

Daydreaming about Cardboards

Virtual Reality in Android



- 🔑: headless CMS: contentful.com
- 🐦: [@MarioBodemann](https://twitter.com/MarioBodemann)
- 📄: bit.ly/mbvrberlin
 - Please interrupt 🚫 🗑️ !

Agenda

Daydreaming about Cardboards
Virtual Reality in Android

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- [bit.ly/mvrbberlin](#)
- Please interrupt

Cardboard

Google Cardboard

- easy to produce
- available from different companies
- in different styles/interactions
- You just need a phone™

How does Cardboard work?

- use 3D data and movement to draw two images
 - one for the left and right eye
- contains Lenses to move things away
- brain combines image to 3D scene

How do I write a Unity App?

Prerequisites

- clone Googles github for unity
<https://github.com/googlevr/gvr-unity-sdk> repository
- install and open Unity
 - <https://store.unity.com/>
 - <http://forum.unity3d.com/threads/unity-on-linux-release-notes-and-known-issues.350256/>

Daydream

New SDK features

- Controlling the controller
 - orientation/acceleration
 - input (Clickpad: xy, clicked, App Button, Vol+/-)
- spatial audio engine
- VR View



Cardboard

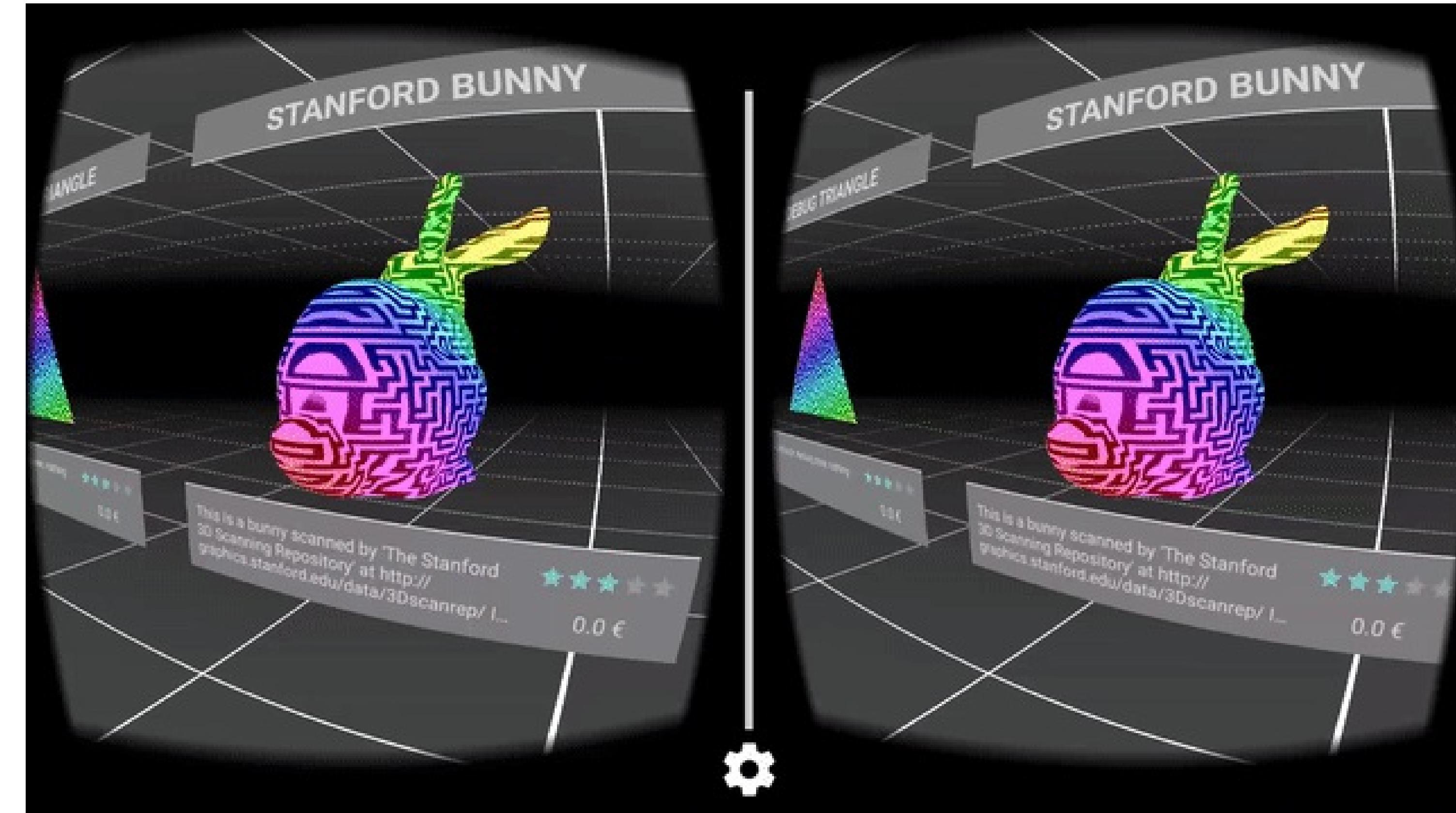
Google Cardboard

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How does Cardboard work?

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- brain combines image to 3D scene



How do you program for it?

Googles SDK are available for

- Android (OpenGL)
- IOS (Objective C)
- Unity Engine (C# /JS) x ( , G,  , )

What do those SDKs provide?

- lens distortion correction
- spatial audio
- head tracking
- 3D calibration
- side-by-side rendering

What else do they provide?

- stereo geometry configuration
- user input event handling
- see developer.google.com/vr/android/

How do I write a Unity App?



Prerequisites

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Home



Projects

Getting started



NEW



OPEN



MY ACCOUNT

Create a project

New project

Home

Projects Getting started

[+ NEW](#) [OPEN](#) [MY ACCOUNT](#)

Project name*
Cardboard Sample

3D 2D [Add Asset Package](#)

Location*
/home/mario/Sources/Unity [...](#)

ON [Enable Unity Analytics](#) ?

Organization*
mario4contentful

[Cancel](#) [Create project](#)

File Edit Assets GameObject Component Help Window



Hierarchy

Create Untitled
Main Camera
Directional Light



Scene Game Asset Store

Shaded 2D 3D Audio

Gizmos

Cloud Account Layers Layout

Inspector Services

Go to Dashboard



Cardboard Sample

SERVICES

Unity provides you a suite of integrated services for creating games, increasing productivity and managing your audience.

[SERVICES](#) [MEMBERS](#) [AGE DESIGNATION](#) [SETTINGS](#)

Collaborate

Create together seamlessly

In-App Purchasing

Simplify cross-platform IAP

Ads

Monetize your games

Multiplayer

Easily implement multiplayer

Analytics

Discover player insights

Performance Reporting

Discover app errors

Cloud Build

Build games faster

Project Console

Create

Favorites

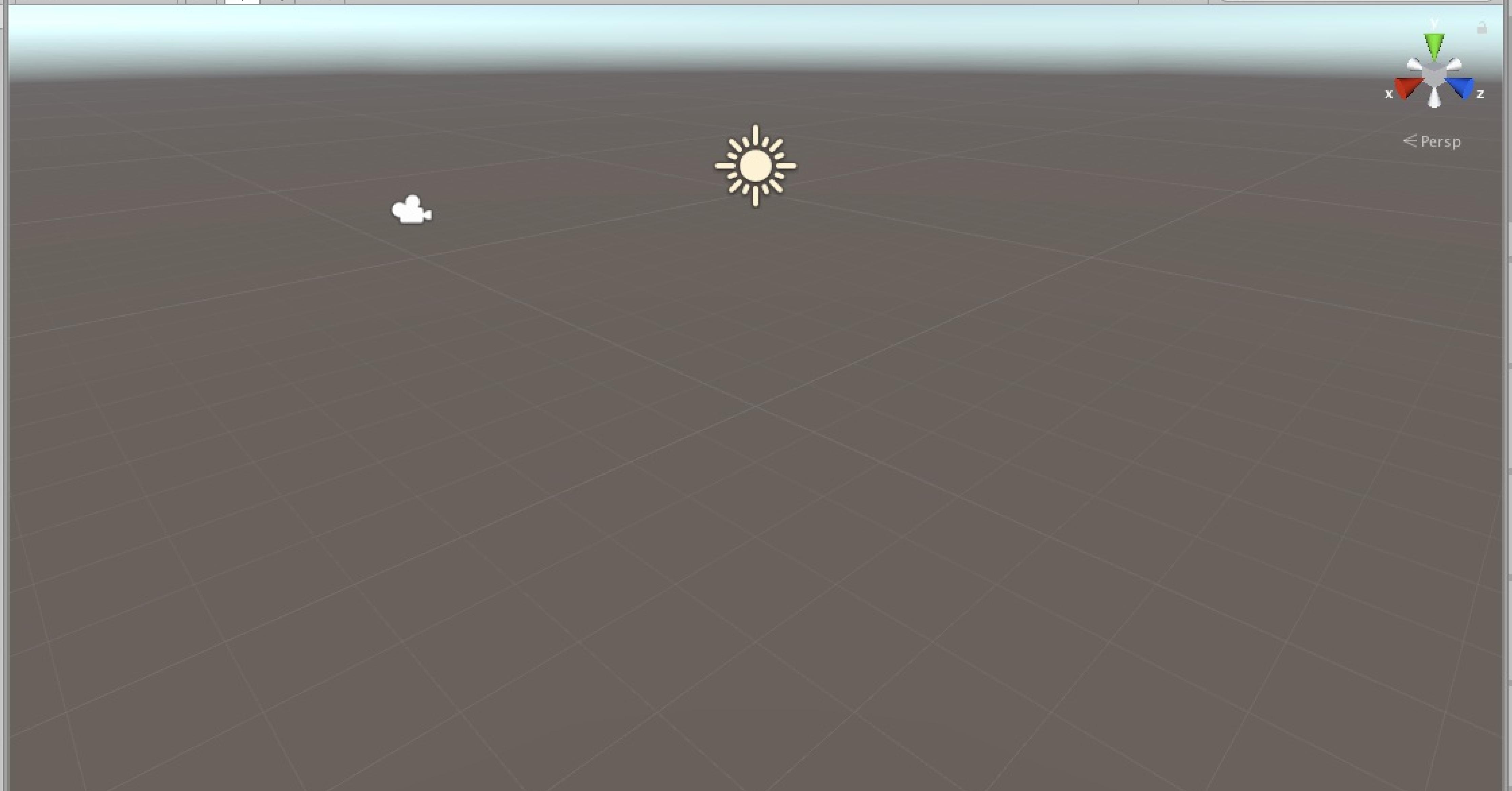
- All Materials
- All Models
- All Prefabs
- All Scripts

Assets

This folder is empty

Assets

Shaded | 2D | ☼ | ⌛ | 🔍 | Gizmos | Qt All



☰



This folder is empty

Cardbo SERVICES

Unity provides you
increasing productivit

SERVICES

Collaborate
Create together se

\$ In-App Purchas
Simplify cross-plat

Ads
Monetize your game

Multiplayer
Easily implement m

Analytics
Discover player ins

Performance
Discover app error

Cloud Bu

File Edit Assets GameObject Component Help Window

Create Empty Shift+Ctrl+N
Create Empty Child Shift+Alt+N
3D Object
2D Object
Light
Audio
UI
Particle System
Camera
Center On Children
Make Parent
Clear Parent
Apply Changes To Prefab
Break Prefab Instance
Set as first sibling
Set as last sibling
Move To View Ctrl+Alt+F
Align With View Shift+Ctrl+F
Align View to Selected
Toggle Active State Shift+Alt+A

