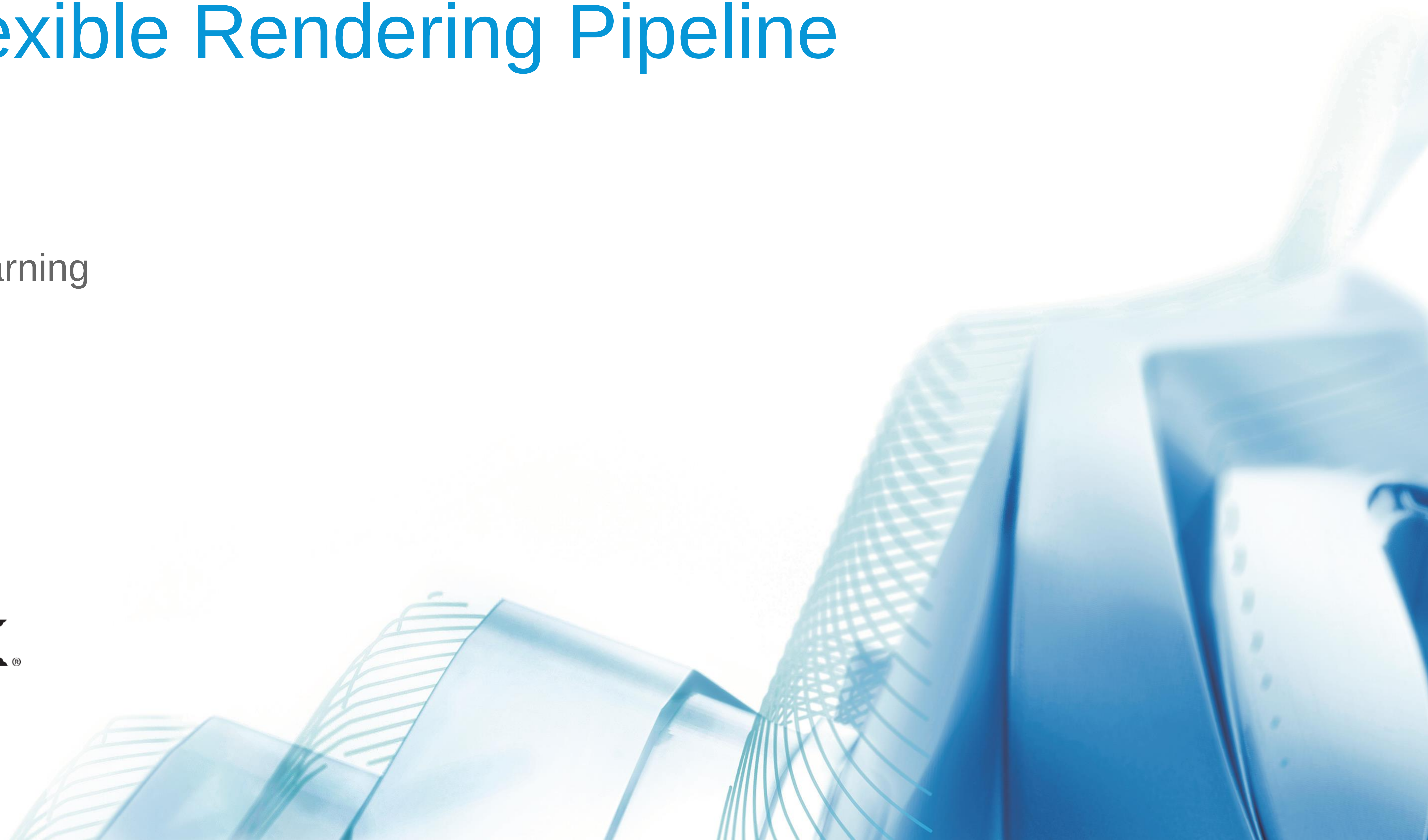
Rendering Everything Everywhere

Creating a Flexible Rendering Pipeline

George Maestri

Staff Author – LinkedIn Learning



George Maestri

Staff Author, CAD, 3D, Animation

Linked in ® LEARNING WITH Lynda.com CONTENT

Goal:

Render Everything Everywhere

Create a pipeline that allows for images to be created at any point.

Outline

Introduction / Definition

Current Technology

Possible Pipelines

Materials

Lights & Cameras

Recommendations

Futures

Introduction

Visualization

The Challenge

The Challenge

1 – We have to render for a **lot** of outputs

The Challenge

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Stills

The Challenge

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Stills

Motion

The Challenge

1 – We have to render for a **lot** of outputs

Stills

Motion

Interactive/VR

The Challenge

1 – We have to render for a lot of outputs

The Challenge

1 – We have to render for a lot of outputs

2 – **Those outputs often require different technologies**

The Challenge

Stills

Motion

Interactive/VR

The Challenge

Stills

Motion

Interactive/VR

Classic Rendering

Arnold

V-Ray

…etc

Real Time Rendering

Unity

Unreal

…etc

The Challenge

1 – We have to render for a **lot** of outputs

2 – Sometimes those outputs require different technologies

3 – **Building an efficient pipeline is challenging**

The Challenge

1 – We have to render for a **lot** of outputs

2 – Sometimes those outputs require different technologies

3 – Building an efficient pipeline is challenging

4 – **Understand What Works, What Doesn’t**

It’s Kind of a Mess

1 – Traditional 3D Creation Tools (Maya, 3ds Max, Revit, etc…)

2 – Renderers Galore (Arnold, V-Ray, Redshift, Octane, etc)

3 – Translation tools (that don’t always work)

4 – Real-Time Engines (different workflows / requirements)

Current Tools

3D / Modeling
(Max, Maya, Revit, etc)

→

Interactive/Real Time
(Unreal, Unity, etc...)

Obstacles

Familiarity with Tools – Artists often go with what they know.

Archival Assets – All that stuff you created may need to change

Outside Assets – Clients and freelancers also need to be on board.

Changing Landscape – Which technology will prevail?

Changing Landscape

3D / Modeling
(Max, Maya, Revit, etc)

Interactive/Real Time
(Unreal, Unity, etc…)

Changing Landscape

3D / Modeling
(Max, Maya, Revit, etc)

Interactive/Real Time
(Unreal, Unity, etc...)

Paradigm Shift

The move towards Real-Time rendering and interactivity has created a **paradigm shift** in the way we create images.

Workflows are changing quickly, creating **obstacles**.

This will eventually get better, but how do you survive the shift?

Technology

Rendering Technology

PARADIGM SHIFT

Rendering technology is increasingly moving towards real-time creation and playback.

FASTER HARDWARE

Fast graphics cards allow for much higher quality and more interactive rendering.

SOFTWARE EVOLUTION

Traditional Tools embracing the GPU as well as prioritizing interactivity.

“Classic” Rendering

“CLASSIC” WORKFLOW

The classic workflow is tightly integrated into the 3D creation tools, creating a seamless workflow

Ability to do Post-Processing/Compositing for added quality.

RENDERING TAKES AS LONG AS NEEDED

Image quality is king.

High-end features/effects can be added, but at a speed cost.

Interactivity takes a back seat.

v·ray

octanerender

PIXAR's
RenderMan

“Classic” Rendering

“CLASSIC” PROS

No compromise on image quality.

Familiar workflows

Tight integration with 3D apps – easy to create an image.

Can do finishing/compositing on output.

“CLASSIC” CONS

Not truly interactive

No “VR”

Some things just take longer

“Real-Time” Rendering

“REAL-TIME” WORKFLOW

Emphasis is on speed/real-time first.

True interactivity with scene contents

VR/AR and other advanced visualizations

RENDERING HAPPENS NOW

Every image takes 1/30 second

Very quick iterations when authoring

“Real-Time” Rendering

“REAL-TIME” PROS

True Interactivity

Instant Results / Quick iterations

VR/AR

“REAL-TIME” CONS

Speed sometimes wins over Quality

Unfamiliar workflows

Integration with 3D Tools can be challenging.

Grey Area

CLASSIC IS GAINING SPEED

Interactive viewports

Better GPU support/integration

Fewer iterations

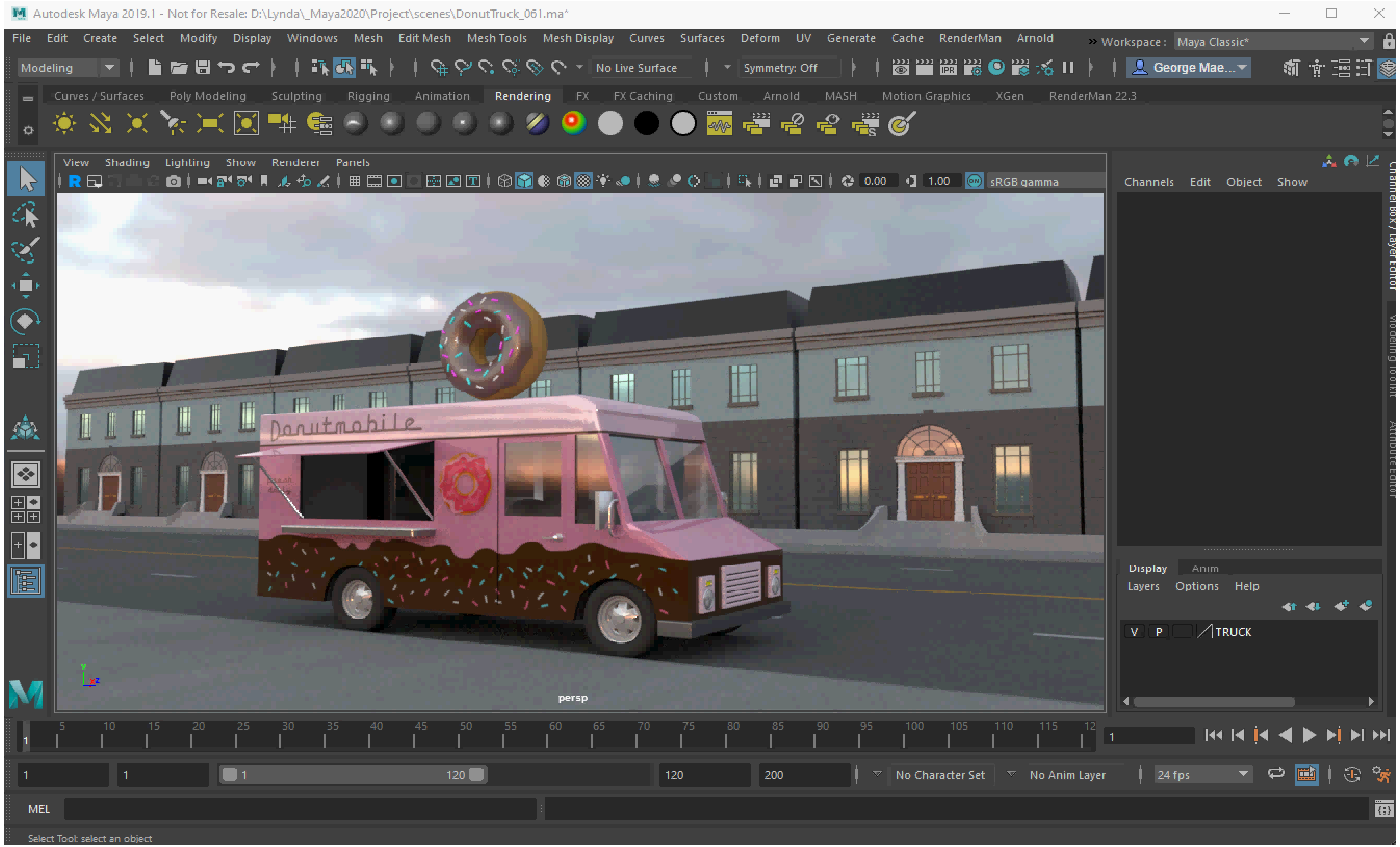
REAL TIME IS GAINING QUALITY

Raytracing with RTX/Nvidia

Advanced Features

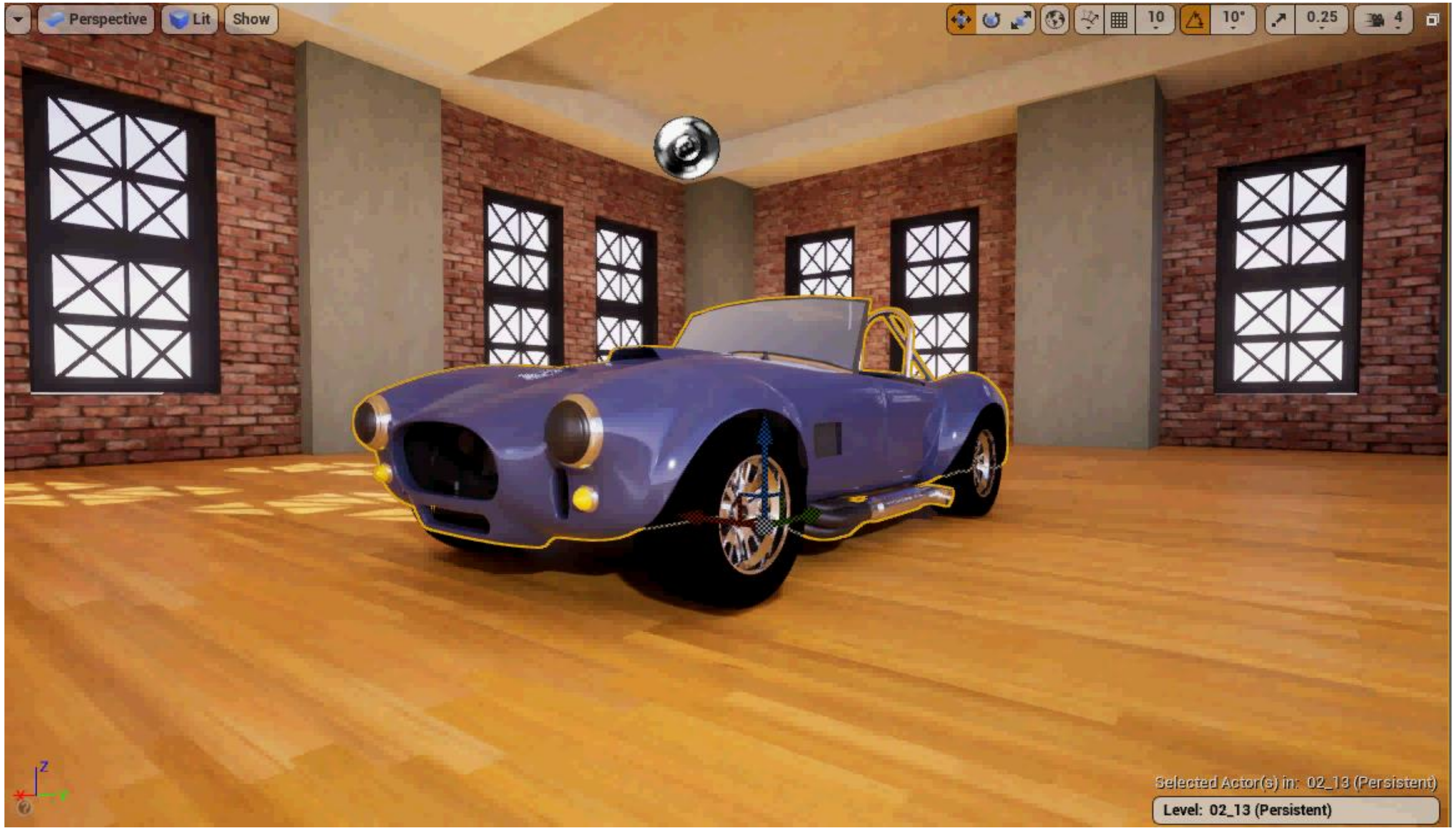
Better quality

Classic Getting Faster



Select Tool: select an object

Real-Time Getting Better



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Level: 02_13 (Persistent)

We’re Not Quite There (yet)

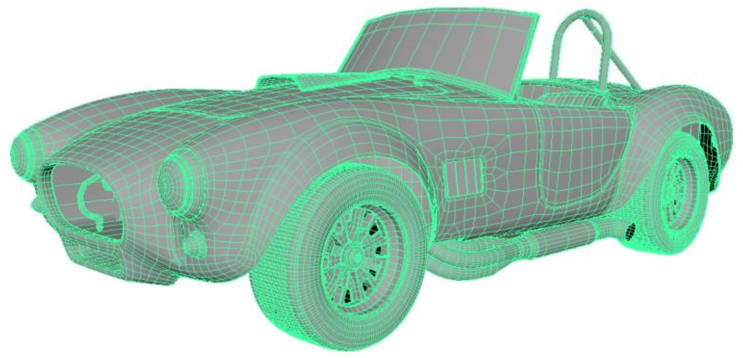
THE LINES ARE BLURRING

EACH STILL HAS ADVANTAGES

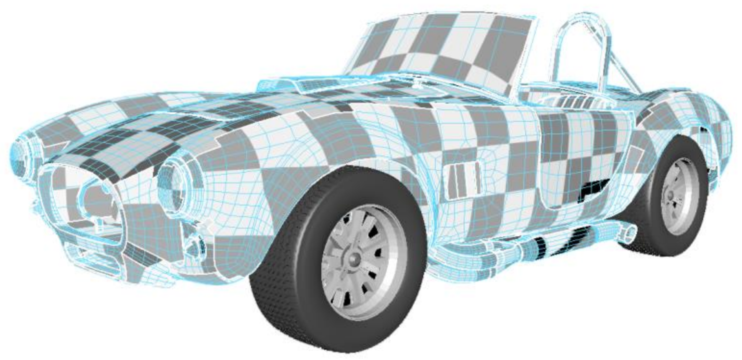
Pipelines

Typical Pipeline

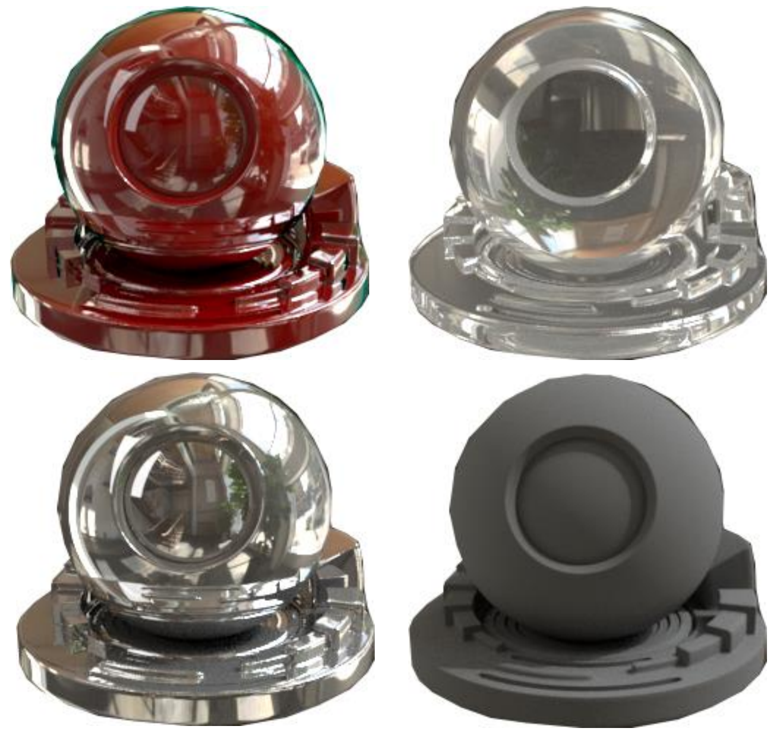
MODELING



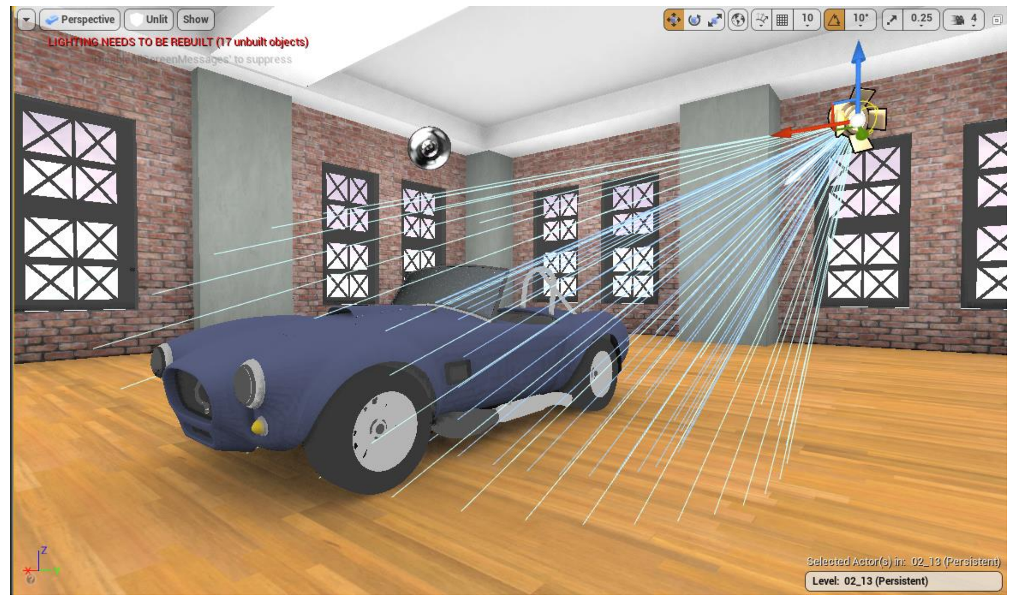
UV/TEXTURES



MATERIALS



LIGHTS/CAMERAS



LIGHTING NEEDS TO BE REBUILT (17 unbuilt objects)
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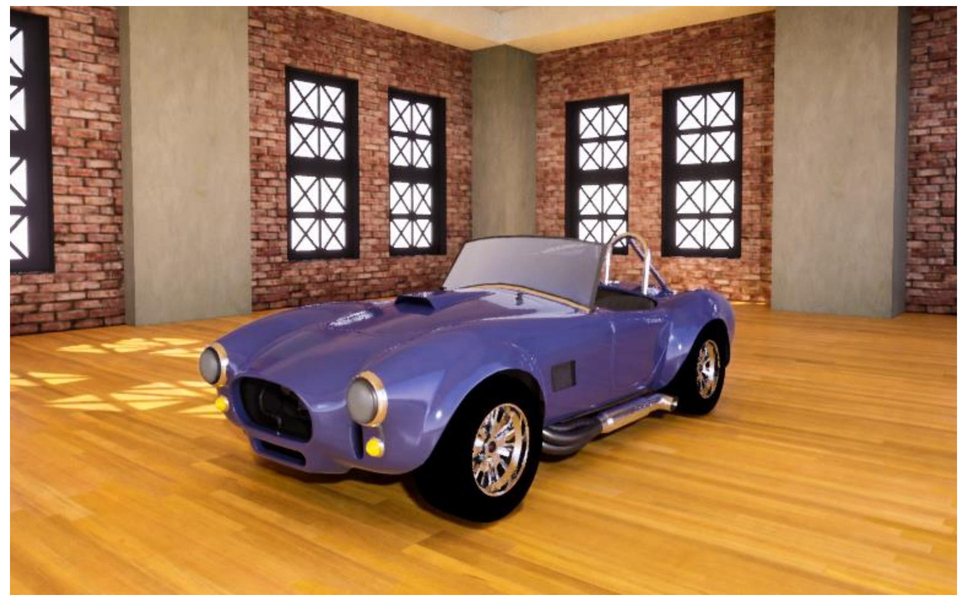
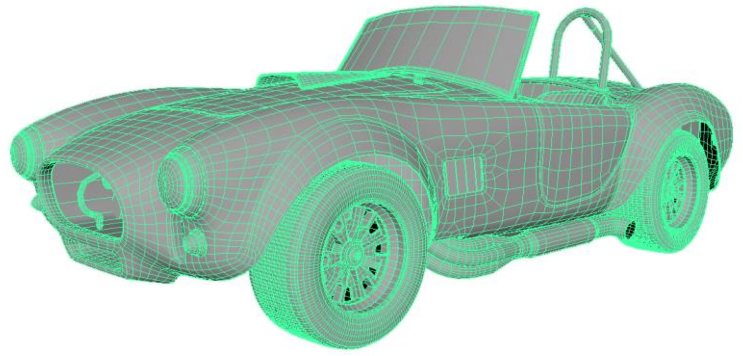
RENDER



Typical Pipeline

MODELING



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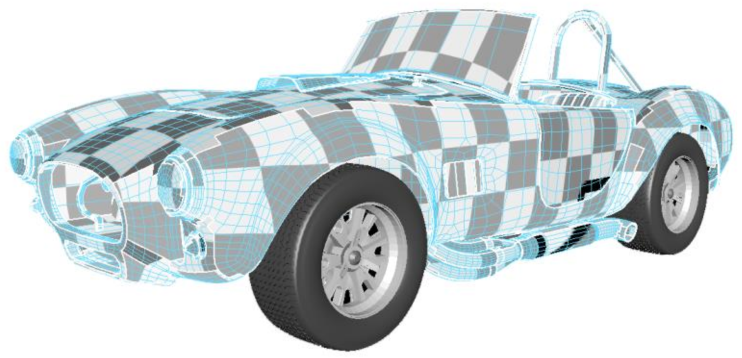

