

# Daydreaming about Cardboards

Virtual Reality in Android

- Please follow the slides at the given address.
- Wait some seconds to see if someone is writing down the address...

#### Audience

- Android programmer? 🤖
- VR programmer? 🤖
  - 🔑: headless CMS: [contentful.com](https://contentful.com)
  - 🐦: [@MarioBodemann](https://twitter.com/MarioBodemann)
  - 📄: [bit.ly/mbvrnyc](https://bit.ly/mbvrnyc)
  - Please interrupt 🚫 🗑 !

# Agenda

The slide features a central collage of nine white rectangular boxes, each containing text and images related to VR technologies. The background is a grid of various colored pixels.

- Daydreaming about Cardboards**  
Virtual Reality in Android
- contentful**
  - [CMS: contentful.com](#)
  - [@MarioBodemann](#)
  - [bit.ly/mvrrnyc](#)
  - 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?**
- Google Daydream Technical Preview**
  - [special preview build from unity](#)
  - Out of the box, basic functionality

or Google VR Plugin

  - Installer for Unity on + (or )
  - [Plugin](#) gives full controller support and more
- Daydream**
- Daydream SDK features**
  - Same as Cardboard SDK
  - Controlling the controller
    - orientation/acceleration
    - input (Clickpad: xy, clicked, App Button, Vol+/-)
  - support for all Android architectures



# Cardboard

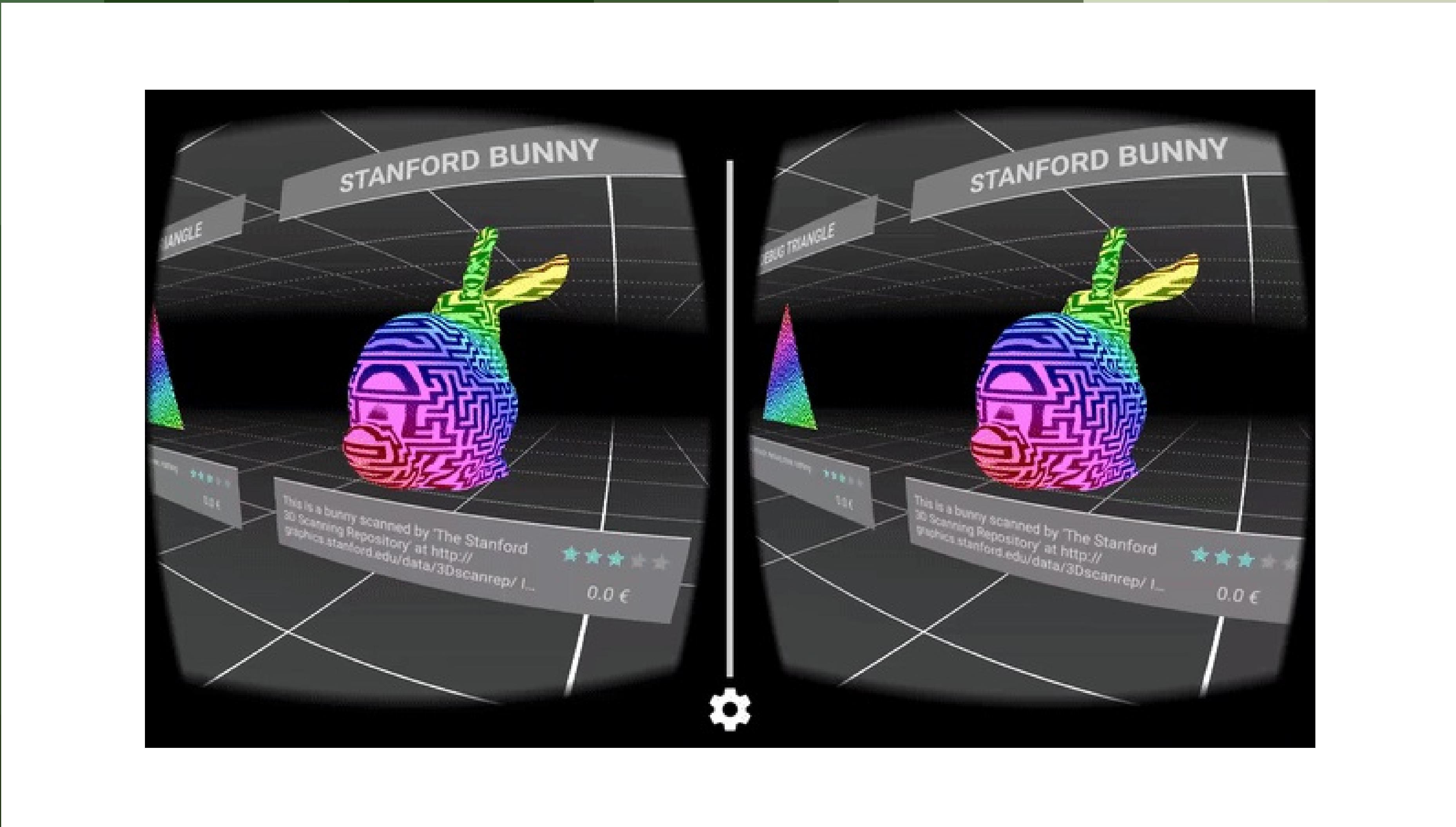
# Google Cardboard

- 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



@MarioBodemann

# How do you program for it?

Googles SDK are available for

- Android (OpenGL)
- iOS (Objective C)
- Unreal Engine (NEW)
- 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 <https://vr.google.com/developers/>

# How do I write a Unity App?

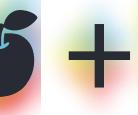


@MarioBodemann

## Google Daydream Technical Preview

- special preview build from unity
- Out of the box, basic functionality

or Google VR Plugin

- Installer for Unity on  +  (or 

@MarioBodemann

## Create a new Project

The screenshot shows a user interface for creating a new project. At the top, there is a navigation bar with the title "Home" and a close button "x". Below the navigation bar, there are two tabs: "Projects" (which is underlined) and "Getting started". On the right side of the header, there are three icons: a plus sign labeled "NEW", an upward arrow labeled "OPEN", and a user profile icon labeled "MY ACCOUNT". The main content area features a large, centered text "Create a project" above a blue button labeled "New project".

@MarioBodemann

Name it

Home

Projects Getting started

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

Project name\*  
Cardboard Sample

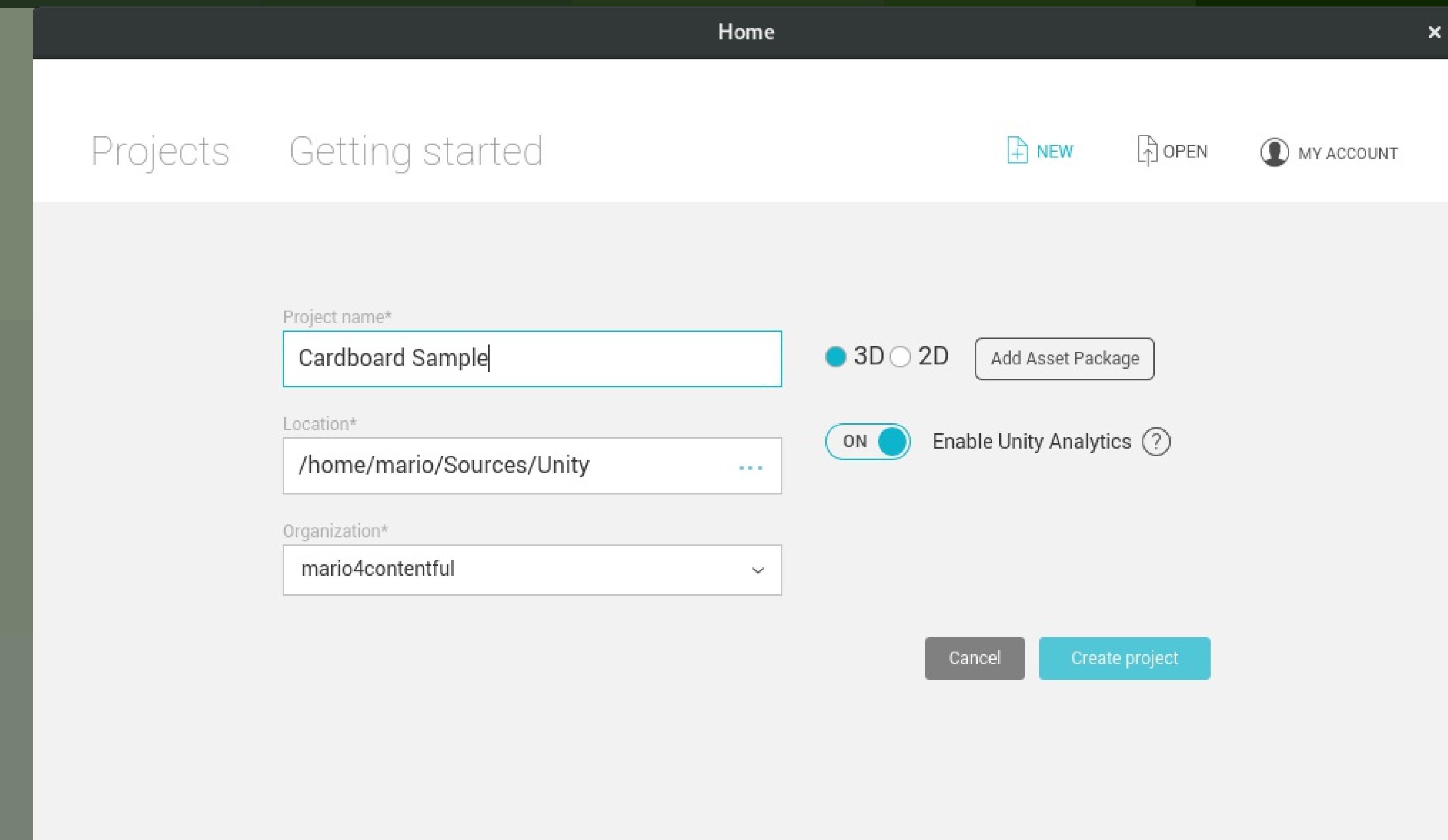
3D  2D [Add Asset Package](#)

Location\*  
/home/mario/Sources/Unity

[ON](#) [Enable Unity Analytics](#)

Organization\*  
mario4contentful

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



@MarioBodemann

File Edit Assets GameObject Component Help Window



Cloud Account Layers Layout

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

See it



Project Console

Create Favorites  
All Materials  
All Models  
All Prefabs  
All Scripts

Assets

This folder is empty

@MarioBodemann

## 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

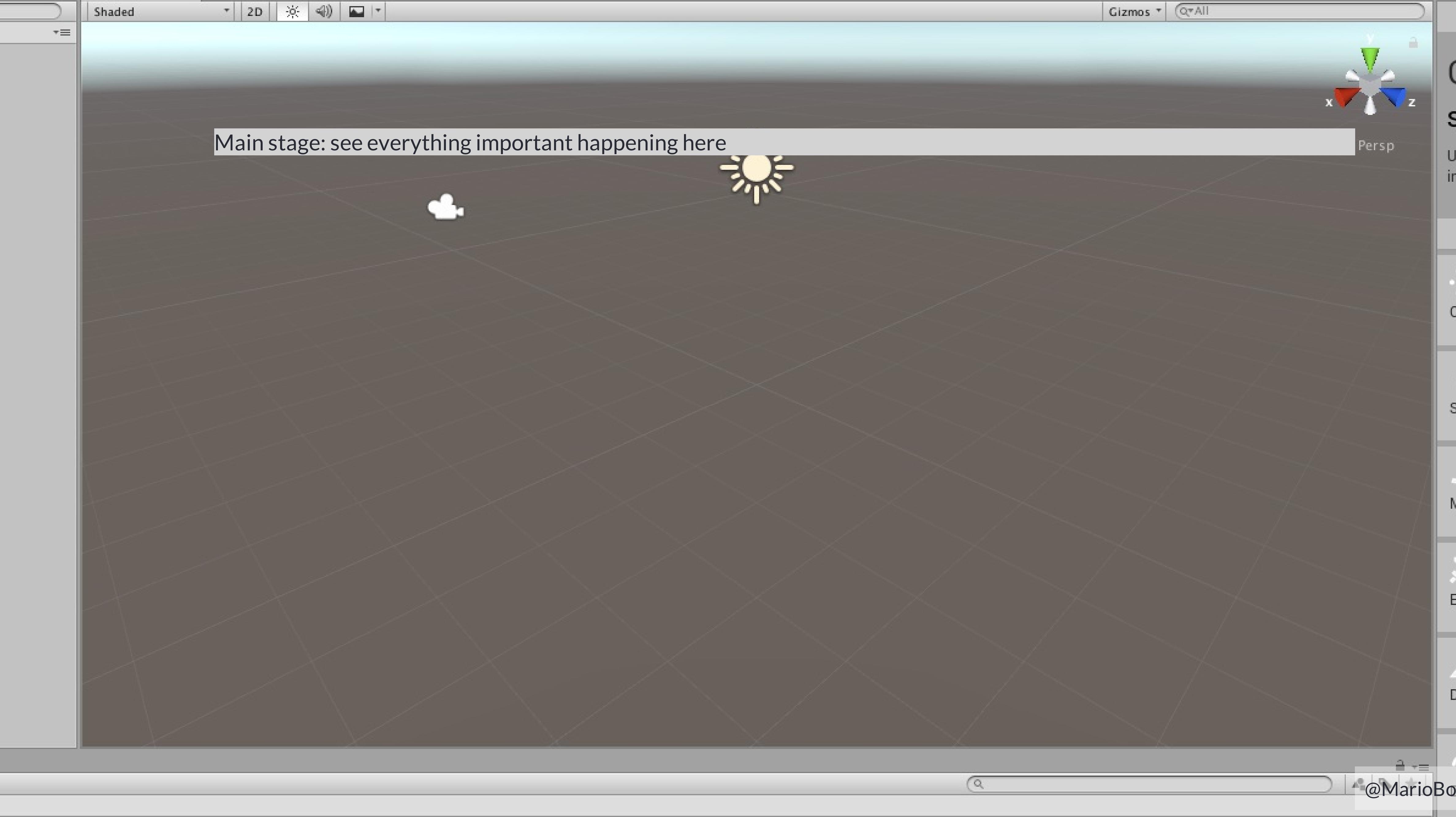
Ads  
Monetize your games

Multiplayer  
Easily implement multiplayer

Analytics  
Discover player insights

Performance Reporting  
Discover app errors

Cloud Build  
Build games faster



Cardboa

## SERVICES

Unity provides you  
increasing producti

### SERVICES

 Collaboration  
Create together se

 In-App Purchases  
Simplify cross-plat

 Ads  
Monetize your game

 Multiplayer  
Easily implement m

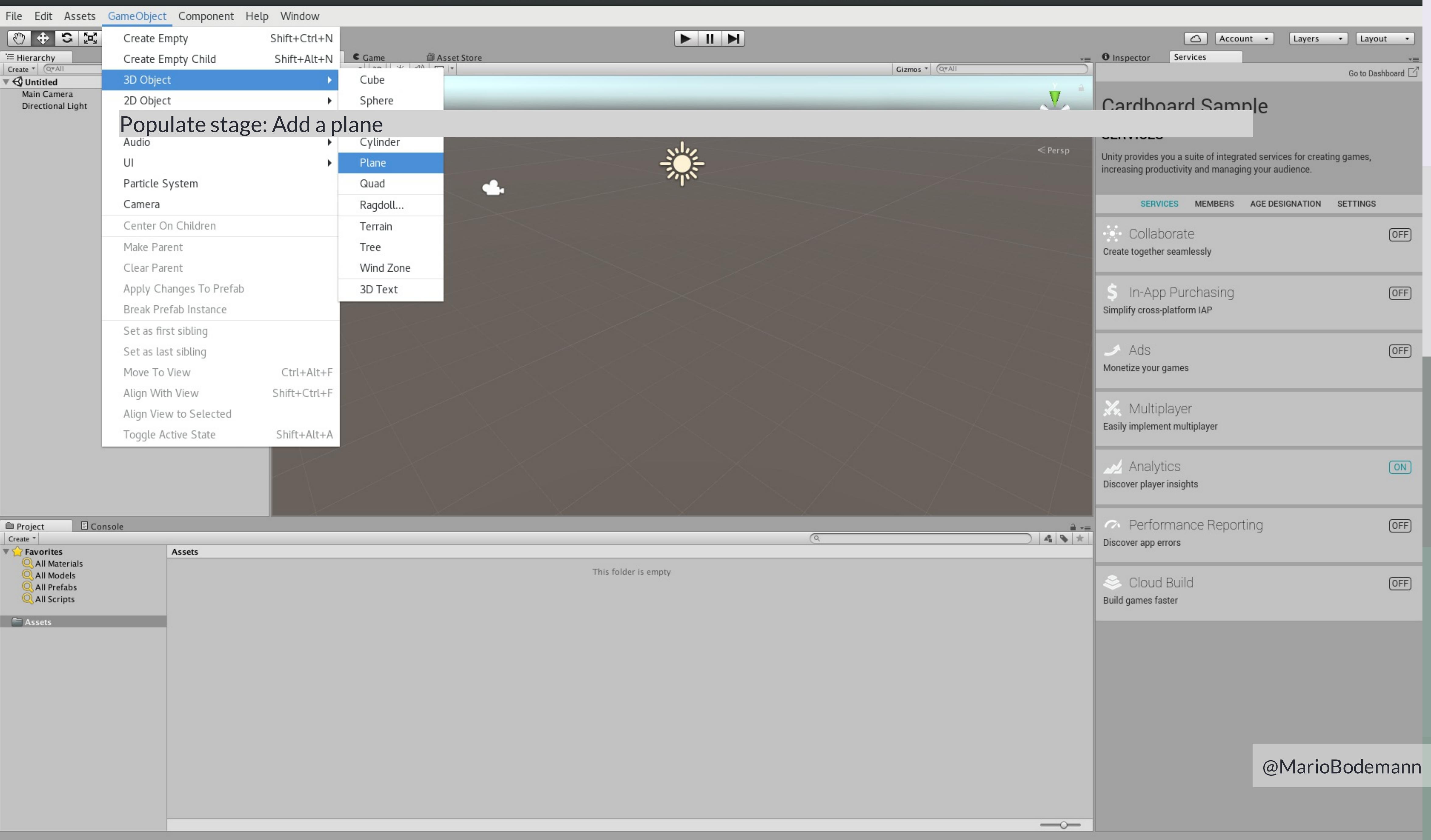
 Analytics  
Discover player ins

 Performance

@MarioBodemann

This folder is empty

 Cloud Bu





Create Empty Shift+Ctrl+N  
Menu > GameObject > 3D Object > Plane

Create Empty Child Shift+Alt+N

3D Object ▶

- 2D Object ▶
- Light ▶
- Audio ▶
- UI ▶
- Particle System
- Camera
- Center On Children
- Make Parent
- Clear Parent

Game Asset Store

Cube

Sphere

Capsule

Cylinder

Plane ▶

Quad

Ragdoll...

