

Daydreaming about Cardboards

Virtual Reality in Android



b0



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

Agenda

Daydreaming about
Cardboards

Virtual Reality in simple slides

contentful

- [CMS: contentful.com](#)
- [@MarioBodemann](#)
- [bit.ly/mvrvberlin](#)
- Please interrupt

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/>

Projects Getting started

Create a project

New SDK features

- Controlling the controller
 - orientation/acceleration
 - clickpad (xy, clicked)
 - buttons (App, Vol+/-)
- spatial audio engine

Controller

Daydream

build?

Bodemann



Cardbooo

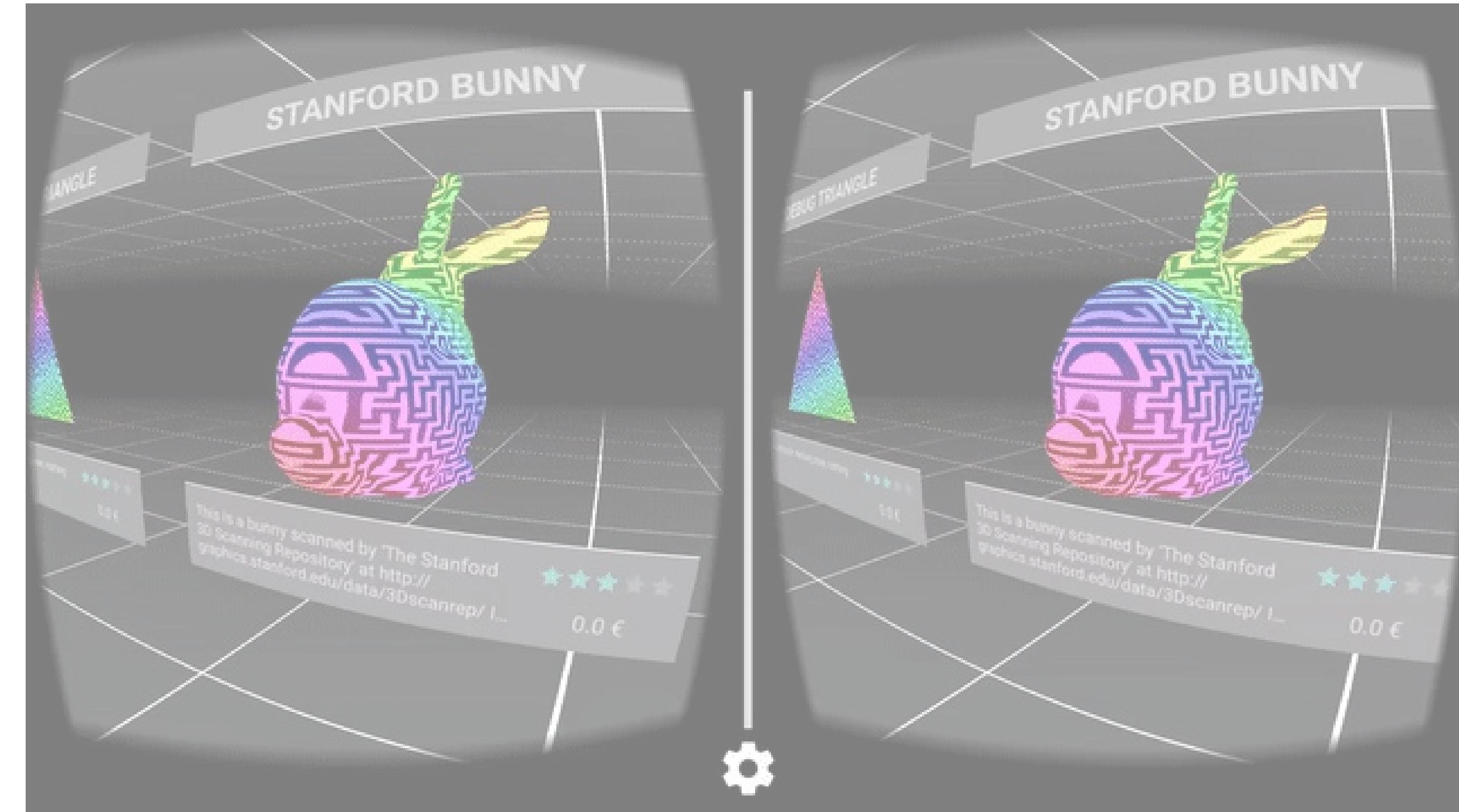
Google Cardboard

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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 ( ,  ,  , )

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?

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-  / https://store.unity.com/

-  : <http://forum.unity3d.com/threads/unity-on-linux-release-notes-and-known-issues.350256/>

Home

x

Projects

Getting started

NEW

OPEN

MY ACCOUNT

Create a project

New project

Home X

Projects Getting started  NEW  OPEN  MY ACCOUNT

Project name* 3D 2D Add Asset Package

Location* ON Enable Unity Analytics ?

Organization*

Cancel Create project

File Edit Assets GameObject Component Help Window



Cloud Account Layers Layout

Hierarchy
Create (Q+All)
Untitled
Main Camera
Directional Light

Scene Game Asset Store Shaded 2D 3D Gizmos (Q+All)



<Persp

Project Console

Create Favorites
All Materials
All Models
All Prefabs
All Scripts

Assets

This folder is empty

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

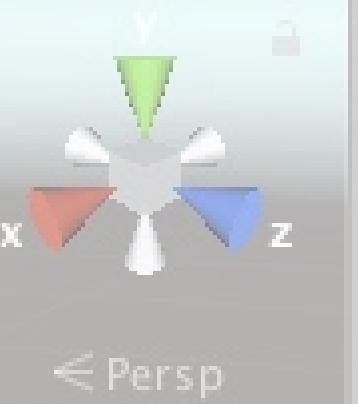
Analytics Discover player insights

Performance Reporting Discover app errors

Cloud Build Build games faster

Shaded | 2D | ☼ | ⌛ | 🔍 | ⌂ | ⌂

Gizmos | ⌂ All



This folder is empty

Cardbo SERVICES

Unity provides you
increasing productivit

SERVICES

Collaboration
Create together se

In-App Purchases
Simplify cross-plat

Ads
Monetize your game

Multiplayer
Easily implement r

Analytics
Discover player ins

Performance
Discover app error

Cloud Bu

File Edit Assets GameObject Component Help Window

Hierarchy Create Untitled Main Camera Directional Light

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

Game Asset Store Gizmos

Persp

Cardboard Sample

SERVICES

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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

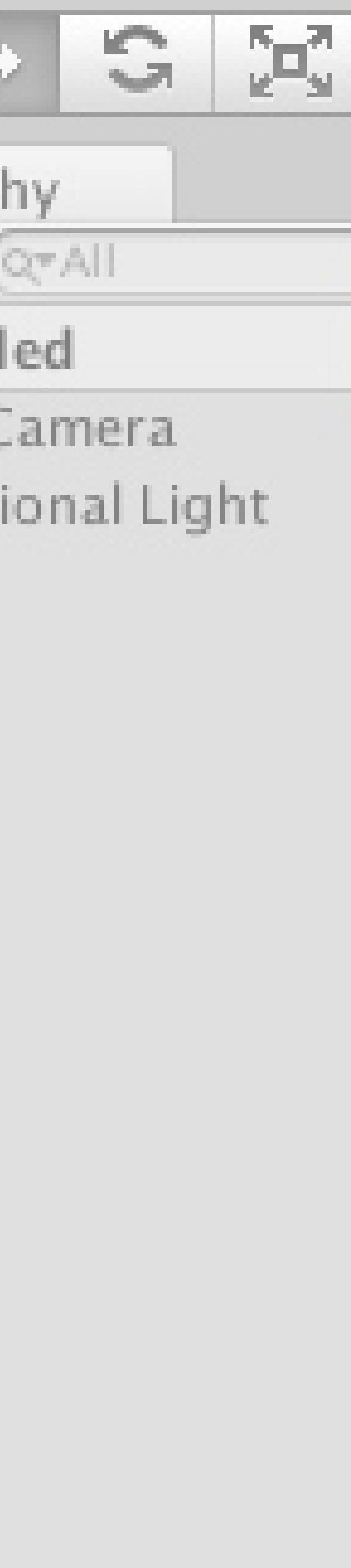
Performance Reporting Discover app errors OFF

Cloud Build Build games faster OFF

Project Console

Favorites All Materials All Models All Prefabs All Scripts

Assets This folder is empty



Create Empty

Shift+Ctrl+N

Create Empty Child

Shift+Alt+N

3D Object



2D Object

Sphere

Light

Capsule

Audio

Cylinder

UI

Plane

Particle System

Quad

Camera

Ragdoll...

Center On Children

Terrain

Make Parent

Tree

Clear Parent

Wind Zone

File Edit Assets GameObject Component Help Window



Hierarchy

Create Untitled*

Main Camera
Directional Light
Plane



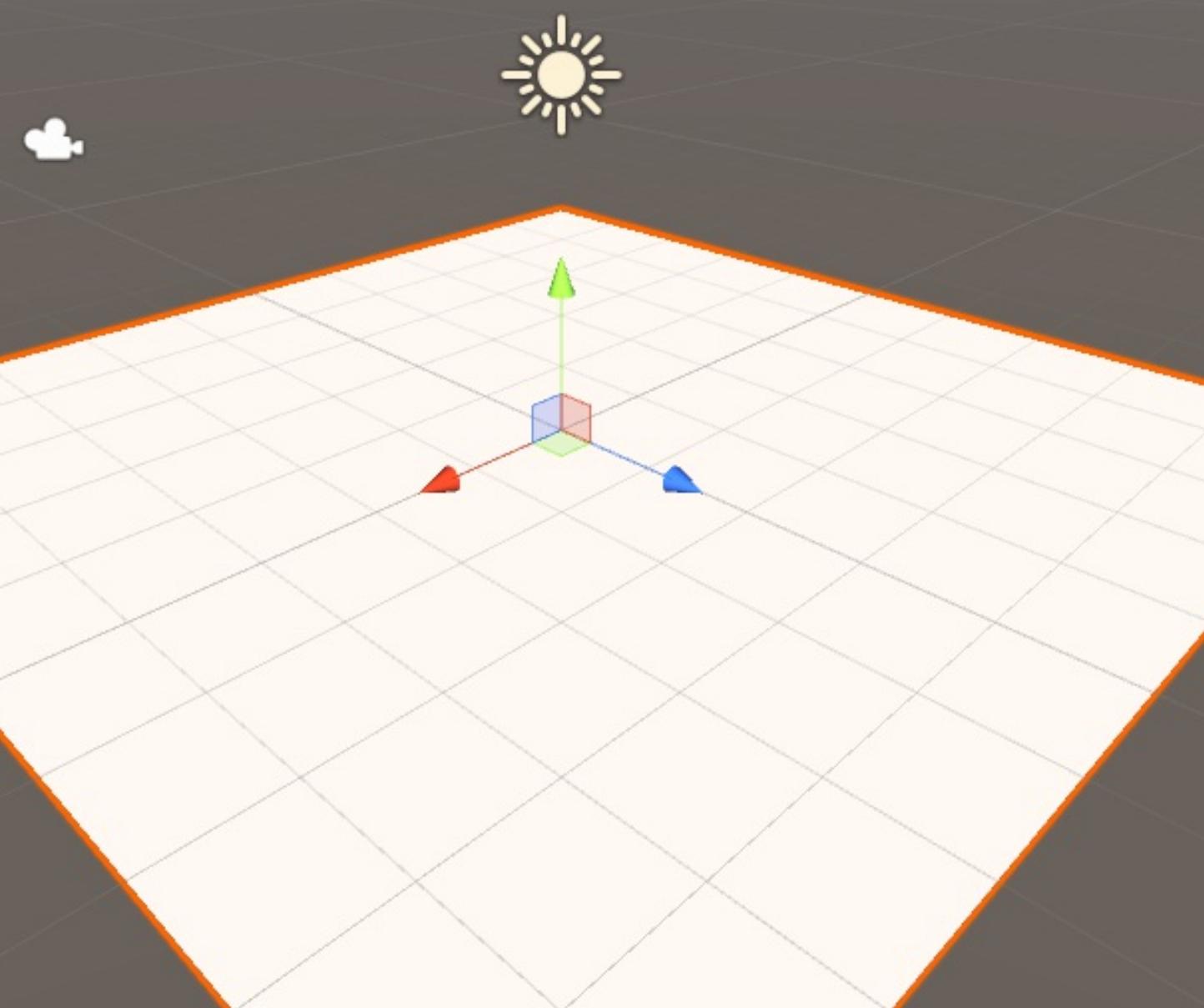
Scene Game Asset Store

Shaded 2D



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
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- 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