GameObject Context Menu

Game Asset Store Gizmos Inspector Services

Cardboard Sample

SERVICES

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SERVICES MEMBERS AGE DESIGNATION SETTINGS

Collaborate Create together seamlessly OFF

In-App Purchasing Simplify cross-platform IAP OFF

Ads Monetize your games OFF

Multiplayer Easily implement multiplayer OFF

Analytics Discover player insights ON

Performance Reporting Discover app errors OFF

Cloud Build Build games faster OFF

Project Console

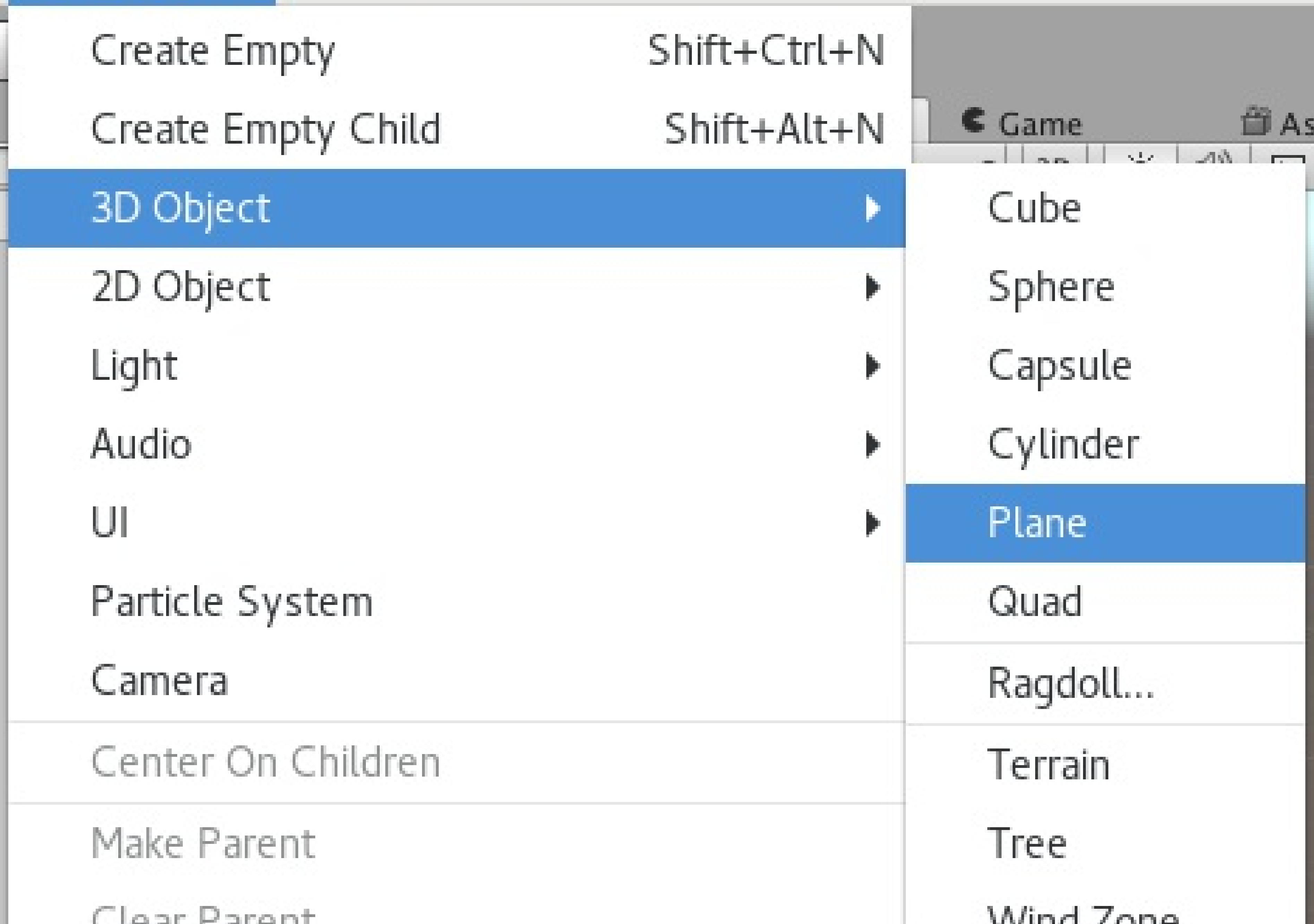
Favorites

- All Materials
- All Models
- All Prefabs
- All Scripts

Assets

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Assets



File Edit Assets GameObject Component Help Window



Hierarchy

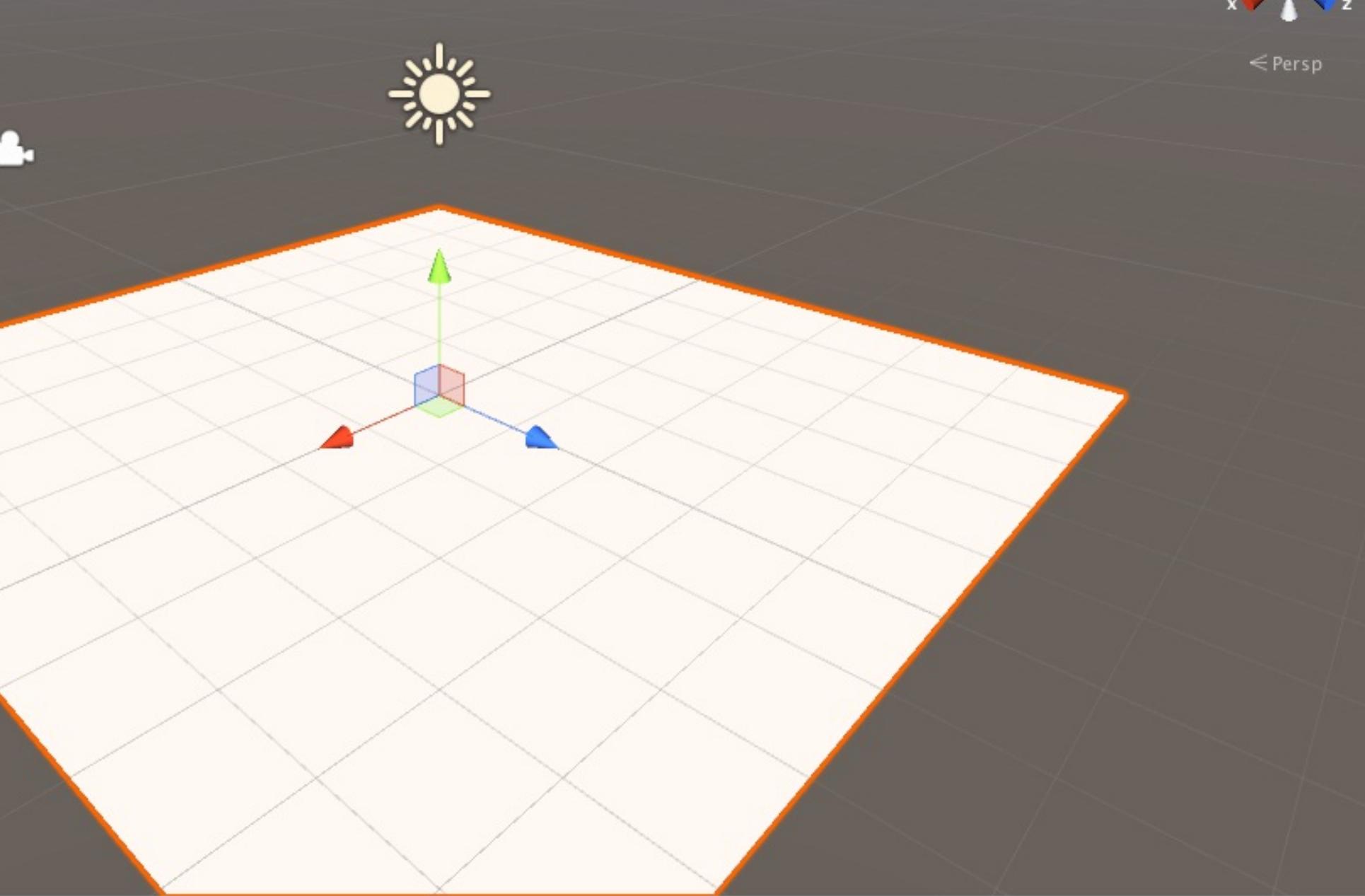
Create Untitled*

Main Camera
Directional Light
Plane



Scene Game Asset Store

Gizmos



Cardboard Sample

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Ads

Monetize your games



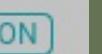
Multiplayer

Easily implement multiplayer



Analytics

Discover player insights



Performance Reporting

Discover app errors



Cloud Build

Build games faster



Project Console

Create

Favorites

- All Materials
- All Models
- All Prefabs
- All Scripts

Assets

Assets

This folder is empty



File Edit Assets GameObject Component Help Window



Center

Local



Cloud Account Layers Layout

Hierarchy

Create

Q>All

Untitled*

Main Camera

Directional Light

Plane

Scene Game Asset Store

Shaded

2D

3D

Gizmos

Q>All

Gizmos

Q>All

Game

Asset Store

Gizmos

Q>All

Persp

Shaded

2D

3D

Gizmos

Q>All

Game

Asset Store

Gizmos

Q>All

Persp

Shaded

2D

3D

Gizmos

Q>All

Game

Asset Store

Gizmos

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Asset Store

Gizmos

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Shaded

2D

3D

Gizmos

Q>All

Game

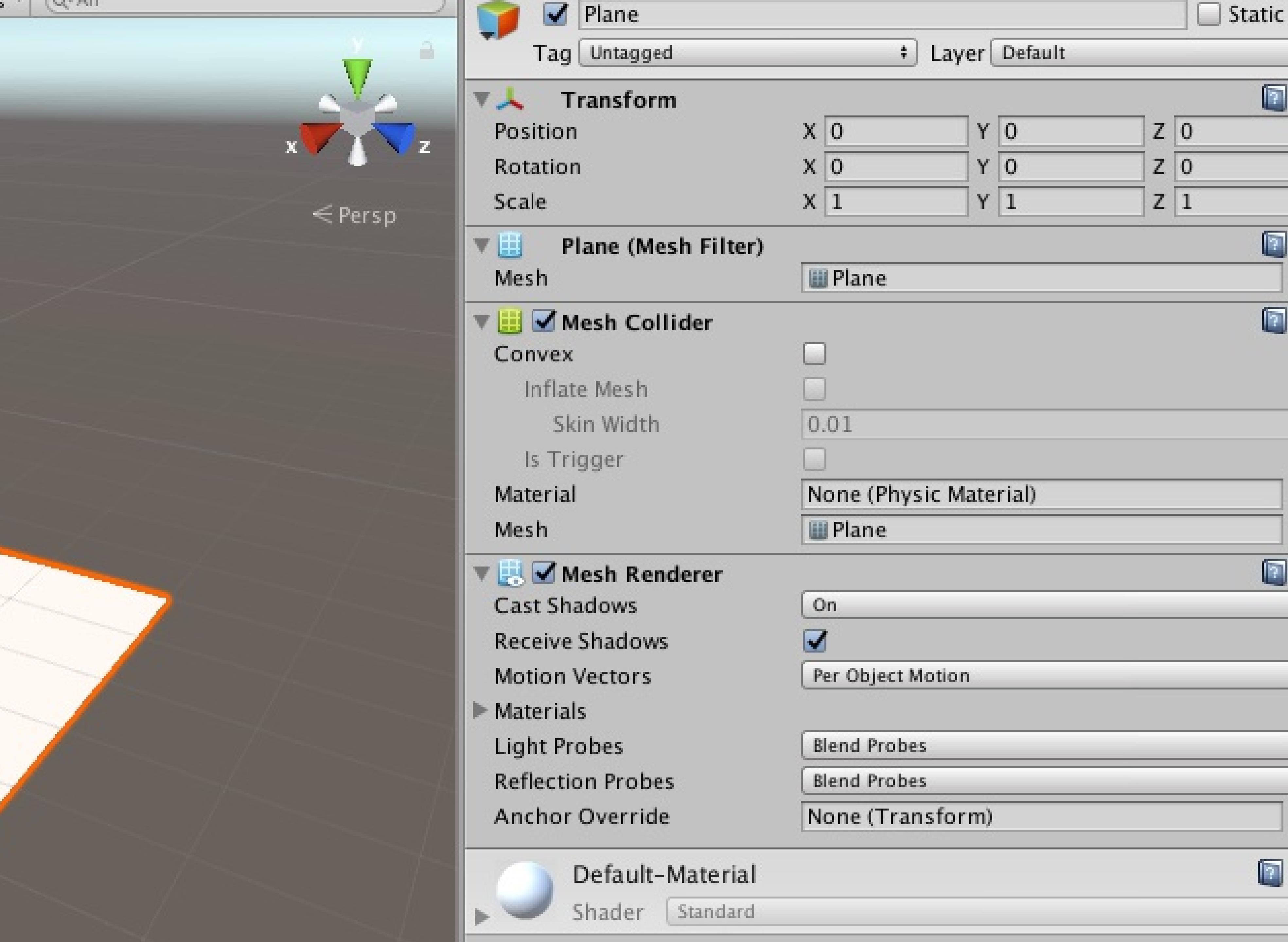
Asset Store

Gizmos

Q>All

Persp

Shaded



File Edit Assets GameObject Component Help Window



Center Local



Cloud Account Layers Layout

Hierarchy

Create

Q All

Untitled*

Main Camera

Directional Light

Plane

Scene

Game

Asset Store

Gizmos

Q All

Shaded

2D

3D

Light

Sound

Image

Movie

Audio

Text

Material

Model

Prefab

Script

Texture

Font

Font Mesh

Font Atlas

Font Sheet

Font

Inspector Services

Cloud Account

Layers

Layout

Plane

✓

Plane

Static

✗

Untagged

Layer

Default

Transform

✗

Position

X

0

Y

0

Z

0

✗

Rotation

X

0

Y

0

Z

0

✗

Scale

X

10

Y

1

Z

10

Plane (Mesh Filter)

✗

Plane

Mesh Collider

✗

Convex

✗

Inflate Mesh

✗

Skin Width

0.01

✗

Is Trigger

✗

Material

None (Physic Material)

✗

Mesh

Mesh Renderer

✗

Mesh Renderer

On

✗

Cast Shadows

✗

Receive Shadows

✗

Per Object Motion

✗

Motion Vectors

Materials

✗

Light Probes

Blend Probes

✗

Reflection Probes

Blend Probes

✗

Anchor Override

None (Transform)

✗

Default-Material

Shader

Standard

✗

Add Component

Project Console

Create

Favorites

All Materials

All Models

All Prefabs

All Scripts

Assets

Assets

This folder is empty

File Edit Assets **GameObject** Component Help Window

Create Empty Shift+Ctrl+N
Create Empty Child Shift+Alt+N
3D Object ►
Cube
Sphere
Capsule
Cylinder
Plane
2D Object
Light
Audio
UI
Particle System
Camera
Center On Children
Make Parent
Clear Parent
Apply Changes To Prefab
Break Prefab Instance
Set as first sibling
Set as last sibling
Move To View Ctrl+Alt+F
Align With View Shift+Ctrl+F
Align View to Selected
Toggle Active State Shift+Alt+A

Game Asset Store Gizmos Q>All Persp

Plane Tag Untagged Layer Default

Transform Position X 0 Y 0 Z 0
Rotation X 0 Y 0 Z 0
Scale X 10 Y 1 Z 10

Plane (Mesh Filter) Mesh Plane

Mesh Collider Convex Inflat Mesh Skin Width 0.01 Is Trigger Material None (Physic Material) Mesh Plane

Mesh Renderer Cast Shadows On Receive Shadows Motion Vectors Per Object Motion Materials Light Probes Blend Probes Reflection Probes Blend Probes Anchor Override None (Transform)

Default-Material Shader Standard Add Component

Project Console

Favorites All Materials All Models All Prefabs All Scripts

Assets This folder is empty

File Edit Assets GameObject Component Help Window



Hierarchy

Untitled*

- Main Camera
- Directional Light
- Plane
- Cube

Scene

Shaded 2D



File Edit Assets GameObject Component Help Window



Hierarchy

Untitled*

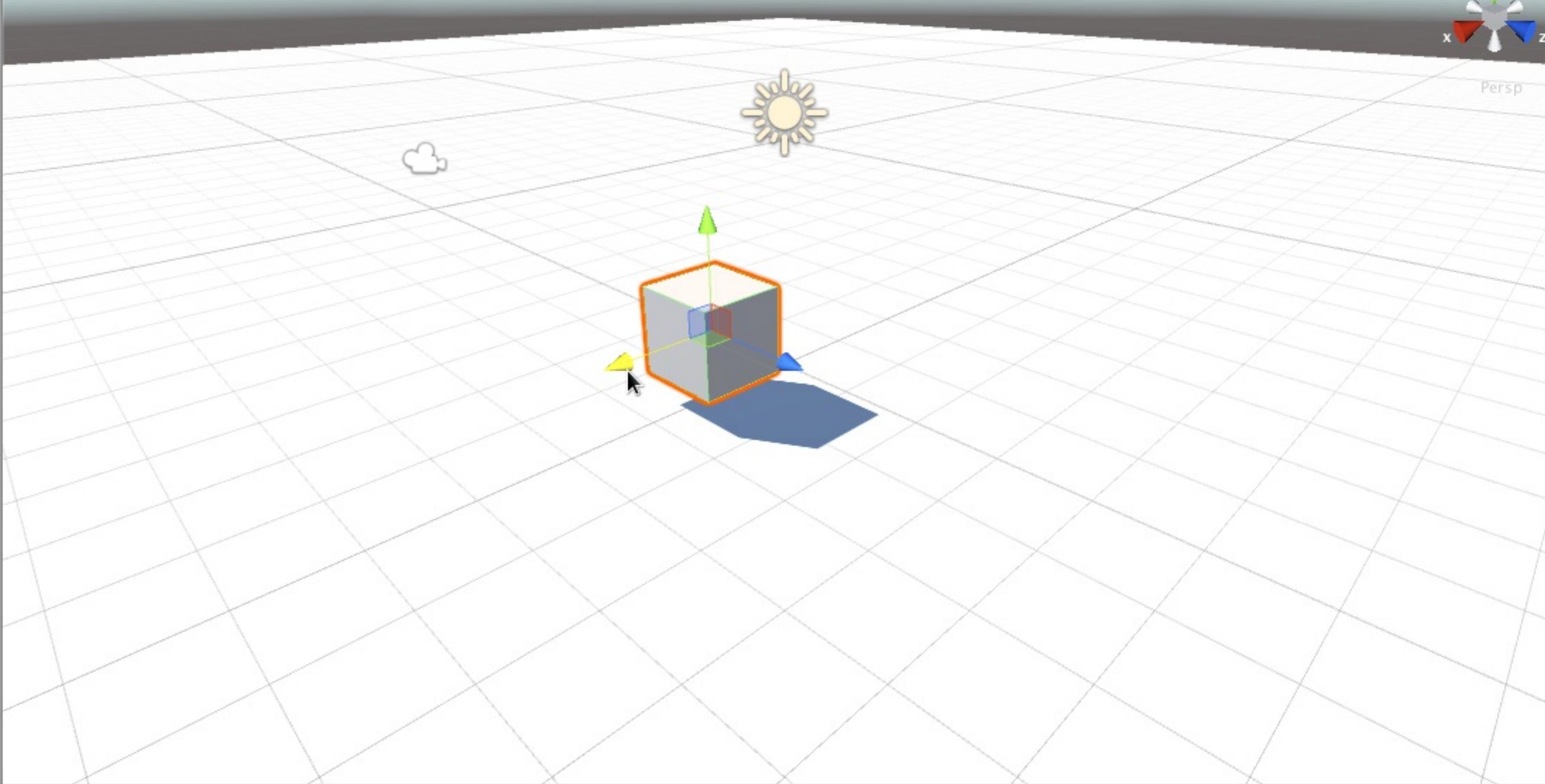
Main Camera
Directional Light
Plane
Cube

Scene

Shaded 2D

Gizmos

Q>All



Inspector

Cube

Tag Untagged

Layer Default

Transform

Position X 1.22 Y 0.88 Z 0.11

Rotation X 0 Y 0 Z 0

Scale X 1 Y 1 Z 1

Cube (Mesh Filter)

Mesh Cube

Box Collider

Is Trigger

Material None (Physic Material)

Center X 0 Y 0 Z 0

Size X 1 Y 1 Z 1

Mesh Renderer

Cast Shadows On

Receive Shadows

Motion Vectors Per Object Motion

Materials

Light Probes Blend Probes

Reflection Probes Blend Probes

Anchor Override None (Transform)

Default-Material

Shader Standard

Add Component

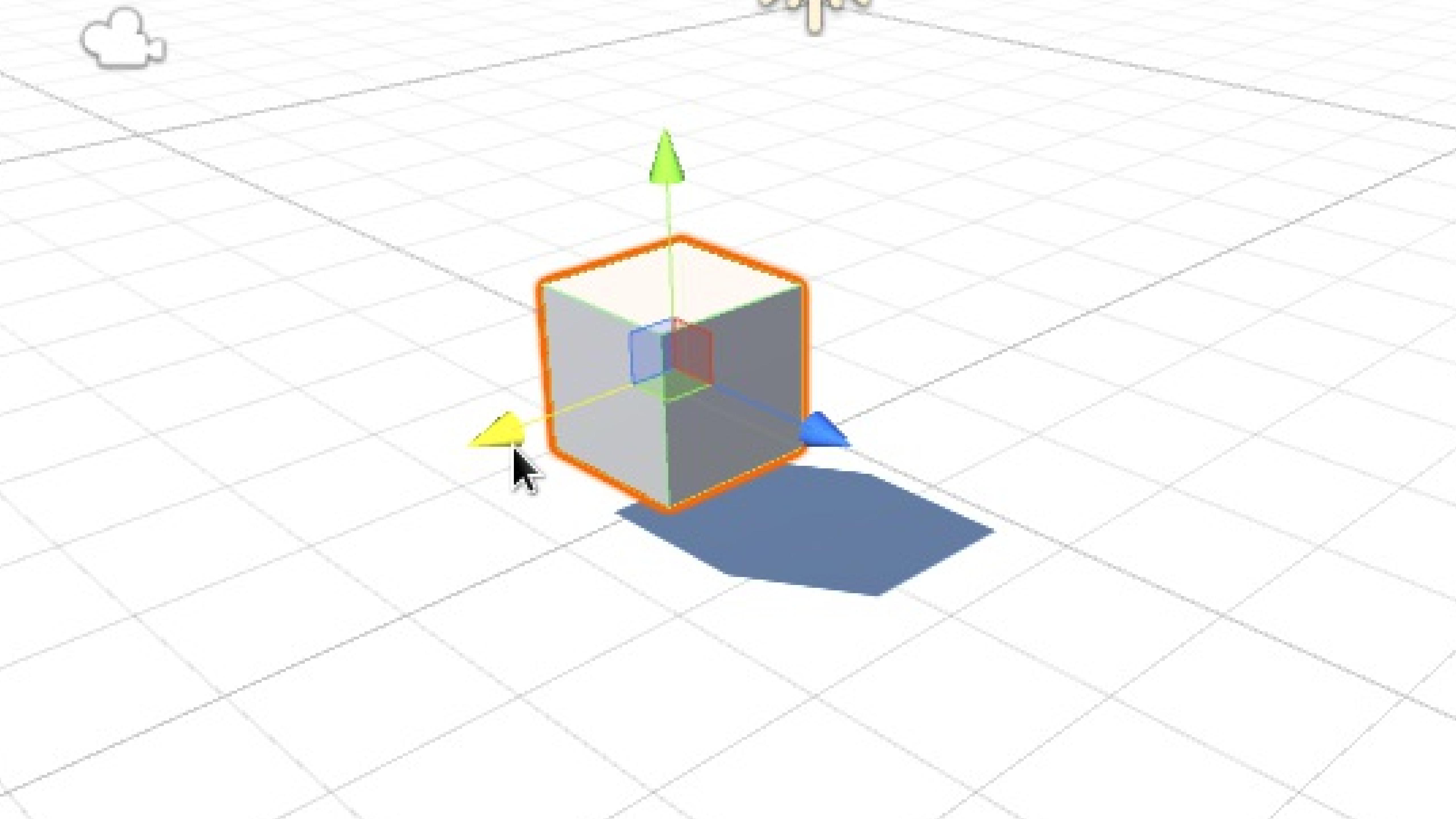
Project

Create

Favorites
All Materials
All Models
All Prefabs
All Scripts

Assets

This folder is empty



File Edit Assets GameObject Component Help Window



Center Local



Cloud Account Layers Layout

Hierarchy

Create (Q) All Untitled*

Main Camera

- Directional Light
- Plane
- Cube
- Sphere
- Capsule
- Cylinder

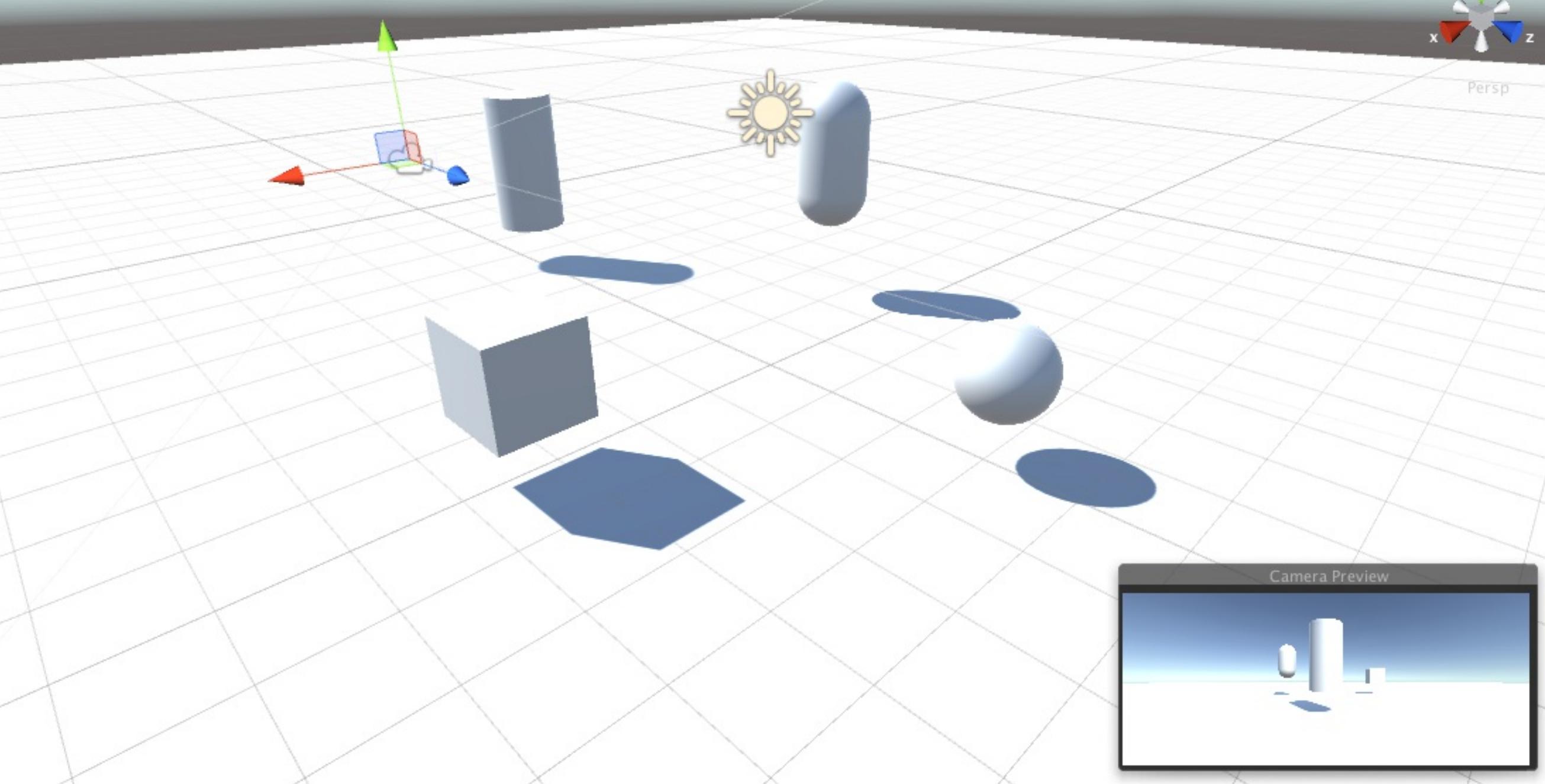
Scene

Game Asset Store

Shaded 2D (Q) All

Gizmos (Q) All

Persp



Inspector Services

Main Camera

Tag MainCamera

Layer Default

Transform

Position X 0 Y 1 Z -10
Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1

Camera

Skybox Everything
Background Perspective
Projection Field of View 60
Clipping Planes Near 0.3 Far 1000
Viewport Rect X 0 Y 0 W 1 H 1
Depth -1
Rendering Path Use Player Settings
Target Texture None (Render Texture)
Occlusion Culling
HDR
Target Display Display 1

