ARNOLD TO RADEON PRORENDER

CONVERSION REPORT

Version 2.5, 22 February 2019 (all reports)

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

- **Software**: Maya 2018, Arnold 3.1.2.1, ProRender 2.5.261

- **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**: **28 nodes** (**30%**), see details

- **PARTIALLY CONVERTIBLE**: **19 nodes** (**21%**), see details

- **NOT CONVERTIBLE**: **47 nodes** (**51%**), see details

- **RESEARCH IS NEEDED**: **14 nodes** (15**%**), see details

This week, we focused mostly on improvements and bug fixes. We added a formula for aiArea lights to get as close to results as possible. We also added a number of fixes for Ambient Occlusion which now supports samples conversion.

 New utility nodes that been add are aiThin film, aiPassthrough, aiMatte, and aiThing film which can only be partially converted. We also added support for two types of render filters (Gaussian and Mitchell) with scales to be converted.

REPORT DETAILS

In this report:

- History
- Script Link
- Known Issues
- Complex Scenes
- Test Report Link
- Conversion Status by Node Group

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.

v.2.4 - aiStandard emissive to Uber emissive now converts with less weight values, Vector map now converts with correct connection for displacement, aiBlackBody now converts to RPR Arithmetic nodes, aiToonShader now partially converts to Uber material, Maya standard lights now convert to ProRender Physical lights, 2d bump and ai 2d bump now converts with correct strength levels, aiNegate now converts to ProRender Arithmetic nodes, aiSqrt now converts using ProRender Arithmetic nodes, aiComposite now is partially convertible using ProRender Arithmetic nodes.

v.2.5 - ai Passthrough now converts to RPR passthrough material, DOF now is partially convert in camera settings, emissive intensity values was adjusted using a formula, aiMatte now converts using blended uber and flat color, ai ThinFilm now partially converts to rpr fresnel (minor tweaks may be needed), Photometric lights now converts temperature to color using a formula, ai toon shader to UBer material was adjusted to match specular metalness, ai Ambient Occlusion samples now convert to RPR Ambient Occlusion samples, ai Ambient Occlusion to RPR Ambient Occlusion colors was switched to match results, ai Ambient Occlusion now converts using RPR passthrough node if connected directly to object, 2d bump nodes had minor adjustments in formula to give better results, Displacement was adjusted to match subs and height strength, Formula was added to Ai area lights for better results.

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:

- [RPRTOOL-58] AI light mesh to RPR Physical light mesh shape
- [RPRTOOL-156] Maya ai atmosphere to Volume materials connection gets broken after conversion
- [RPRTOOL-101] Maya AI Layered shader convert to RPR blend material
- [RPRMAYA-971] incorrect render results with interior scene when IOR of glass is set to 1.52
- [RPRMAYA-967] would be good to have some kind atmosphere environment when it comes to volume lighting
- [RPRMAYA-952] Support for xgen discritpion and collection Workflow
- [RPRMAYA-938] Texture Data lost when using RGB to HSV or HSV to RGB maya nodes
- [RPRMAYA-931] Maya Projection node gives incorrect render results
- [RPRMAYA-920] Add Min, Max, Mod, Floor and Abs operations into RPRArithmetic node
- [RPRMAYA-919] Add support for Clamp node (or make a new node)
- [RPRMAYA-918] (Standard nodes) Several standard nodes work only with maps
- [RPRMAYA-887] CarPaint material
- [RPRMAYA-873] feature request for rpr hair shader
- [RPRMAYA-737] Normal+normal and normal+bump angle corrected blend
- [RPRMAYA-693] Hair support via xgen

Currently we are having issues when adding aiLightMesh to RPR Physical light mesh type. 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 are struggling to come up with a formula that will work with photometric lights to RPR IES lights, and still investigating how to find one that will work. One issue is IES losing Data with more power full lights in scene.

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 v2.5
Radeon ProRender v2.4	**Radeon ProRender v2.5**

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.

At the moment, there is no way to convert aiCarPaint flakes. Current work around would be the user will have to create their own custom texture map for flakes.

We also have a plugin issue regarding Refraction and transparency and Shadow Catcher. This is a very old issue we had for long time in plugin [RPRMAYA-73]. There seems to be an issue with IOR as well 1.52 is what is set in scene.