Terrain

Tree

Wind Zone

@MarioBodemann

File Edit Assets GameObject Component Help Window



Center Local



Cloud Account Layers Layout

Hierarchy  
Create (Q>All)  
Untitled\*  
Main Camera  
Directional Light  
Plane

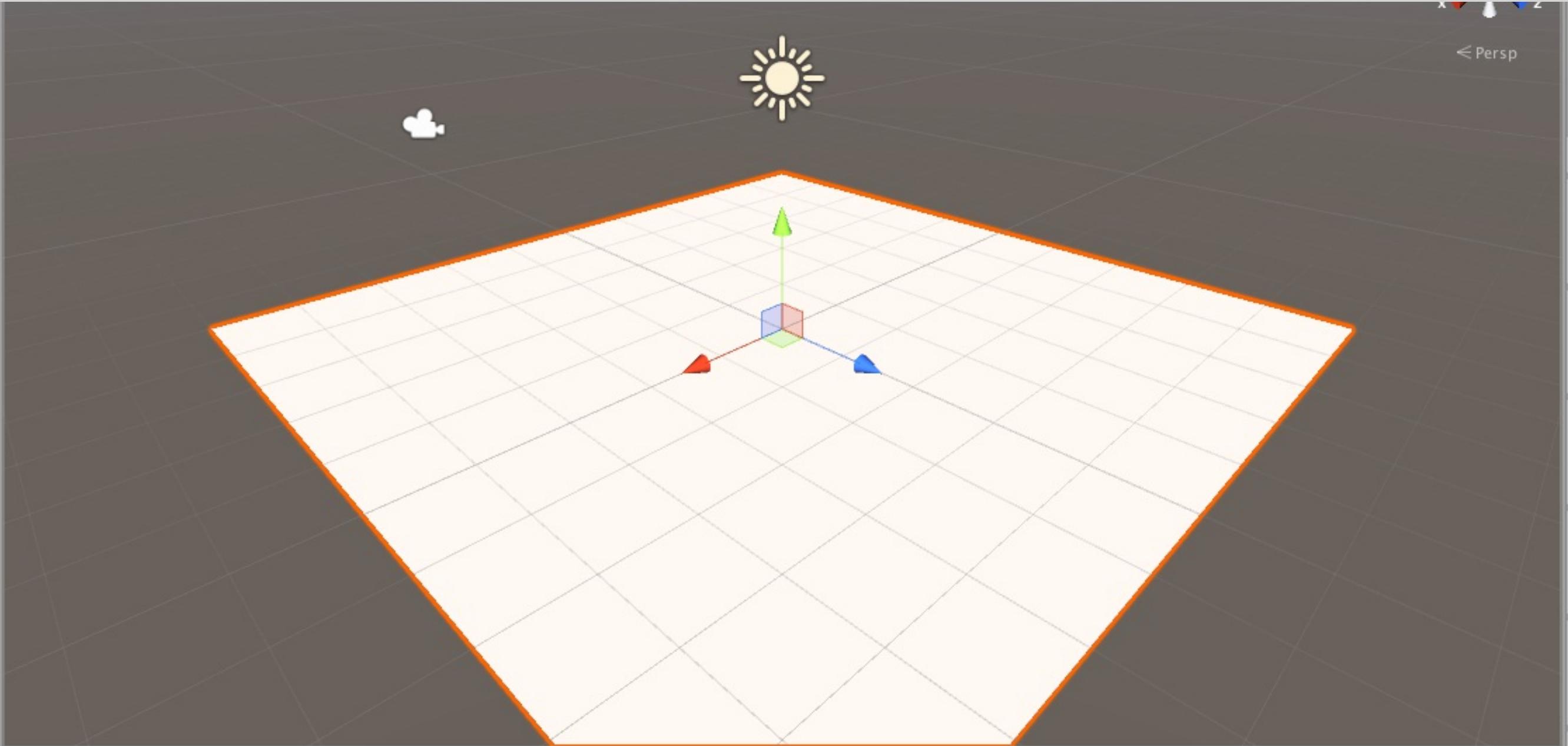
Scene Game Asset Store

Gizmos (Q>All)

Inspector Services

Go to Dashboard

## Show GameObject Plane



### 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

@MarioBodemann

Project Console

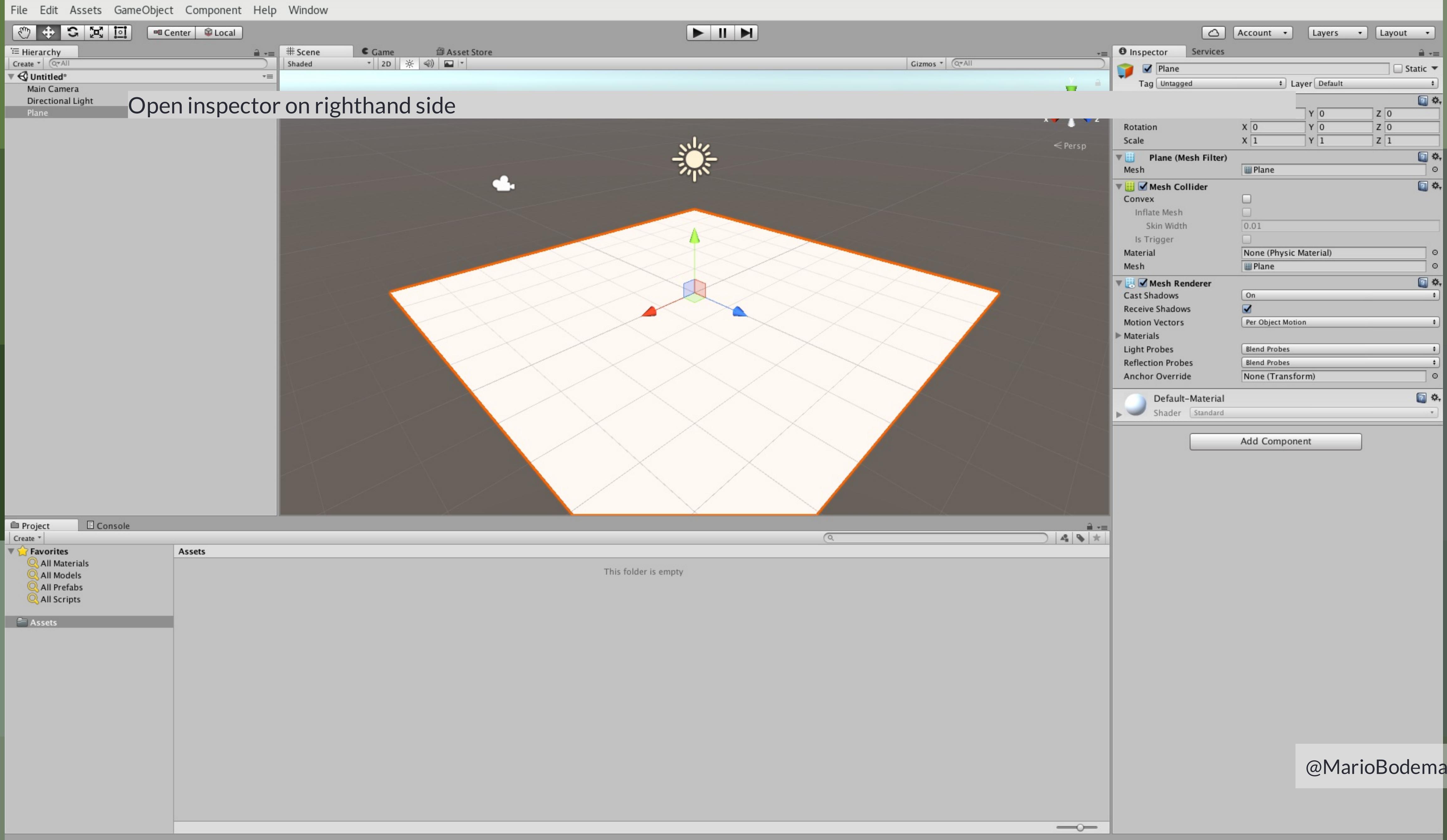
Create

Favorites  
All Materials  
All Models  
All Prefabs  
All Scripts

Assets

This folder is empty

Assets



Plane

Static

Tag Untagged Layer Default

Transform

Position 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

Search for Inspector > Transform > Scale

< Persp

@MarioBodemann

File Edit Assets GameObject Component Help Window



Center Local



Cloud Account Layers Layout

Hierarchy

Create Q All

Untitled\*

Main Camera

Directional Light

Plane

- See size changed to be screen filling.
- Let's make it more exciting > more objects!

Scene Game Asset Store

Shaded 2D



Inspector Services

Plane

Tag Untagged

Layer Default

Y	0	Z	0
Y	0	Z	0
Y	1	Z	10



File Edit Assets **GameObject** Component Help Window

Create Empty Shift+Ctrl+N  
Create Empty Child Shift+Alt+N  
**3D Object** Cube

Let's add more objects

Capsule  
Cylinder  
Plane  
Quad  
Ragdoll...  
Terrain  
Tree  
Wind Zone  
3D Text

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

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

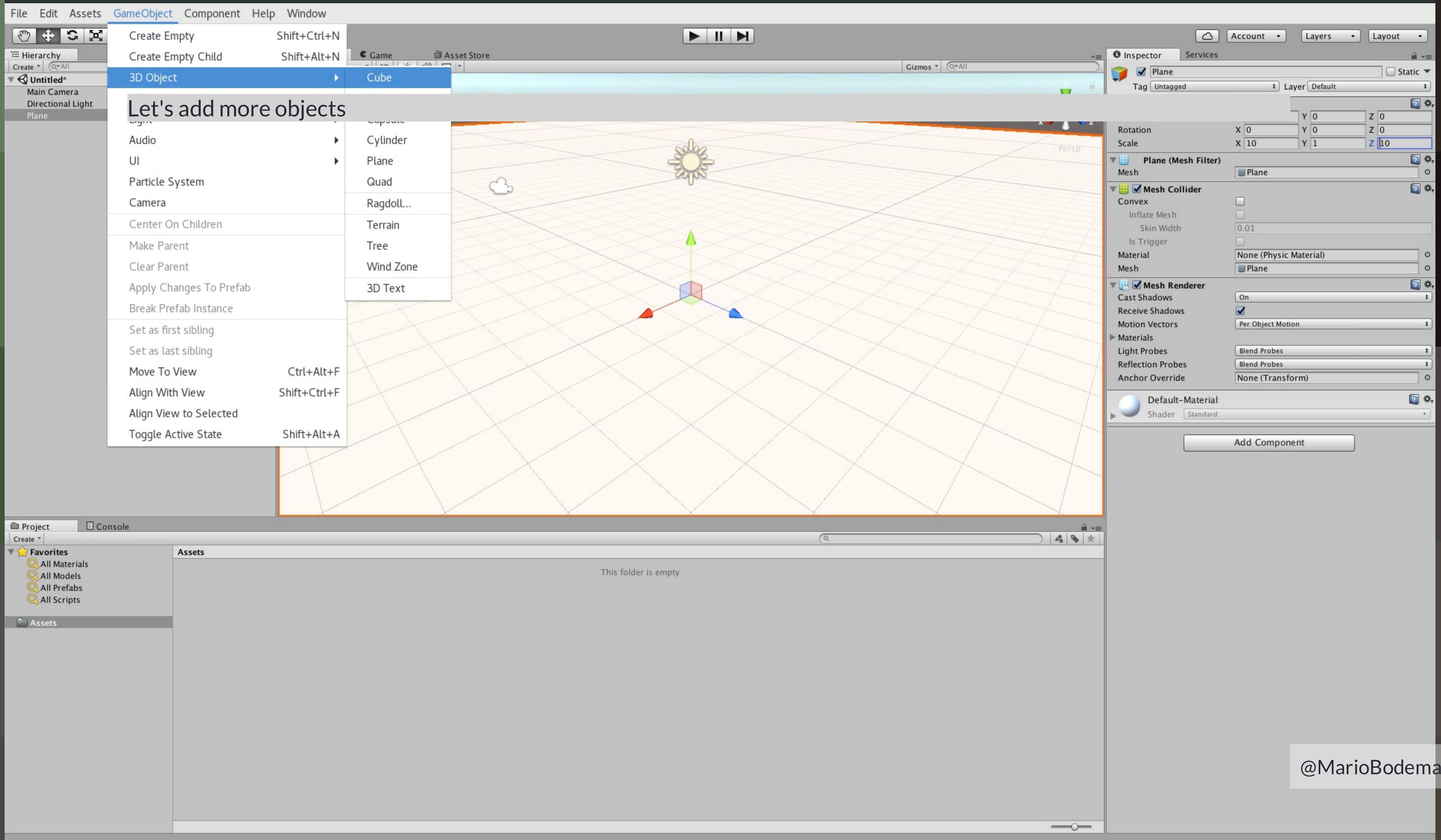
Mesh Renderer  
Cast Shadows On  
Receive Shadows   
Motion Vectors Per Object Motion  
Materials  
Light Probes Blend Probes  
Reflection Probes Blend Probes  
Anchor Override None (Transform)  
Default-Material  
Shader Standard

Add Component

Project Console

Favorites  
All Materials  
All Models  
All Prefabs  
All Scripts

Assets This folder is empty



@MarioBodemann

File Edit Assets GameObject Component Help Window



A Cube appears



Cloud Account Layers Layout

Hierarchy

Create Untitled\*  
Main Camera  
Directional Light  
Plane  
Cube

Scene Game Asset Store

Shaded 2D 3D Gizmos

Gizmos

All

Persp

Edit

Game

Asset Store

File Edit Assets GameObject Component Help Window



Move that cube.



Cloud Account Layers Layout

Hierarchy

Create Untitled\*  
Main Camera  
Directional Light  
Plane  
Cube

Scene

Game Asset Store

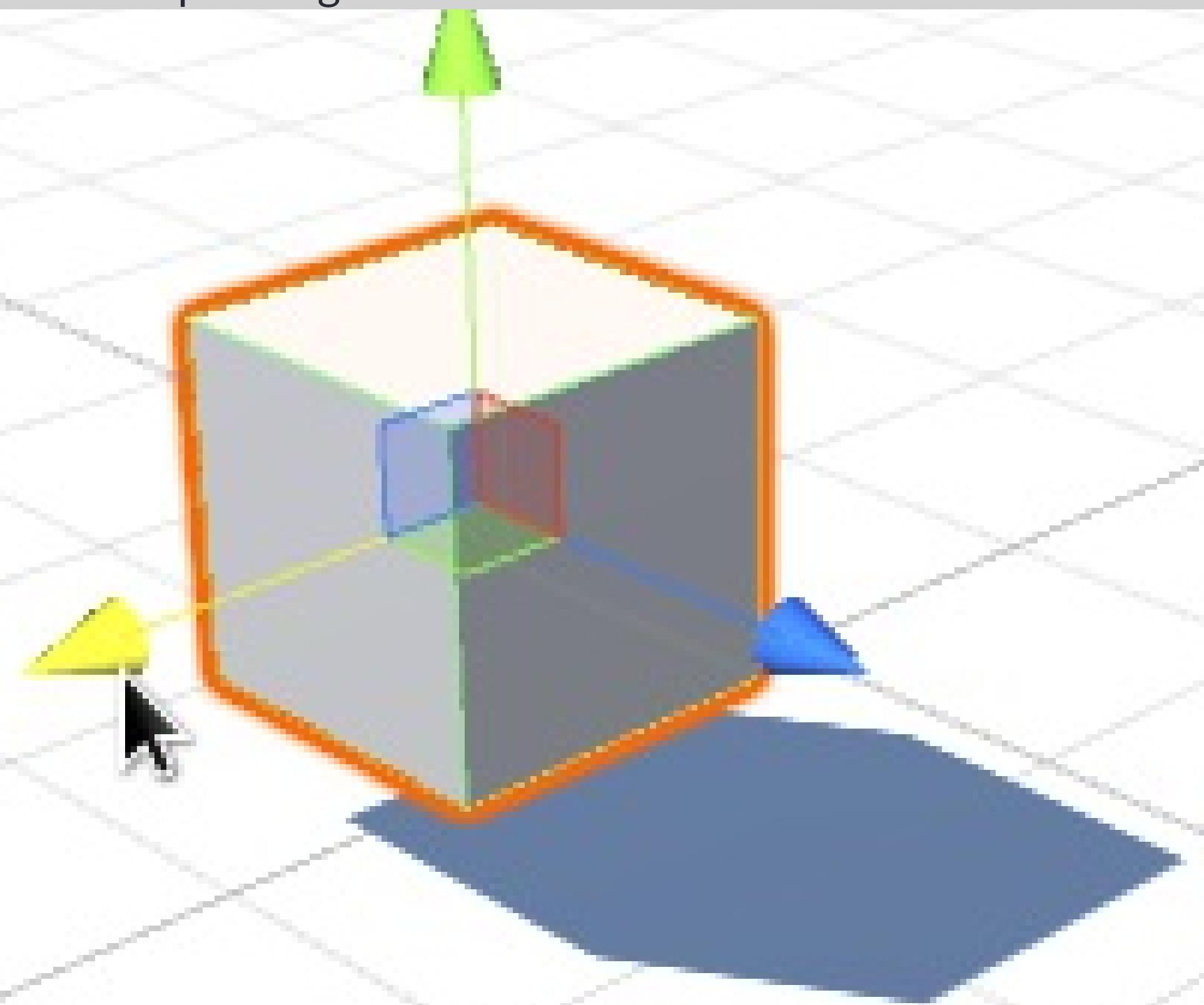
Gizmos

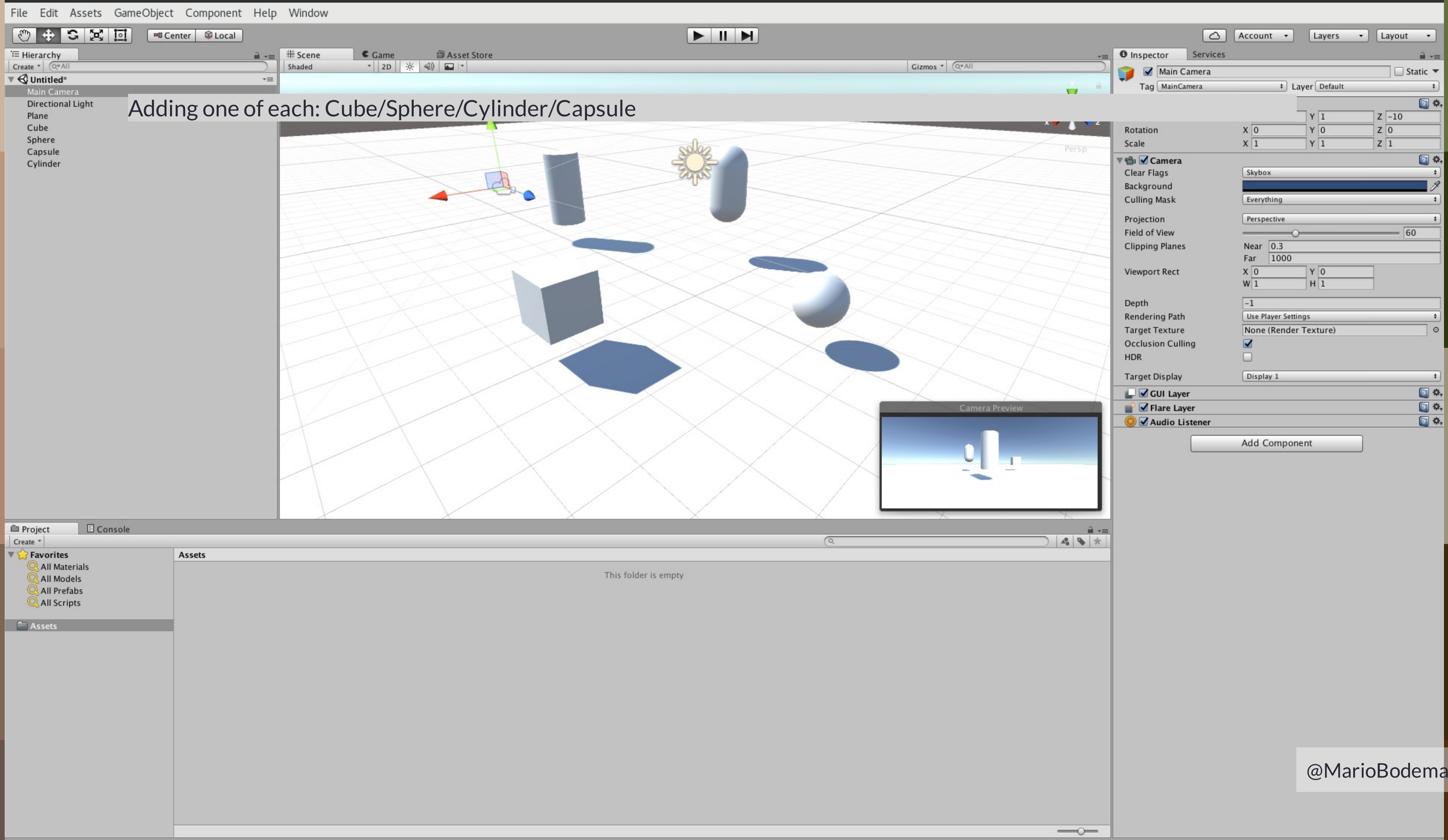
Shaded 2D 3D

Q All Q All



Take a look where the mouse cursor is pointing at.





Occclusion Culling

HDR

Display

Take a look at the camera preview: It does not look too colourfull. Let's change that.

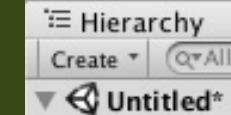


@MarioBodemann

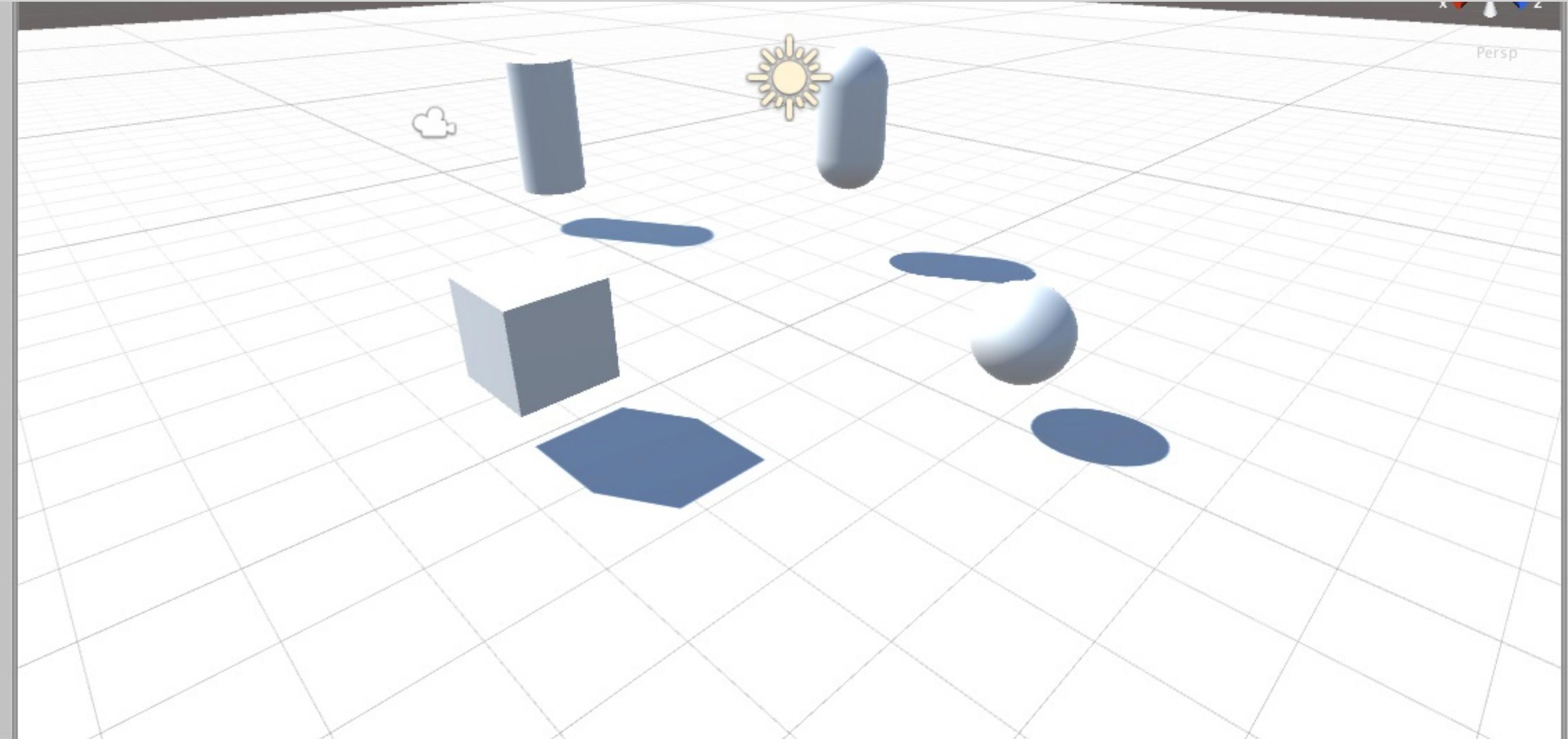
File Edit Assets GameObject Component Help Window



Cloud Account Layers Layout



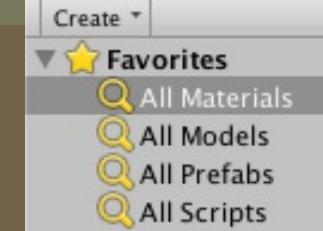
## Overview of next steps: Let's add materials.