GUI Layer

Flare Layer

Audio Listener

Add Component

Project Console

Create

Favorites

- All Materials
- All Models
- All Prefabs
- All Scripts

Assets

This folder is empty

Occclusion Culling

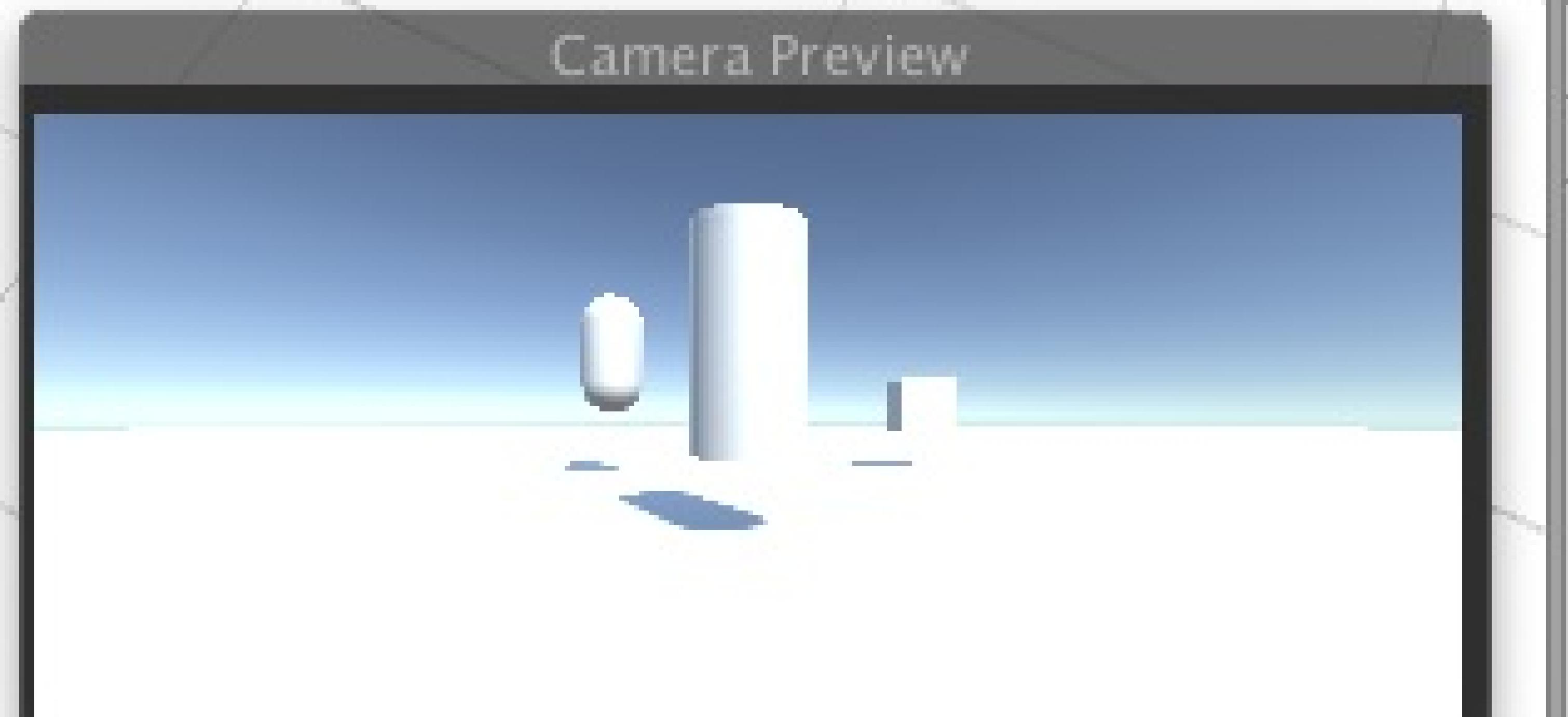
HDR

Target Display

GUI Layer

Flare Layer

Audio Listener



File Edit Assets GameObject Component Help Window

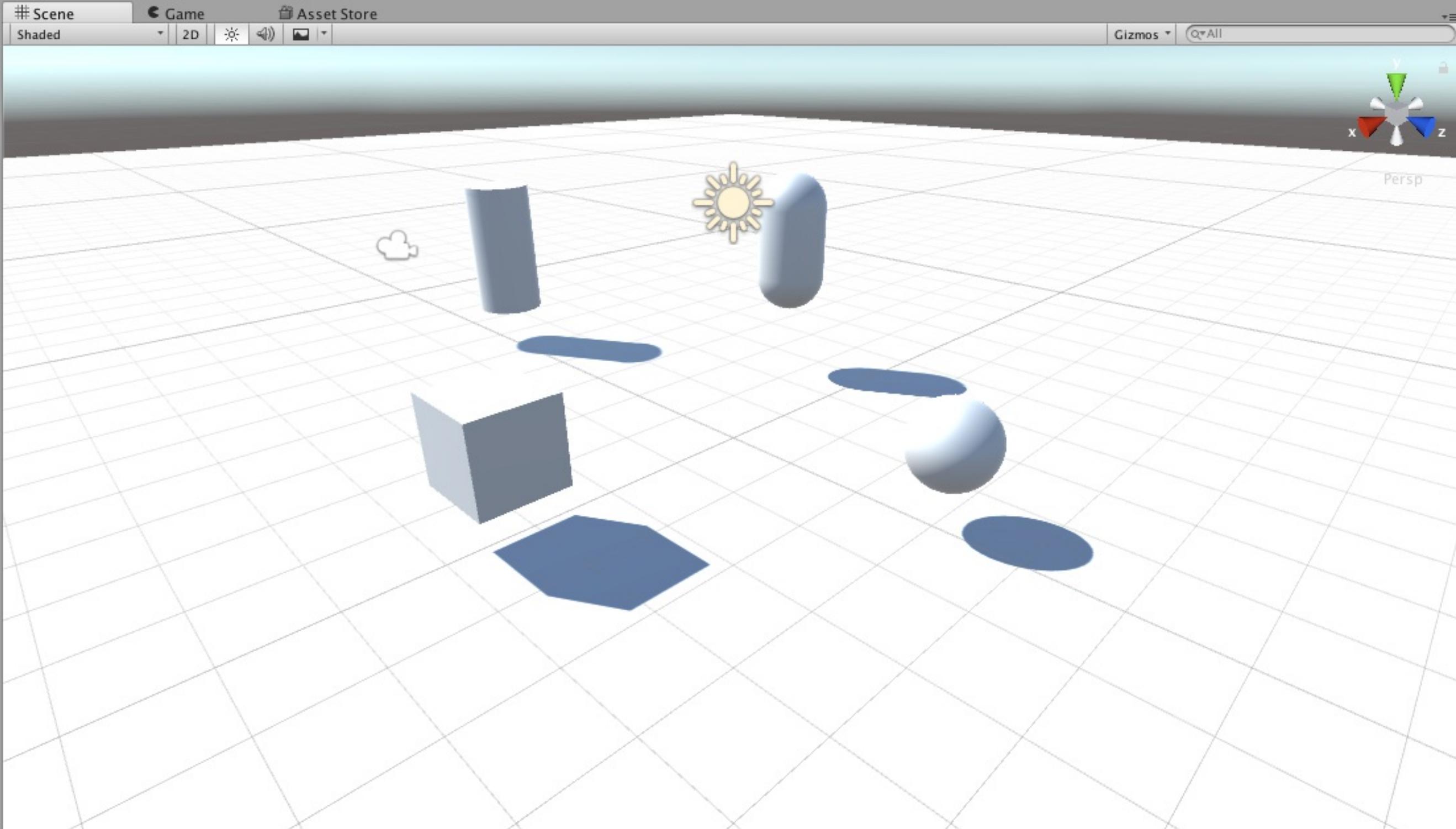


Cloud Account Layers Layout

Hierarchy

Create Untitled*

- Main Camera
- Directional Light
- Plane
- Cube
- Sphere
- Capsule
- Cylinder



Inspector

Asset Store: RedBeard_Bluestone WallV2.sbsar

Type ProceduralMaterial
Part of package
 Name Free Material 5 Pack
 Version 1.0
 Price free
 Rating 5 of 5
 Size 559.74 KB
 Asset count 8
 Web page <http://u3d.as/r9x>
 Publisher Russ Denny

Import package

Open Asset Store

Project

Create

Console

Favorites

- All Materials
- All Models
- All Prefabs
- All Scripts

Assets

Search: Assets Selected folder Asset Store: 999+ / 999+

Free Assets



Procedural Properties

Random Seed Randomize 0
 Randomizer 1
 Uniform / Random

Generated Textures

Asset Store Preview



Asset Store: RedBeard_Bluestone WallV2.sbsar
 512x512

 Project

 Console

Create ▾

▼  Favorites

 All Materials

 All Models

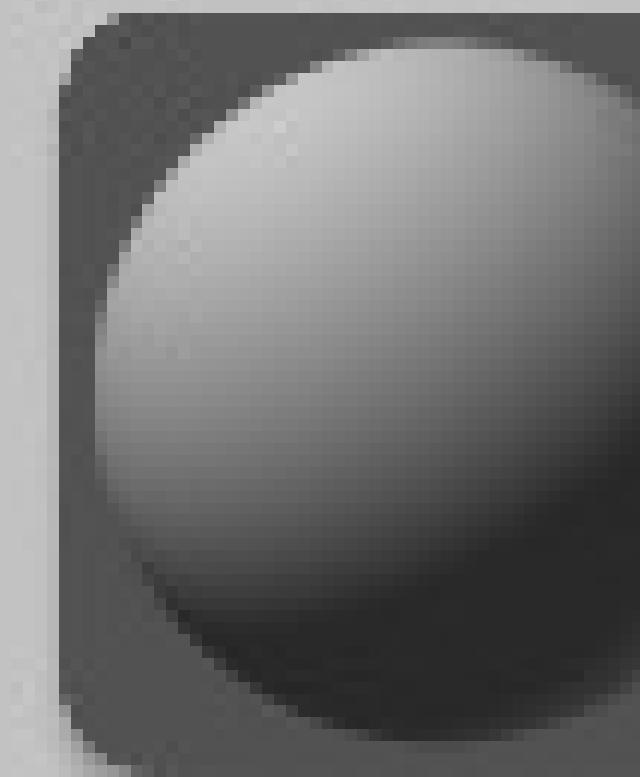
 All Prefabs

 All Scripts

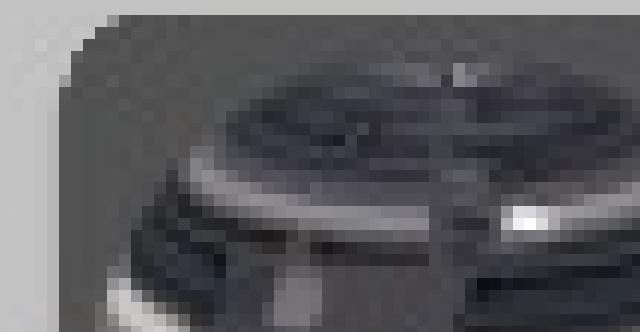
 Assets

Search: A

▼ Free Ass



Material



ected folder

Asset Store: 999+ / 999+





FREE



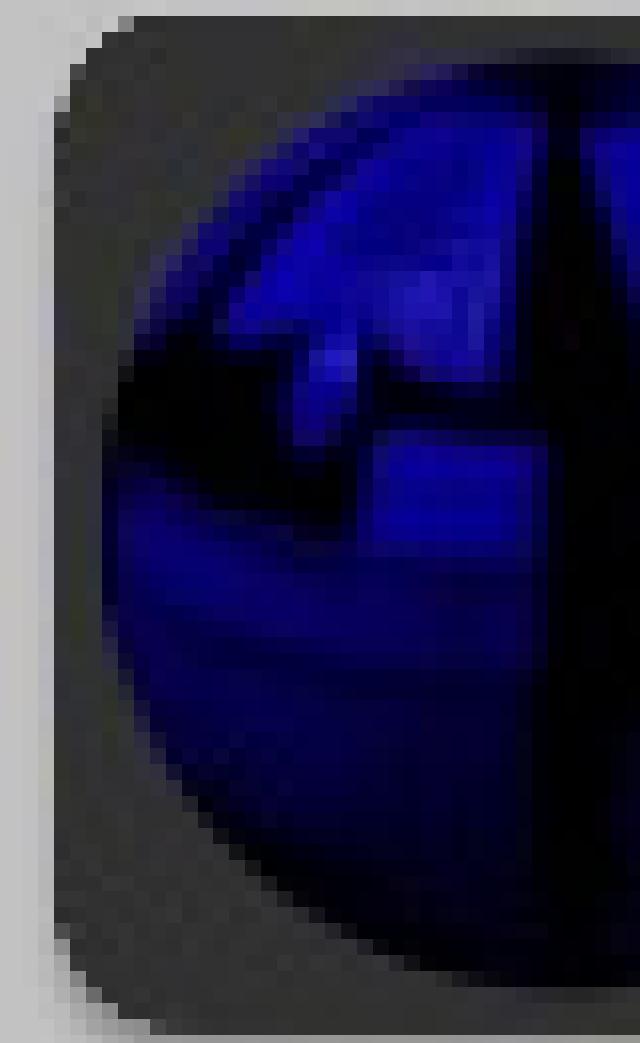
Ninja



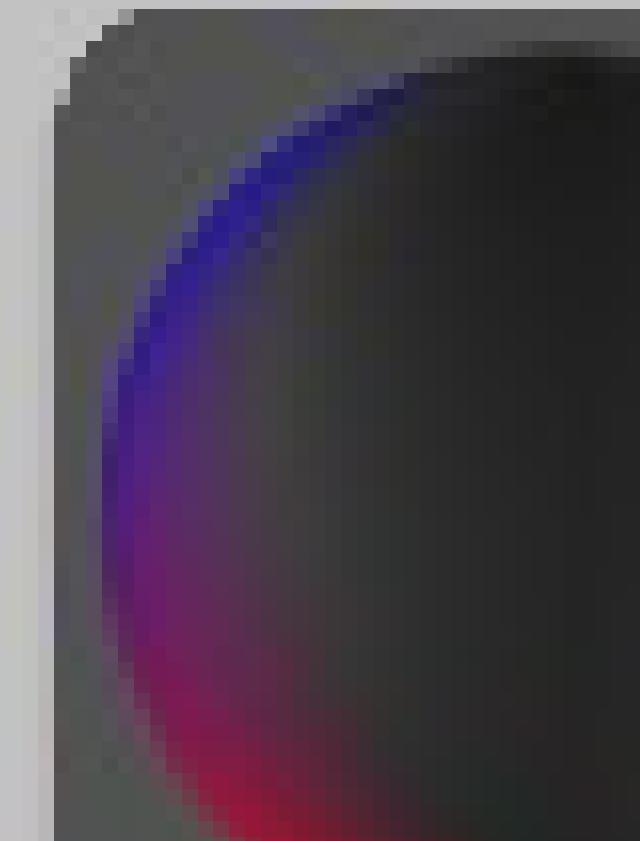
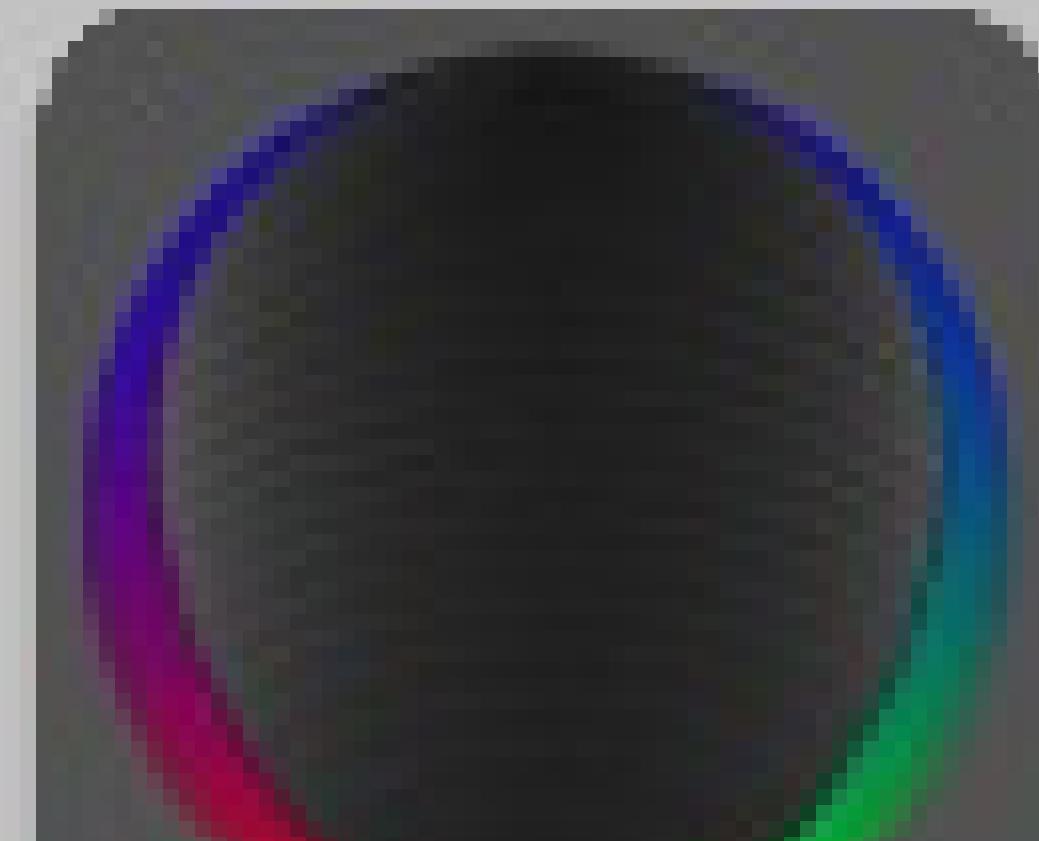
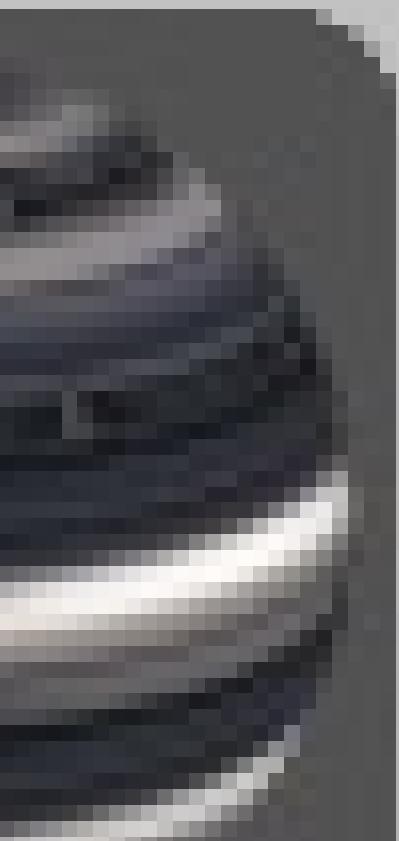
RedBeard_Blo...