- [RPRMAYA-887]
- [RPRMAYA-891]
- [RPRMAYA-73]
- [RPRMAYA-971]

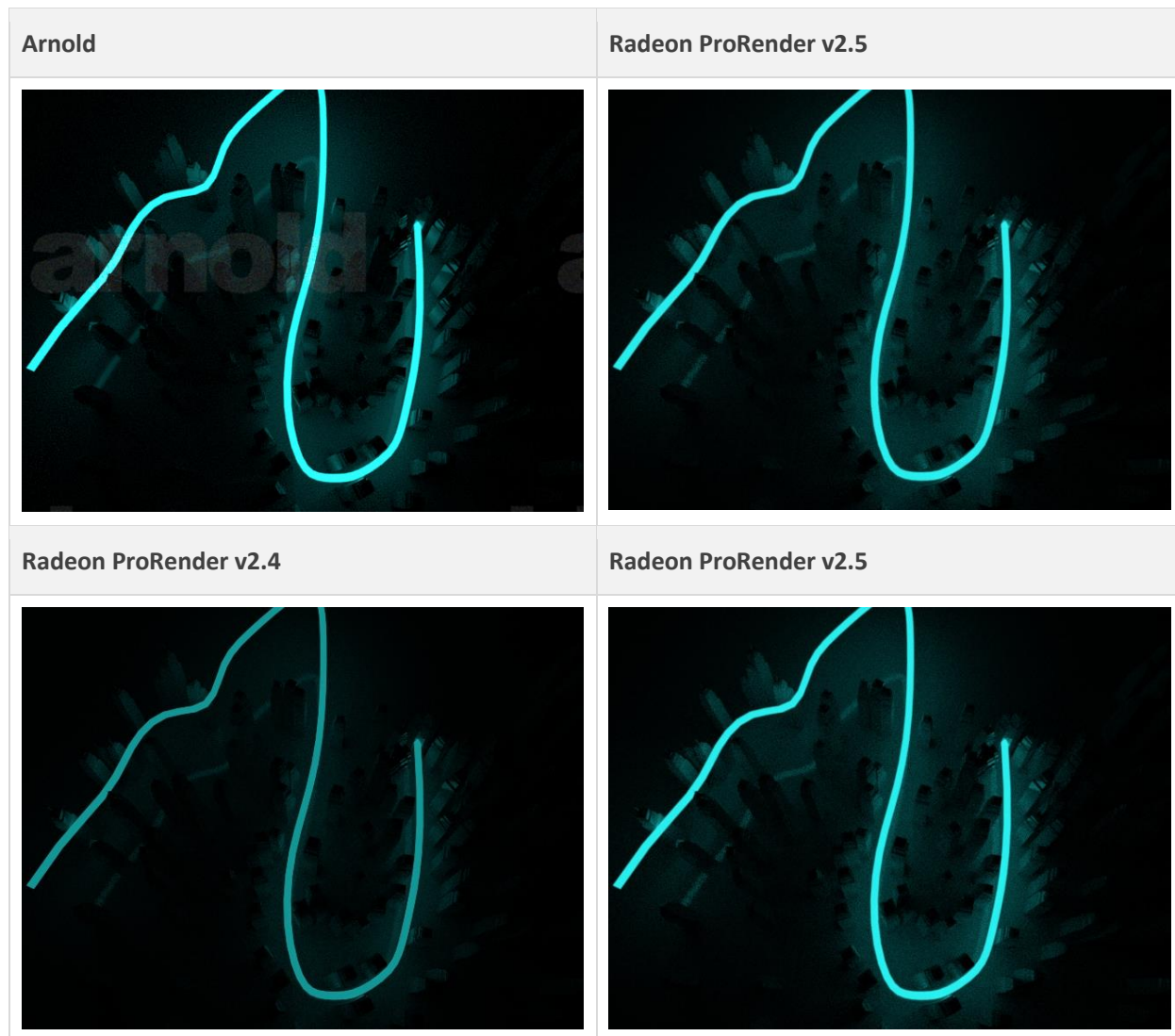| Arnold	Radeon ProRender v2.5
Radeon ProRender v2.4	**Radeon ProRender v2.5**

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 v2.5
Radeon ProRender v2.4	**Radeon ProRender v2.5**

Scene 4

Emissive city scene.

Simple scene with emissive materials lighting the entire scene.