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	<a href="http://u3d.as/r9x">http://u3d.as/r9x</a>
Publisher	Russ Denny

Import package Open Asset Store

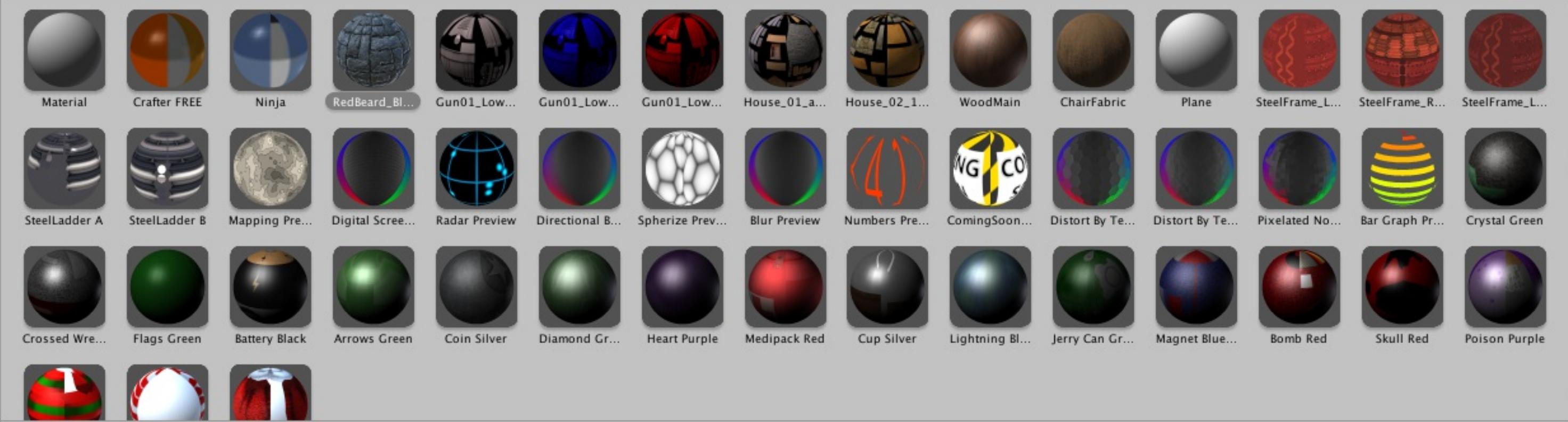
Project Console



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

t:Material

16184 Total



Click on Favorites\All Material

The screenshot shows the Unity Project Manager interface. At the top, there are tabs for "Project" and "Console". Below the tabs, a "Create" dropdown menu is visible. The main area is titled "Favorites" with a yellow star icon. Under "Favorites", there are four items: "All Materials", "All Models", "All Prefabs", and "All Scripts", each preceded by a magnifying glass icon. To the right of the favorites section, there is a search bar labeled "Search: A" and a section labeled "Free Ass..." which is partially cut off. On the far right, there is a preview window showing a dark sphere and the word "Material". In the bottom right corner, there is a watermark that reads "@MarioBodemann".

Project

Console

Create

Favorites

All Materials

All Models

All Prefabs

All Scripts

Assets

Search: A

Free Ass...

Material

@MarioBodemann

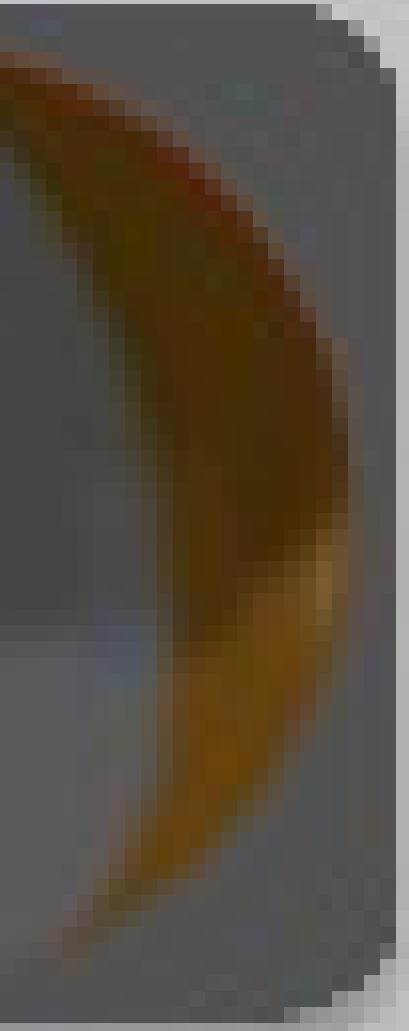
Click on Asset Store

ected folder

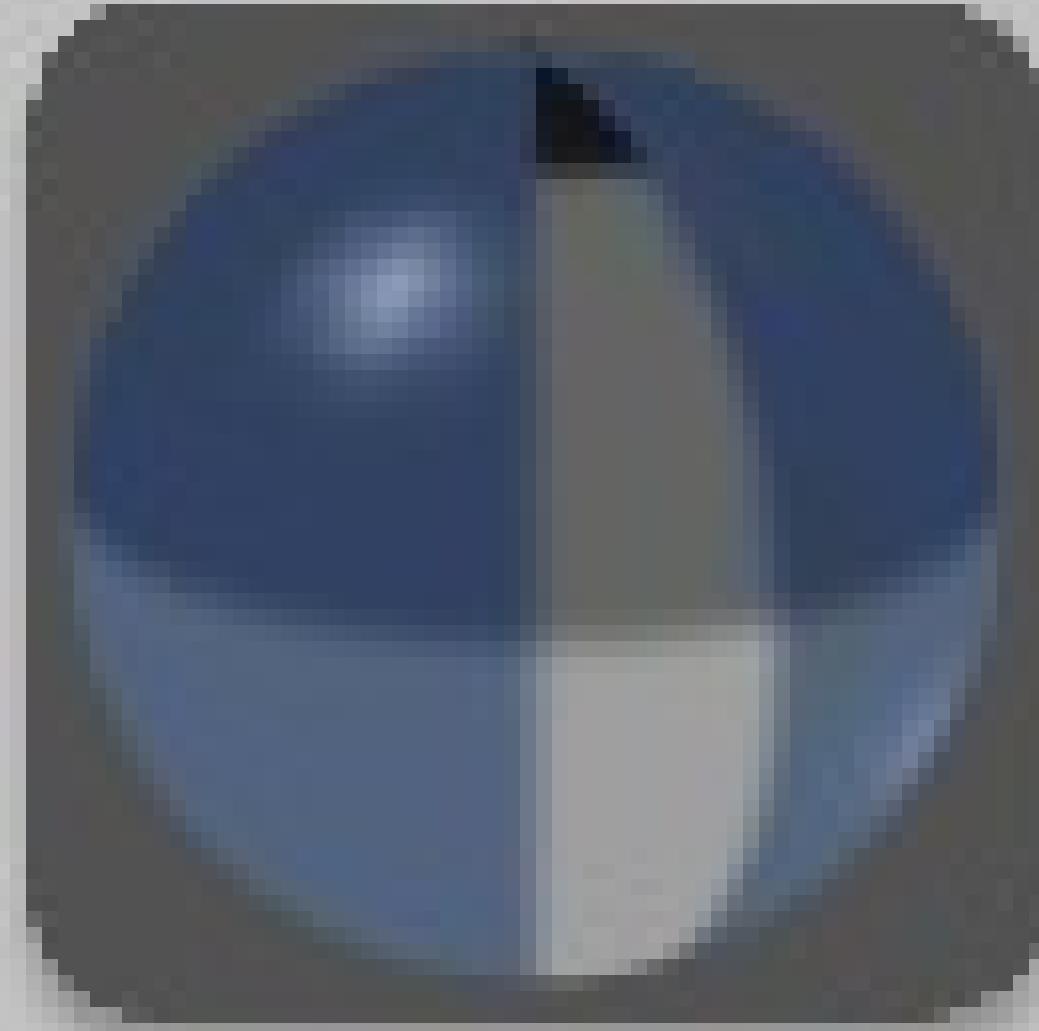
Asset Store: 999+ / 999+

@MarioBodemann

Click on an asset which is interesting/looks nice (RedBeard\_Bluestone WallV2)



FREE



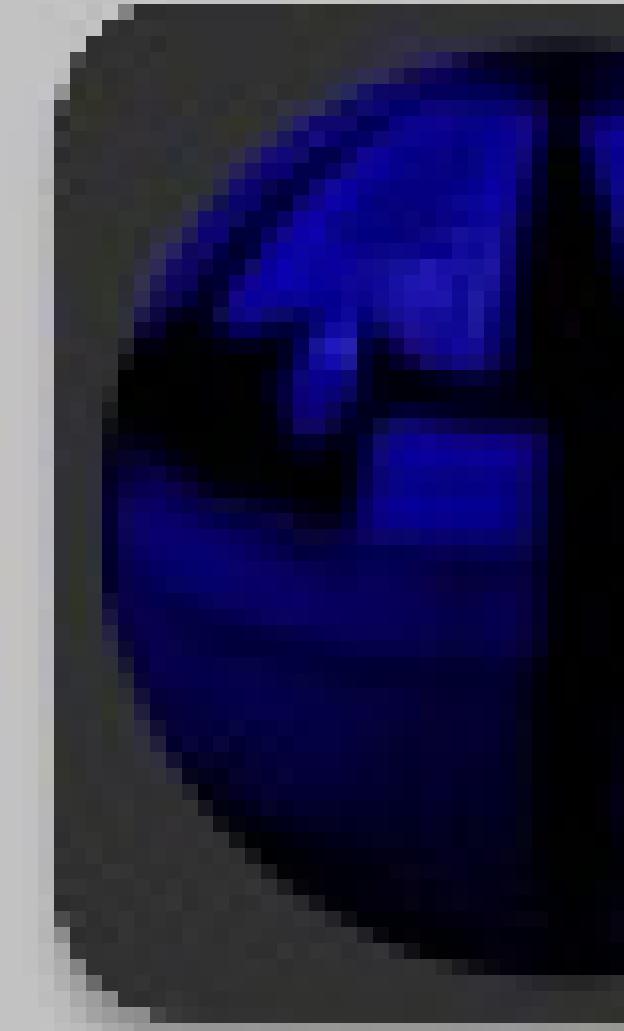
Ninja



RedBeard\_B...



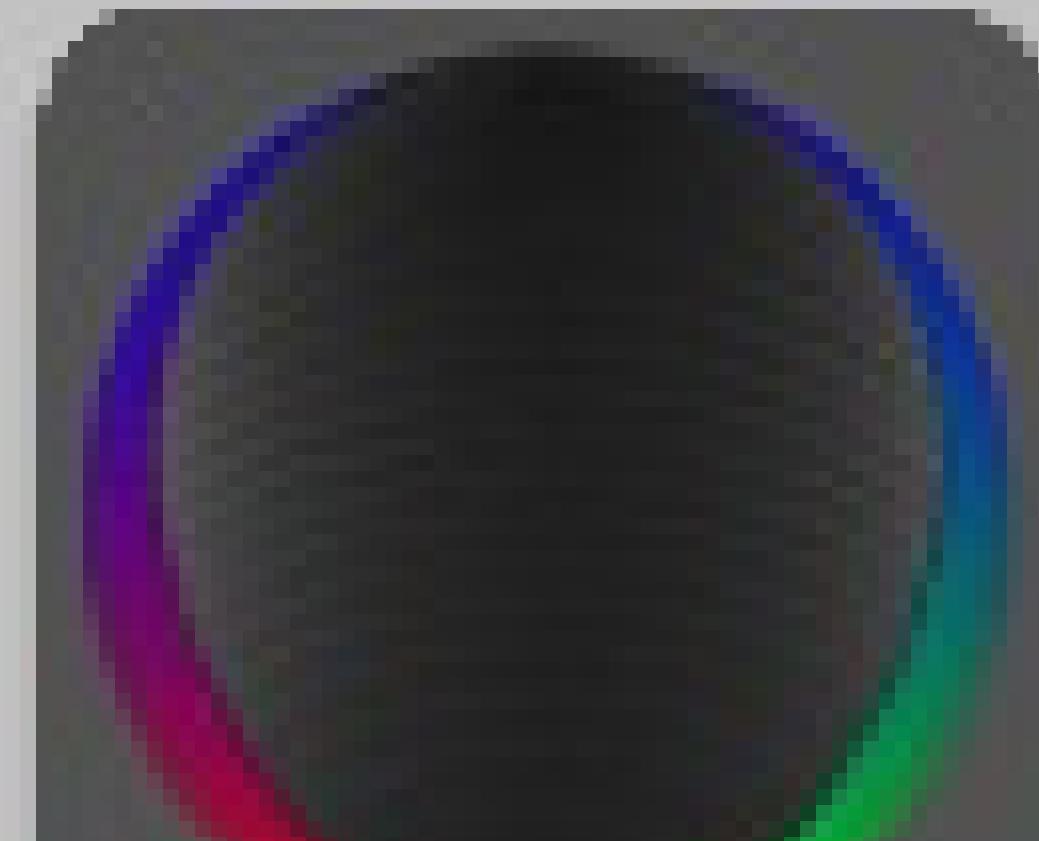
Gun01\_Low...



Gun01\_Hi...



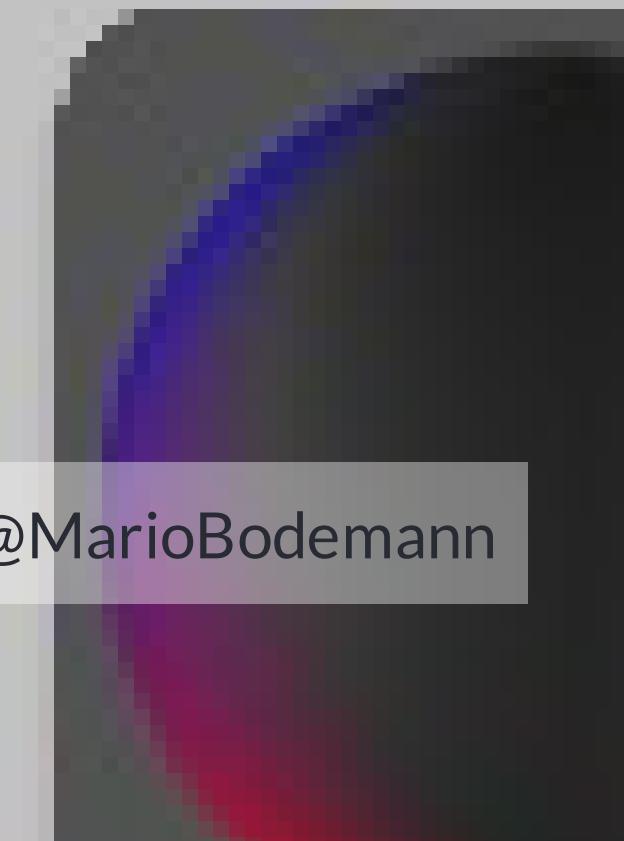
Rocky



Colorful



Glowing



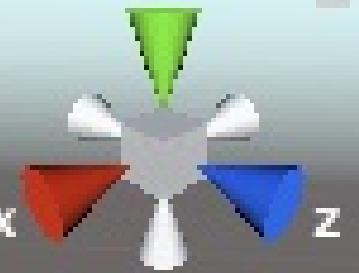
Abstract

@MarioBodemann

 Account Layers Layout

- Check Asset count: Defines how many different materials are included. the more the nicer looking.
- Hit Import package.

Gizmos

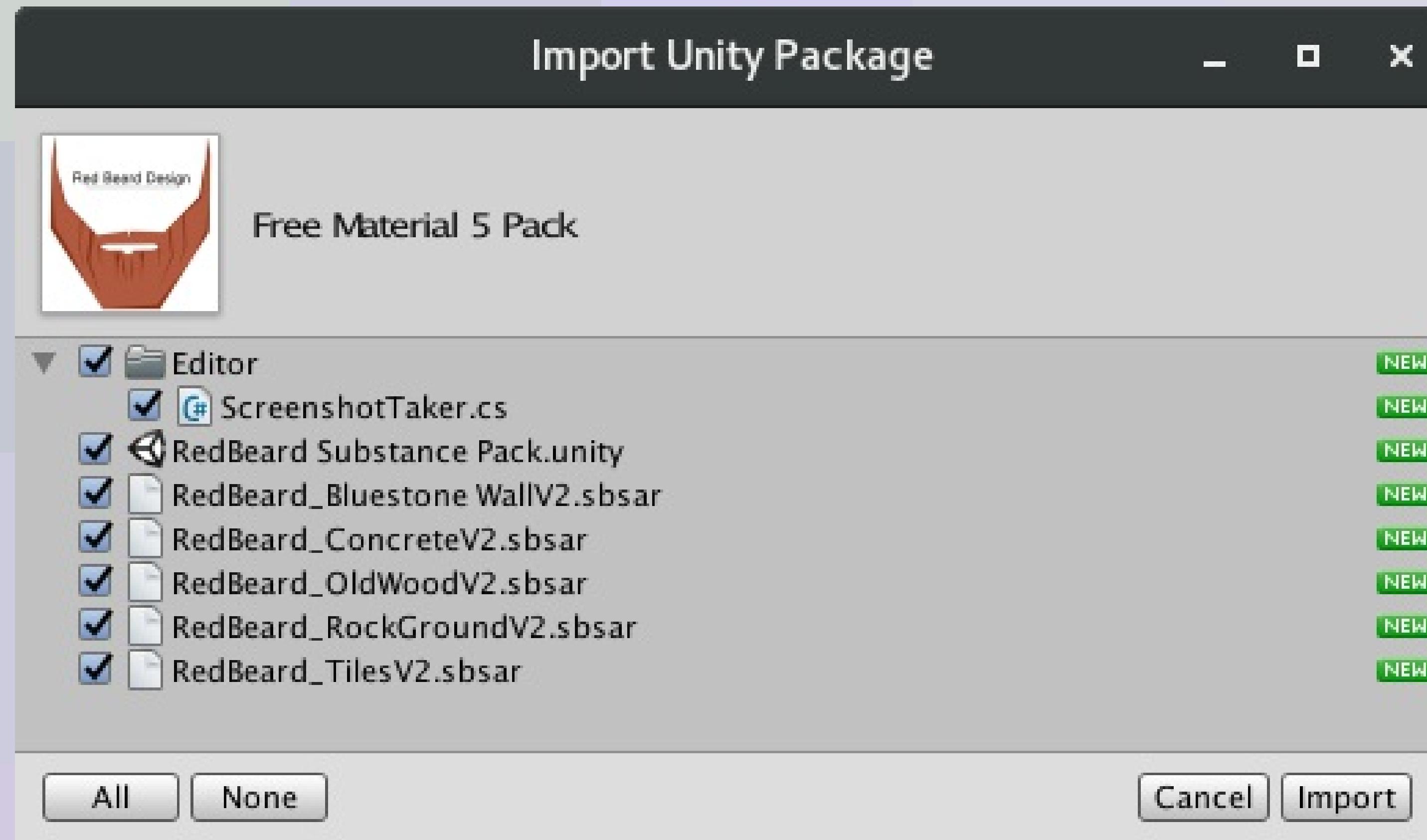


Persp

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	<a href="http://u3d.as/r9x">http://u3d.as/r9x</a>
Publisher	Russ Denny

[Import package](#)[Open Asset Store](#)

Hit import after checking all checkmarks (should already be the case)



