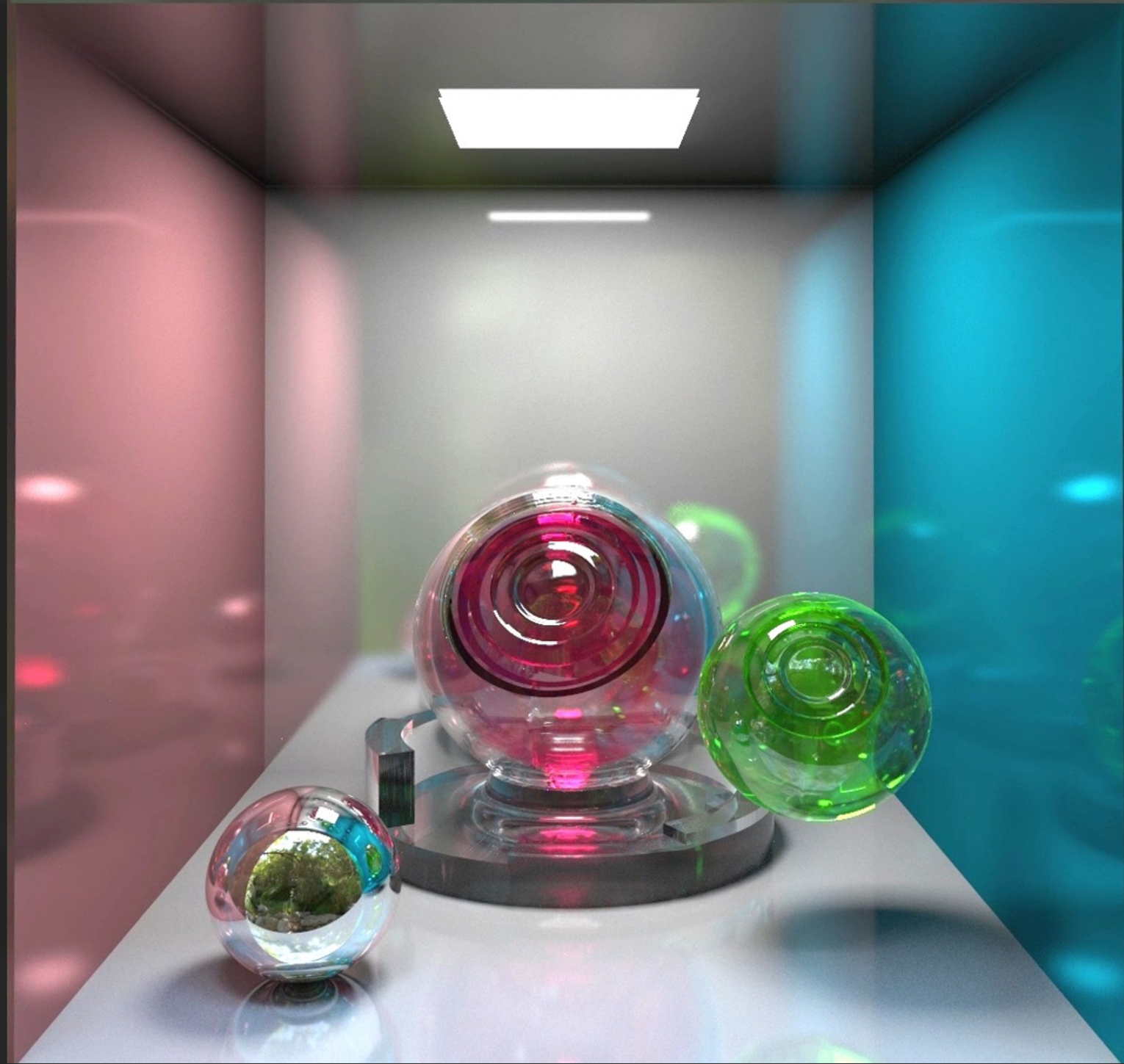
MPC Film

Dekko : A Realtime Preview Framework

GTC 2015



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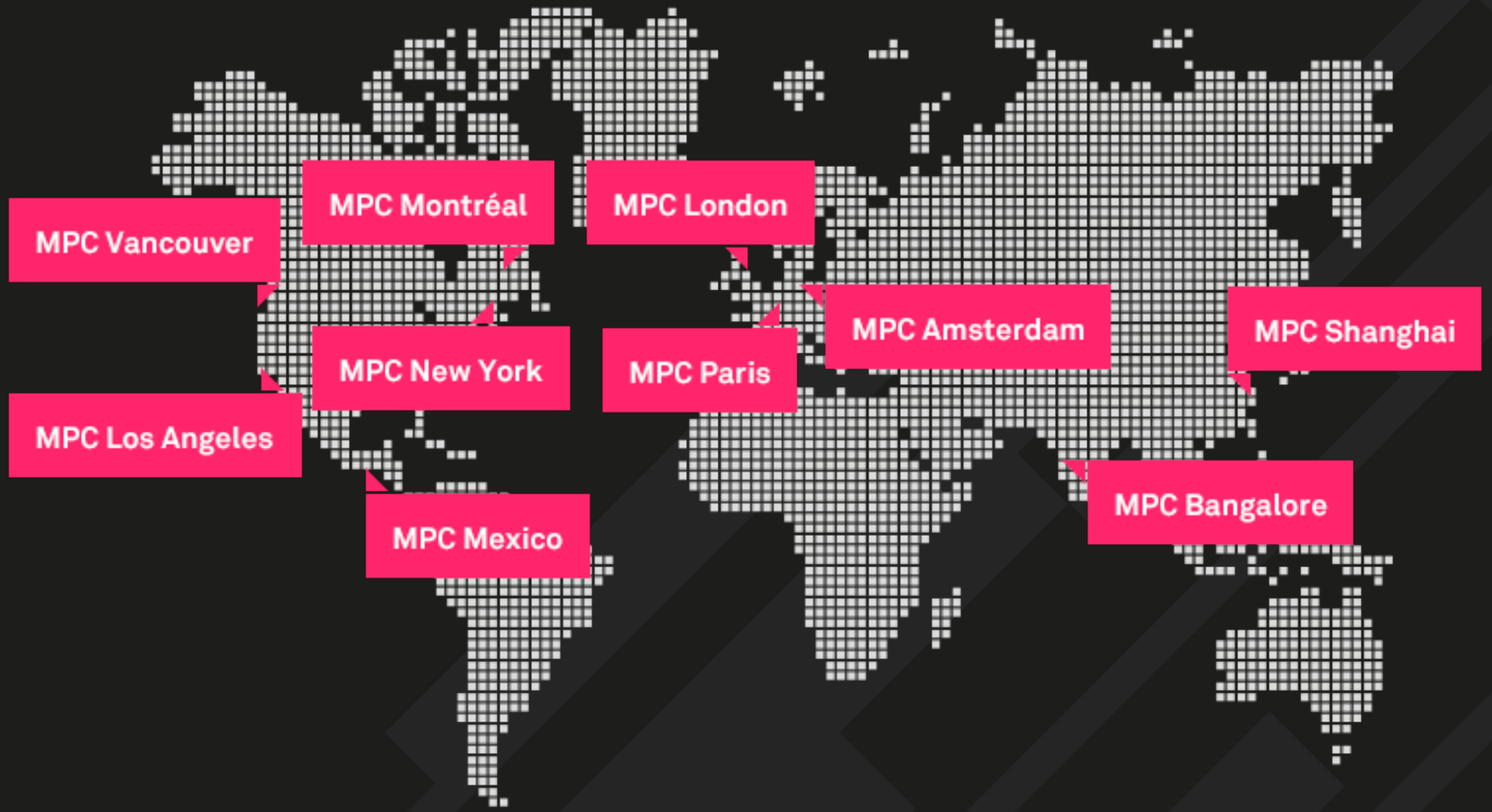
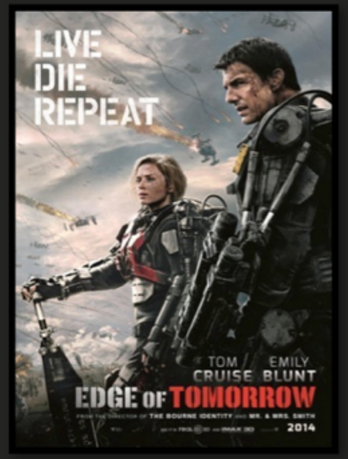
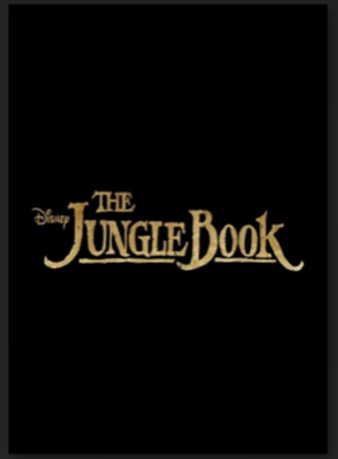

MPC Vancouver
MPC Montréal
MPC London
MPC New York
MPC Paris
MPC Amsterdam
MPC Shanghai
MPC Los Angeles
MPC Mexico
MPC Bangalore

MPC

MPC Film Recent Shows





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Preview for VFX

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Challenges

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Billions of Polygons

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Speed

Quality

?

