Making 3D Accessible.

RapidPBR – Leveraging CGI content for real-time XR experiences

AR in E-Commerce Today

powered by **OTTO**
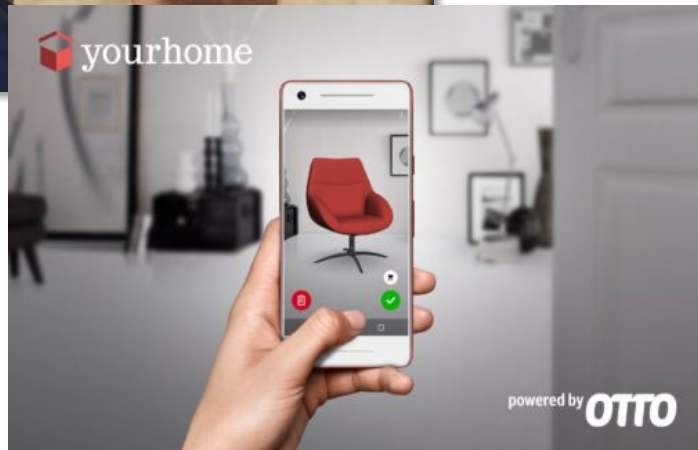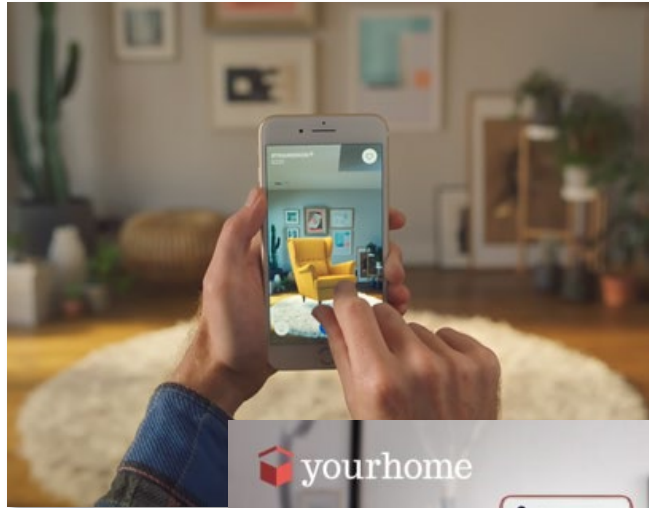
Which of these is the "real one"? Source: Shopify
https://www.youtube.com/watch?v=ajF5Rasyq3o&t=428s

What we are looking for

Millions of 3D Assets
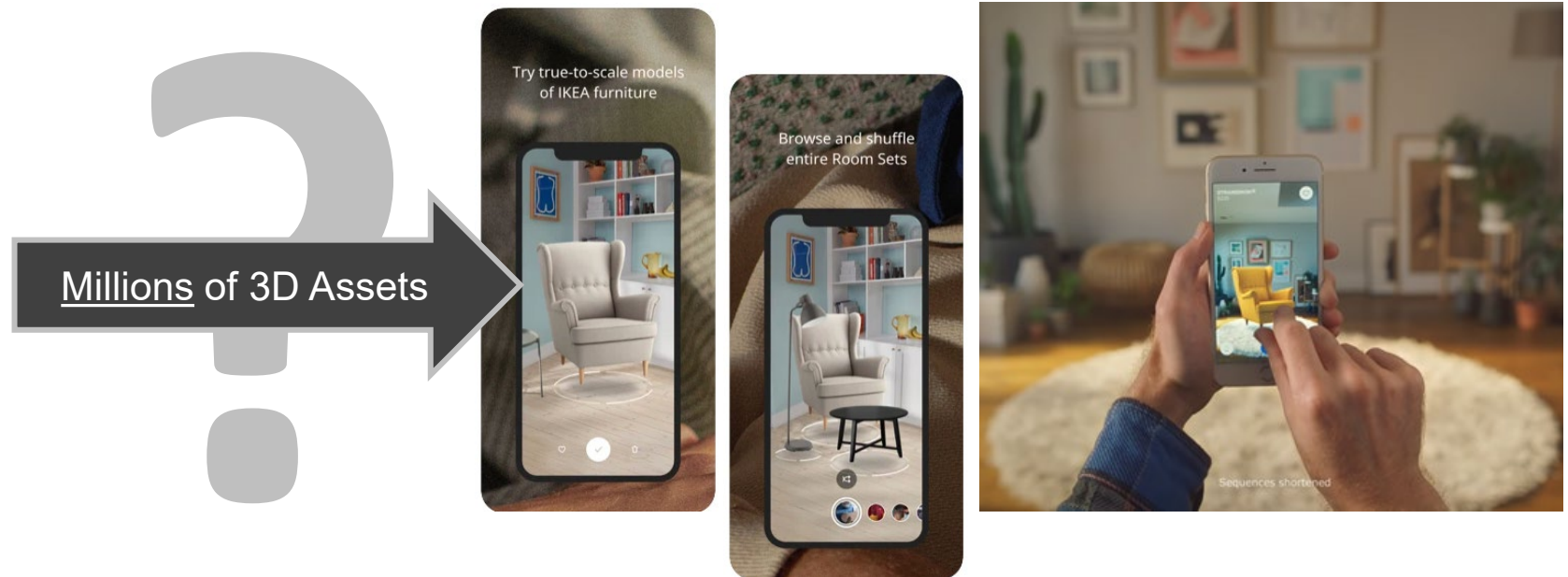
3D assets for real-time apps:
AR + Web technology