Cloud Account Layers Layout

Hierarchy

Create

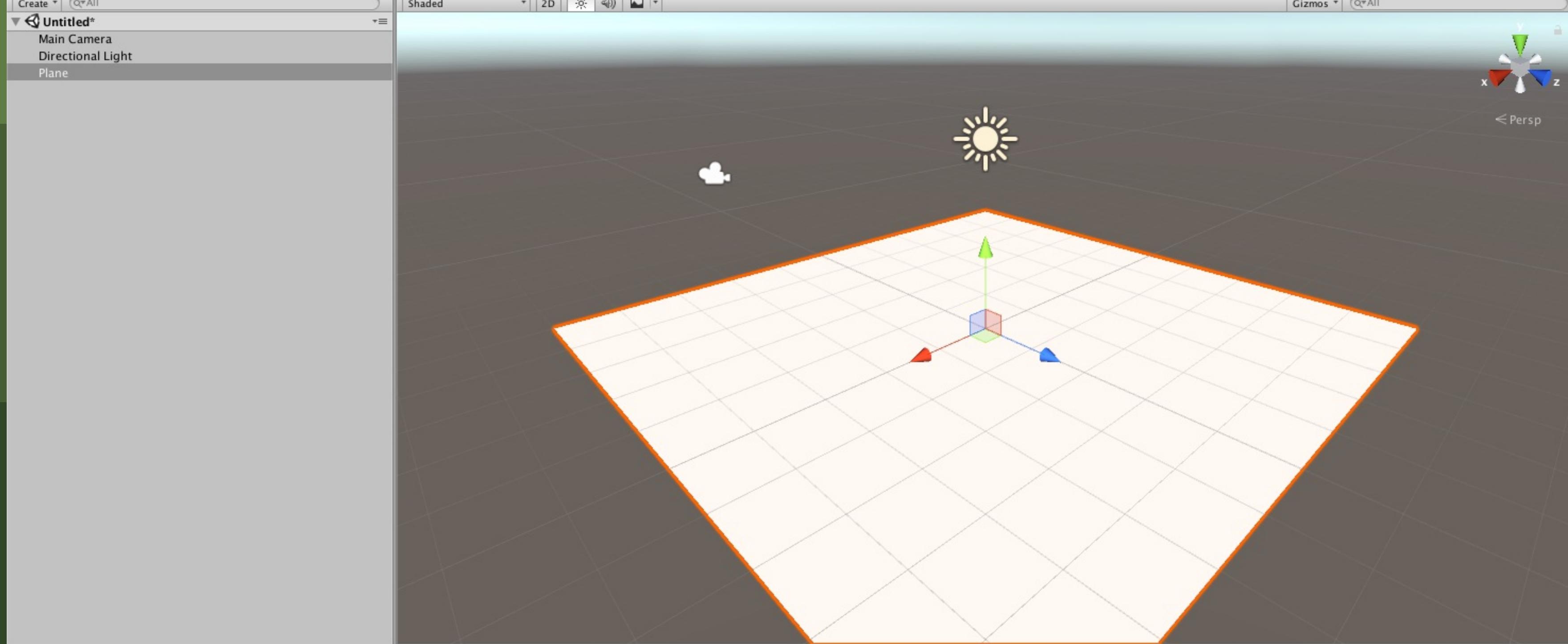
Untagged

Main Camera

Directional Light

Plane

Scene Game Asset Store



Inspector Services

Plane

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

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

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

Create

Favorites

All Materials

All Models

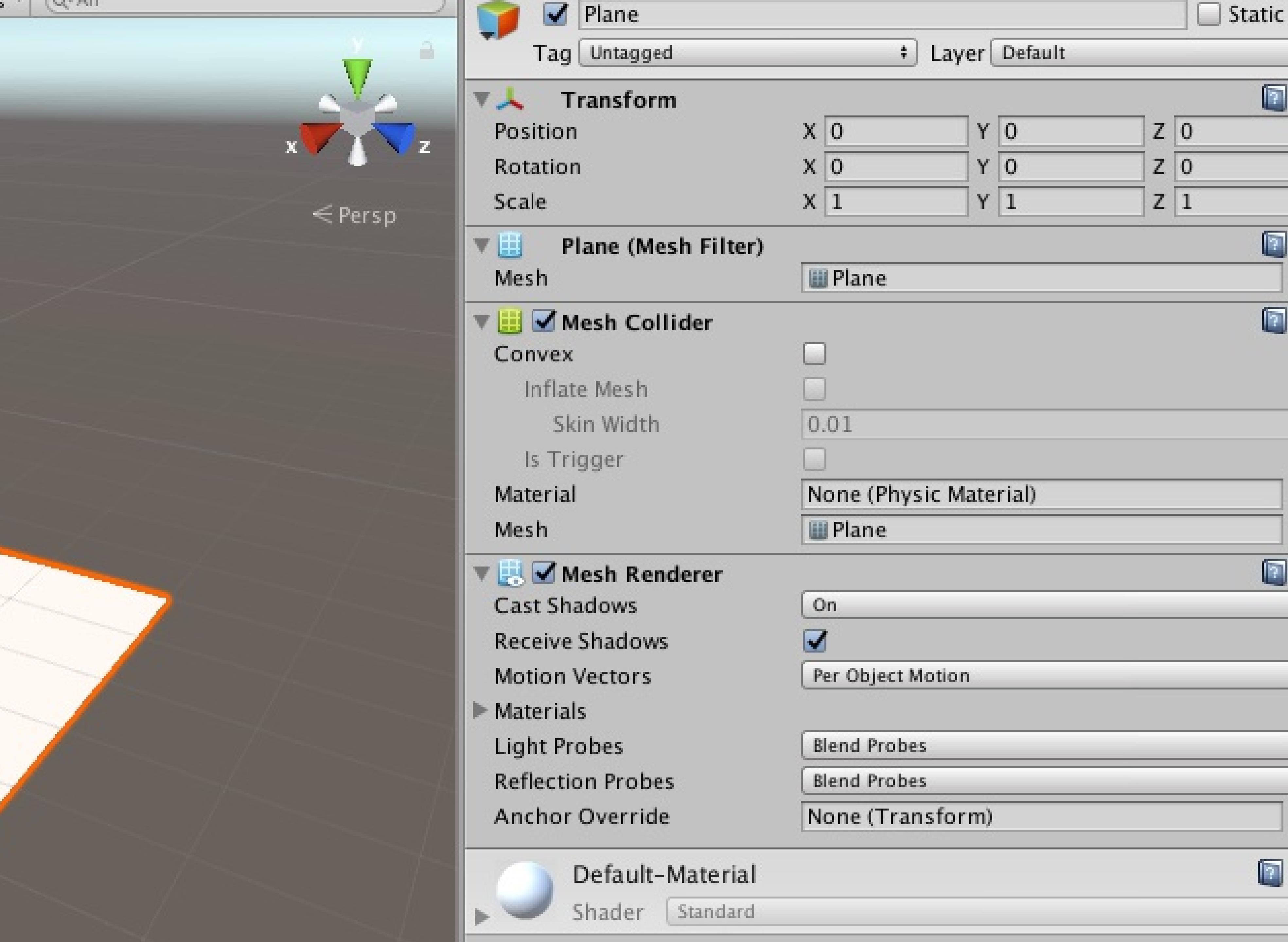
All Prefabs

All Scripts

Assets

Assets

This folder is empty



File Edit Assets GameObject Component Help Window



Cloud Account Layers Layout

Hierarchy

Create

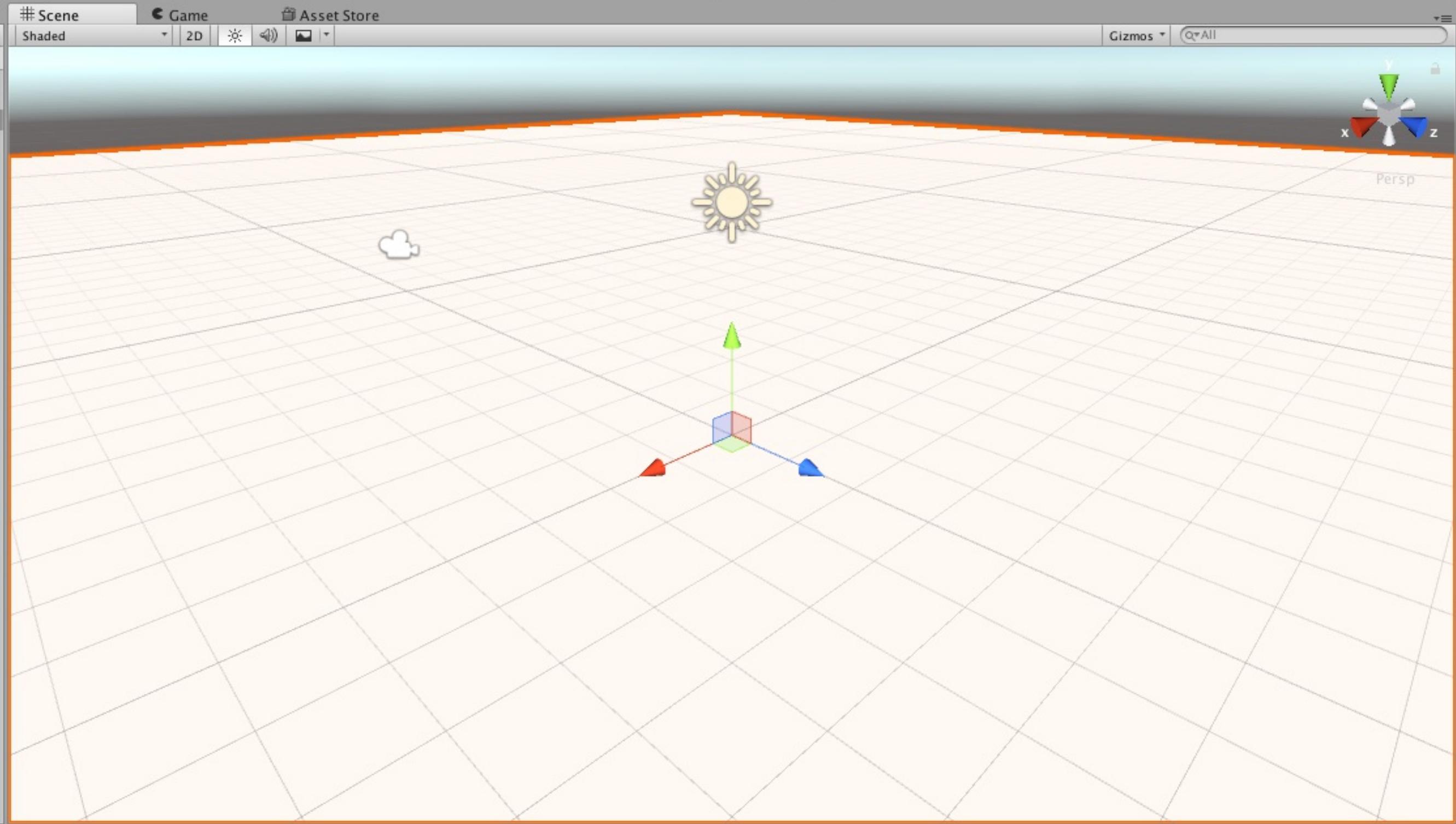
Q All

Untitled*

Main Camera

Directional Light

Plane



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

Mesh Collider

Convex

Inflate Mesh

Skin Width 0.01

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Mesh Renderer

Cast Shadows On

Receive Shadows Per Object Motion

Motion Vectors

Materials

Light Probes Blend Probes

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Default-Material

Shader Standard

Add Component

Project Console

Create

Favorites

All Materials

All Models

All Prefabs

All Scripts

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



Center Local



Cloud Account Layers Layout

Hierarchy

Create Untitled*

Main Camera

Directional Light

Plane

Cube

Scene Game Asset Store

Shaded 2D

Gizmos

Q>All

Q2D

QGizmos

QAll

Gizmos

QAll

Persp

QAll

Q2D

QGizmos

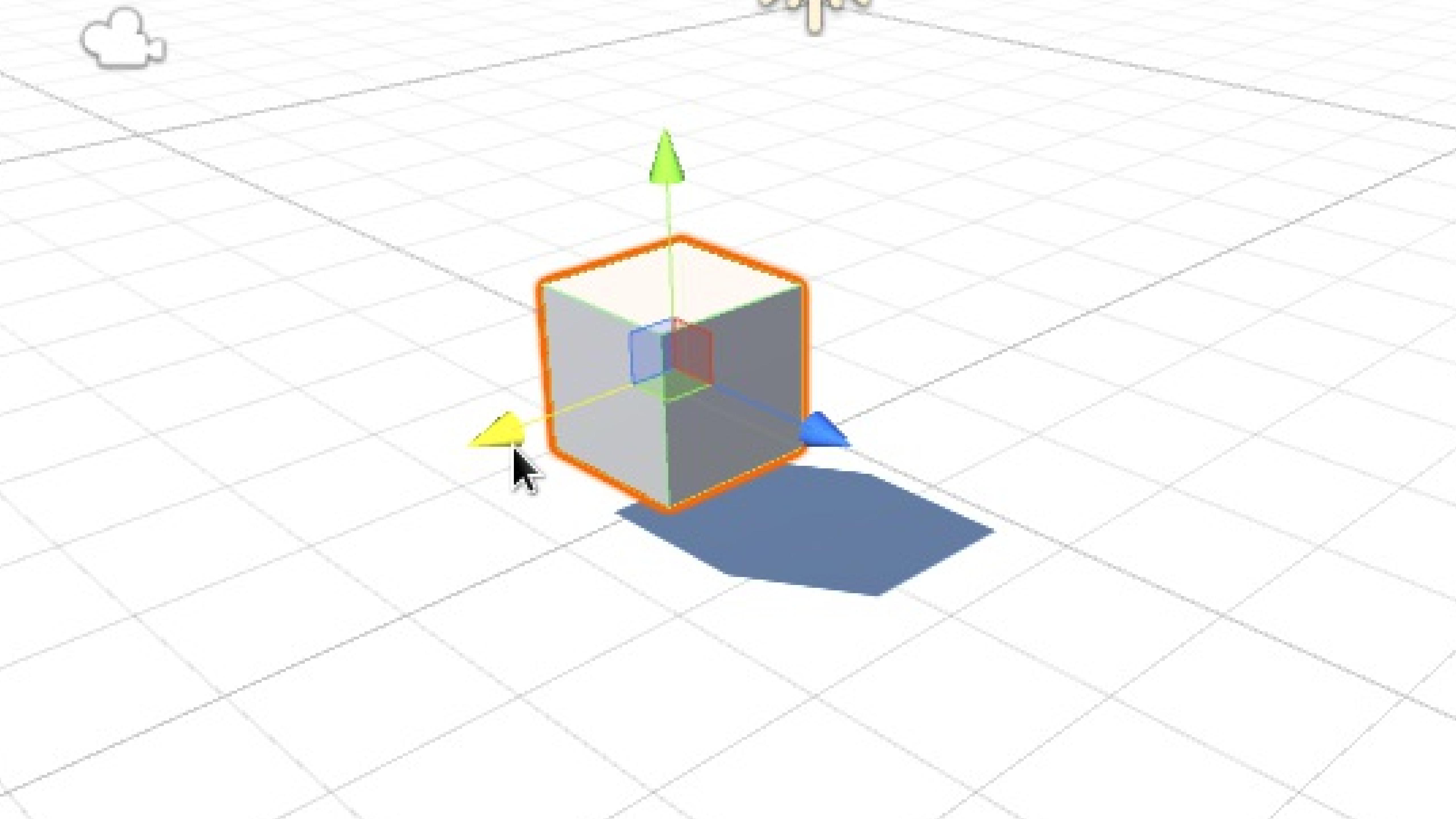
QAll

QAll

Q2D

QGizmos

<p



File Edit Assets GameObject Component Help Window