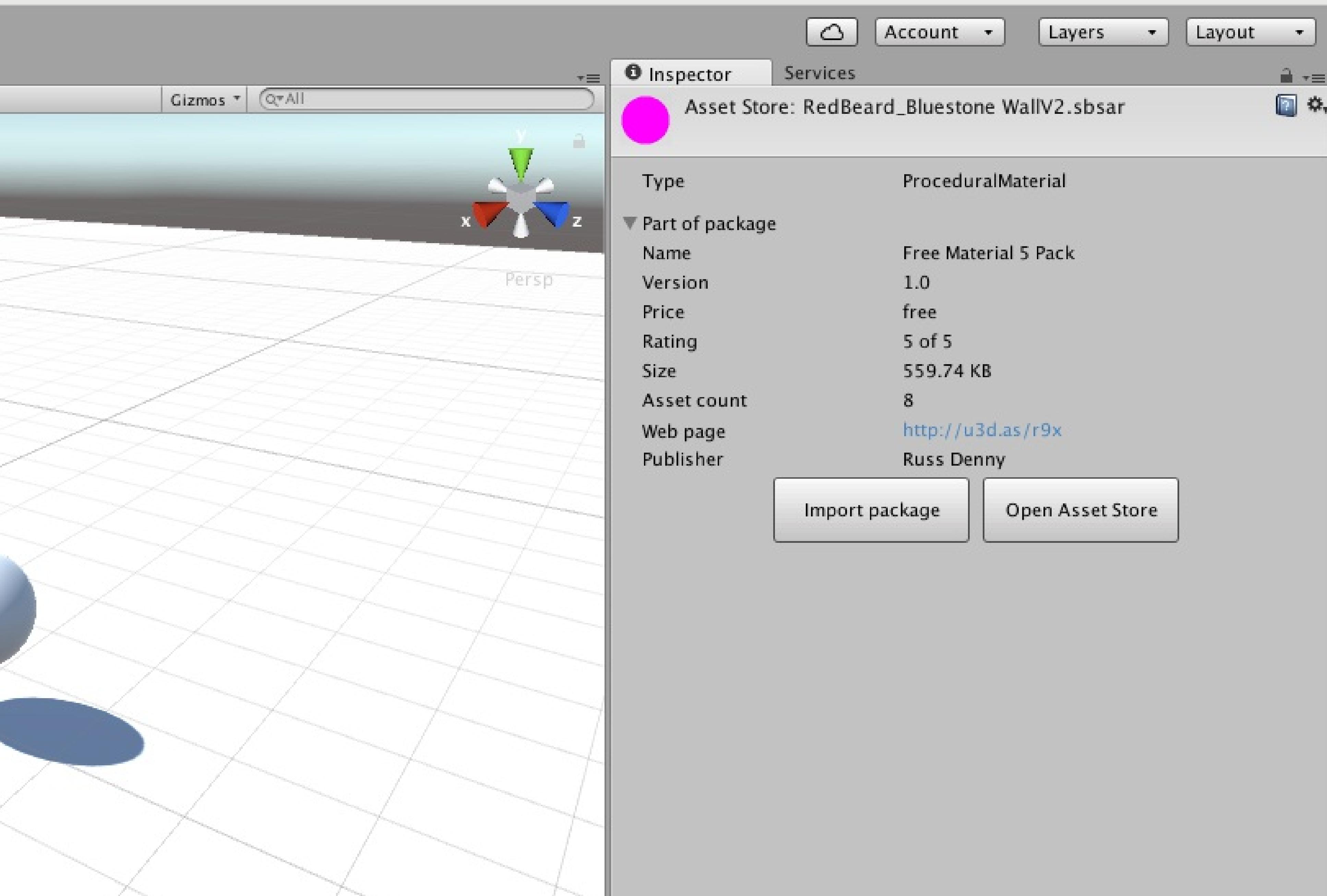


Gun01_Low...



Gun01_...





Import Unity Package



Free Material 5 Pack

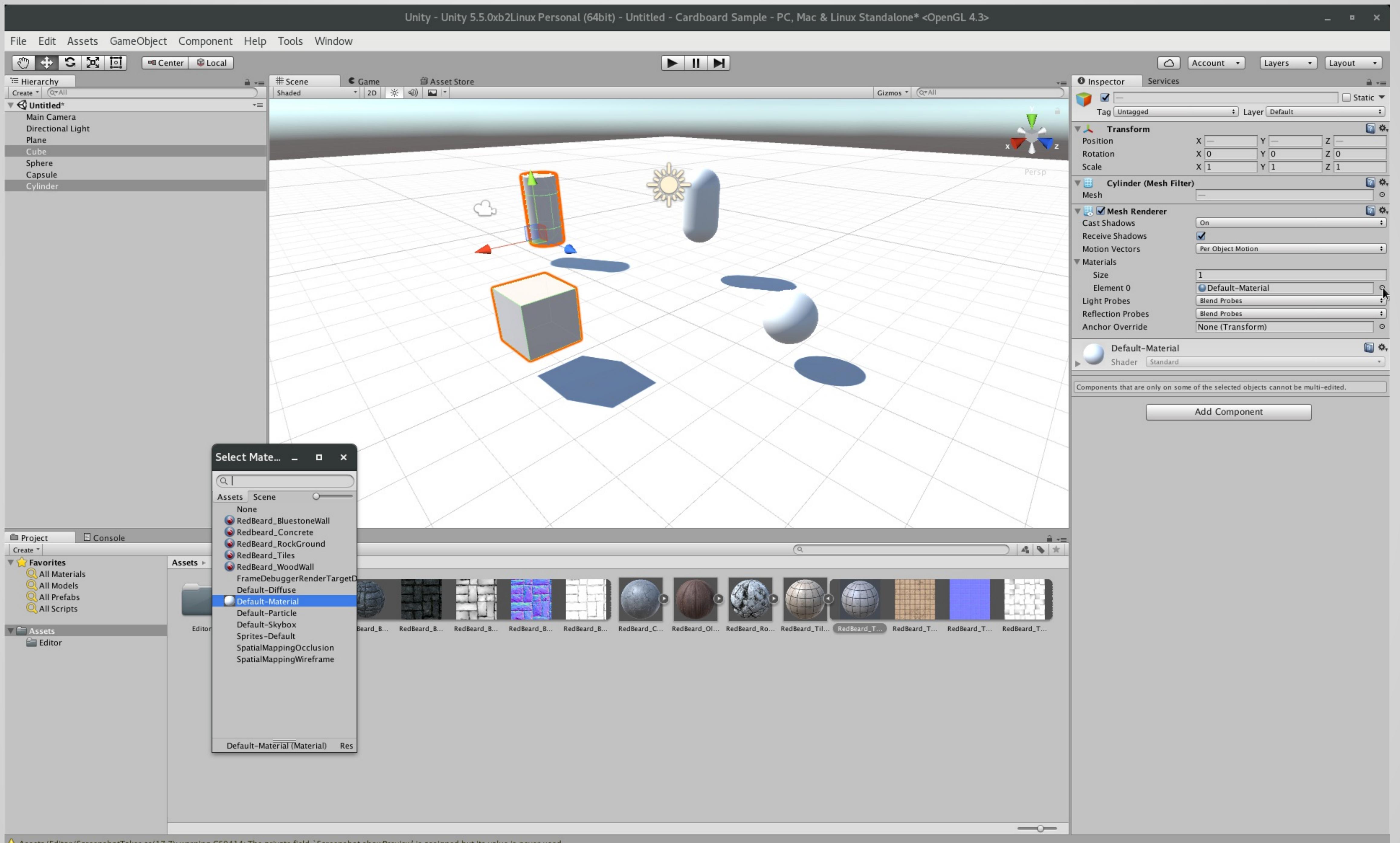
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Editor	NEW
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ScreenshotTaker.cs	NEW
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RedBeard Substance Pack.unity	NEW
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RedBeard_Bluestone WallV2.sbsar	NEW
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RedBeard_ConcreteV2.sbsar	NEW
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RedBeard_OldWoodV2.sbsar	NEW
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RedBeard_RockGroundV2.sbsar	NEW
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RedBeard_TilesV2.sbsar	NEW

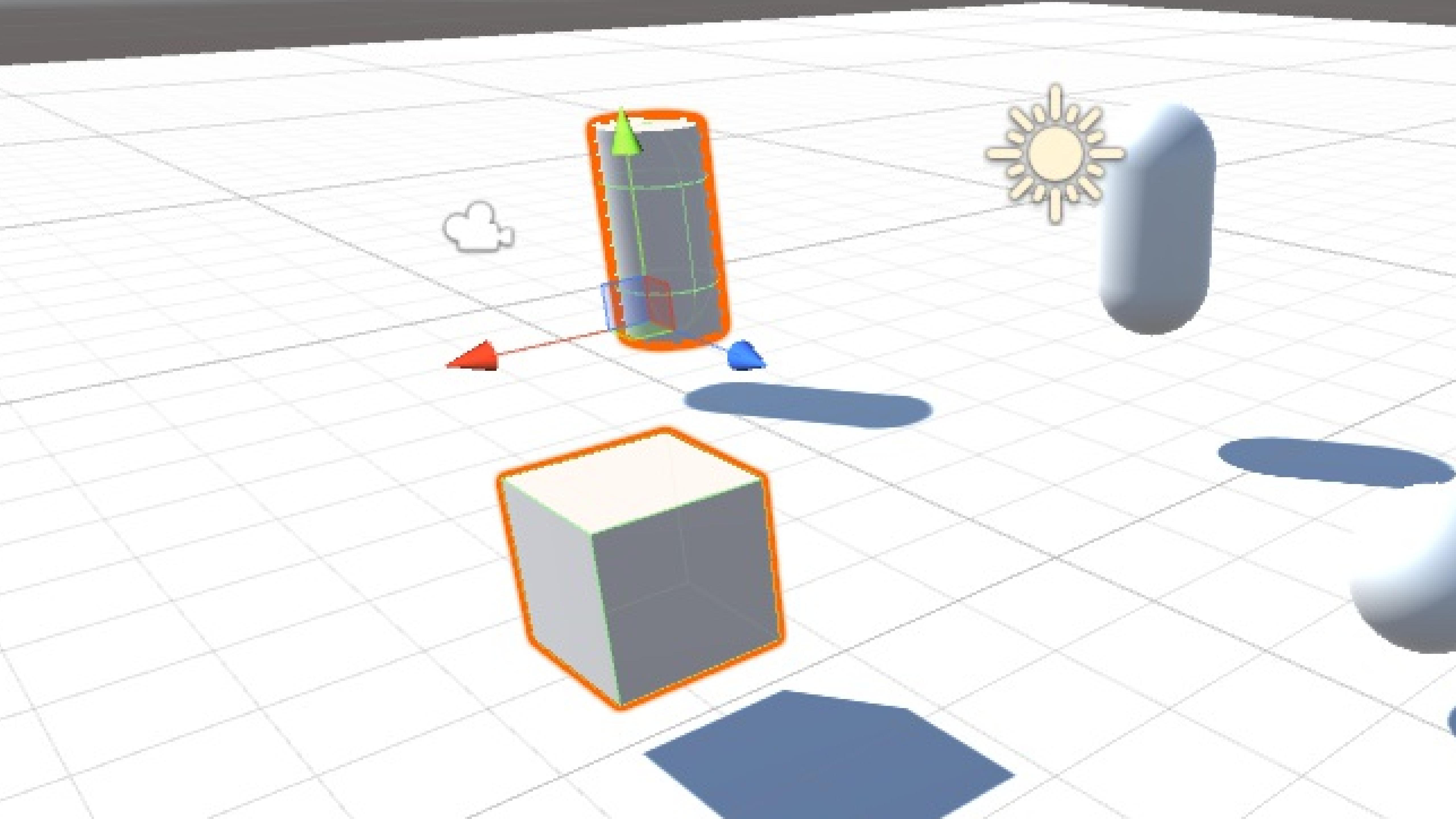
All

None

Cancel

Import





Position

X —

Y —

Z —

Rotation

X 0

Y 0

Z 0

Scale

X 1

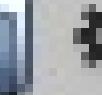
Y 1

Z 1

▼  Cylinder (Mesh Filter)  

Mesh

— 

▼  Mesh Renderer  

Cast Shadows

On 

Receive Shadows



Motion Vectors

Per Object Motion 

▼ Materials

Size

1

Element 0

 Default-Material 

Light Probes

Blend Probes 

Reflection Probes

Blend Probes 

Anchor Override

None (Transform) 

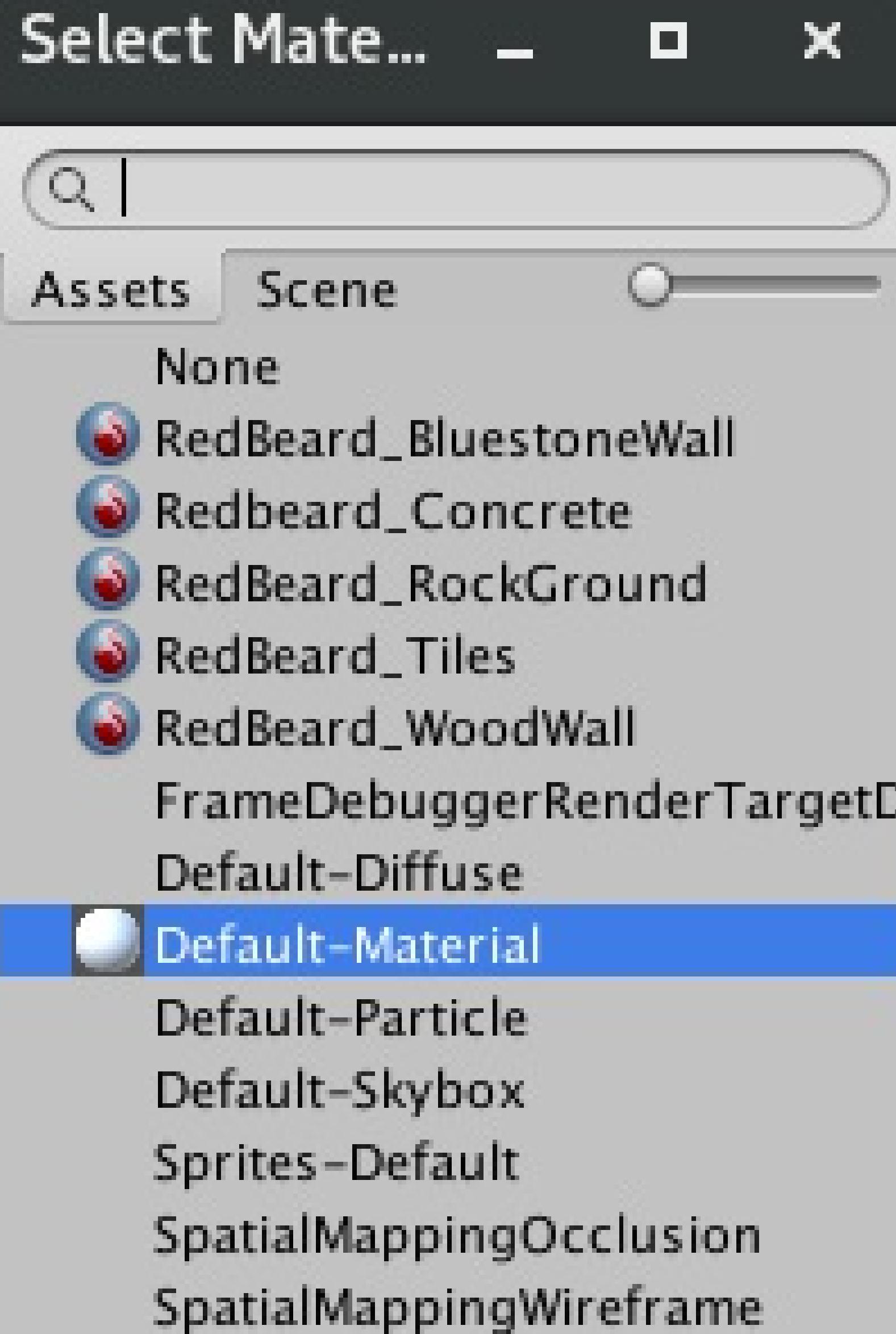
Default-Material



Shader

Standard

Components that are only on some of the selected objects cannot be multi-edited.



