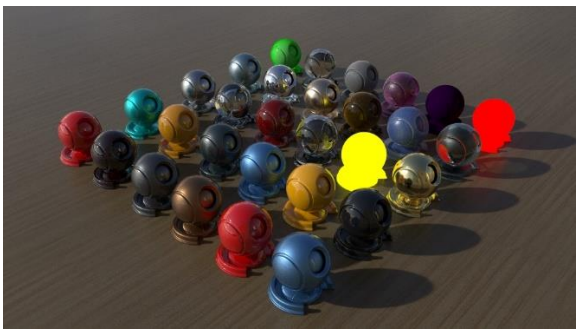
	

Scene 16

Curvature Mustang scene.

Car scene featuring the aiCurvature utility node. Using ProRender Ambient Occlusion node. (Note that users may have to tweak the RPR AO node to get best results).

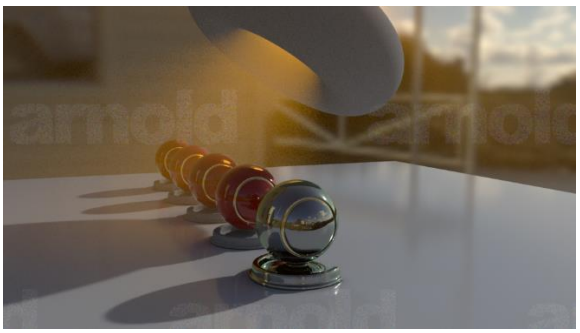
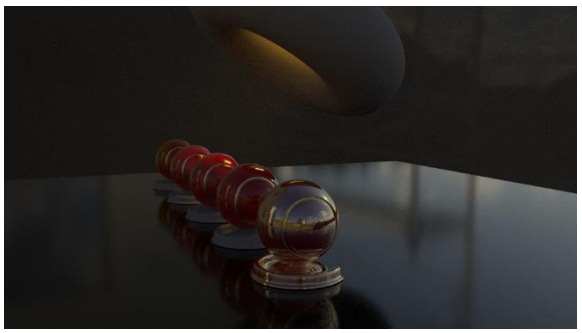
Arnold	Radeon ProRender v 2.3
	

Scene 17

Volume scene.

Currently we are struggling to fully convert this. Mostly due to the way Arnold handles aiAtmosphere and aiFog, they are classified as an environment that can be used with Filters. It will be almost impossible to get a 100 percent match going from an environment fog that can mask an area for IBl to an object with volume material.

- [RPRTOOL-127]

Arnold	Radeon ProRender v 2.3
	

TEST REPORT LINK

For detailed comparison of rendered scenes, see Test Report. The report includes 179 scenes.

Note that this is still the Alpha version of the report. The render process was run on two machines, with AMD and Intel CPUs.

CONVERSION STATUS BY NODE GROUP

Node Group	Total Nodes	Convertible	Partially Convertible	Not Convertible	Research is Needed	Details
Environment	4	0	4	0	0	Link
Files	5	5	0	0	0	Link
Filters	4	0	0	4	0	Link
Lights	4	0	3	0	1	Link
Materials	16	3	3	5	5	Link
Textures	7	1	3	1	2	Link
Utilities	68	13	3	34	18	Link
Total	**108**	**22**	**16**	**44**	**26**	Link