OpenGL

GameEngine

Re-Rendering

RenderMan

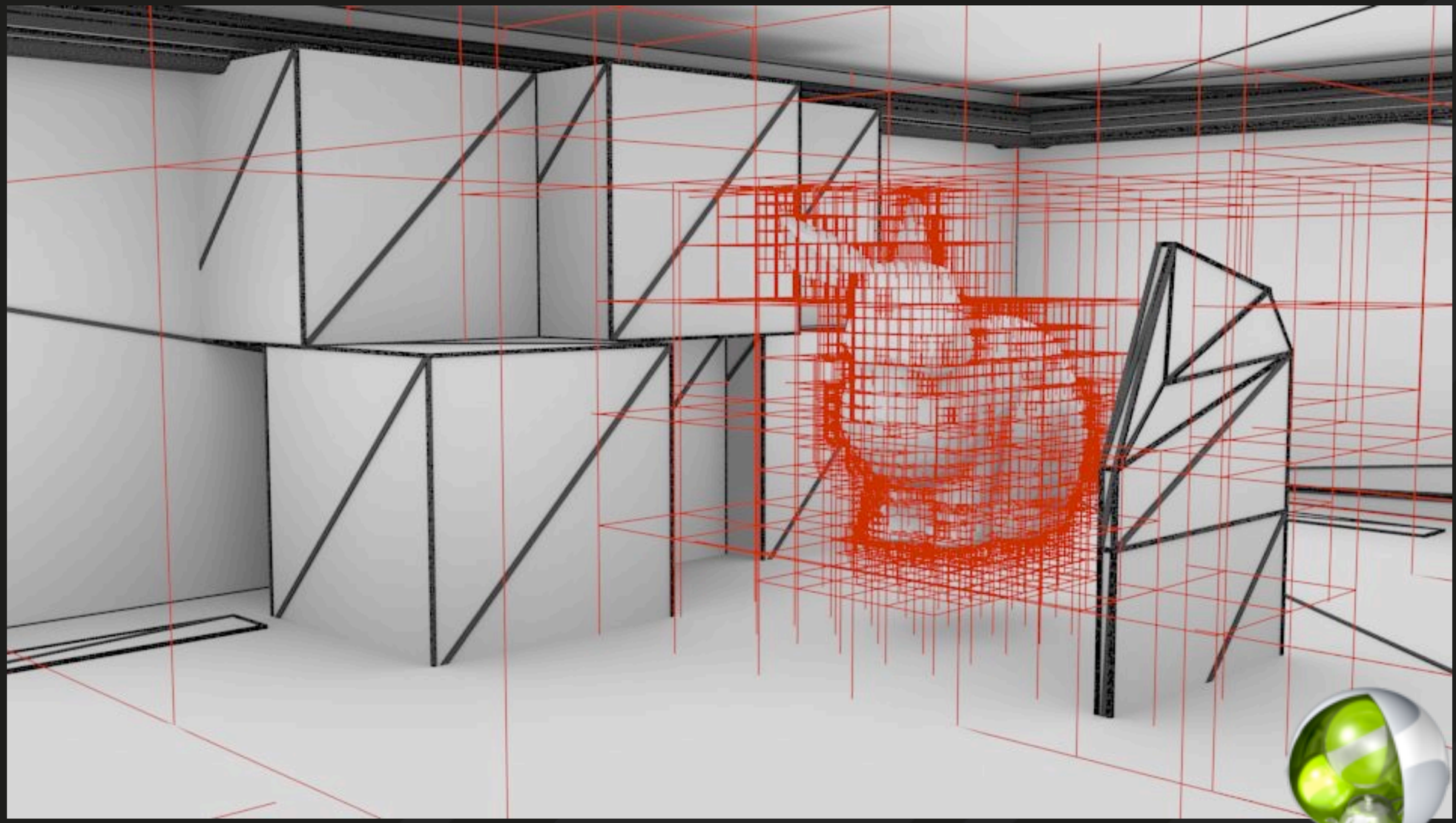
MPC

Dekko

MPC

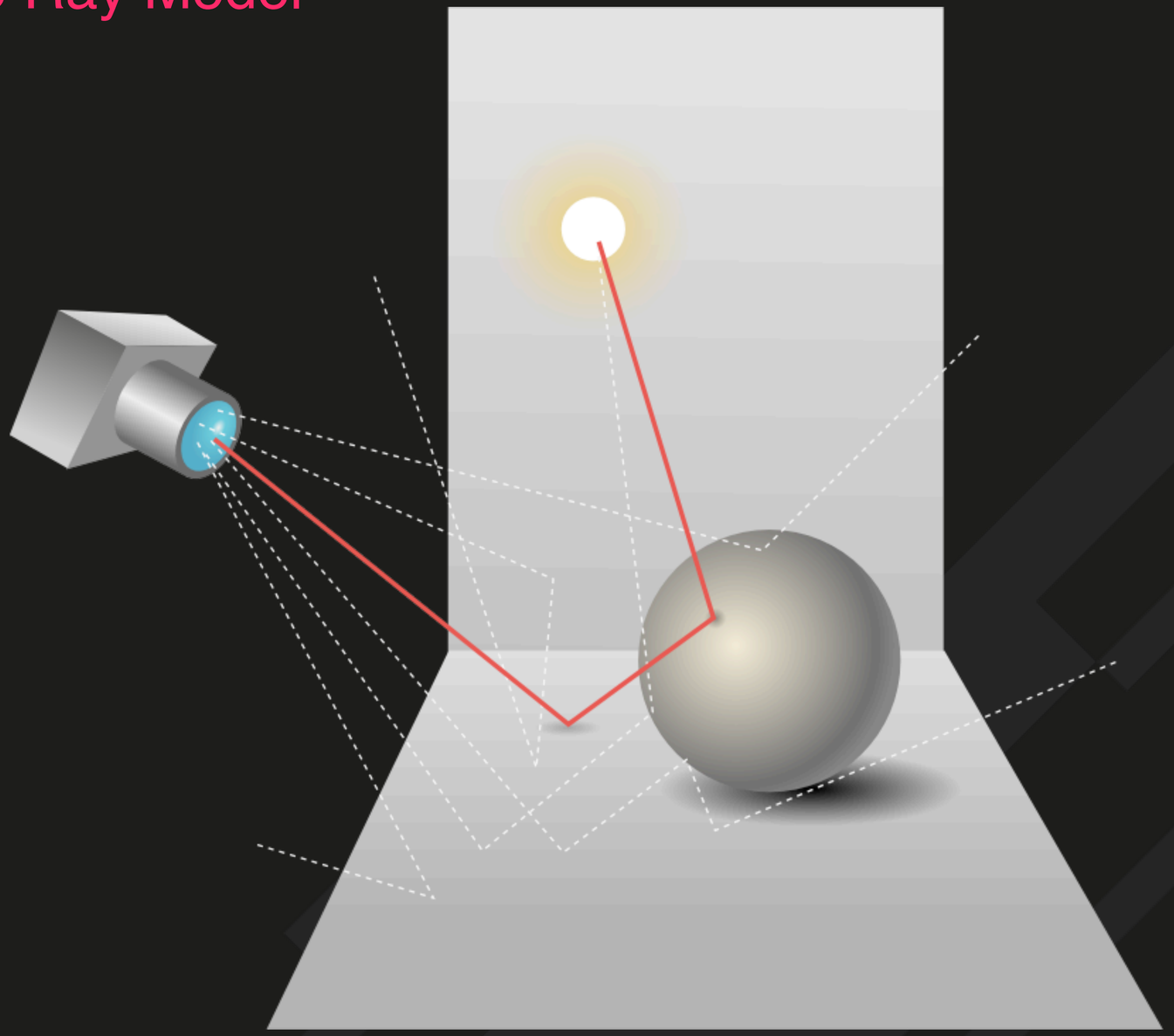
GPU Raytracing
+
Modern Scene Assembly

Dekko : Build using NVIDIA OptiX



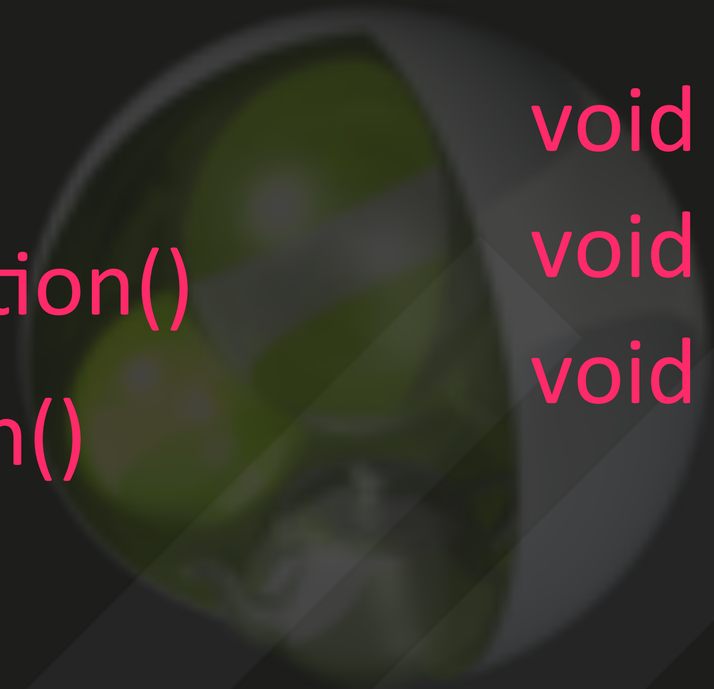
OptiX : Single Ray Model

MPC



Using Nvidia OptiX

MPC



void ray_generation()

void exception()

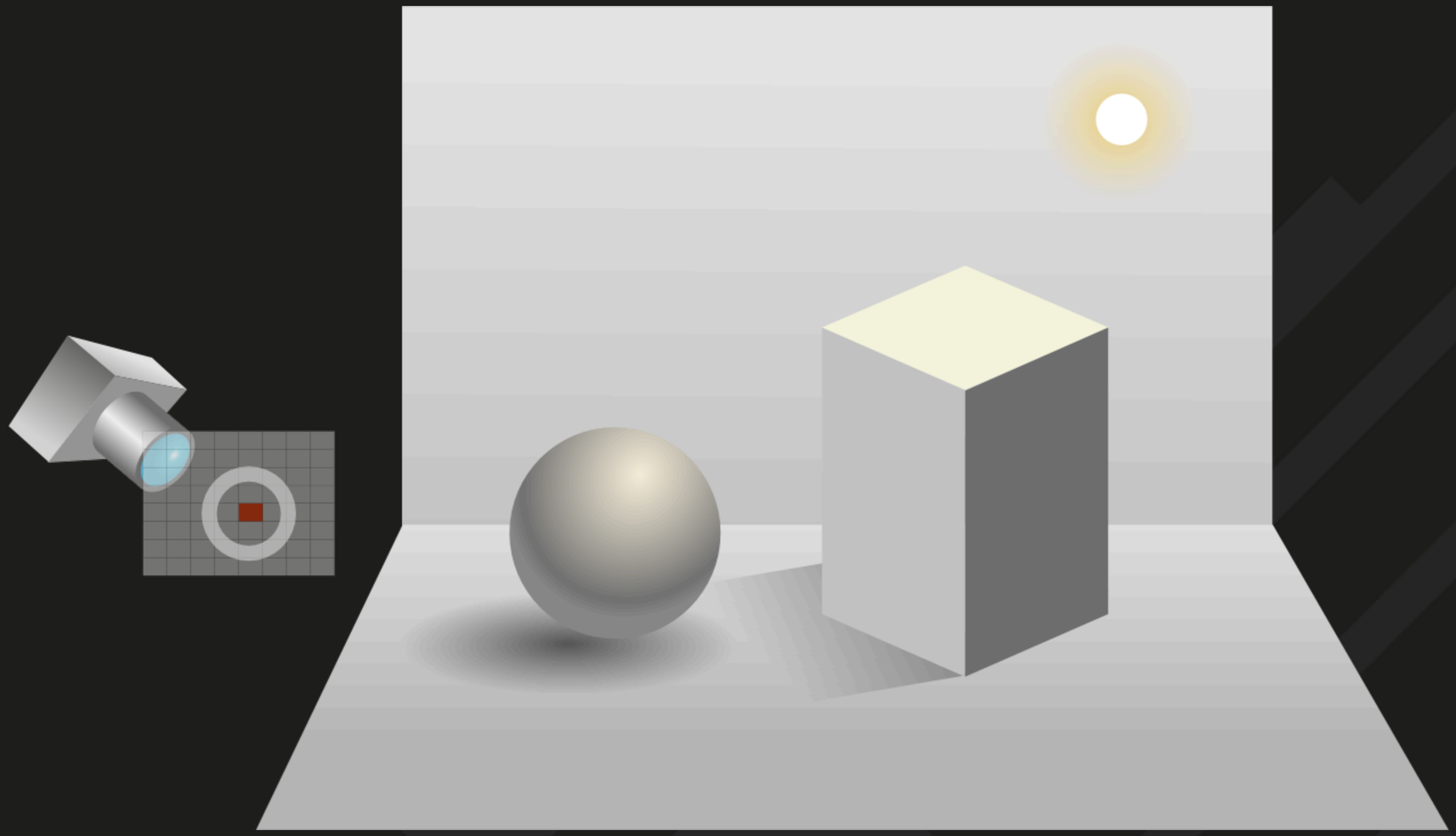
void intersection()

void closest_hit()

void any_hit()

void miss()

Dekko : Single Ray Programming Model



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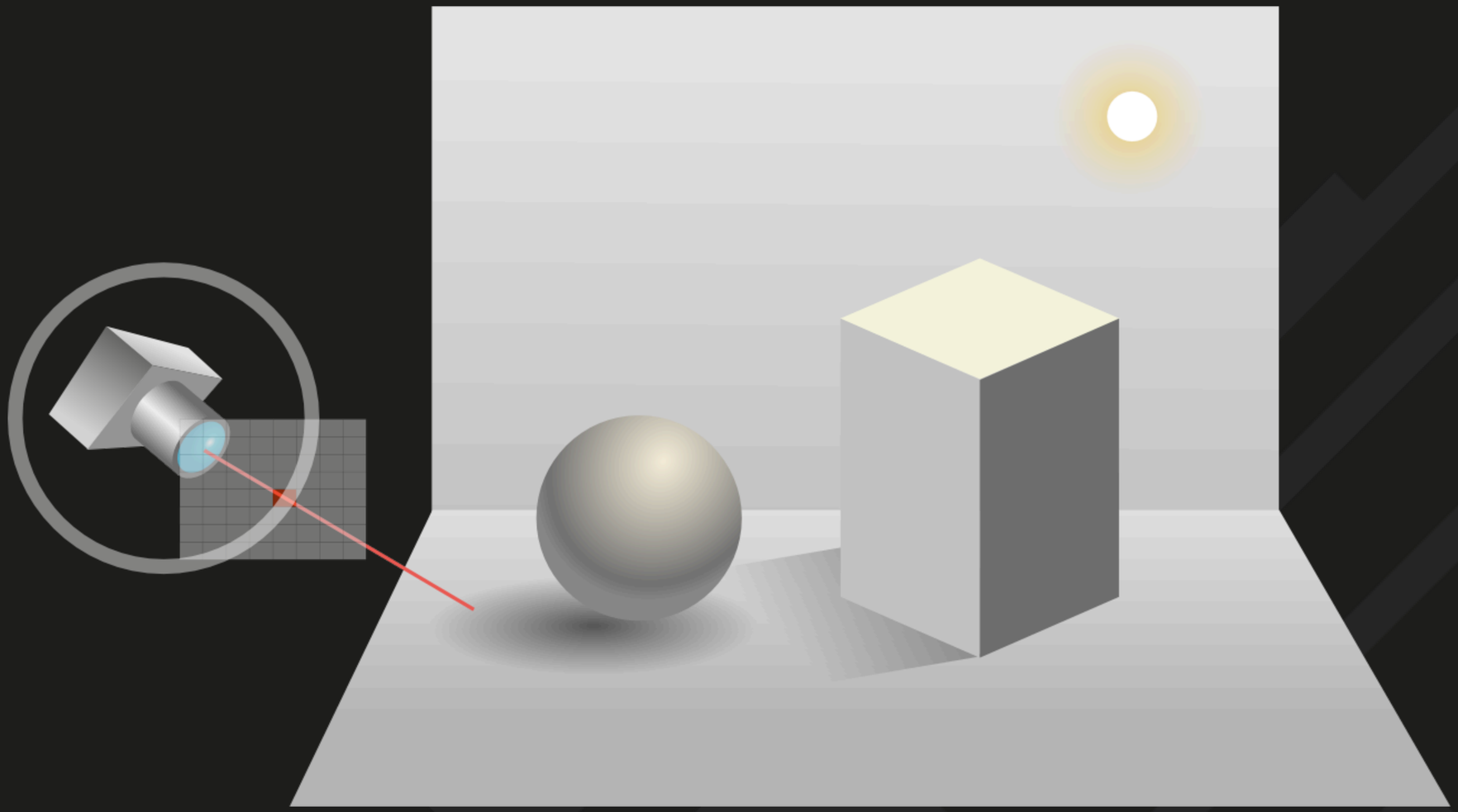
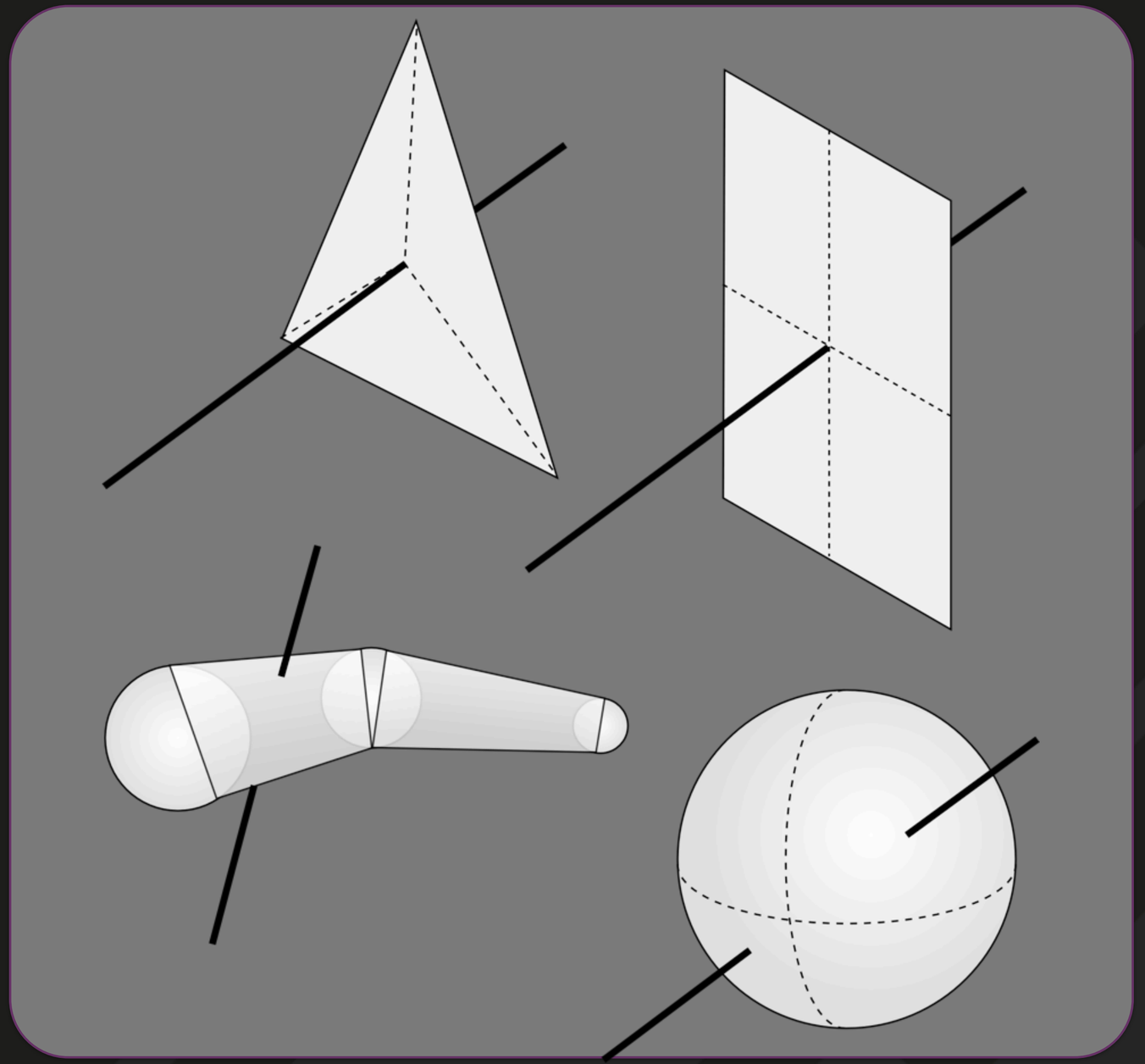
Send a ray from the camera