Center Local



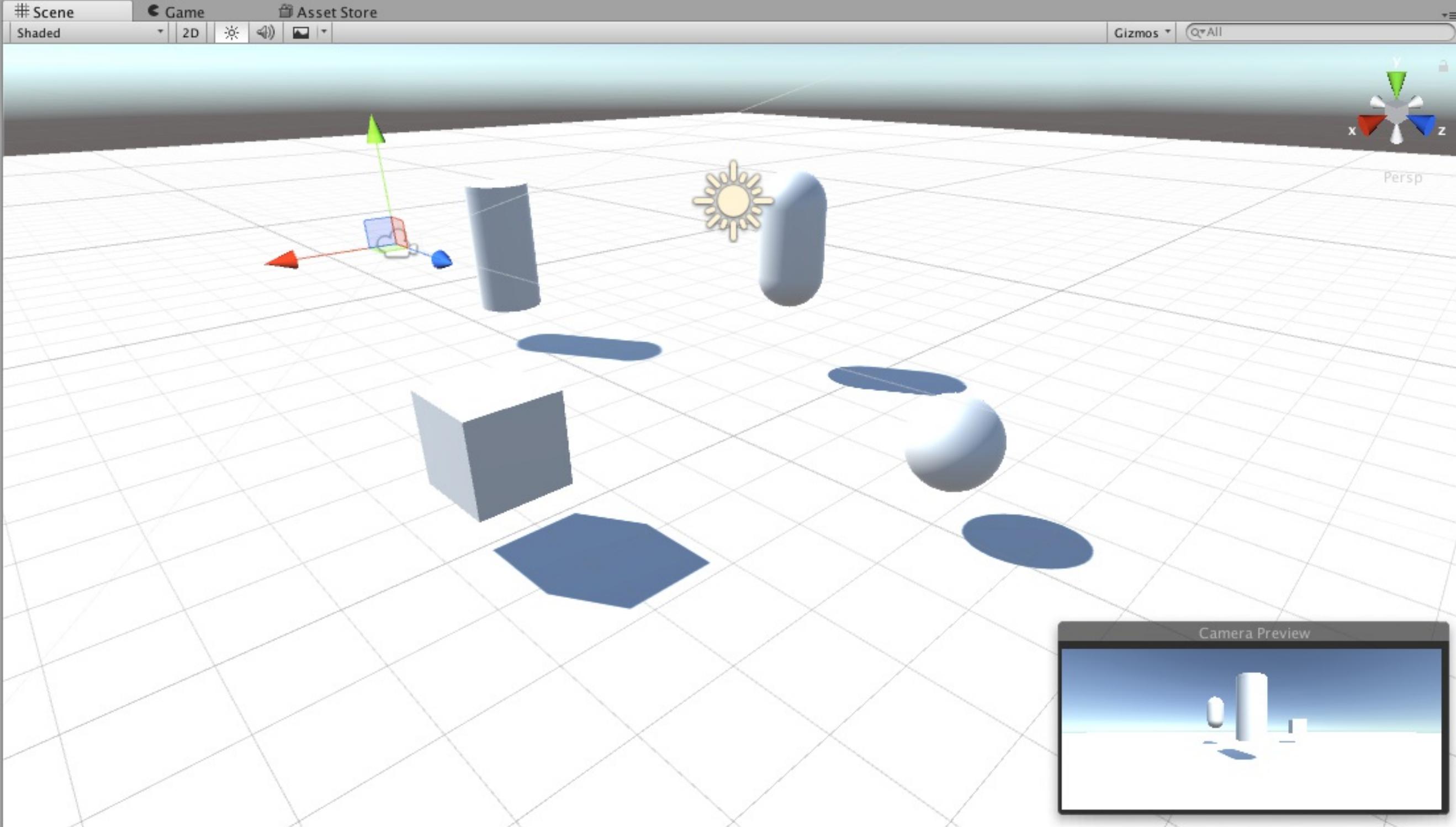
Cloud Account Layers Layout

Hierarchy

Create (Q) All Untitled*

Main Camera

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



Scene

Game

Asset Store

Gizmos (Q) All

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

Clear Flags Skybox

Background Everything

Culling Mask 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 Checkmark

HDR Off

Target Display Display 1

GUI Layer

Flare Layer

Audio Listener

Add Component

Project Console

Create (Q) All

Favorites

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

Assets

This folder is empty

Assets

Occclusion Culling

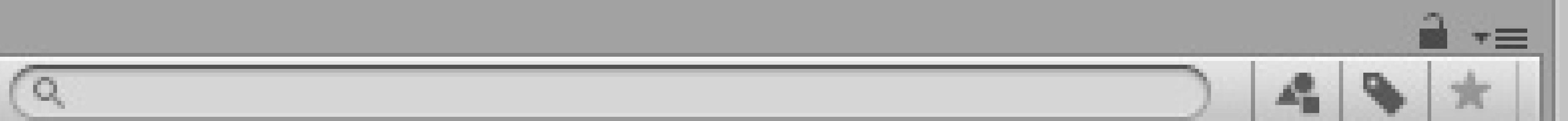
HDR

Target Display

GUI Layer

Flare Layer

Audio Listener



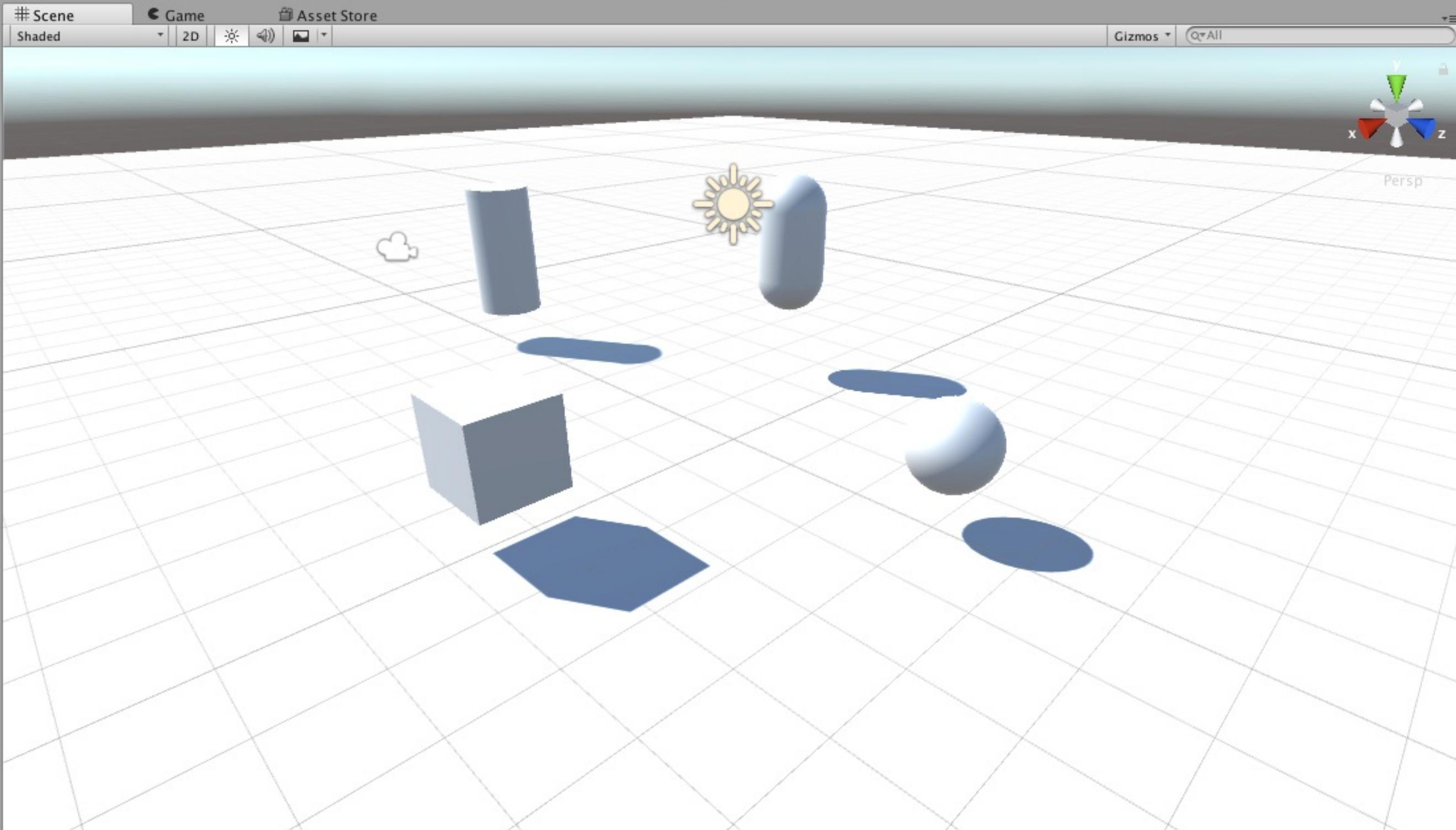
File Edit Assets GameObject Component Help Window



Cloud Account Layers Layout

Hierarchy

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

Free Assets



Procedural Properties

Random Seed: 0
Randomizer: 1
Uniform / Random:

Generated Textures

Asset Store Preview



 Project

 Console

Create ▾

▼  Favorites

 All Materials

 All Models

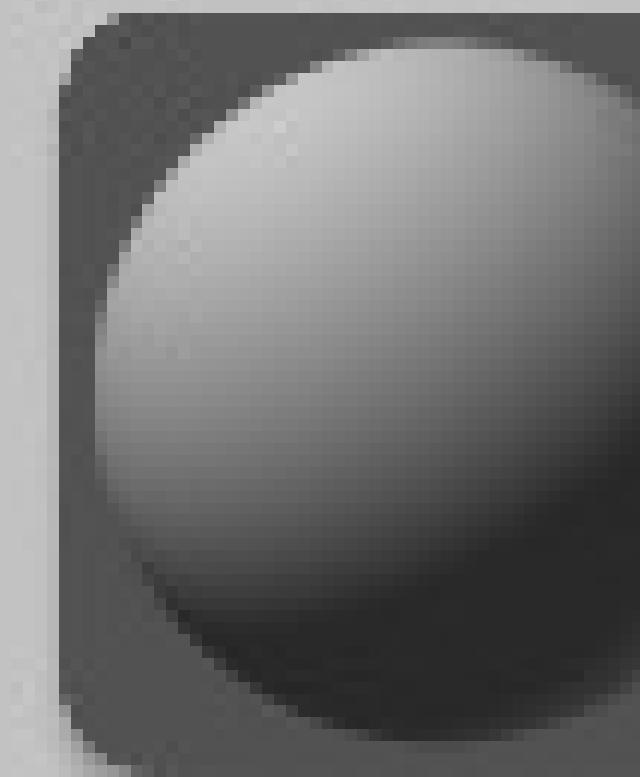
 All Prefabs

 All Scripts

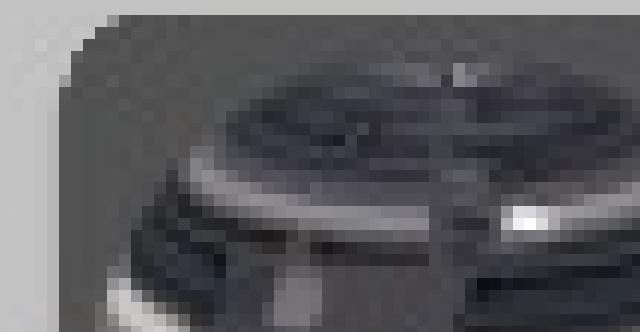
 Assets

Search: A

▼ Free Ass



Material



ected folder

Asset Store: 999+ / 999+





FREE



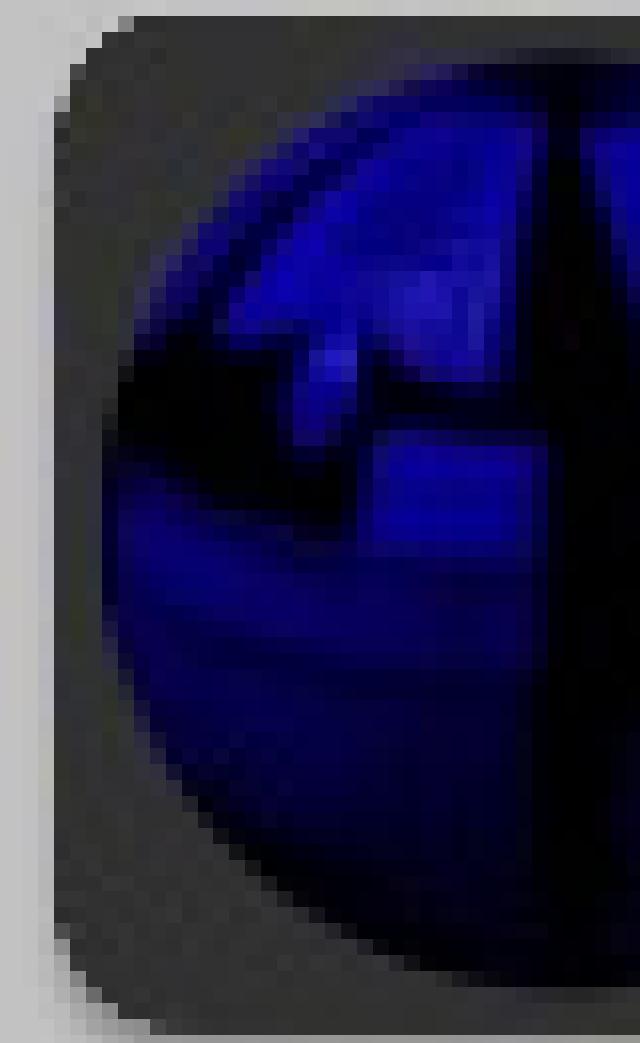
Ninja



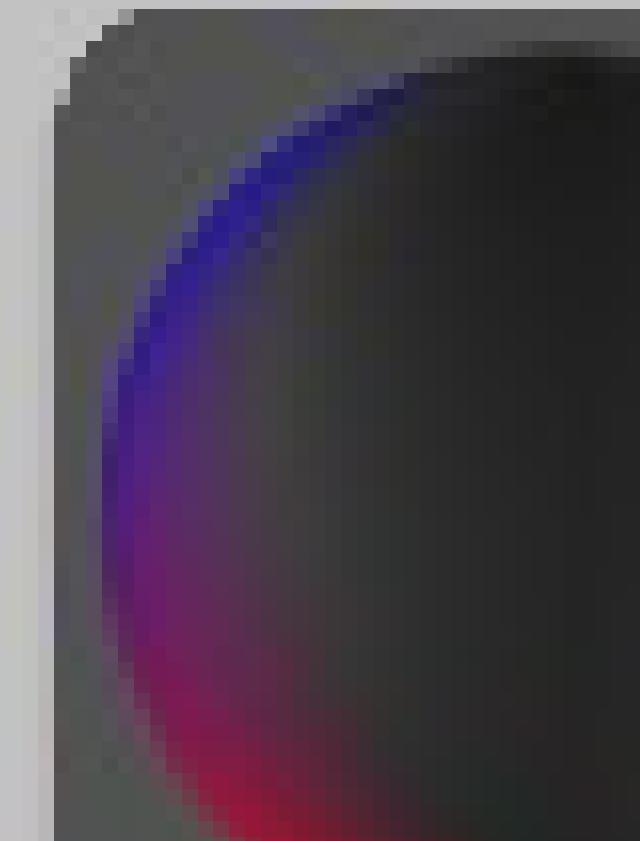
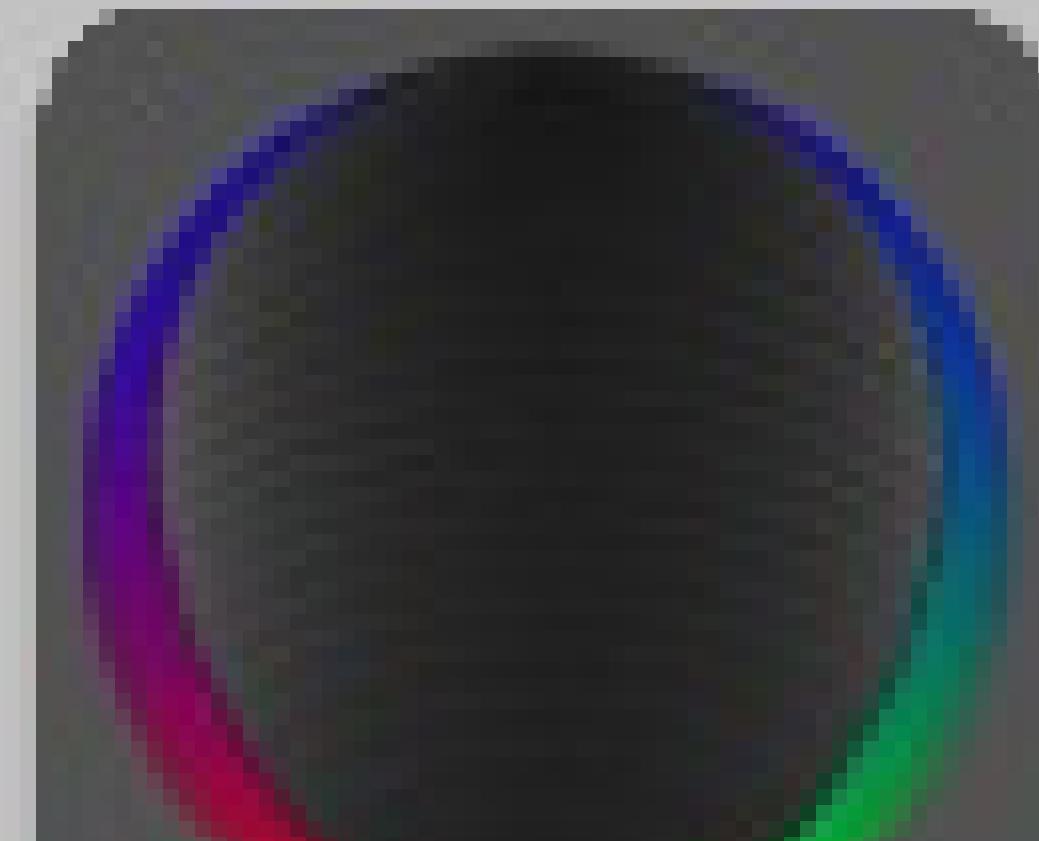
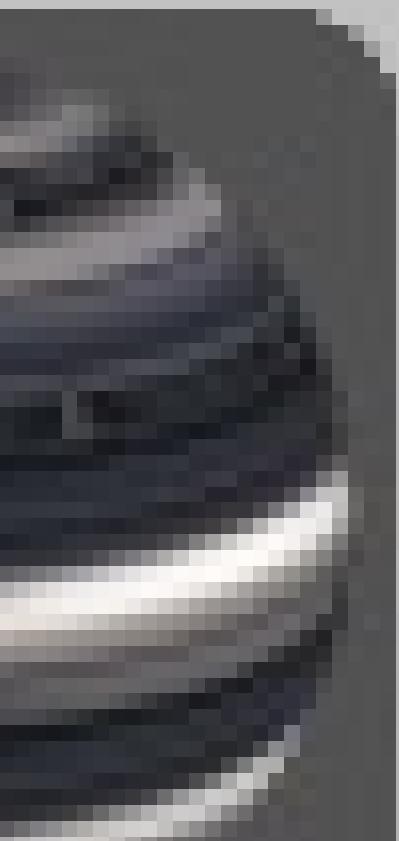
RedBeard_Blo...

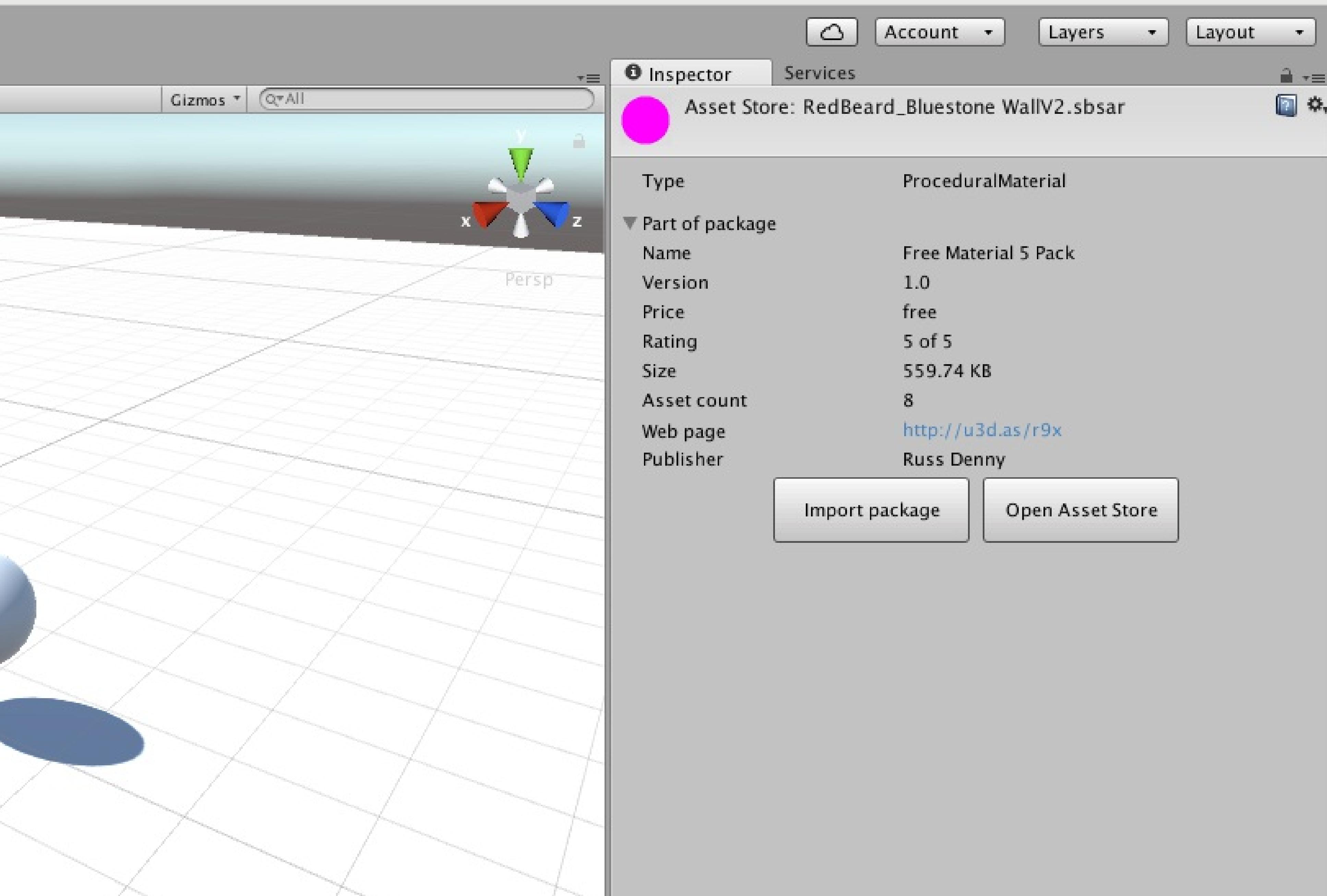


Gun01_Low...