Arnold	Radeon ProRender v2.5
Radeon ProRender v2.4	Radeon ProRender v2.5

Scene 5

Laptop scene.

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

Arnold	Radeon ProRender v2.5
Radeon ProRender v2.4	**Radeon ProRender v2.5**

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.

We have an issue with in the plugin for some time were more powerful lights over ride IES lights in scene. Work around user can slightly increase intensity of ProRender IES lights. There seems to be something wrong with IOR and light passing through glass on plugin side as well.

- [RPRMAYA-216]
- [RPRTOOL-79]
- [RPRMAYA-971]

Arnold	Radeon ProRender v2.5
Radeon ProRender v2.4	Radeon ProRender v2.5

Scene 7

IES test scene.

Scene using Photometric lighting with multiple IES lights.

Arnold	Radeon ProRender v2.5
Radeon ProRender v2.4	**Radeon ProRender v2.5**

Scene 8

Light test scene.

Scene with aIStandard surface materials using SSS skin preset and Procedural math nodes like aiAdd, subtract, multiply and divide.

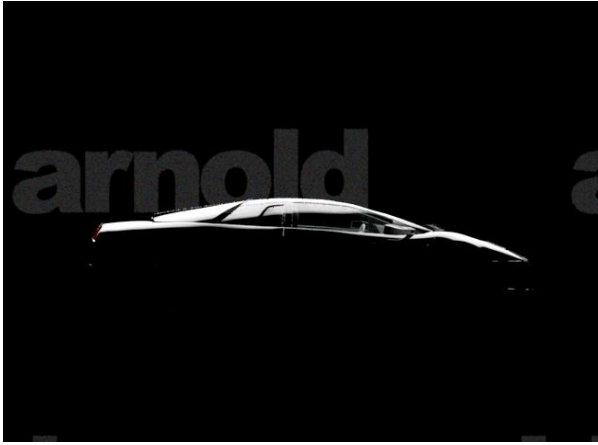| Arnold	Radeon ProRender v2.5
Radeon ProRender v2.4	**Radeon ProRender v2.5**
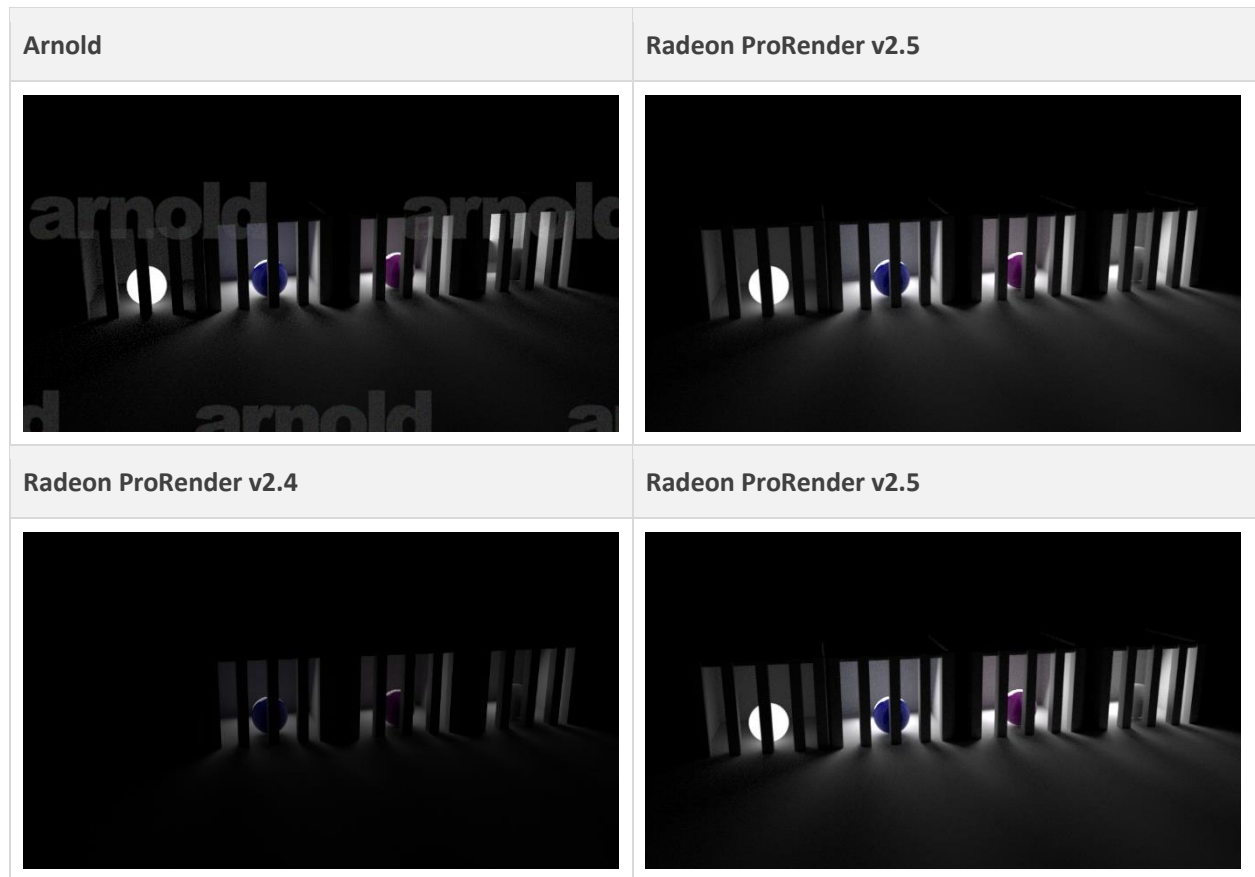
Scene 9
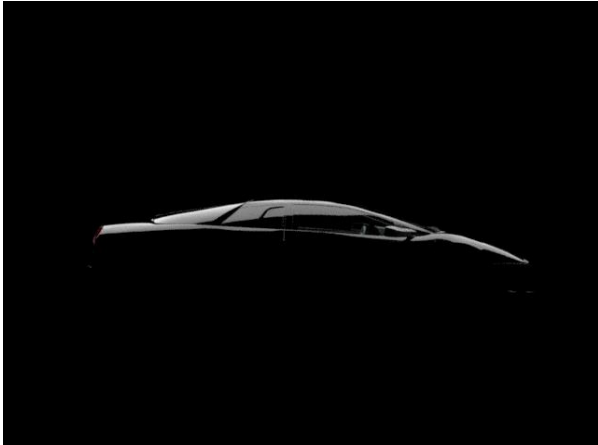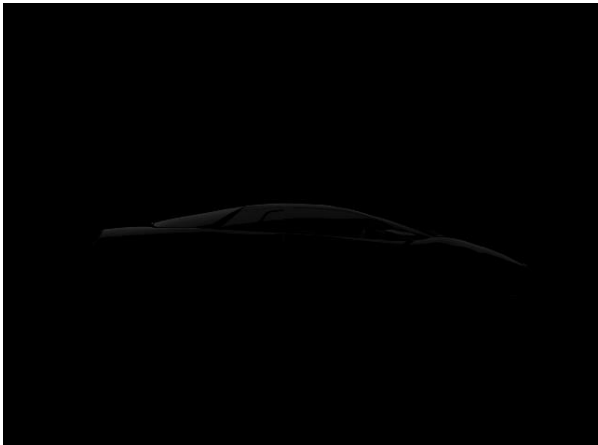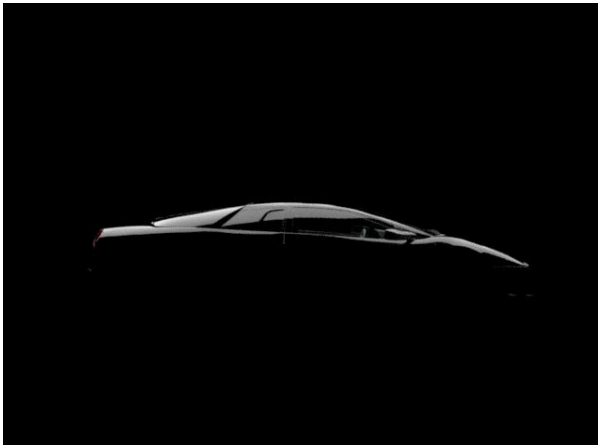
Dragon Scene.

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

Arnold	Radeon ProRender v2.5
Radeon ProRender v2.4	**Radeon ProRender v2.5**

Scene 10

Car-Side scene.

We use a formula to convert Maya standard lights to ProRender Physical light. We'll be adding this formula to aiStandard area light as well, as it should give better results.