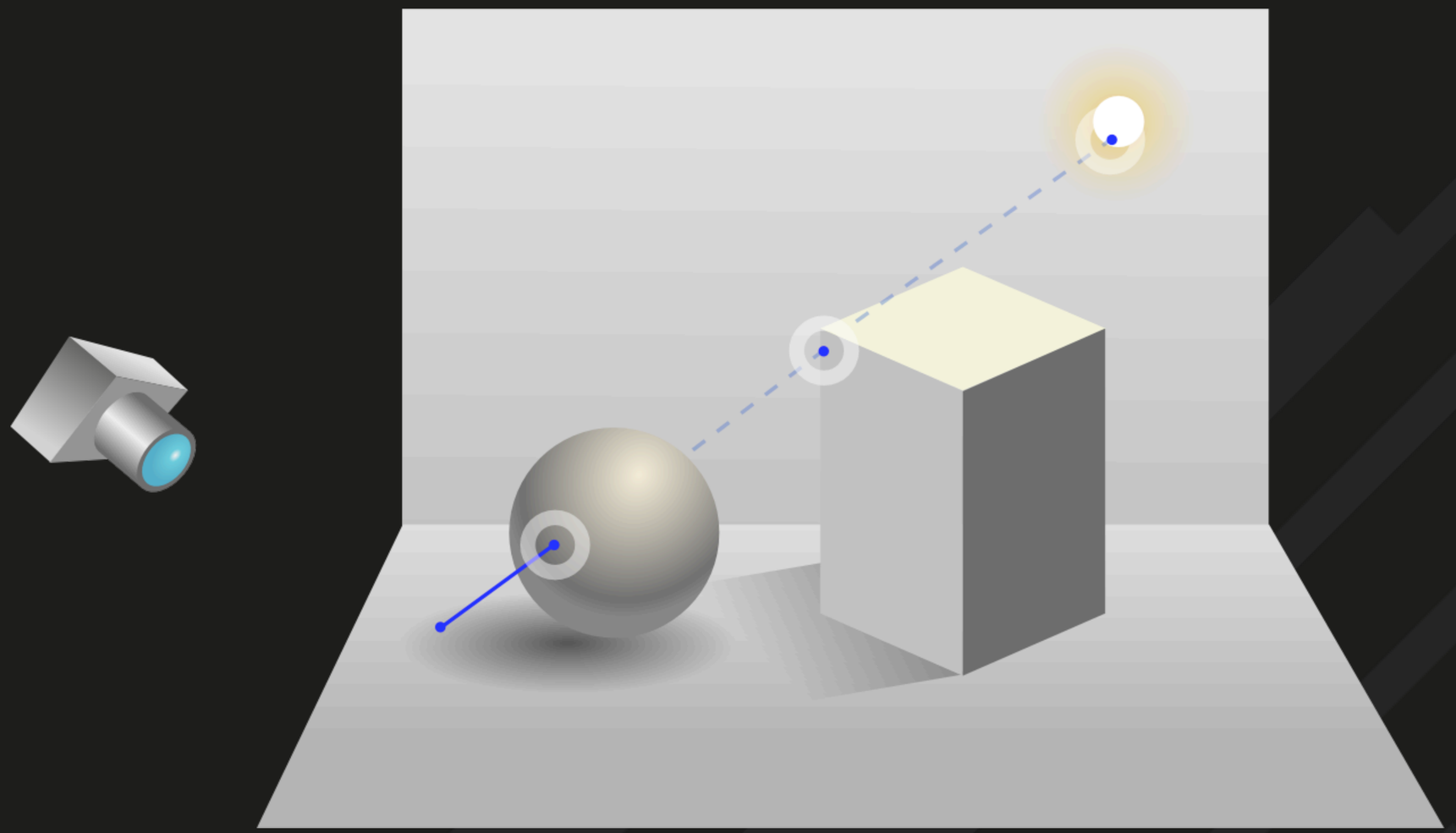


OptiX : Customisable Primitive



Any Hits

MPC



Closest Hit

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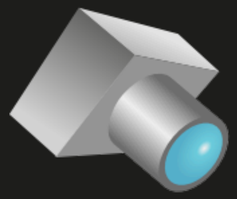
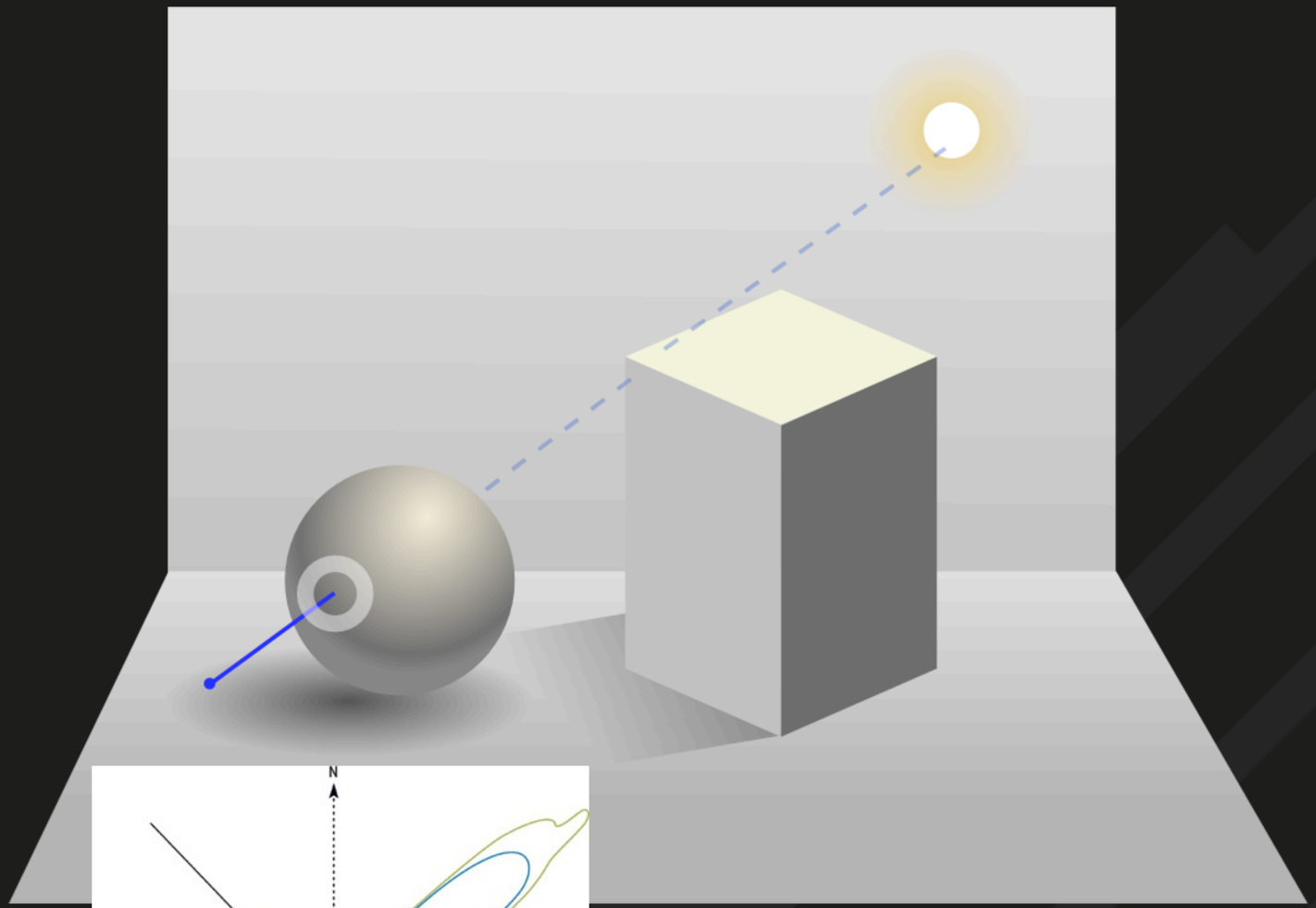
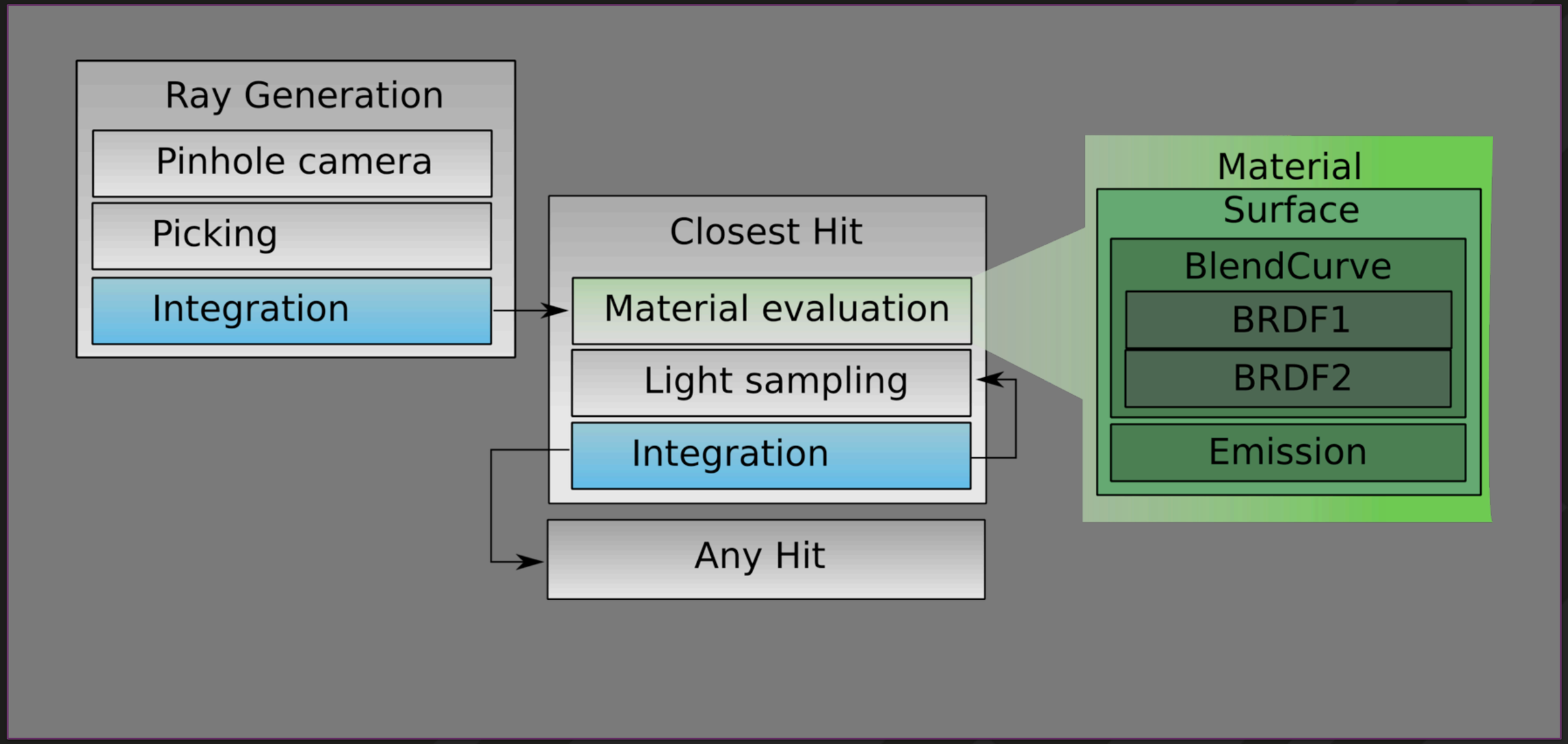
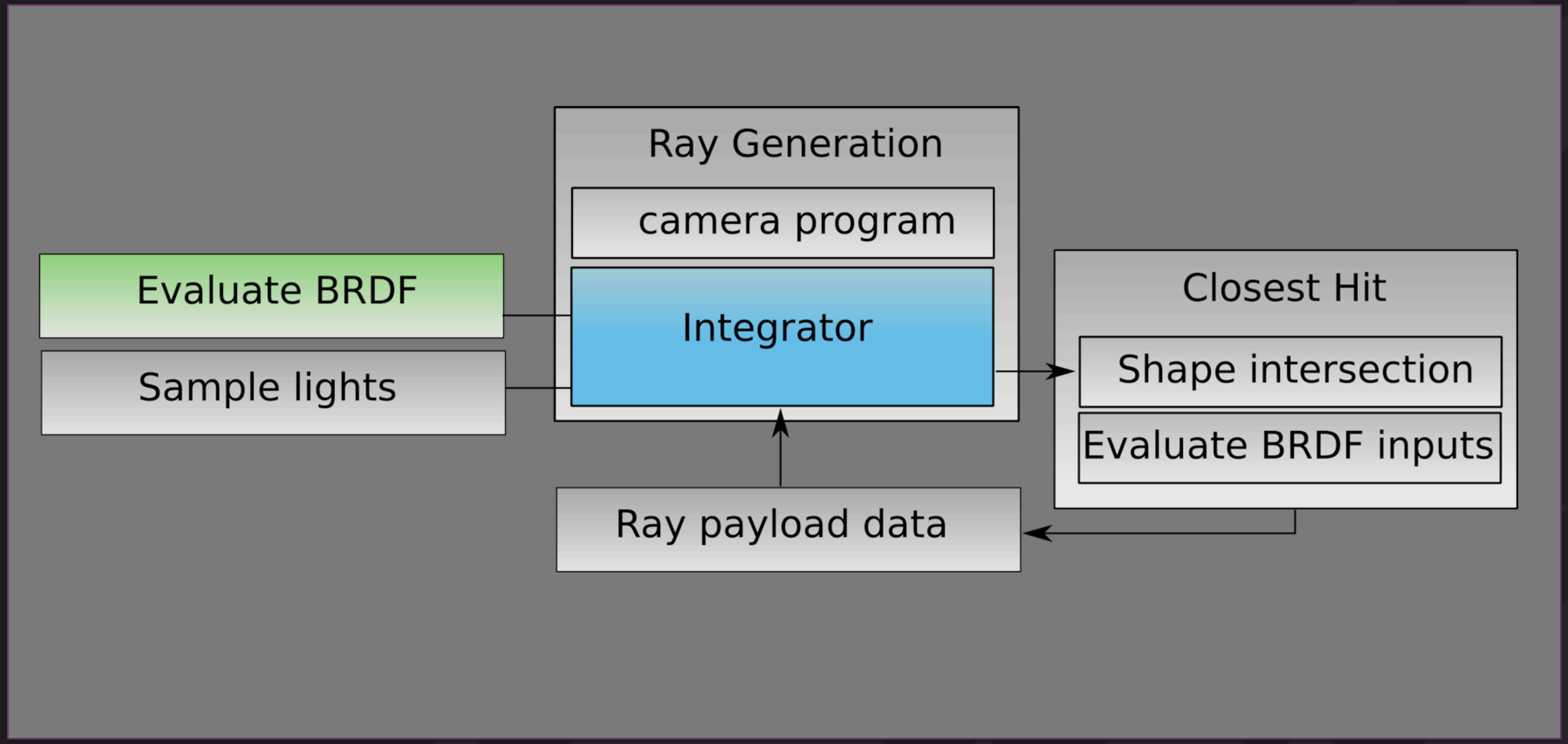