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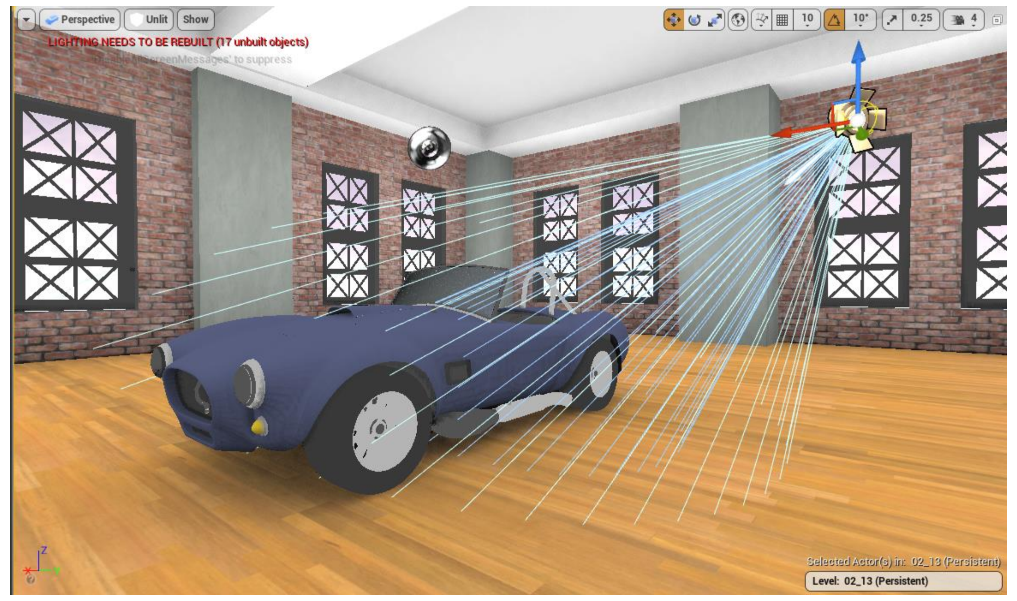
LIGHTS/CAMERAS



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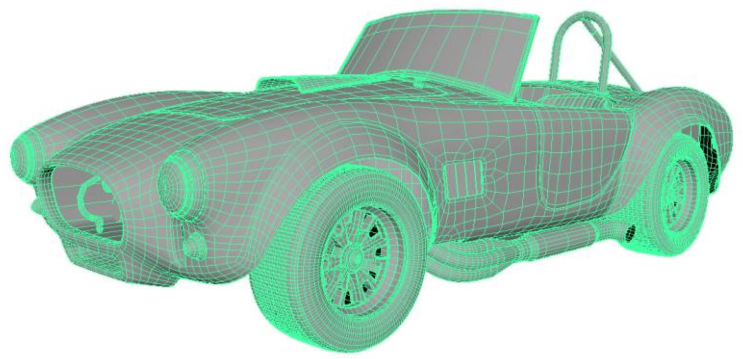
RENDER

3D / Modeling
(Max, Maya, Revit, etc)

Typical Pipeline

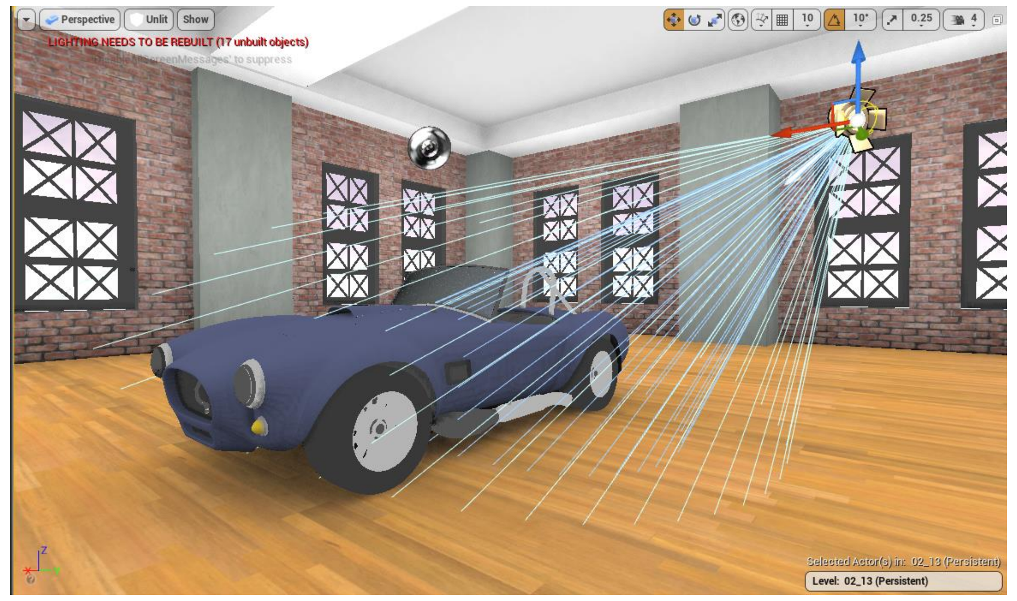
MODELING



UV/TEXTURES

MATERIALS

LIGHTS/CAMERAS



LIGHTING NEEDS TO BE REBUILT (17 unbuilt objects)

RENDER

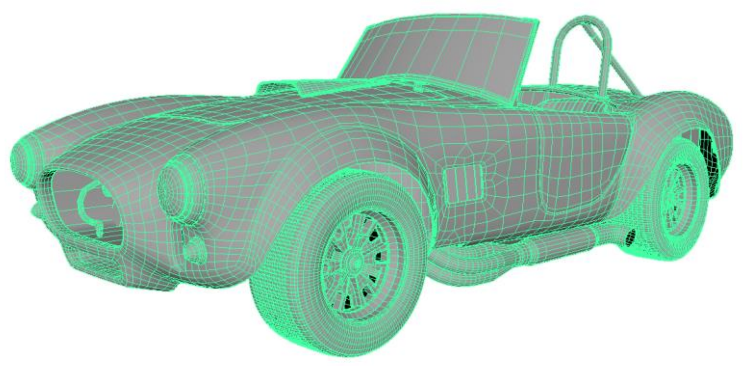
3D / Modeling
(Max, Maya, Revit, etc)

Classic
(Arnold, V-Ray, etc)

Interactive/Real Time
(Unity, Unreal, etc)

Typical Pipeline

MODELING



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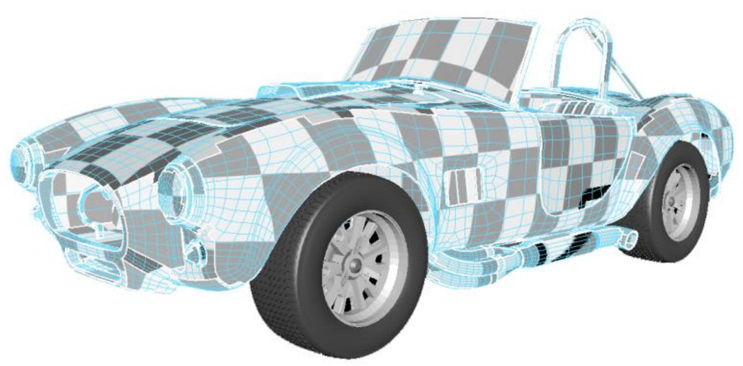

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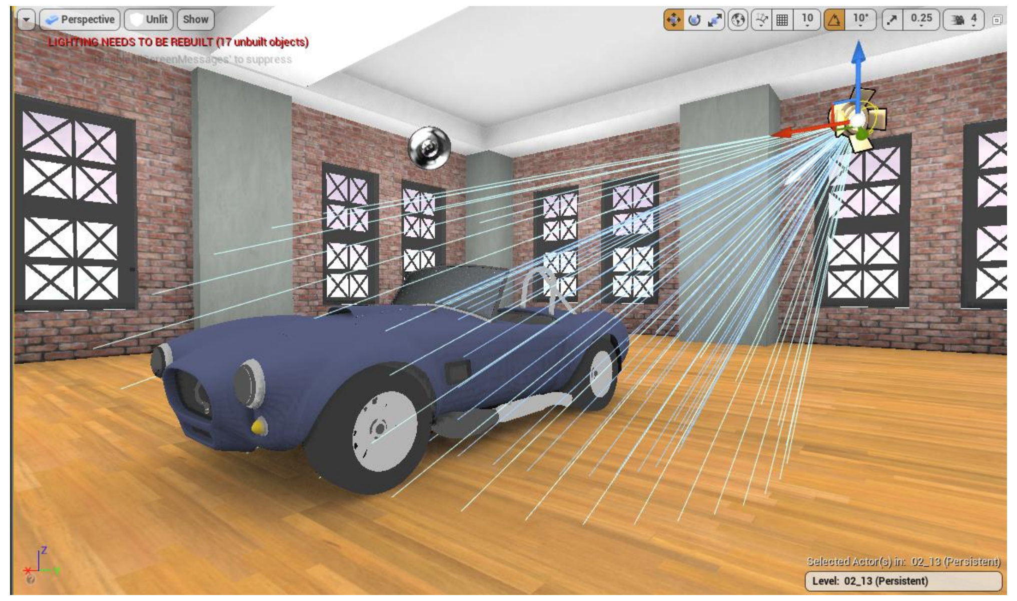
LIGHTS/CAMERAS



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RENDER

3D / Modeling
(Max, Maya, Revit, etc)

→

Classic
(Arnold, V-Ray, etc)

Typical Pipeline

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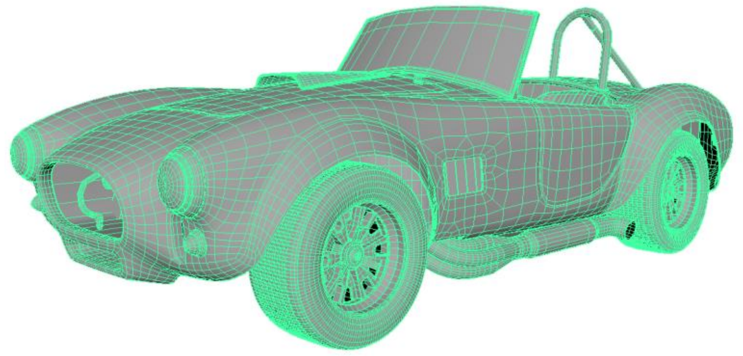

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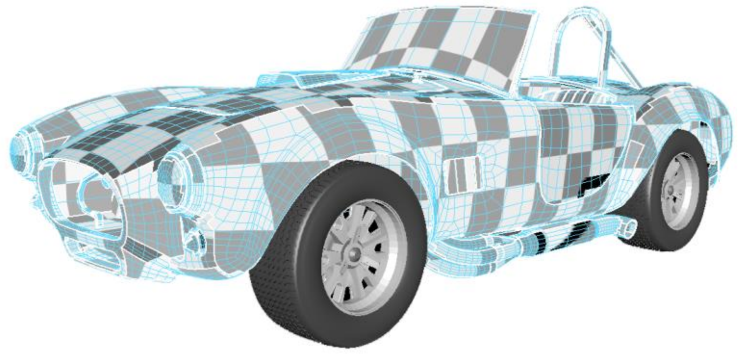

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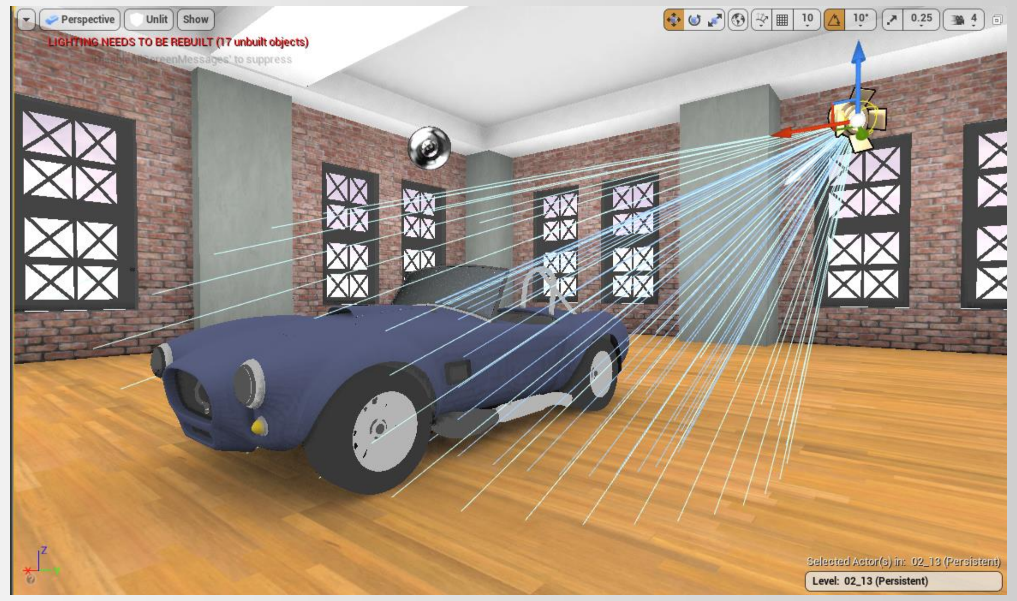
LIGHTS/CAMERAS



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RENDER

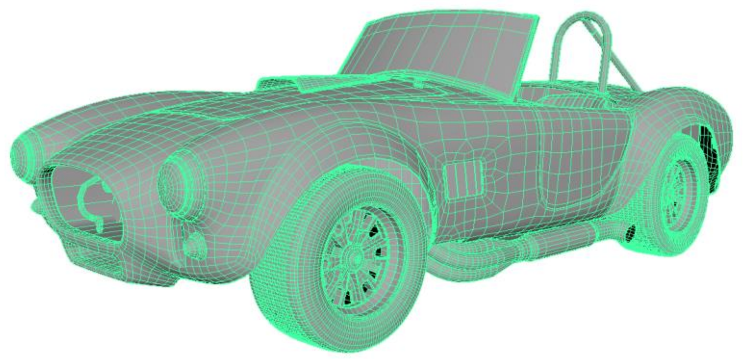
3D / Modeling
(Max, Maya, Revit, etc)

GREY AREA

Interactive/Real Time
(Unity, Unreal, etc)

Typical Pipeline

MODELING



UV/TEXTURES

MATERIALS

LIGHTS/CAMERAS

RENDER

3D / Modeling
(Max, Maya, Revit, etc)

Interactive/Real Time

Possible Pipelines

Render Classic Only

Render Real-Time Only

Move Between the Two

Possible Pipeline : Render 100% Classic

REDSHIFT

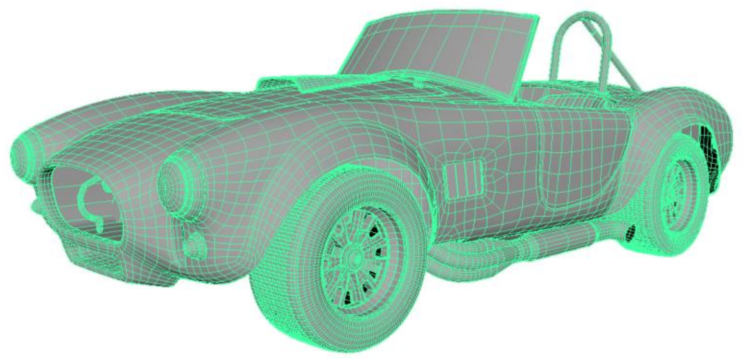
v·ray

octanerender

PIXAR's
RenderMan

Possible Pipeline : Render 100% Classic

MODELING



UV/TEXTURES

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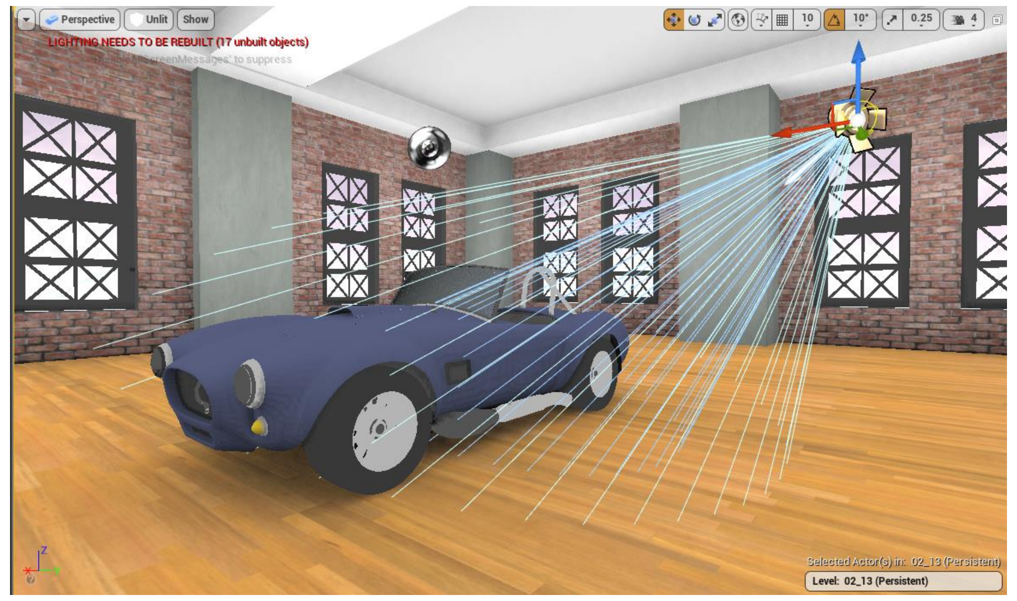

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RENDER

3D / Modeling
(Max, Maya, Revit, etc)

Classic
(Arnold, V-Ray, etc)

Possible Pipeline : Render 100% Classic

Render Everything “Classic”

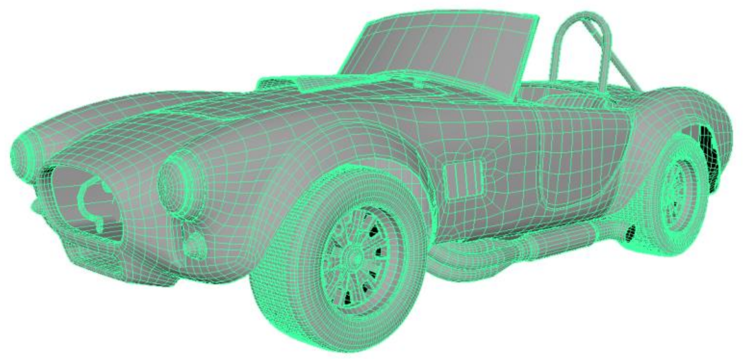
Interactivity is limited to real-time in viewports

Possible Pipeline : Render 100% Classic

Possible Pipeline : Render 100% Real-Time

Possible Pipeline : Render 100% Real-Time

MODELING



UV/TEXTURES

MATERIALS

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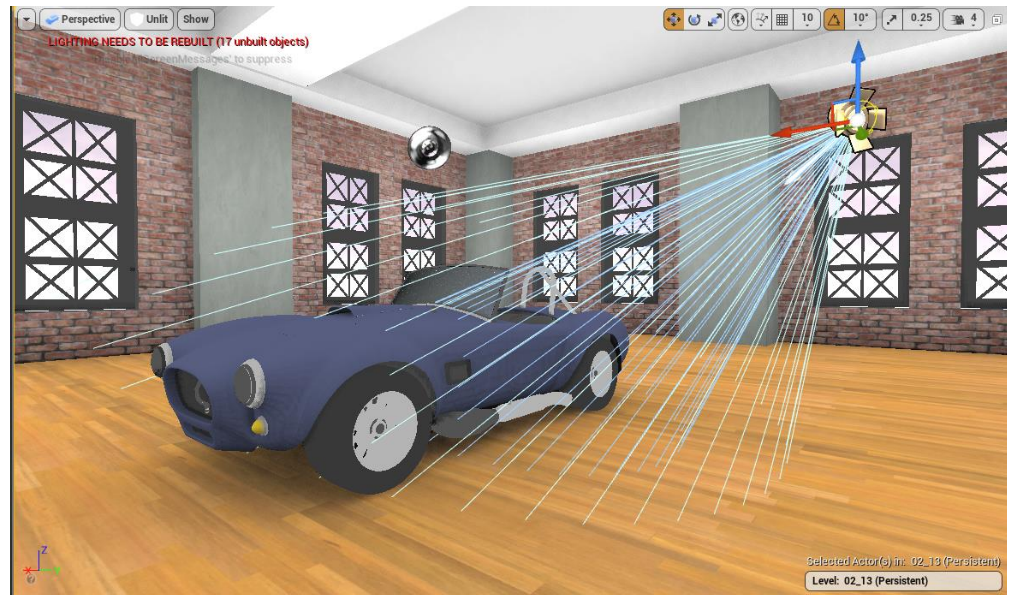

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RENDER

3D / Modeling
(Max, Maya, Revit, etc)

Interactive/Real Time

Possible Pipeline : Render 100% Real-Time

Gain Latest Features

May Compromise Some Quality

May Compromise Integration

Possible Pipeline : Render 100% Real-Time

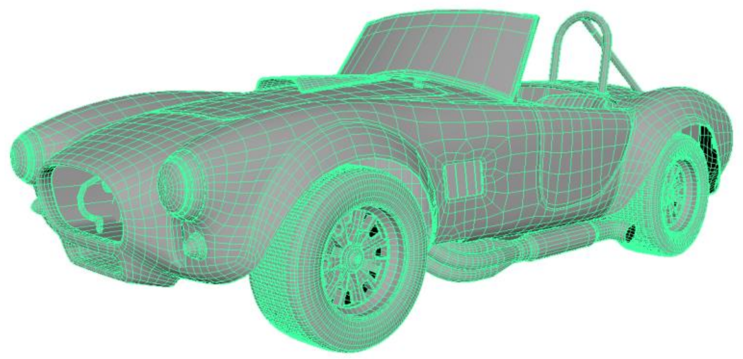
Pros

Cons

Possible Pipeline : Use Both / Hybrid

Possible Pipeline : Use Both / Hybrid

MODELING



UV/TEXTURES

MATERIALS

LIGHTS/CAMERAS

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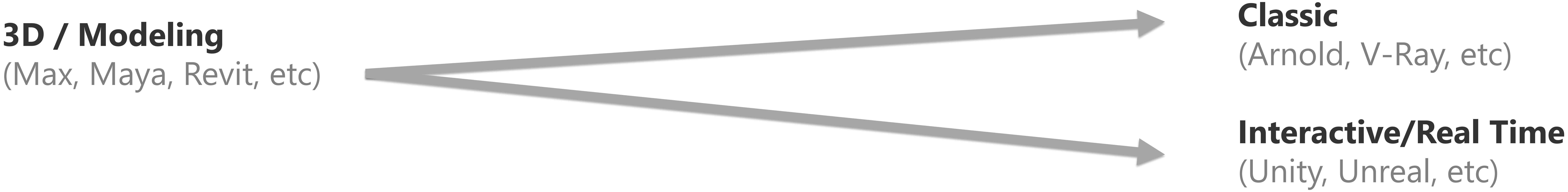
Level: 02_13 (Persistent)

RENDER



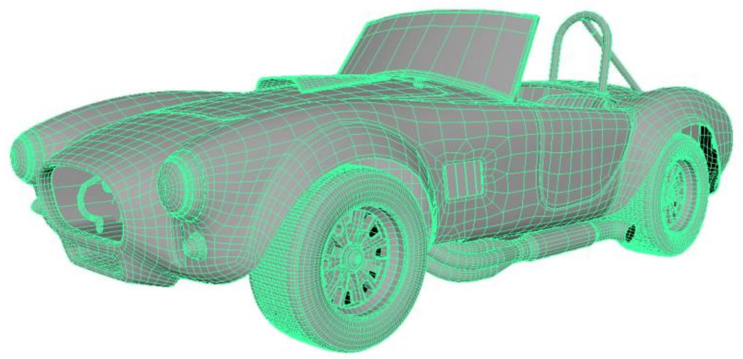
3D / Modeling
(Max, Maya, Revit, etc)

Classic
(Arnold, V-Ray, etc)

Interactive/Real Time
(Unity, Unreal, etc)

Possible Pipeline : Use Both / Hybrid

MODELING



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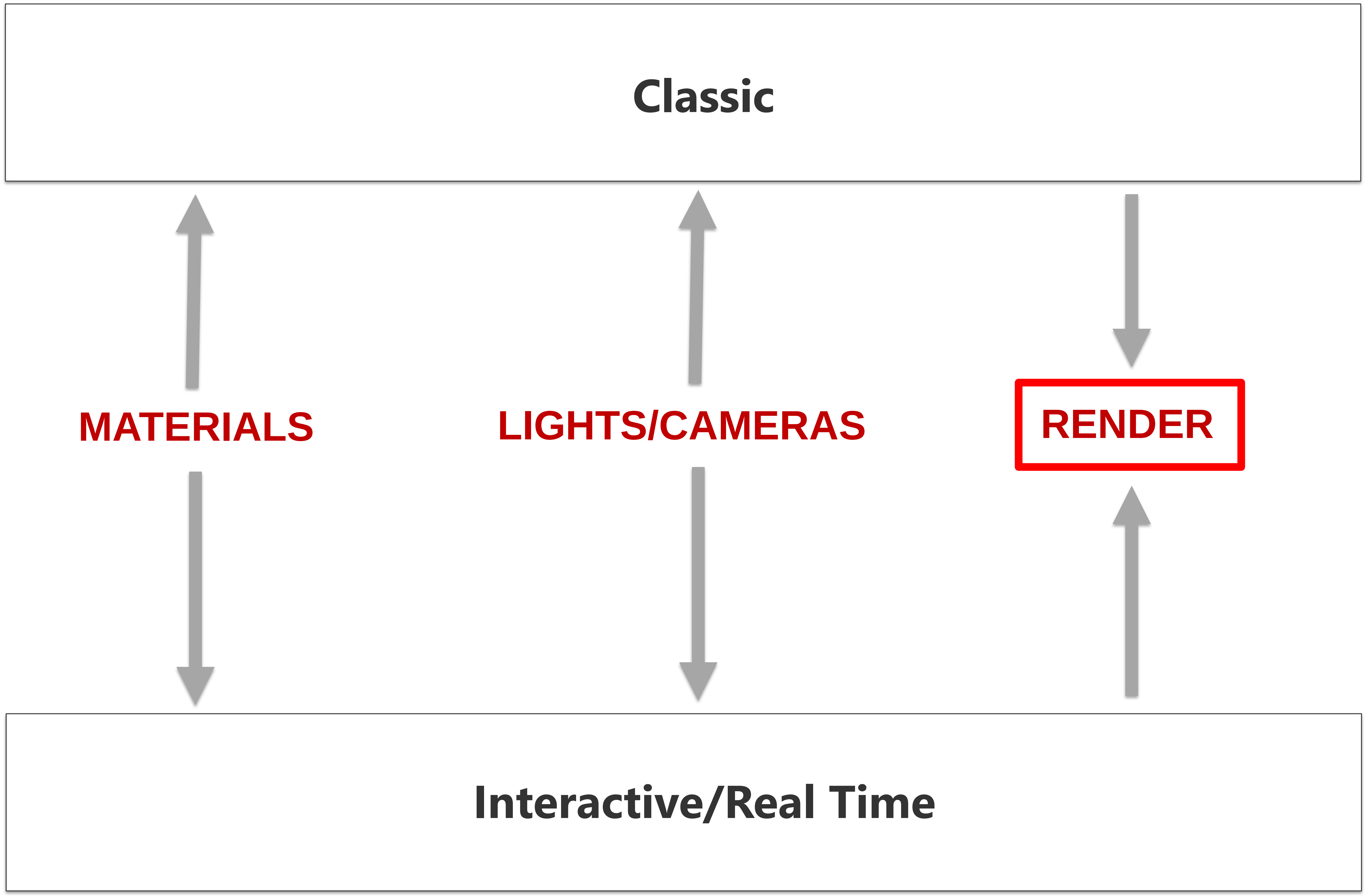