Arnold	Radeon ProRender v2.5
Radeon ProRender v2.4	Radeon ProRender v2.5

Scene 11

Car-Rear scene.

Light conversion error/invalid RPR parameters.

Arnold	Radeon ProRender v2.5
Radeon ProRender v2.4	**Radeon ProRender v2.5**

Scene 12

Car_Top scene.

In the scene we found out that the area light and IBL both have a Maya Ramp node connected to them which is making the image darker. As far as we know we have no support for this in Plugin with Maya. We would need to add lights in hyper shade and add a color wheel connection to IBL.

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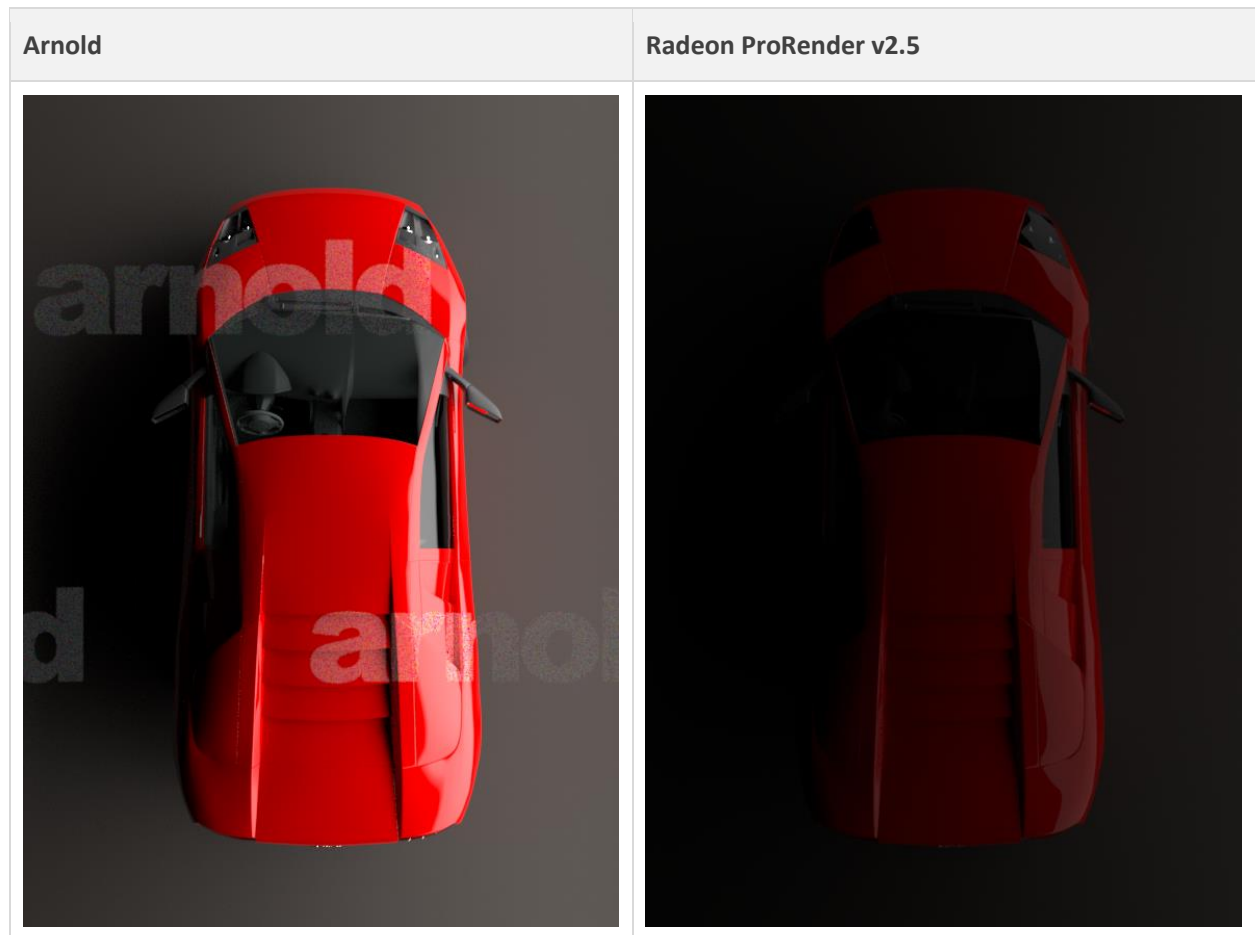
Radeon ProRender v2.4	Radeon ProRender v2.5

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 v2.5
Radeon ProRender v2.4	Radeon ProRender v2.5

Scene 14

Bump scene.