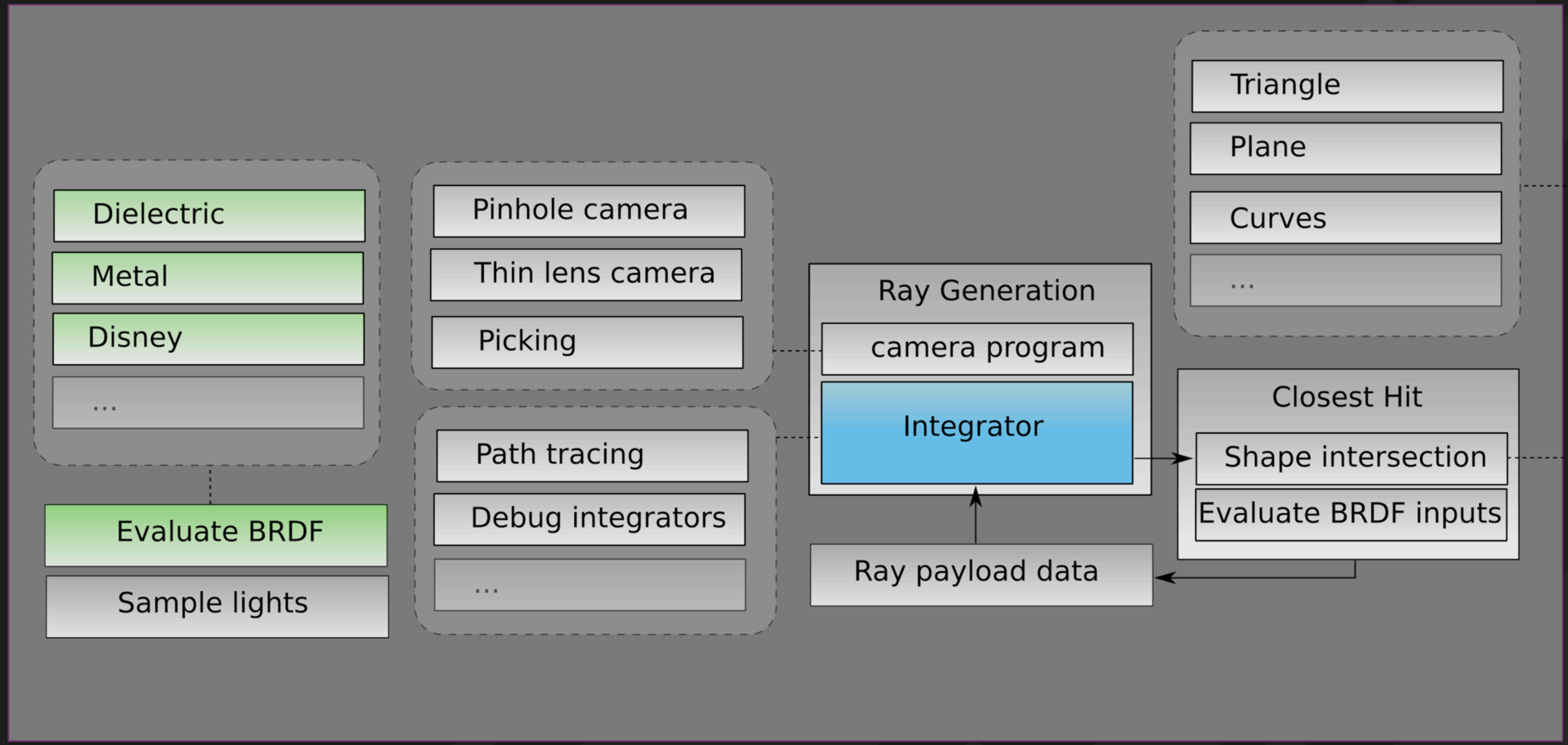
Preview Implementation (GTC 2014)



Dekko New Flexible Design



Dekko New Flexible Design



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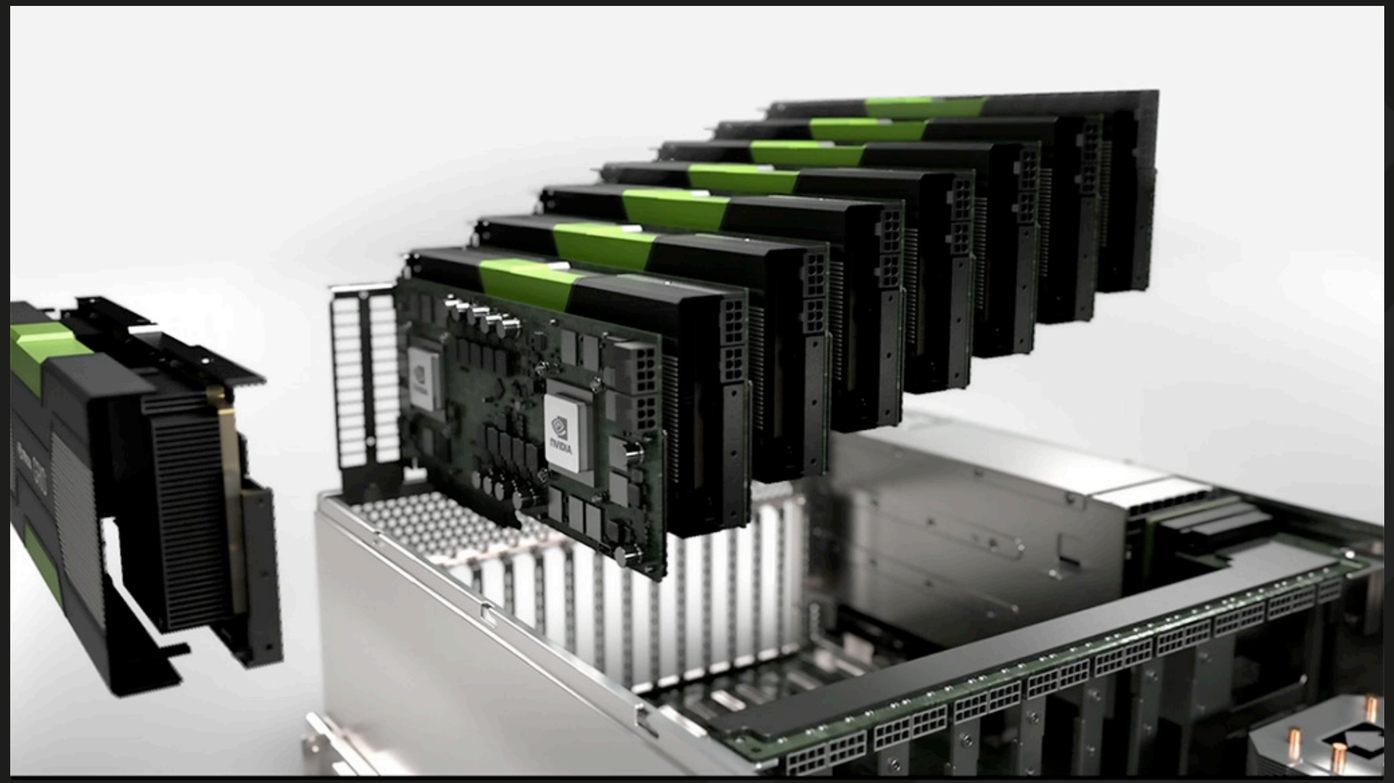
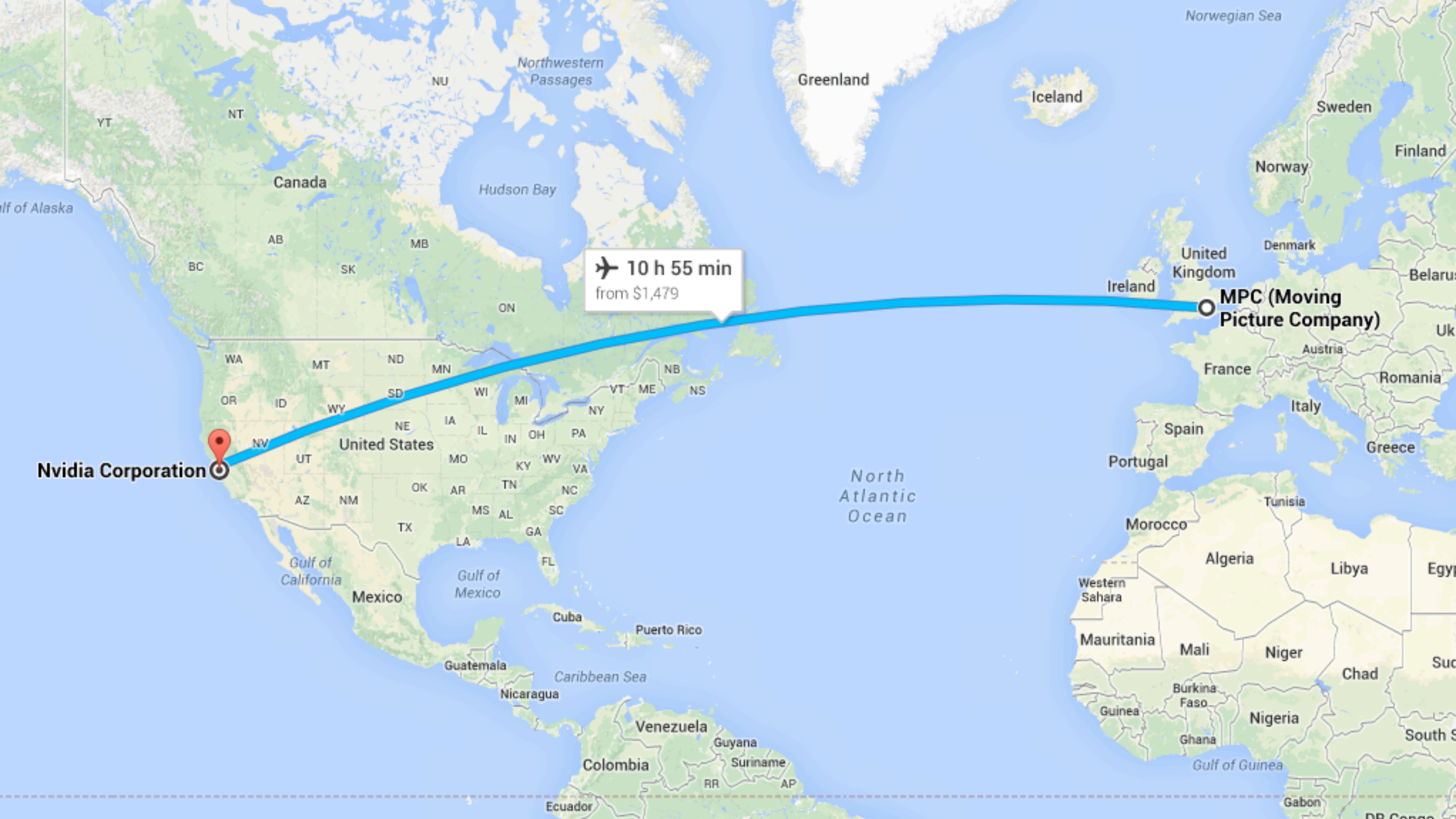
NVIDIA VCA Support

— Worked with NVIDIA to have Dekko running on NVIDIA VCA
— Current Build running with Optix 3.8
— Goal is to disconnect the compute from the artists
— Also enable better scaling for reviews




10 h 55 min
from $1,479
Nvidia Corporation
MPC (Moving Picture Company)
Norwegian Sea
Northwestern Passages
Greenland
Iceland
Sweden
Finland
Norway
Hudson Bay
Canada
Denmark
United Kingdom
Ireland
Belarus
Austria
France
Romania
Italy
Spain
Portugal
Greece
United States
North Atlantic Ocean
Tunisia
Morocco
Algeria
Libya
Western Sahara
Mauritania
Mali
Niger
Chad
Burkina Faso
Guinea
Nigeria
Ghana
Gulf of Guinea
Gulf of California
Mexico
Gulf of Mexico
Cuba
Puerto Rico
Guatemala
Caribbean Sea
Nicaragua
Venezuela
Guyana
Suriname
Colombia
Ecuador
Gabon
YT
NT
NU
AB
BC
SK
MB
ON
NB
NS
WA
MT
ND
MN
OR
ID
SD
WI
MI
VT
ME
NY
WY
NE
IA
IL
IN
OH
PA
NV
UT
MO
KY
WV
VA
AZ
NM
OK
AR
TN
NC
MS
AL
SC
TX
GA
LA
FL

Modern Scene Assembly

MPC

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KL is easy to learn: think Python

MPC

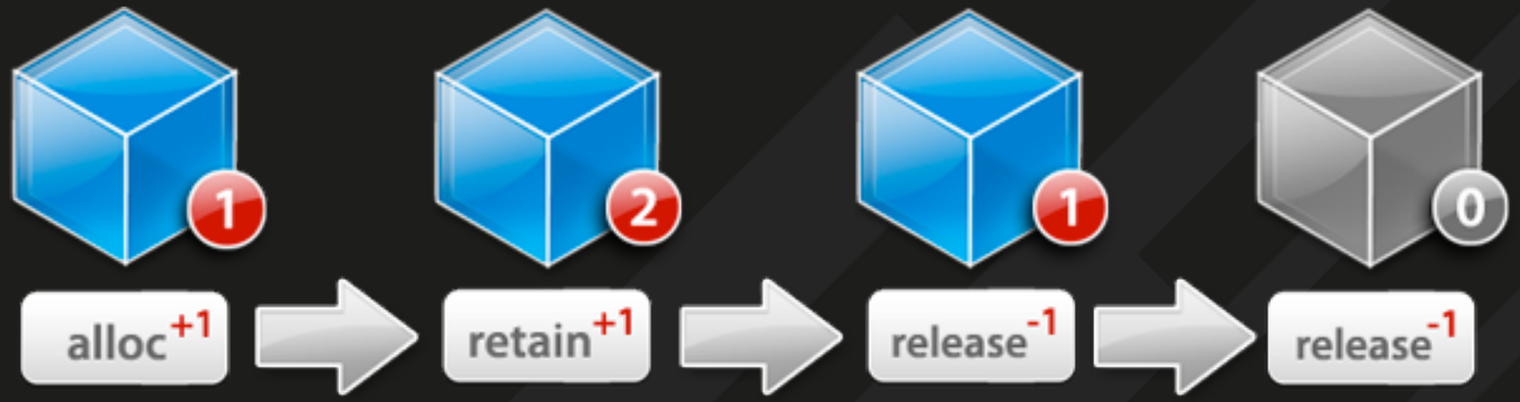
python

MPC

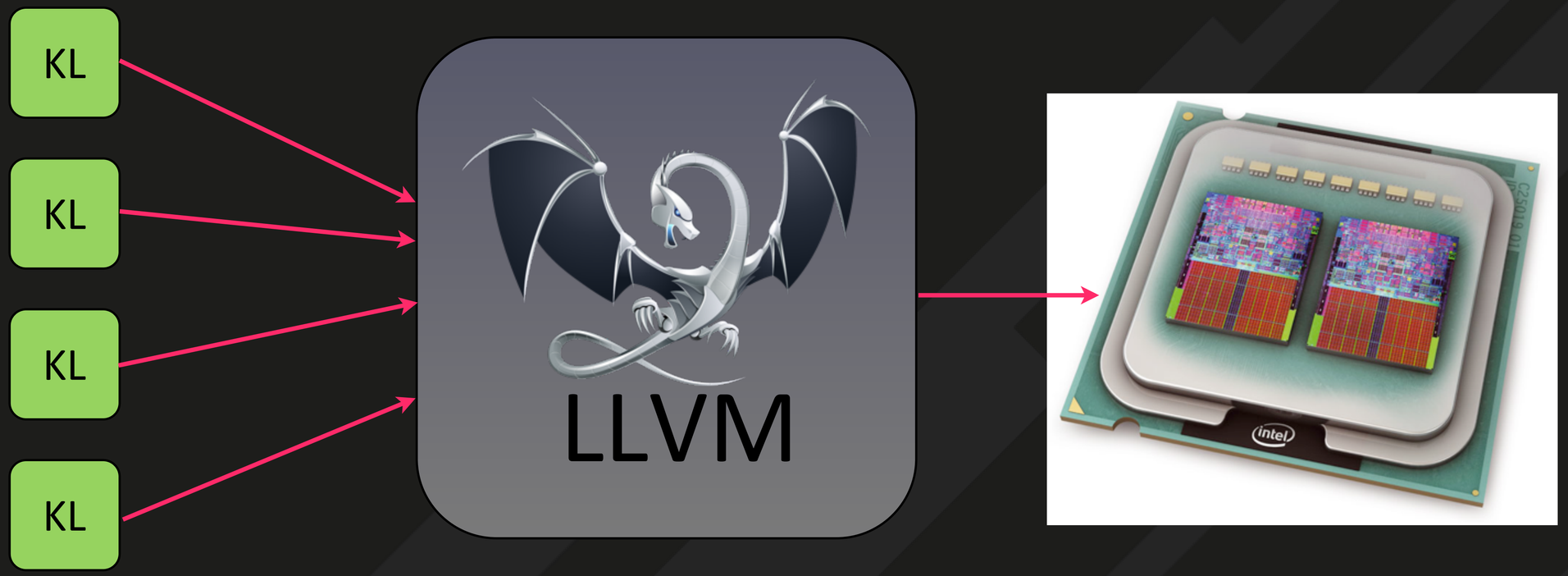
Designed for performance using LLVM compilation