File Edit Assets GameObject Component Help Tools Window



Hierarchy

Untitled*

- Main Camera
- Directional Light
- Plane
- Cube
- Sphere
- Capsule
- Cylinder

Scene

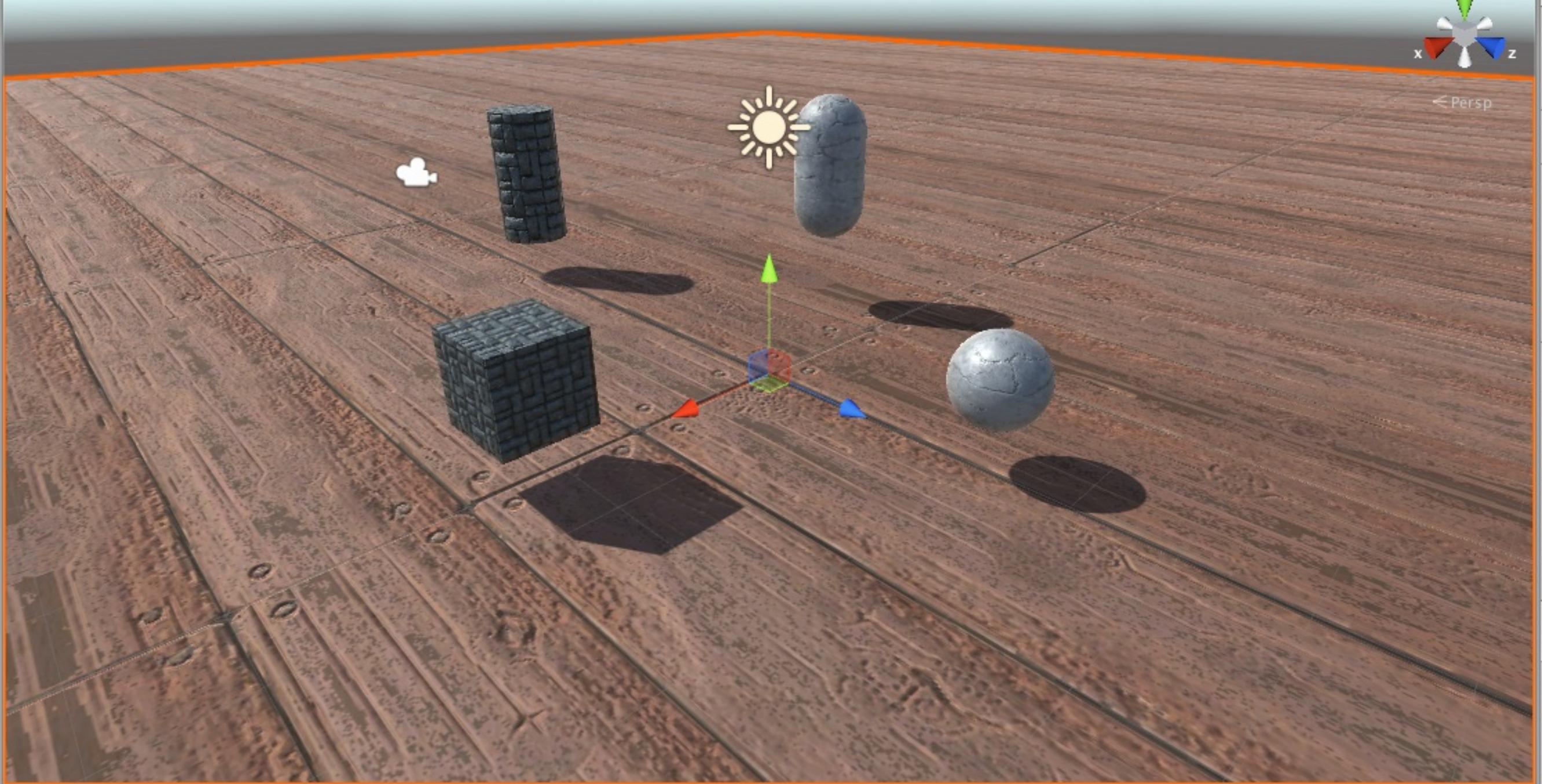
Shaded 2D

Gizmos

Asset Store



Cloud Account Layers Layout



Inspector

Plane

Tag Untagged

Layer Default

Transform

Position X 0 Y 0 Z 0

Rotation X 0 Y 0 Z 0

Scale X 10 Y 1 Z 10

Plane (Mesh Filter)

Mesh Plane

Mesh Collider

Convex

Inflate Mesh

Skin Width 0.01

Is Trigger

Material None (Physic Material)

Mesh Plane

Mesh Renderer

Cast Shadows

Receive Shadows

Motion Vectors

Materials

Size 1

Element 0 RedBeard_WoodWall

Light Probes Blend Probes

Reflection Probes Blend Probes

Anchor Override None (Transform)

RedBeard_WoodWall

Shader Standard

Rendering Mode Opaque

Main Maps

Albedo

Metallic

Smoothness

Source

Normal Map

Height Map

Occlusion

Emission

Global Illumination

Realtime

Detail Mask

Tiling

Offset

UV Set UV0

Secondary Maps

Detail Albedo x2

Normal Map

Tiling

Offset

UV Set UV0

Forward Rendering Options

Specular Highlights

Reflections

Procedural Properties

Generate all outputs

Generate Min Maps

Project

Create

Console

Favorites

All Materials

All Models

All Prefabs

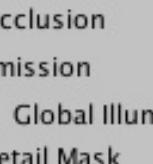
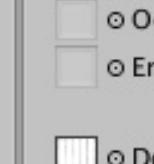
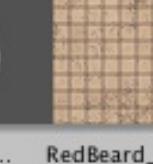
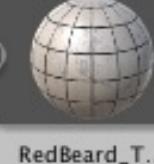
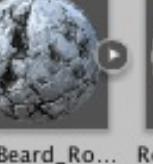
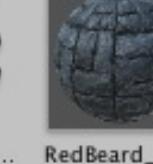
All Scripts

Assets

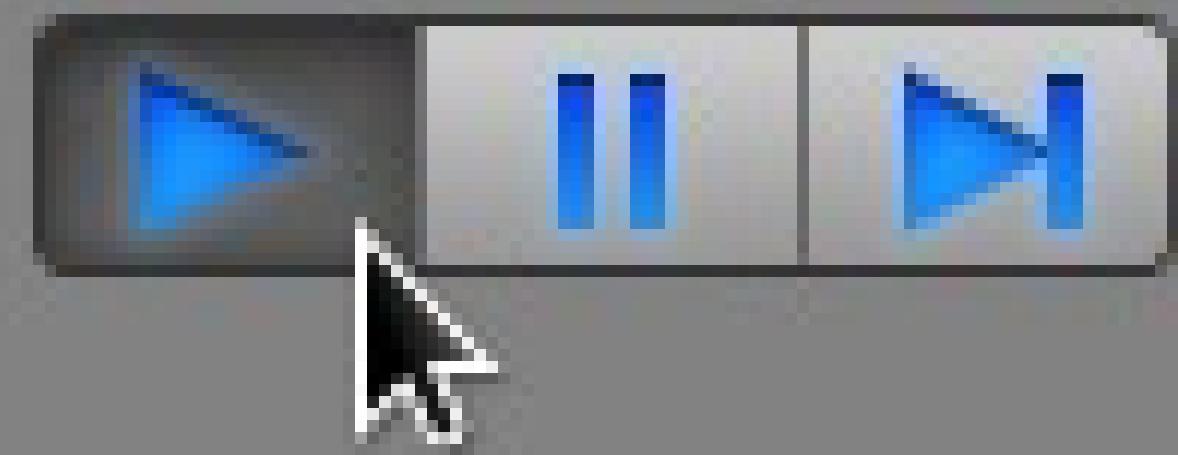
Editor

Assets

Editor



x Personal (64bit) - Untitled - Cardboard Sample - PC, Mac & Li



→ 1x

File Edit Assets GameObject Component Help Tools Window



Center Local

Hierarchy

Create Create All

Untitled*

- Main Camera
- Directional Light
- Plane
- Cube
- Sphere
- Capsule
- Cylinder

Scene Game Asset Store

Display 1 Free Aspect Scale 1x

Maximize On Play Mute Audio Stats Gizmos



Cloud Account Layers Layout

Inspector Services

Plane Tag Untagged Layer Default

Transform Position X 0 Y 0 Z 0

Rotation X 0 Y 0 Z 0

Scale X 10 Y 1 Z 10

Plane (Mesh Filter) Mesh Plane

Mesh Collider Convex

Inflate Mesh Skin Width 0.01

Is Trigger

Material None (Physic Material)

Mesh Plane

Mesh Renderer Cast Shadows On

Receive Shadows Check

Motion Vectors Per Object Motion

Materials Size 1

Element 0 RedBeard_WoodWall

Light Probes Blend Probes

Reflection Probes Blend Probes

Anchor Override None (Transform)

RedBeard_WoodWall Shader Standard

Rendering Mode Opaque

Main Maps Albedo

Metallic

Smoothness Source

Normal Map Metallic Alpha 1

Height Map

Occlusion

Emission

Global Illumination Realtime

Detail Mask

Tiling X 10 Y 10

Offset X 0 Y 0

Secondary Maps Detail Albedo x2

Normal Map

Tiling X 1 Y 1

Offset X 0 Y 0

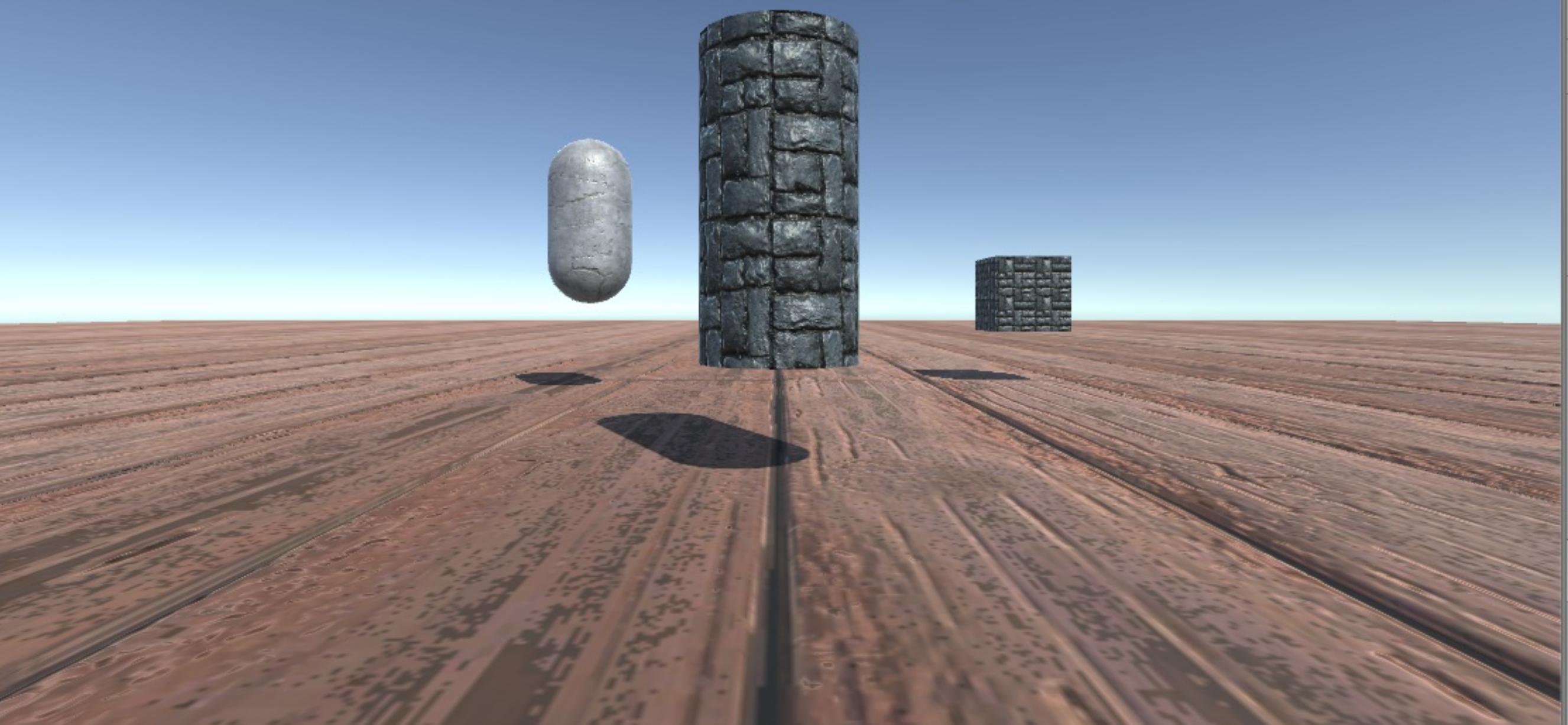
UV Set UV0

Forward Rendering Options Specular Highlights

Reflections

Procedural Properties Generate all outputs

Generate Min Maps



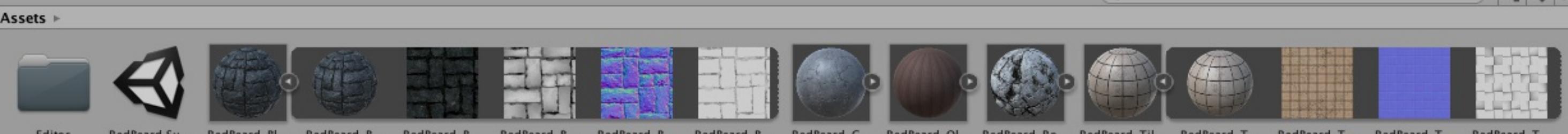
Project Console

Create

Favorites

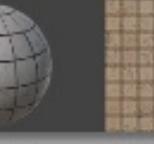
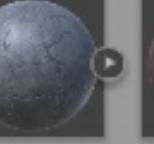
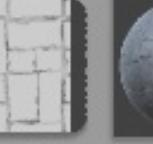
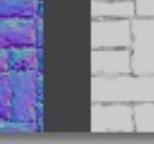
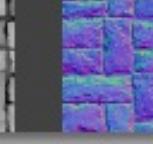
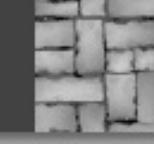
- All Materials
- All Models
- All Prefabs
- All Scripts

Assets



Editor

RedBeard Su...



File Edit Assets GameObject Component Help Tools Window

Add... Shift+Ctrl+A

Hierarchy The tool handle is placed at the center of the selected object.

Create **Q+Alt**

Untitled*

- Main Camera
- Directional Light
- Plane
- Cube
- Sphere
- Capsule
- Cylinder

Physics Rigidbody

- Character Controller
- Box Collider
- Sphere Collider
- Capsule Collider
- Mesh Collider
- Wheel Collider
- Terrain Collider
- Cloth
- Hinge Joint
- Fixed Joint
- Spring Joint
- Character Joint
- Configurable Joint
- Constant Force

Asset Store

Gizmos **Q+All**

Inspector Services

Tag Untagged **Layer** Default

Transform

Position	X	—	Y	—	Z	—
Rotation	X	0	Y	0	Z	0
Scale	X	1	Y	1	Z	1

Cylinder (Mesh Filter)

Mesh

Mesh Renderer

- Cast Shadows
- Receive Shadows
- Motion Vectors

Materials

- Size: 1
- Element 0
- Light Probes: Blend Probes
- Reflection Probes: Blend Probes
- Anchor Override: None (Transform)

Components that are only on some of the selected objects cannot be multi-edited.

Add Component

Project **Console**

Create

Favorites

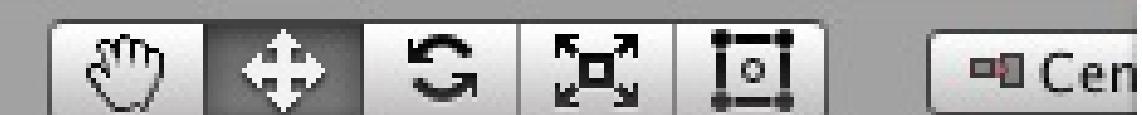
- All Materials
- All Models
- All Prefabs
- All Scripts

Assets

Editor RedBeard_Su... RedBeard_B... RedBeard_B... RedBeard_B... RedBeard_B... RedBeard_B... RedBeard_C... RedBeard_Ol... RedBeard_Ro... RedBeard_Til... RedBeard_Til... RedBeard_Til... RedBeard_Til...



File Edit Assets GameObject Component Help Tools Window



Hierarchy The tool handle is placed at the selected object's center.
Create ▾ Q+A