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

Looking to improve displacement as we did with 2dbump nodes. But will have some issues due to the way ProRender displacement gives bad results with artefacts.

Arnold displacement gives clean results no matter what polycount is: an object can have only 1 face 1 subdivision in displacement, and it will render with zero artefacts. We cannot replicate this because of the way our displacement works in ProRender, we can only transfer the values over to the material. For anything lower than 4 subs, users will have to increase the subdivision level to 4 or higher, and possibly increase the polycount of the object.

- [RPRMAYA-329]
- [RPRMAYA-965]

Arnold	Radeon ProRender v2.5
Radeon ProRender v2.4	**Radeon ProRender v2.5**
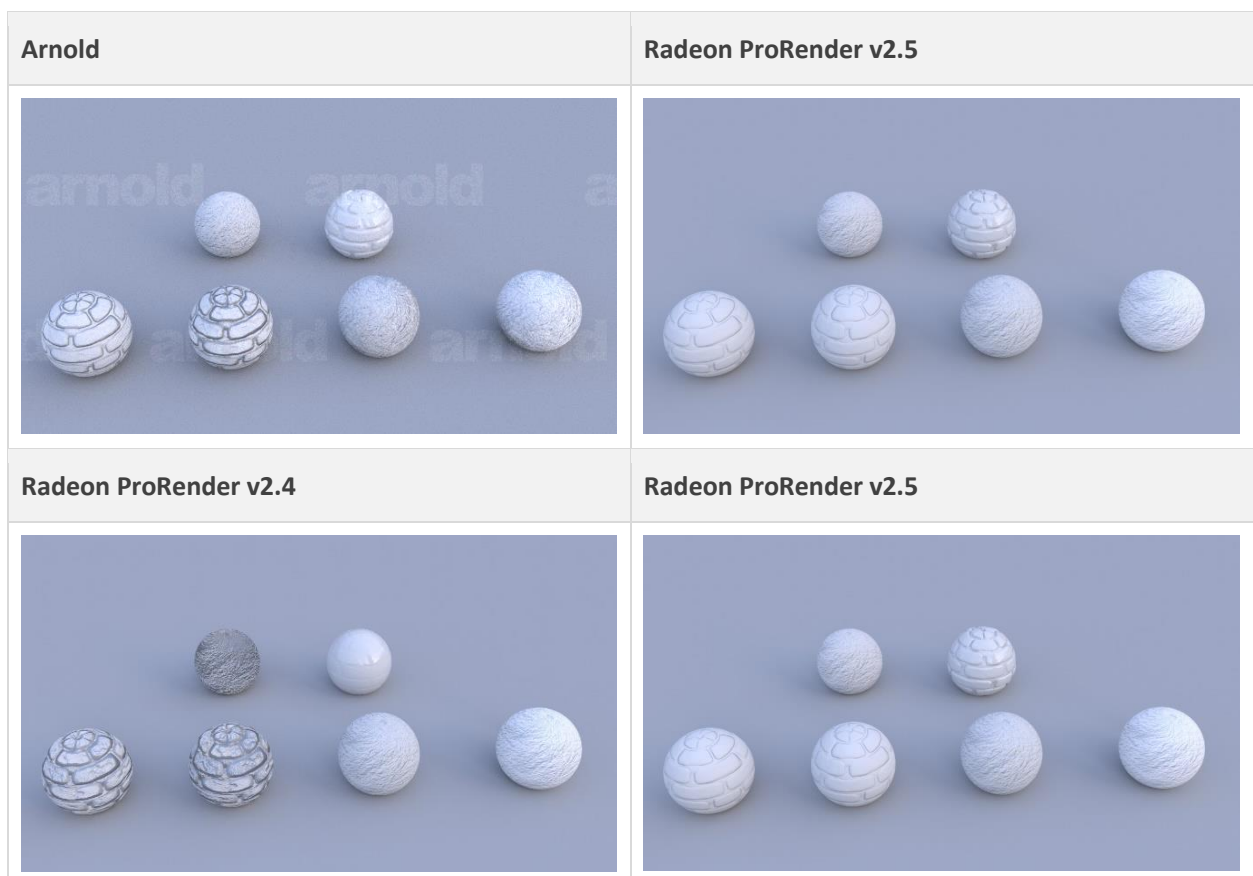
Scene 15

Complex materials scene.