Materials

MATERIALS

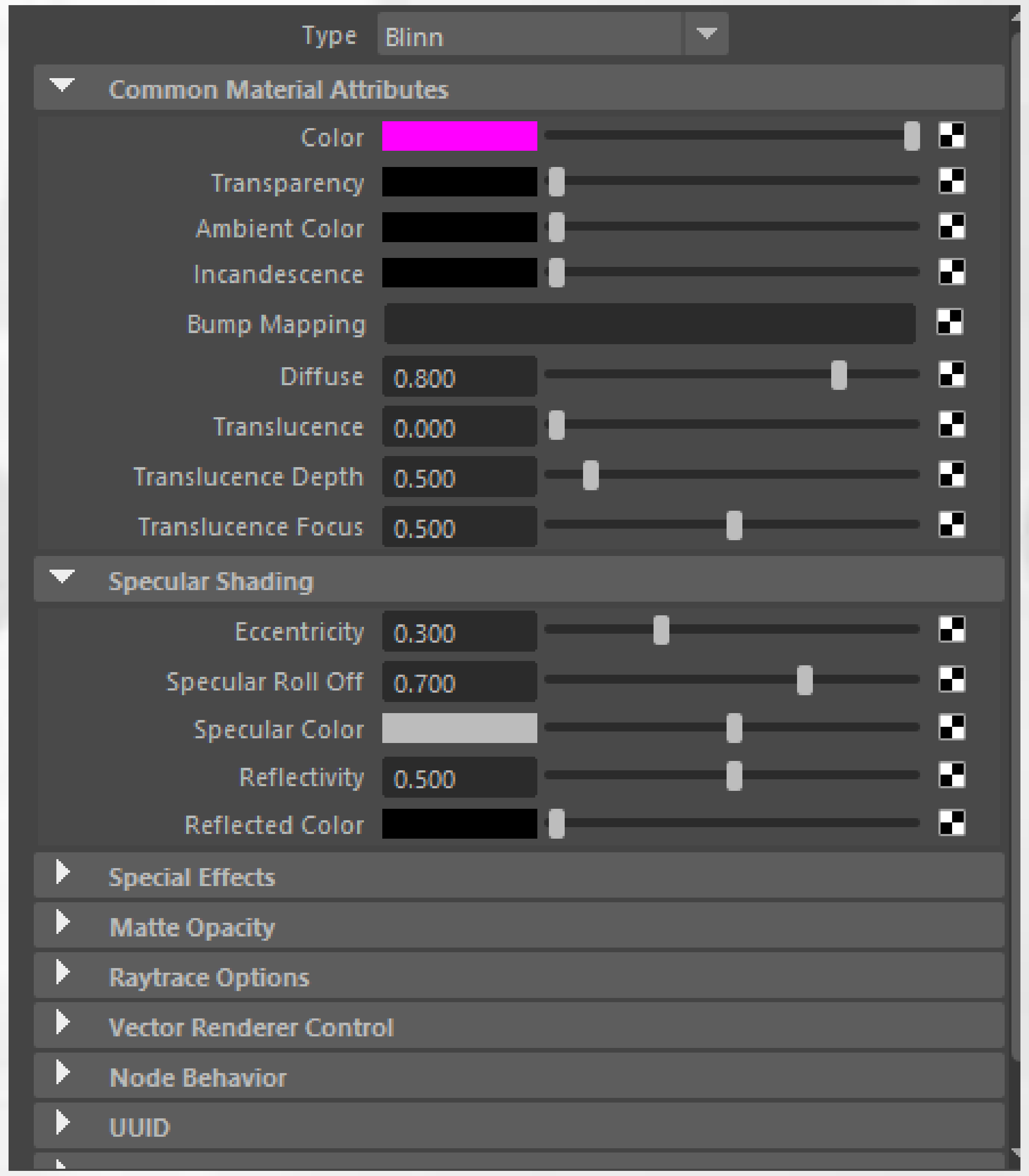
BIGGEST HURDLE

- Different Algorithms (Blinn/Phong/Albedo/PBR)
- Lots of Parameters
- Custom Features
- Different “Looks”

Different Shading Models

STANDARD

Phong / Blinn / Lambert



Type: Blinn

▼ Common Material Attributes

Color
Transparency
Ambient Color
Incandescence
Bump Mapping
Diffuse 0.800
Translucence 0.000
Translucence Depth 0.500
Translucence Focus 0.500

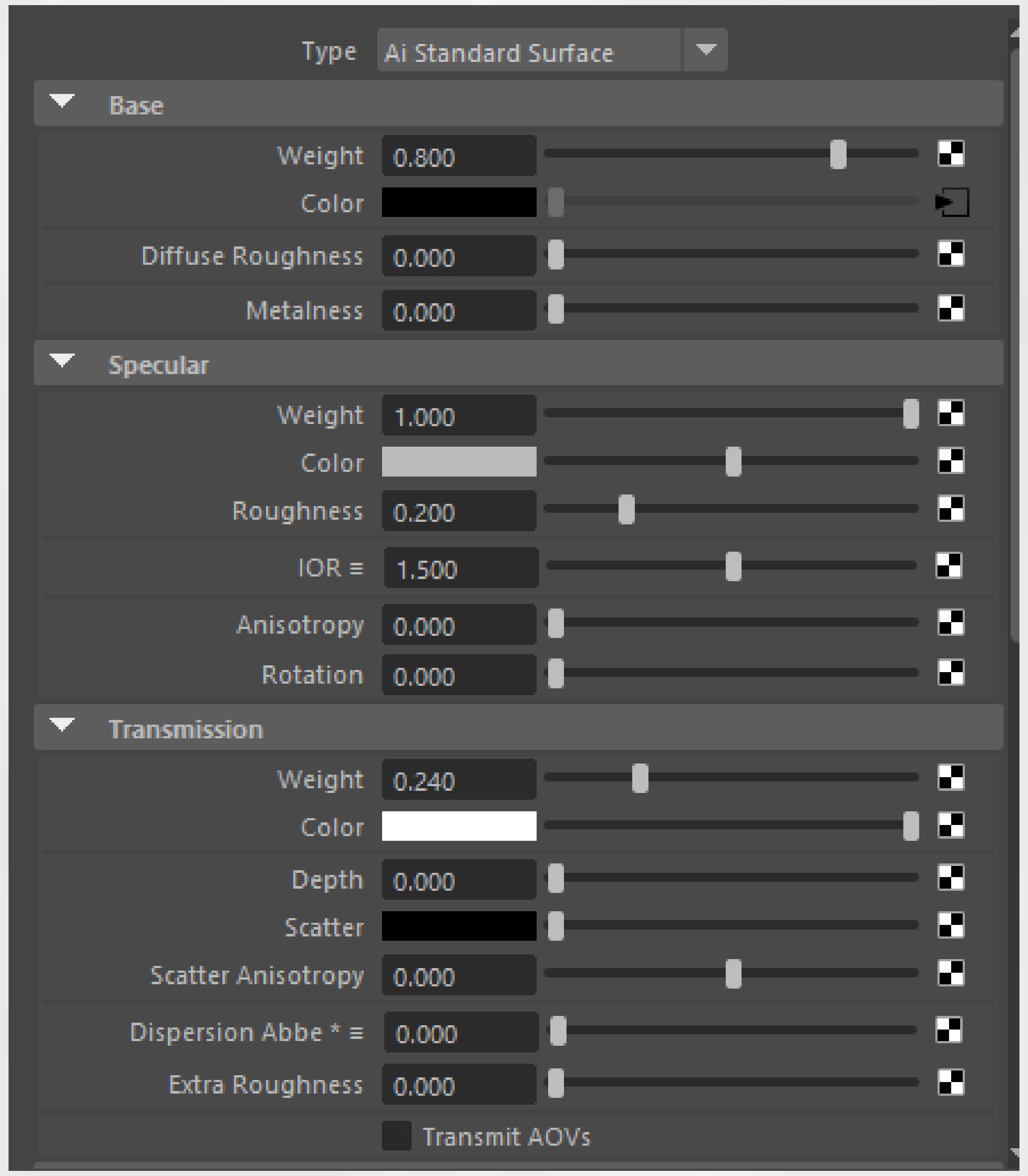
▼ Specular Shading

Eccentricity 0.300
Specular Roll Off 0.700
Specular Color
Reflectivity 0.500
Reflected Color

▶ Special Effects
▶ Matte Opacity
▶ Raytrace Options
▶ Vector Renderer Control
▶ Node Behavior
▶ UUID

PHYSICAL

Physically **B**ased **R**endering (PBR)



Type: Ai Standard Surface

▼ Base

Weight 0.800
Color
Diffuse Roughness 0.000
Metalness 0.000

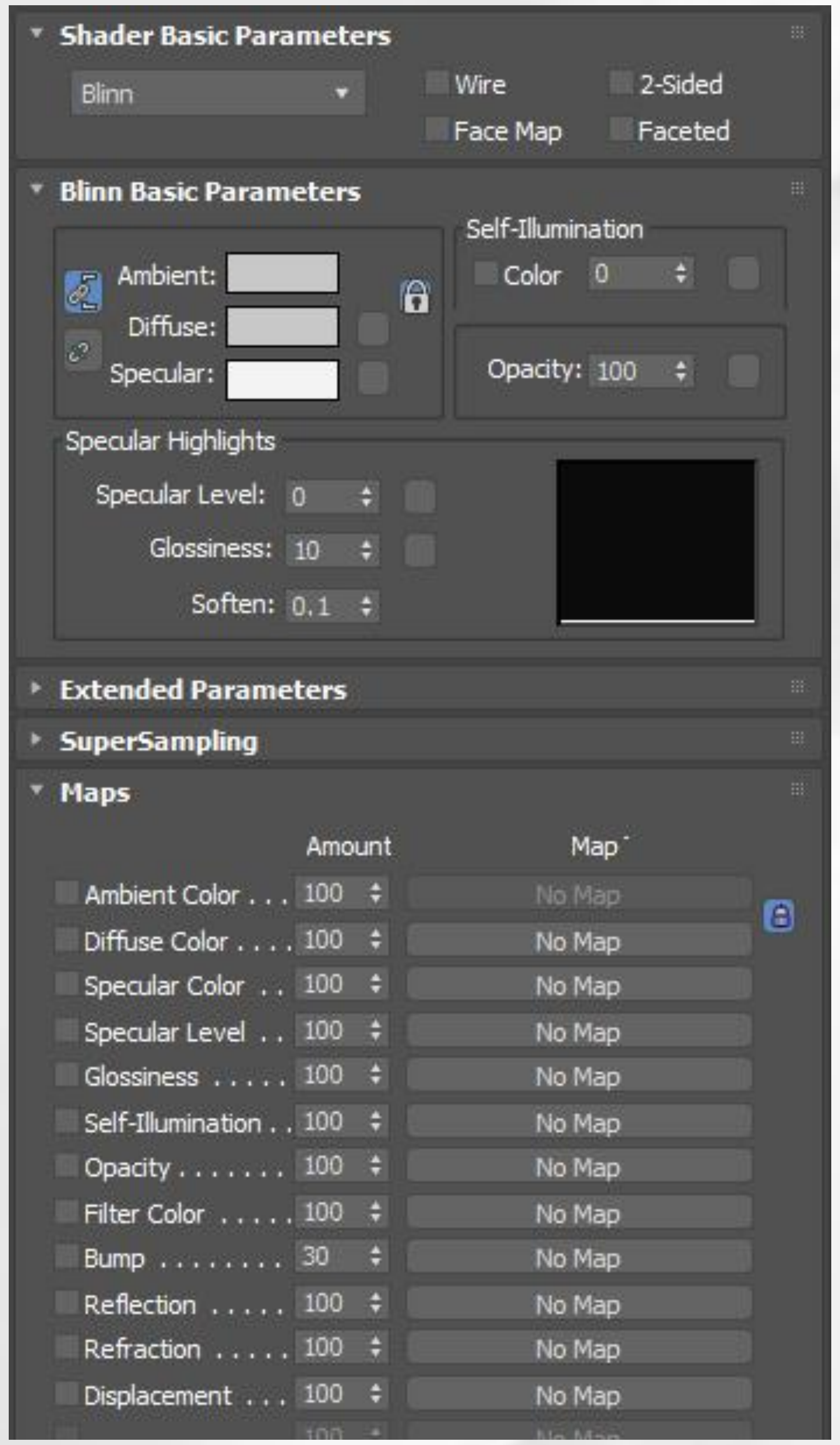
▼ Specular

Weight 1.000
Color
Roughness 0.200
IOR ≡ 1.500
Anisotropy 0.000
Rotation 0.000

▼ Transmission

Weight 0.240
Color
Depth 0.000
Scatter
Scatter Anisotropy 0.000
Dispersion Abbe * ≡ 0.000
Extra Roughness 0.000
□ Transmit AOVs

Lots of Parameters



Shader Basic Parameters

Blinn ▾ ☐ Wire ☐ 2-Sided ☐ Face Map ☐ Faceted

Blinn Basic Parameters

Ambient: Diffuse: Specular:

Self-Illumination: ☐ Color 0

Opacity: 100

Specular Highlights

Specular Level: 0

Glossiness: 10

Soften: 0.1

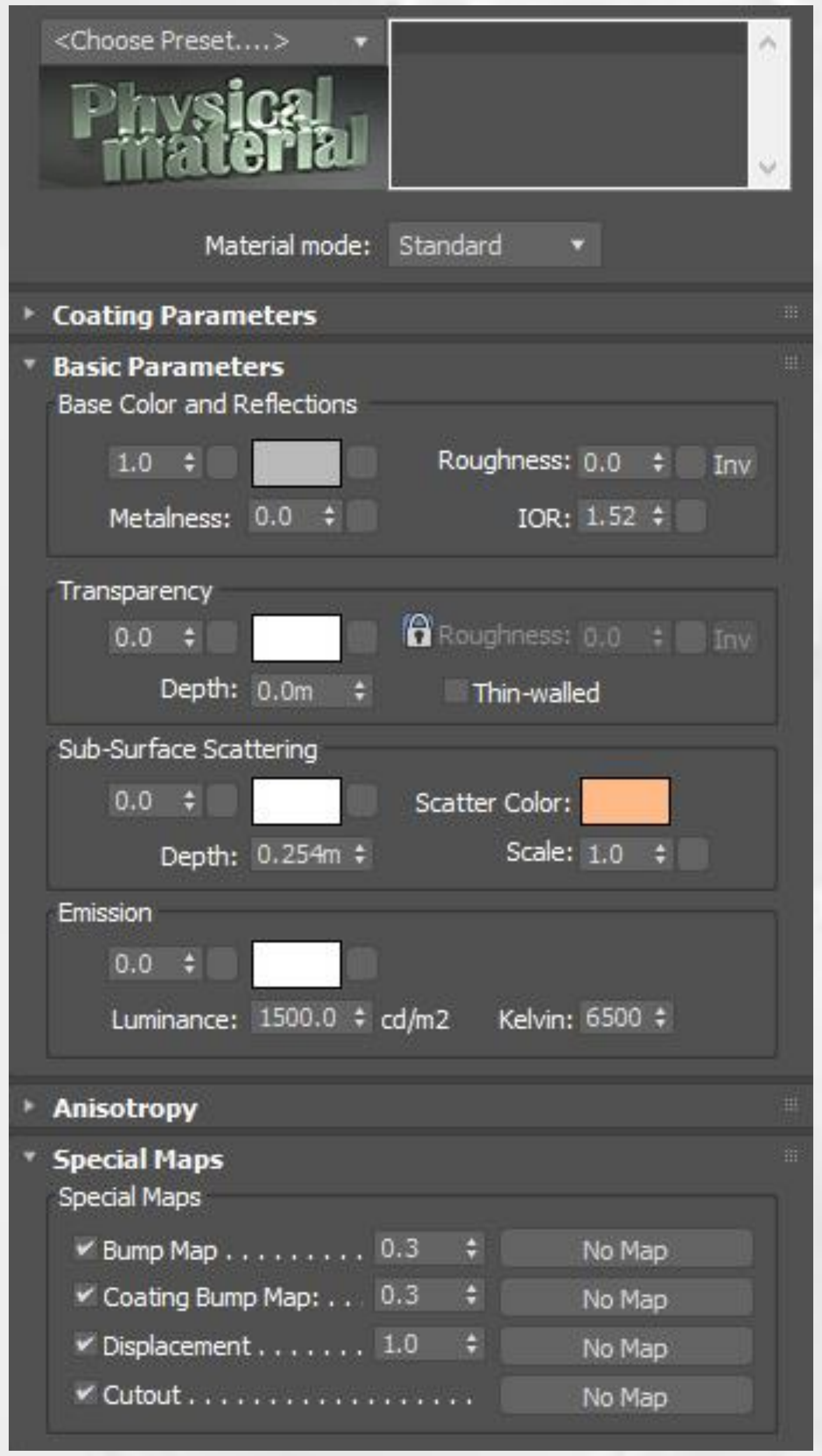
Extended Parameters

SuperSampling

Maps

	Amount	Map
☐ Ambient Color . . .	100	No Map
☐ Diffuse Color	100	No Map
☐ Specular Color . .	100	No Map
☐ Specular Level . .	100	No Map
☐ Glossiness	100	No Map
☐ Self-Illumination . .	100	No Map
☐ Opacity	100	No Map
☐ Filter Color	100	No Map
☐ Bump	30	No Map
☐ Reflection	100	No Map
☐ Refraction	100	No Map
☐ Displacement . . .	100	No Map

STANDARD



<Choose Preset....> ▾

Material mode: Standard ▾

Coating Parameters

Basic Parameters

Base Color and Reflections

1.0 Roughness: 0.0 Inv

Metalness: 0.0 IOR: 1.52

Transparency

0.0 Roughness: 0.0 Inv

Depth: 0.0m ☐ Thin-walled

Sub-Surface Scattering

0.0 Scatter Color:

Depth: 0.254m Scale: 1.0

Emission

0.0

Luminance: 1500.0 cd/m2 Kelvin: 6500

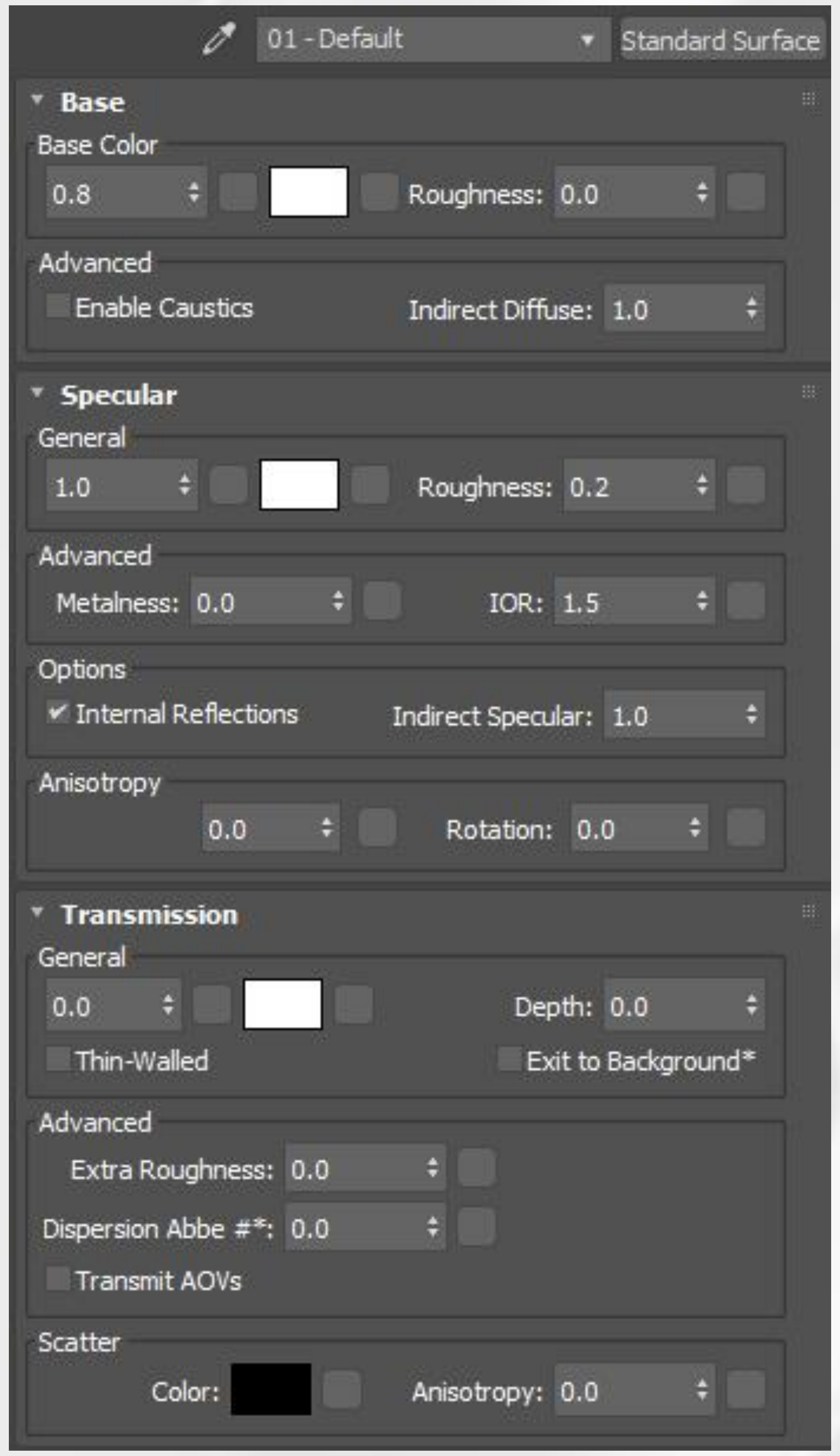
Anisotropy

Special Maps

Special Maps

☑ Bump Map	0.3	No Map
☑ Coating Bump Map: . .	0.3	No Map
☑ Displacement	1.0	No Map
☑ Cutout		No Map

PHYSICAL



01 - Default ▾ Standard Surface

Base

Base Color

0.8 Roughness: 0.0

Advanced

☐ Enable Caustics Indirect Diffuse: 1.0

Specular

General

1.0 Roughness: 0.2

Advanced

Metalness: 0.0 IOR: 1.5

Options

☑ Internal Reflections Indirect Specular: 1.0

Anisotropy

0.0 Rotation: 0.0

Transmission

General

0.0 Depth: 0.0

☐ Thin-Walled ☐ Exit to Background*

Advanced

Extra Roughness: 0.0

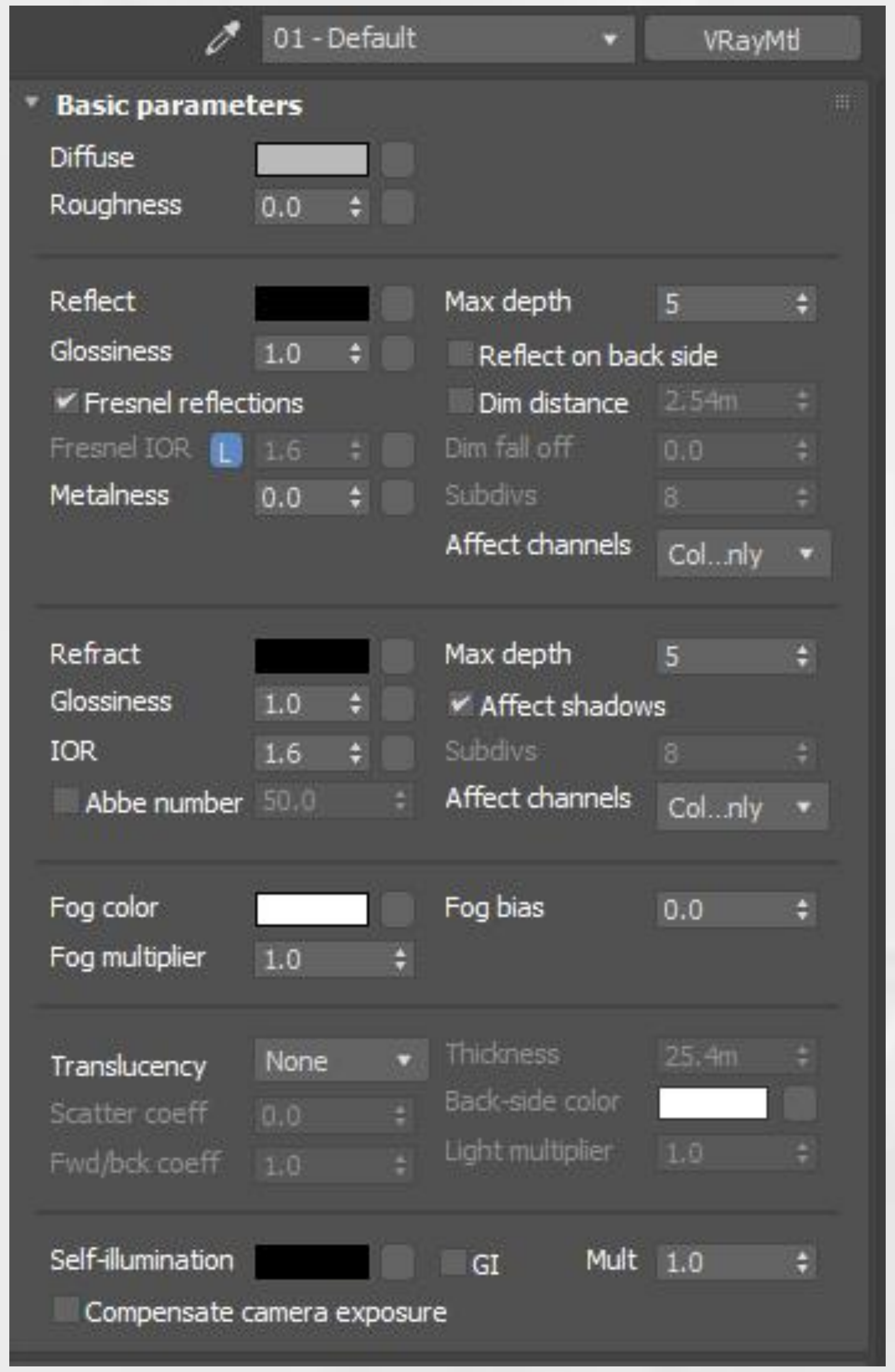
Dispersion Abbe #*: 0.0

☐ Transmit AOVs

Scatter

Color: Anisotropy: 0.0

ARNOLD



01 - Default ▾ VRayMtl

Basic parameters

Diffuse

Roughness 0.0

Reflect Max depth 5

Glossiness 1.0 ☐ Reflect on back side

☑ Fresnel reflections ☐ Dim distance 2.54m

Fresnel IOR L 1.6 Dim fall off 0.0

Metalness 0.0 Subdivs 8

Affect channels Col...nly ▾

Refract Max depth 5

Glossiness 1.0 ☑ Affect shadows

IOR 1.6 Subdivs 8

☐ Abbe number 50.0 Affect channels Col...nly ▾

Fog color Fog bias 0.0

Fog multiplier 1.0

Translucency None ▾ Thickness 25.4m

Scatter coeff 0.0 Back-side color

Fwd/bck coeff 1.0 Light multiplier 1.0

Self-illumination ☐ GI Mult 1.0

☐ Compensate camera exposure

V-RAY

Different Models

STANDARD

Phong / Blinn / Lambert

- Color
- Specularity
- Specular Falloff
- Reflectivity
- Transparency
- Bump/Normal
- Refractions