LLVM

Automatic Memory Management



Compile at Runtime



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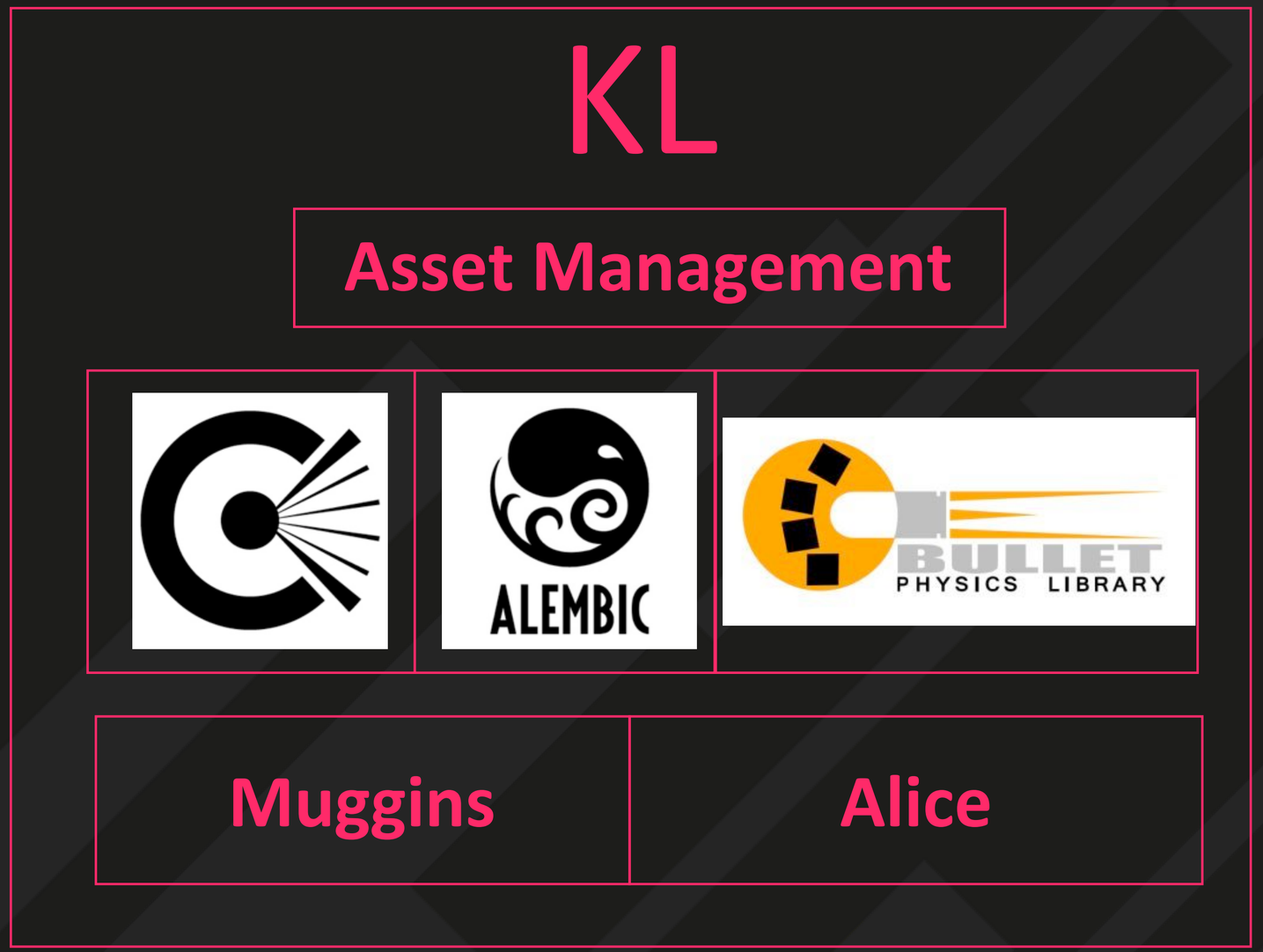
Extensible Runtime

— Built-in Extension

- Alembic
- Bullet
- OIIO

— EDK to Build your own

- Muggins
- Alice

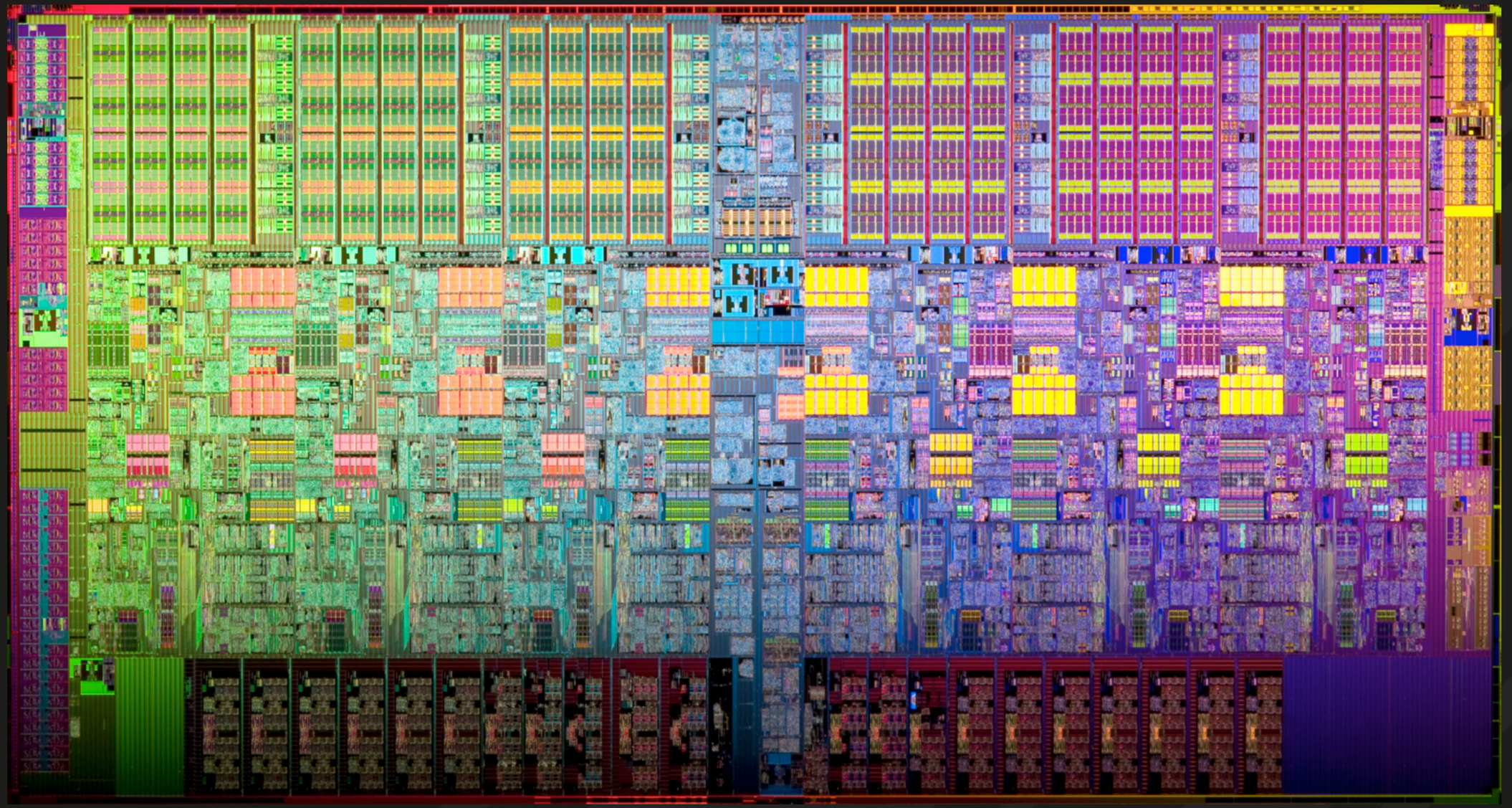


Modern Programming Language

MPC

```
752 function String RenderData.getPrimitiveName?( Size primIndex ) {
753     Size numLayer = this.primitives[primIndex].params.getNumLayers();
754     String desc;
755     if( primIndex == 0 )
756         desc = "(root/viewport)";
757     else if( this.primitives[primIndex].used == false )
758         desc = "(unused)";
759     else {
760         RenderParamKey nameKey = this.primitives[primIndex].params.getKey( "name" );
761         if( nameKey.isValid() )
762             this.primitives[primIndex].params.get(nameKey, desc, 0);
763         else if(numLayer)
764             desc = this.primitives[primIndex].params.layers[numLayer-1].layerRef[0].ownerName;
765         else
766             desc = "(undefined)";
767     }
768     return desc;
769 }
```

Multi-Threaded engine for the CPU



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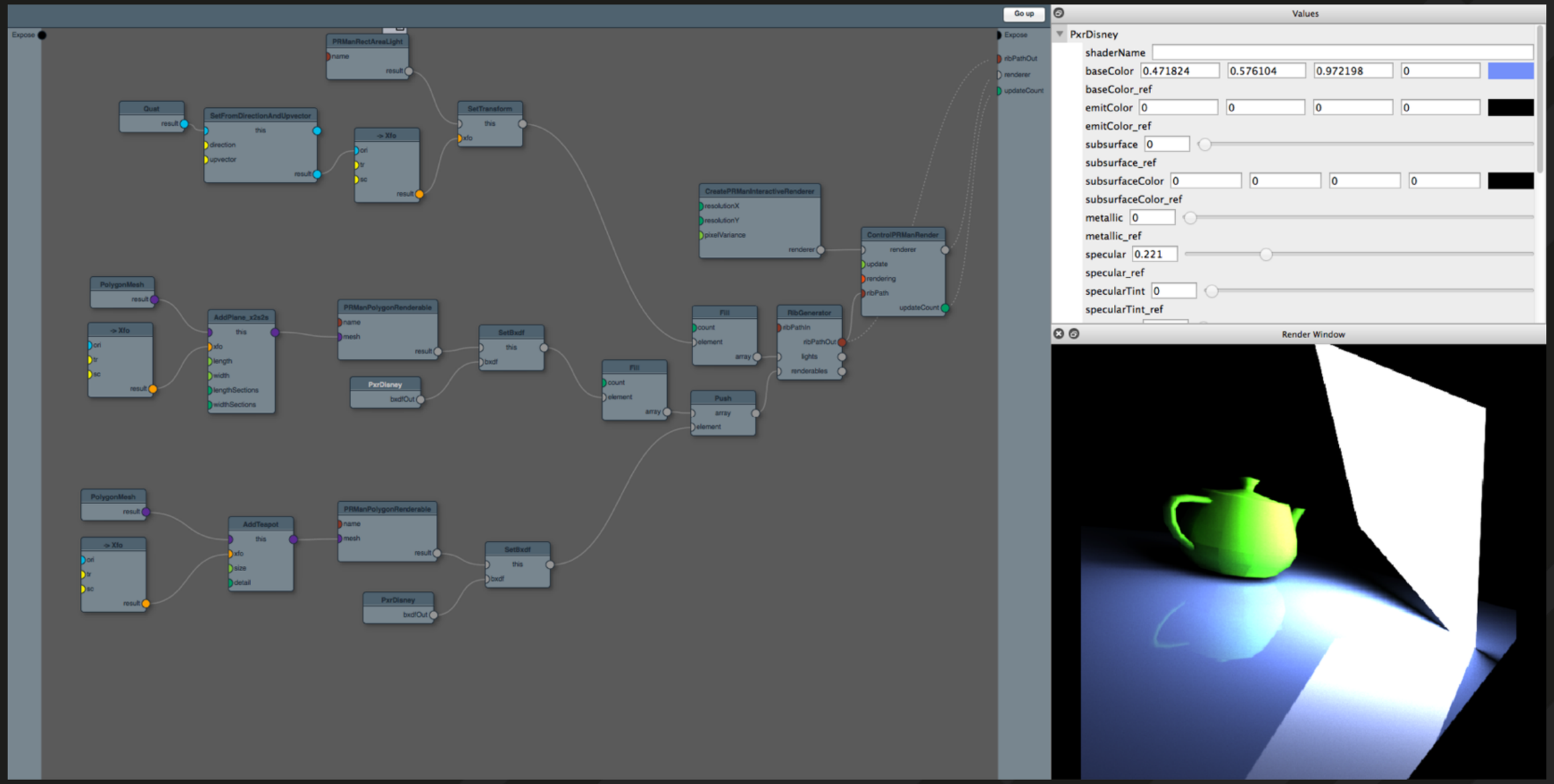
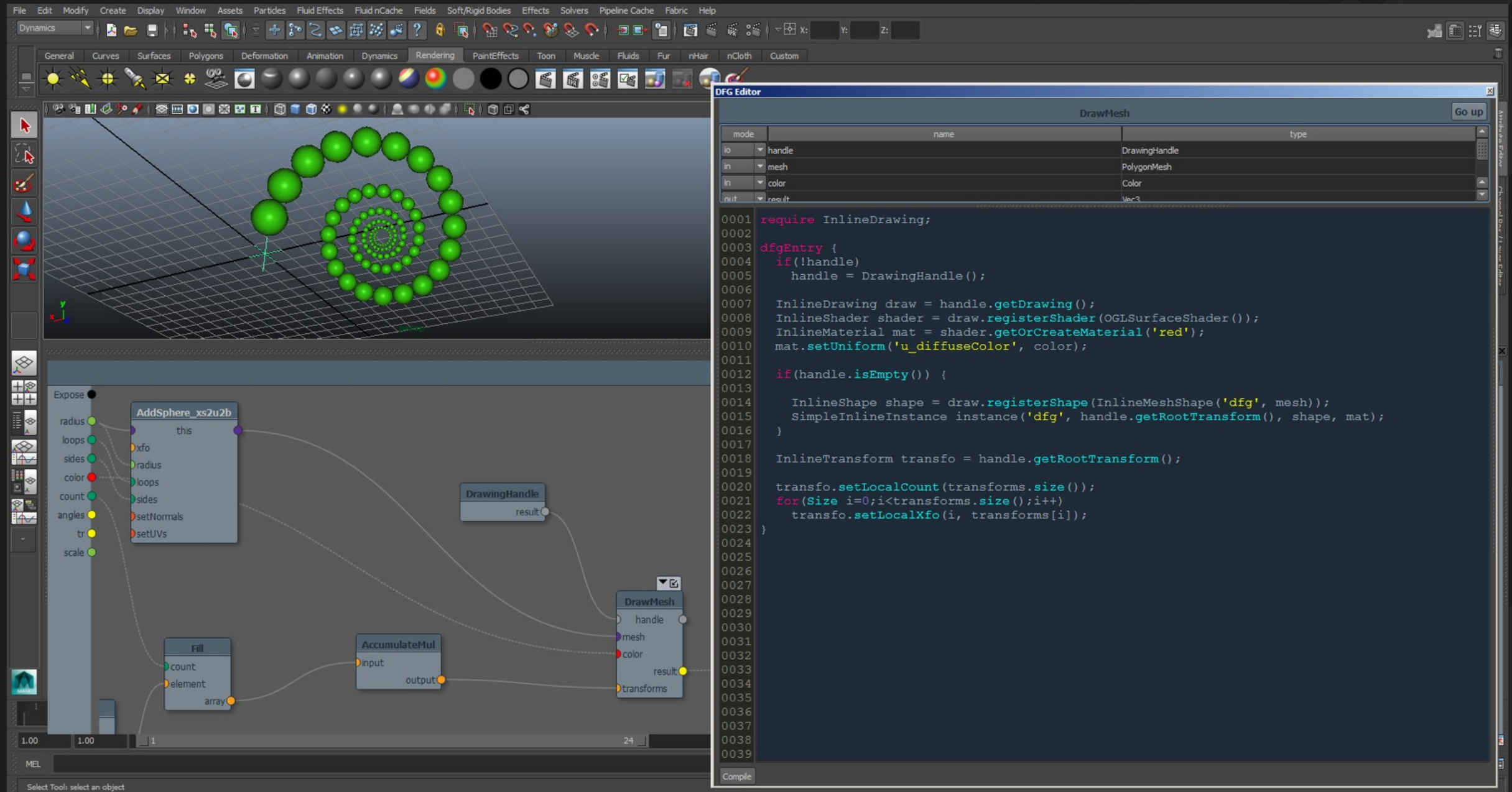
Multi-Threaded engine for the GPU