Material test scene using aiCarPaint and aiStandardSurface. Variety of different material setup from SSS glass and emissive materials. Bump values with 2d bump and ai 2d bump were improved to get better results.

Arnold	Radeon ProRender v2.5
Radeon ProRender v2.4	Radeon ProRender v2.5
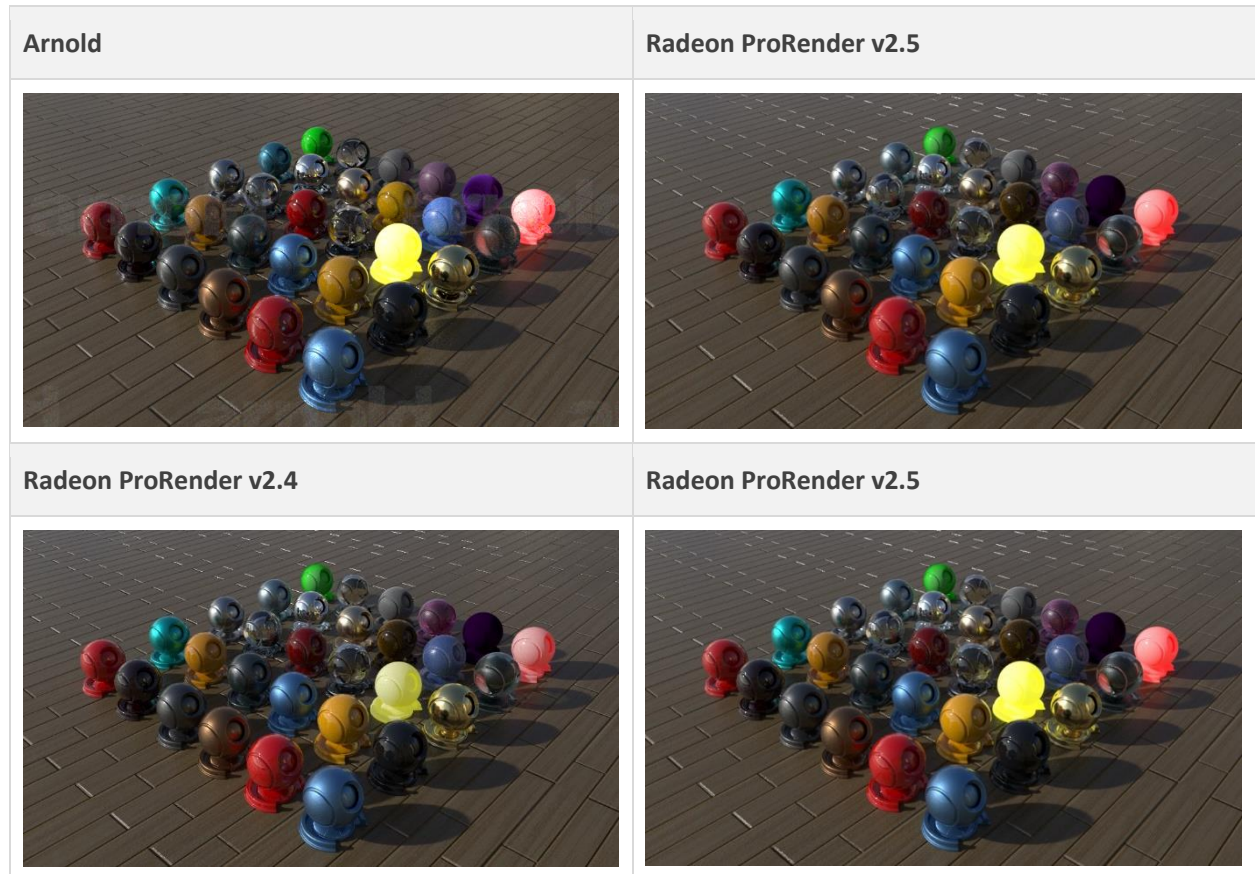
Scene 16

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 2.4
Radeon ProRender v2.4	**Radeon ProRender v2.5**

Scene 17

Volume scene.