PHYSICAL

Physically **B**ased **R**endering (PBR)

- Base Color
- Metallic
- Roughness
- Opacity
- Normal
- Refractions

Different Models

STANDARD

Phong / Blinn / Lambert

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Physically **B**ased **R**endering (PBR)

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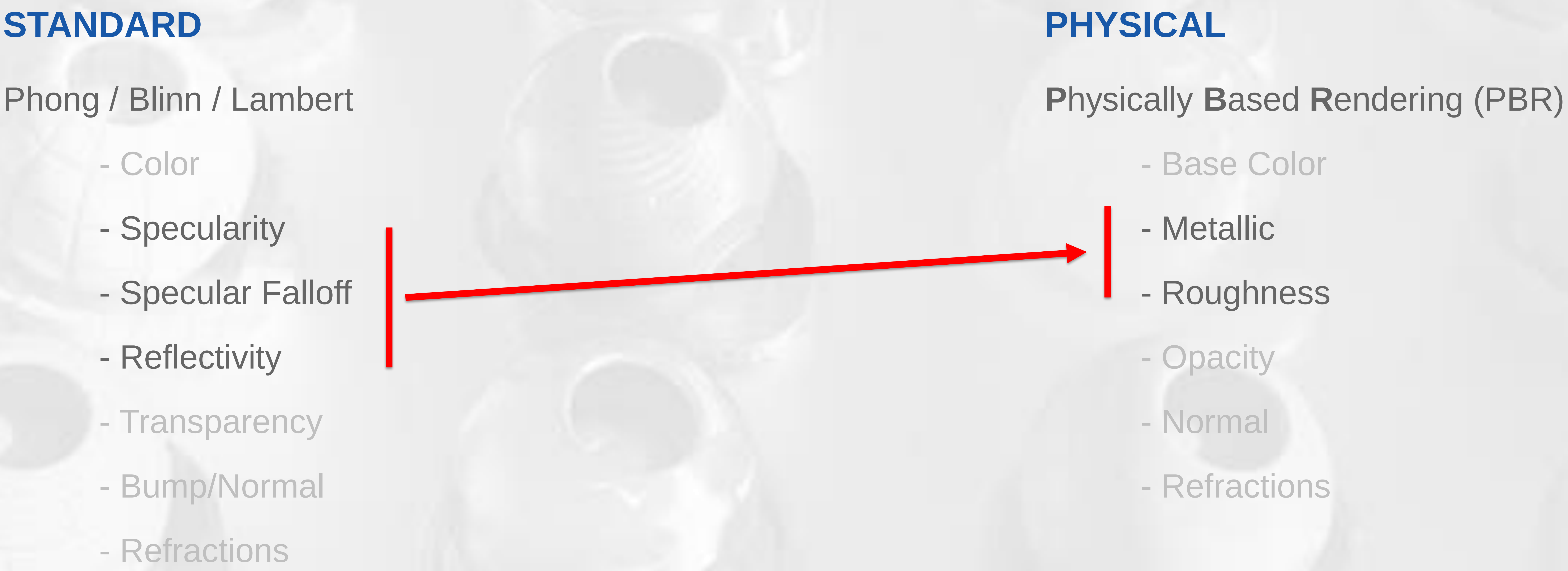
Different Models



STANDARD

Phong / Blinn / Lambert

- Color
- Specularity
- Specular Falloff
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PHYSICAL

Physically **B**ased **R**endering (PBR)

- Base Color
- Metallic
- Roughness
- Opacity
- Normal
- Refractions

Translation Tools

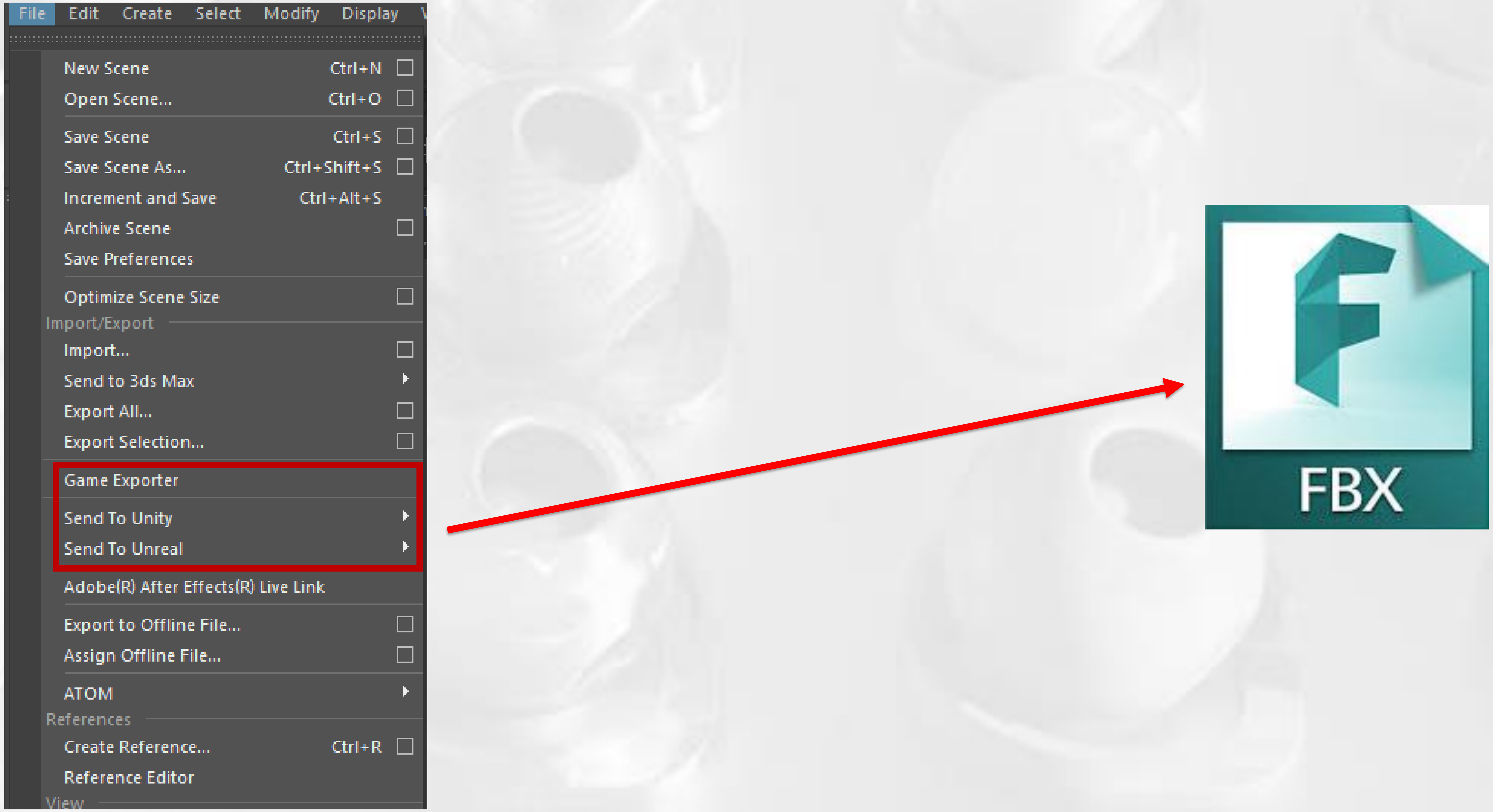
STANDARD FORMATS

- **FBX**
- OSL (Open Shading Language) - future
- Material X - future

THIRD PARTY TOOLS

- **Datasmith** (Unreal)
- Custom scripts
- Others

FBX


File
Edit
Create
Select
Modify
Display
New Scene Ctrl+N □
Open Scene... Ctrl+O □
Save Scene Ctrl+S □
Save Scene As... Ctrl+Shift+S □
Increment and Save Ctrl+Alt+S
Archive Scene □
Save Preferences
Optimize Scene Size □
Import/Export
Import... □
Send to 3ds Max
Export All... □
Export Selection... □
Game Exporter
Send To Unity
Send To Unreal
Adobe(R) After Effects(R) Live Link
Export to Offline File... □
Assign Offline File... □
ATOM
References
Create Reference... Ctrl+R □
Reference Editor
View
FBX

FBX

CREATED BY **KAYDARA**

FBX = “Filmbox”

Later became **Motionbuilder**

GREAT FOR MESHES / MOTION / RIGGING

Multiple mesh formats (Polygons, NURBS)

Supports animation and multiple takes

Supports skeletons/deformations

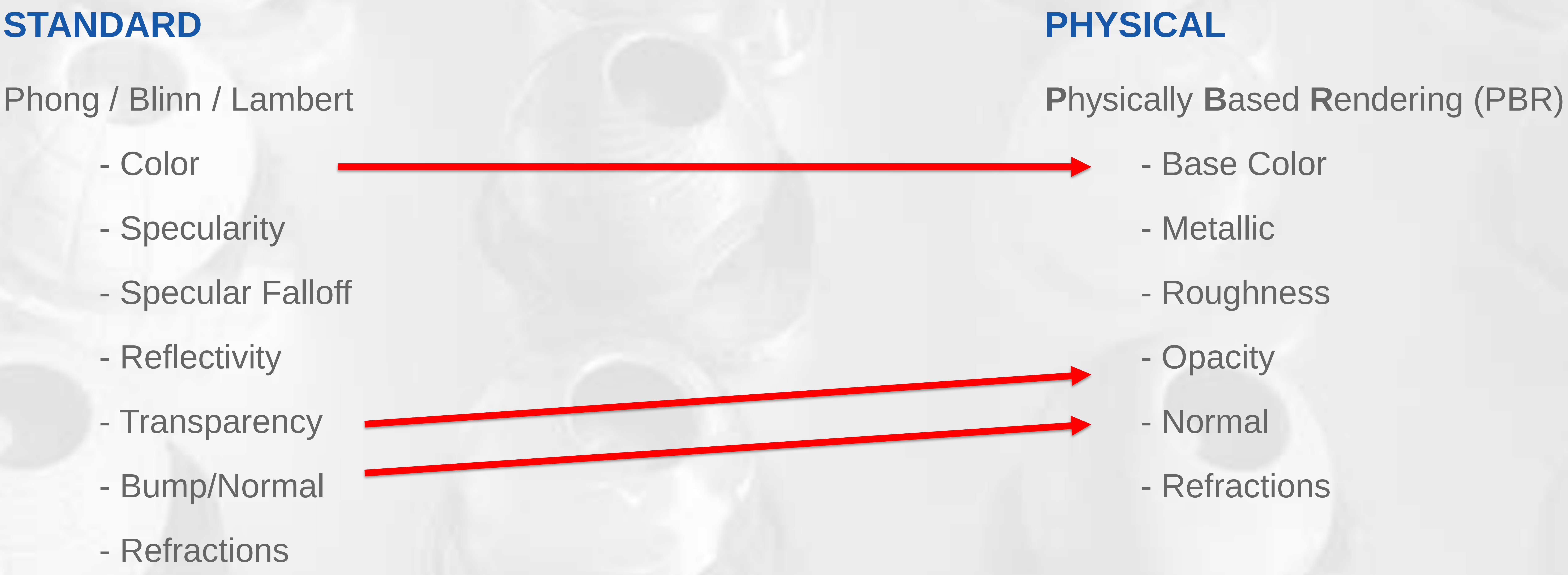
NOT IDEAL FOR MATERIALS

Supports “standard” material shading models (“Blinn, Phong, etc…)

Advanced rendering features not well supported

PBR shading models not really supported

FBX - MATERIALS



STANDARD

Phong / Blinn / Lambert

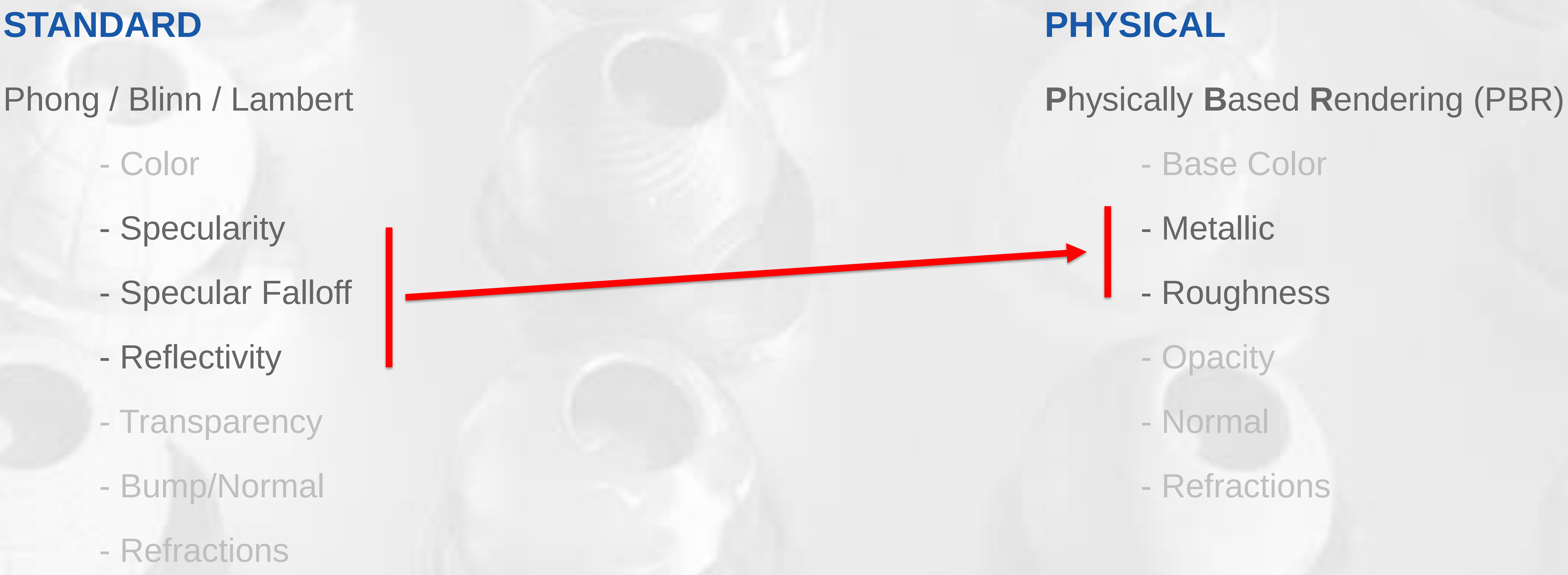
- Color
- Specularity
- Specular Falloff
- Reflectivity
- Transparency
- Bump/Normal
- Refractions

PHYSICAL

Physically **B**ased **R**endering (PBR)

- Base Color
- Metallic
- Roughness
- Opacity
- Normal
- Refractions

FBX - MATERIALS



STANDARD

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- Refractions

PHYSICAL

Physically **B**ased **R**endering (PBR)

- Base Color
- Metallic
- Roughness
- Opacity
- Normal
- Refractions

FBX

FBX IS GREAT FOR WHAT IT DOES BEST

- Models
- Animation/Rigging
- Basic Materials / Shading / UVs

YOU MAY NEED TO WORKAROUND

- Advanced Render Features
- Non-trivial shading models

Third-Party Translators

DATASMITH (UNREAL)

Works well for supported packages   (NOTE: Maya currently not supported)

Translates materials with 80-90% accuracy

Some advanced features still may not translate

Works on some third-party renderers (V-Ray, Corona…)

OTHERS

Third-party tools

Custom scripts / Plug-ins

Translation

EVEN THE BEST TRANSLATION ISN’T 100% ACCURATE

TRANSLATE WHAT YOU CAN, FIX THE REST

Parallel Libraries

MAYA / 3DS MAX

Car_Paint_Red

Chrome_01

Rubber_01

Create Equivalent Materials
on Both Sides

Standard Naming Schemes

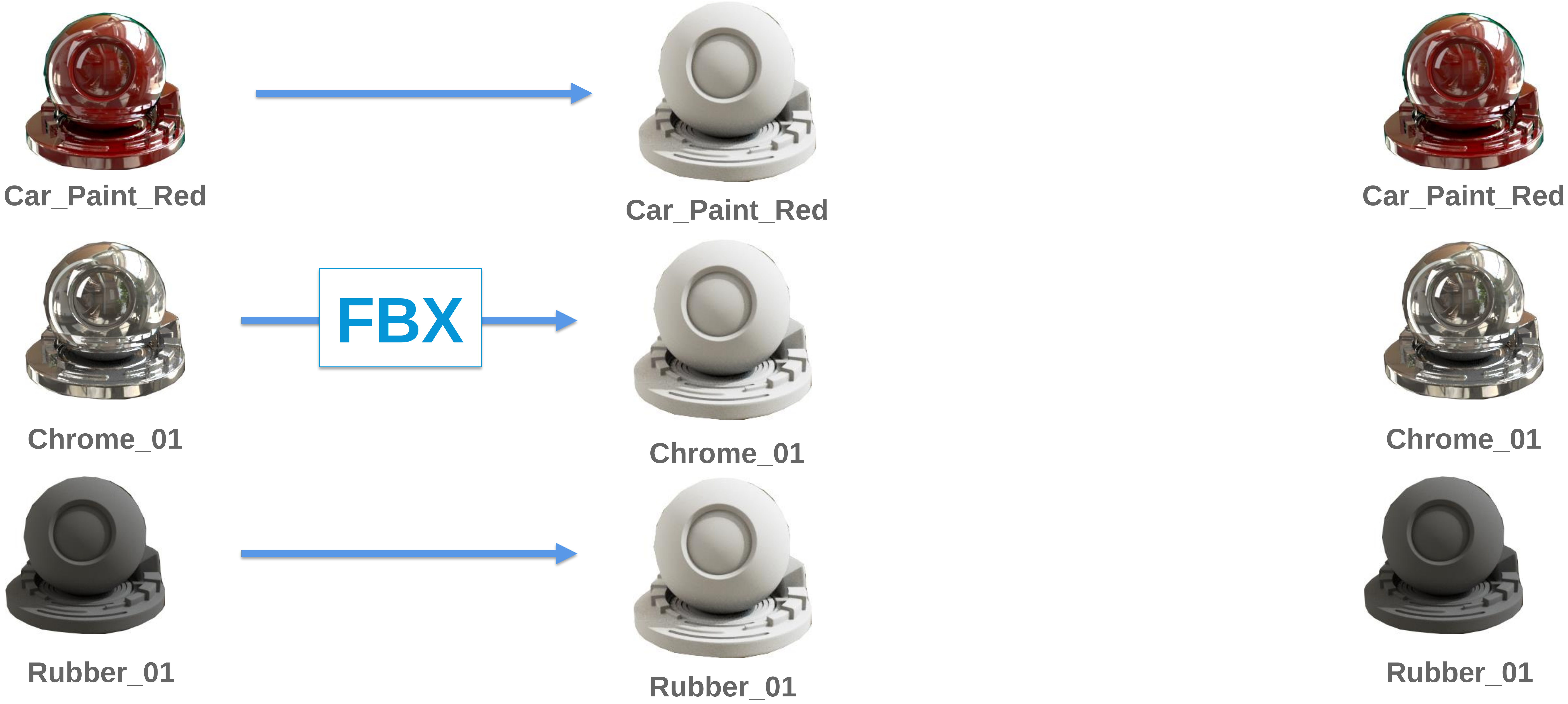
UNITY / UNREAL

Car_Paint_Red

Chrome_01

Rubber_01

Parallel Libraries



MAYA / 3DS MAX

UNITY / UNREAL

Car_Paint_Red

Car_Paint_Red

Car_Paint_Red

FBX

Chrome_01

Chrome_01

Chrome_01

Rubber_01

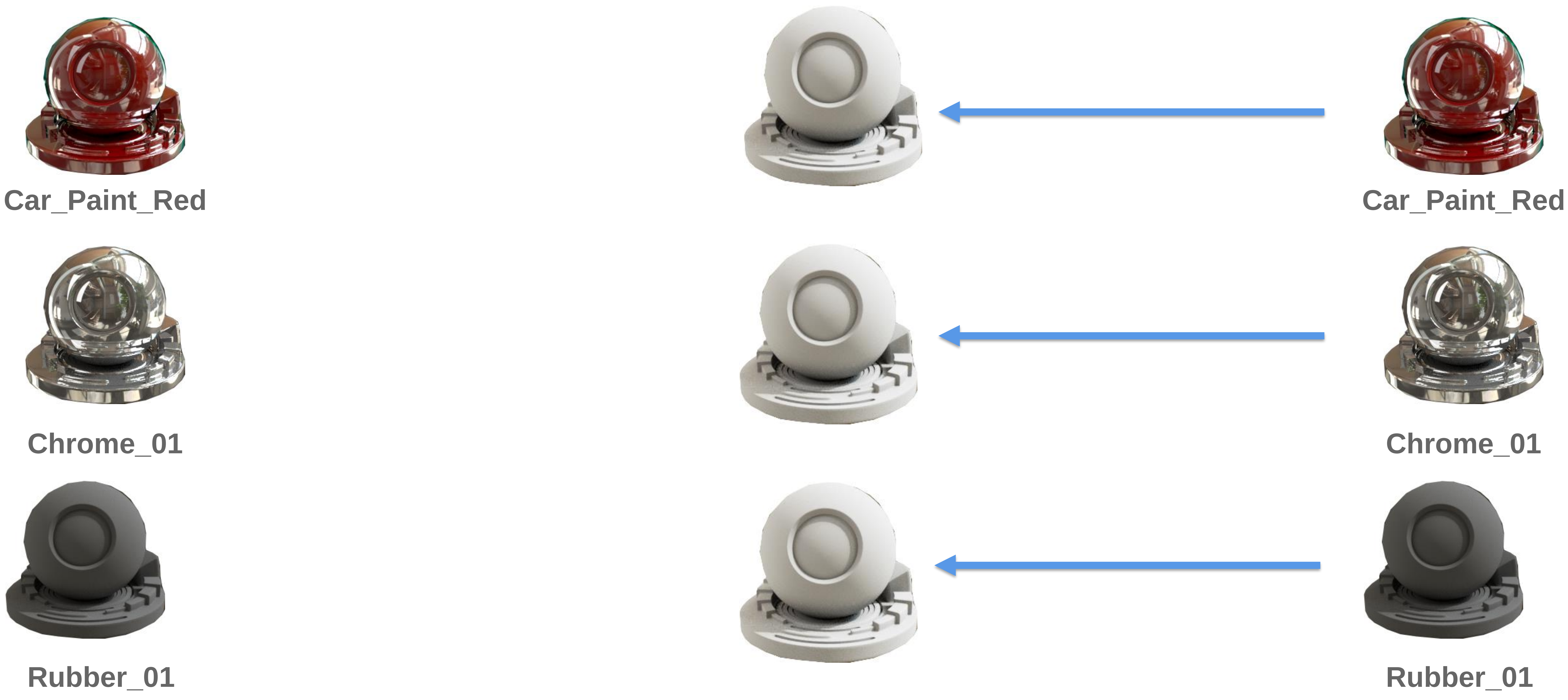
Rubber_01

Rubber_01

Parallel Libraries

MAYA / 3DS MAX

UNITY / UNREAL



Car_Paint_Red

Chrome_01

Rubber_01

Car_Paint_Red

Chrome_01

Rubber_01

Parallel Libraries

MAYA / 3DS MAX

Car_Paint_Red

Chrome_01

Rubber_01

UNITY / UNREAL

Car_Paint_Red

Chrome_01

Rubber_01

Parallel Libraries

PROS

- Straightforward to Implement
- Enjoy best features of each renderer
- No worries about translation errors
- Gets easier as you go

CONS

- Maintaining dual libraries can be time-consuming
- Must enforce standard naming schemes
- Kind of annoying

Standardization

STANDARDIZE MATERIALS

Substance

STANDARDIZE RENDERER

V-Ray

Octane

Standardizing Materials

STANDARDIZED MATERIAL FORMATS

OSL (Open Shading Language)

PBR Based workflow

Material X (future)

STANDARDIZE MATERIAL CREATION

Substance

Standardized Formats

OSL (OPEN SHADING LANGUAGE)

Lots of features/capabilities

Supported in Arnold/V-Ray/Octane

Limited Real-Time Support

PBR-BASED WORKFLOW

Each renderer’s “PBR” is slightly different (not really a ‘format’).