MPC

Visual Programing using Fabric Canvas and Data Flow Graph



Integrated into Maya like Splice



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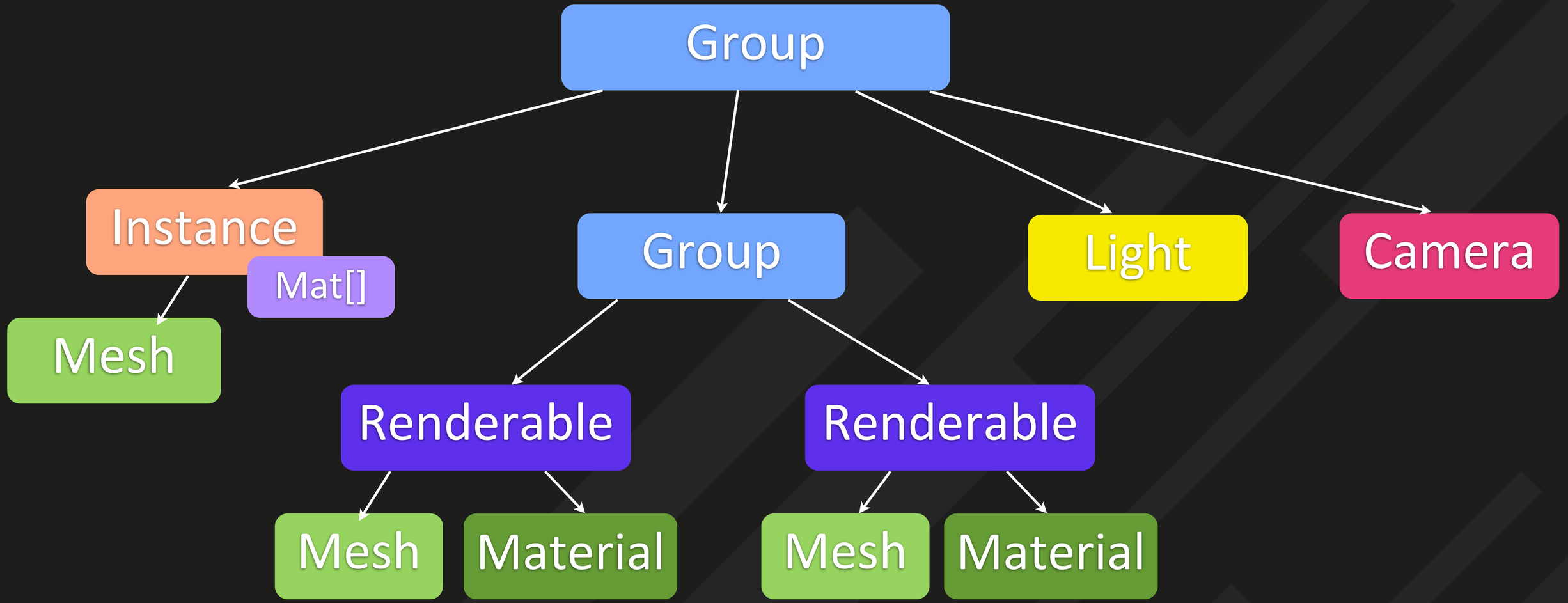
SceneLib



Shoto

File Display Window

Attribute Editor

SLItem params

Material: outerSphereMaterial

Basecolor

Subsurface Color

Metallic Coefficient: 0.000

Subsurface Coefficient: 0.800

Specular Coefficient: 0.200

Roughness Coefficient: 0.500

SpecularTint Coeffient: 0.000

Anisotropic Coefficient: 0.000

Sheen Coefficient: 0.000

SheenTint Coefficient: 0.000

Log

```
[FABRIC:MT:test/materialSC.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/camera_0' property: 'focalLength' value:'15'
[FABRIC:MT:test/materialSC.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/outerSphereMaterial' property: 'baseColor' value:'{  "r" : 0.5686274766921997,  "g" : 0.5686274766921997,  "b" : 0.5686274766921997,  "a" : 4.561787020763009e-41  }'
[FABRIC:MT:test/materialSC.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/outerSphereMaterial' property: 'baseColor' value:'{  "r" : 0.7450980544090271,  "g" : 0.7450980544090271,  "b" : 0.7450980544090271,  "a" : 0  }'
[FABRIC:MT:test/materialSC.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/outerSphereMaterial' property: 'baseColor' value:'{  "r" : 0.7607843279838562,  "g" : 0.7607843279838562,  "b" : 0.7607843279838562,  "a" : 4.561787020763009e-41  }'
[FABRIC:MT:test/materialSC.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/outerSphereMaterial' property: 'subsurfaceColor' value:'{  "r" : 0.615686297416687,  "g" : 0.615686297416687,  "b" : 0.615686297416687,  "a" : 4.561927150609442e-41  }'
[FABRIC:MT:test/materialSC.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/outerSphereMaterial' property: 'subsurfaceColor' value:'{  "r" : 0.7450980544090271,  "g" : 0.7450980544090271,  "b" : 0.7450980544090271,  "a" : 0  }'
[FABRIC:MT:test/materialSC.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/outerSphereMaterial' property: 'subsurfaceColor' value:'{  "r" : 0.7803921699523926,  "g" : 0.7803921699523926,  "b" : 0.7803921699523926,  "a" : 0  }'
[FABRIC:MT:test/materialSC.kl_KLCode:commandsHistory] =[load history end]=====================
[FABRIC:MT] CppNotificationObserver.set: registerObserver 756434304
```

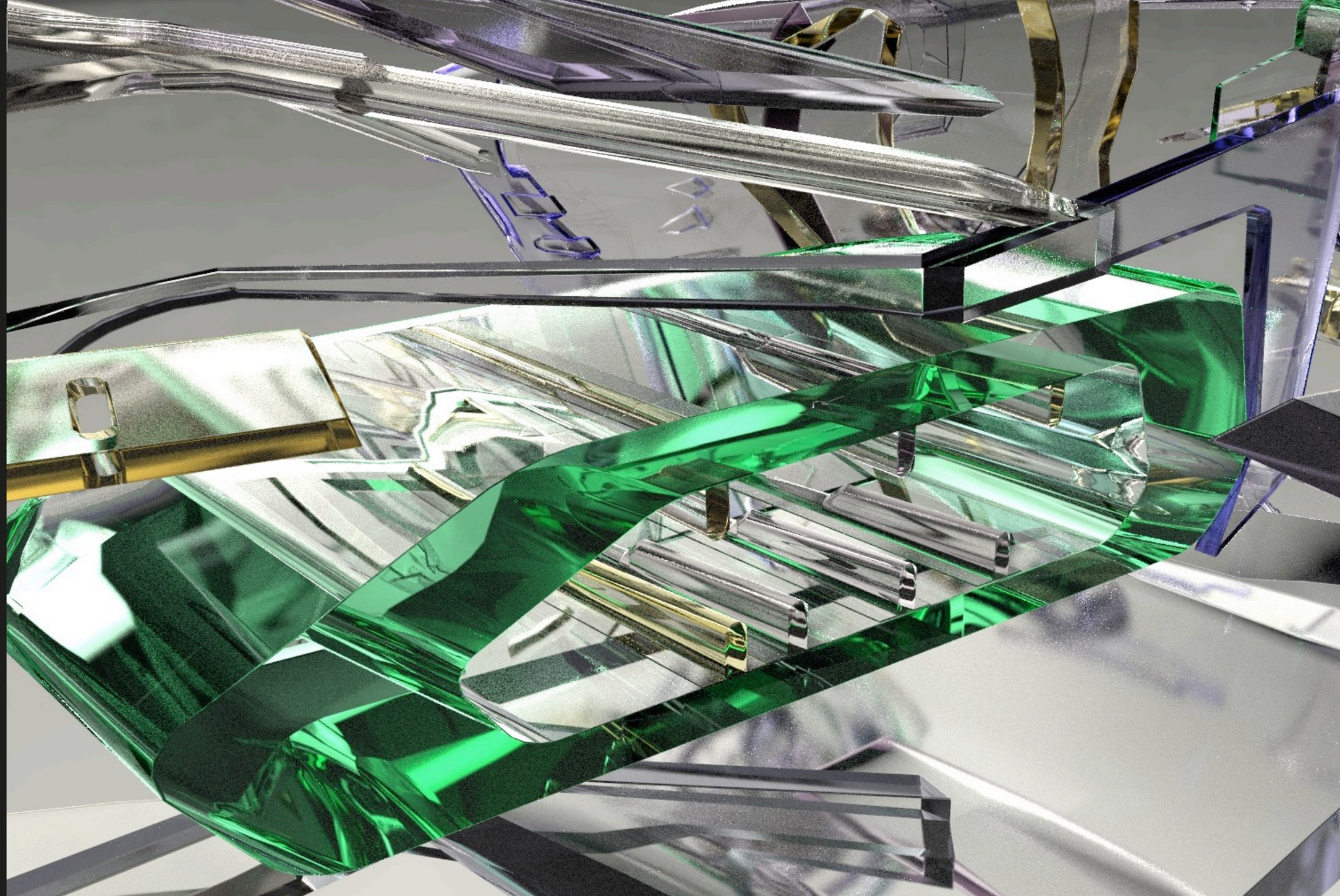
SceneLib Tree

- root
  - baseMaterial
  - innerSphereMaterial
  - outerSphereMaterial
  - glass
  - base
  - innerSphere
  - outerSphere
  - LG
  - freeCamera
  - camera_0

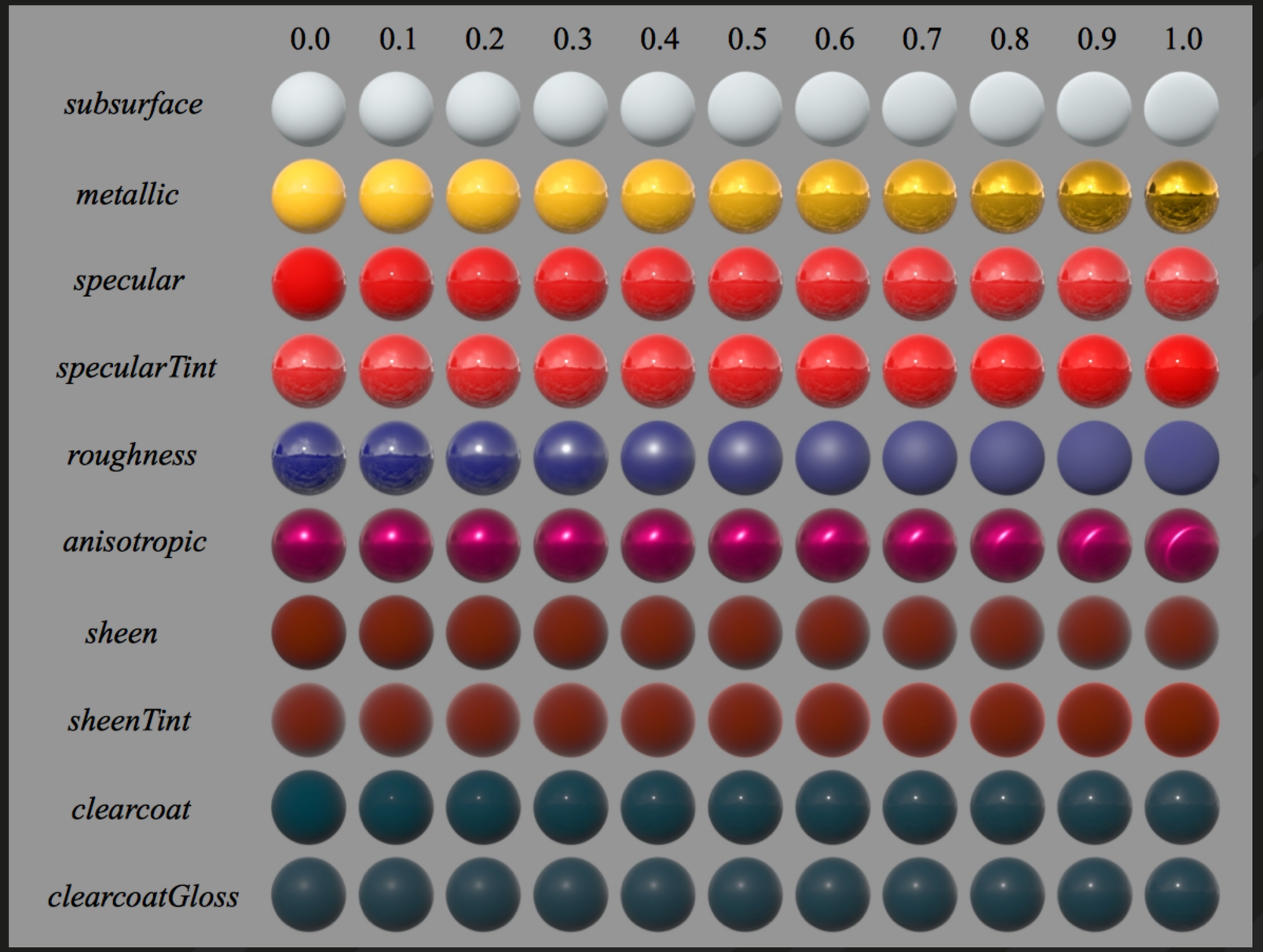
0 1000 1000 |<< |< > >| >>| max fps Loop Once