Images: IKEA

How is RapidCompact helping there in the first place?

And what is RapidPBR?

What is RapidCompact?

DGG
Making 3D Accessible.

Before

190MB

Offline 3D asset
1M polygons
15 texture atlases
38 draw-calls
glTF / FBX / USD(Z) / ...
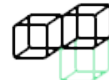CAD, 3D Scan or DCC

After

2.5MB

Real-time 3D
15K polygons
3 texture atlas
2 draw-calls
glTF / FBX / USD(Z) / ...

Thumbnail Rendering Mesh Optimization Draw-call reduction Material baking

Rapid Compact
by DGG

Compression algorithms Optimization tools Custom presets Embed/ Deploy
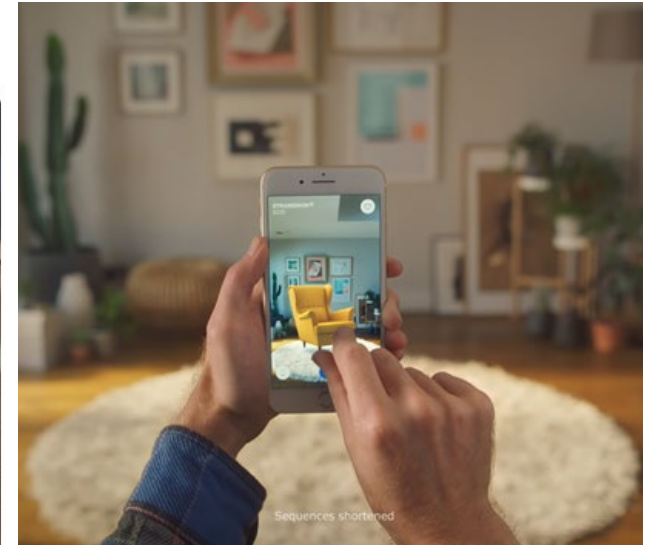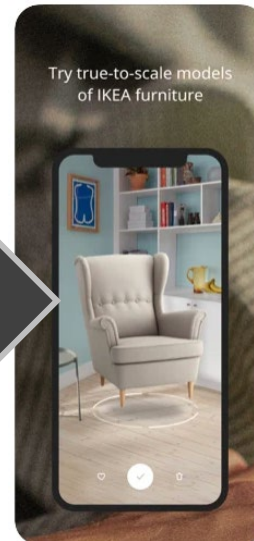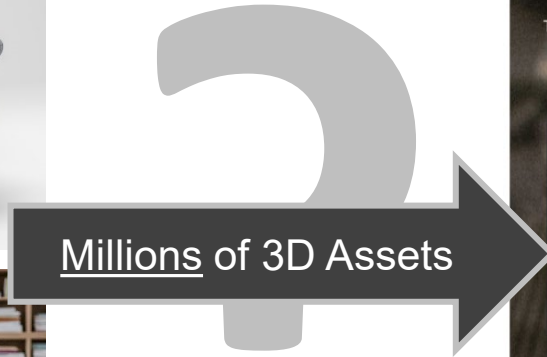
CGI models are not always available

Use **3D scanning**!

