
unity

Building and Optimizing VR in Unity

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Technical Product Manager

- 11 years in industry
- Tools guy; some gameplay
- Graphics, VR/AR, & Performance areas
- Large Team, console, AAA expertise
- Focus on technical use cases
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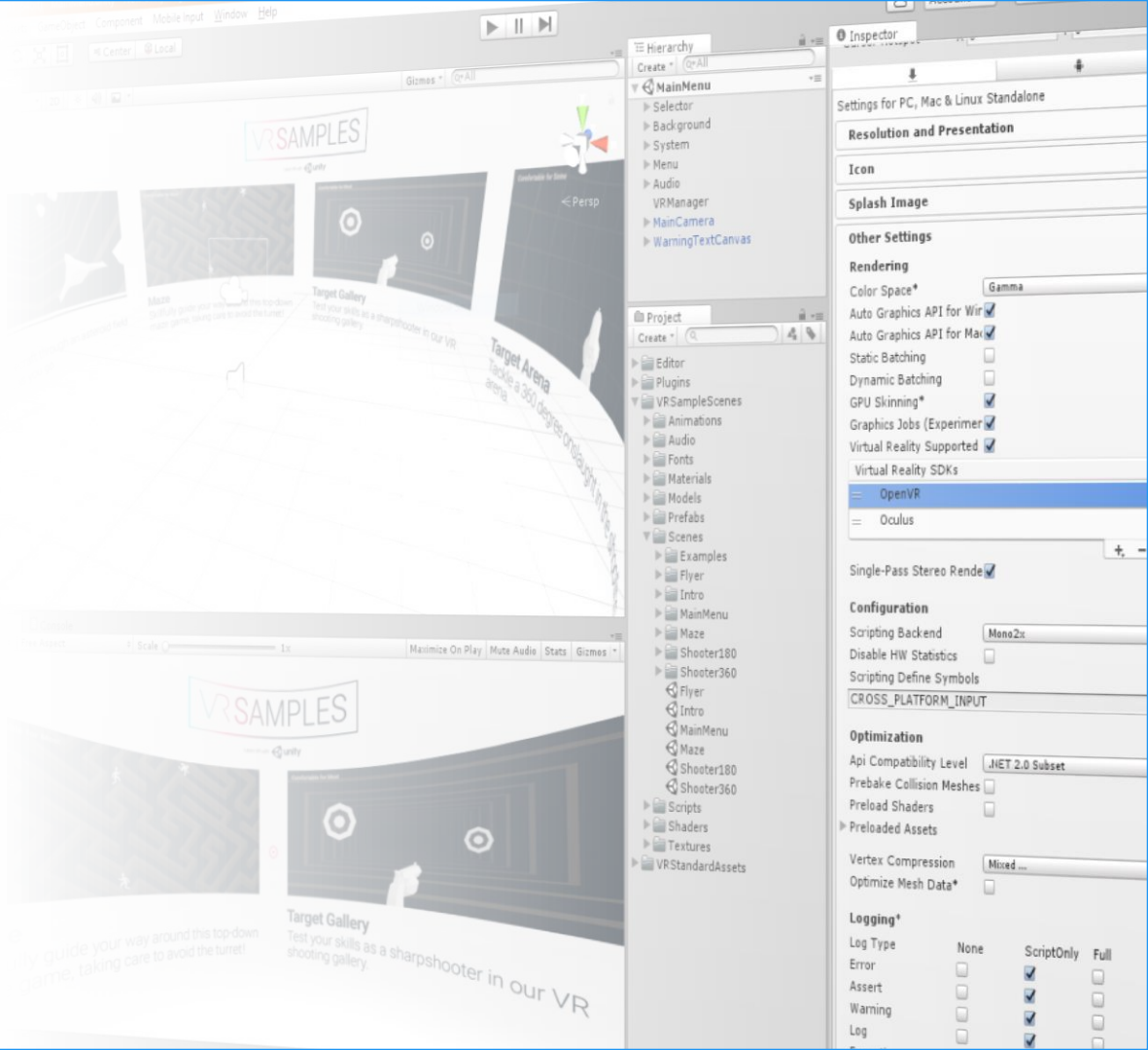
Topics