Untitled*

- Main Camera
- Directional Light
- Plane
- Cube
- Sphere
- Capsule
- Cylinder

Add... Shift+Ctrl+A

Mesh ► Scene Asset Store

Effects ►

Physics ► Rigidbody

Physics 2D ► Character Controller

Navigation ► Box Collider

Audio ► Sphere Collider

Rendering ► Capsule Collider

Layout ► Mesh Collider

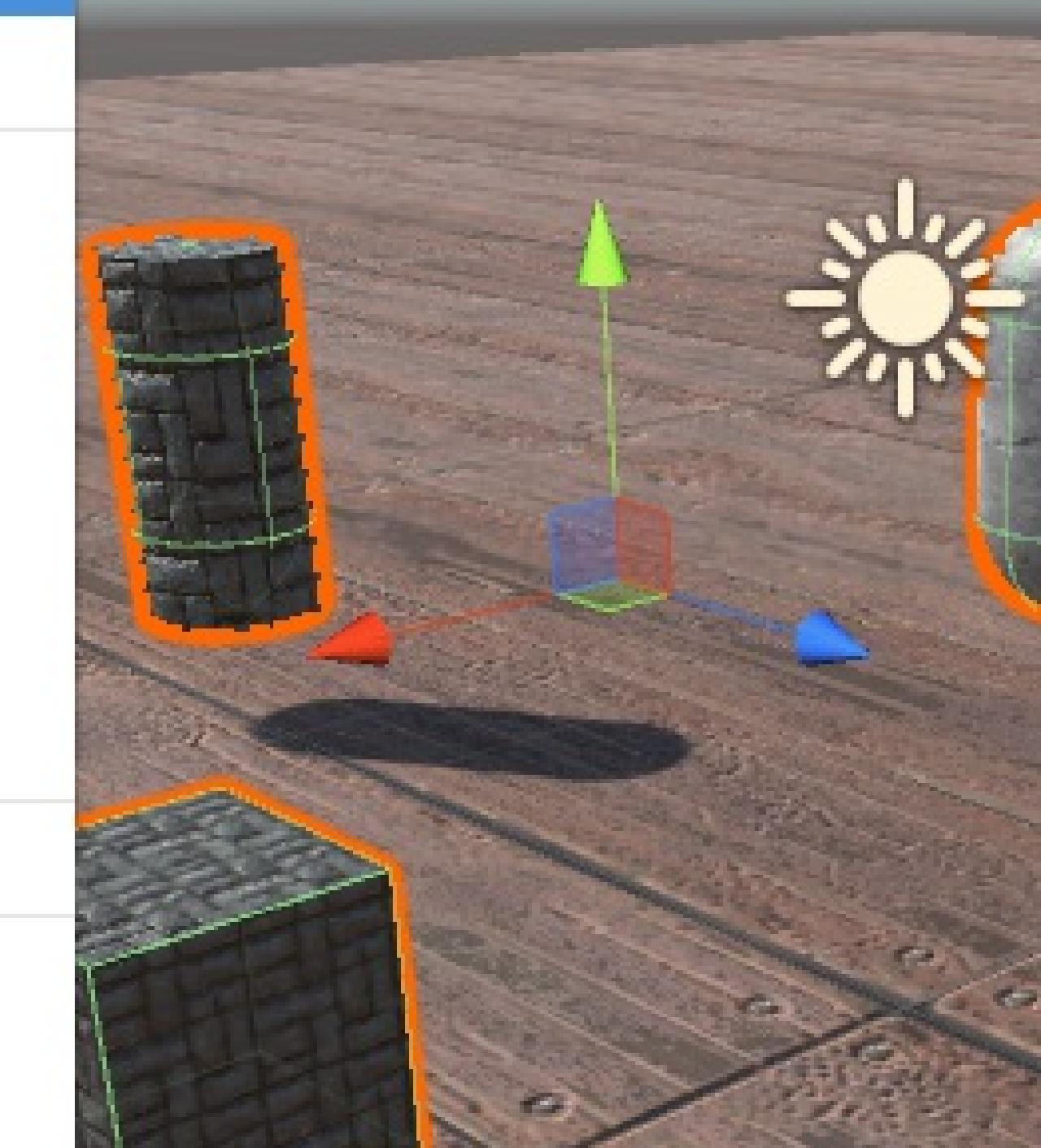
Miscellaneous ► Wheel Collider

Scripts ► Terrain Collider

Analytics ► Cloth

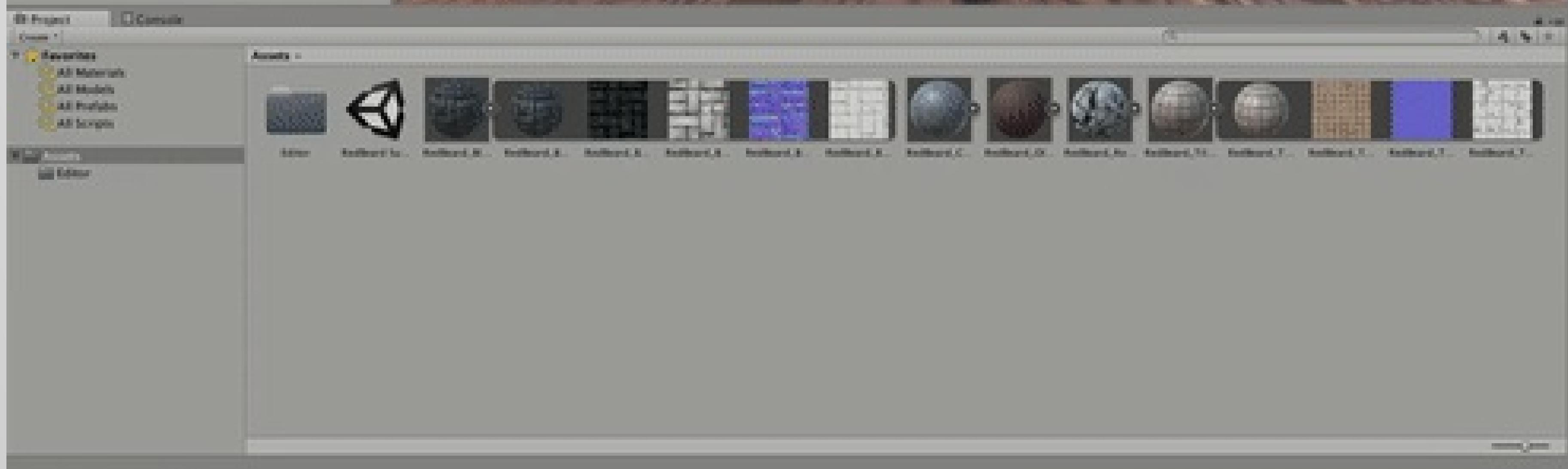
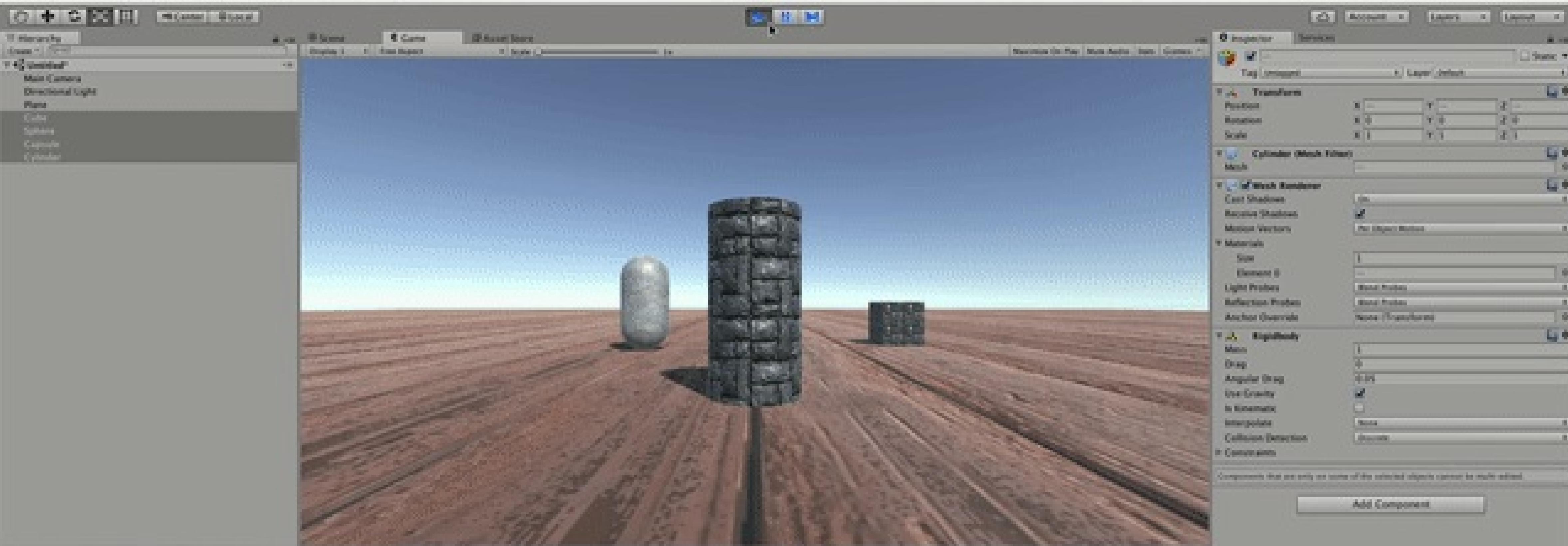
Event ► Hinge Joint

Network ► Fixed Joint





File Edit Assets GameObject Component Help Tools Window



File Edit Assets GameObject Component Help Tools Window



Center Local



Cloud Account Layers Layout

Hierarchy

Create (Q>All)
Untitled*
Main Camera
Directional Light
Plane
Cube
Sphere
Capsule
Cylinder
Cylinder (1)
Capsule (1)
Sphere (1)
Cube (1)
Capsule (2)
Capsule (3)
Cylinder (2)
Cube (2)
Cube (3)
Sphere (2)
Sphere (3)
Sphere (4)
Sphere (5)
Sphere (6)
Cube (4)
Cube (5)

Scene Game Asset Store

Shaded 2D

Gizmos (Q>All)

Persp

x y z

<Persp

← Persp

↑ Persp

↓ Persp

→ Persp

← Persp

File Edit Assets GameObject Component Help Tools Window



M Hierarchy

Assets

Main Camera

Directional Light

Plane

Cube

Sphere

Capsule

Cylinder

Cube (2)

Capsule (2)

Sphere (2)

Cube (2)

Capsule (2)

Cylinder (2)

Cube (2)

Cube (2)

Sphere (2)

File Edit **Assets** GameObject Component Help Tools Window

Create Open Containing Folder Open Open in Look Dev Delete Open Scene Additive Import New Asset... Import Package Export Package... Find References In Scene Select Dependencies Refresh Ctrl+R Reimport Reimport All Reimport All Run API Updater... Open C# Project

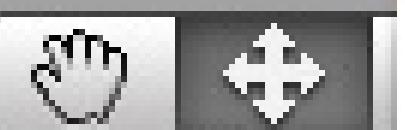
Scene Game Asset Store Shaded 2D Gizmos All Persp

Custom Package...

The Unity Editor interface is shown with the following details:

- Assets Menu:** The "Assets" menu is open, showing options like Create, Import Package (which is selected), and Custom Package... (highlighted with a blue box).
- Scene View:** Displays a 3D scene with several floating spheres and cubes on a wooden floor.
- Inspector View:** Shows various components and settings for selected objects.
- Project View:** Shows the "Assets" tab, which contains a folder icon, a cube icon, and several material icons labeled RedBeard_Su..., RedBeard_Bl..., RedBeard_C..., RedBeard_Ol..., RedBeard_Ro..., RedBeard_Til..., and sample-scene.
- Bottom Status Bar:** Shows a warning message: "Assets/Editor/ScreenshotTaker.cs(17,7): warning CS0414: The private field 'Screenshot.showPreview' is assigned but its value is never used".

File Edit **Assets** GameObject Component Help Tools Window



Create

Open Containing Folder

Open

Open in Look Dev

Delete

Open Scene Additive

Import New Asset...

Import Package

Export Package...

Find References In Scene

Capsule (1)

Cylinder (1)

Refresh

Ctrl+R

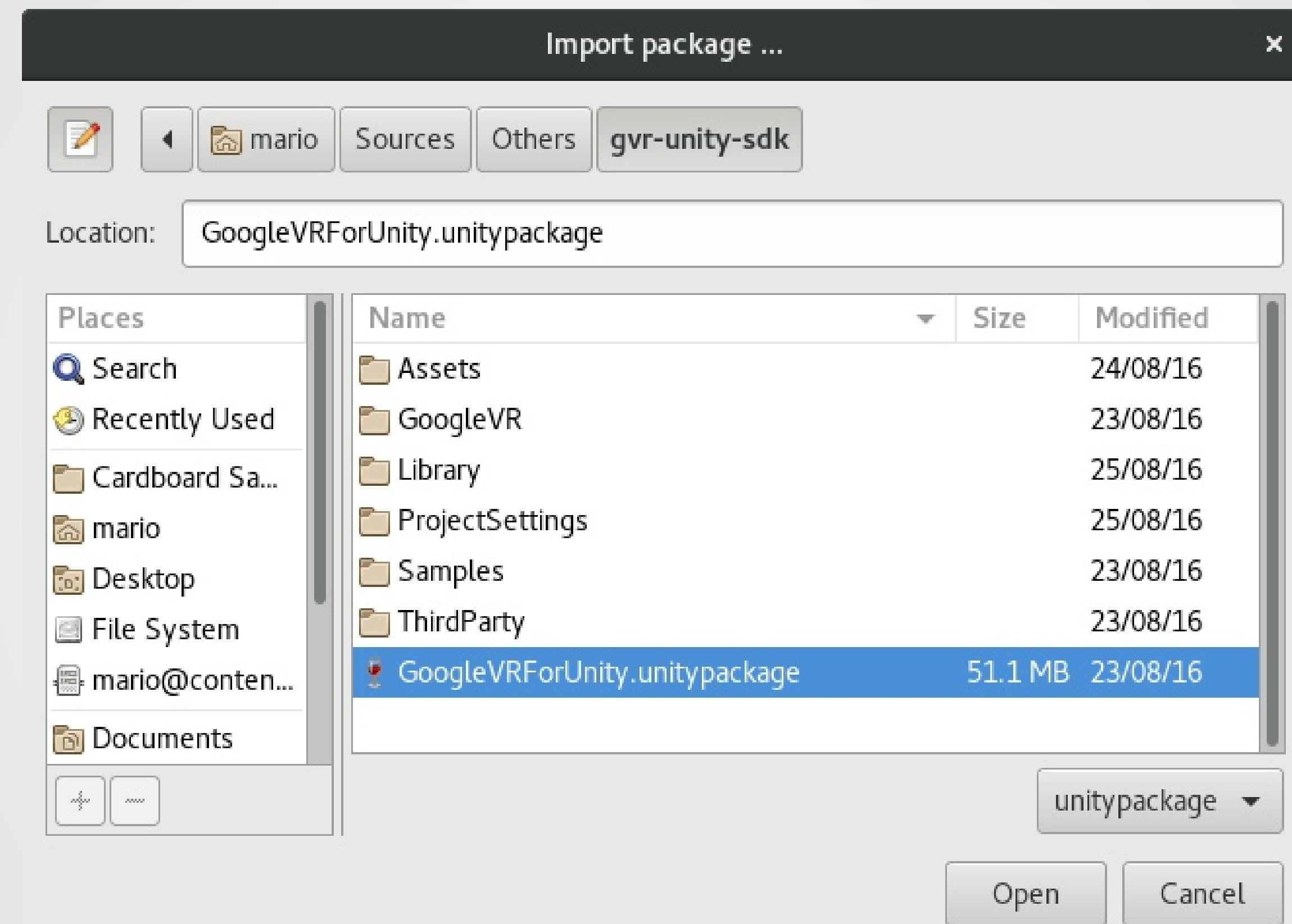
Reimport

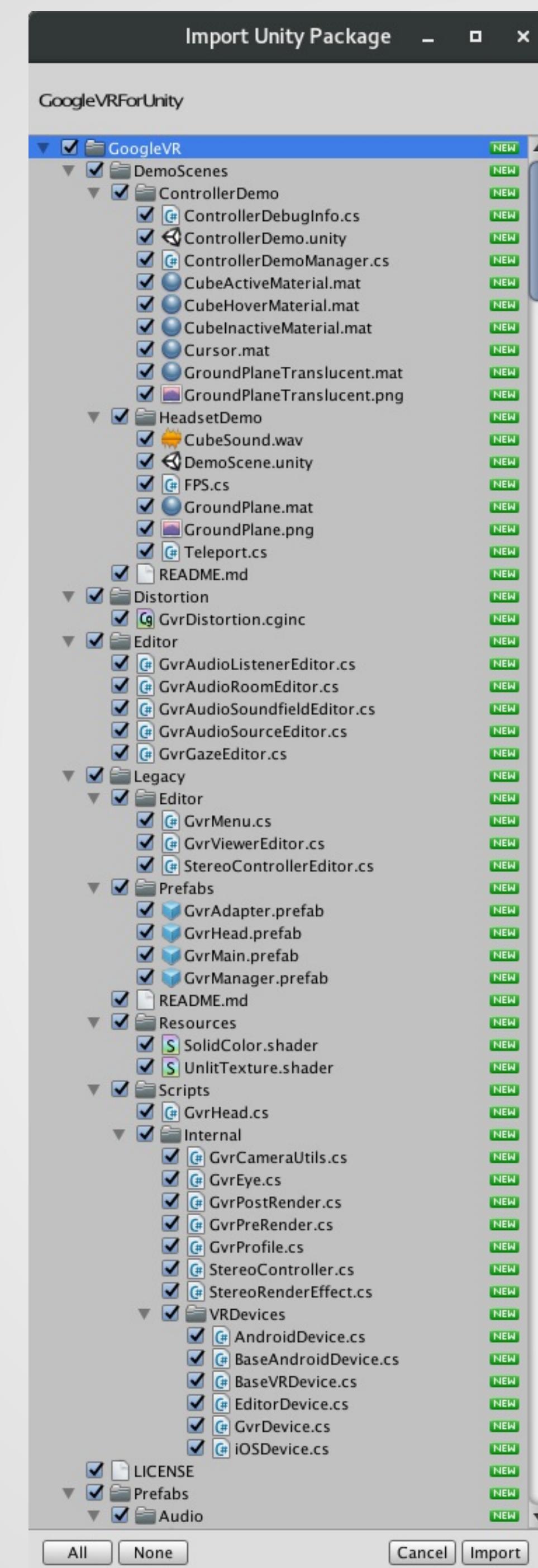
Reimport All

Run API Updater...

Scene Game Asset Store
Shaded 2D









API Update Required



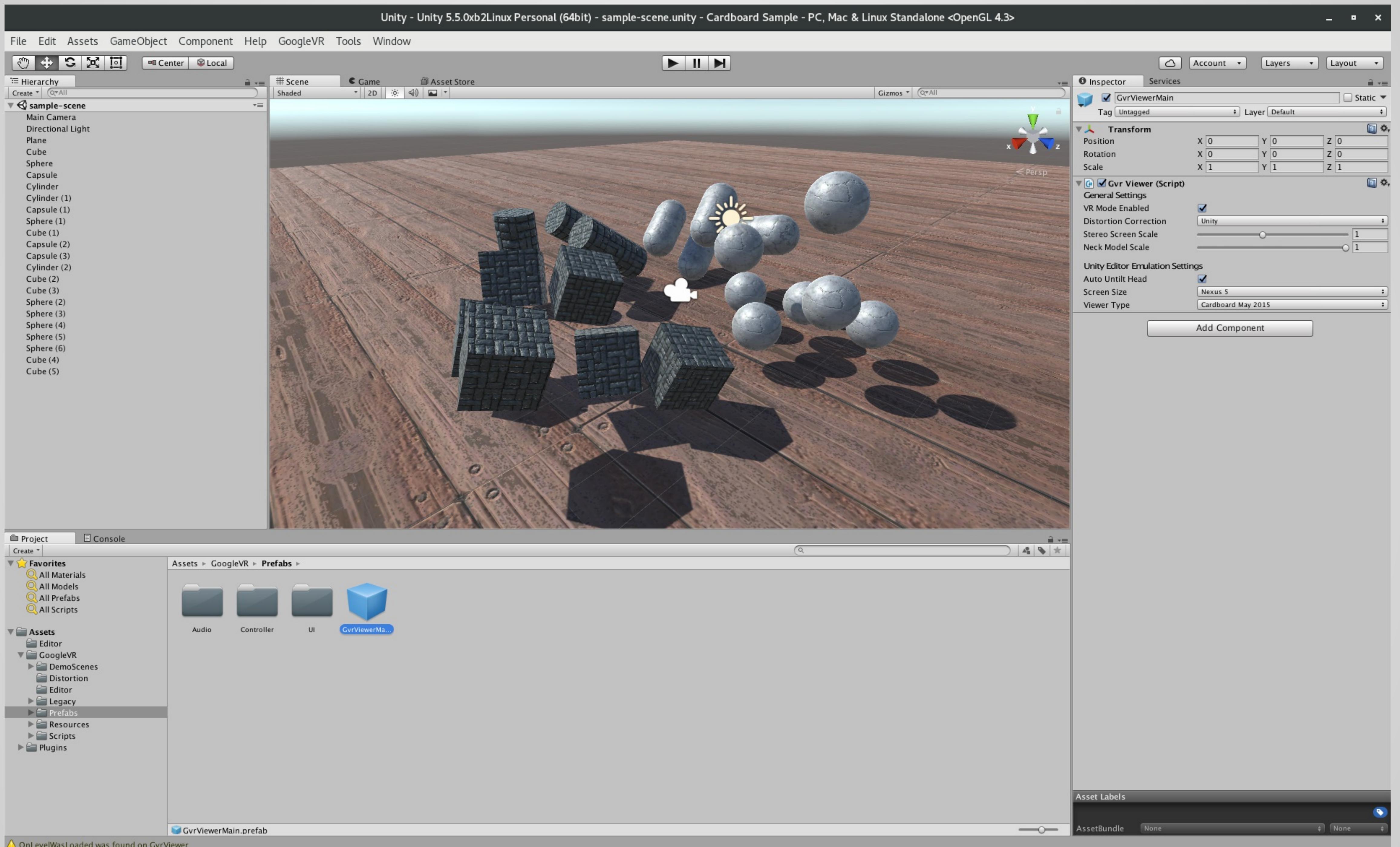
This project contains scripts and/or assemblies that use obsolete APIs.

If you choose 'Go Ahead', Unity will automatically upgrade any scripts/assemblies in the Assets folder found using the old APIs. You should make a backup before proceeding.

(You can always run the API Updater manually via the 'Assets/Run API Updater' menu command.)

I Made a Backup. Go Ahead!