Get models created reliably, **as a service!**

All of the above / build a **database**!

Use available **CAD data!**

6

Yet often, CGI can be used as the source!

Millions of 3D Assets

CGI models
for offline rendering

3D assets for real-time apps:
AR + Web technology

What is the **RapidPBR** extension to RapidCompact?
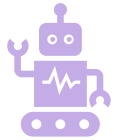
Fully automated pipeline tool for Material Translation from proprietary CGI Material models into Real-Time PBR standards

Saves artists and users time otherwise spent with manual conversions, while aiming for visual fidelity and physical correctness

Removes the hurdles of getting your models outside of the DCC, to your end users, at scale

What can RapidPBR do?

What can **RapidPBR** do?

Possible Future Support*:

*Other renderers and DCCs listed are just for reference, subject to change

Material Levels

L1

Untextured Materials

No Texmaps of any kind

L2

Textured Materials

Simple L2
Bitmaps,

Normal/Bump Nodes

Rendered L2
All non-Procedural,

Tiled Texmaps

L3

Procedural Materials

Procedural Texmaps, Real World

Scale Textures, UDIM, etc

Input Materials Support

Material	Support	Comments / Limitations
VRayMtl	Yes	Diffuse Roughness: Unsupported in GLTF
		Thin-film, Clear Coat, Sheen, Anisotropy: Support to be developed
		SSS: Unsupported, pending Khronos' extensions release
VRayLightMtl	Yes	---
VRayFastSSS2	WIP	SSS: Unsupported, pending Khronos' extensions release
		Diffuse and Specular components are supported
VRayBlendMtl	WIP	Additive displacement or shellac are currently not supported
VRayWrapperMtl	Yes	Replaced by base material
VRayOverrideMtl	Yes	Replaced by base material
VRay2SidedMtl	WIP	Replaced by Front material, or by the Back material if no Front was provided
		Future Khronos' Diffuse Transmission extension could be useful for this effect
VRayBumpMtl	Yes	---

*Non-extensive list, subject to change

Input Geometry Support

- All surfaces and primitives convertible to Editable Meshes are supported by RapidPBR

- Unsupported Geometry objects are removed during RapidPBR scene preprocessing in the DCC

Geometry	Support
Editable Meshes, Polys, Patches, Shapes	Yes
Standard Primitives	Yes
Extended Primitives	Yes
Patch Grid Primitives	Yes
Door Primitives	Yes
NURBS Surfaces	Yes
Windows Primitives	Yes
Body Objects	Yes
Particle System Primitives	No