- Unity VR Workflow
  - How to get started
  - What's different
- Design
  - Common mistakes
  - General VR tips
- Optimizations

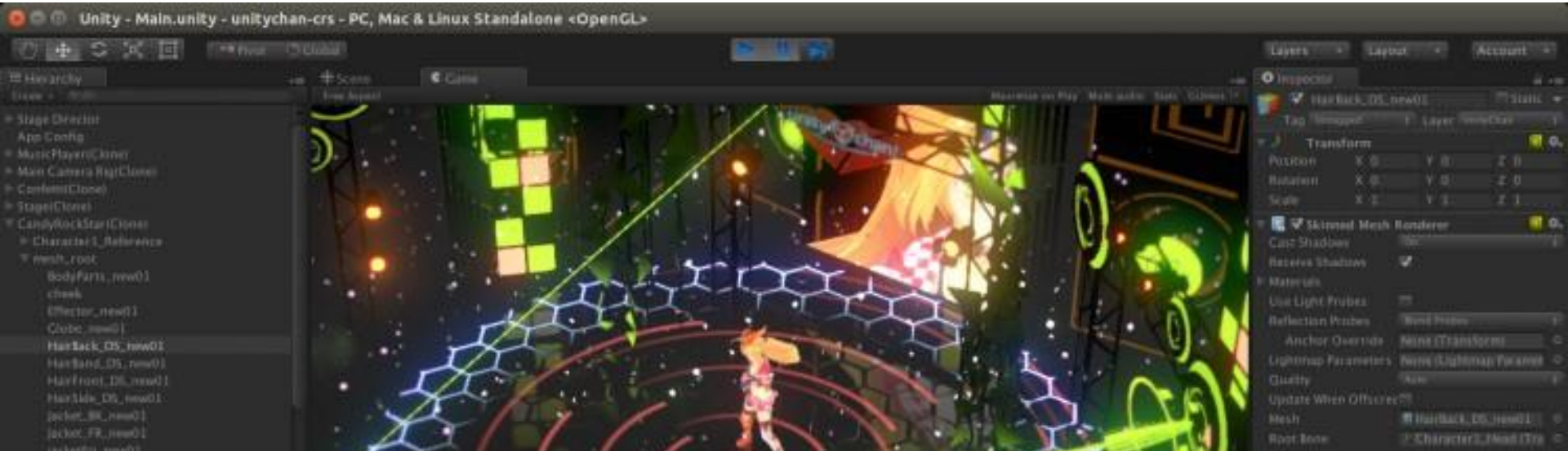
Workflow


Hierarchy
MainMenu
Selector
Background
System
Menu
Audio
VRManager
MainCamera
WarningTextCanvas
Project
Editor
Plugins
VRSampleScenes
Animations
Audio
Fonts
Materials
Models
Prefabs
Scenes
Examples
Flyer
Intro
MainMenu
Maze
Shooter180
Shooter360
Scripts
Shaders
Textures
VRStandardAssets
Inspector
Settings for PC, Mac & Linux Standalone
Resolution and Presentation
Icon
Splash Image
Other Settings
Rendering
Color Space*
Gamma
Static Batching
Dynamic Batching
GPU Skinning*
Virtual Reality Supported
Virtual Reality SDKs
OpenVR
Oculus
Single-Pass Stereo Rende
Configuration
Scripting Backend
Mono2x
Disable HW Statistics
Scripting Define Symbols
CROSS_PLATFORM_INPUT
Optimization
Api Compatibility Level
.NET 2.0 Subset
Prebake Collision Meshes
Preload Shaders
Preloaded Assets
Vertex Compression
Mixed ...
Optimize Mesh Data*
Logging*
Log Type
None
ScriptOnly
Full
Error
Assert
Warning
Log
Target Gallery
Test your skills as a sharpshooter in our VR