Currently, there is just no way to fully replicate atmosphere environment volumes. We could really use a feature like this specifically for Volume lighting. At the moment, we are using a volume material. And with a volume material we are getting correct results. Arnold volume material works like ours but has more control. However they don't use a volume material for volume lighting as it will take away any background images such as an IBL. The benefits of having an Atmosphere is to allow users to have scene with volume lights.

- ▪ [RPRMAYA-967]

Arnold	Radeon ProRender v 2.4
Radeon ProRender v2.4	**Radeon ProRender v2.5**
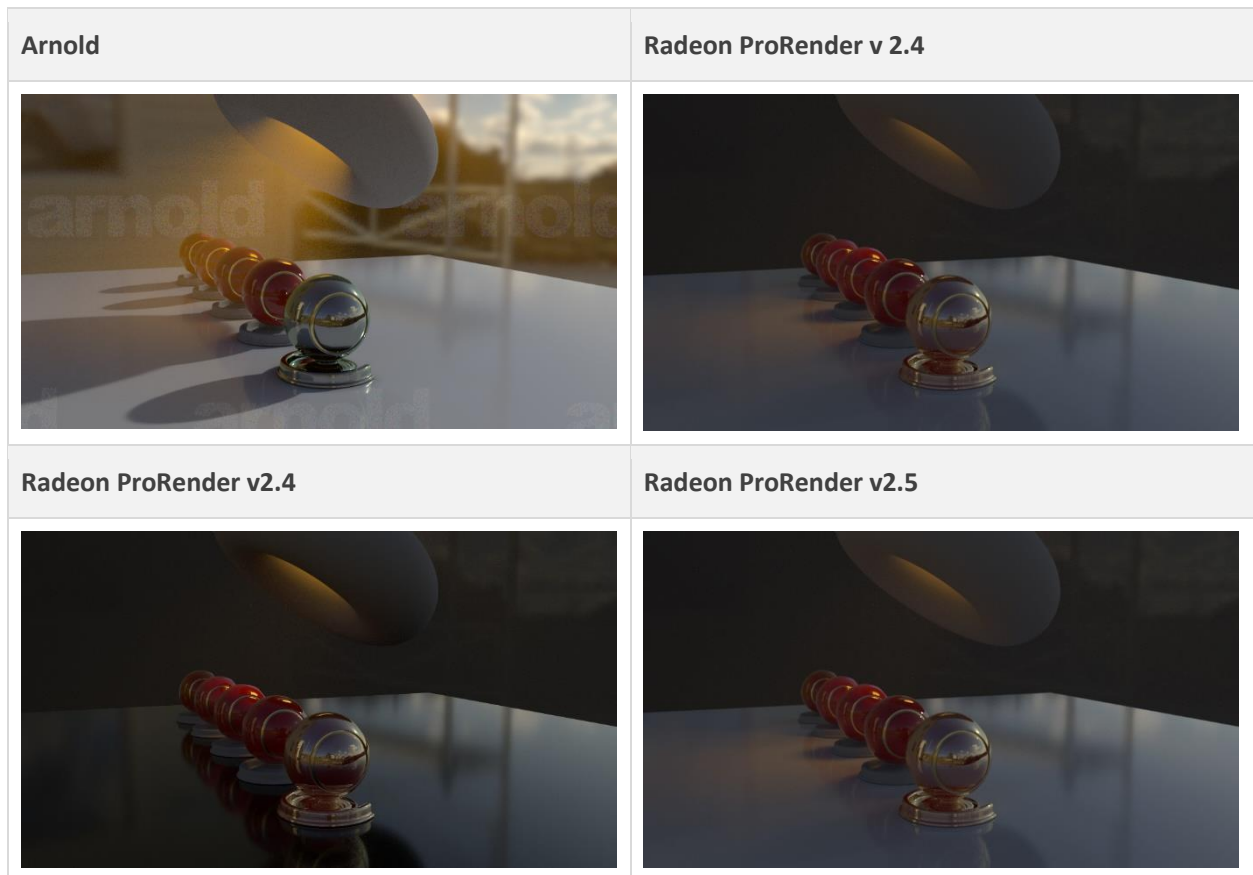
TEST REPORT LINK

For detailed comparison of rendered scenes, see Test Report. The report includes 169 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	5	4	5	2	Link
Textures	7	1	4	1	1	Link
Utilities	68	17	4	37	10	Link
Total	108	28	19	47	14	Link