937.50 FPS

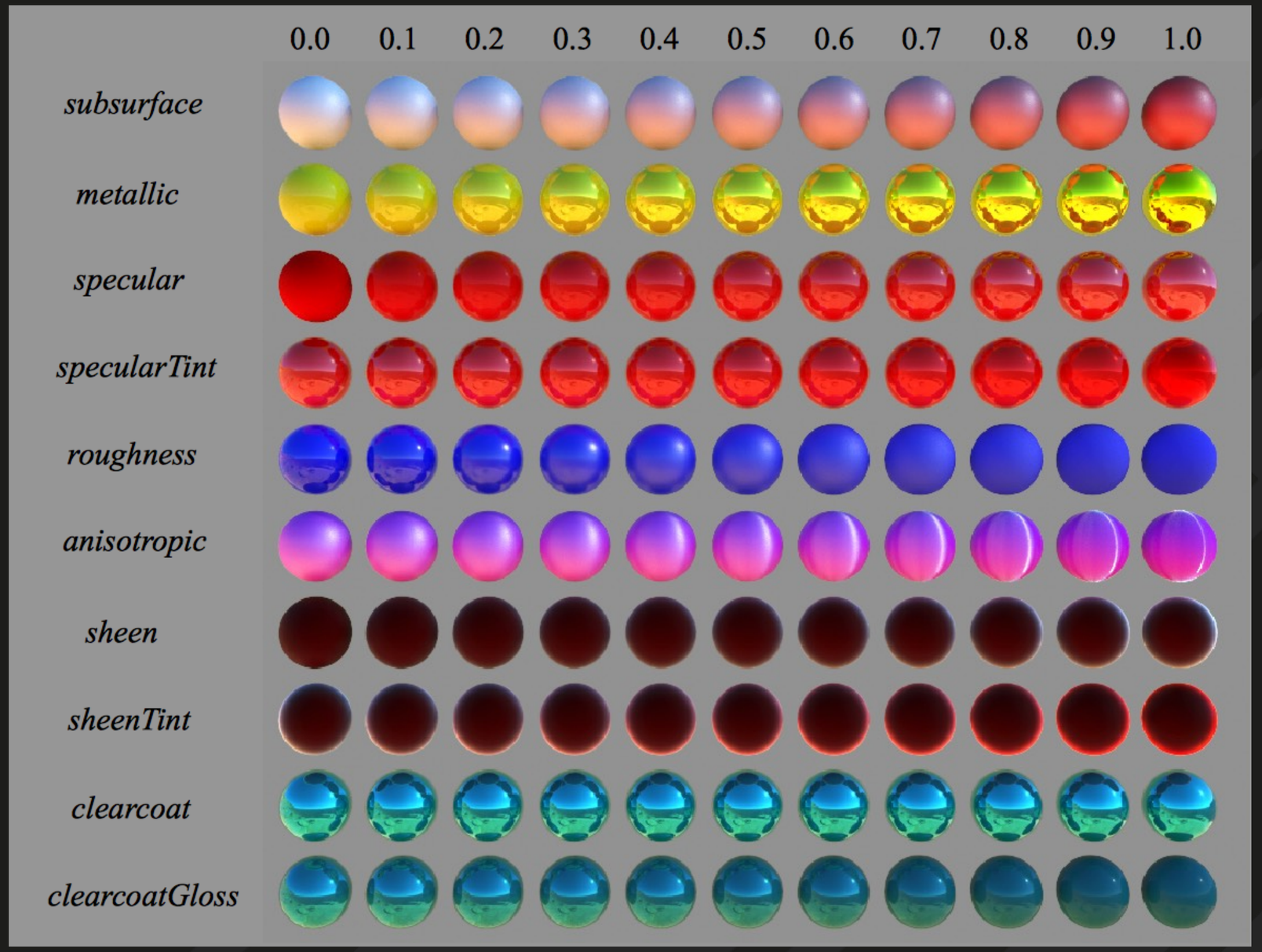
Demos



Disney Shader



Disney Shader Written in Cuda



Attribute Editor

SLItem params

Camera: camera_3

DOF: ☑

Focal Length (mm): 29

f-Stop: 5.0

Auto-Focus: ☑

Focal Distance (m): 0.4

Transform params

Translation

Translation X: 0.521

Translation Y: 1.526

Translation Z: 4.015

Rotation

Euler X: 0.000

Euler Y: 0.098

Euler Z: 0.000

Scale

Scale X: 1.000

Scale Y: 1.000

Scale Z: 1.000

Log

```
"g" : 0.329412,  "b" : 0.329412,  "a" : 0}' multiplier:'48.925'
[FABRIC:MT:test/lightingRig_gtcDemo.kl_KLCode:commandsHistory] [Applying
Command History] Setting Radiance: '/LightRig/RimGroup/Rim' radiance: '{  "r" : 1,
"g" : 0.329412,  "b" : 0.329412,  "a" : 0}' multiplier:'48.925'
[FABRIC:MT:test/lightingRig_gtcDemo.kl_KLCode:commandsHistory] [Applying
Command History] Setting Radiance: '/LightRig/RimGroup/Rim' radiance: '{  "r" : 1,
"g" : 0.329412,  "b" : 0.329412,  "a" : 0}' multiplier:'49.462'
[FABRIC:MT:test/lightingRig_gtcDemo.kl_KLCode:commandsHistory] [Applying
Command History] Setting Radiance: '/LightRig/RimGroup/Rim' radiance: '{  "r" : 1,
```

SceneLib Tree

- root
  - BaseMaterial
  - InnerMaterial
  - OuterMaterial
  - + sphere
  - – LightRig
    - environmentLight
    - – KeyGroup
      - Key
    - – FillGroup
      - Fill
    - – RimGroup
      - Rim
  - + materials
  - Ground
  - camera_1
  - camera_2
  - freeCamera
  - camera_3

Attribute Editor

SLItem params

Shape Name	giggleModel_InnerSphere_v6.geo
Material	InnerMaterial
Basecolor	
Subsurface Color	
Metallic Coefficient	0.935
Subsurface Coefficient	0.000
Specular Coefficient	1.000
Roughness Coefficient	0.124
SpecularTint Coeffient	0.000
Anisotropic Coefficient	0.000
Sheen Coefficient	0.000
SheenTint Coefficient	0.000

Transform params

Translation

Translation X	0.000
Translation Y	0.000
Translation Z	0.000

Rotation

Euler X	0.000
Euler Y	0.000
Euler Z	0.000

Scale

Scale X	1.000
Scale Y	1.000
Scale Z	1.000

Log

```
SLGroupGenerator.kl:221
[FABRIC:MT:test/lightingRig_gtcDemo.kl_KLCode:commandsHistory]  4
method.getChild.io_AS0.UO_SLGroup.in_AS0.OO_SLContext.in_AS0.ST()
SLGroup.kl:129
[FABRIC:MT:test/lightingRig_gtcDemo.kl_KLCode:commandsHistory]  5
method._findChild.io_AS0.UO_SLScene.in_AS0.OO_SLContext.in_AS0.OO_SLItem.in_
AS0.ST() SLScene.kl:447
[FABRIC:MT:test/lightingRig_gtcDemo.kl_KLCode:commandsHistory]  6
method._findChild.io_AS0.UO_SLScene.in_AS0.OO_SLContext.in_AS0.OO_SLItem.in_
AS0.ST() SLScene.kl:441
[FABRIC:MT:test/lightingRig_gtcDemo.kl_KLCode:commandsHistory]  7
method.findChild.io_AS0.UO_SLScene.in_AS0.OO_SLContext.in_AS0.ST()
SLScene.kl:467
[FABRIC:MT:test/lightingRig_gtcDemo.kl_KLCode:commandsHistory]  8
```

SceneLib Tree

- root
  - BaseMaterial
  - InnerMaterial
  - OuterMaterial
  - \+ sphere
  - \+ LightRig
  - \+ materials
  - Ground
  - camera_1
  - camera_2
  - camera_3
  - freeCamera

File Display Window

Attribute Editor

SLItem params

Material	glass
Bump Strength	0.001
Basecolor	
Subsurface Color	
Metallic Coefficient	0.000
Subsurface Coefficient	0.000
Specular Coefficient	0.900
Roughness Coefficient	0.145
SpecularTint Coeffient	0.000
Anisotropic Coefficient	0.000
Sheen Coefficient	0.000
SheenTint Coefficient	0.000

Log

```
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command History] Setting Radiance: '/LightRig/FillGroup/Fill' radiance: '{ "r" : 0, "g" : 1, "b" : 0, "a" : 0}' multiplier:'10'
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command History] Setting Radiance: '/LightRig/FillGroup/Fill' radiance: '{ "r" : 0, "g" : 1, "b" : 0, "a" : 0}' multiplier:'10'
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command History] Setting Radiance: '/LightRig/RimGroup/Rim' radiance: '{ "r" : 0, "g" : 0, "b" : 1, "a" : 0}' multiplier:'10'
```

SceneLib Tree

- root
  - materials
    - wagon
      - metal
      - wood
      - leather
      - paper
      - string
      - rope
      - cotton
      - glass
    - materials
      - ground
  - wagon
    - metalRenderable
    - woodRenderable
    - leatherRenderable
    - paperRenderable
    - stringRenderable
    - ropeRenderable
    - cottonRenderable
    - glassRenderable
  - groundRenderable
  - LightRig
    - environmentLight
    - KeyGroup
      - Key
    - FillGroup
      - Fill
    - RimGroup
      - Rim
  - freeCamera
  - camera_0
  - camera_1
  - camera_2
  - camera_3
  - camera_4
  - camera_5
  - camera_6
  - backDOF

File Display Window

Attribute Editor

SLItem params

Material	cotton
Bump Strength	0.001
Basecolor	
Subsurface Color	
Metallic Coefficient	0.000
Subsurface Coefficient	0.000
Specular Coefficient	0.600
Roughness Coefficient	1.000
SpecularTint Coeffient	0.000
Anisotropic Coefficient	0.000
Sheen Coefficient	0.000
SheenTint Coefficient	0.000

SceneLib Tree

- root
  - materials
    - wagon
      - metal
      - wood
      - leather
      - paper
      - string
      - rope
      - cotton
      - glass
    - materials
      - ground
  - wagon
    - metalRenderable
    - woodRenderable
    - leatherRenderable
    - paperRenderable
    - stringRenderable
    - ropeRenderable
    - cottonRenderable
    - glassRenderable
  - groundRenderable
  - LightRig
    - environmentLight
    - KeyGroup
      - Key
    - FillGroup
      - Fill
    - RimGroup
      - Rim
  - freeCamera
  - camera_0
  - camera_1
  - camera_2
  - camera_3
  - camera_4
  - camera_5
  - camera_6
  - backDOF
  - frontDOF

Log

```
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command History] Setting Radiance: '/LightRig/FillGroup/Fill' radiance: '{ "r" : 0, "g" : 1, "b" : 0, "a" : 0}' multiplier:'10'
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command History] Setting Radiance: '/LightRig/FillGroup/Fill' radiance: '{ "r" : 0, "g" : 1, "b" : 0, "a" : 0}' multiplier:'10'
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command History] Setting Radiance: '/LightRig/RimGroup/Rim' radiance: '{ "r" : 0, "g" : 0, "b" : 1, "a" : 0}' multiplier:'10'
```

File Display Window

Attribute Editor

SLItem params

Camera: back_againDOF

DOF: ✓

Focal Length (mm): 29

f-Stop: 1.0

Auto-Focus: ✓

Focal Distance (m): 6.9

Transform params

Translation

Translation X: -35.704

Translation Y: 25.722

Translation Z: -66.602

Rotation

Euler X: -2.879

Euler Y: -0.588

Euler Z: -2.994

Scale

Scale X: 1.000

Scale Y: 1.000

Scale Z: 1.000

Log

```
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command History] Setting Radiance: '/LightRig/FillGroup/Fill' radiance: '{ "r" : 0, "g" : 1, "b" : 0, "a" : 0}' multiplier:'10'
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command History] Setting Radiance: '/LightRig/FillGroup/Fill' radiance: '{ "r" : 0, "g" : 1, "b" : 0, "a" : 0}' multiplier:'10'
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command History] Setting Radiance: '/LightRig/RimGroup/Rim' radiance: '{ "r" : 0, "g" : 0, "b" : 1, "a" : 0}' multiplier:'10'
```

SceneLib Tree

- root
  - materials
    - wagon
      - metal
      - wood
      - leather
      - paper
      - string
      - rope
      - cotton
      - glass
    - materials
      - ground
  - wagon
    - metalRenderable
    - woodRenderable
    - leatherRenderable
    - paperRenderable
    - stringRenderable
    - ropeRenderable
    - cottonRenderable
    - glassRenderable
  - groundRenderable
  - LightRig
    - environmentLight
    - KeyGroup
      - Key
    - FillGroup
      - Fill
    - RimGroup
      - Rim
  - freeCamera
  - camera_0
  - camera_1
  - camera_2
  - camera_3
  - camera_4
  - camera_5
  - camera_6
  - backDOF
  - frontDOF
  - back_againDOF

File Display Window

Attribute Editor

SLItem params

Env. light color

Env. light multiplier 1.000

Transform params

Translation

Translation X 0.000

Translation Y 0.000

Translation Z 0.000

Rotation

Euler X 0.000

Euler Y 1.380

Euler Z 0.000

Scale

Scale X 1.000

Scale Y 1.000

Scale Z 1.000

Log

"b" : 1, "a" : 0}' multiplier:'2.5'
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command History] Creating Camera: back_againDOF
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/back_againDOF' property: 'dofOn' value:'true'
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/back_againDOF' property: 'fStop' value:'1'
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/back_againDOF' property: 'fStop' value:'1'
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/materials/wagon/wood' property: 'bumpMapMultiplier' value:'0.004999999888241291'
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/materials/wagon/wood' property: 'bumpMapMultiplier' value:'0.009999999776482582'
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command History] Setting Radiance: '/LightRig/environmentLight' radiance: '{ "r" : 1, "g" : 1, "b" : 1, "a" : 0}' multiplier:'1'
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command History] Setting Radiance: '/LightRig/environmentLight' radiance: '{ "r" : 1, "g" : 1, "b" : 1, "a" : 0}' multiplier:'2'
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command History] Setting Radiance: '/LightRig/environmentLight' radiance: '{ "r" : 1, "g" : 1, "b" : 1, "a" : 0}' multiplier:'2.5'
[FABRIC:MT:test/GTC/wagon.kl_KLCode:commandsHistory] [Applying Command

SceneLib Tree

- root
  - materials
    - wagon
      - metal
      - wood
      - leather
      - paper
      - string
      - rope
      - cotton
      - glass
    - materials
  - wagon
  - groundRenderable
  - LightRig
    - environmentLight
    - KeyGroup
      - Key
    - FillGroup
      - Fill
    - RimGroup
      - Rim
  - freeCamera
  - camera_0
  - camera_1
  - camera_2
  - camera_3
  - camera_4
  - camera_5
  - camera_6
  - backDOF
  - frontDOF
  - back_againDOF