@MarioBodemann

File Edit Assets GameObject Component Help Tools Window



Scene Game Asset Store



Cloud Account Layers Layout

Hierarchy

Create Untitled\*

Main Camera

Directional Light

Plane

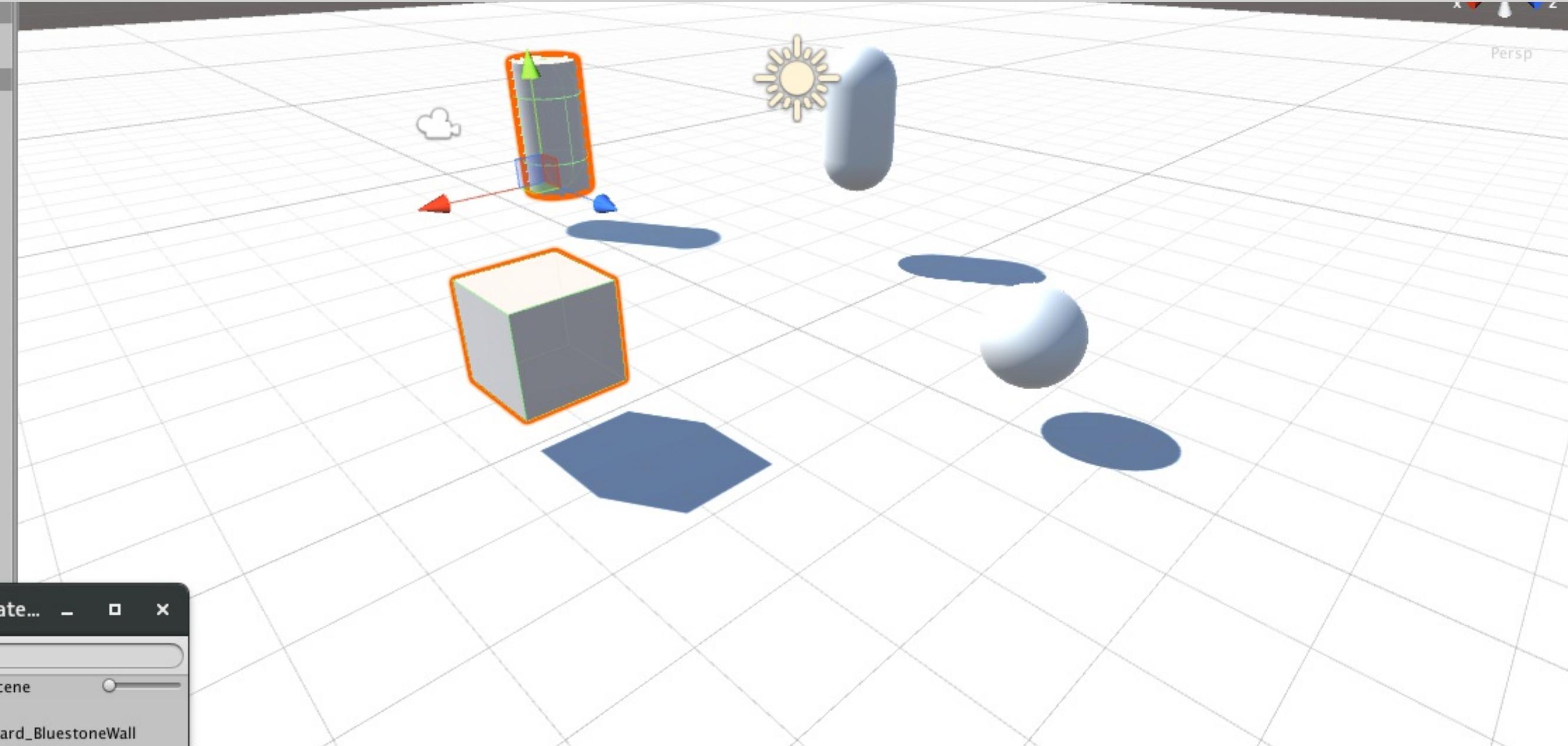
Cube

Sphere

Capsule

Cylinder

No change, we have to assign the material to different objects.



Inspector Services

Tag Untagged Layer Default

Rotation

Y

0

X

1

Scale

Y

1

Z

1

Cylinder (Mesh Filter)

Mesh

Mesh Renderer

Cast Shadows

Receive Shadows

Motion Vectors

Materials

Size

Element 0

Light Probes

Reflection Probes

Anchor Override

Default-Material

Blend Probes

Blend Probes

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

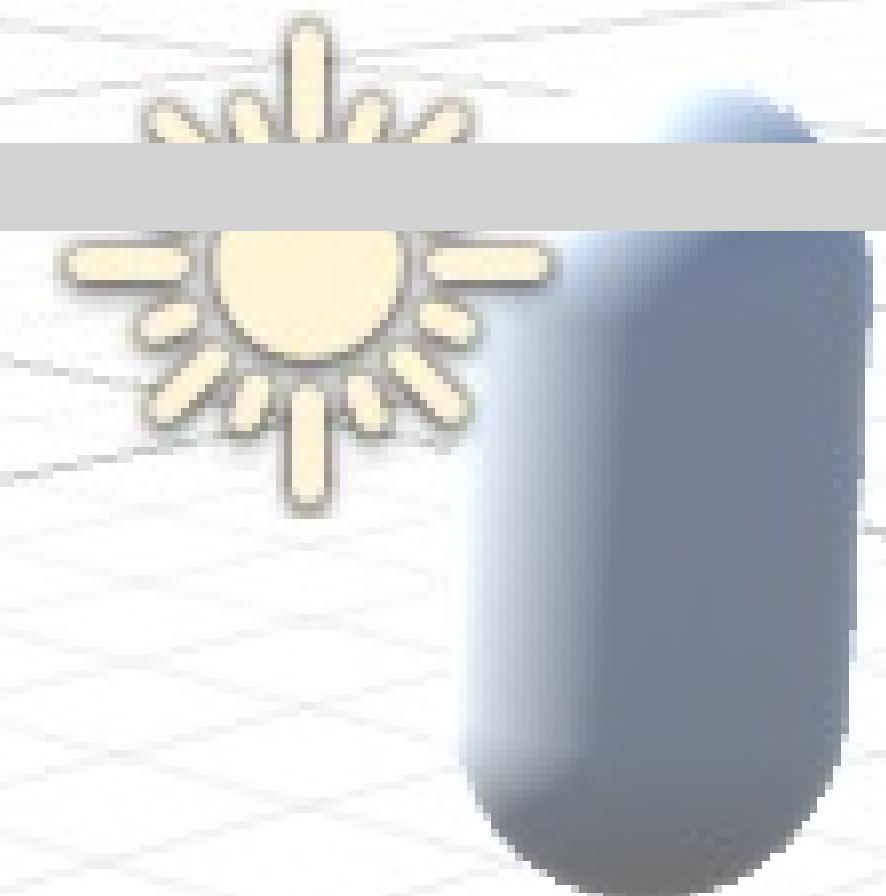
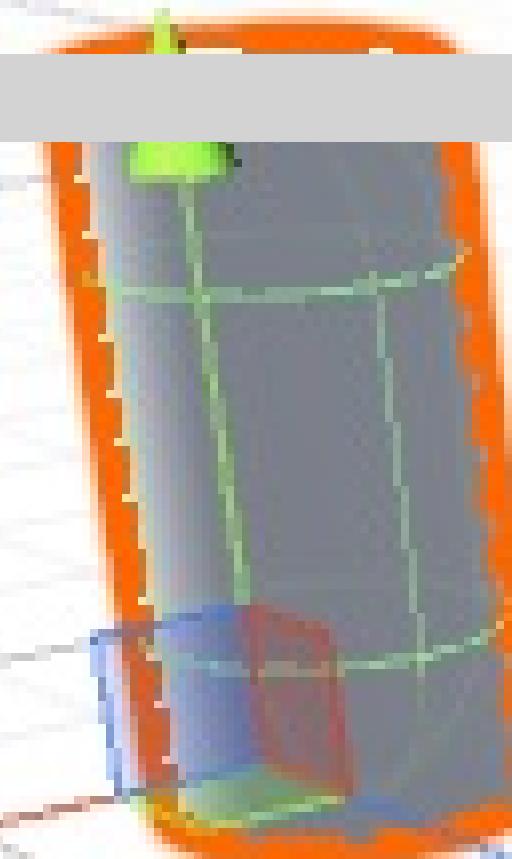
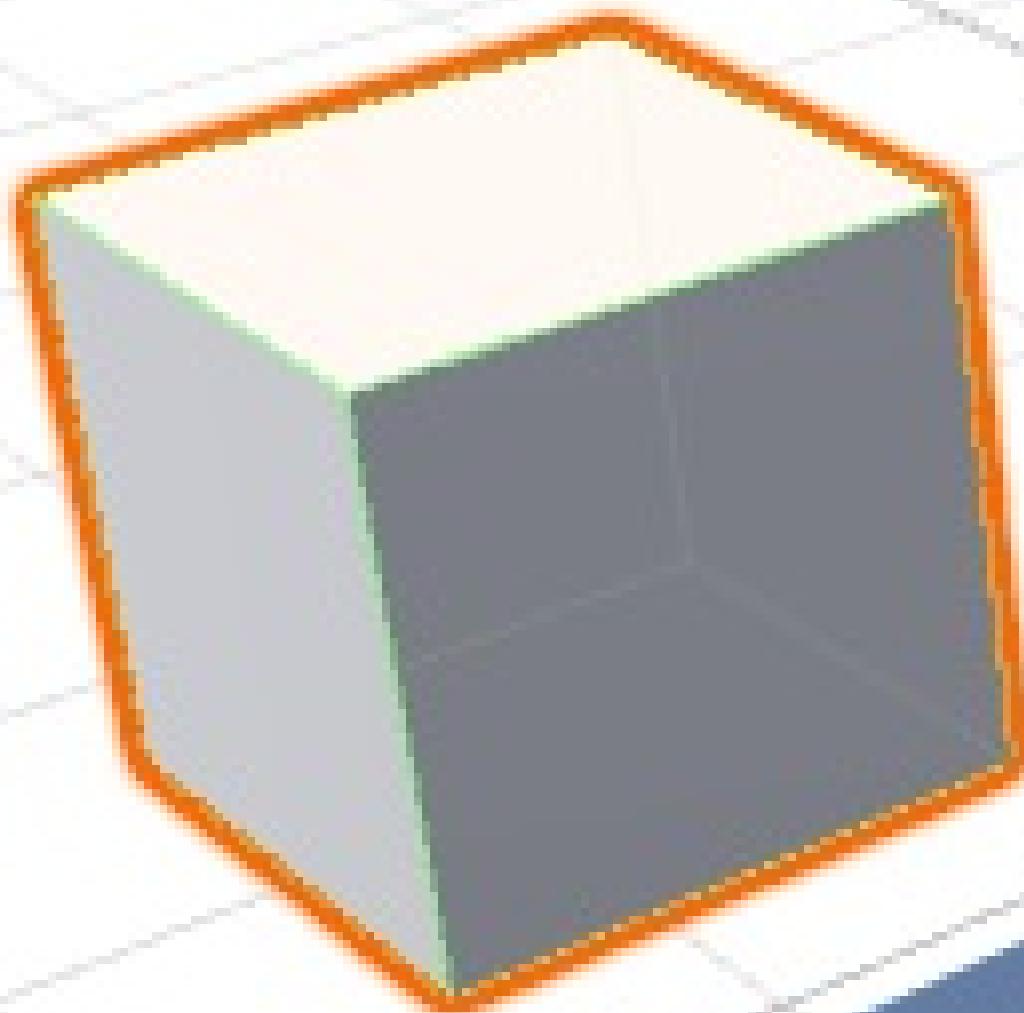
Editor



Default-Material (Material) Res

@MarioBodemann

Use SHIFT to click select multiple objects.



@MarioBodemann

Position

X —

Y —

Z —

Rotation

X 0

Y 0

Z 0

Scale

X 1

Y 1

Z 1

Hit the little hidden button next to Inspector > ✓ Mesh Renderer > Materials > Element 0 > Default Material ... ○

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.

@MarioBodemann

## Select Mate...

- Select a material to be used.
- Repeat for all objects.

None  
RedBeard\_BluestoneWall  
Redbeard\_Concrete  
RedBeard\_RockGround  
RedBeard\_Tiles  
RedBeard\_WoodWall  
FrameDebuggerRenderTargetD  
Default-Diffuse  
**Default-Material**  
Default-Particle  
Default-Skybox  
Sprites-Default  
SpatialMappingOcclusion  
SpatialMappingWireframe



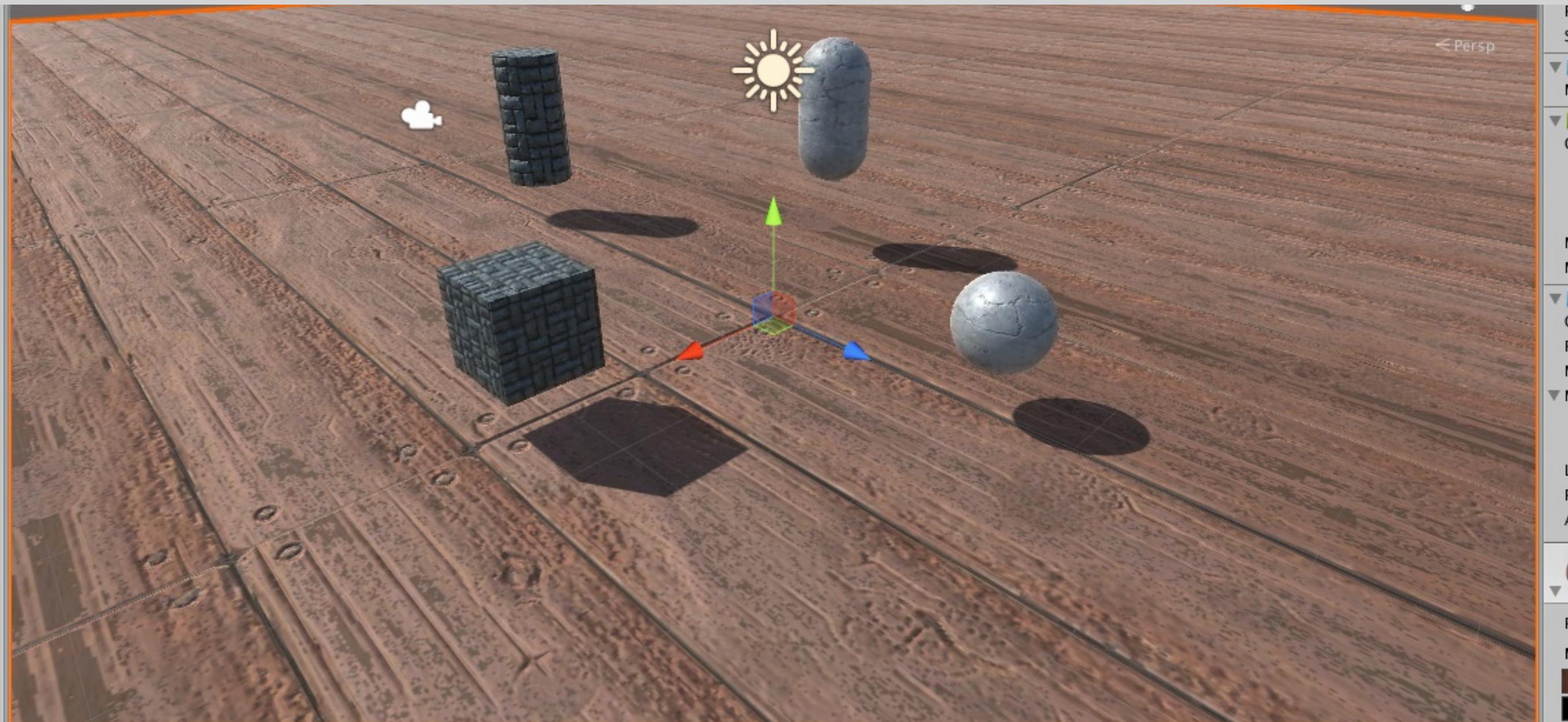
Beard\_B... RedBeard\_B... RedBeard\_B... Re

File Edit Assets GameObject Component Help Tools Window



Hierarchy  
Create (Q+A)  
Untitled\*  
Main Camera  
Directional Light  
Plane  
Cube  
Sphere  
Capsule  
Cylinder

Looks nice, let's run it.



Project Console

Favorites  
All Materials  
All Models  
All Prefabs  
All Scripts

Assets



Assets  
Editor



Cloud Account Layers Layout

Scene Game Asset Store

Shaded 2D 3D Gizmos

(Q+A)

Gizmos

(Q+A)

Default

Static

Layer

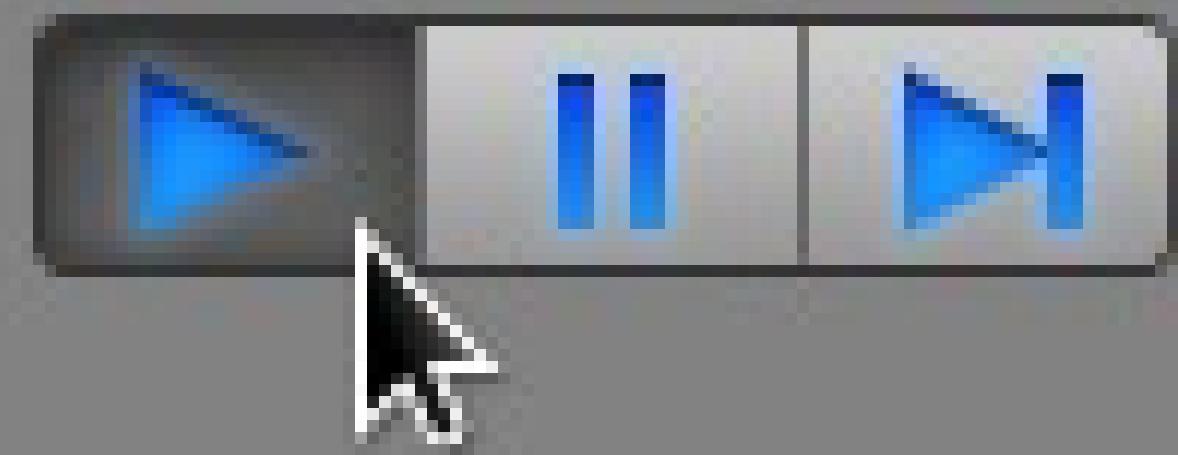
Untagged

Layer

Default

Plane

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



→ 1x

File Edit Assets GameObject Component Help Tools Window



Center

Local



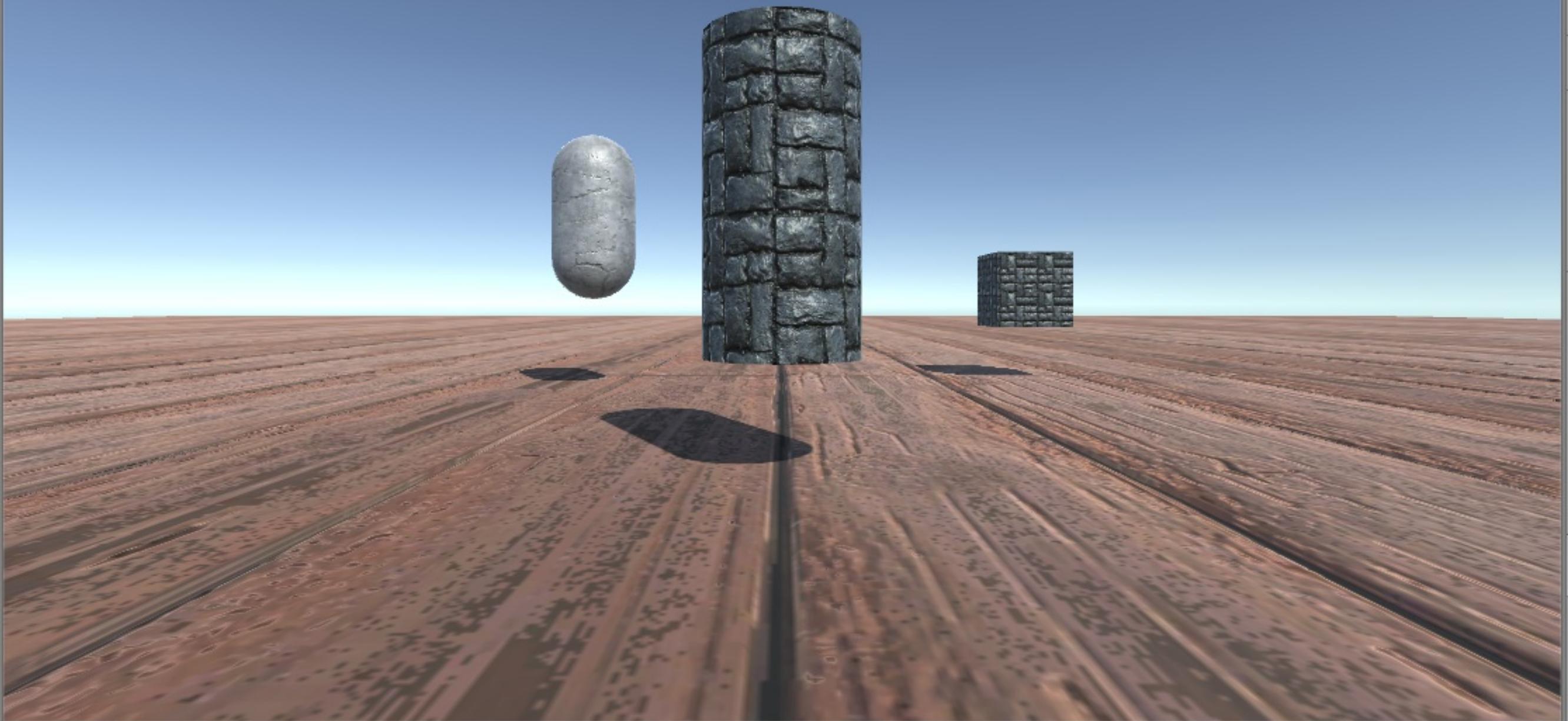
Cloud Account Layers Layout

Hierarchy

Create  Untitled\*

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

Looks nice, but there is nothing happening, let's change that!