Gun01_Hi...





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

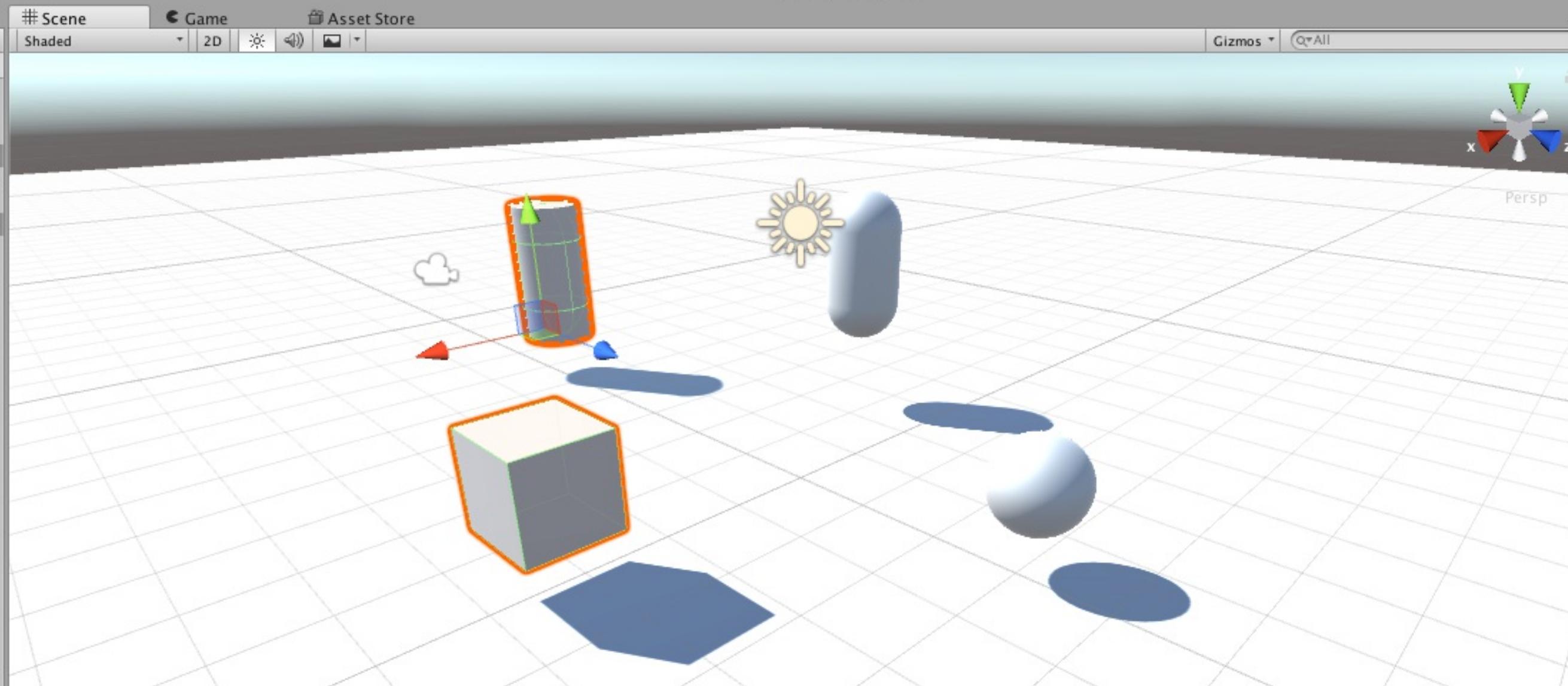
File Edit Assets GameObject Component Help Tools Window



Hierarchy
Create ▾ (Q>All
Untitled*
Main Camera
Directional Light
Plane
Cube
Sphere
Capsule
Cylinder



Cloud Account Layers Layout



Inspector Services
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
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.

Add Component

Select Mate... □ ×

Assets Scene

None

RedBeard_BluestoneWall

Redbeard_Concrete

RedBeard_RockGround

RedBeard_Tiles

RedBeard_WoodWall

FrameDebuggerRenderTargetD

Default-Diffuse

Default-Material

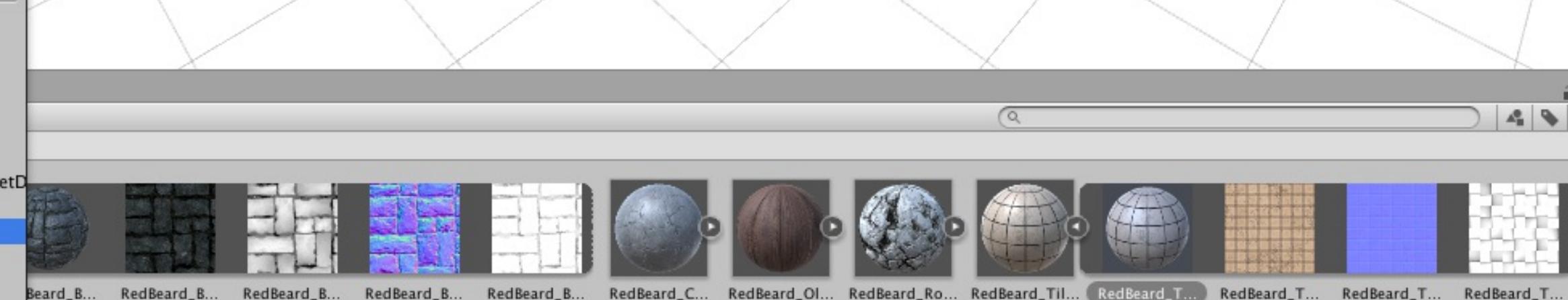
Default-Particle

Default-Skybox

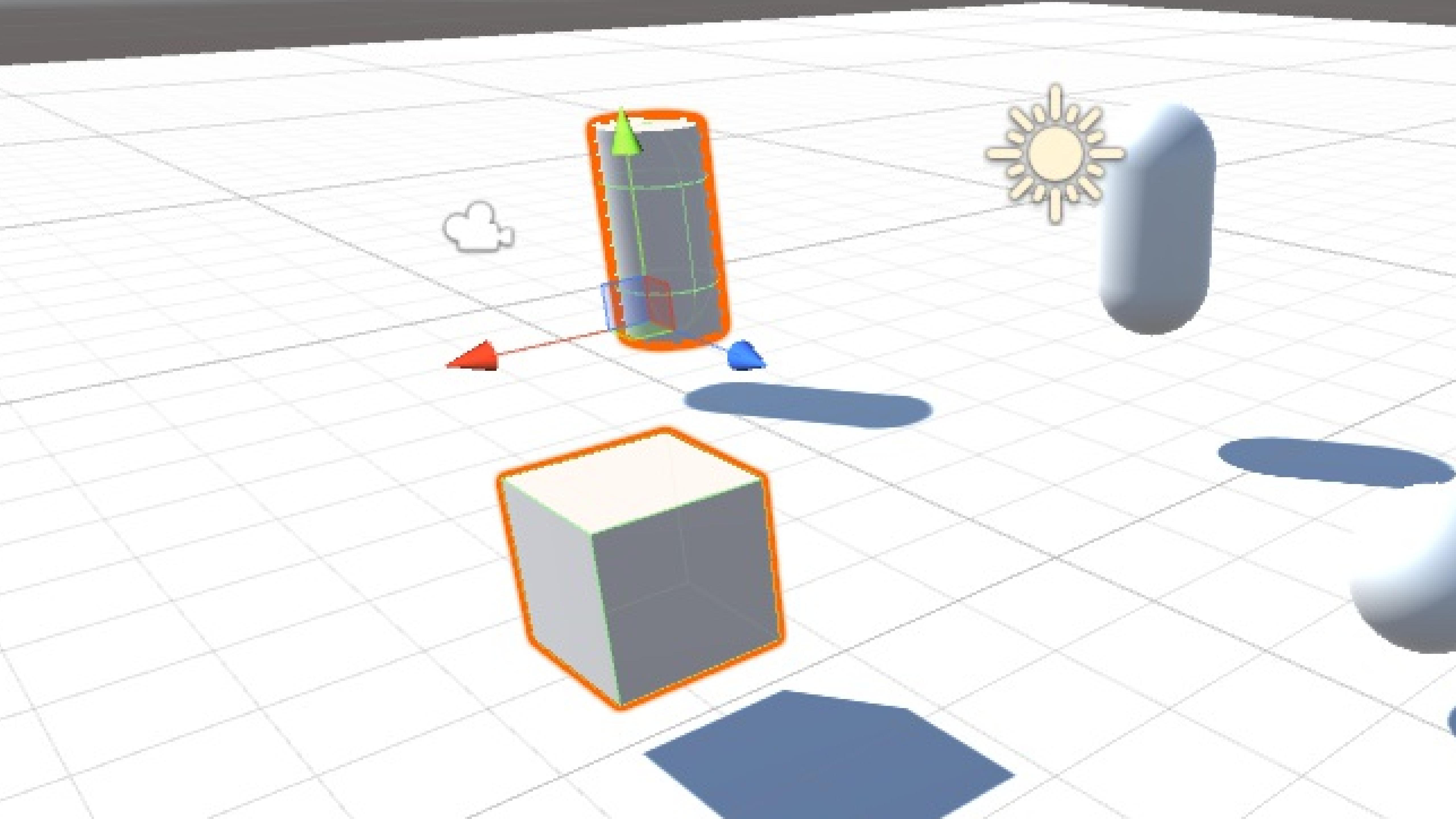
Sprites-Default

SpatialMappingOcclusion

SpatialMappingWireframe



Default-Material (Material) Res



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) 

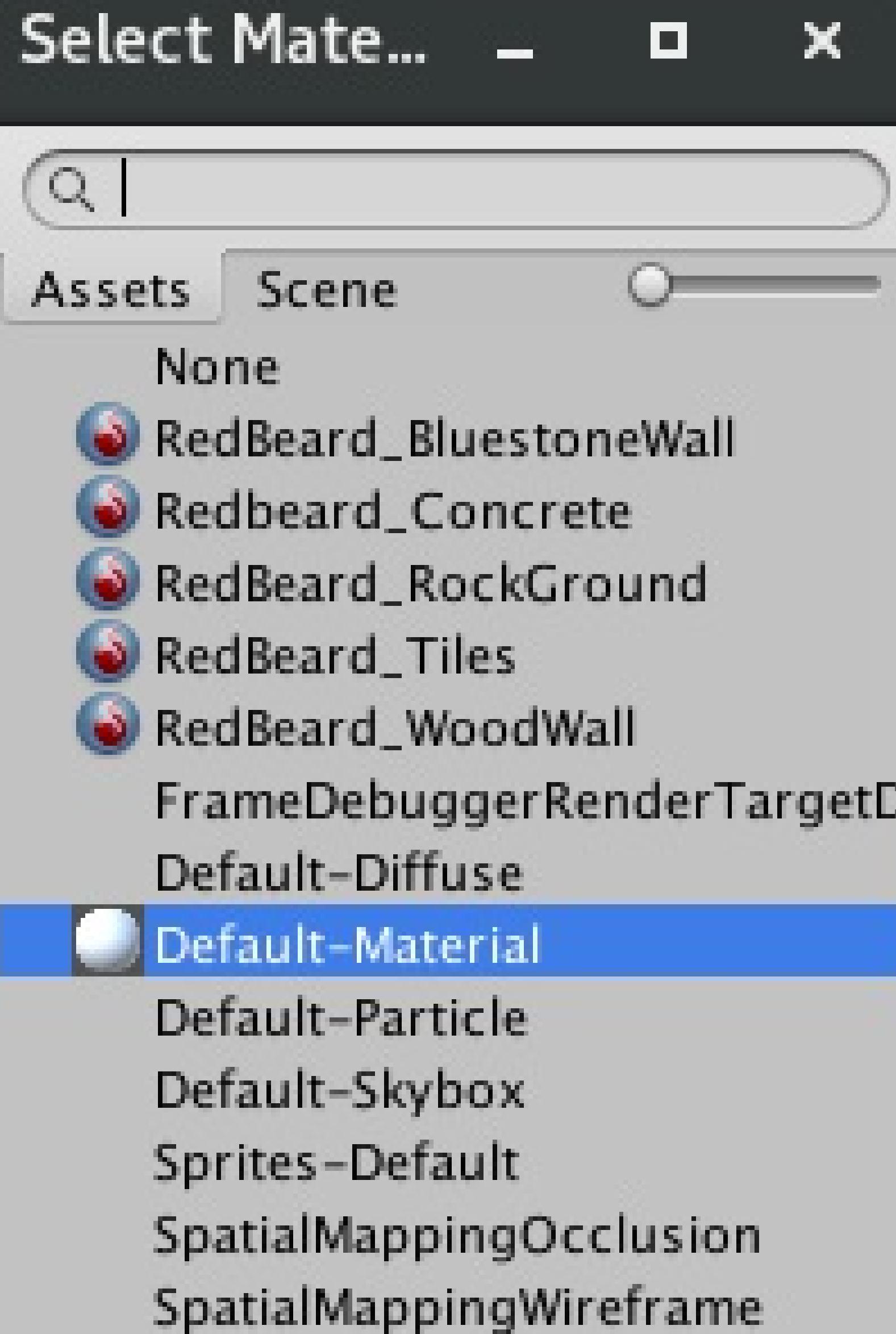
Default-Material



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

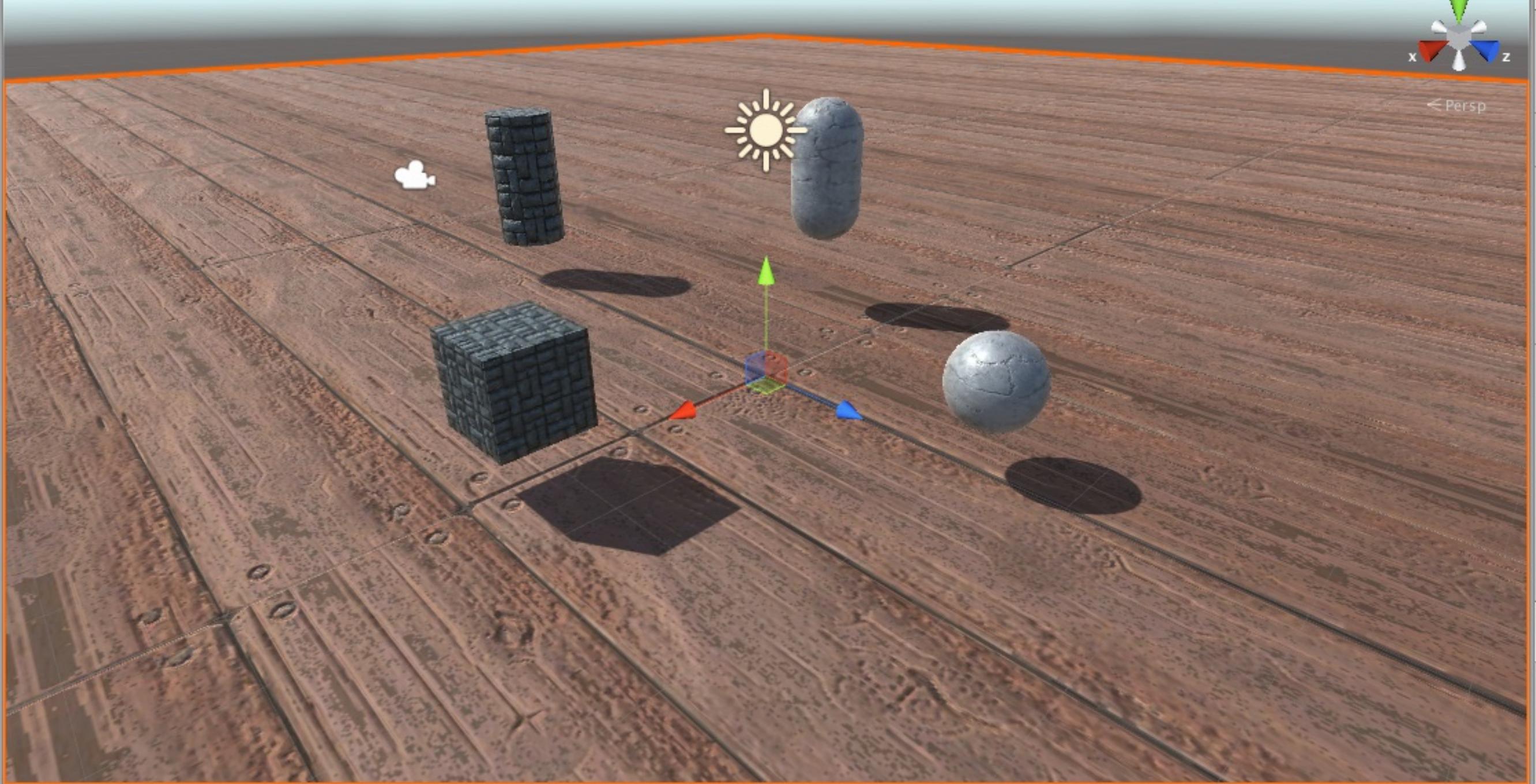
Shaded 2D

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 On

Receive Shadows

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

Height Map

Occlusion

Emission

Global Illumination Realtime

Detail Mask

Tiling X 10

Offset X 0

Secondary Maps

Detail Albedo x2

Normal Map

Tiling X 1

Offset X 0

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

RedBeard Su...