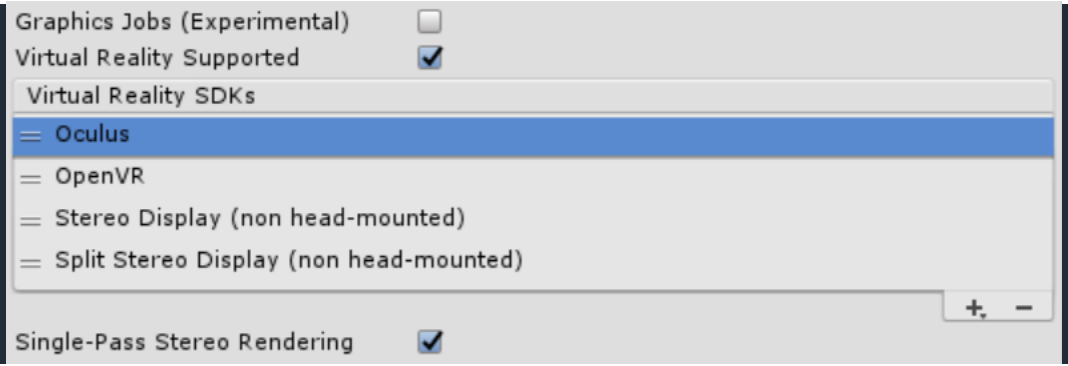
VR Workflow

Same exact workflow as any other 3D application.

- Scale in Unity is 1 unit equals 1 meter



Enable VR Support



Player Settings -> Other Settings -> Virtual Reality Supported

Add platforms you wish to support

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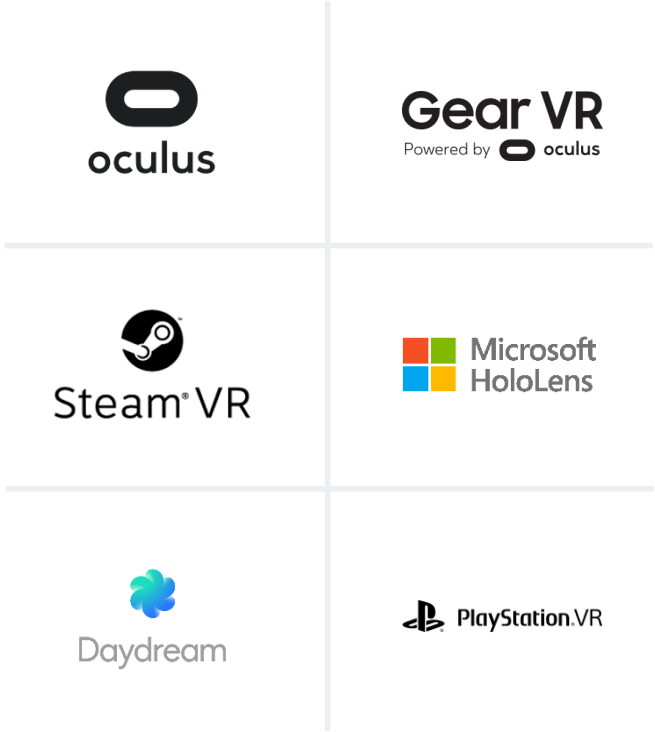
Partner Platforms

Our partner platforms require no plugins and “just work”. We work closely with them to have a simple, integrated workflow and stay up to date and optimized for their devices.



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Other Platforms

There are many other platforms work with Unity. They require manual set up of a stereo camera rig and lens warping shaders. Many of these platforms provide asset packages that make this step trivial.