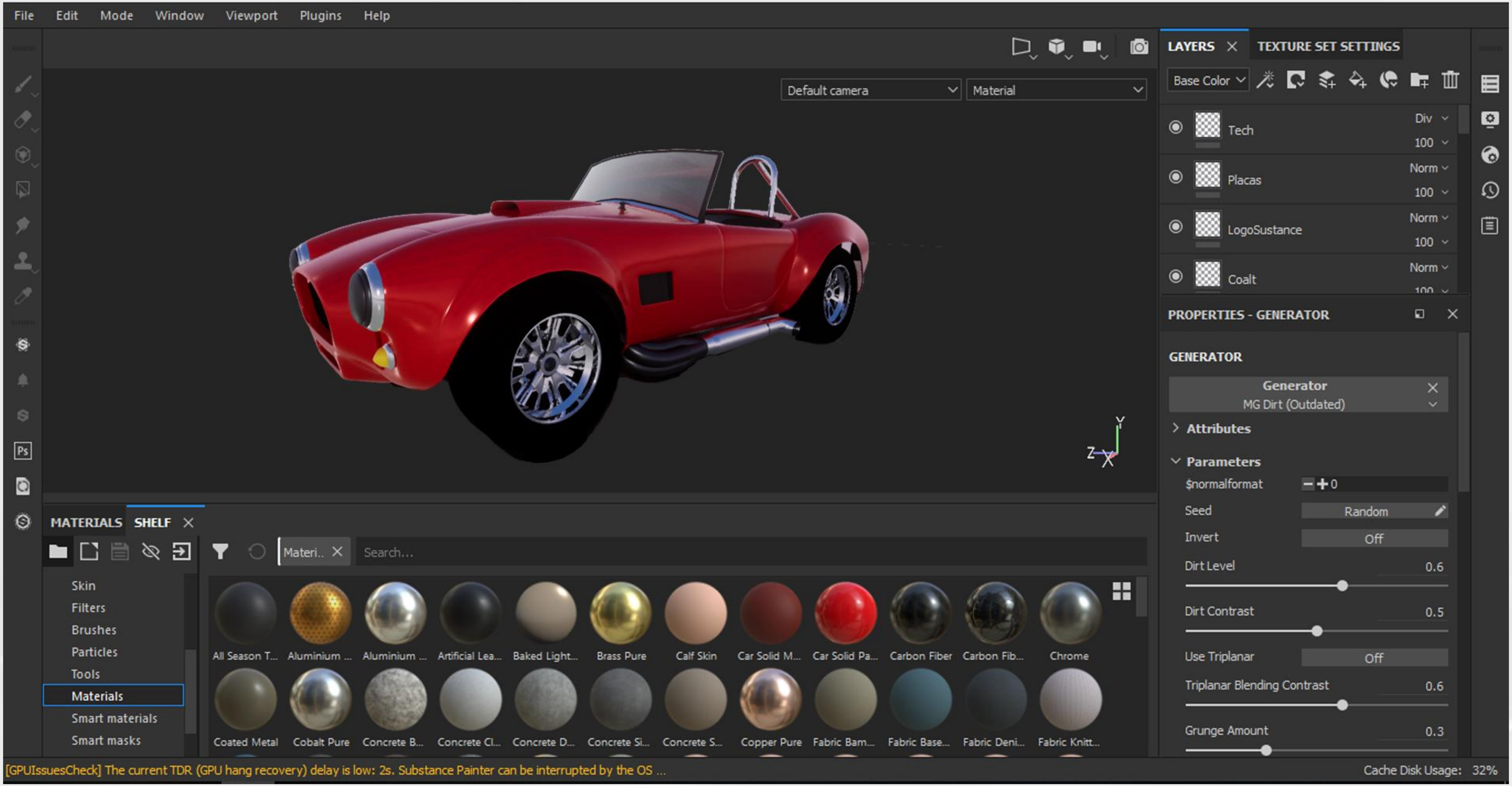
Still run into file format / translation issues

MATERIAL X

Still future - Not developed/released.

Standardizing Material Creation

Standardizing Material Creation



Tech Div 100

Placas Norm 100

LogoSustance Norm 100

Coalt Norm 100

GENERATOR

Generator
MG Dirt (Outdated)

Attributes

Parameters

$normalformat 0

Seed Random

Invert Off

Dirt Level 0.6

Dirt Contrast 0.5

Use Triplanar Off

Triplanar Blending Contrast 0.6

Grunge Amount 0.3

[GPUIssuesCheck] The current TDR (GPU hang recovery) delay is low: 2s. Substance Painter can be interrupted by the OS ...

Cache Disk Usage: 32%

SUBSTANCE

CREATES "RENDERER-NEUTRAL” MATERIALS

- Materials are created in Substance
- These can then be used in the renderer of choice
- Supports wide range of packages, including Real-Time engines

CREATE/DOWNLOAD MATERIAL LIBRARIES

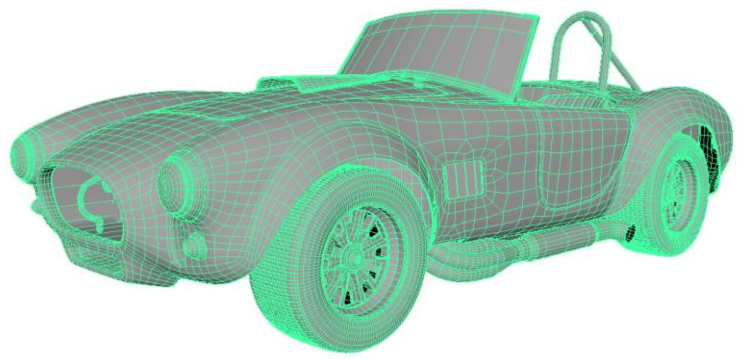
- Materials can be stored/archived for later use
- Substance has a wealth of materials for download / purchase
- Third party libraries also available

RESOLUTION-INDEPENDENT

- Materials / Textures are generated at render
- Lower Res for Real-Time/Interactive
- Higher res for quality stills/video

Typical Pipeline

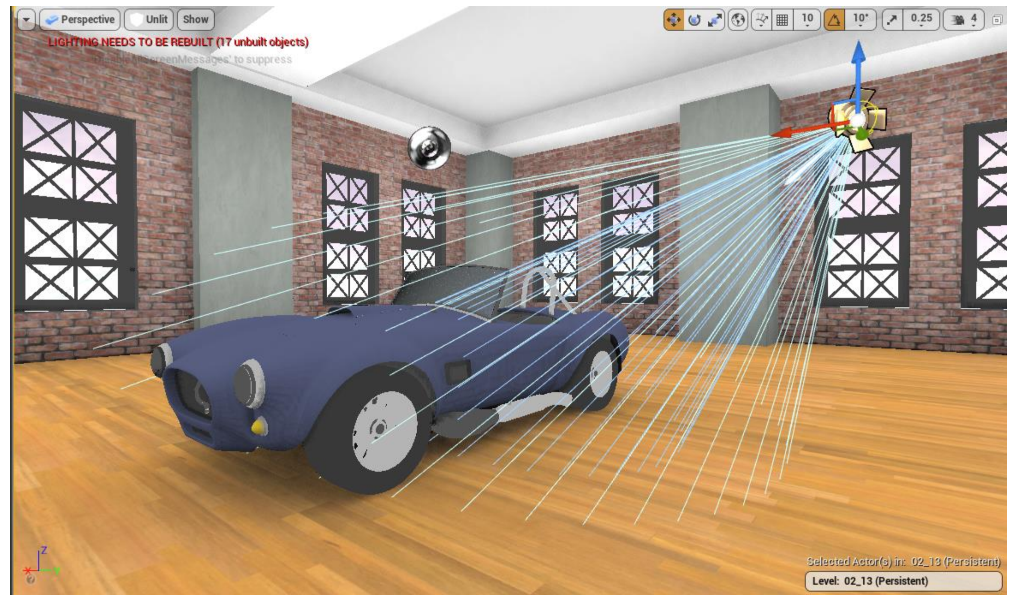
MODELING



UV/TEXTURES

MATERIALS

LIGHTS/CAMERAS



LIGHTING NEEDS TO BE REBUILT (17 unbuilt objects)

'DisableAllScreenMessages' to suppress

Selected Actor(s) in: 02_13 (Persistent)

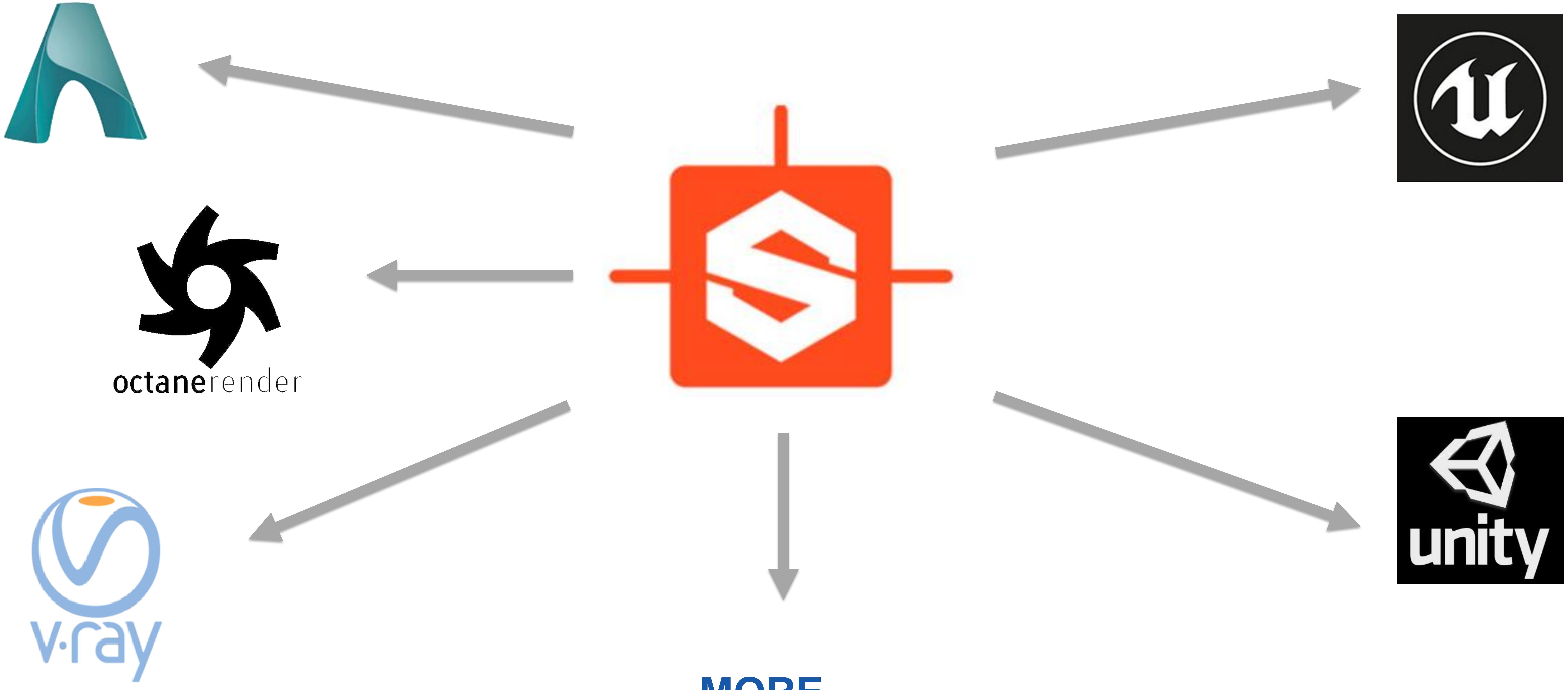
Level: 02_13 (Persistent)

RENDER

3D / Modeling
(Max, Maya, Revit, etc)

Classic
(Arnold, V-Ray, etc)

Interactive/Real Time
(Unity, Unreal, etc)



MORE…

Lighting

Lighting

CLASSIC LIGHTING

Standard Lights (Spot, point, directional, etc…)

Special Lights (Area lights, etc)

Geometry Lights

Environmental Light

Secondary Light (bounce lighting)

REAL-TIME LIGHTING

Standard Lights

Special Lights

Environmental Light

Secondary Light (bounce lighting)

Lighting

CLASSIC LIGHTING

Standard Lights (Spot, point, directional, etc…)

Special Lights (Area lights, etc)

Geometry Lights

Environmental Light

Secondary Light (bounce lighting)

REAL-TIME LIGHTING

Standard Lights

Special Lights

Environmental Light

Secondary Light (bounce lighting)