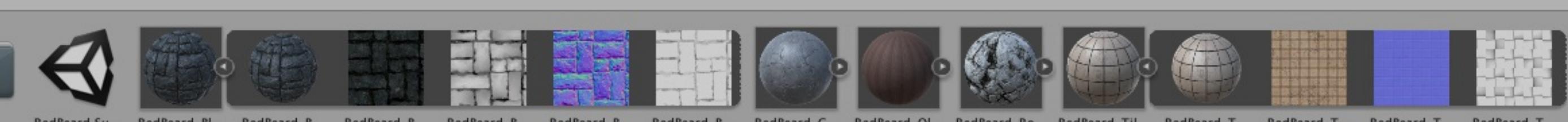


Project Console

Create  Favorites

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

Assets



Assets

Editor

Inspector Services

Plane  
Tag Untagged

Layer Default

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 1

Source Metallic Alpha

Normal Map

Height Map

Occlusion

Emission 0

Global Illumination Realtime

Detail Mask

Tiling X 10

Offset X 0

UV Set UV0

Secondary Maps

Detail Albedo x2

Normal Map 1

Tiling X 1

Offset X 0

UV Set UV0

Forward Rendering Options

Specular Highlights Reflections 

Procedural Properties

Generate all outputs

@MarioBodemann

**Overview of adding a gravity animation**

The Unity Editor interface showing the process of adding a gravity effect to a scene.

**Component Menu:** A dropdown menu under the **Component** tab in the top navigation bar. It lists various physics components such as Box Collider, Sphere Collider, Capsule Collider, Mesh Collider, Wheel Collider, Terrain Collider, Cloth, Hinge Joint, Fixed Joint, Spring Joint, Character Joint, Configurable Joint, and Constant Force. The **Constant Force** option is currently selected.

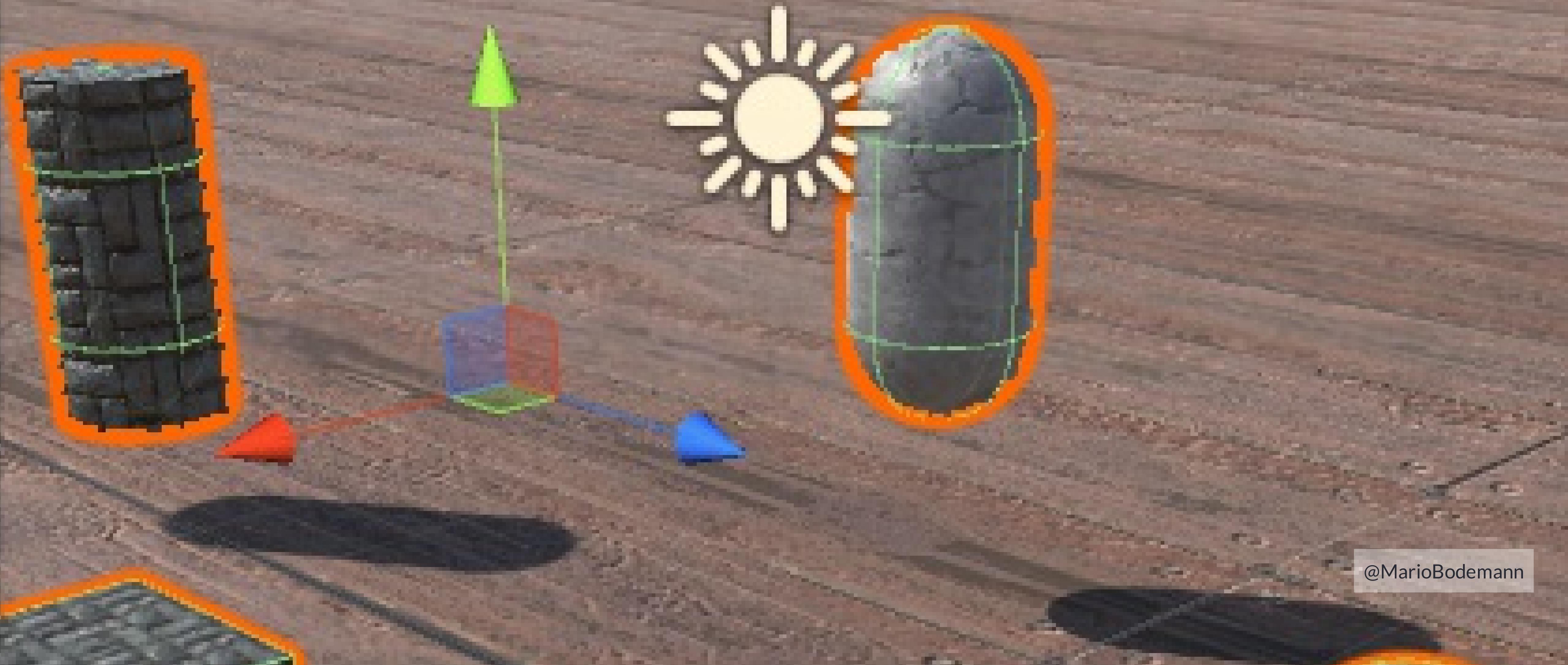
**Scene View:** The central view showing a 3D environment on a wooden floor. Several objects are present: a tall black cylinder, a smaller black cube, a blue cube, a yellow sun-like sphere, and a dark sphere. The objects have orange outlines, indicating they are selected.

**Inspector View:** The right-hand panel displays the properties of the selected objects. For the selected cylinder, the **Mesh Renderer** component is active, with options like **Cast Shadows** (On), **Receive Shadows** (checked), and **Motion Vectors** (Per Object Motion). The **Materials** section shows a single material assigned with a size of 1.

**Project View:** The bottom-left panel shows the project structure. Under **Favorites**, there are links to All Materials, All Models, All Prefabs, and All Scripts. The **Assets** folder contains several materials named RedBeard\_Su..., RedBeard\_Bl..., RedBeard\_B..., RedBeard\_B..., RedBeard\_B..., RedBeard\_B..., RedBeard\_C..., RedBeard\_Ol..., RedBeard\_Ro..., RedBeard\_Til..., RedBeard\_T..., RedBeard\_T..., and RedBeard\_T... .

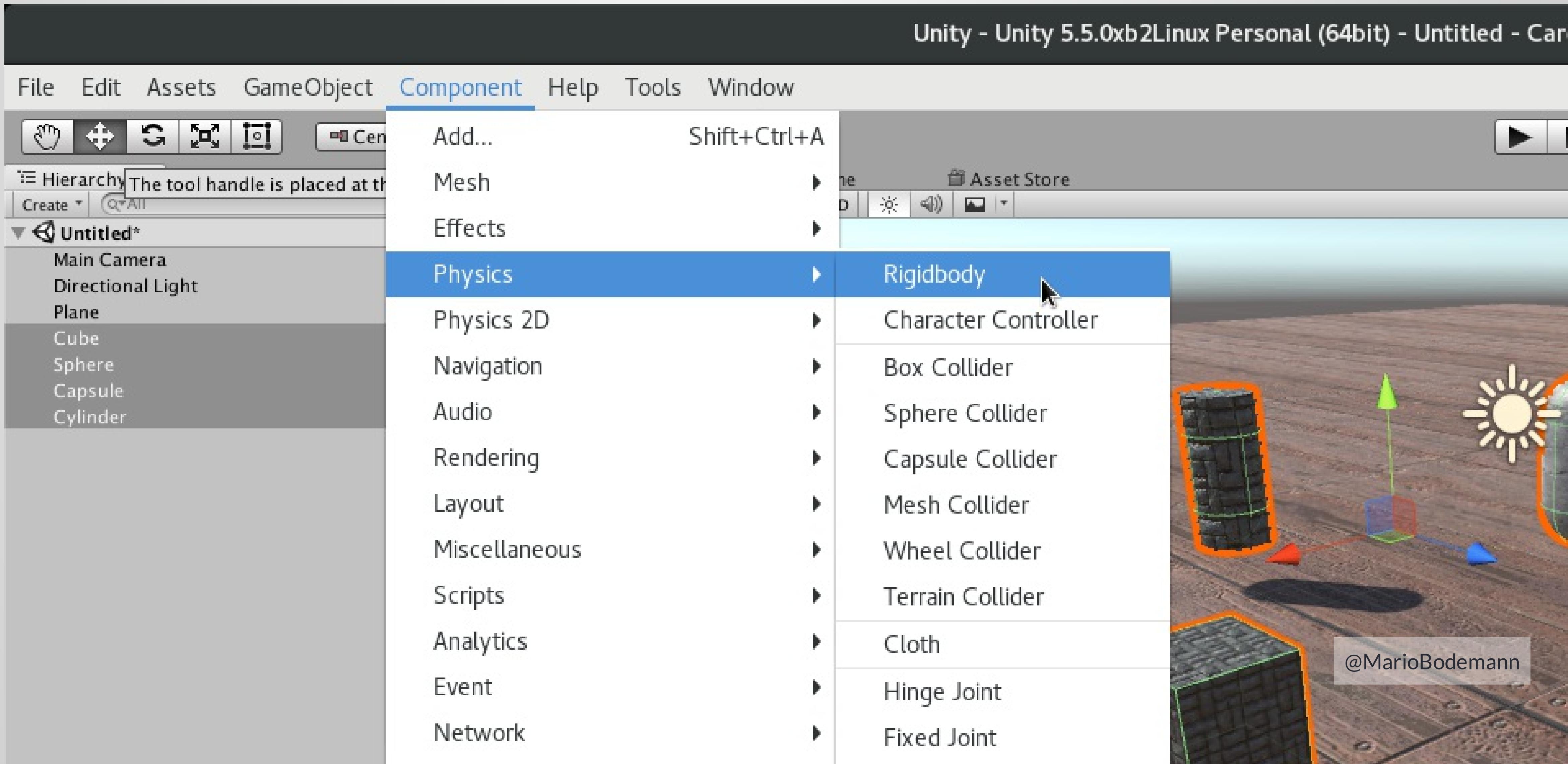
**Bottom Right:** A watermark or signature at the bottom right corner reads **@MarioBodemann**.

- Select all gravityable objects using SHIFT and left mouse click.
- Do not add the plane, since the other objects need something to land on.

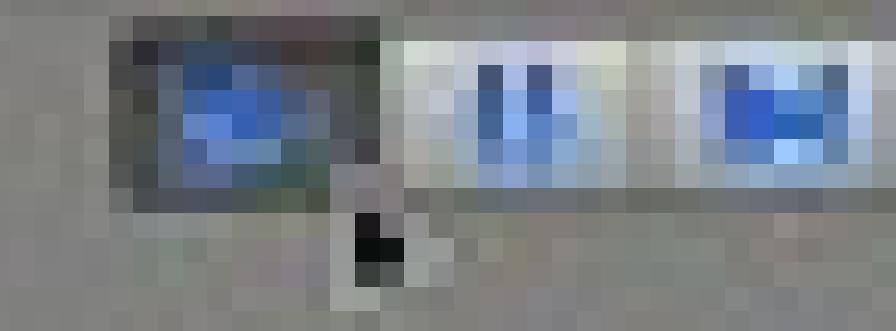


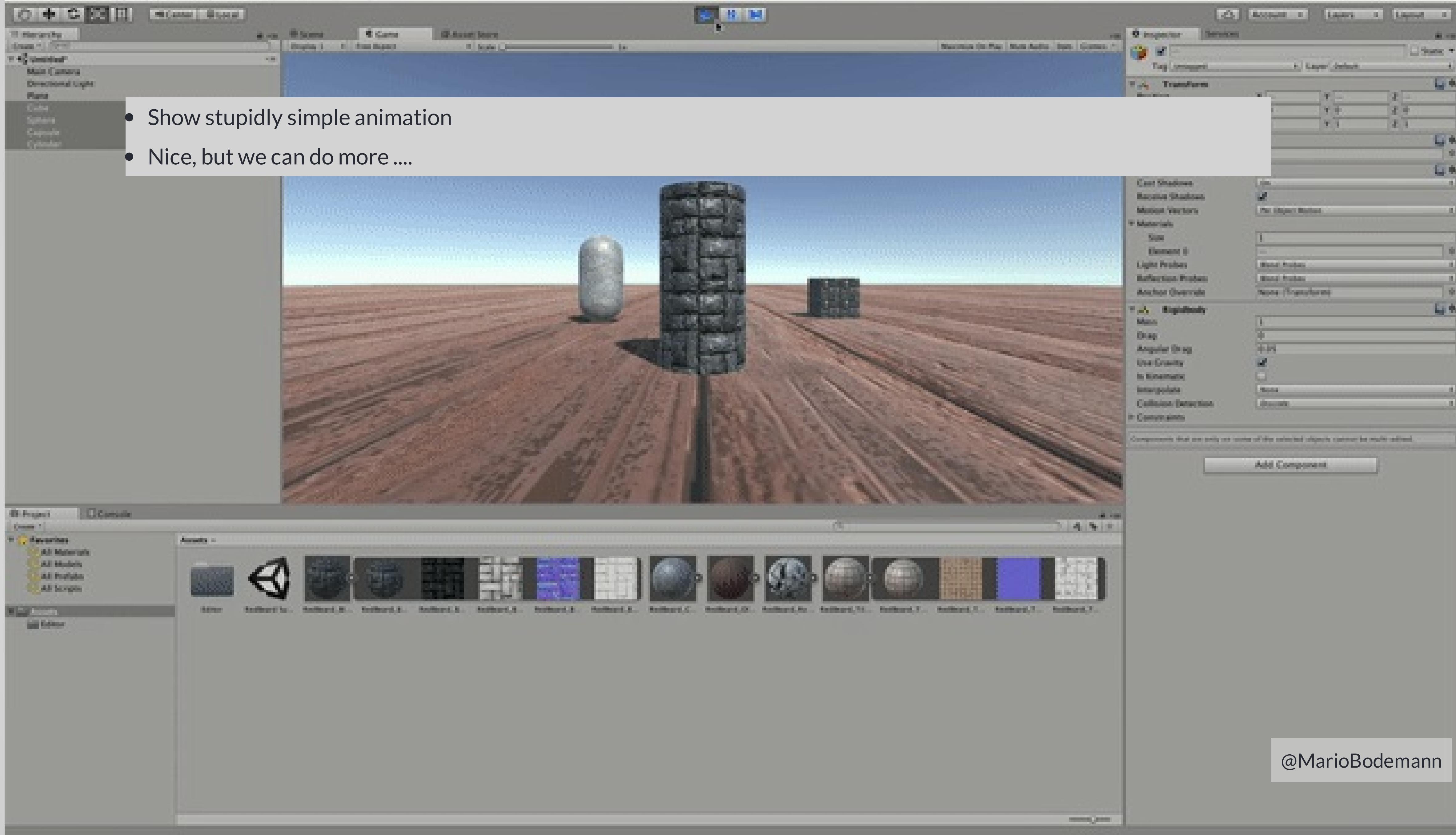
@MarioBodemann

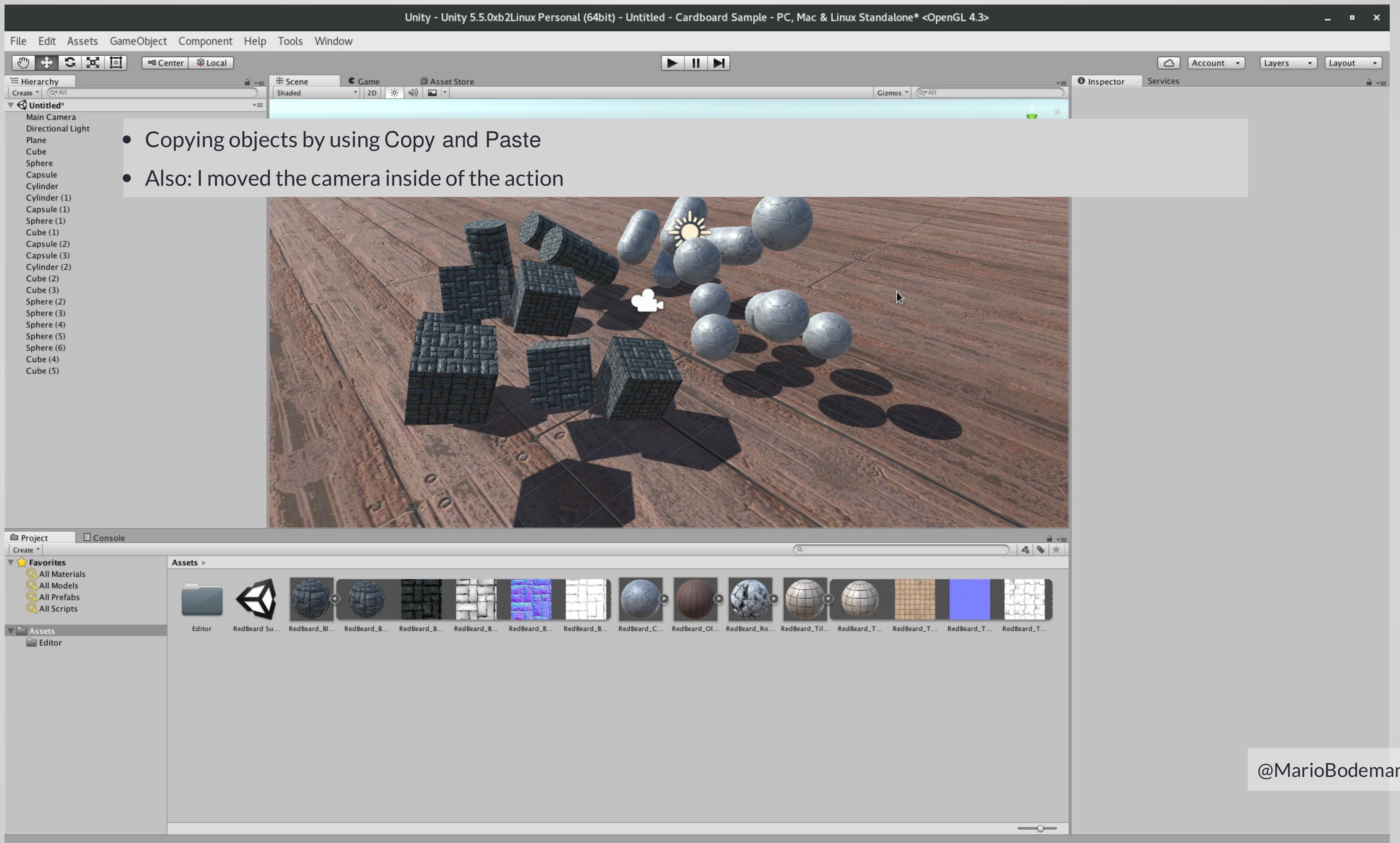
Add gravity to all selected objects by hitting menu option Component > Physics > Rigidbody.



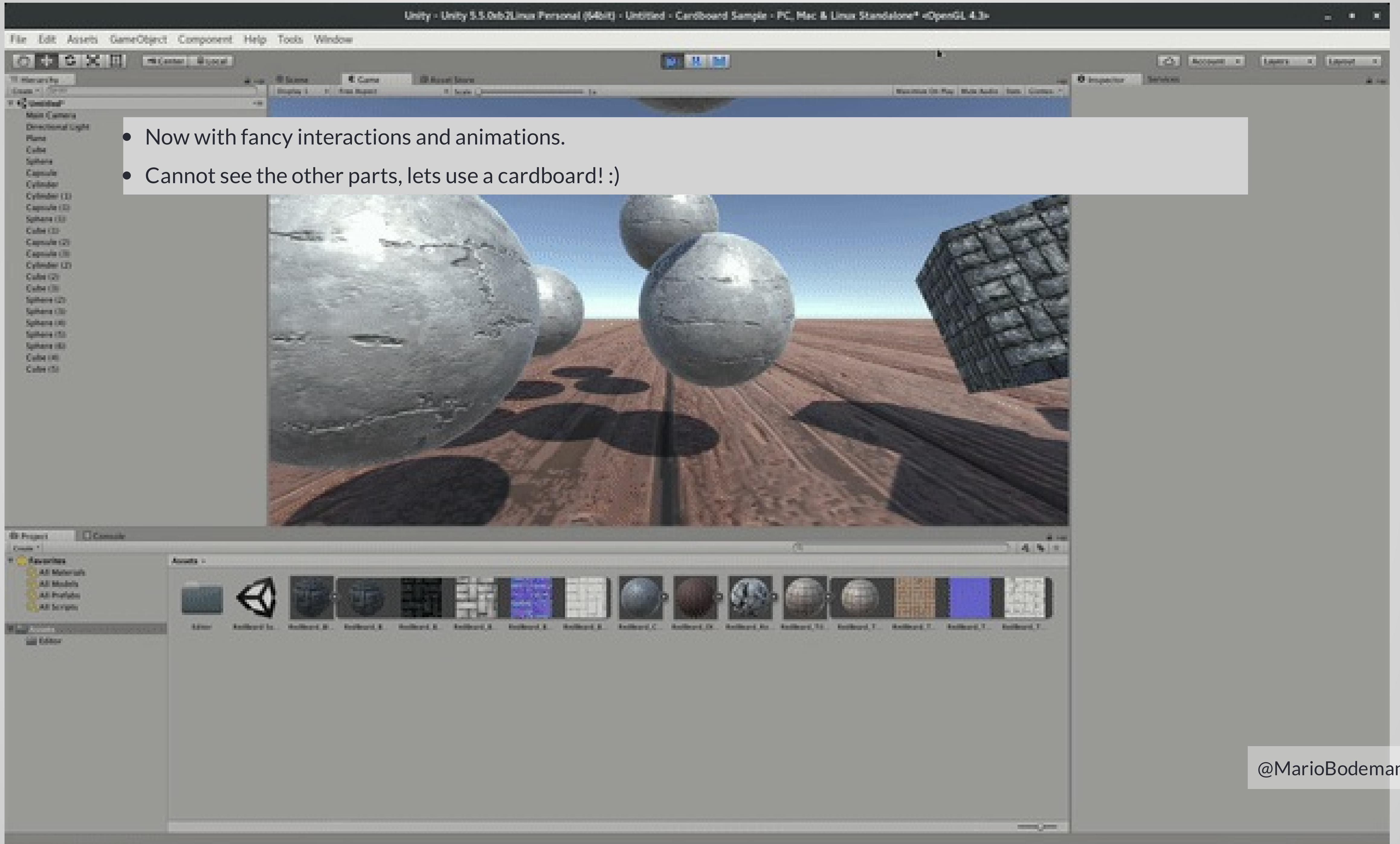
Hit play.