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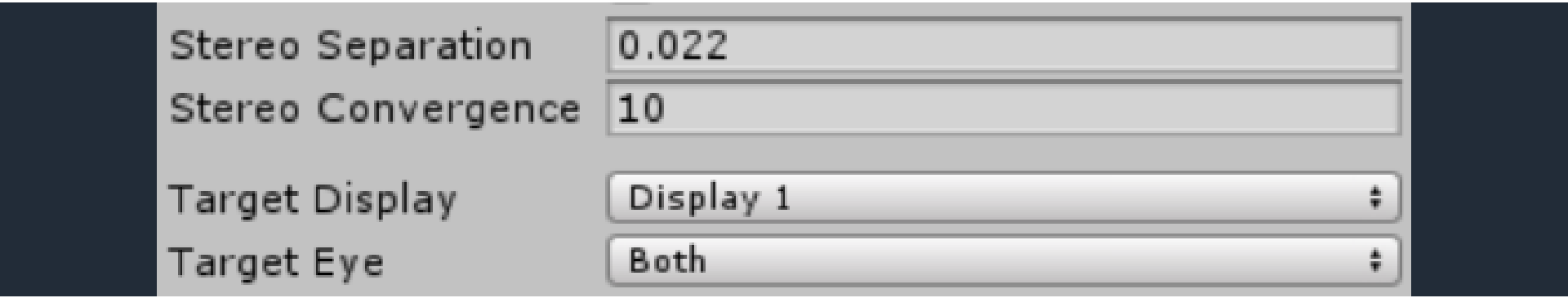
VR options



Stereo Separation & Convergence are for manually setting up platforms

Target Eye for setting render buffer

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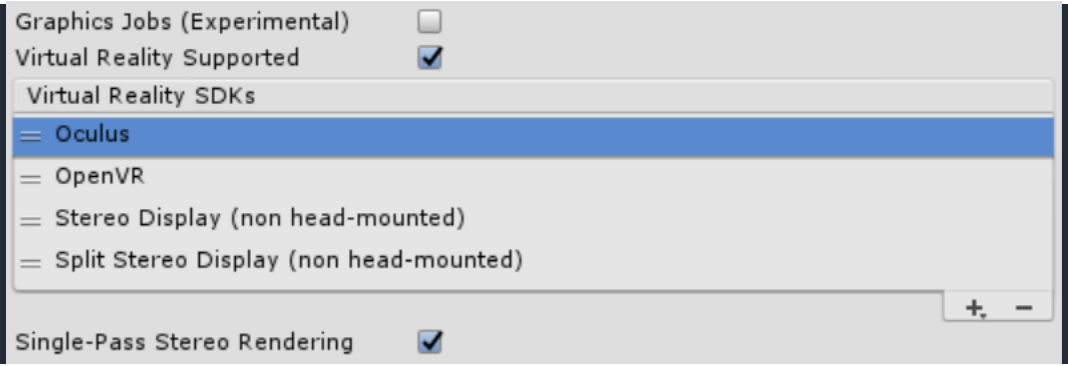
Other Settings