RedBeard_Bl...

RedBeard_B...

RedBeard_B...

RedBeard_B...

RedBeard_B...

RedBeard_B...

RedBeard_C...

RedBeard_Ol...

RedBeard_Ro...

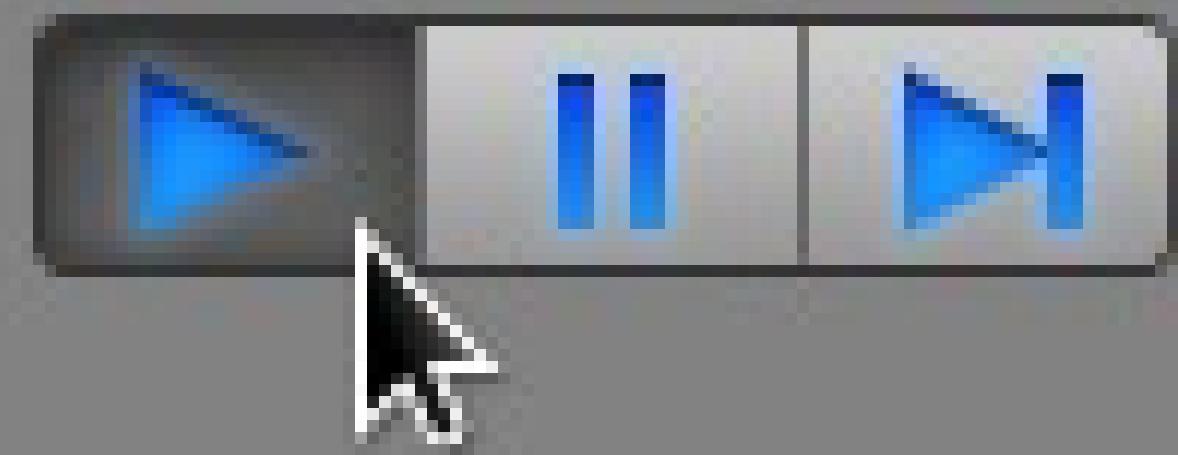
RedBeard_Til...

RedBeard_T...

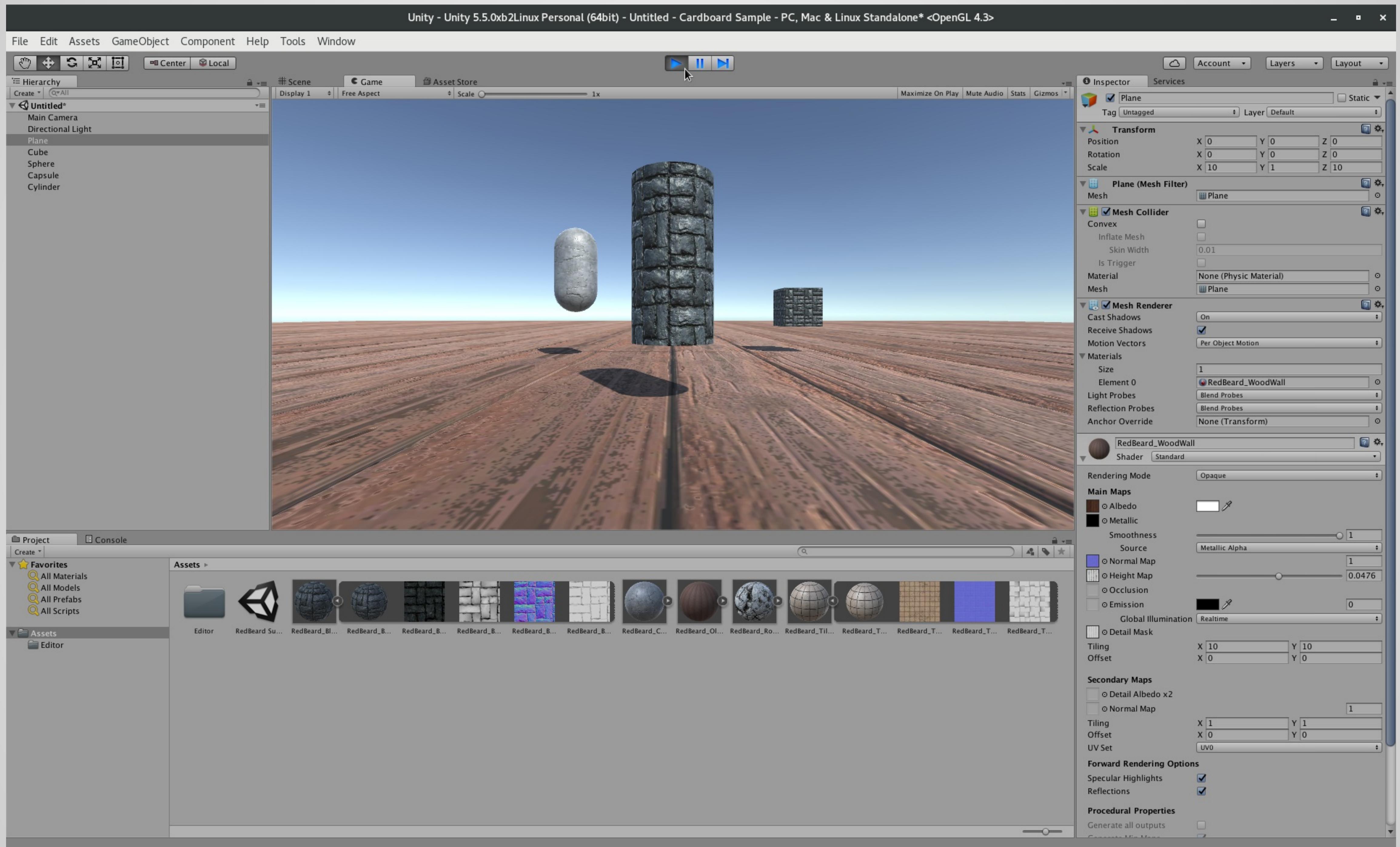
RedBeard_T...

RedBeard_T...

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



→ 1x



File Edit Assets GameObject Component Help Tools Window

Add... Shift+Ctrl+A

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

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

Persp

Transform

Position X: 0 Y: 0 Z: 0

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

Light Probes Blend Probes

Reflection Probes Blend Probes

Anchor Override None (Transform)

Add Component

Project

Create

Favorites

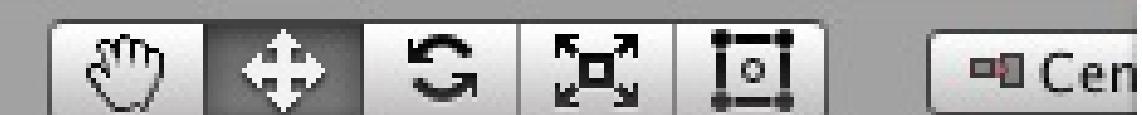
- All Materials
- All Models
- All Prefabs
- All Scripts

Assets

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



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

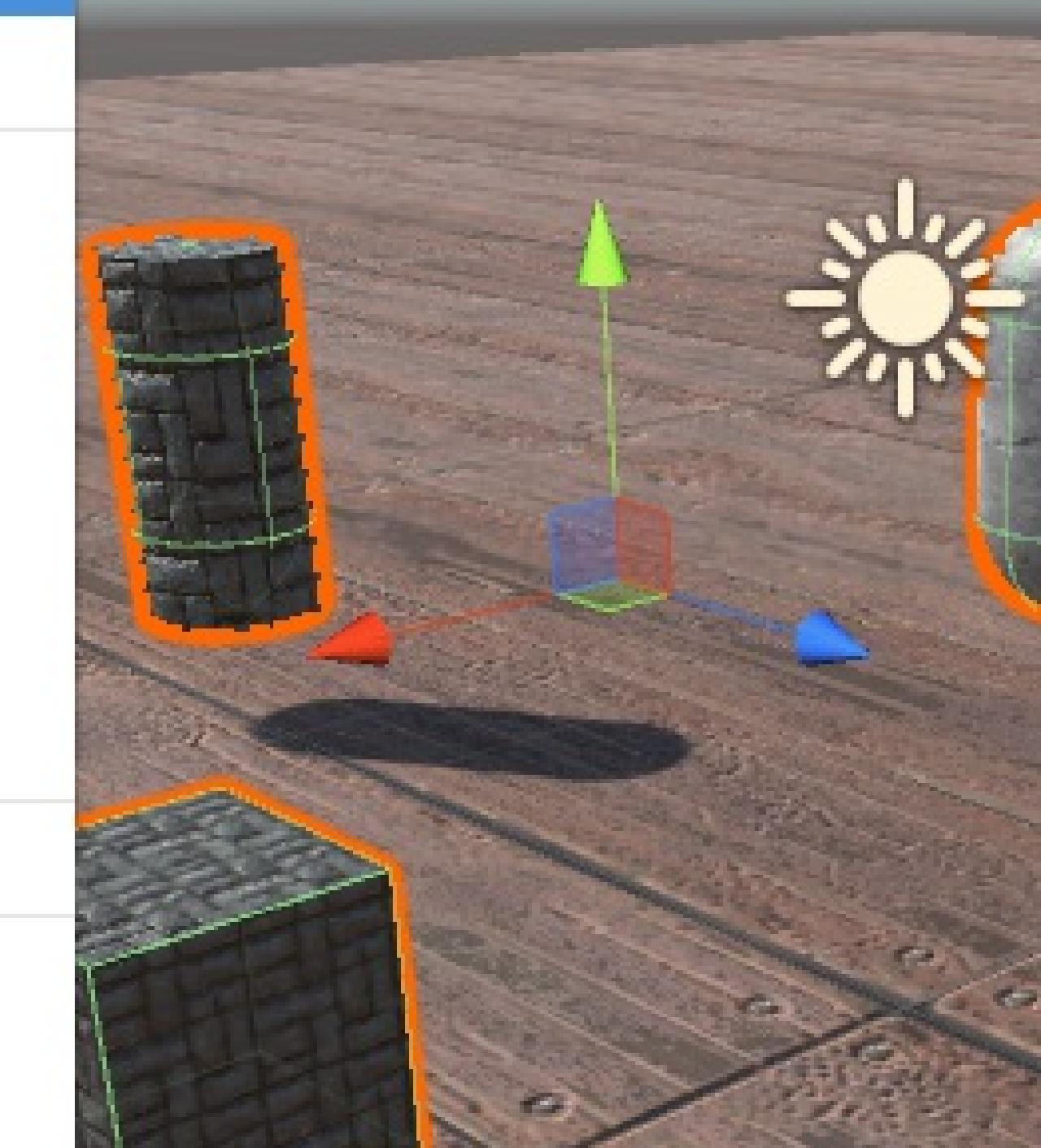
Miscellaneous ► Wheel Collider

Scripts ► Terrain Collider

Analytics ► Cloth

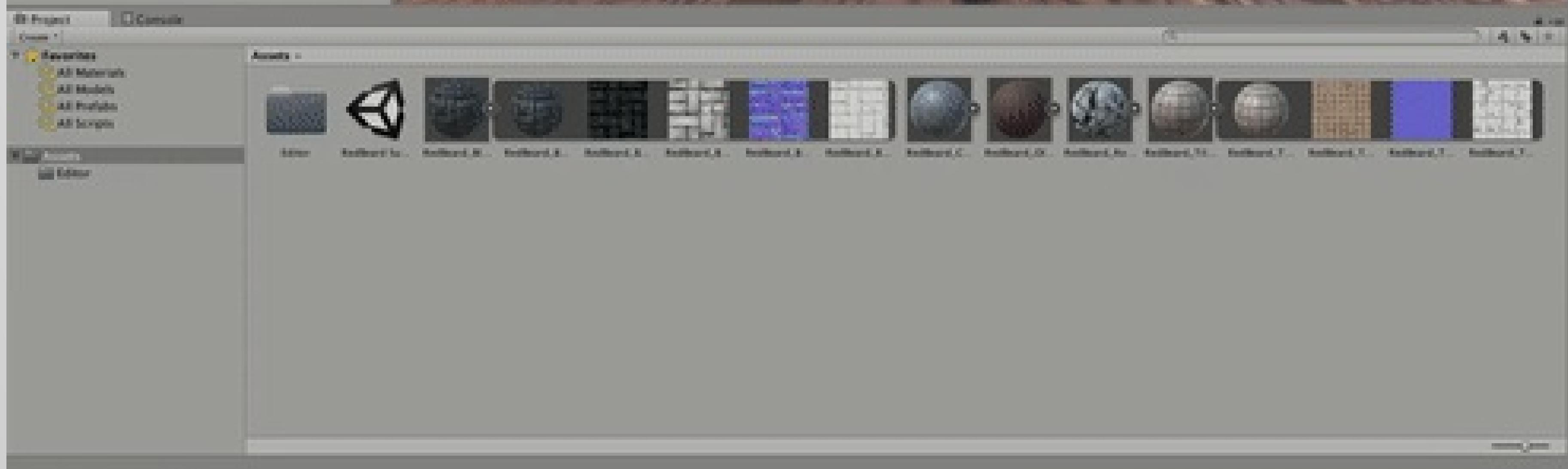
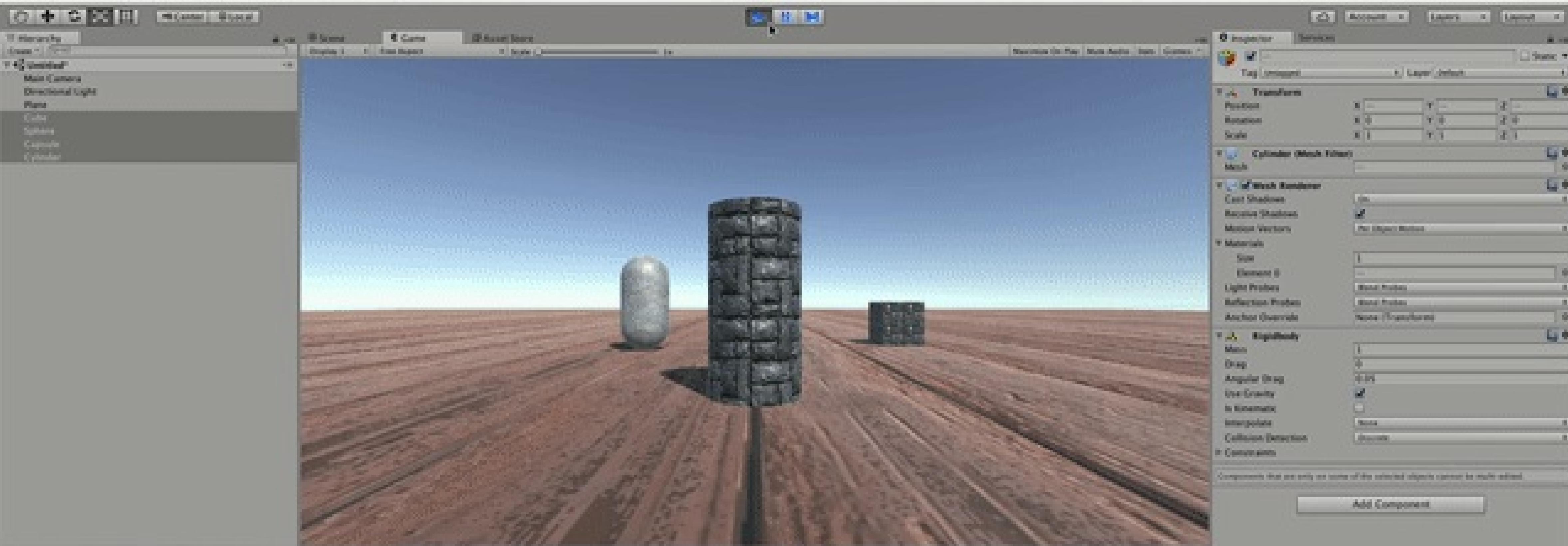
Event ► Hinge Joint