*Non-extensive example list, subject to change

Supported Extensions

- KHR_materials_specular

- KHR_materials_transmission

- KHR_materials_volume

- KHR_materials_ior

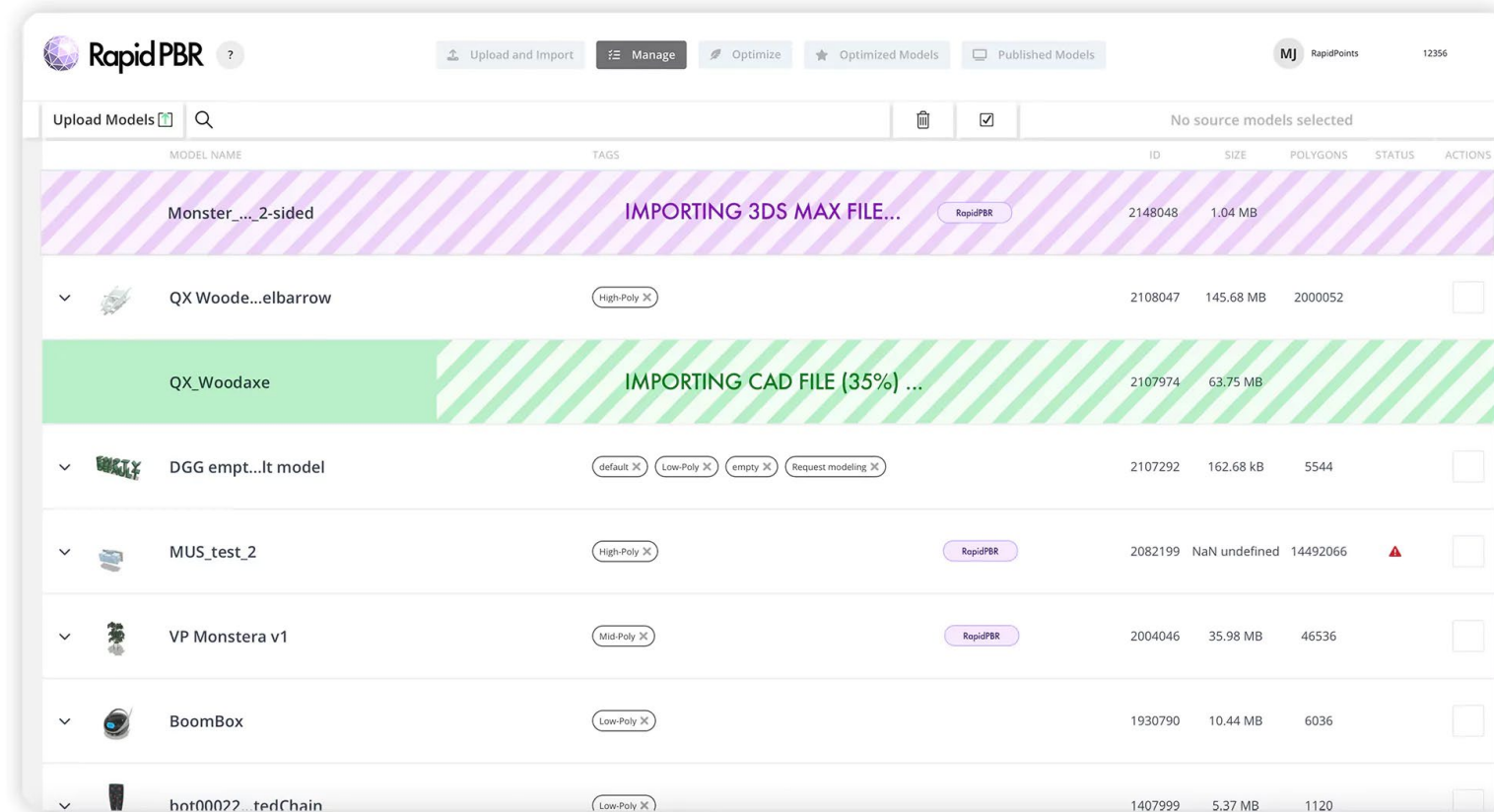- KHR_materials_emissive_strength