No Thanks



Create ▾

▼ ★ Favorites

- 🔍 All Materials
- 🔍 All Models
- 🔍 All Prefabs
- 🔍 All Scripts

▼ Assets

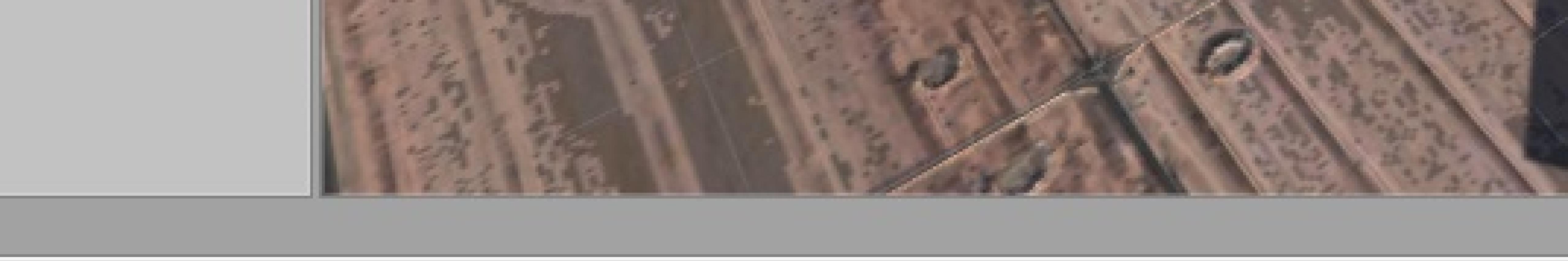
- 📁 Editor
- ▼ GoogleVR
 - ▶ DemoScenes
 - ▶ Distortion
 - ▶ Editor
 - ▶ Legacy
 - ▶ Prefabs
 - ▶ Resources
 - ▶ Scripts
 - ▶ Plugins

Assets ➔ GoogleVR ➔ Prefabs



Audio

Controller



Assets ▶ GoogleVR ▶ Prefabs ▶



Audio



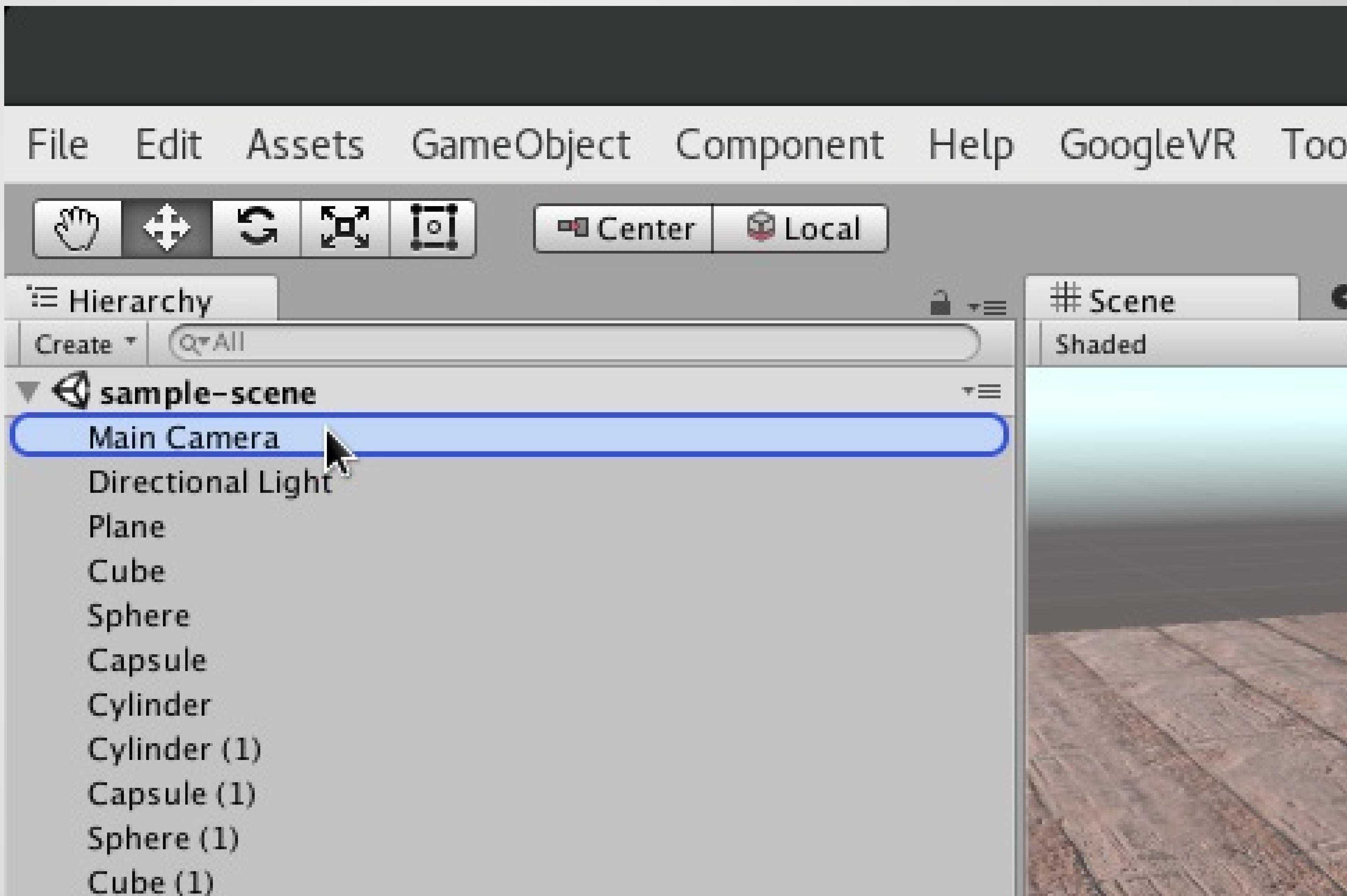
Controller



UI



GvrViewerMa...



File Edit Assets GameObject Component Help GoogleVR Tools Window



Center Local



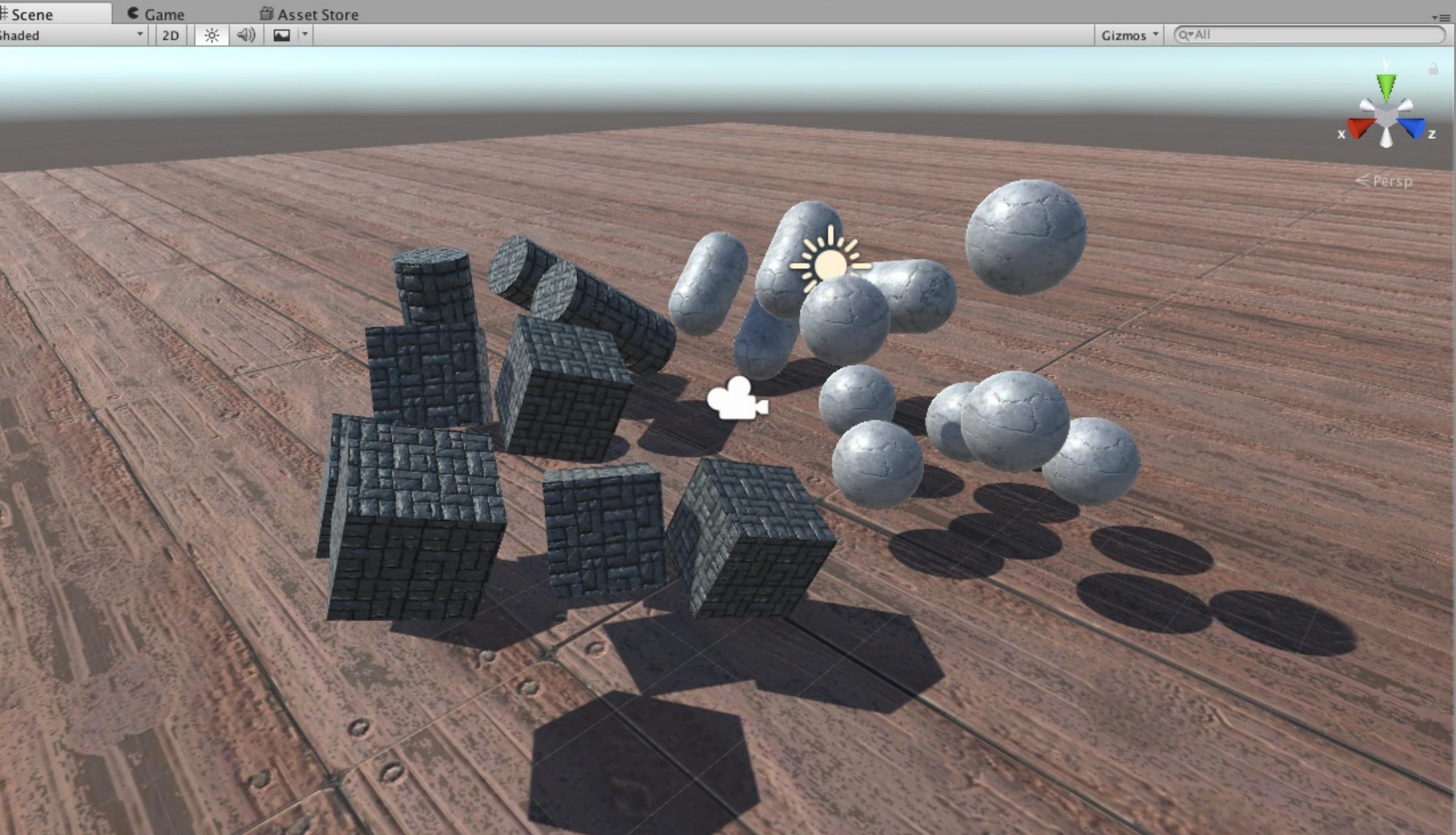
Cloud Account Layers Layout

Hierarchy

Create (All)

sample-scene

- Main Camera
- Directional Light
- Plane
- Cube
- Sphere
- Capsule
- Cylinder
- Cylinder (1)
- Capsule (1)
- Sphere (1)
- Cube (1)
- Capsule (2)
- Capsule (3)
- Cylinder (2)
- Cube (2)
- Cube (3)
- Sphere (2)
- Sphere (3)
- Sphere (4)
- Sphere (5)
- Sphere (6)
- Cube (4)
- Cube (5)



Inspector Services

GvrViewerMain

Tag Untagged Layer Default

Transform

Position	X 0	Y 0	Z 0
Rotation	X 0	Y 0	Z 0
Scale	X 1	Y 1	Z 1

Gvr Viewer (Script)

General Settings

VR Mode Enabled

Distortion Correction

Stereo Screen Scale

Neck Model Scale

Unity Editor Emulation Settings

Auto Until Head

Screen Size

Viewer Type

Add Component

Project Console

Create

Favorites

- All Materials
- All Models
- All Prefabs
- All Scripts

Assets

- Editor
- GoogleVR
- DemoScenes
- Editor
- Legacy
- Prefabs
- Resources
- Scripts
- Plugins

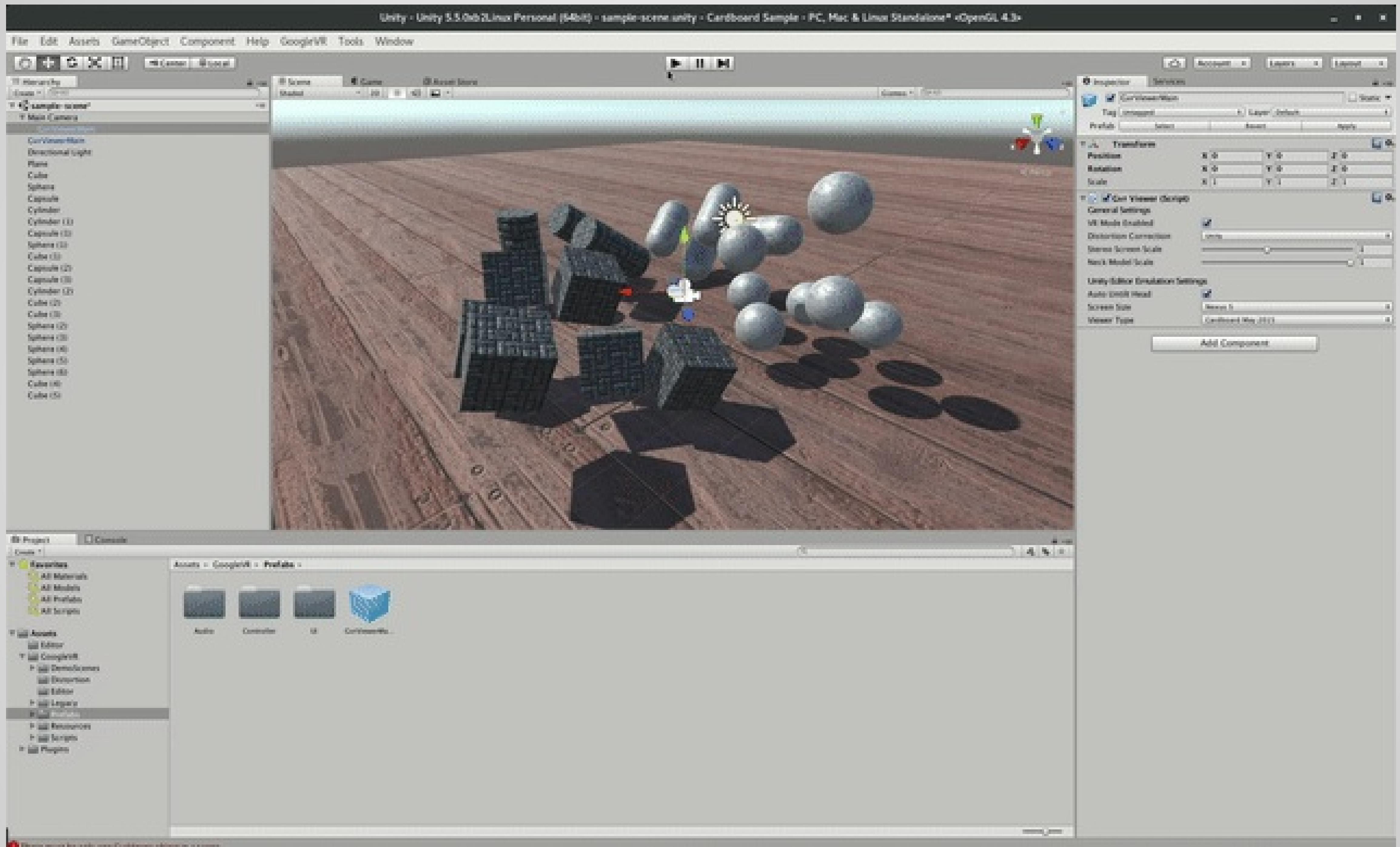
Assets > GoogleVR > Prefabs >

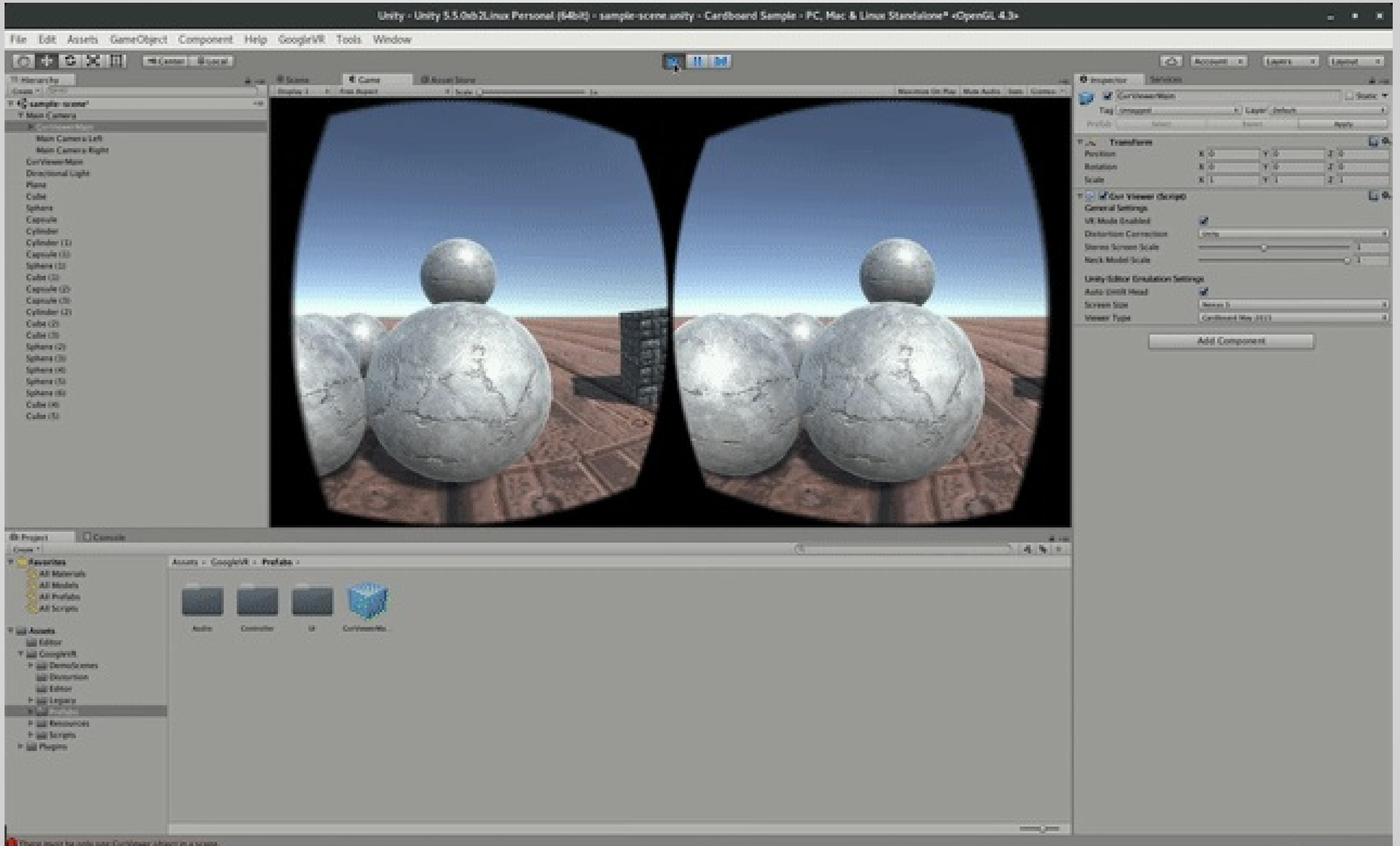
Audio Controller UI GvrViewerMa...