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)

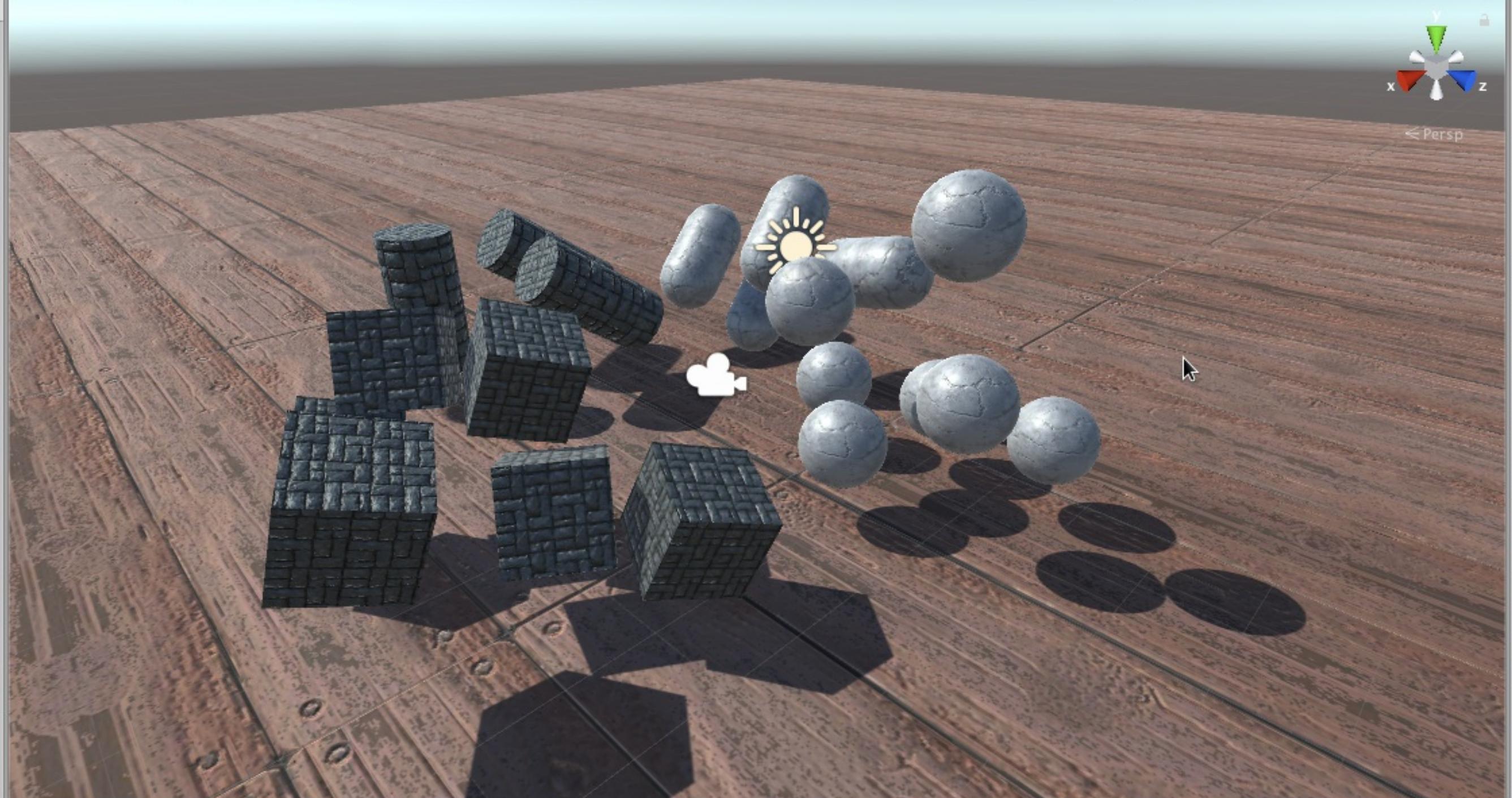
Scene

Game

Asset Store

Gizmos

(Q) All



Inspector

Services

Project

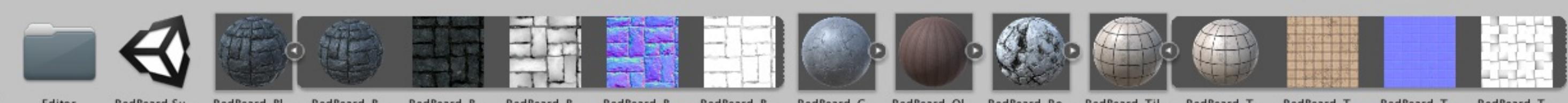
Console

Create (Q) All

Favorites

All Materials
All Models
All Prefabs
All Scripts

Assets



Assets

Editor

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

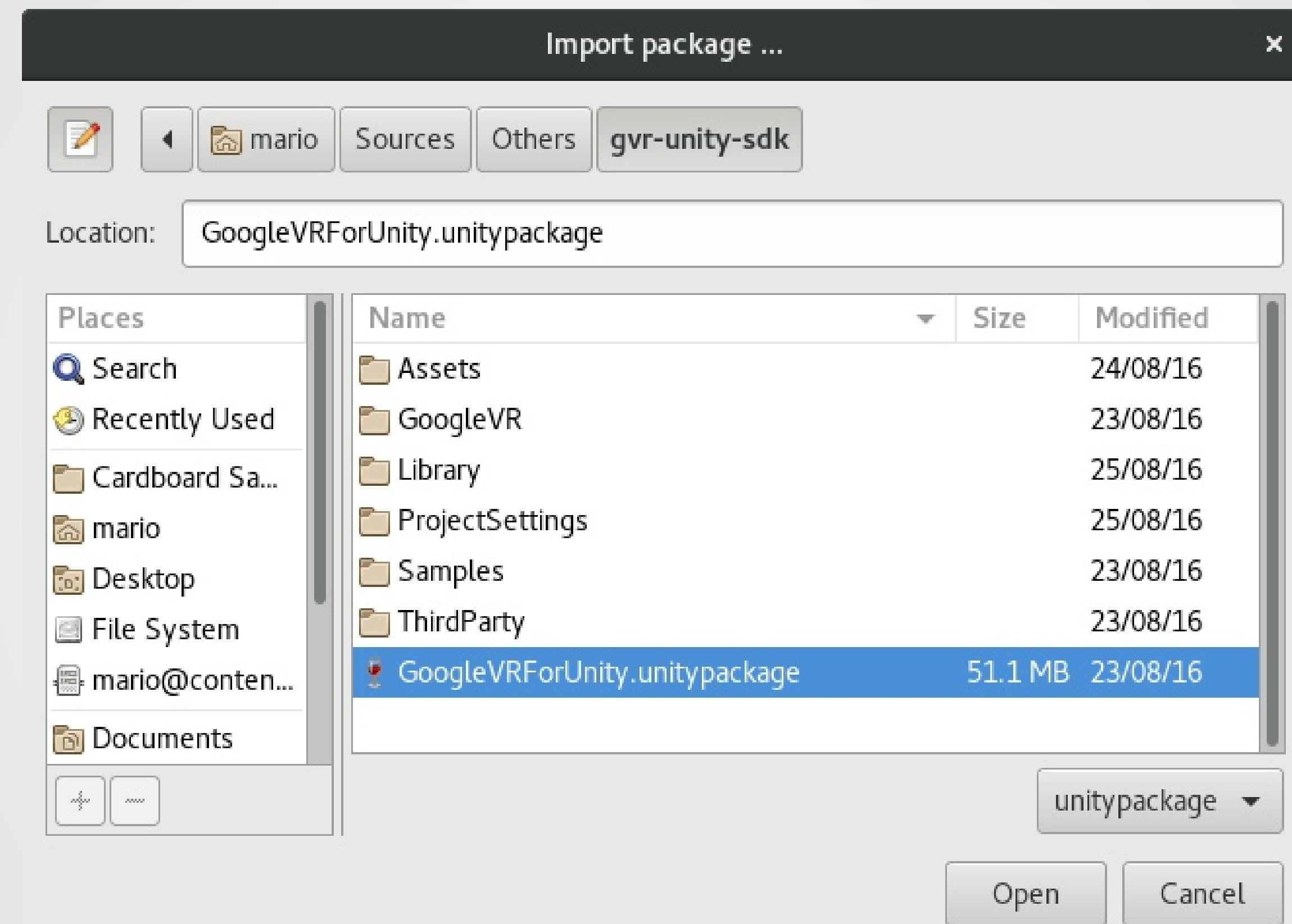
Reimport

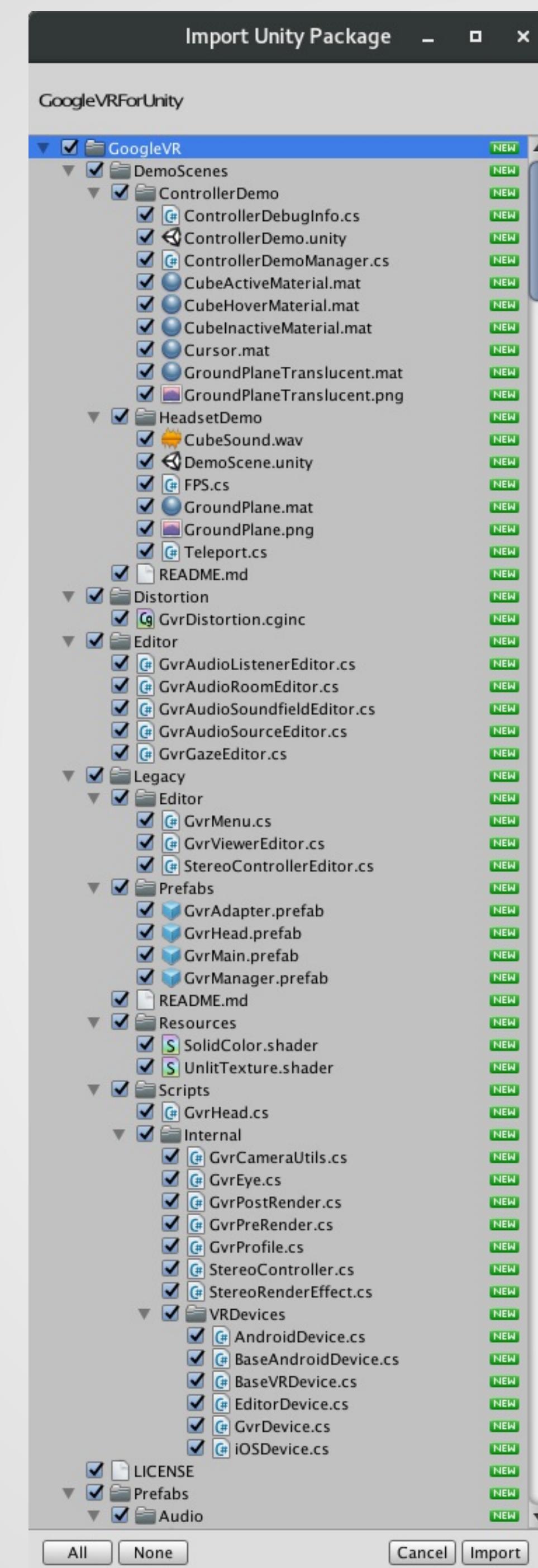
Reimport All

Run API Updater...

Scene Game Asset Store
Shaded 2D









API Update Required



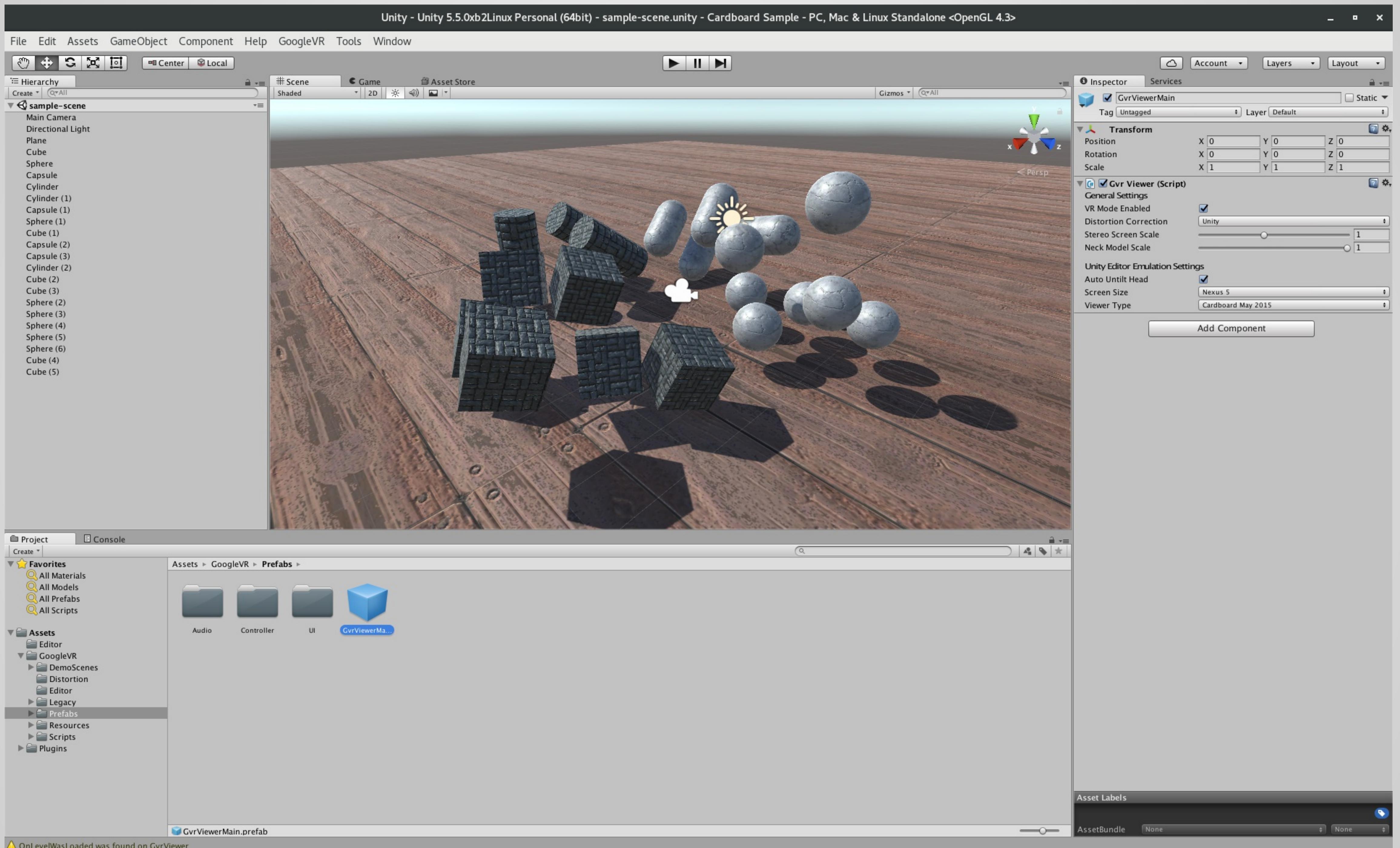
This project contains scripts and/or assemblies that use obsolete APIs.