- KHR_texture_transform

Planned Future Support:
- KHR_materials_clearcoat
- KHR_materials_iridescence
- KHR_materials_sheen
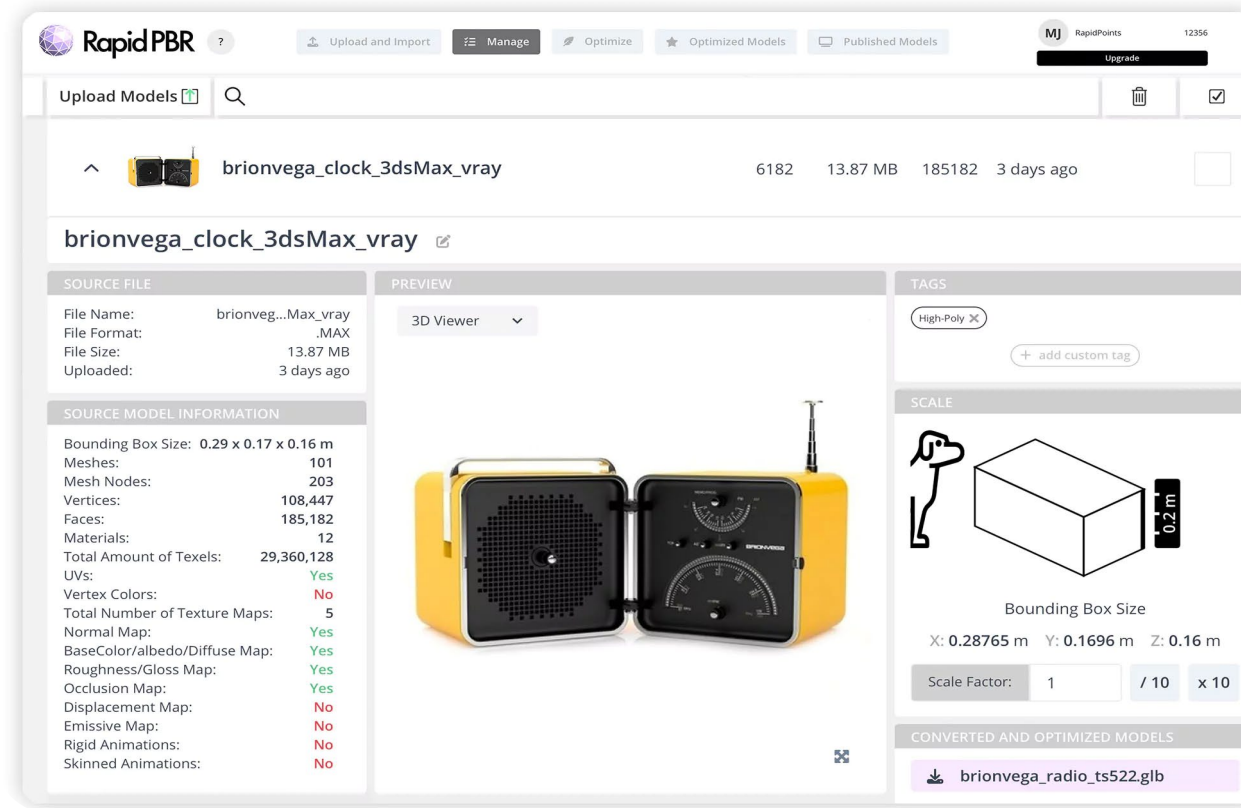- KHR_materials_anisotropy