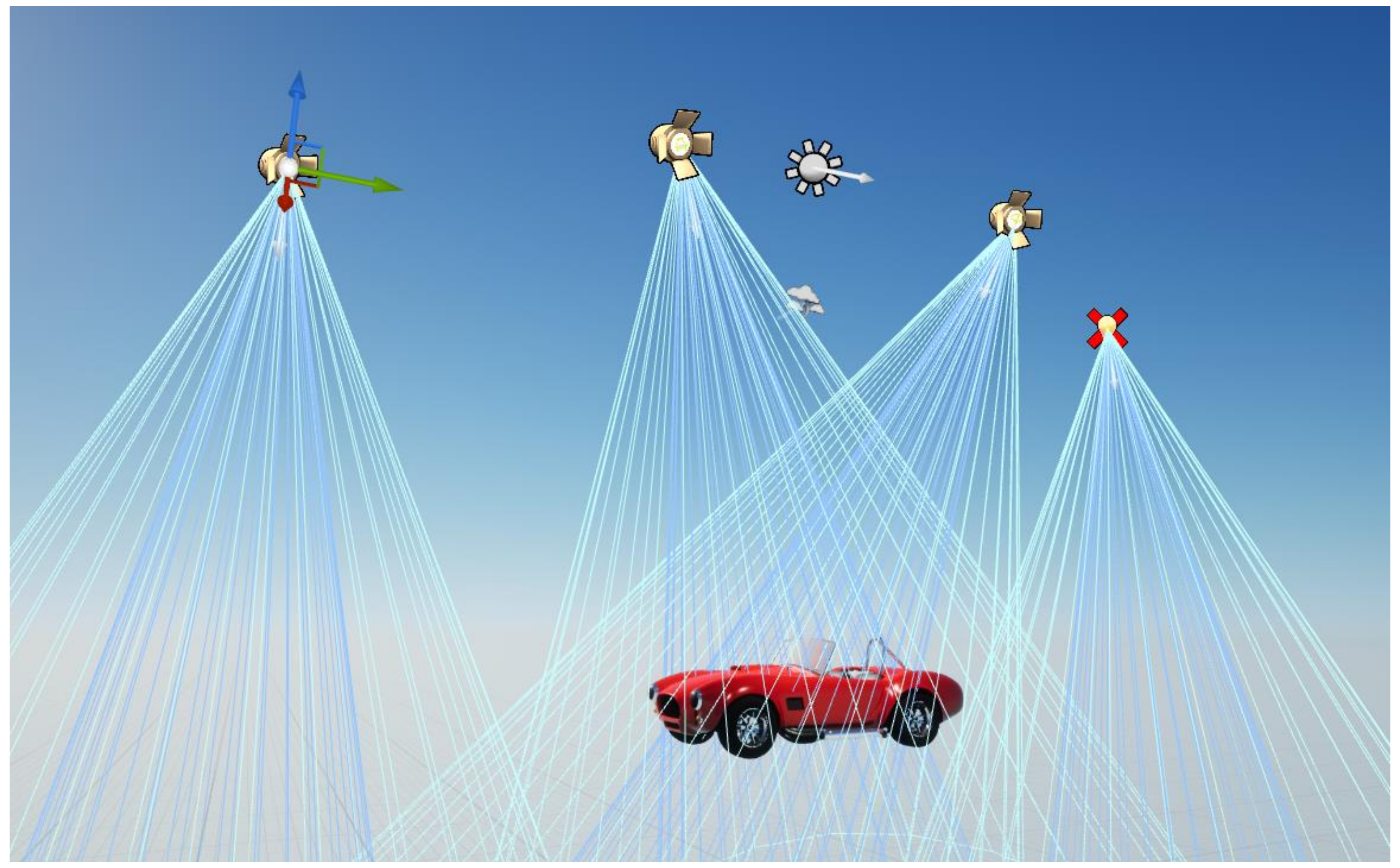
Baked Lighting

Stationary Lights

Dynamic Lights

Real-Time Lighting

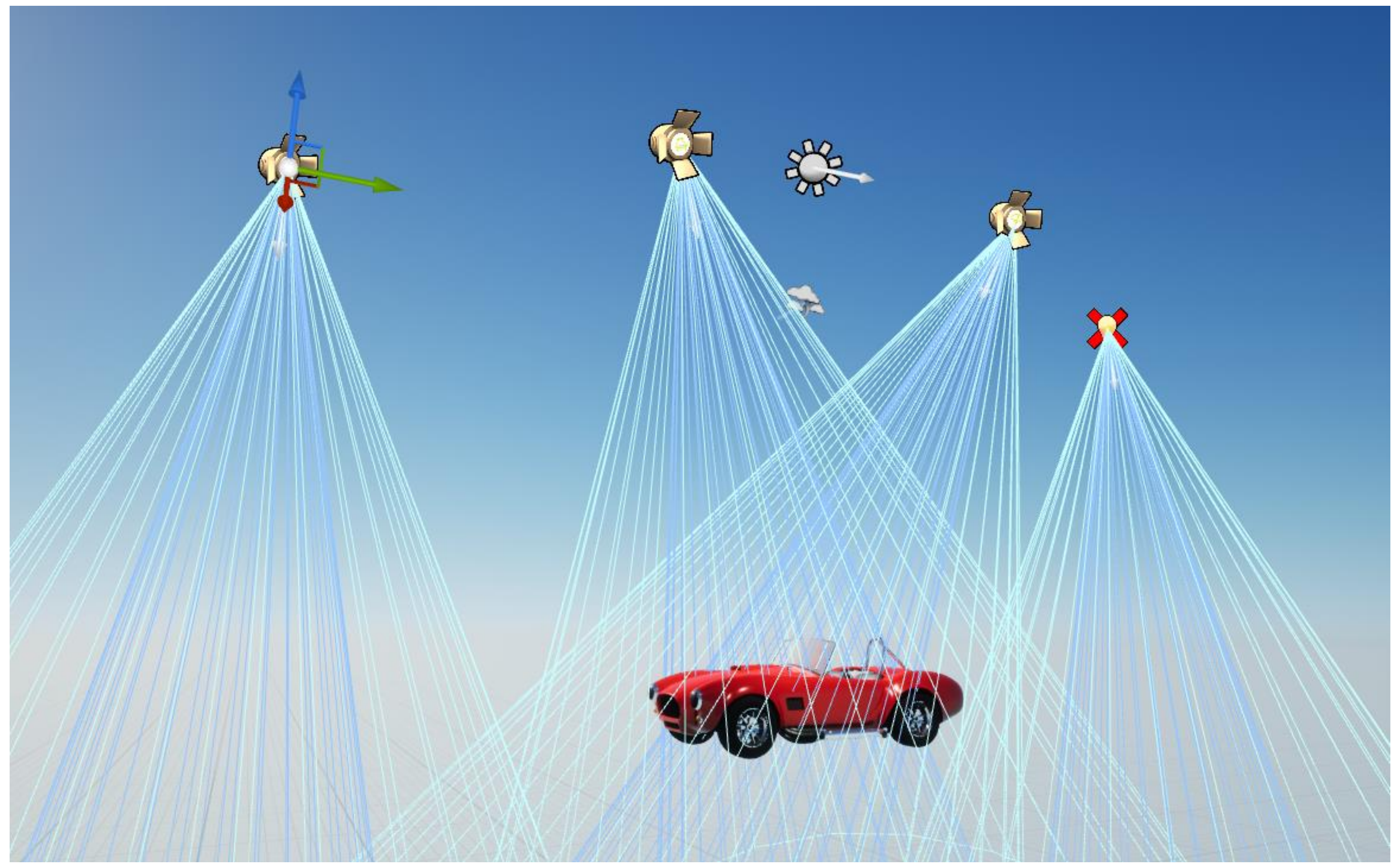
DIFFERENT WORKFLOW



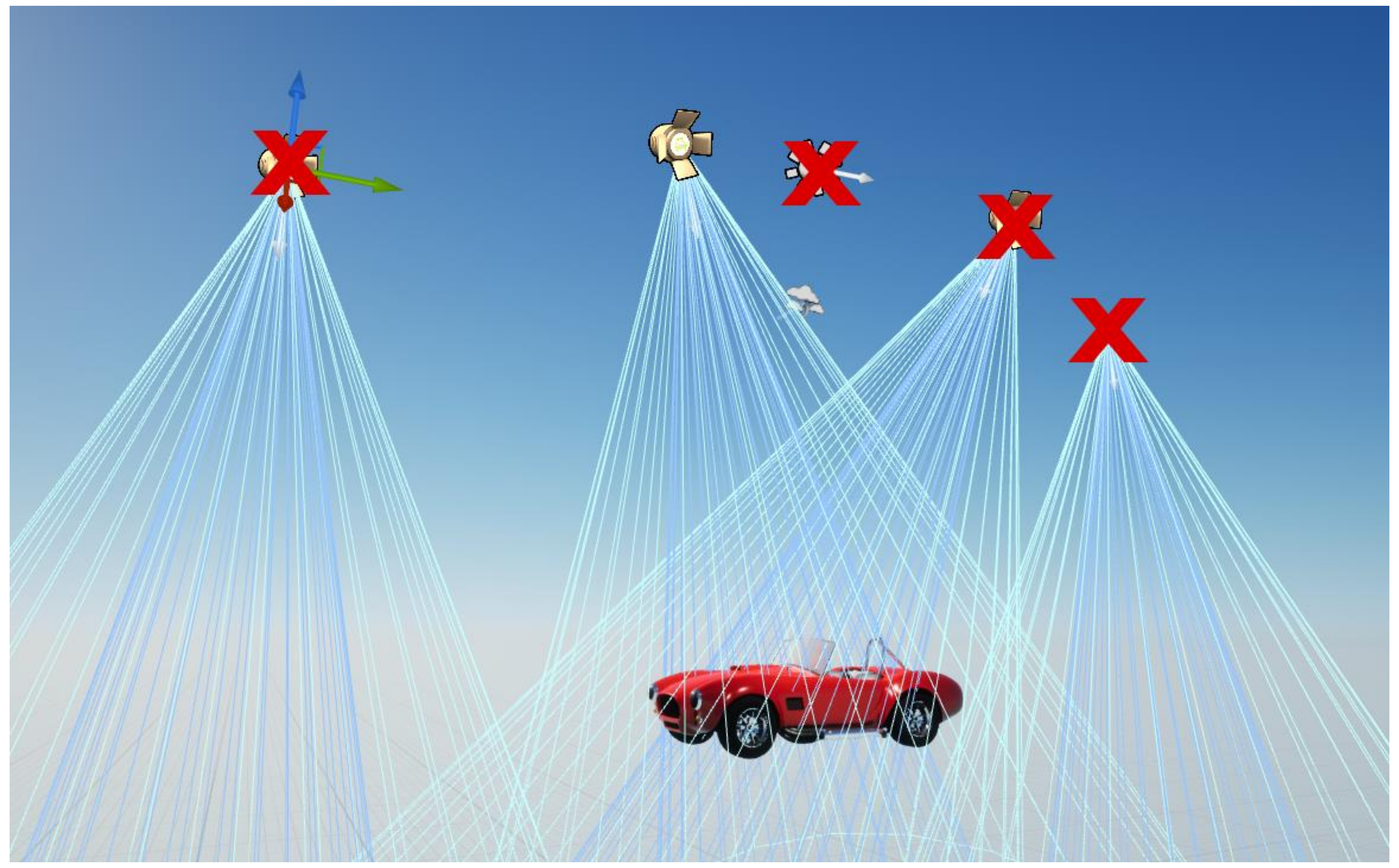
Light

Real-Time Lighting

DIFFERENT WORKFLOW



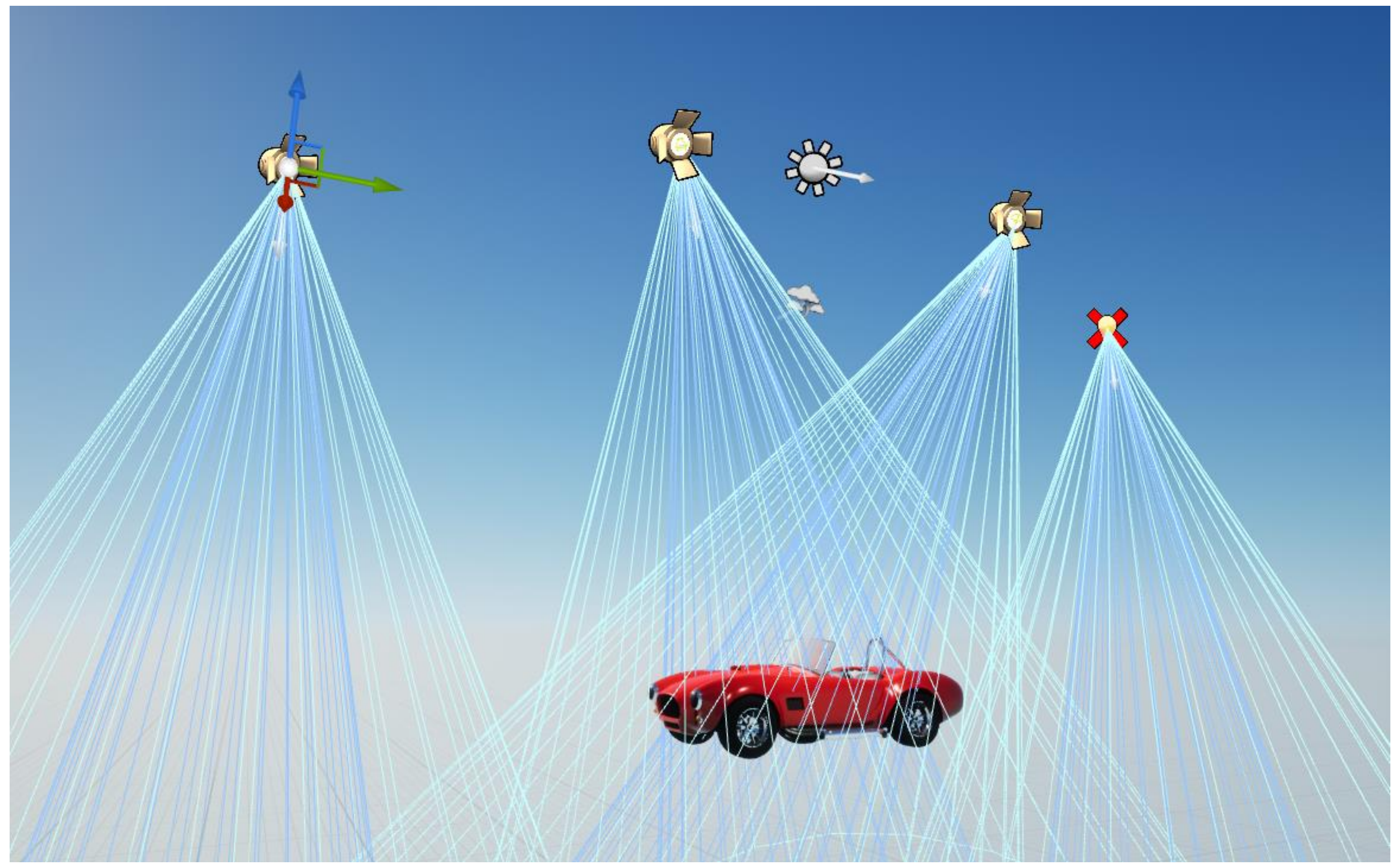
Light



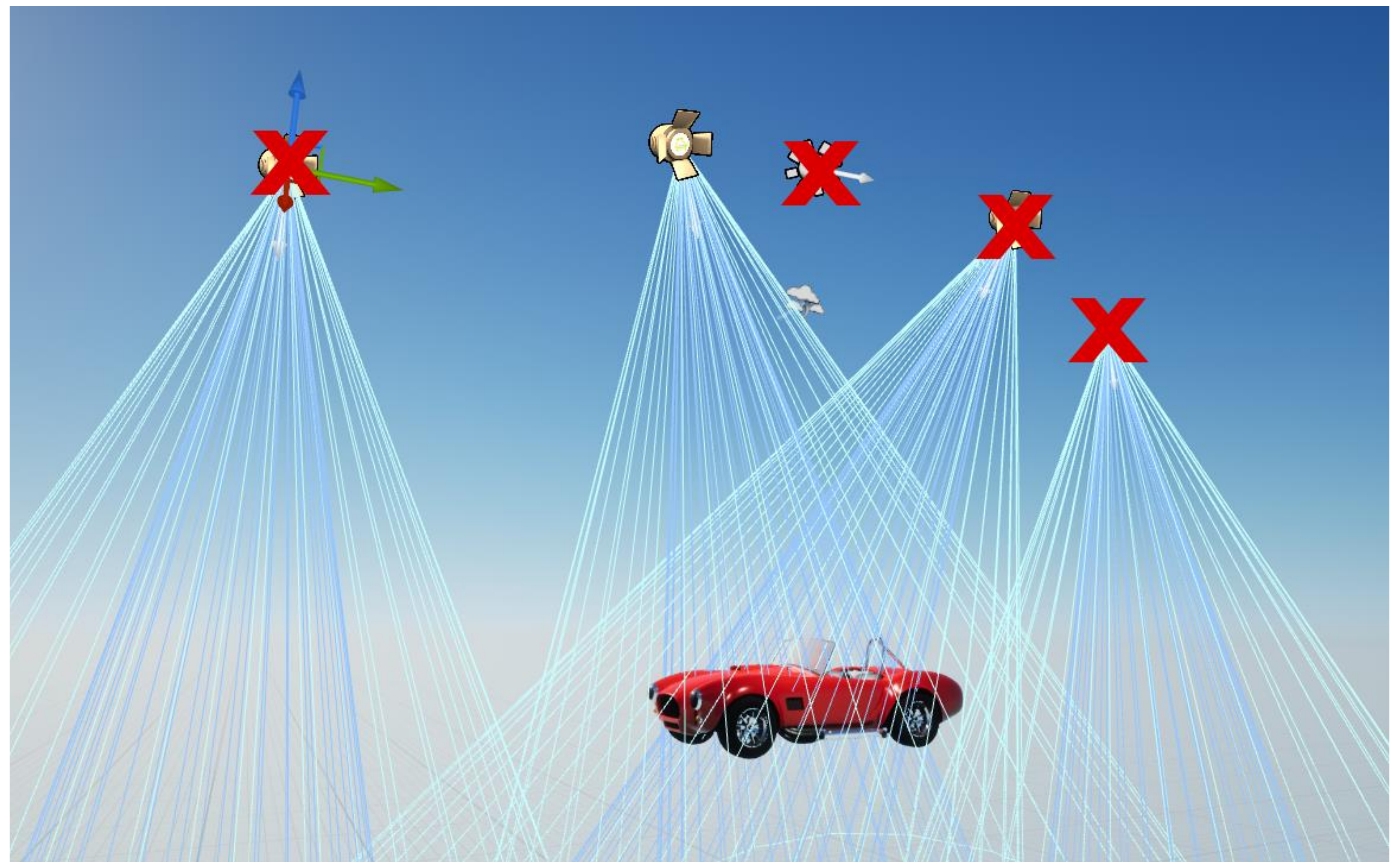
Bake

Real-Time Lighting

DIFFERENT WORKFLOW



Light

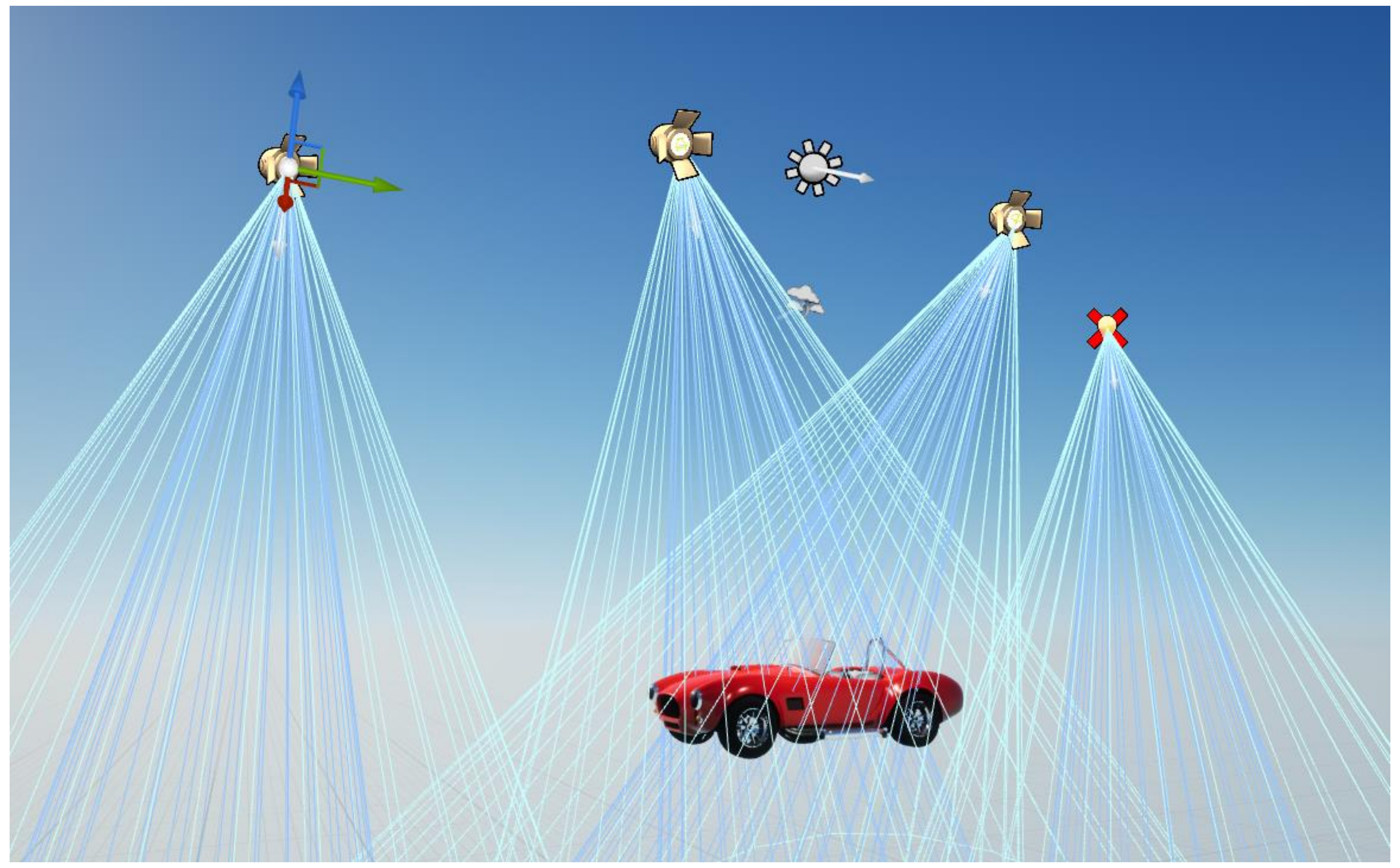


Bake

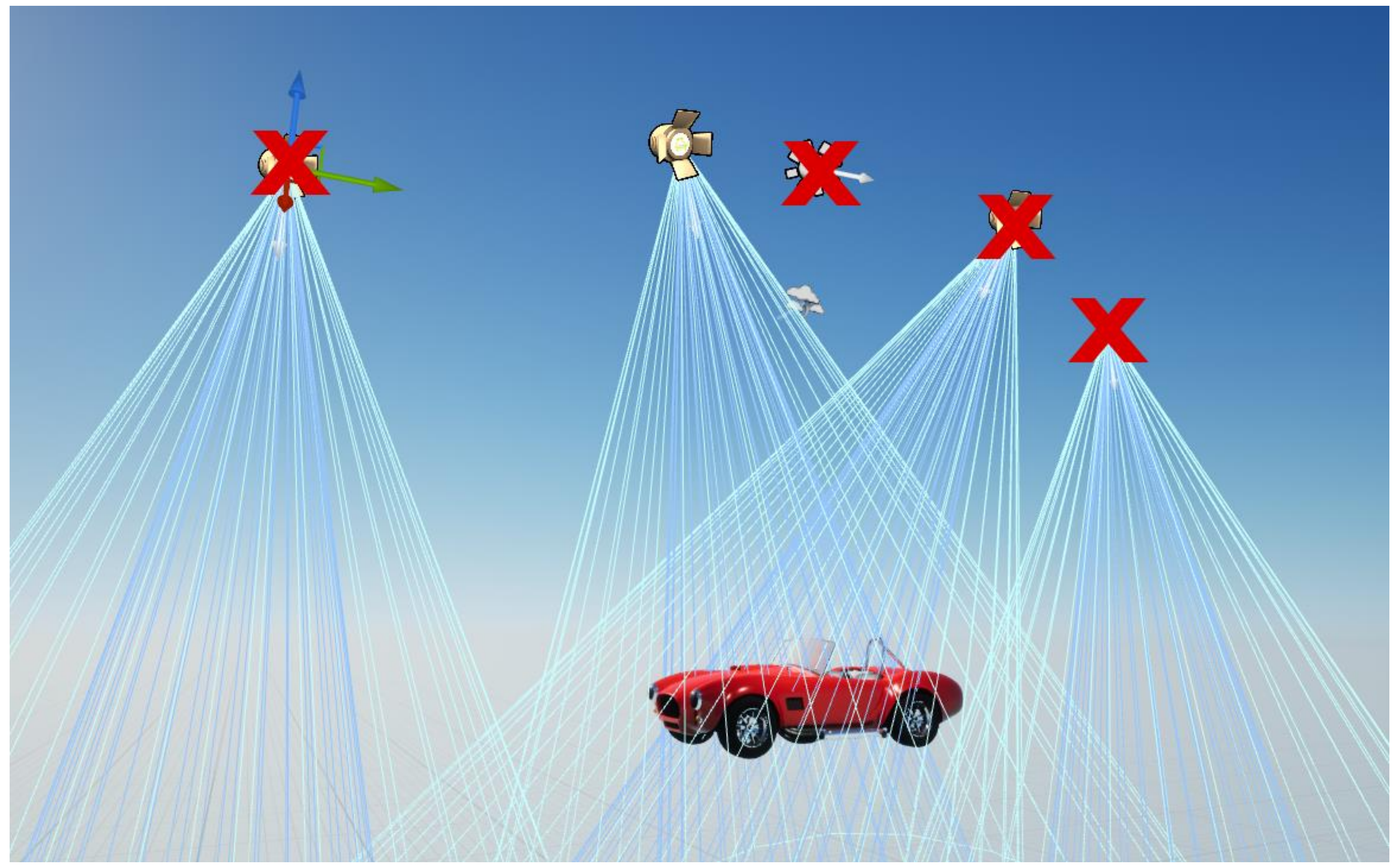
Interact / Render

Real-Time Lighting

DIFFERENT WORKFLOW



Light



Bake

Real-Time

Classic

Interact / Render

Baking Lights

REMOVES LIGHTS FROM FINAL CALCULATIONS

Speeds up Real-Time rendering

Simplifies calculations

CAN BAKE IN MULTIPLE PLACES

Baking in Real-Time engine usually happens automatically

Can bake externally in some classic renderers to utilize special features

External baking also captures some **materials**, removing need to translate those.

NOT ALL LIGHTING CAN BE BAKED

Any light that moves or changes.

Any light casting shadows on moving objects

Baking Lights

BAKING IN REAL-TIME ENGINES

Lighting is designed in Real-Time engine

Baking happens automatically (easy to implement)

Lighting from 3D Applications will **need to be translated** if rendering everywhere

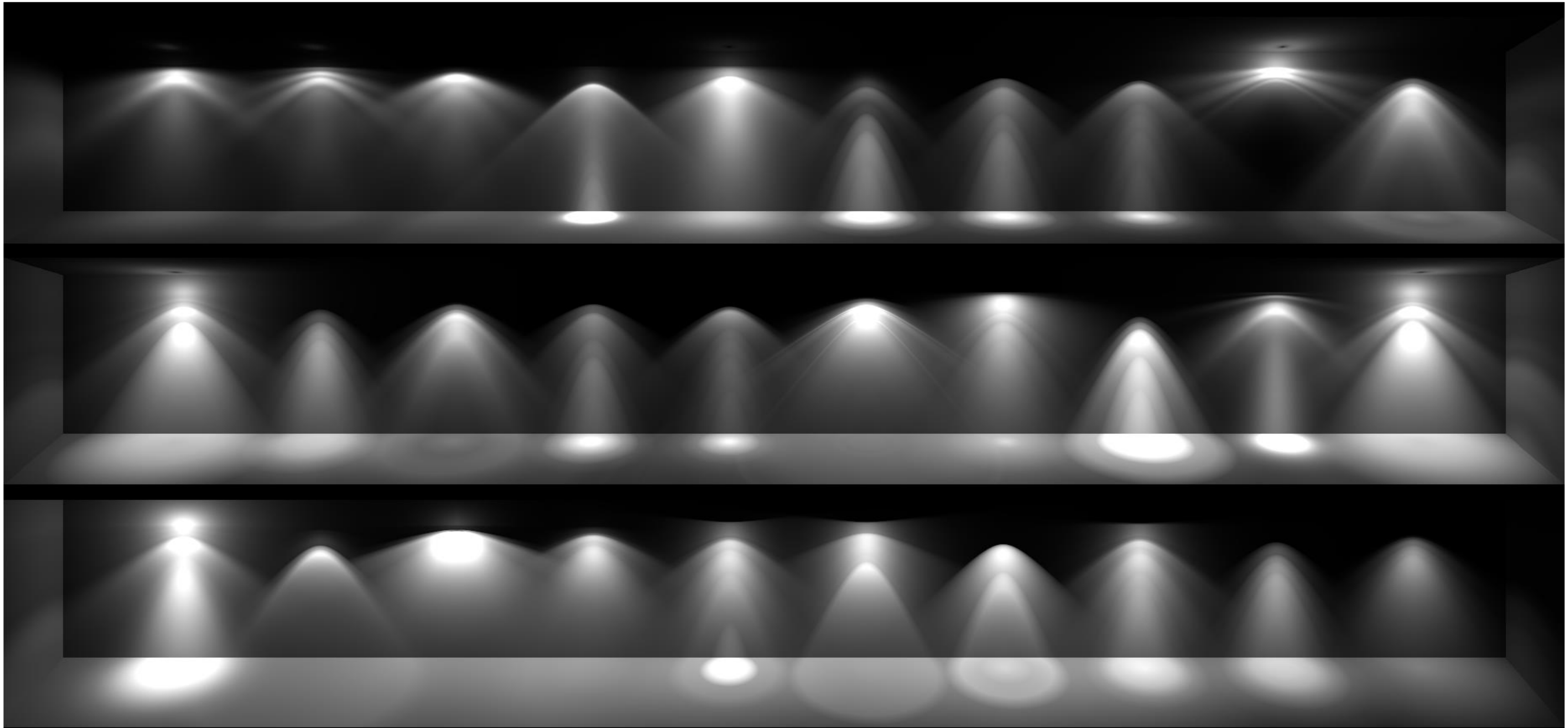
BAKING IN EXTERNAL (CLASSIC) RENDERER

Removes the need to translate lights

Can possibly remove the need to translate some materials

Workflows can be challenging / not straightforward

Translating Lighting



Translating Lighting

FBX-SUPPORTED

- Spotlights
- Point Lights
- Directional

NOT FBX SUPPORTED

- Photometric / IES
- Environmental Lighting
- Area Lights, Rect Lights, Tube lights, etc…
- Directional

Translating Lighting

FBX-SUPPORTED

Spotlights

Point Lights

Directional

NOT FBX SUPPORTED

Photometric / IES

Environmental Lighting

Area Lights, Rect Lights, Tube lights, etc…

Directional

DATASMITH (3DS MAX / REVIT)

Spotlights

Point Lights

Directional

Photometric / IES

Environmental Lighting

V-Ray lights

Corona Lights

Translating Lighting

FBX TRANSLATION

Only basic lights come across

WILL need to tweak in Real-Time Engine

DATASMITH TRANSLATION

More stuff comes across

Not perfect – will still need adjustment.

Standardize Rendering

Standardized Rendering

ONE RENDERER FOR (ALMOST) EVERYTHING

- Get renderer that can plug into **both** 3D App and Real-Time App
  - Lighting is supported
  - Materials are also supported
  - Other rendering features can come across

v·ray

octanerender

Standardized Rendering

ONE RENDERER FOR (ALMOST) EVERYTHING

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  - Materials are also supported
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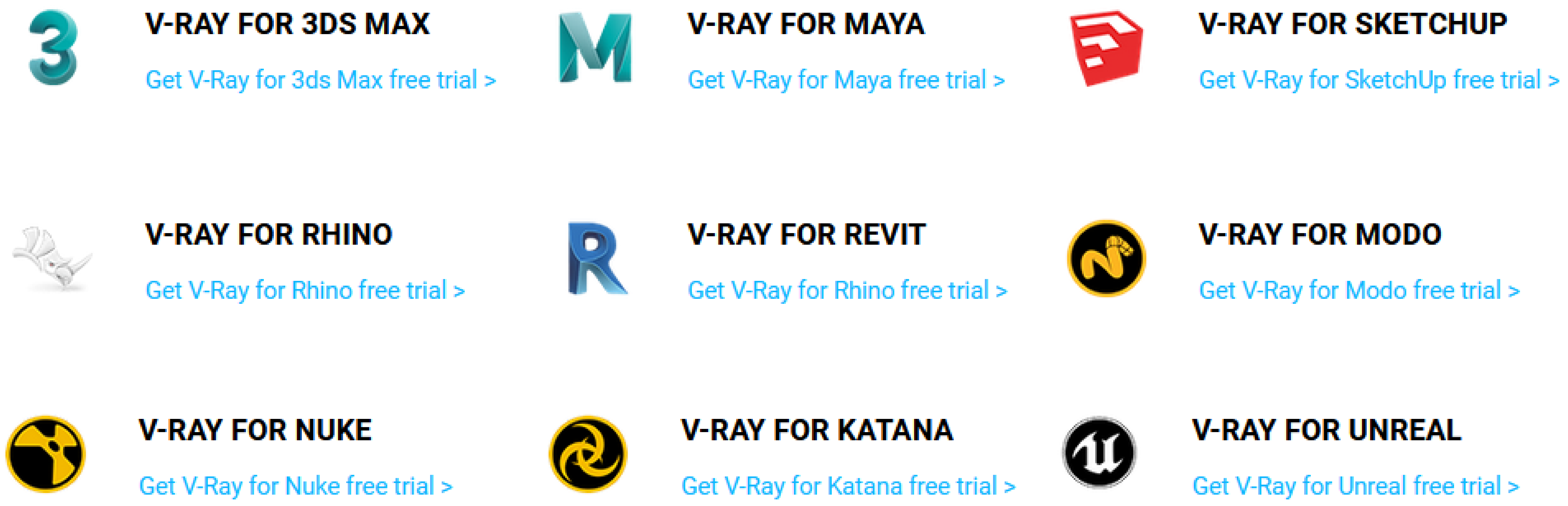
V-Ray Workflow



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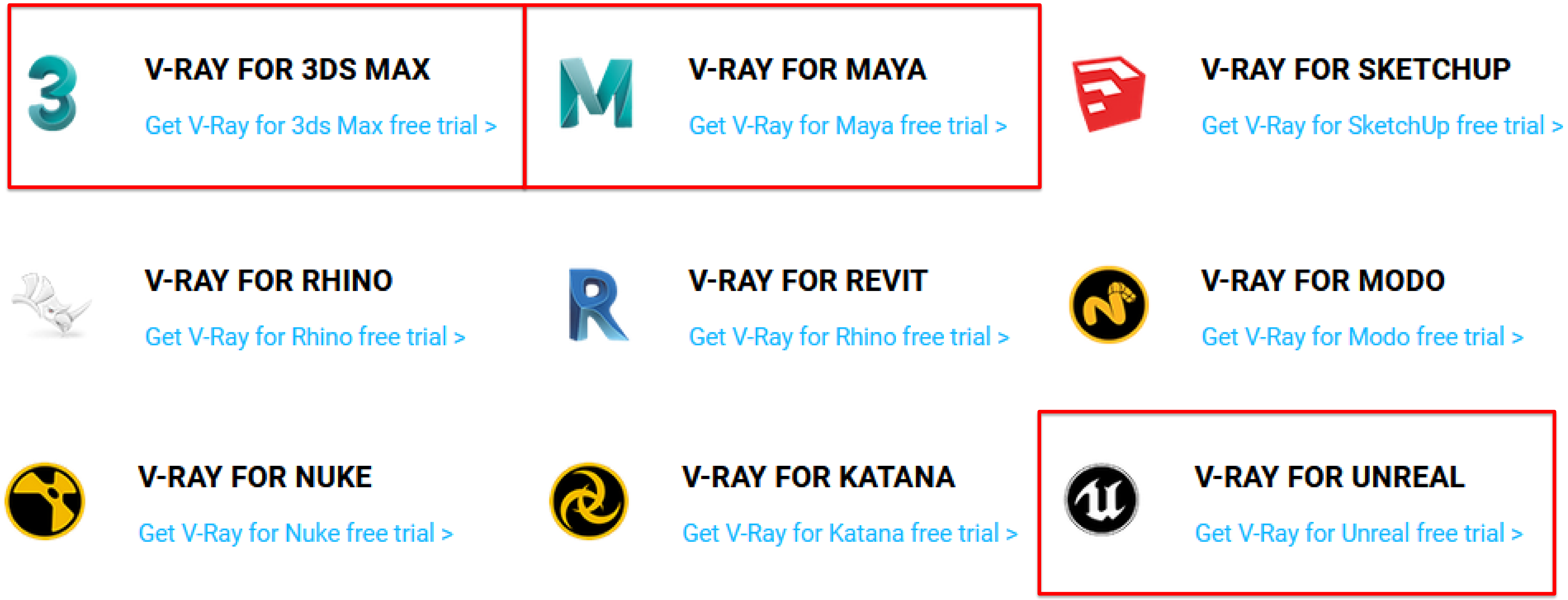
V-Ray Workflow