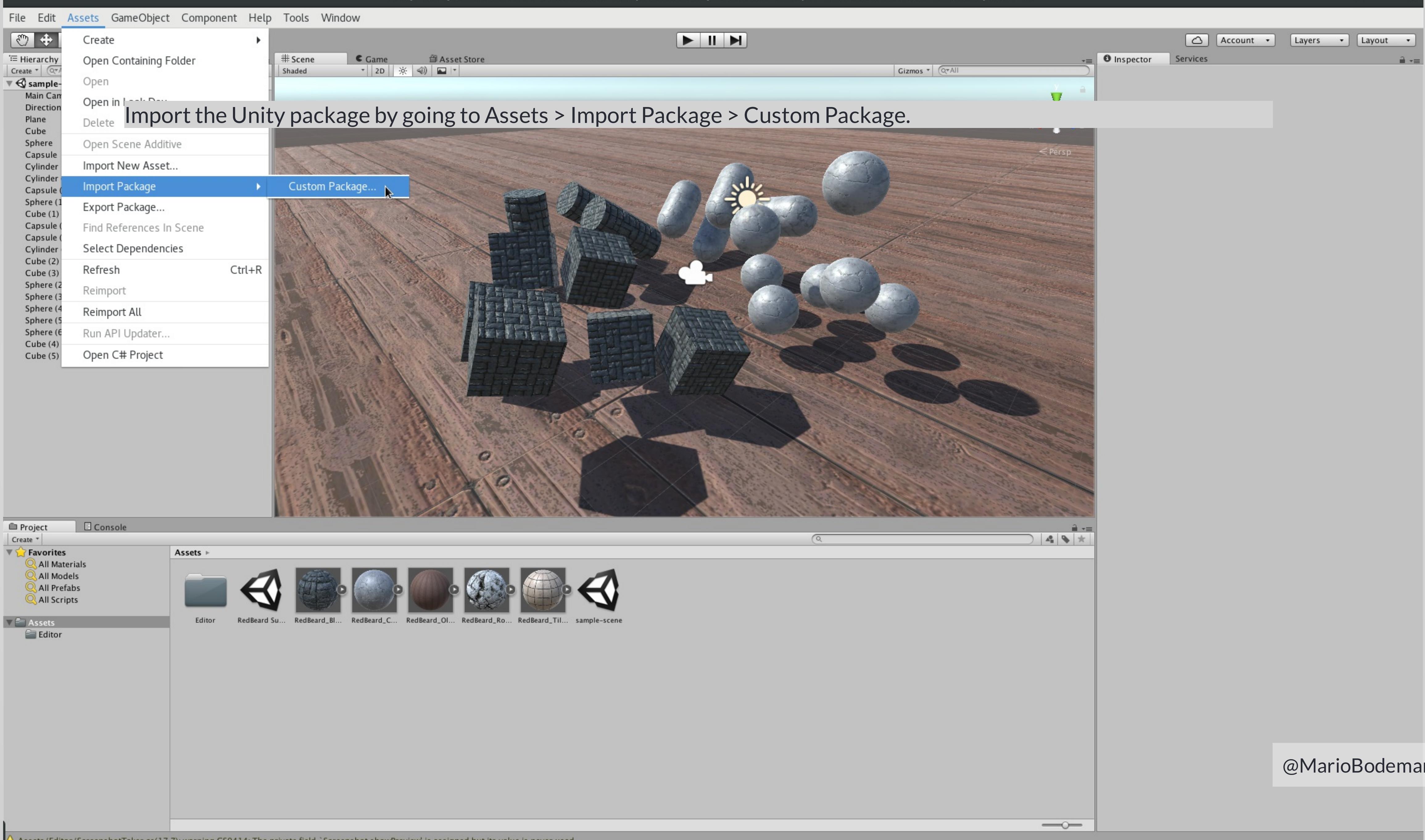




@MarioBodemann



@MarioBodemann



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

zoomed in view

Hierarchy

Create

sample-

Main Cam

Direction

Plane

Cube

Sphere

Capsule

Cylinder

Cylinder

Capsule

Sphere (1)

Cube (1)

Capsule (1)

Capsule (1)

Cylinder (1)

Cube (2)

Cube (3)

Sphere (2)

Sphere (3)

Sphere (4)

Sphere (5)

Sphere (6)

Cube (4)

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

Run API Updater...

# Scene

Shaded

Game

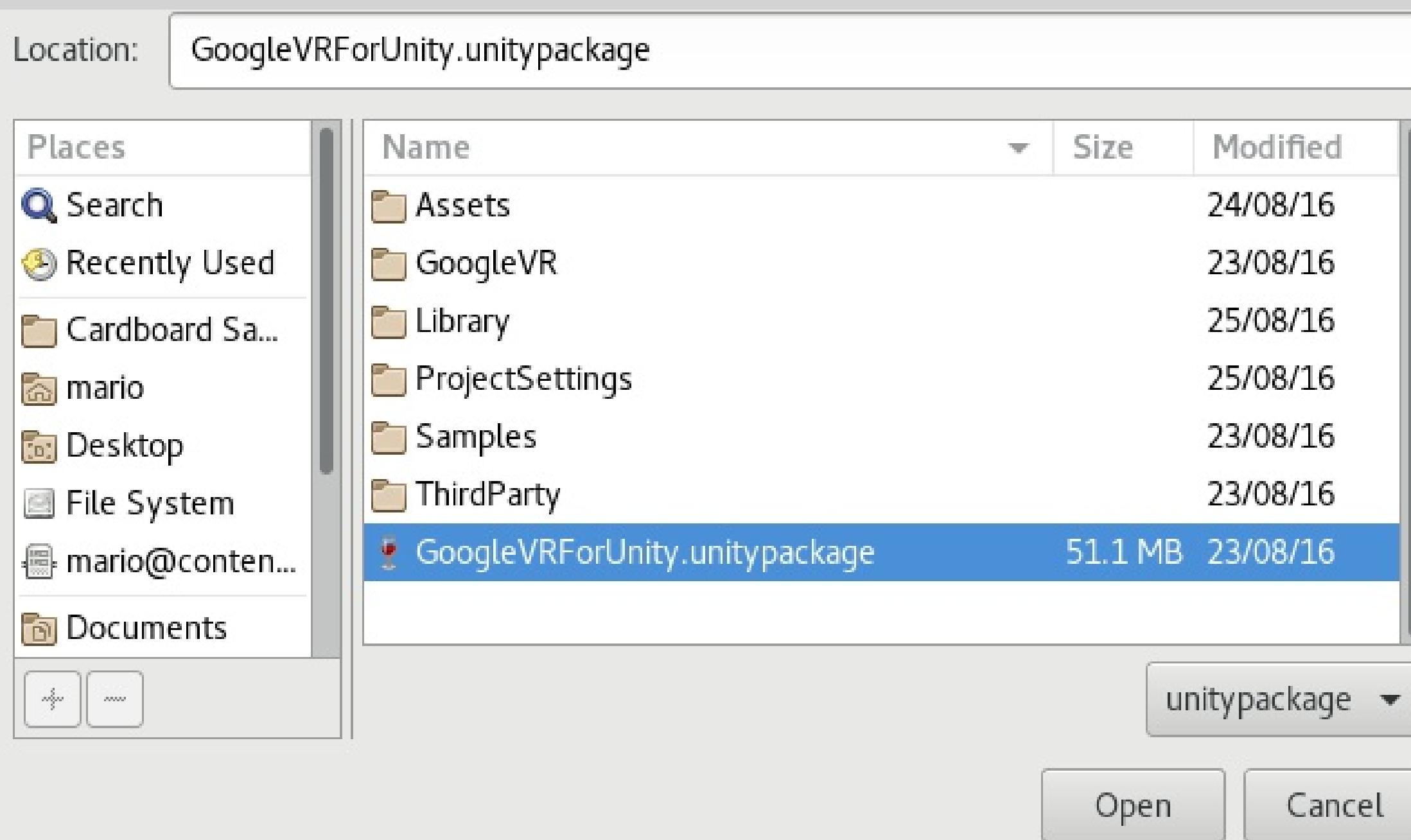
Asset Store



Custom Package...

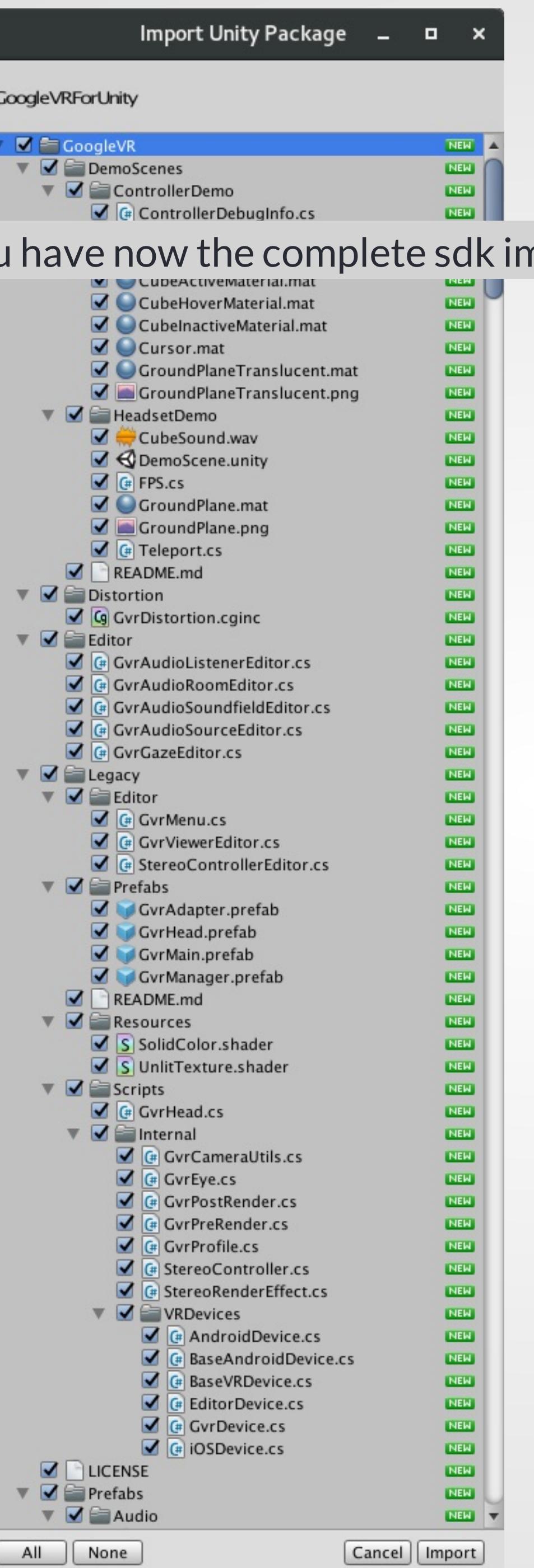


- Find the checked out folder from step 1
- Select the GoogleVRForUnity.unitypackage
- Hit Open.
- Wait



@MarioBodemann

Select all and hit ok again. You have now the complete sdk imported.

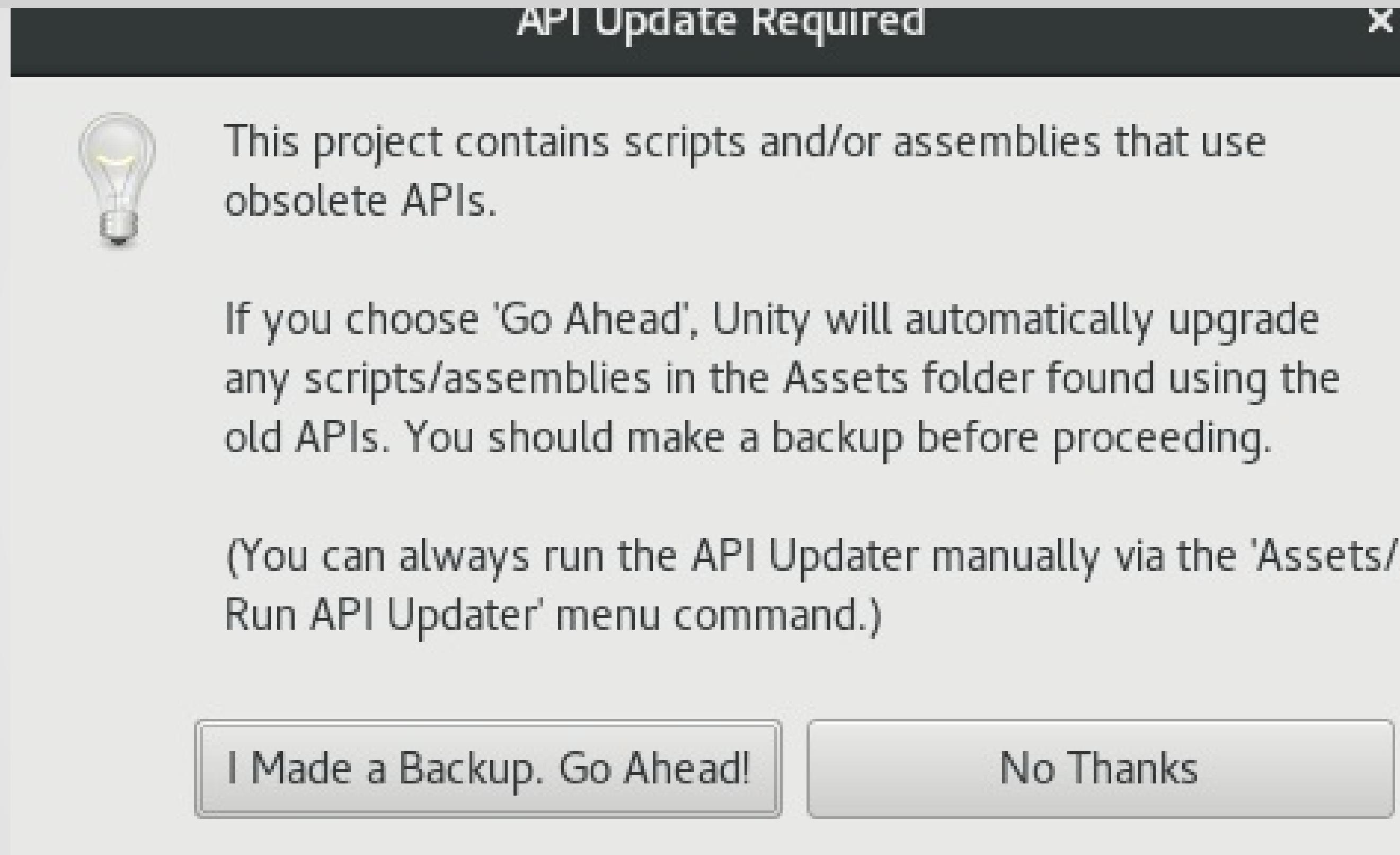


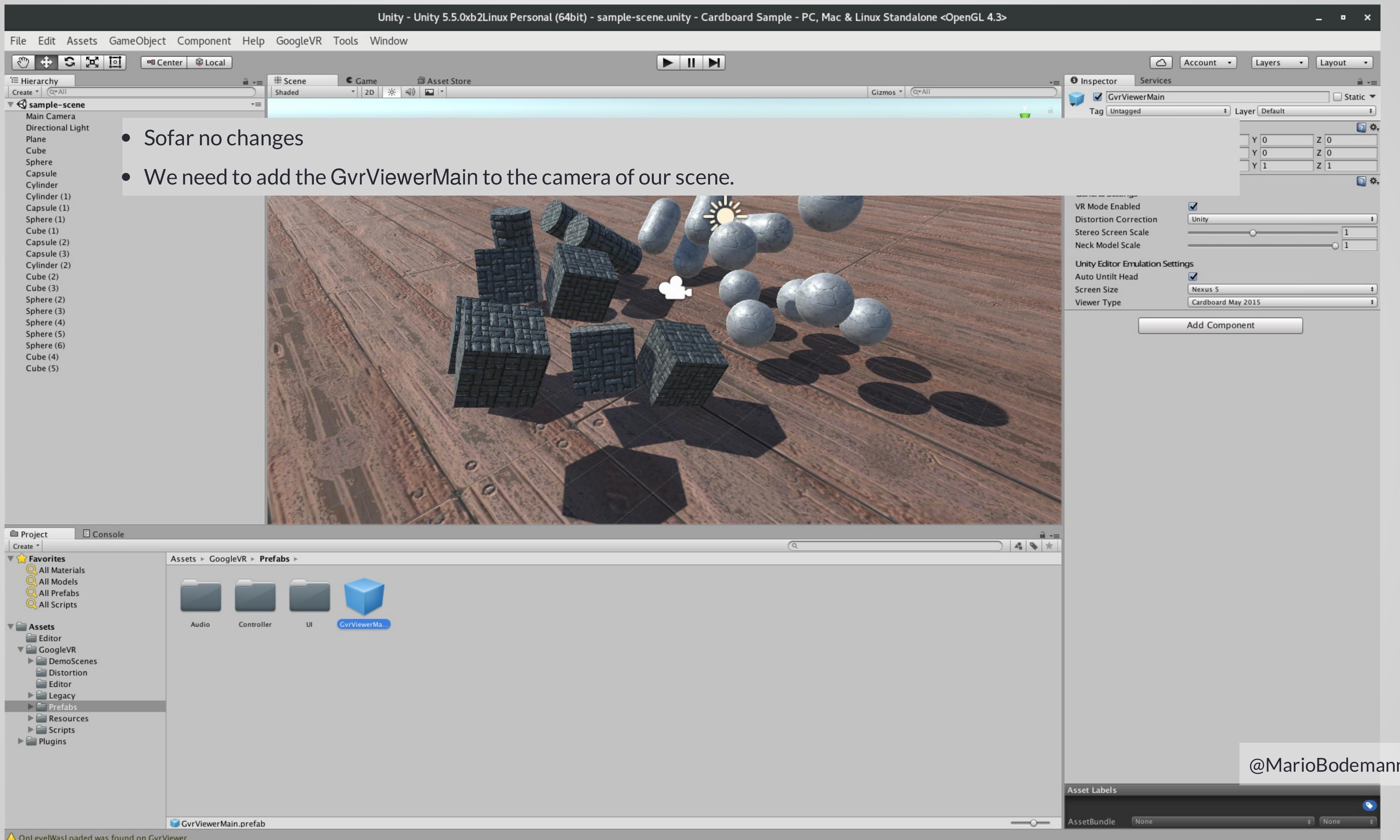
Please wait ... ;)



@MarioBodemann

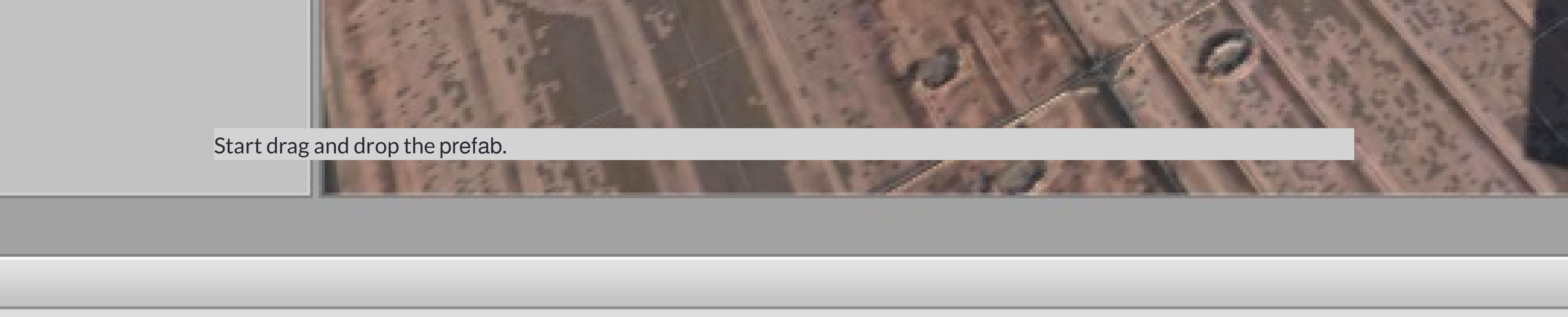
- Updating is fine for simple projects, more complex might be an issue.
- I Made a Backup. Go Ahead!