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

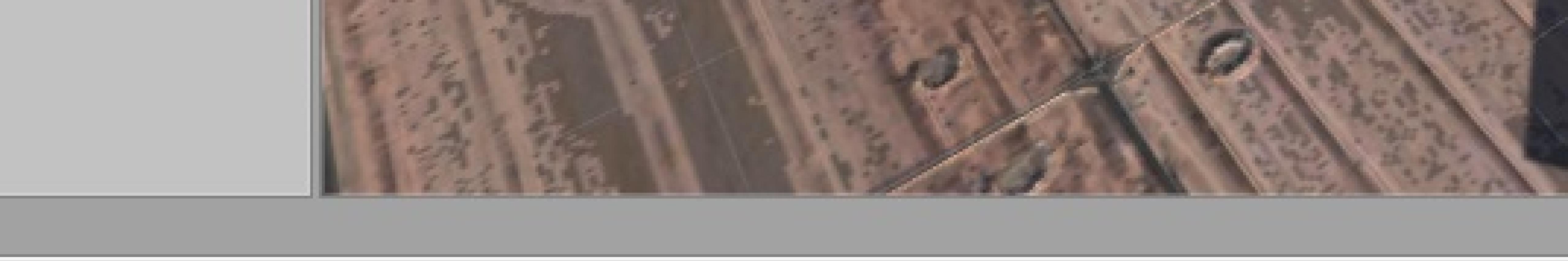
- 📁 Editor
- ▼ GoogleVR
 - ▶ DemoScenes
 - ▶ Distortion
 - ▶ Editor
 - ▶ Legacy
 - ▶ Prefabs
 - ▶ Resources
 - ▶ Scripts
 - ▶ Plugins

Assets ➔ GoogleVR ➔ Prefabs



Audio

Controller



Assets ▶ GoogleVR ▶ Prefabs ▶



Audio



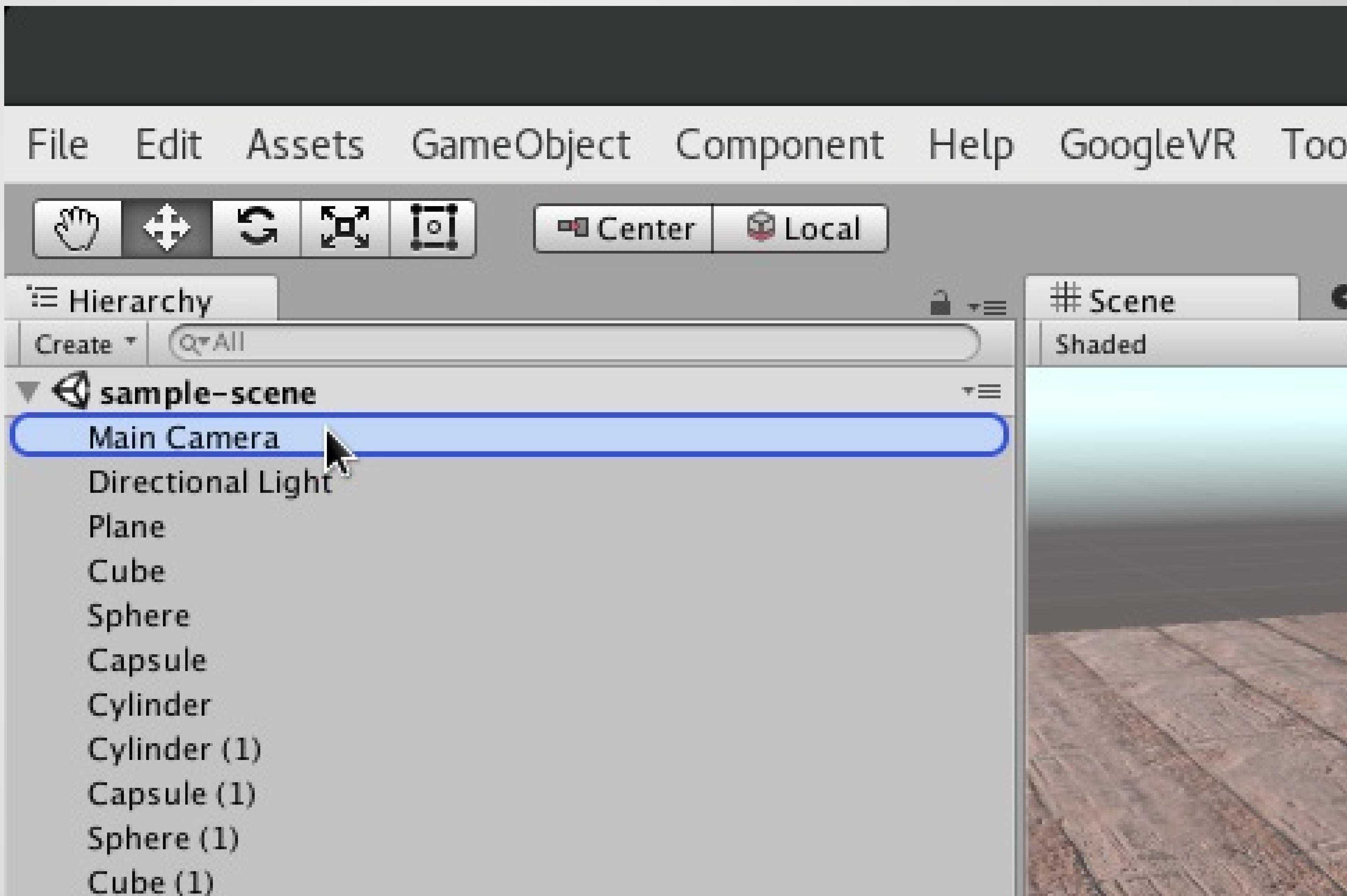
Controller



UI



GvrViewerMa...



File Edit Assets GameObject Component Help GoogleVR Tools Window



Center Local



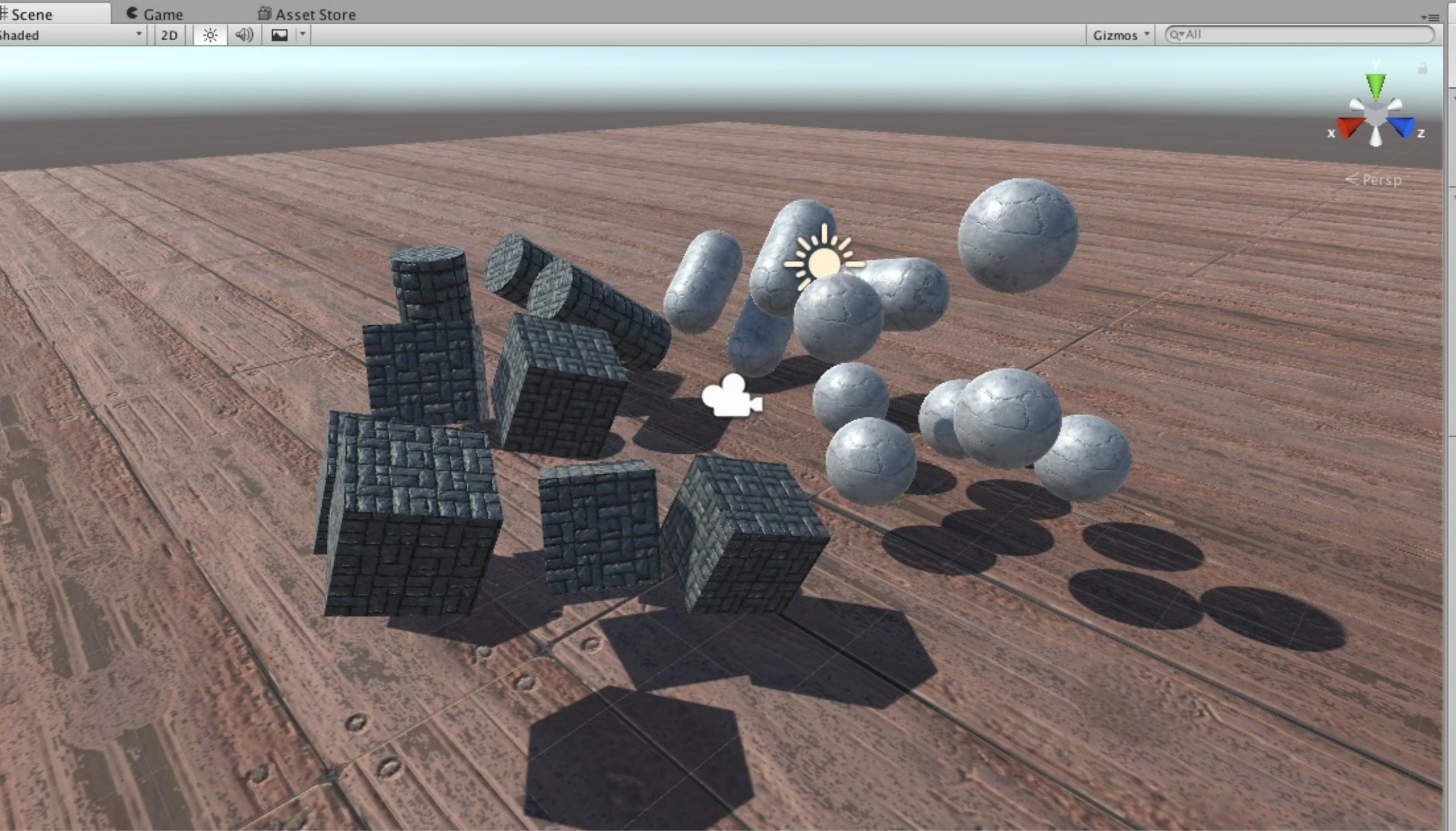
Cloud Account Layers Layout

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 Unity

Stereo Screen Scale 1

Neck Model Scale 1

Unity Editor Emulation Settings

Auto Until Head

Screen Size Nexus 5

Viewer Type Cardboard May 2015

Add Component

Project Console

Create

Favorites

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

Assets

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

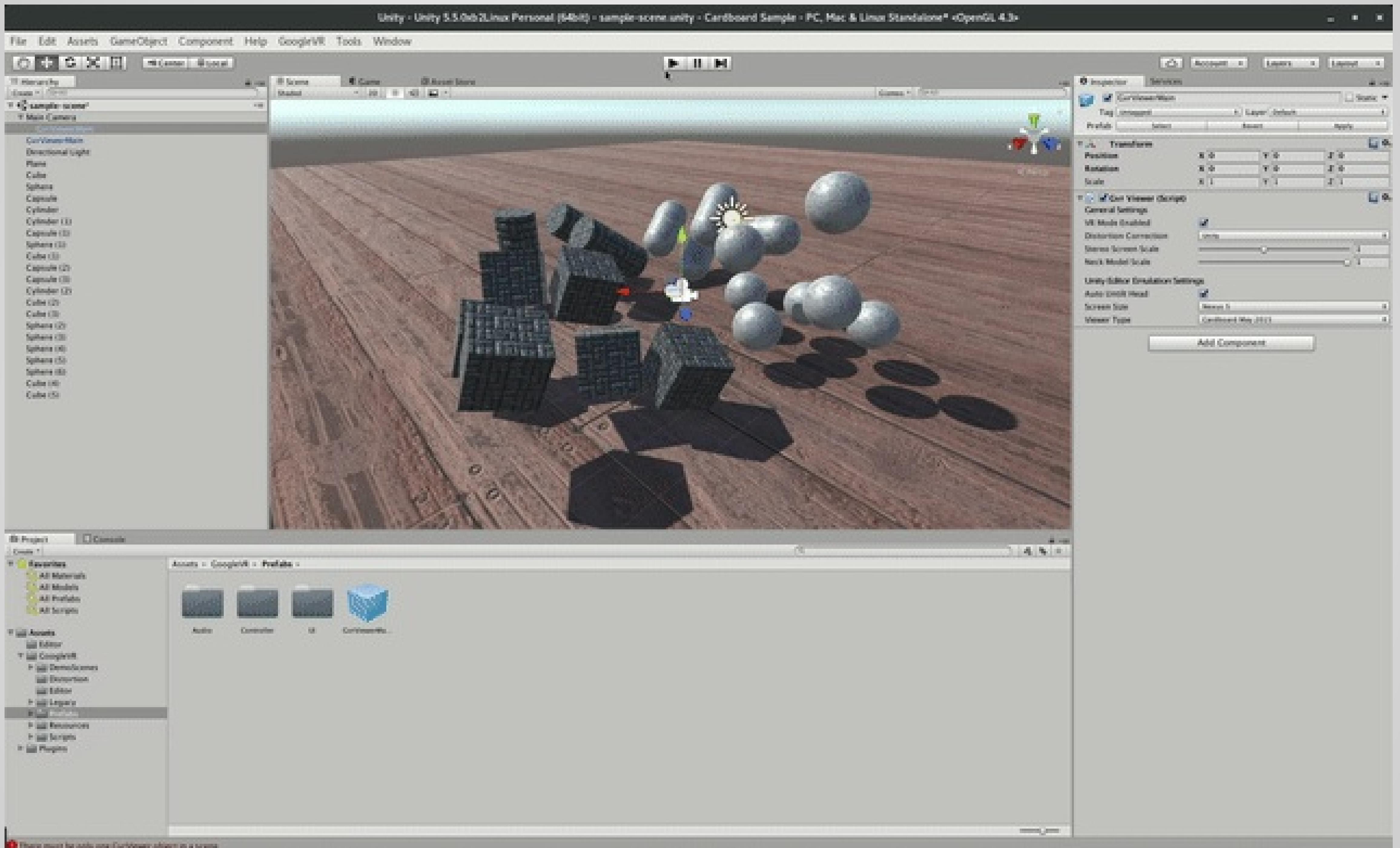
Assets > GoogleVR > Prefabs >

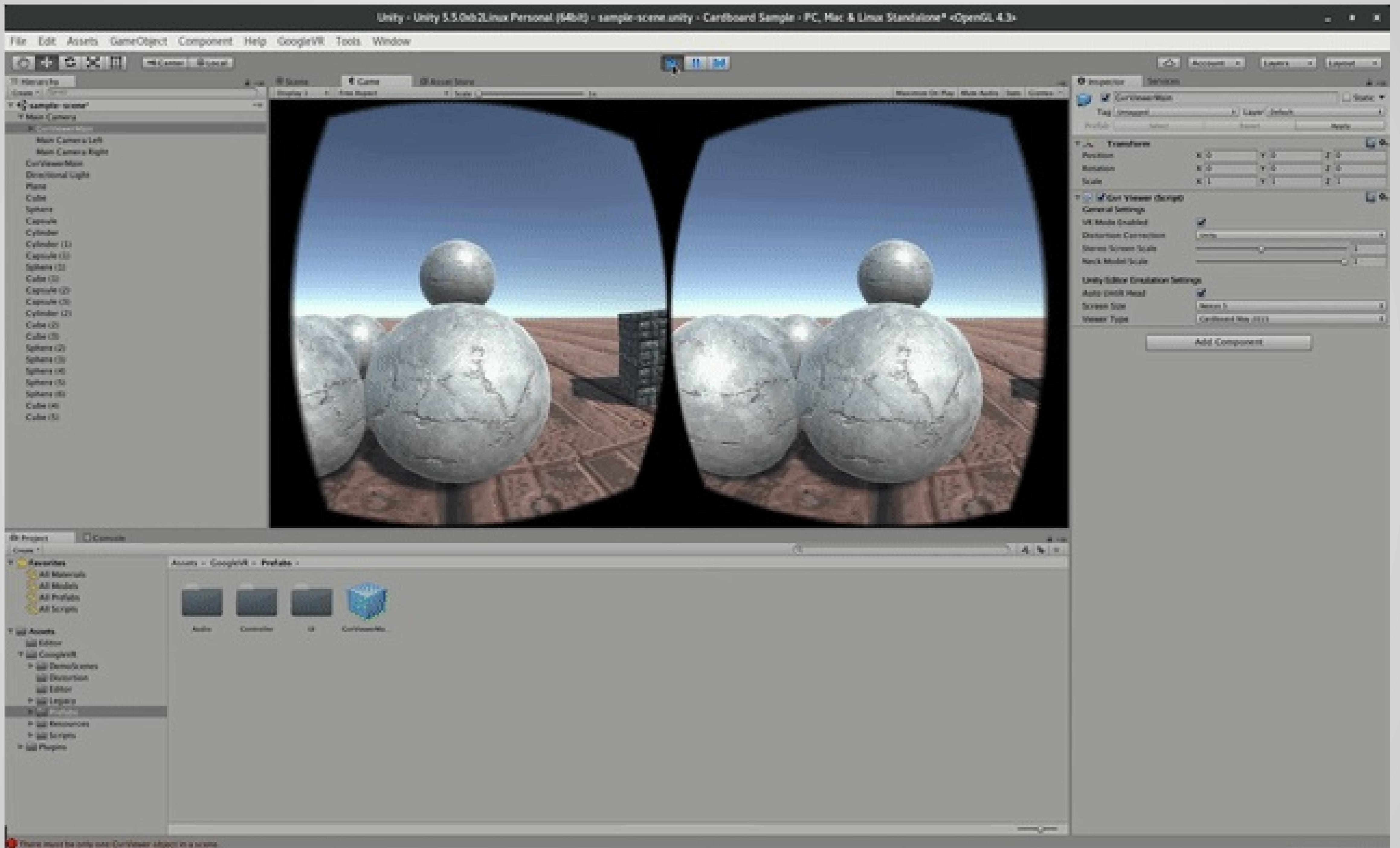
Audio Controller UI GvrViewerMa...