Asset Labels

AssetBundle None

OnLevelWasLoaded was found on GvrViewer





Summary of Unity Demo

- Using Unity is fast
- Using Cardboard SDK is easy
- Using internal renderer for simulating

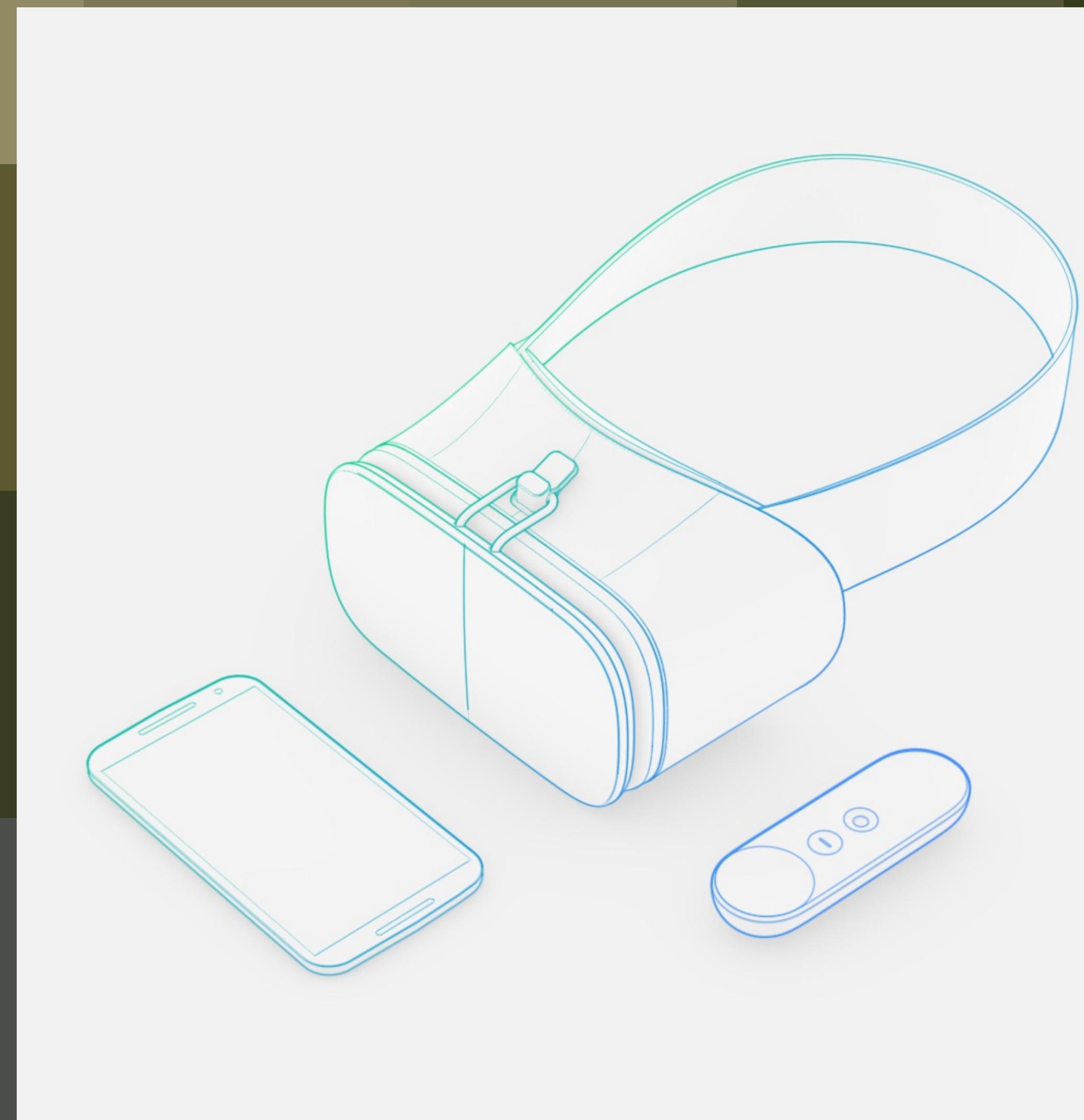


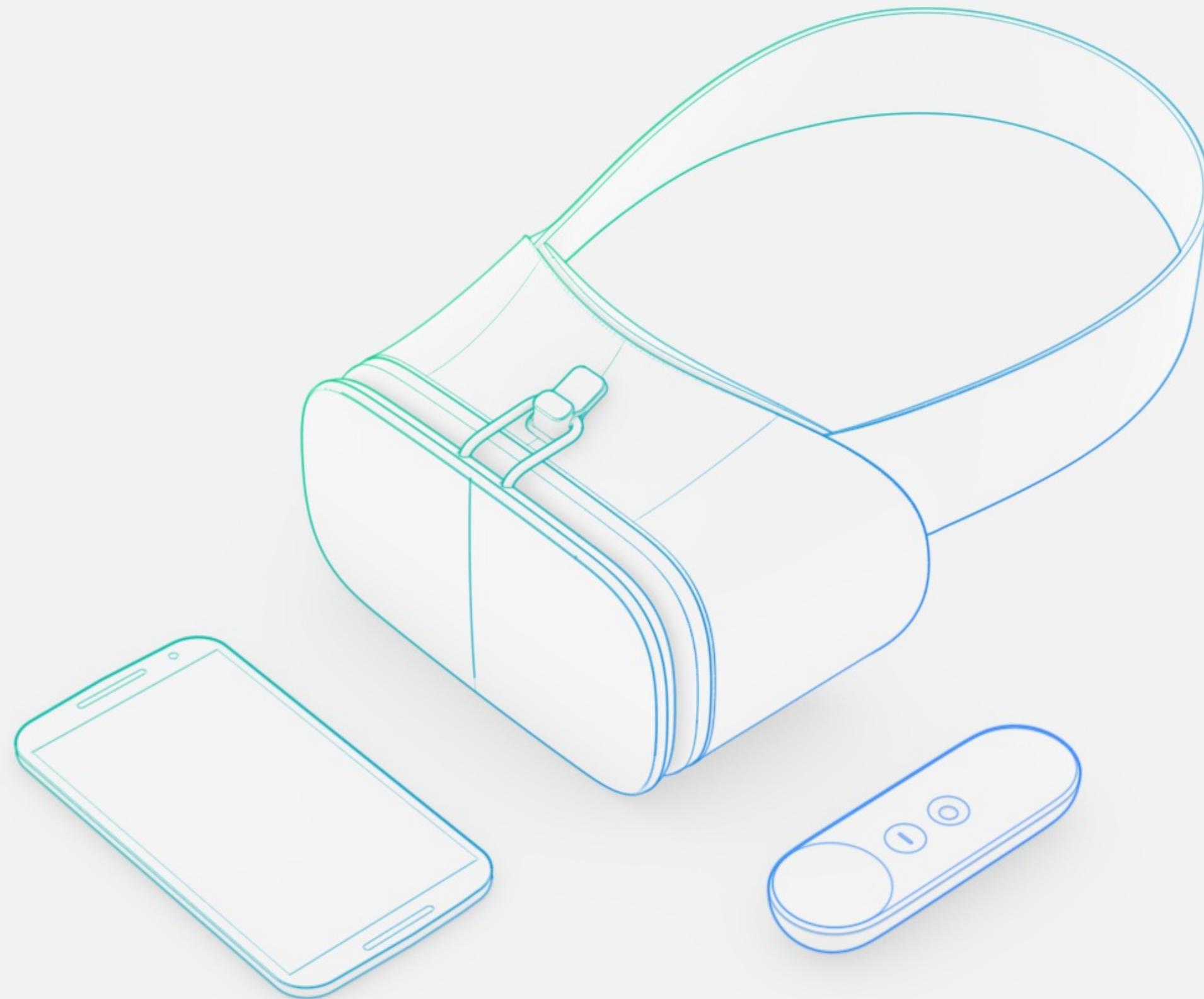
Difficulties in using Unity

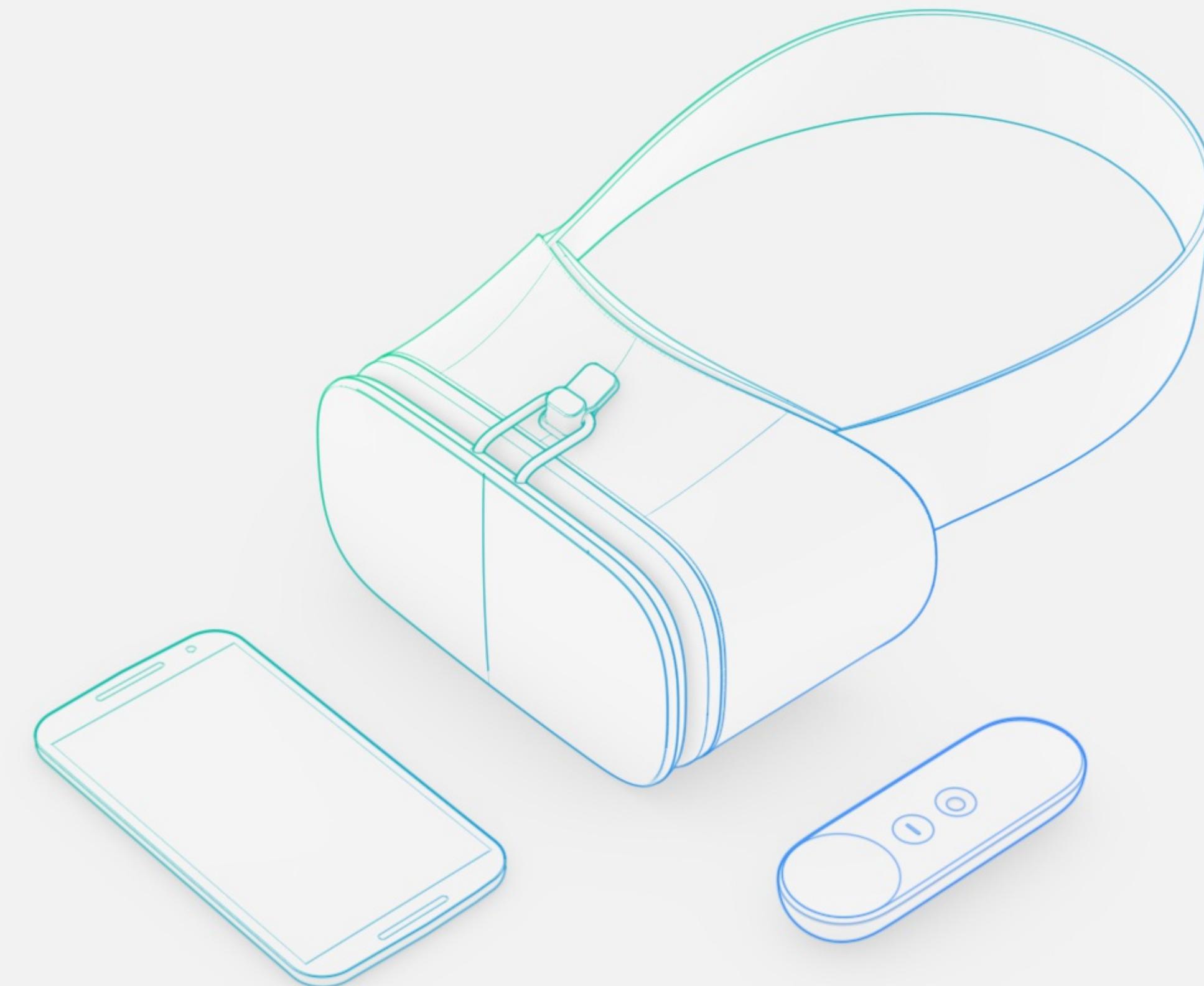
- Cost for non free version exists.
- Integration with other (Java) libraries difficult at best.
- Sending of Intents (aka interacting with Android OS / apps) is rather hard.

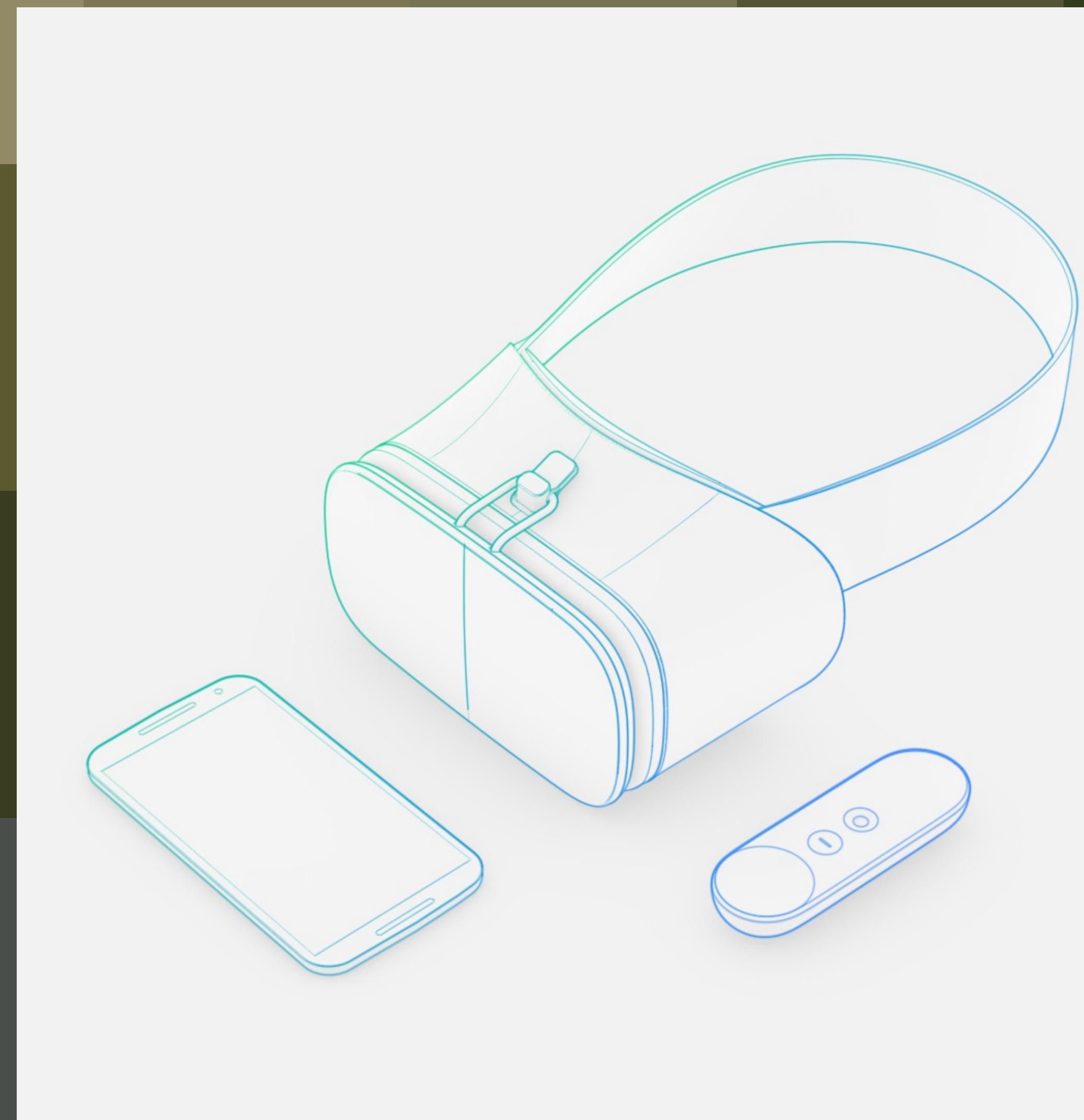


Daydream









New SDK features

- Controlling the controller
 - orientation/acceleration
 - input (Clickpad: x,y, clicked, App Button, Vol+/-)
- spatial audio engine
- VR View

i

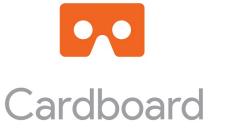
Deprecation & Deletion

- depreciation of v1.0 Cardboards 
- magnets are uncool!
- depreciation of cardboard button infavor of controller
- renaming Cardboard* packages to Gvr*

Adding Photospheres to a simple project

Limitations of Android SDK

- using 3D models has to be done by
 - either low level OpenGL or
 - 3rd party 3d engine

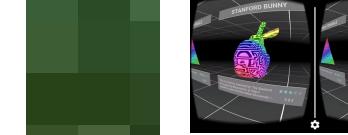


Cardboard



Google Cardboard

- easy to produce
- available from different companies
- in different styles/interactions
- You just need a phone™



How does Cardboard work?

- use 3D data and movement to draw two images
 - one for the left and right eye
- contains lenses to move things away
- brain combines image to 3D scene

How do you program for it?

Googles SDKs are available for

- Android (OpenGL)
- iOS (Objective C)
- Unity Engine (C# / JS) x (e.g., Δ)

What do those SDKs provide?

- lens distortion correction
- spatial audio
- head tracking
- 3D calibration
- side-by-side rendering

What else do they provide?

- stereo geometry configuration
- user input event handling
- see developer.google.com/vr/android/

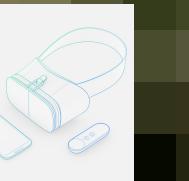
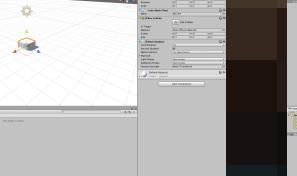
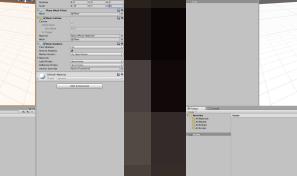
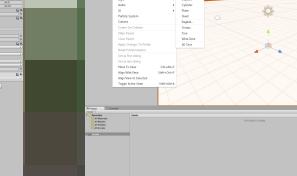
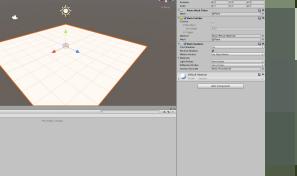
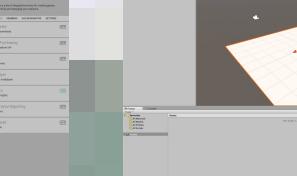
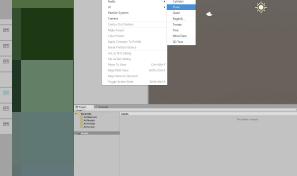
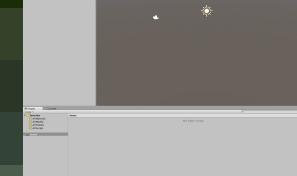
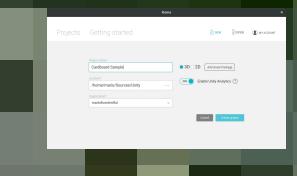
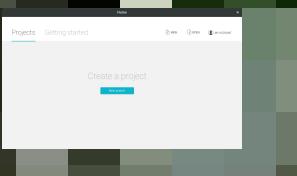


How do I write a Unity App?



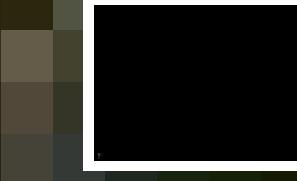
Prerequisites

- clone Google's GitHub for Unity
 - <https://github.com/googlevr/google-unity-sdk>
- install and open Unity
 - <https://store.unity.com/>
 - <http://forum.unity3d.com/threads/unity-on-linux-release-notes-and-known-issues.350256/>



New SDK features

- Controlling the controller
 - orientation/acceleration
 - Input (Click/Up, x/y, Clicked, App.Button, Vol+/-)
 - spatial audio engine
 - VR View



Deprecation & Deletion

- Deprecation of UI Components
 - magenta are uncool!
- deprecation of cardboard button flavor of controller
- renaming `BaseController` packages to `VRController`

Adding Photospheres to a simple project

Limitations of Android SDK

- using 3D models has to be done by
 - either low level OpenGL
 - 3rd party 3D engine

What will you build?

🎥 General 🎥 Controller 🎥 Designing

📄 Google VR Github

🐦 @MarioBodemann