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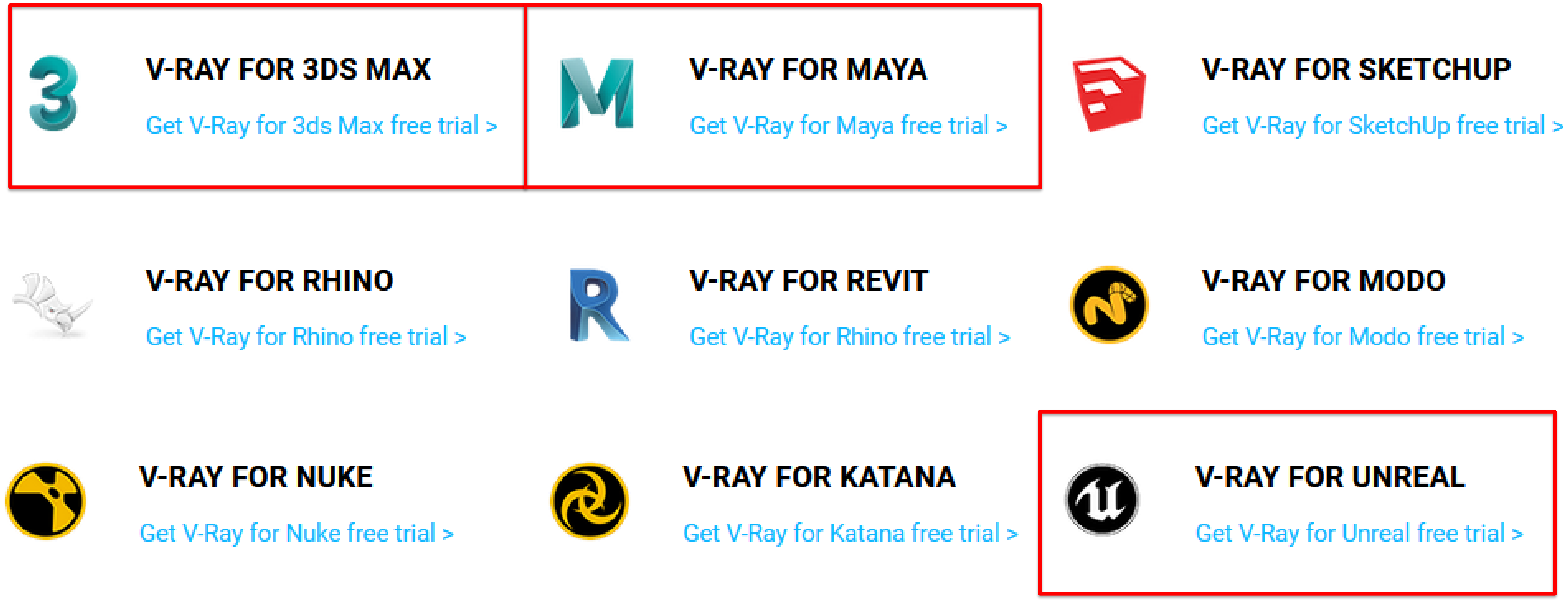
V-Ray Workflow



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V-RAY FOR UNREAL

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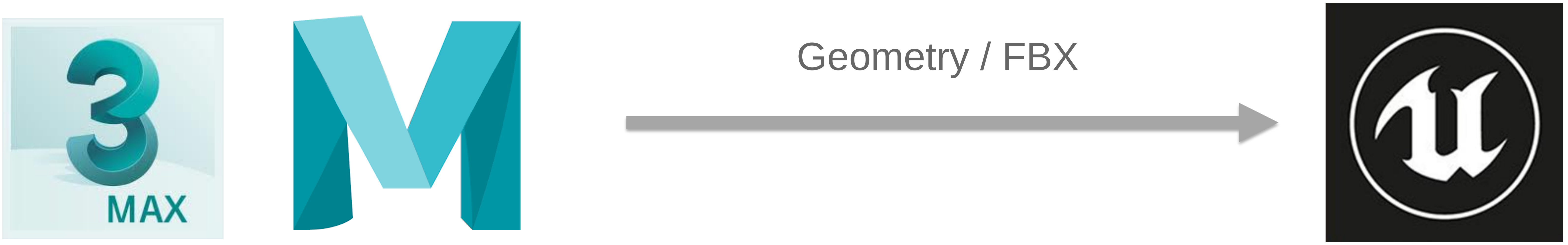
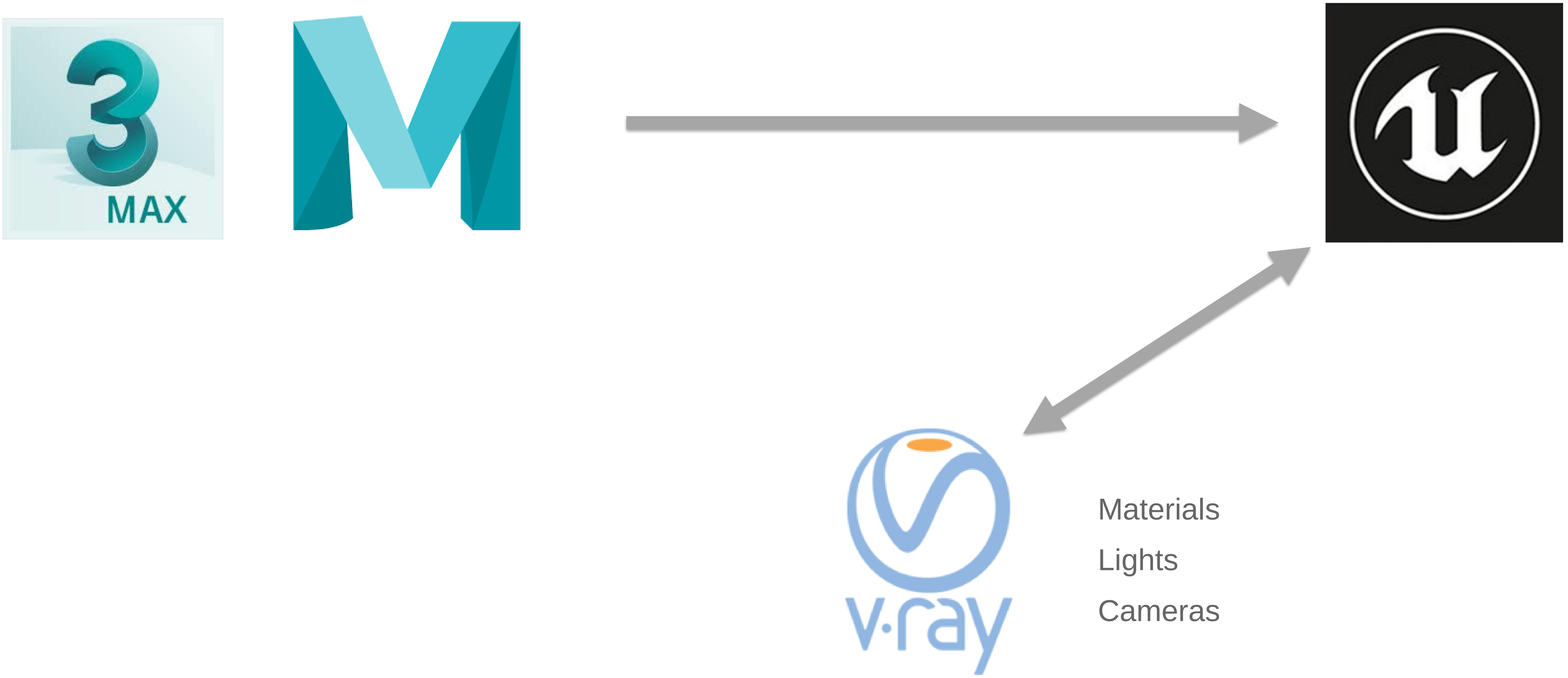
~~unity~~

Standardized Rendering



Geometry / FBX

Standardized Rendering

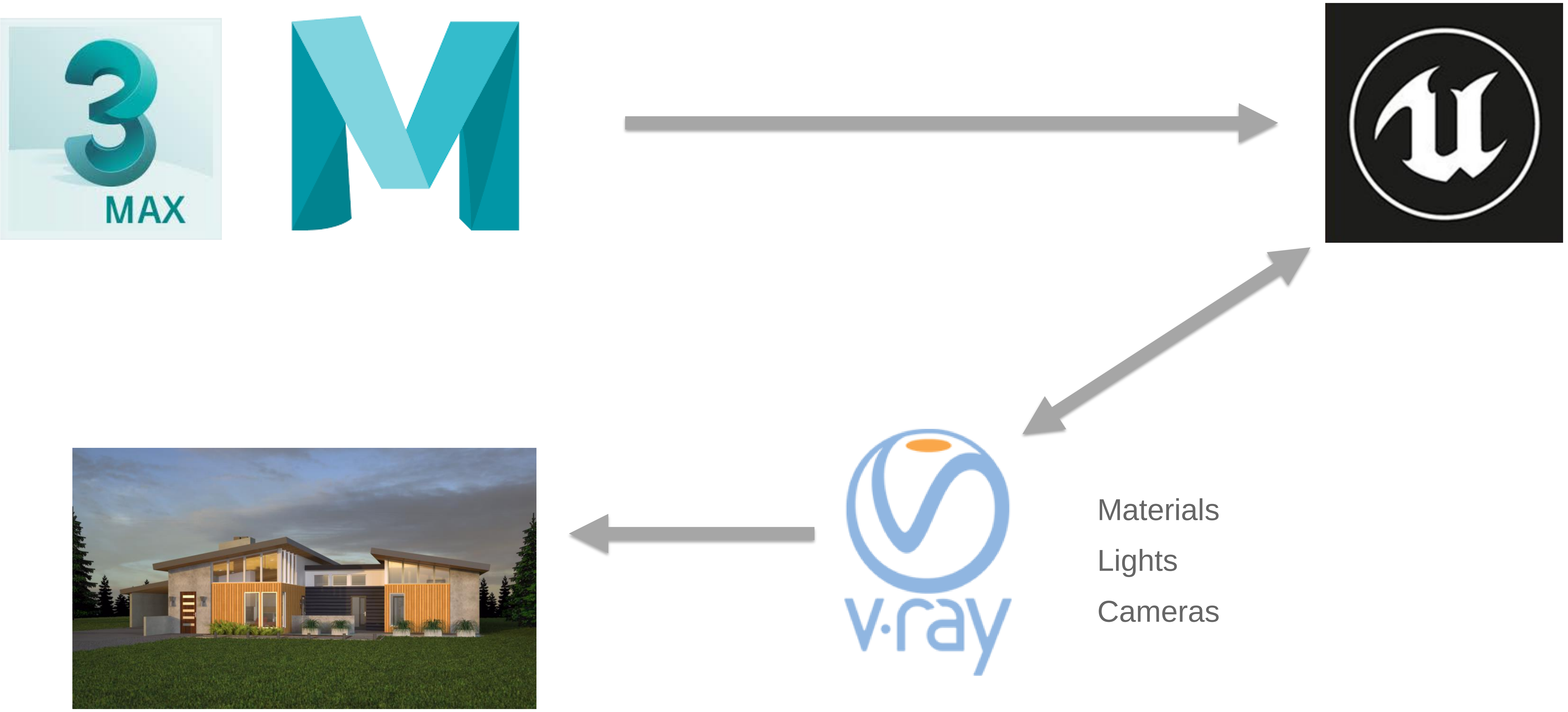


Materials

Lights

Cameras

Standardized Rendering

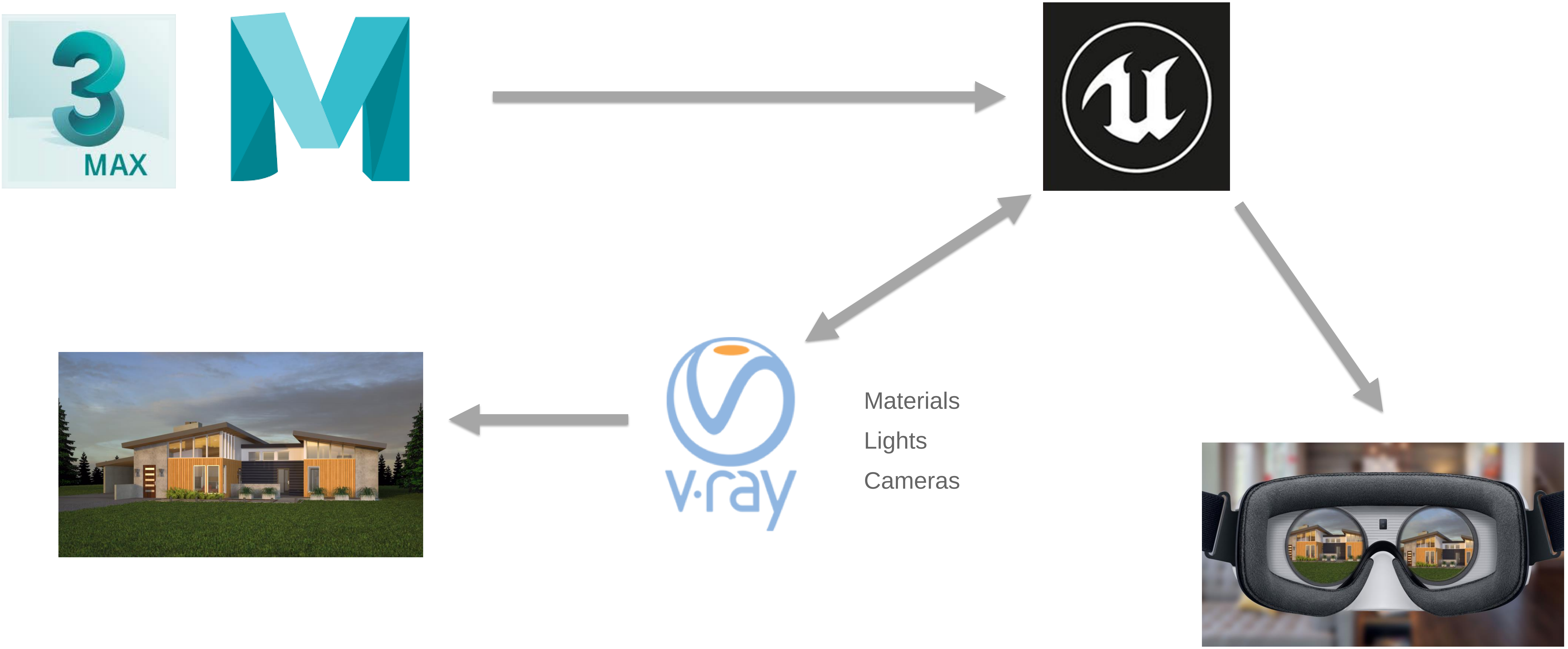


Materials

Lights

Cameras

Standardized Rendering



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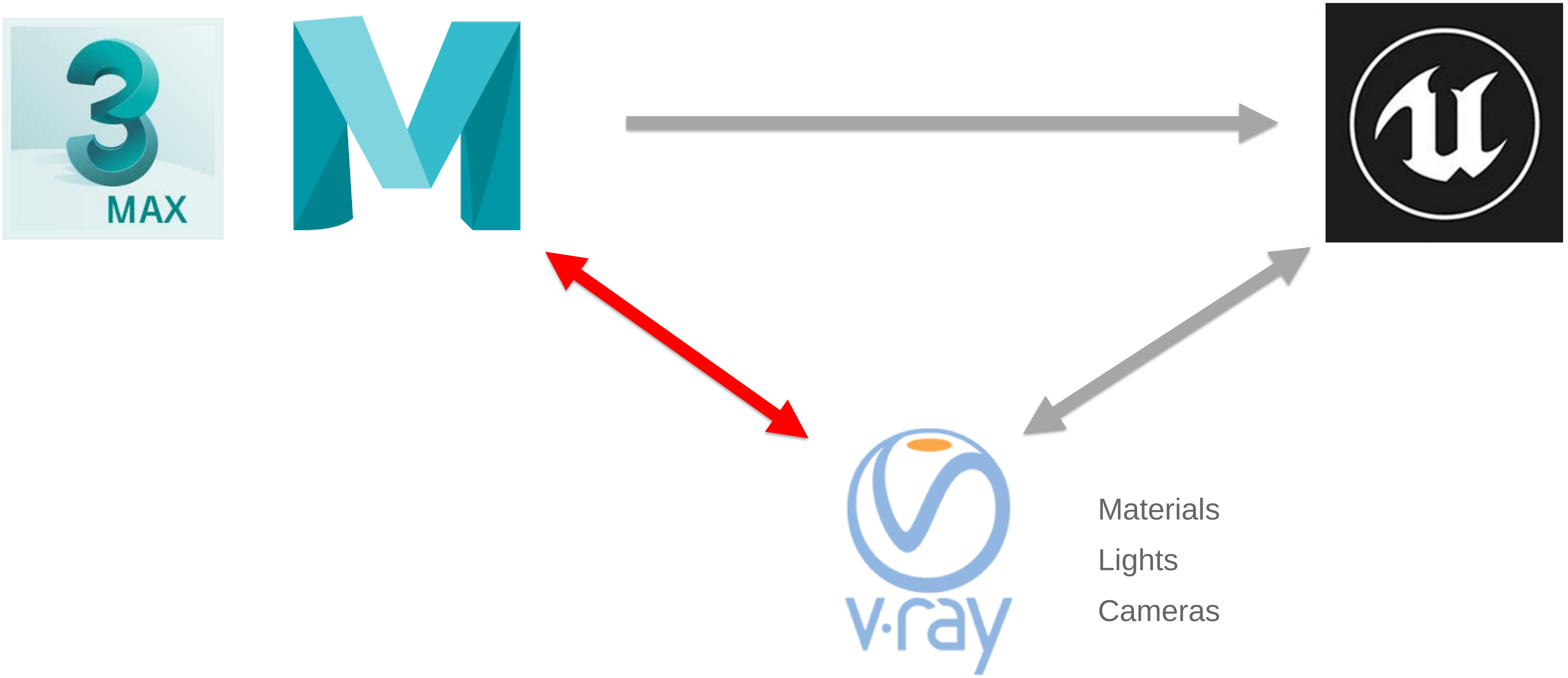
Standardized Rendering



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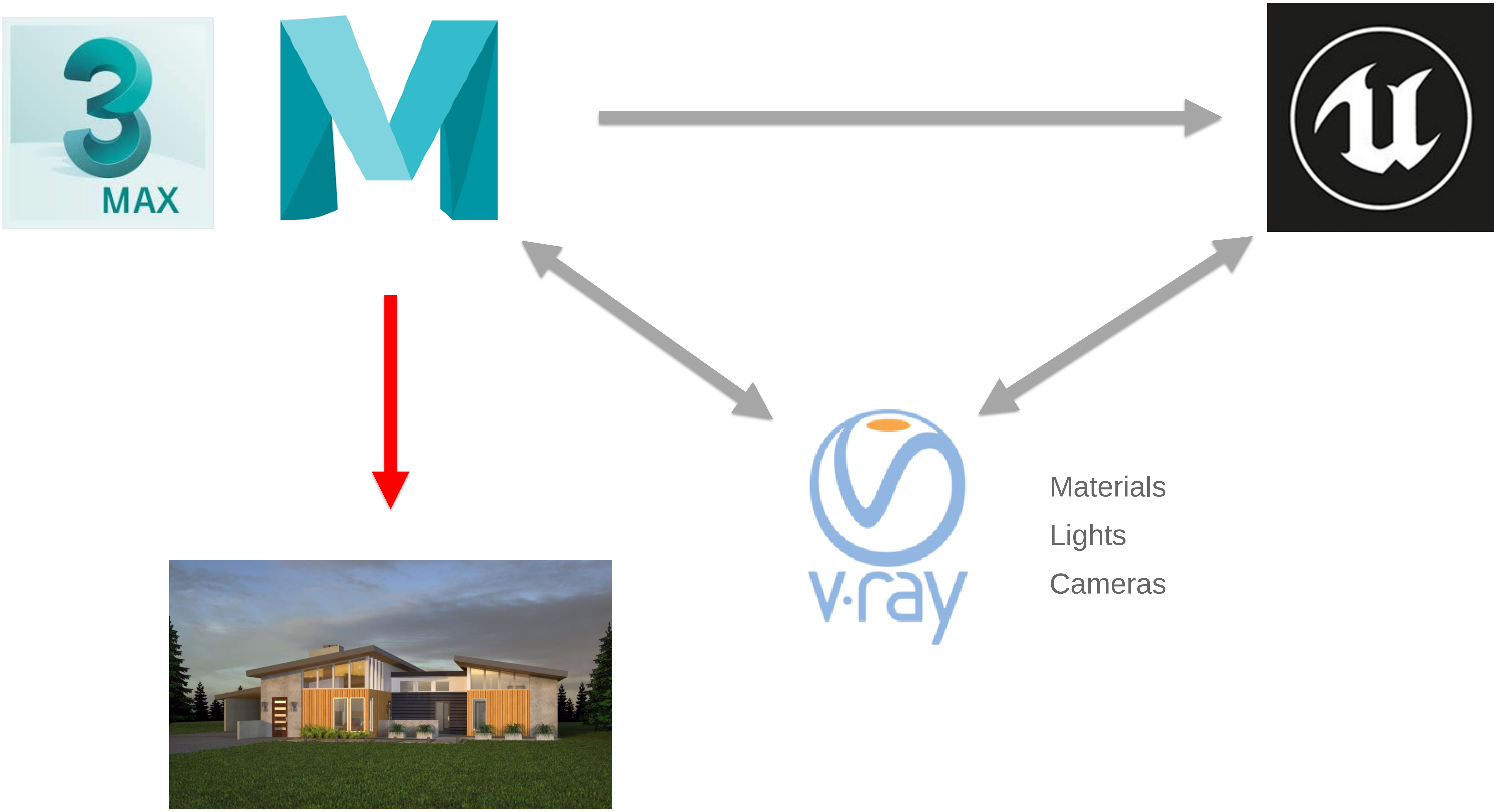

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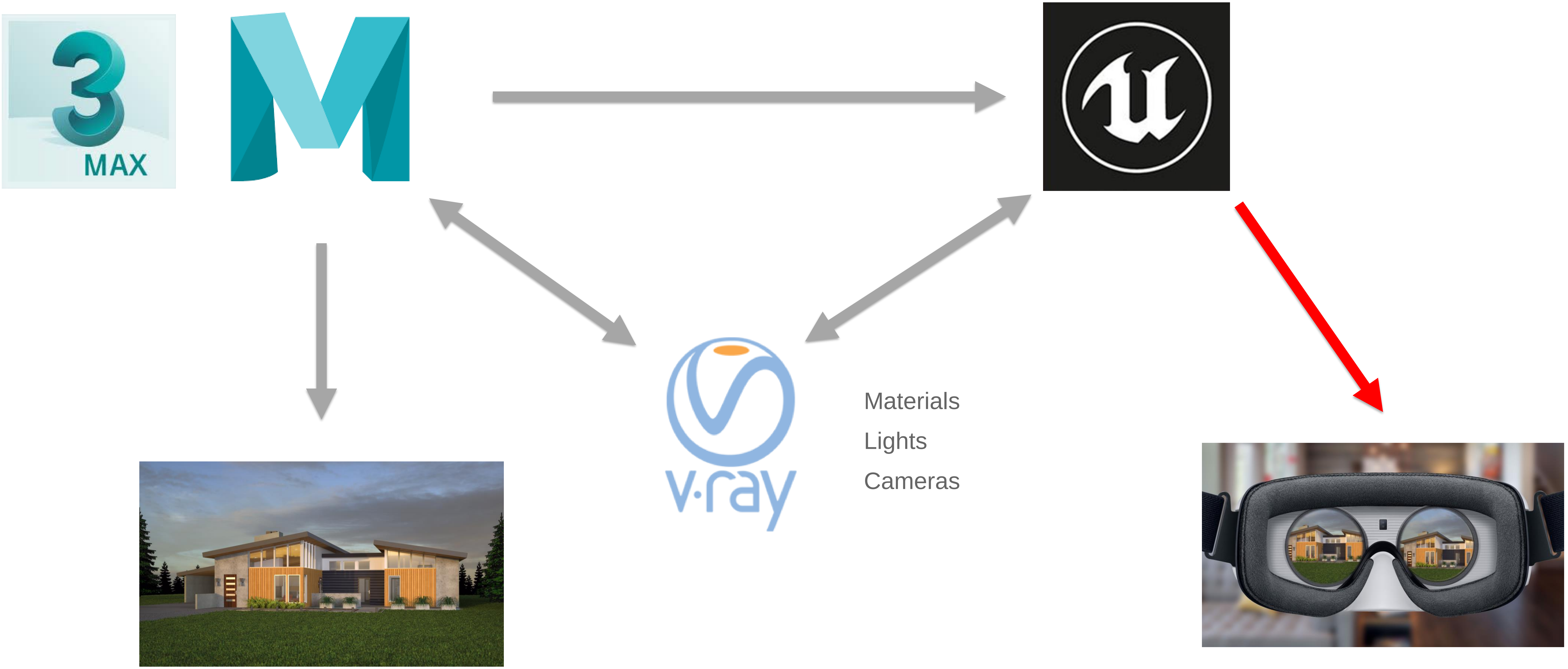