Asset Labels

AssetBundle None

OnLevelWasLoaded was found on GvrViewer





Summary of unity demo

- Writing an okayish demo in unity
- Using Cardboard SDK
- Using internal renderer
 -  APK
 -  Project

What can I do in pure Android only?

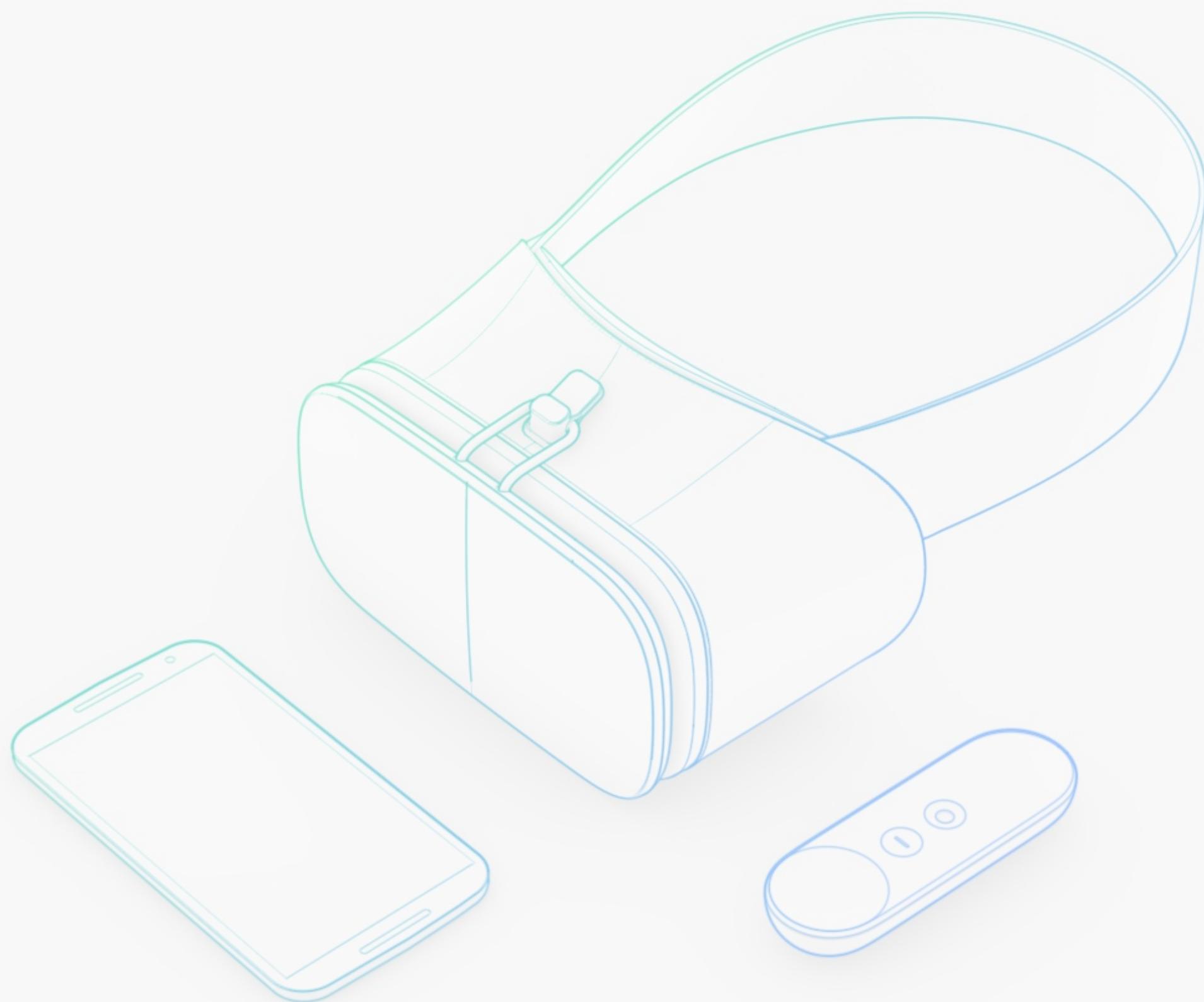
- VrPanoramaView/VrVideoView
 - integration of photospheres in view hierarchies
- integration with other (Java) libraries
- sending of Intents easily

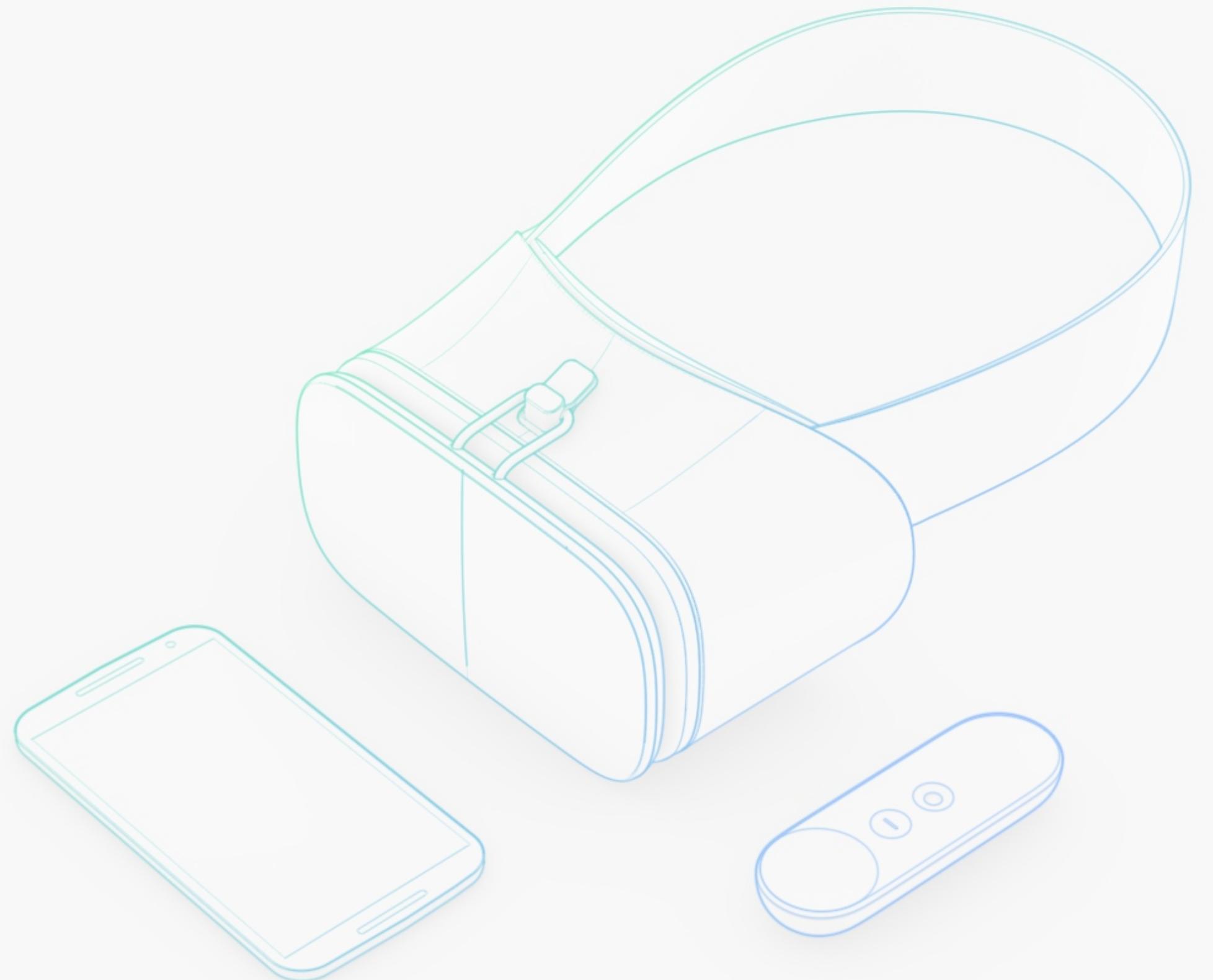
Limitations of Android SDK

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

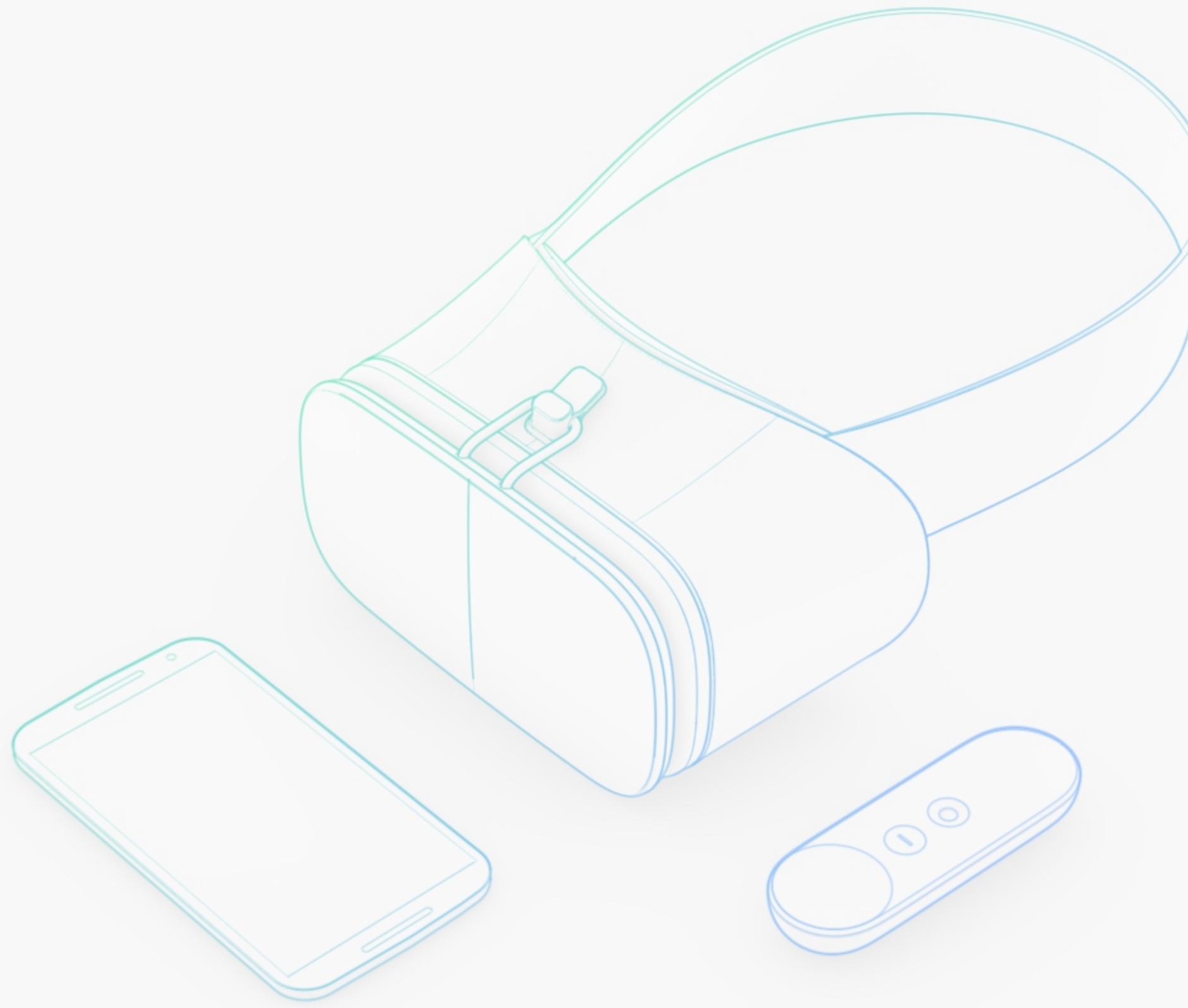
Adding Photospheres to a simple project

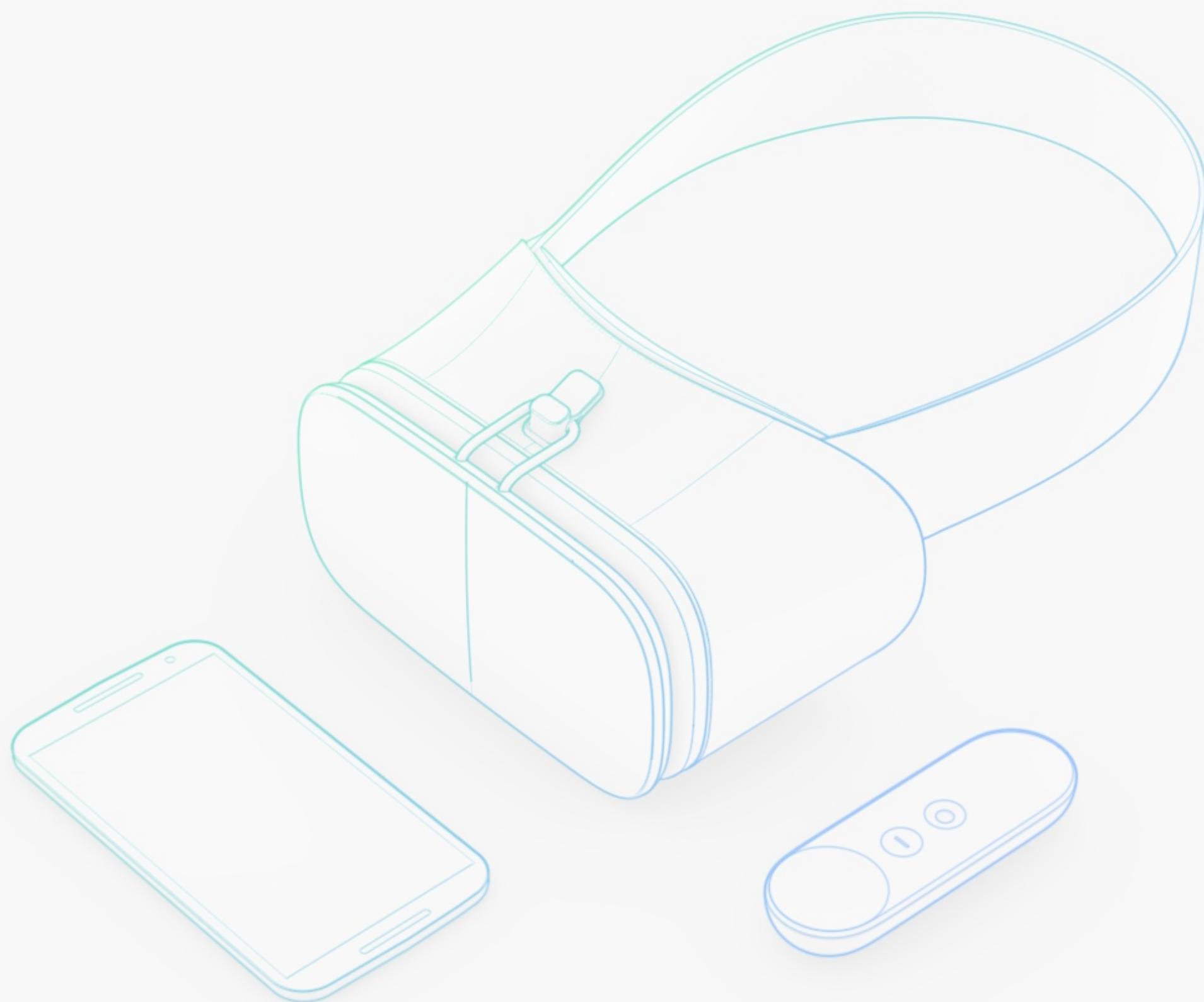






c
o
m





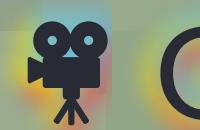
New SDK features

- Controlling the controller
 - orientation/acceleration
 - clickpad (x,y, clicked)
 - buttons (App, Vol+/-)
- spatial audio engine

Deprecation & Deletion

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

What will you build?



General Controller



Designing



Google VR Github



@MarioBodemann