Select Project > Assets > GoogleVR > Prefabs





Start drag and drop the prefab.

Assets ▶ GoogleVR ▶ Prefabs ▶



Audio

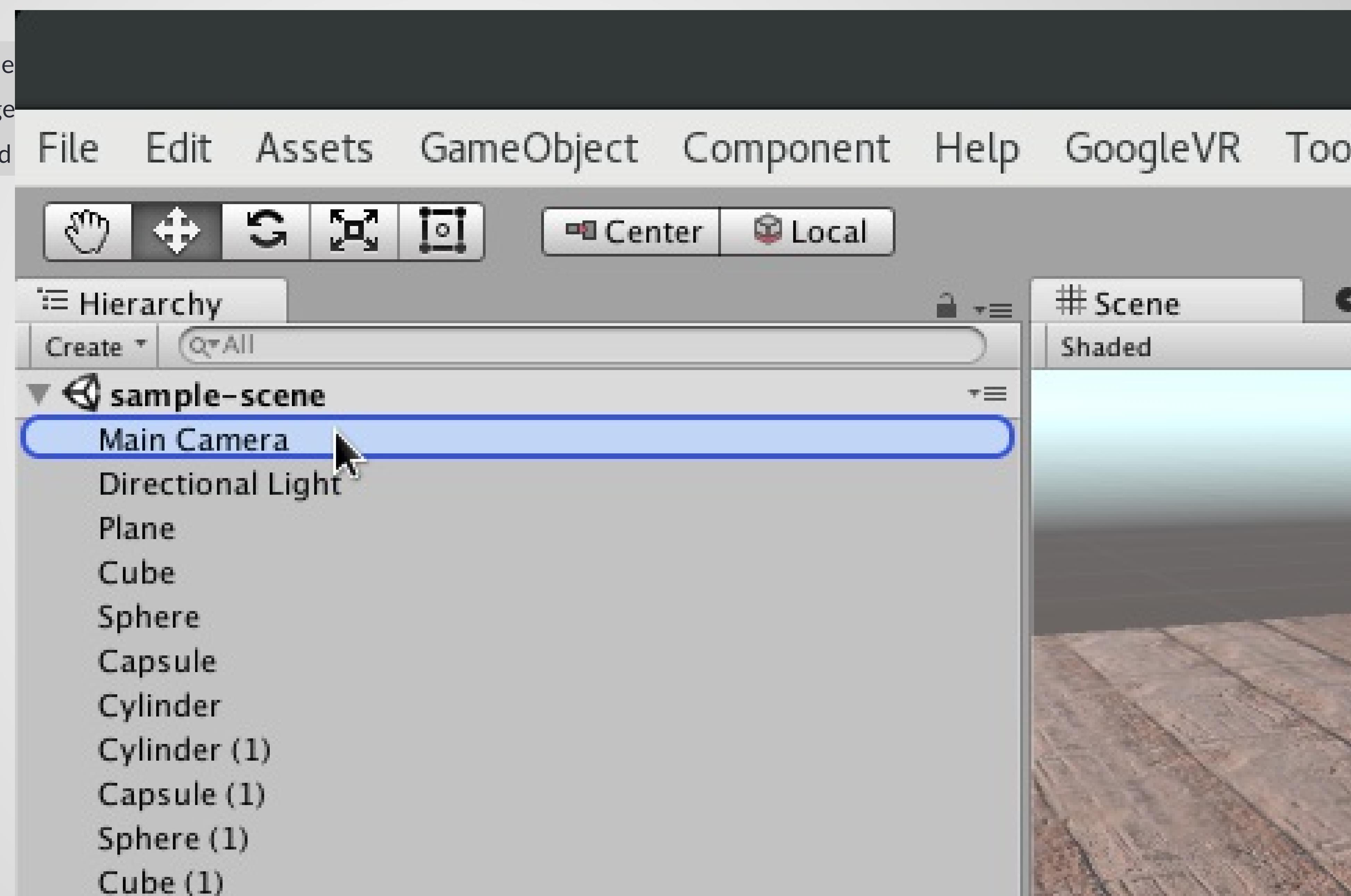
Controller

UI

GvrViewerMa...

@MarioBodemann

- Drop it onto the
- So far no change
- We need to add



File Edit Assets GameObject Component Help GoogleVR Tools Window



Center Local



Cloud Account Layers Layout

Hierarchy

Create Q 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)

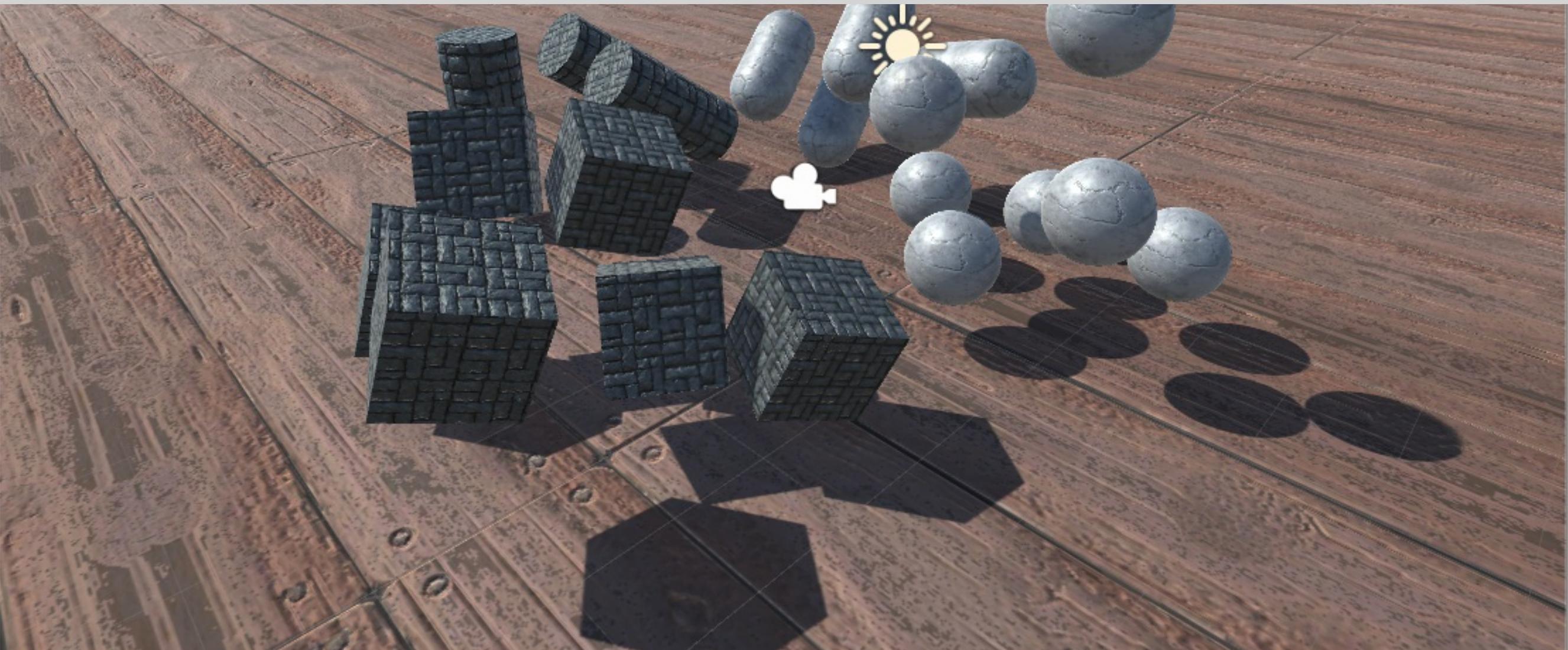
Cube (5)

Scene Game Asset Store

Shaded 2D

Gizmos Q All

- Again no change :(
- Let's run it.



Inspector Services

GvrViewerMain

Tag Untagged

Layer Default

<input type="checkbox"/>	Y 0	Z 0
<input type="checkbox"/>	Y 0	Z 0
<input type="checkbox"/>	Y 1	Z 1

VR Mode Enabled



Unity

<input type="checkbox"/>	1
<input type="checkbox"/>	1

Distortion Correction

Stereo Screen Scale

Neck Model Scale

<input type="checkbox"/>	1
<input type="checkbox"/>	1

Unity Editor Emulation Settings

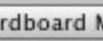
Auto Uント Head



Screen Size



Viewer Type



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

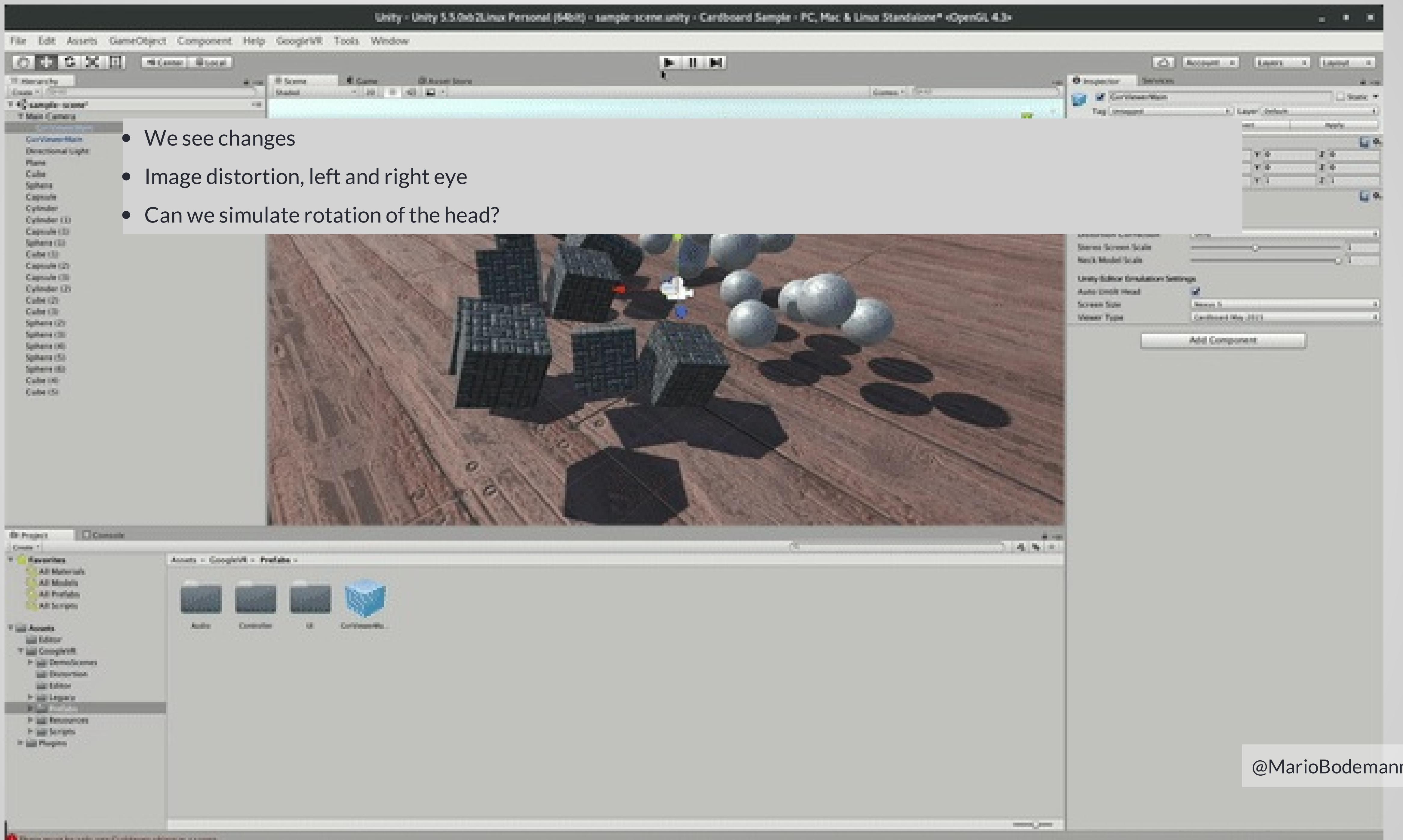
GvrViewerMa...

@MarioBodemann

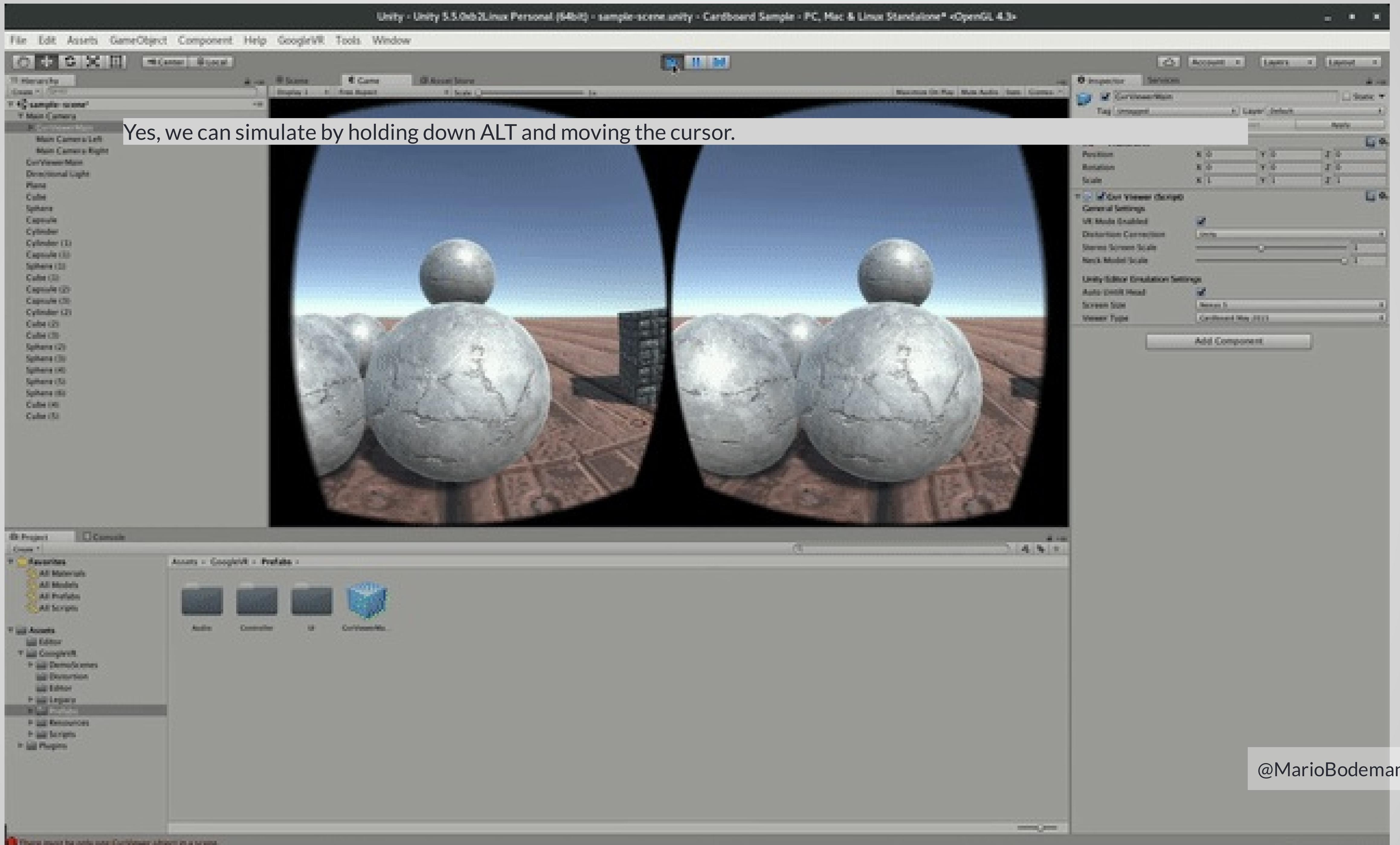
Asset Labels

AssetBundle None

OnLevelWasLoaded was found on GvrViewer



@MarioBodemann



# Summary of Unity Demo

- Using Unity is fast
- Using Cardboard SDK is easy
- Using internal renderer for simulating
- GvrIntent start of interoperation Android - Unity



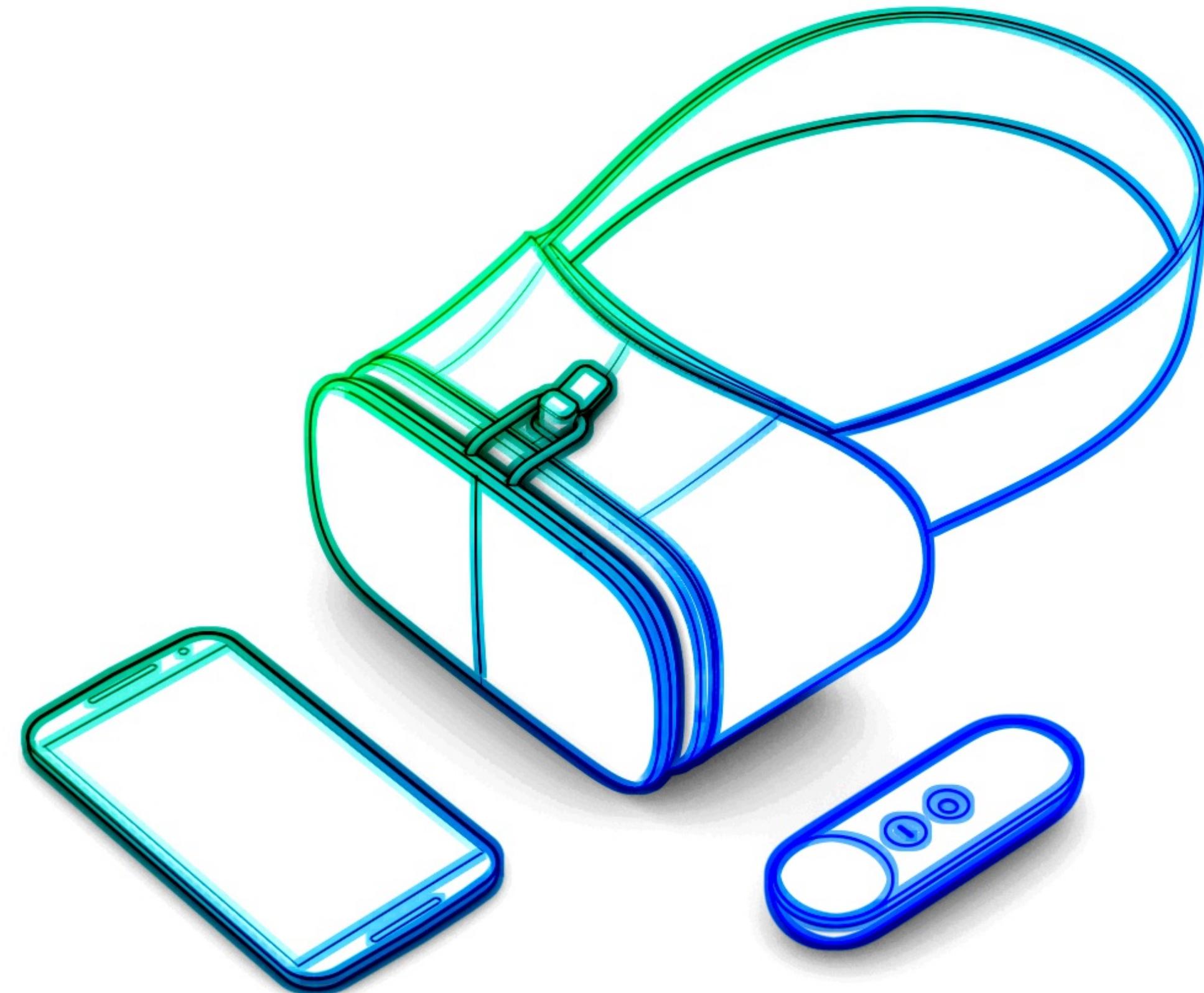
# Difficulties in using Unity

- Cost for non free version exists.
- Integration with other (Java) libraries difficult at best.

- Introduced at Google I/O this year.
- Soon™ first hardware available.



# Daydream



@MarioBodemann

## Controller

- uses special hardware as controller
  - can get emulated by any Android phone (>= 4.4)
  - has four Buttons: Volume +/-, App(Programmable), Home
  - clickable Touchpad. (x/y position, clicked state)(emulated by two touches)
- Print out sheet to not get to distracted by Phone
- Connects via bluetooth to Headset Phone



## Headset Phone

- has to be a Nexus 6P running Android Nougat
- start a Daydream app once, set it up by clicking on the Gear, enabling all VR settings
- Reboot phone ... ;).
- Bluetooth to connect to controller.



## Complete Package

- Daydream Ready
  - high performance sensors for high accuracy head tracking
  - displays with fast response time to minimize blur
  - powerfull mobile processor
  - VR System notifications
- will be available in fall
- will be created by hardware partners
- certified by Google
- Google Play for VR and Daydream Home

# Daydream SDK features

- Same as Cardboard SDK
- Controlling the controller
  - orientation/acceleration
  - input (Clickpad: x,y, clicked, App Button, Vol+/-)
- support for all Android architectures

- ApiStatus changed: If controller gets invalid
- recenter: Long press on home button on controller, should assume current rotation is straight forward ...