Deployment – DGG cloud solution

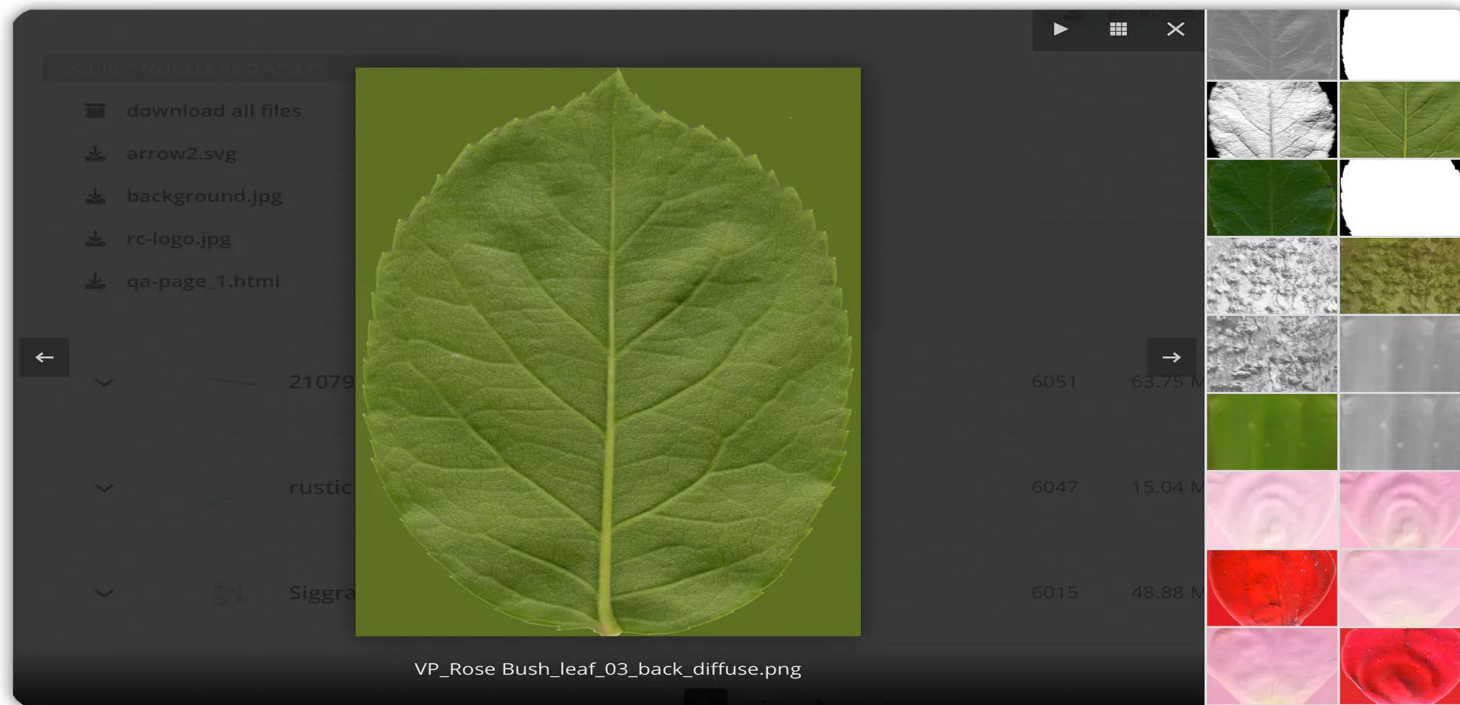- Upload your 3ds Max files with VRay materials directly to our cloud

Deployment – DGG cloud solution
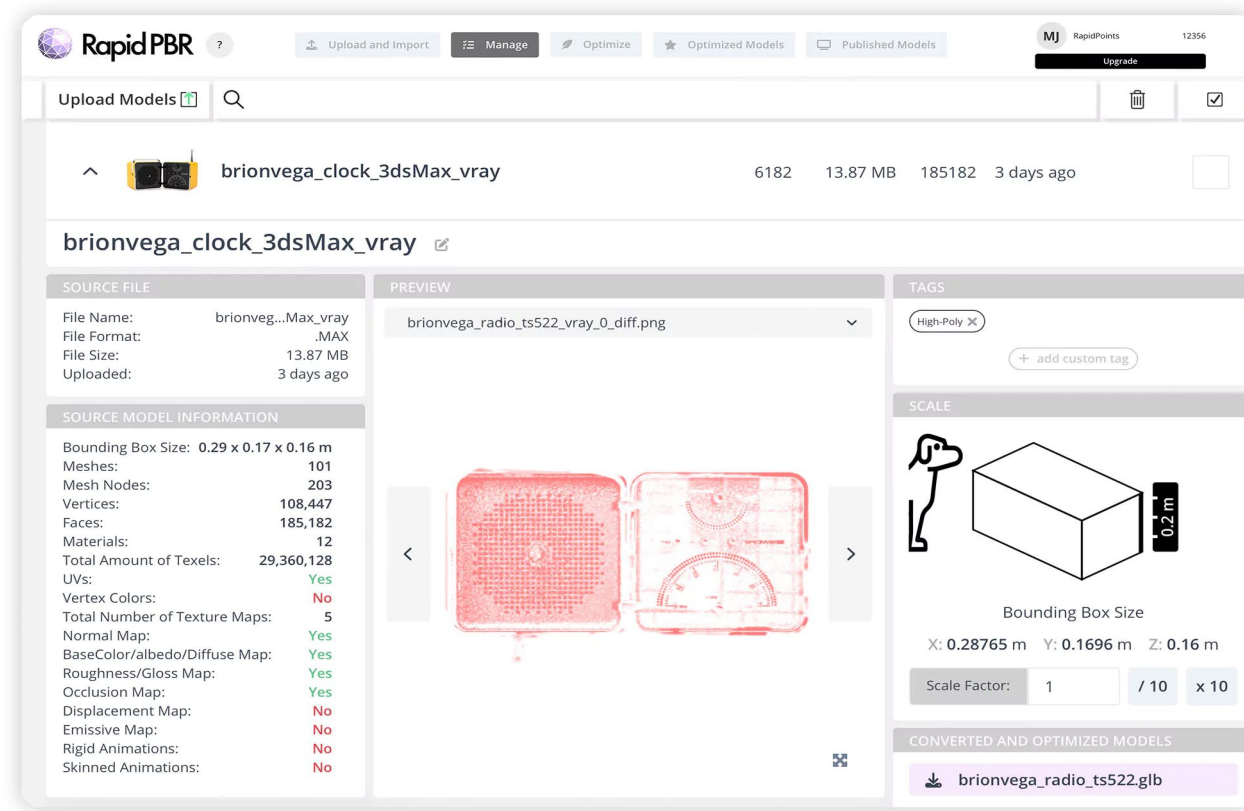
- Preview in real time 3D