Attribute Editor

SLItem params

Camera: freeCamera

DOF: ☑

Focal Length (mm): 29

f-Stop: 2.0

Auto-Focus: ☑

Focal Distance (m): 8.2

Transform params

Translation

Translation X: -51.213

Translation Y: 11.277

Translation Z: 43.462

Rotation

Euler X: 0.017

Euler Y: -0.798

Euler Z: 0.012

Scale

Scale X: 1.000

Scale Y: 1.000

Scale Z: 1.000

Log

```
method.findChild.io_AS0.UO_SLScene.in_AS0.OO_SLContext.in_AS0.ST()
SLScene.kl:467
[FABRIC:MT]  13
method.getItemGivenPath.io_AS0.UO_SLScene.in_AS0.OO_SLContext.in_AS0.ST()
SLScene.kl:473
[FABRIC:MT]  14
__callMethodWithWithArgs__getItemGivenPath__RT_OO_SLItem__OO_SLContext__ST
()
__callMethodWithWithArgs__getItemGivenPath__RT_OO_SLItem__OO_SLContext__ST.
kl:2
```

SceneLib Tree

- root
  - + materials
  - + wagon
  - groundRenderable
  - – LightRig
    - environmentLight
    - – KeyGroup
      - Key
    - – FillGroup
      - Fill
    - – RimGroup
      - Rim
  - freeCamera
  - camera_0
  - camera_1
  - camera_2
  - camera_3
  - camera_4
  - camera_5
  - camera_6
  - backDOF
  - frontDOF
  - back_againDOF
  - pumpkinCam
  - generalCam
  - wheelCam
  - interiorCam

File Display Window

Attribute Editor

SLItem params

Camera: portrait

DOF: ✓

Focal Length (mm): 29

f-Stop: 1.0

Auto-Focus: ✓

Focal Distance (m): 3.7

Transform params

Translation

Translation X: 25.288

Translation Y: 49.215

Translation Z: 23.099

Rotation

Euler X: 0.397

Euler Y: 0.817

Euler Z: -0.297

Scale

Scale X: 1.000

Scale Y: 1.000

Scale Z: 1.000

Log

```
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory]  10
operator.commandsHistory.io_AS0.OO_SLScene.io_AS0.BO()
commandsHistory.kl:273
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory]  11
kl.internal.commandsHistory.stub.cpu()
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory] [Applying Command
History] Setting item: '/DOF' property: 'focalLength' value:'1'
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory] [Applying Command
History] Setting item: '/DOF' property: 'focalLength' value:'15'
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory] [Applying Command
History] Setting item: '/DOF' property: 'focalLength' value:'2'
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory] [Applying Command
```

Boggart

SceneLib Tree

- root
  - boggartA
  - materials
    - boggart
      - wood
      - teeth
      - nail
      - skin
      - eye
      - cornea
      - water
    - materials
      - ground
  - LightRig
    - environmentLight
    - KeyGroup
      - Key
    - FillGroup
      - Fill
    - RimGroup
      - Rim
  - groundRenderable
  - DOF
  - freeCamera
  - portrait

File Display Window

Attribute Editor

SLItem params

Area light color

Area. light multiplier 15.000

Transform params

Translation

Translation X 176.330

Translation Y 74.373

Translation Z 176.330

Rotation

Euler X 2.934

Euler Y -0.766

Euler Z 2.635

Scale

Scale X 1.000

Scale Y 1.000

Scale Z 1.000

Log

```
value:'-107'
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/LightRig/RimGroup' property: 'transformTranslationY'
value:'4'
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/LightRig/RimGroup' property: 'transformTranslationY'
value:'48'
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/LightRig/RimGroup' property: 'transformTranslationZ'
value:'-3'
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/LightRig/RimGroup' property: 'transformTranslationZ'
```

SceneLib Tree

- root
  - boggartA
    - boggart_lodA_GRP
      - roots_GRP
      - body_level1Zbrush_GRP
      - eyes_GRP
        - r_tearDuct_IDskin_GEO
        - l_eye_IDeye_GEO
          - renderable
        - r_cornea_IDcornea_GEO
        - l_tearDuct_IDskin_GEO
        - r_eyeWetness_IDwater...
        - l_eyeWetness_IDwater...
        - l_cornea_IDcornea_GEO
        - r_eye_IDeye_GEO
          - renderable
      - body_level2Zbrush_GRP
  - materials
    - boggart
      - wood
      - teeth
      - nail
      - skin
      - eye
      - cornea
      - water
    - materials
  - LightRig
    - environmentLight
    - KeyGroup
    - FillGroup
    - RimGroup
      - Rim
  - groundRenderable
  - freeCamera

Attribute Editor

SLItem params

Transform params

Translation

Translation X	0.000
Translation Y	0.000
Translation Z	0.000

Rotation

Euler X	-0.034
Euler Y	0.001
Euler Z	0.101

Scale

Scale X	1.000
Scale Y	1.000
Scale Z	1.000

Log

```
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory]  10
operator.commandsHistory.io_AS0.OO_SLScene.io_AS0.BO()
commandsHistory.kl:273
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory]  11
kl.internal.commandsHistory.stub.cpu()
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory] [Applying Command
History] Setting item: '/DOF' property: 'focalLength' value:'1'
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory] [Applying Command
History] Setting item: '/DOF' property: 'focalLength' value:'15'
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory] [Applying Command
History] Setting item: '/DOF' property: 'focalLength' value:'2'
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory] [Applying Command
History] Setting item: '/DOF' property: 'focalLength' value:'29'
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory] [Applying Command
```

SceneLib Tree

- root
  - + boggartA
  - + materials
  - − LightRig
    - environmentLight
    - + KeyGroup
    - + FillGroup
    - RimGroup
      - Rim
  - groundRenderable
  - DOF
  - freeCamera

Attribute Editor

SLItem params

Shape Name	gums_IDskin_GEO
Material	skin
Basecolor	
Subsurface Color	
Metallic Coefficient	0.000
Subsurface Coefficient	0.000
Specular Coefficient	0.050
Roughness Coefficient	0.400
SpecularTint Coeffient	0.000
Anisotropic Coefficient	0.000
Sheen Coefficient	0.000
SheenTint Coefficient	0.000

Transform params

Translation

Translation X	0.000
Translation Y	0.000
Translation Z	0.000

Rotation

Euler X	0.000
Euler Y	0.000
Euler Z	0.000

Scale

Scale X	1.000
Scale Y	1.000
Scale Z	1.000

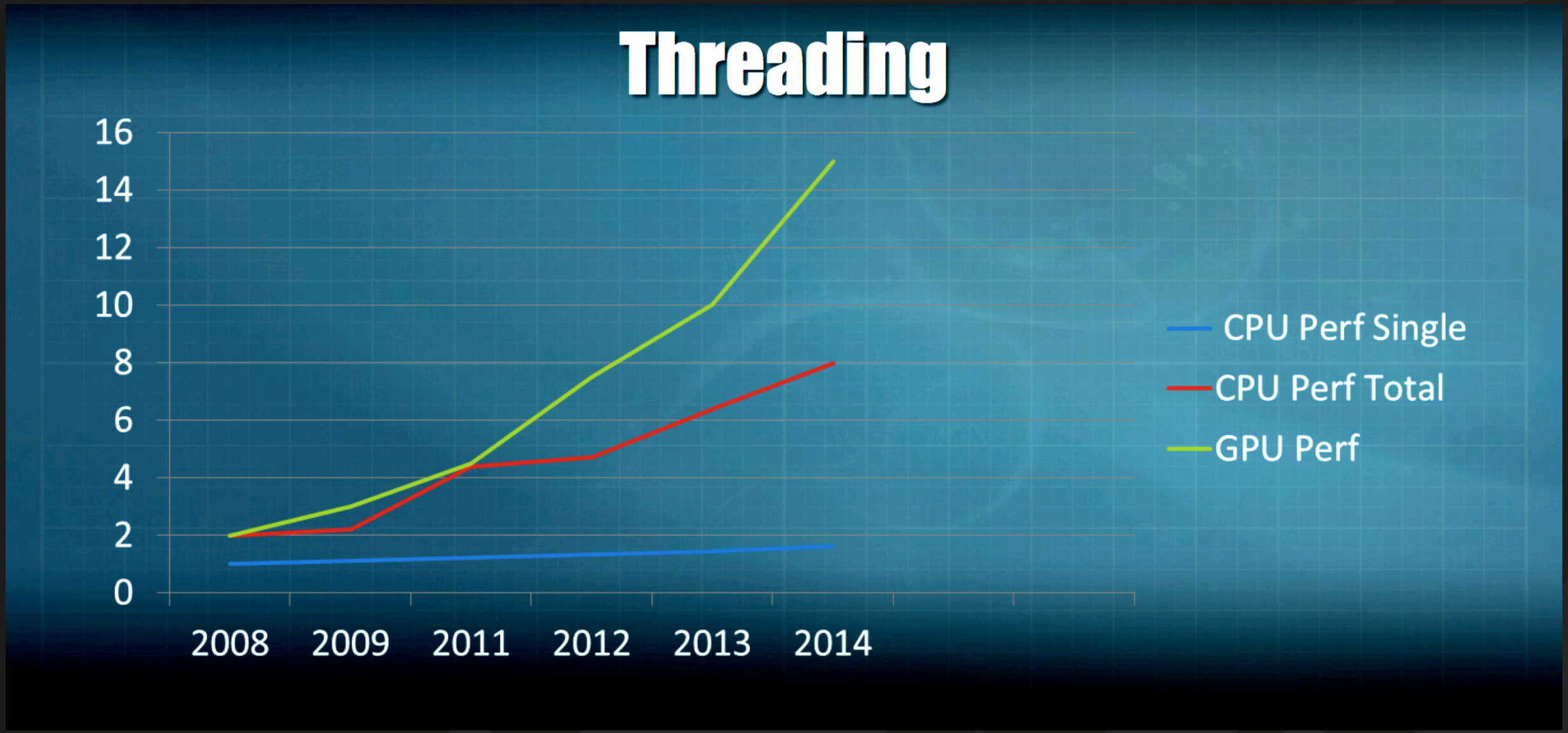
Log

```
operator.commandsHistory.io_AS0.OO_SLScene.io_AS0.BO()
commandsHistory.kl:273
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory]  11
kl.internal.commandsHistory.stub.cpu()
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/DOF' property: 'focalLength' value:'1'
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/DOF' property: 'focalLength' value:'15'
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/DOF' property: 'focalLength' value:'2'
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory] [Applying Command History] Setting item: '/DOF' property: 'focalLength' value:'29'
[FABRIC:MT:test/GTC/boggart.kl_KLCode:commandsHistory] [Applying Command
```

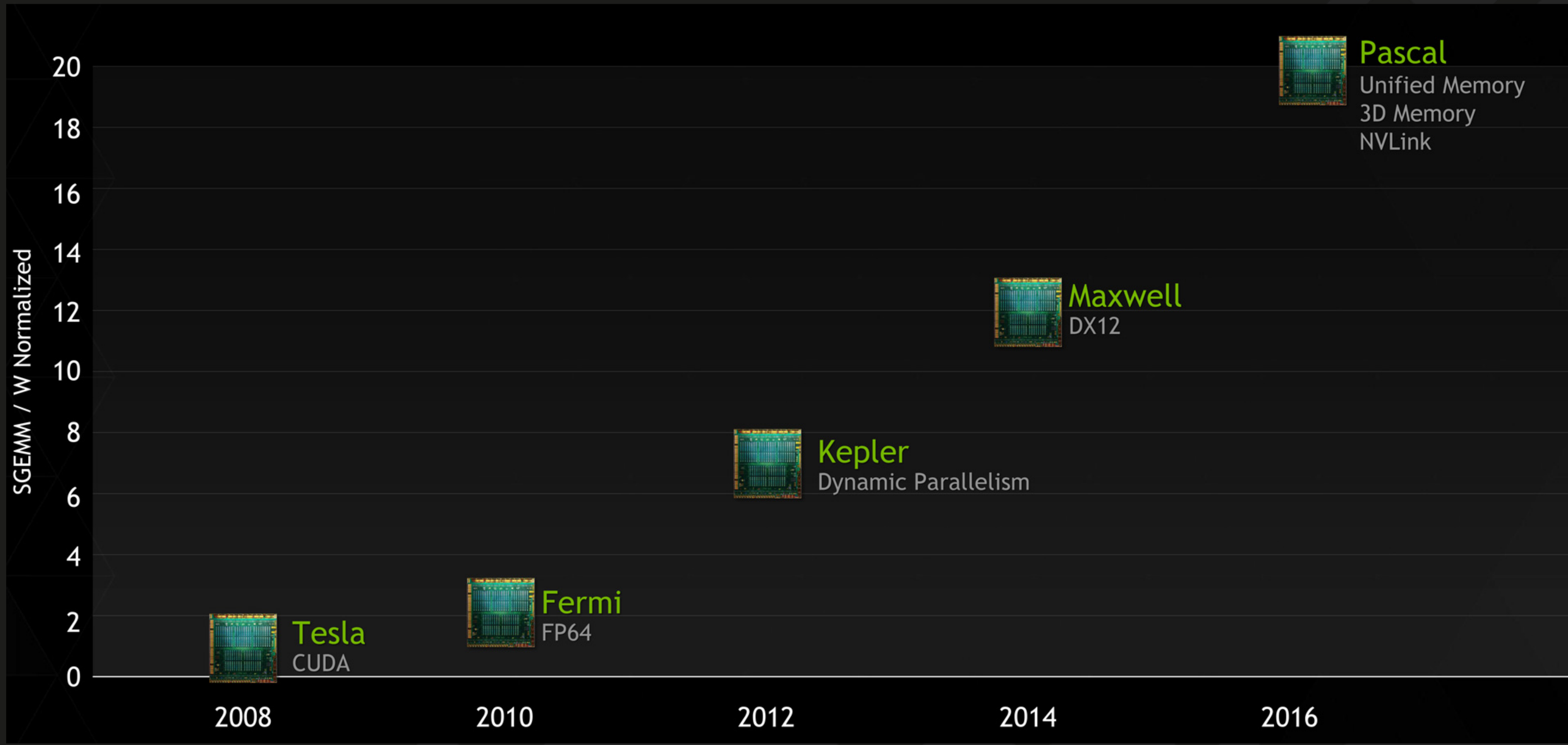
SceneLib Tree

- root
  - boggartA
    - boggart_lodA_GRP
      - roots_GRP
      - body_level1Zbrush_GRP
      - eyes_GRP
        - r_tearDuct_IDskin_GEO
        - l_eye_IDeye_GEO
        - r_cornea_IDcornea_GEO
        - l_tearDuct_IDskin_GEO
        - r_eyeWetness_IDwater...
        - l_eyeWetness_IDwater...
        - l_cornea_IDcornea_GEO
        - r_eye_IDeye_GEO
      - body_level2Zbrush_GRP
        - body_level2_IDskin_GEO
  - materials
    - boggart
      - wood
      - teeth
      - nail
      - skin
      - eye
      - cornea
      - water
    - materials
      - ground
  - LightRig
  - groundRenderable
  - DOF
  - freeCamera
  - camera_2

Future Ahead



Future Ahead



MPC

Thanks

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THANKS

Q & A

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