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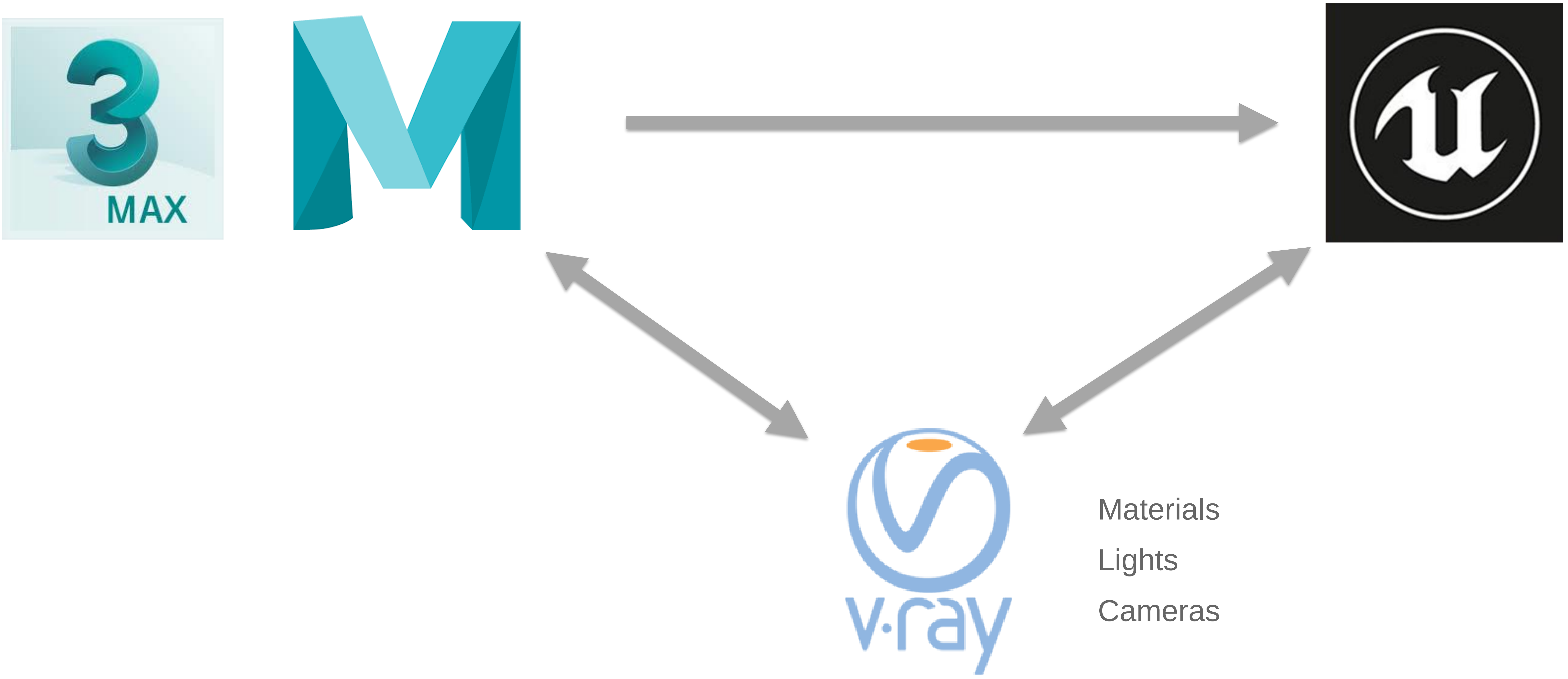
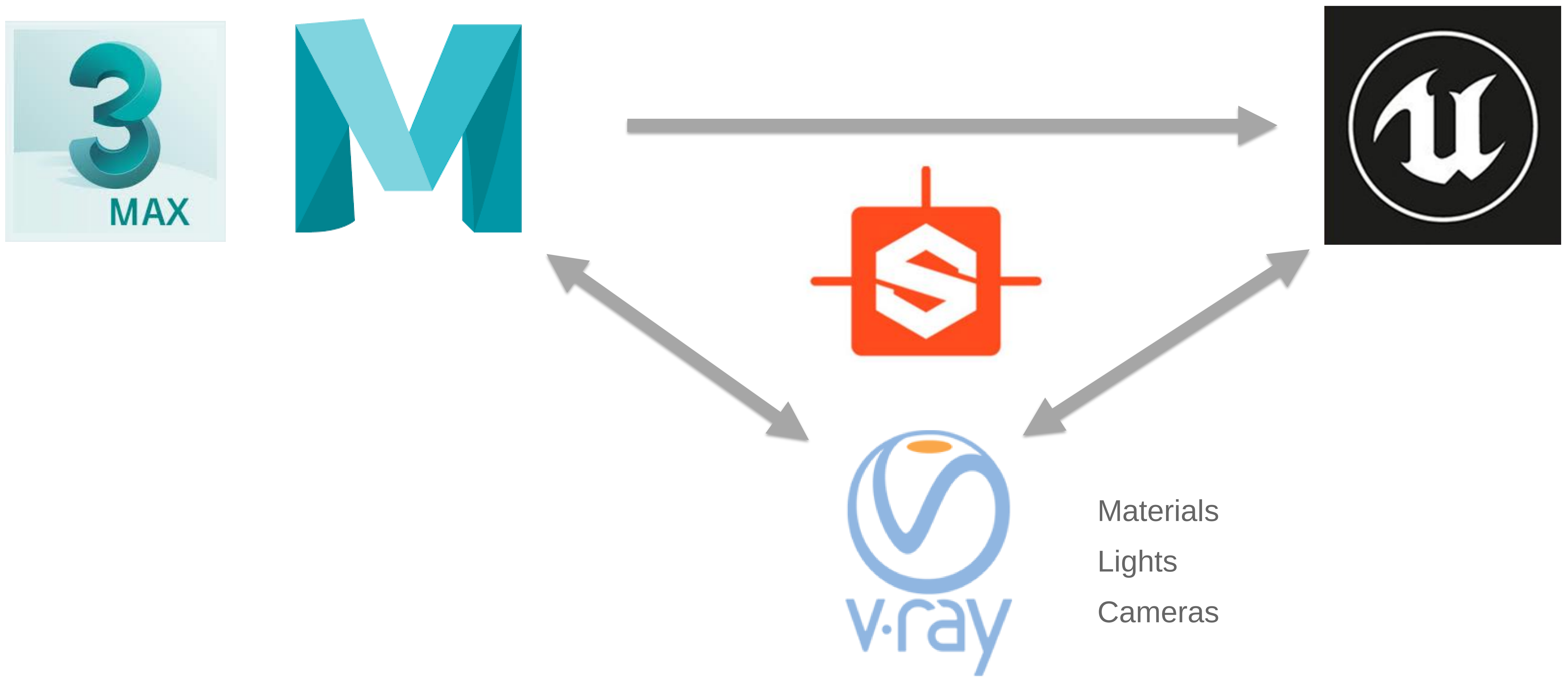


Materials

Lights

Cameras

Standardized Rendering



Materials

Lights

Cameras

V-Ray Workflow

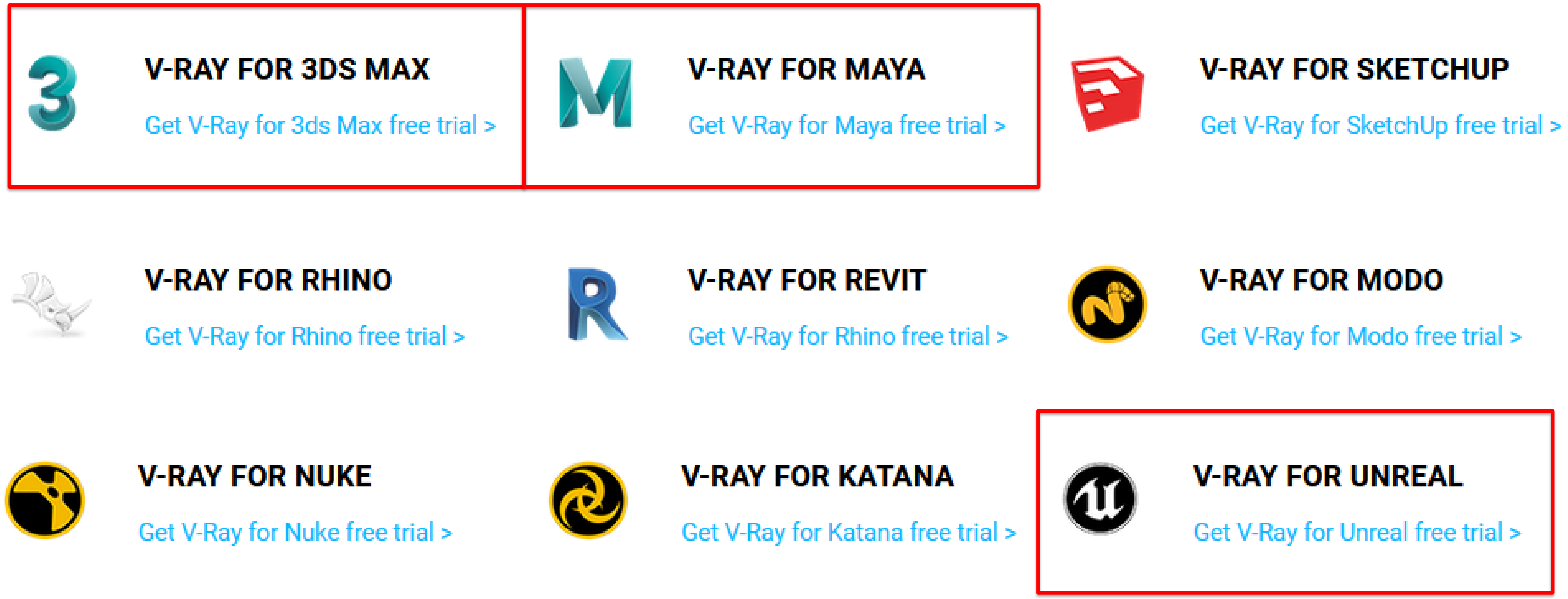
A FEW CAVEATS….

FBX does not move V-Ray materials, lights, etc.

Moving V-Ray between scenes requires using .vrscene files

Not all V-Ray features are supported in Unreal

V-Ray Workflow



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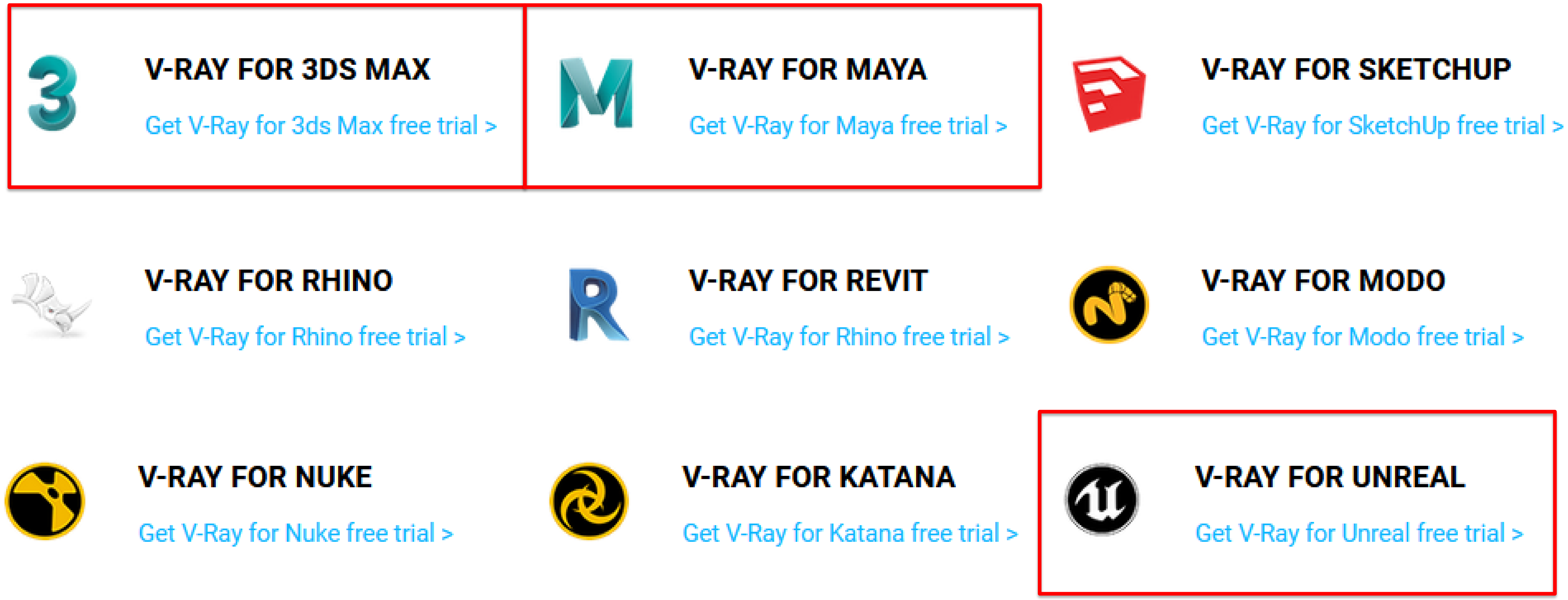
V-Ray Workflow



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V-RAY FOR UNREAL
Get V-Ray for Unreal free trial >

Octane

3DS Max

Maya

AutoCAD

Inventor

Revit

Blender

Cinema 4D

SketchUp

MODO

Nuke

Octane

3DS Max

Maya

AutoCAD

Inventor

Revit

Blender

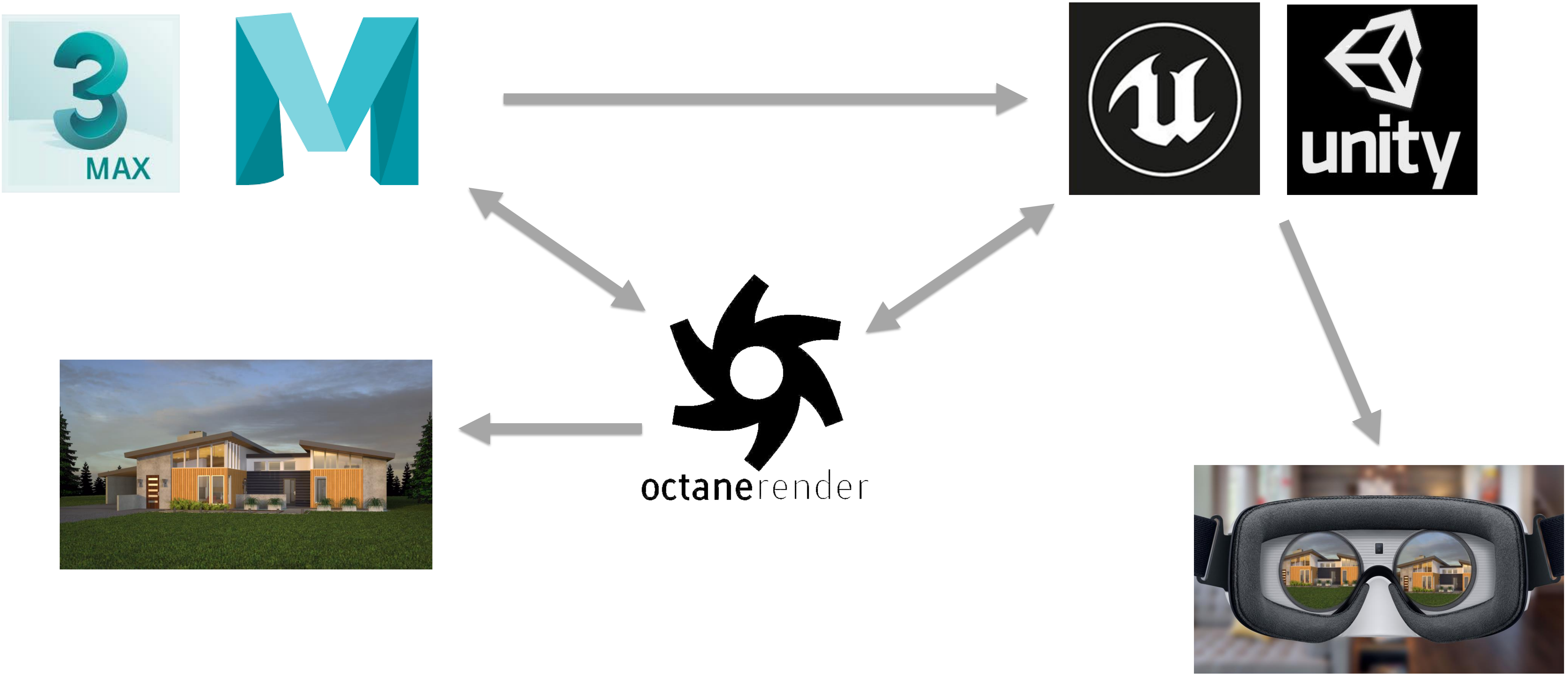
Cinema 4D

SketchUp

MODO

Nuke

Octane Workflow



Other Considerations

Cameras

Cameras are straightforward

A few simple parameters (position, orientation, FOV, etc…)

They do translate via FBX

Some render-specific things may not translate (effects, bokeh, etc…_

Usually set up for a specific render

Most times, we set up the camera for the specific shot

Recreating a single camera is not that big of a task

Interactive/VR is a separate camera

You’ll still set up VR in the Real-Time engine, no need to translate

Visual Effects

Can be resource-intensive

Some effects can be very compute-intensive, not ideal for real time

Offline or Classic rendering may suit these better

Much better tools in 3D apps (Bitfrost, Hair, Fur, etc…)

Real-Time can handle some

Much progress on real-time front.

Some effects can be cached to save compute cycles

Unreal - Chaos

Post-Processing

Post-Production

Classic rendering can output multiple passes/layers for post

Photoshop/After Effects/Nuke are great for getting ultimate quality

Can also help with integration (live action / photos)

Real-Time

Great way to add another layer of quality/control.

Many post effects can be duplicated

Upper limit on how much you can do in real time.

Futures

Faster Machines / More convergence

Classic rendering gets fast enough to be real time

Real time gets enough power to be photoreal

Better Tools / Translation

Better movement of assets to/from Real-Time

Better translation tools

Standardization

OSL – Already a standard, may become more common

Material X – Common material definition

Recommendations

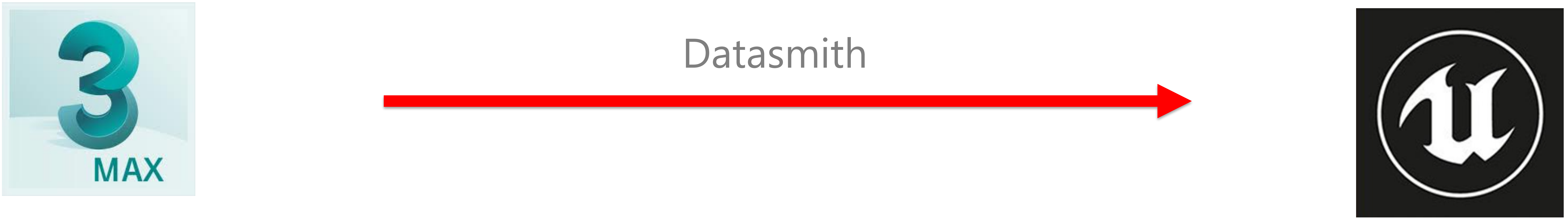
Recommendations

Best practices

Whatever pipeline you choose, s

Recommendations

Translation



Datasmith

3ds Max to Unreal has slight advantage

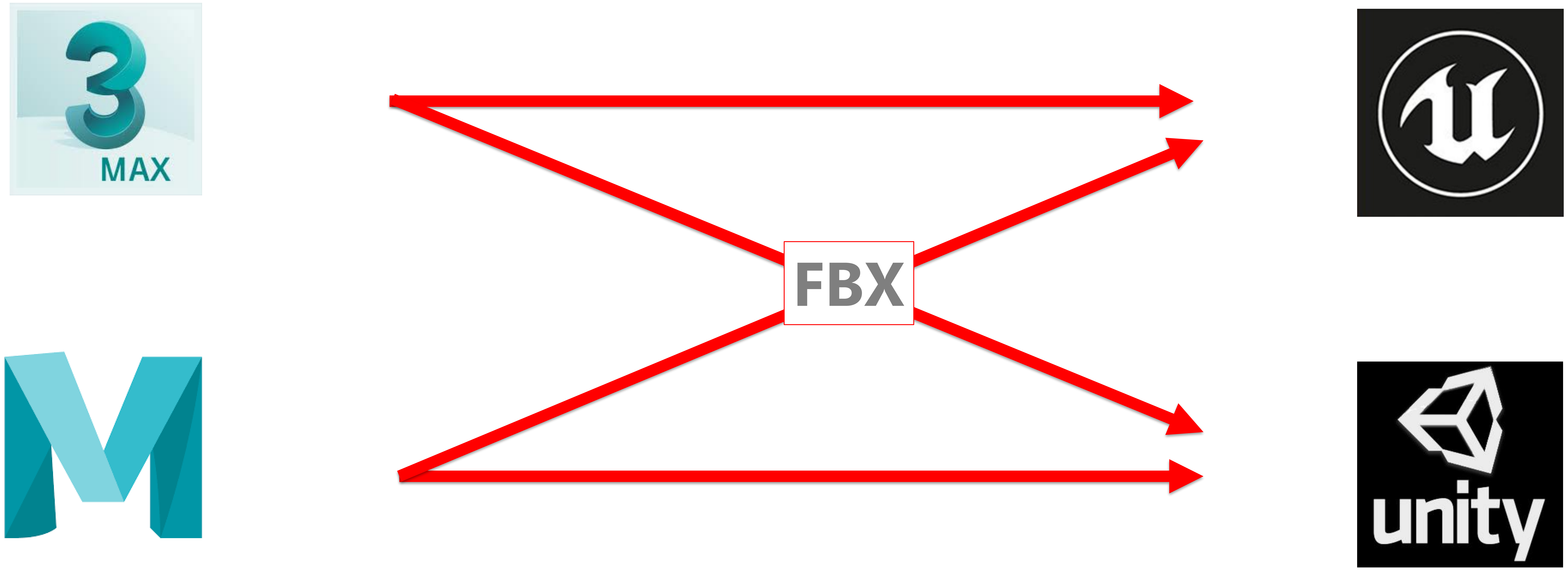
Datasmith will preserve a lot more data

Less need to revise/create new assets

.

Translation

Translation



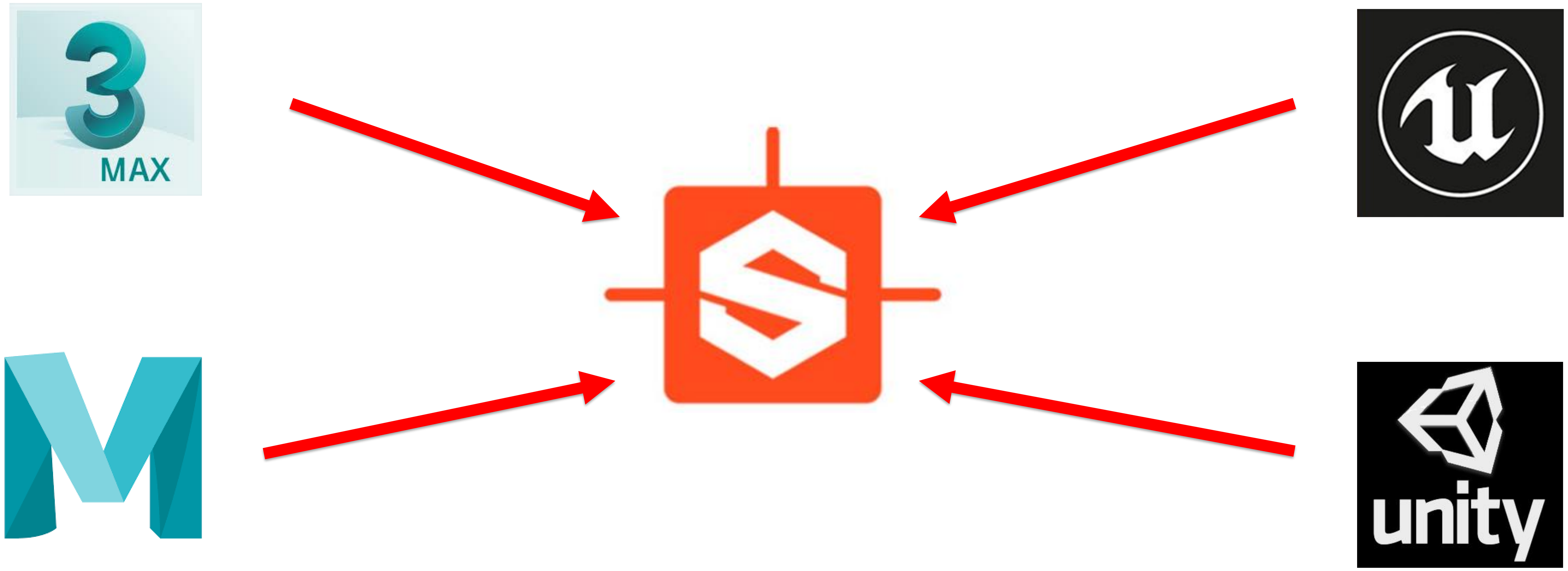
FBX

FBX can be used

- Will translate geometry, animation
- Some materials, lights, etc may not fully translate

Materials

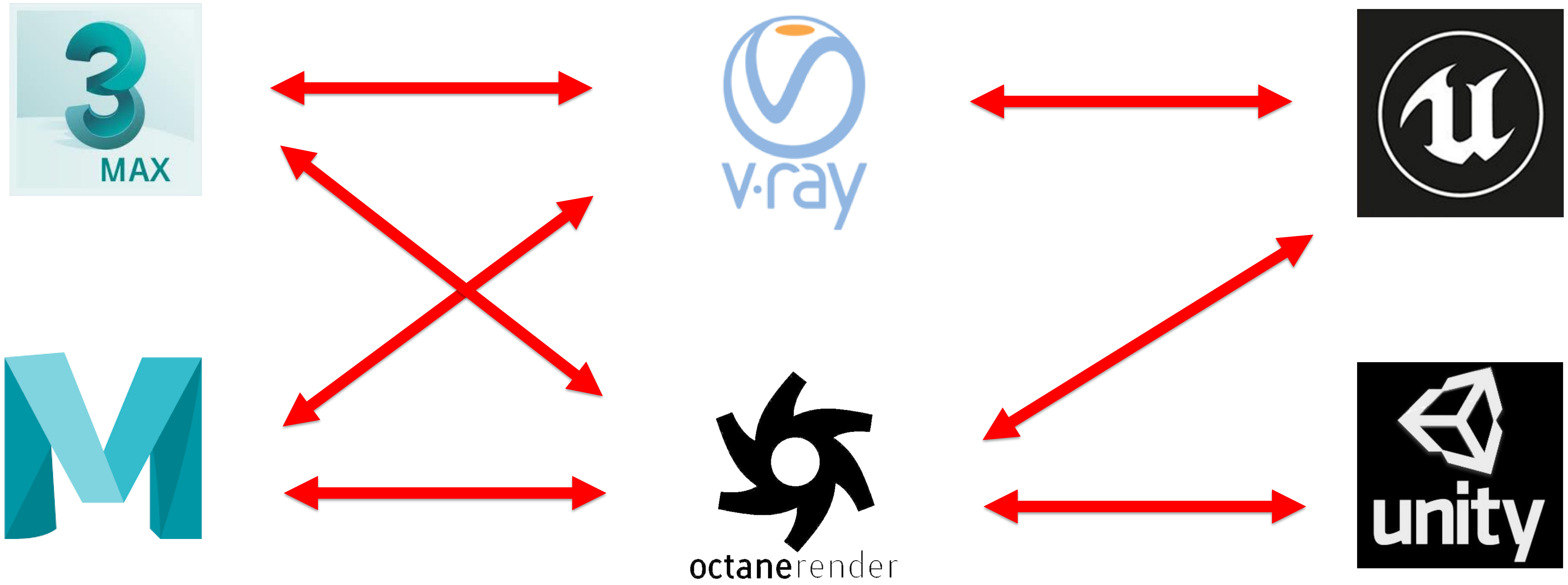
Materials



Substance to Manage Materials

Classic Rendering

Classic Rendering



Summary

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