Deployment – DGG cloud solution

- Preview textures

Deployment – DGG cloud solution

- Automatic quality control
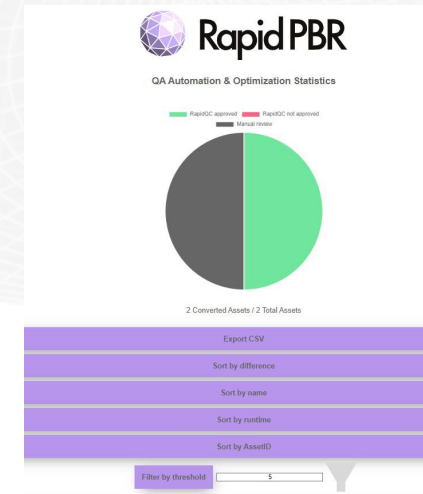
Automated Quality Control on Batches

Fully Automated Quality Control at scale for RapidPBR and RapidCompact

Features

- Automated Rendering Pipeline
  - Controlled lighting environment, standardized camera positions
  - Autonomous rendering of input and output format
  - Comparison of rendered images in controlled lighting environment

- HTML Report Generation
  - 6+ renderings per asset (6 automated positions + input cameras)
  - Creation of difference score and difference visualisation
  - Function to sort and filter assets based on difference
  - Additional information about output
  - Warning / Error logging for entire RapidPBR pipeline
  - Export Data to CSV

Future Updates

- RapidCompact RC Renderer
- glTF → USD
- further DCC support

Deployment – on premise

- It's also possible to go on premise

- Process and manage your own assets, in your infrastructure

- Necessary:
  - 3ds Max instances
  - VRay licenses

Automated Quality Control

Fully Automated Quality Control for RapidPBR and RapidCompact

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Shadergraph Translation

- Translation of DCC-Texmap Trees into pure MaterialX nodes

- One DCC node could be factored into several chained MaterialX nodes
  - MaterialX nodes are often "atomic" operations
  - DCCs frequently have utility nodes that perform multiple things "at once" - e.g. 3dsMax's ColorCorrection

Limitations:

- Some effects aren't translatable – e.g. Falloff
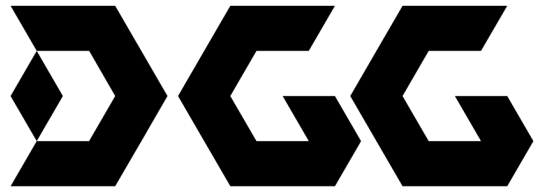 - MaterialX discussion about NPR Node Library offers more opportunities

Enables:

- Using MaterialX as a framework for translation between different material models

Shadergraph Translation

DGG

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Thanks! Questions?