## How to use the controller

```
ControllerManager manager =  
    new ControllerManager(this,  
        new ControllerManager.EventListener() {  
  
    public void onApiStatusChanged(int state) {  
    }  
  
    public void onRecentered() {  
    }  
});
```

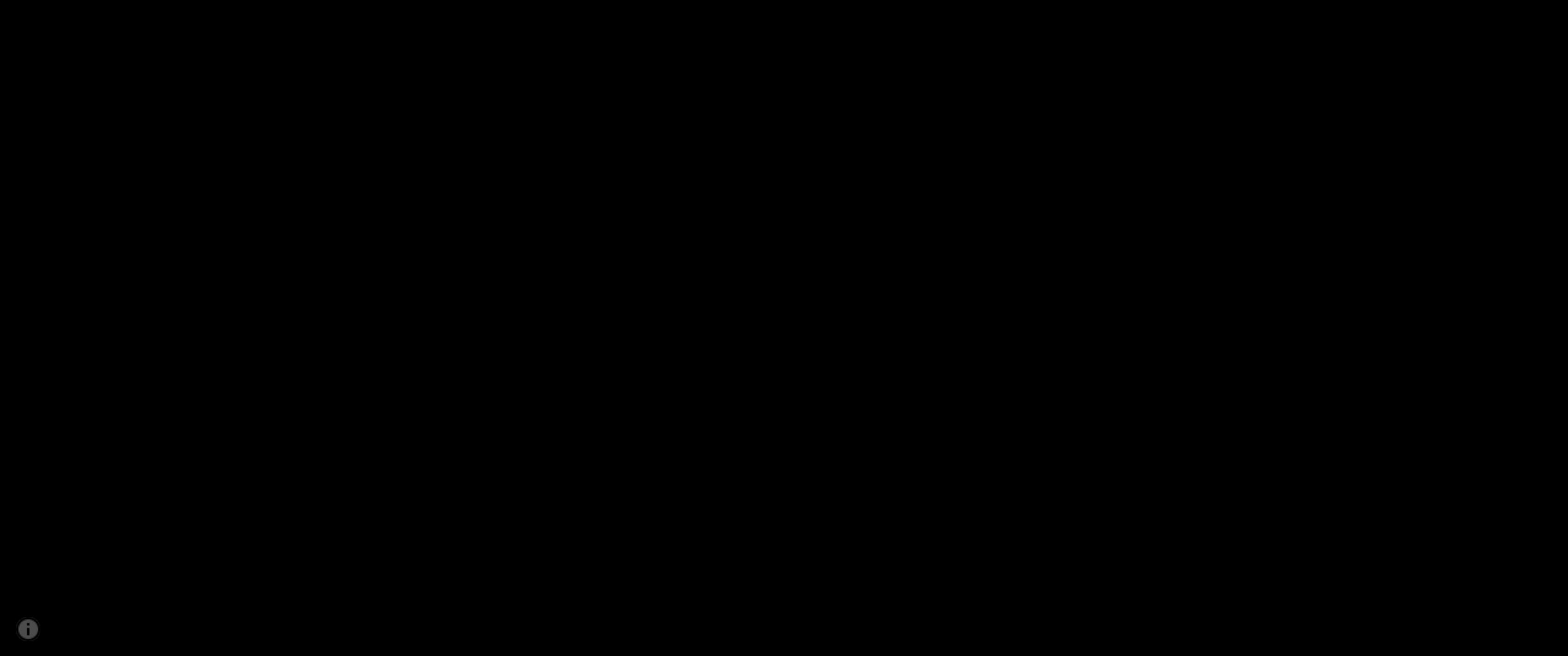
- orientation: Quaternion (xyzw)
- polling every frame

```
Controller controller = manager.getController();
if (controller != null) {
    controller.timestamp
    controller.orientation
    controller.isTouching
    controller.touch
    controller.clickButtonState
    controller.appButtonState
    controller.homeButtonState
    controller.volumeUpButtonState
    controller.volumeDownButtonState
}
```

VRView, available for

- Android
- IOS
- Web

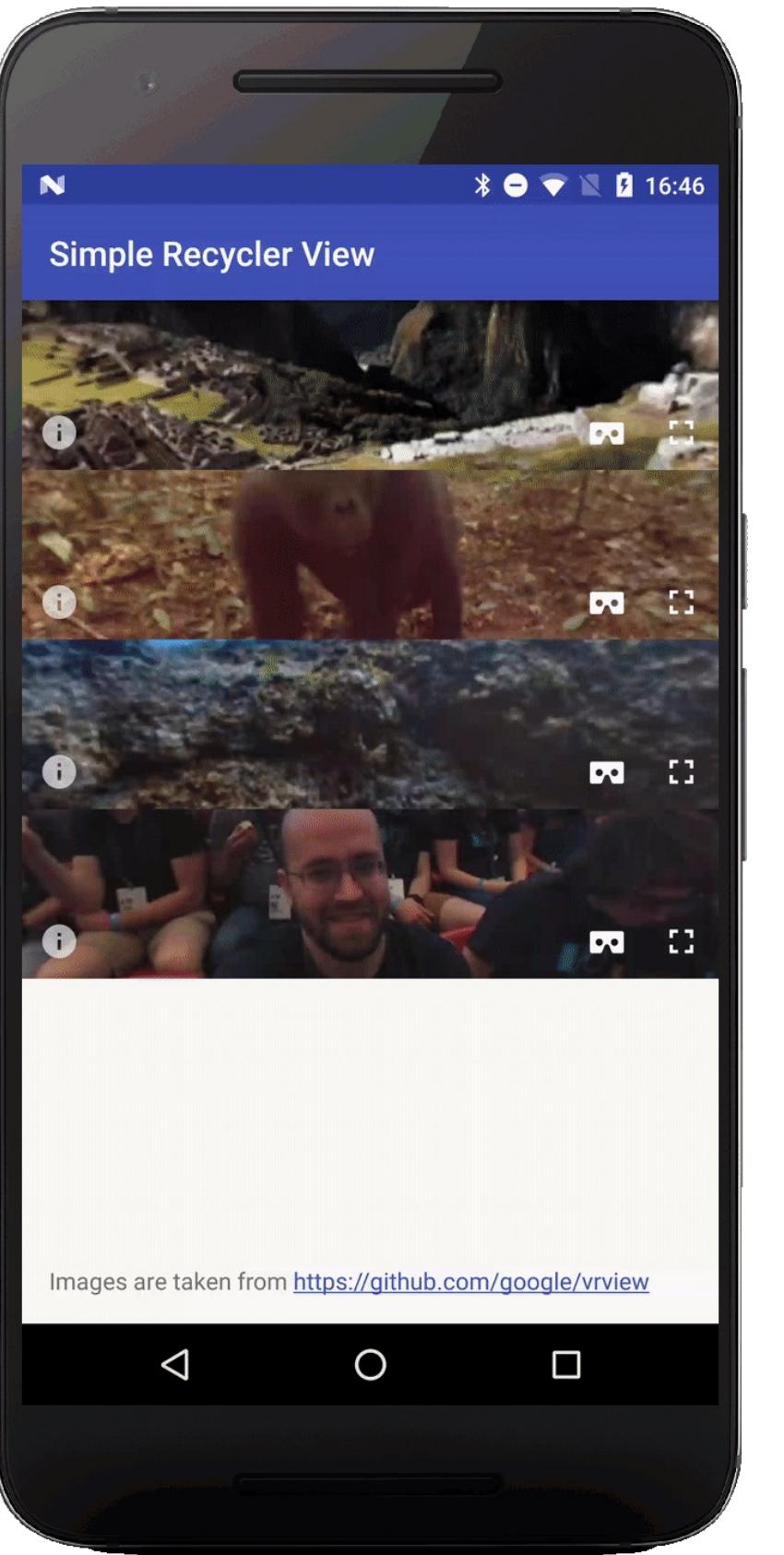
Not for Unity!



@MarioBodemann

VrPanoramaView in Android

# Simple RecyclerView with 4 VrViews © images

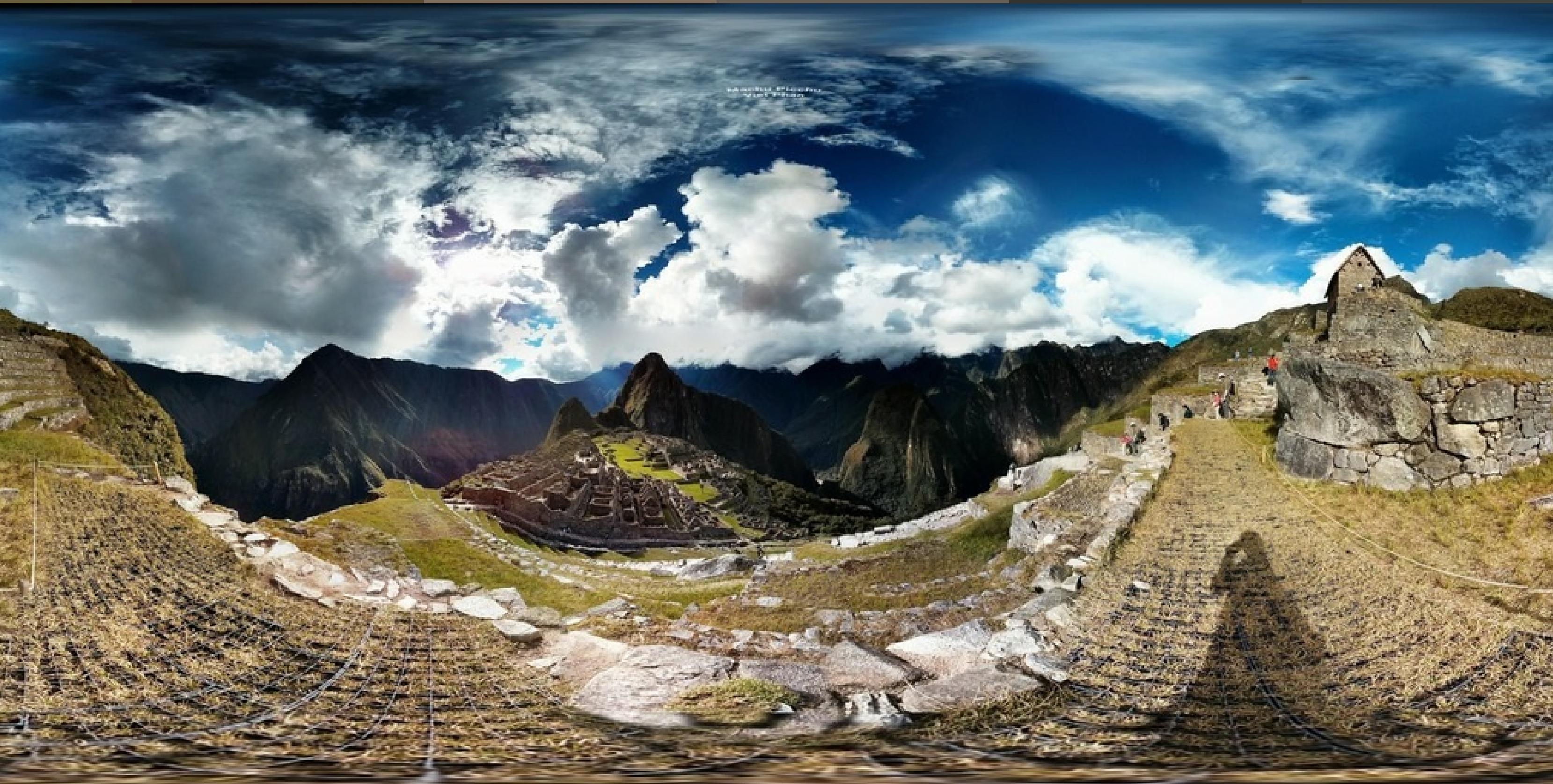


@MarioBodemann

# Run through the code

How to write an photosphere app like this

Sample equirectangular image



@MarioBodemann

# Dependencies

- common.aar, commonwidget.aar and panowidget.aar  
as new module or directly in gradle.
- compile 'com.google.protobuf.nano:protobuf-javanano:3.0.0-alpha-7'

see Google VR Getting Started

## item\_layout.xml

```
<?xml version="1.0" encoding="utf-8"?>
<com.google.vr.sdk.widgets.pano.VrPanoramaView
    android:layout_width="match_parent"
    android:layout_height="100dp"
    />
```

```
@Override public void onBindViewHolder(...) //{

    final ResourceItemViewHolder viewHolder =
        (ResourceItemViewHolder) baseHolder;
    final Resources resources =
        viewHolder.vrPanoramaView.getResources();
    final Bitmap bitmap =
        BitmapFactory.decodeResource(resources,
            elements.get(position));
    viewHolder.vrPanoramaView
        .loadImageFromBitmap(bitmap, null);

}
```

```
@Override public void onBindViewHolder(...) //{

    final ResourceItemViewHolder viewHolder =
        (ResourceItemViewHolder) baseHolder;

    final Resources resources =
        viewHolder.vrPanoramaView.getResources();
    final Bitmap bitmap =
        BitmapFactory.decodeResource(resources,
            elements.get(position));
    viewHolder.vrPanoramaView
        .loadImageFromBitmap(bitmap, null);

}
```

```
@Override public void onBindViewHolder(...) //{

    final ResourceItemViewHolder viewHolder =
        (ResourceItemViewHolder) baseHolder;
    final Resources resources =
        viewHolder.vrPanoramaView.getResources();

    final Bitmap bitmap =
        BitmapFactory.decodeResource(resources,
            elements.get(position));
    viewHolder.vrPanoramaView
        .loadImageFromBitmap(bitmap, null);

}
```

```
@Override public void onBindViewHolder(...) //{

    final ResourceItemViewHolder viewHolder =
        (ResourceItemViewHolder) baseHolder;
    final Resources resources =
        viewHolder.vrPanoramaView.getResources();
    final Bitmap bitmap =
        BitmapFactory.decodeResource(resources,
            elements.get(position));

    viewHolder.vrPanoramaView
        .loadImageFromBitmap(bitmap, null);

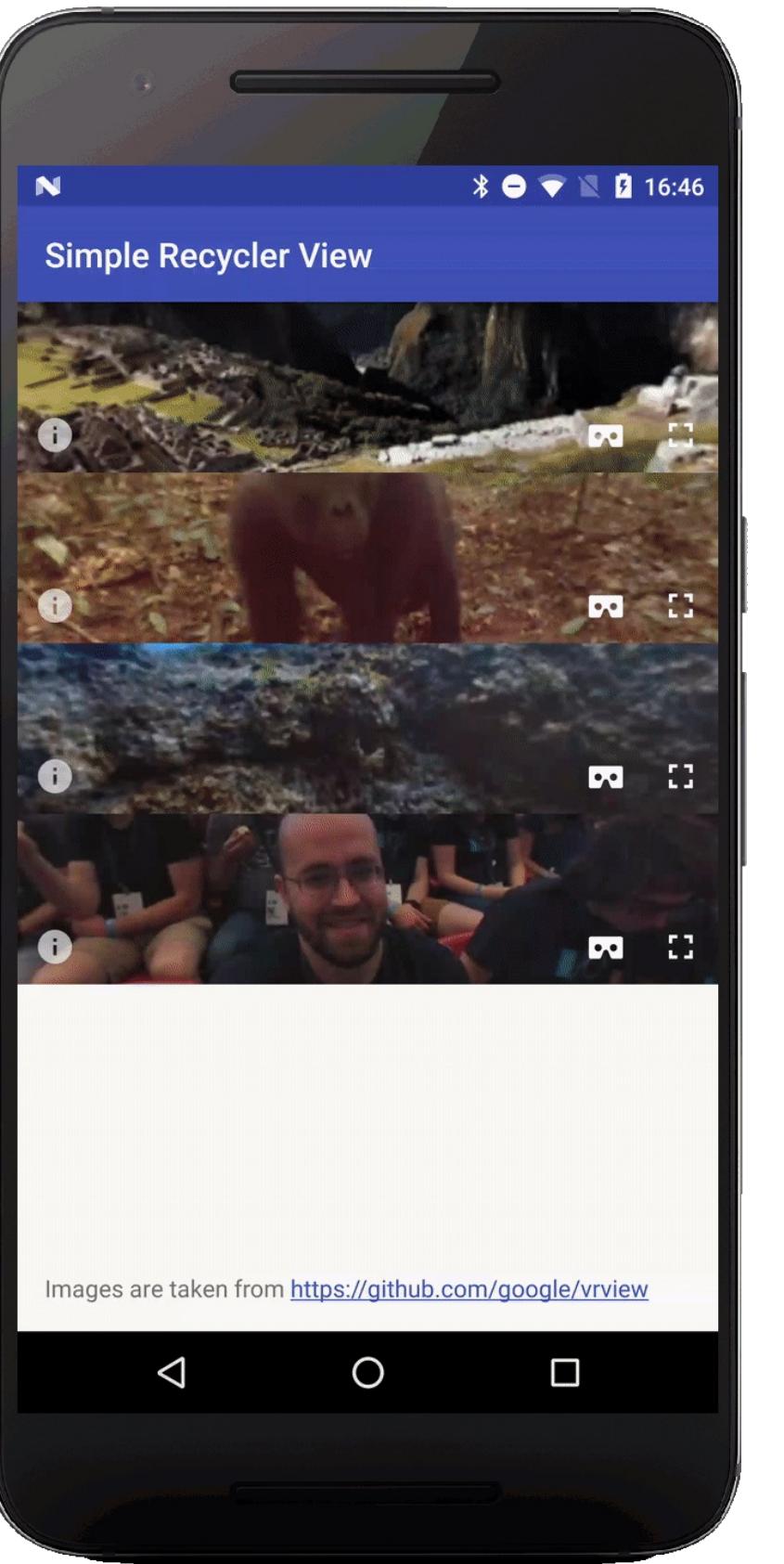
}
```

```
@Override public void onBindViewHolder(...) //{

    final ResourceItemViewHolder viewHolder =
        (ResourceItemViewHolder) baseHolder;
    final Resources resources =
        viewHolder.vrPanoramaView.getResources();
    final Bitmap bitmap =
        BitmapFactory.decodeResource(resources,
            elements.get(position));
    viewHolder.vrPanoramaView
        .loadImageFromBitmap(bitmap, null);
}
```

Final result of our current demo

# Result



Images are taken from <https://github.com/google/vrview>

@MarioBodemann

# What did we do?

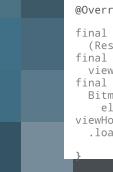
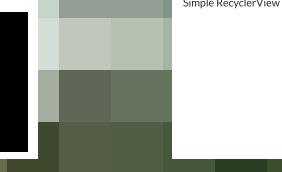
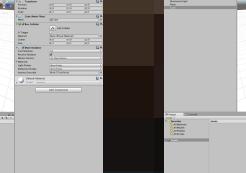
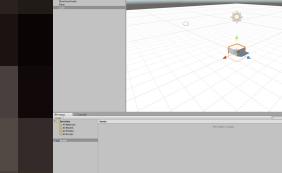
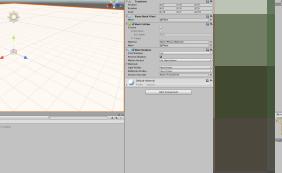
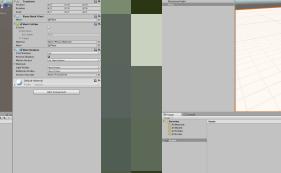
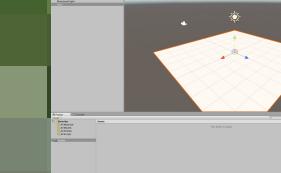
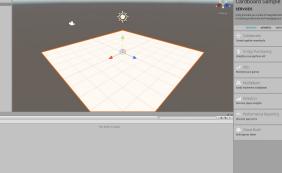
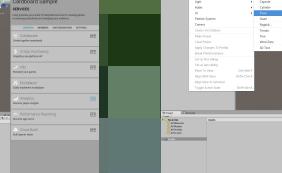
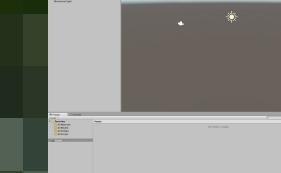
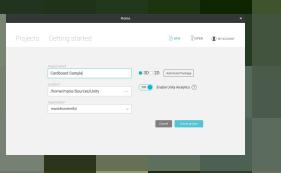
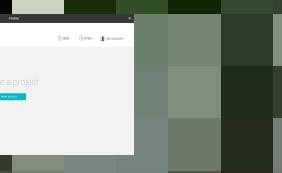
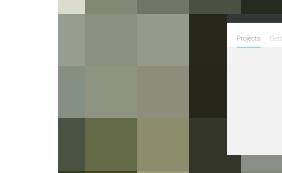
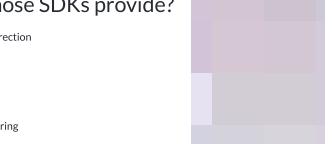
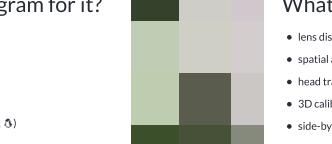
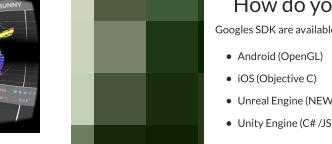
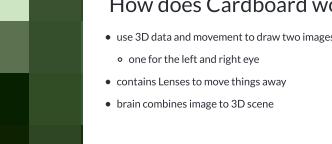
- Loaded a equirectangular image into a bitmap
- Let it be displayed by a VrPanoramaView
- Use Daydream SDK to display it

# Limitations of Daydream for Android SDK

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



Cardboard



# What will you build?

🎥 General 🎥 Controller 🎥 Designing

📄 Google VR Github

🐦 @MarioBodemann

@MarioBodemann