Player Settings -> Other Settings -> Single-Pass Stereo Rendering

Player Settings -> Other Settings -> Graphics Jobs

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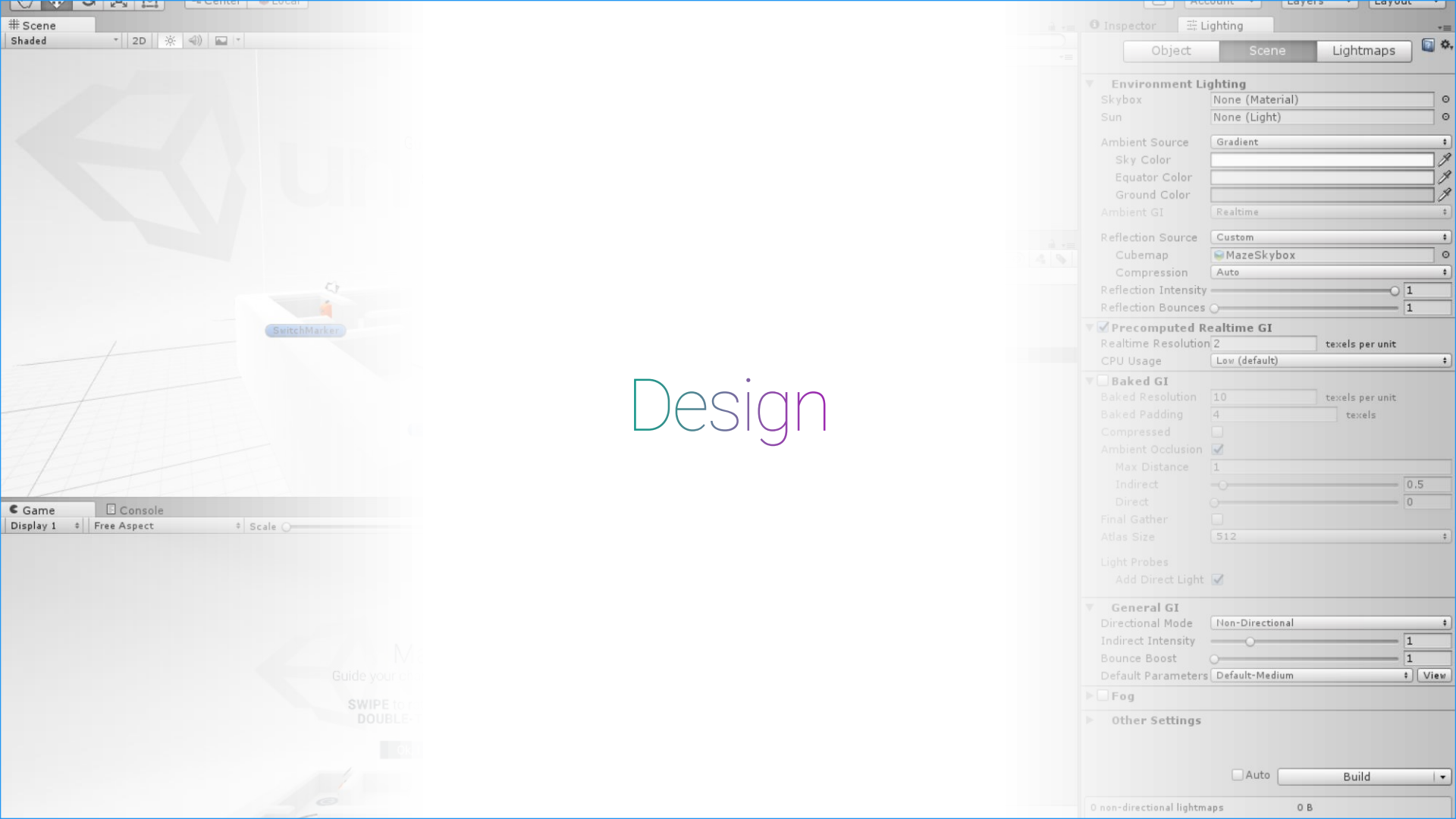
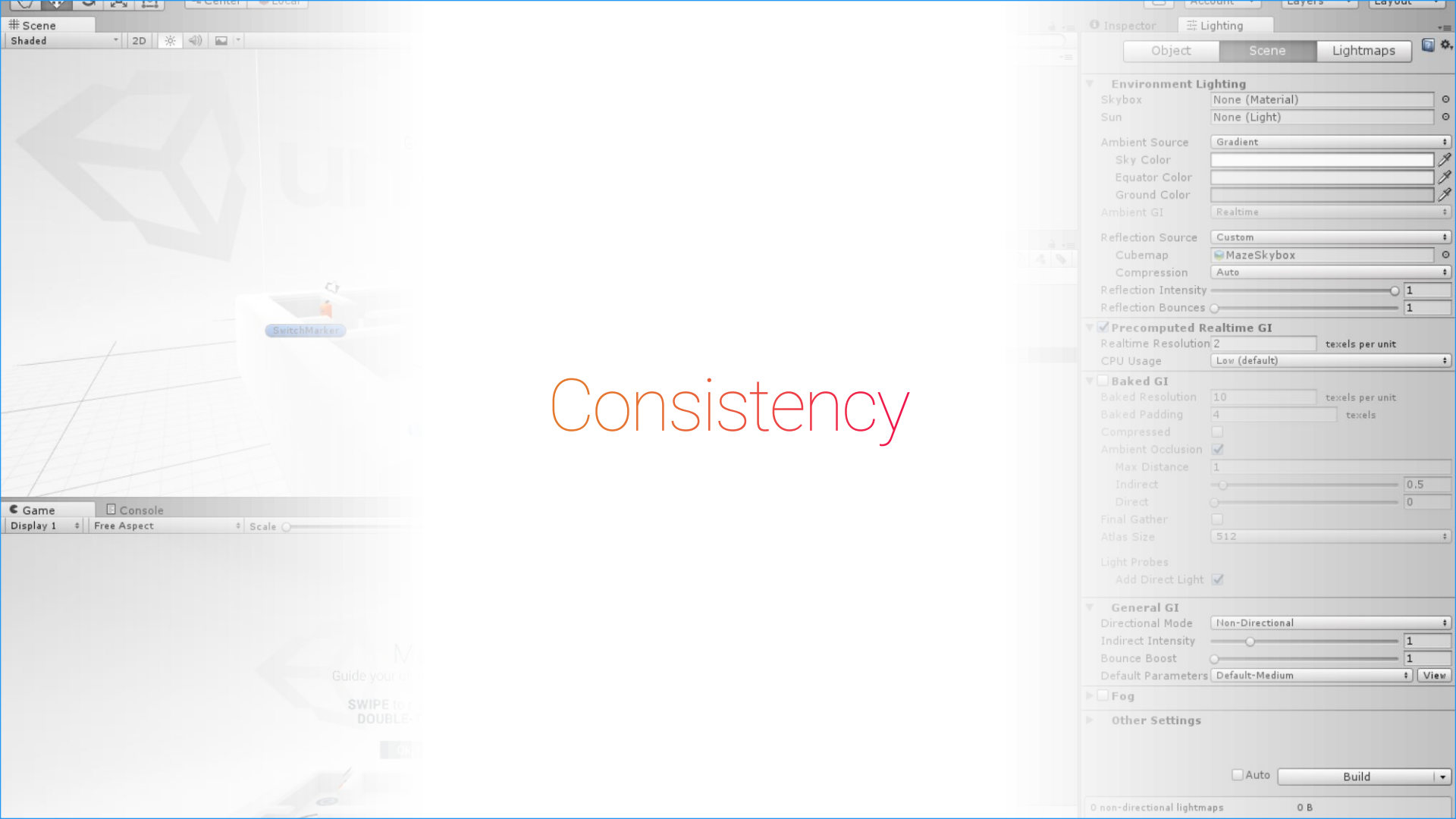
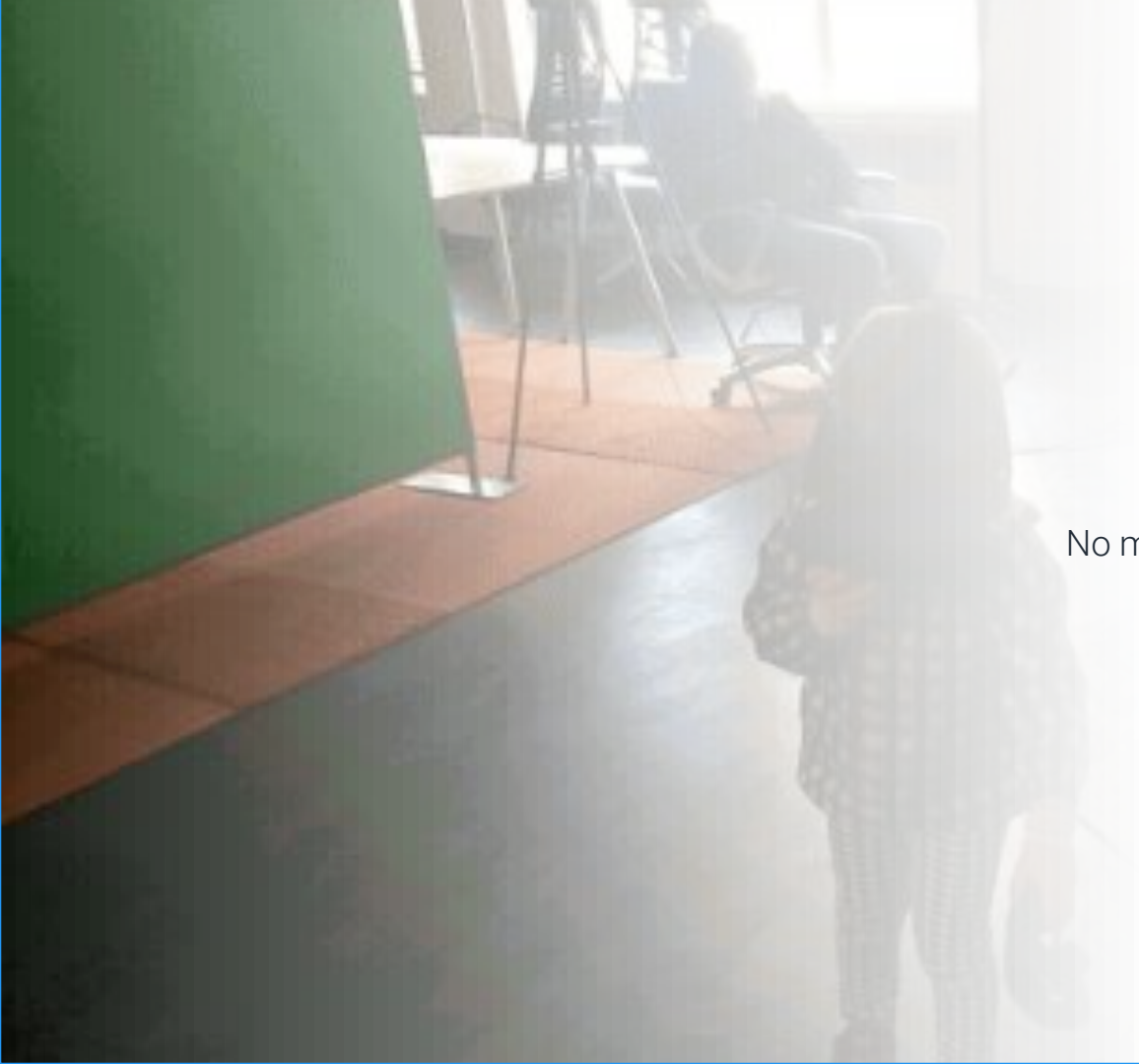

Scene
Shaded
2D
SwitchMarker
Game
Console
Display 1
Free Aspect
Scale
Inspector
Lighting
Object
Scene
Lightmaps
Environment Lighting
Skybox
None (Material)
Sun
None (Light)
Ambient Source
Gradient
Sky Color
Equator Color
Ground Color
Ambient GI
Realtime
Reflection Source
Custom
Cubemap
MazeSkybox
Compression
Auto
Reflection Intensity
1
Reflection Bounces
1
Precomputed Realtime GI
Realtime Resolution
2
texels per unit
CPU Usage
Low (default)
Baked GI
Baked Resolution
10
texels per unit
Baked Padding
4
texels
Compressed
Ambient Occlusion
Max Distance
1
Indirect
0.5
Direct
0
Final Gather
Atlas Size
512
Light Probes
Add Direct Light
General GI
Directional Mode
Non-Directional
Indirect Intensity
1
Bounce Boost
1
Default Parameters
Default-Medium
View
Fog
Other Settings
Auto
Build
0 non-directional lightmaps
0 B

Design



Consistency

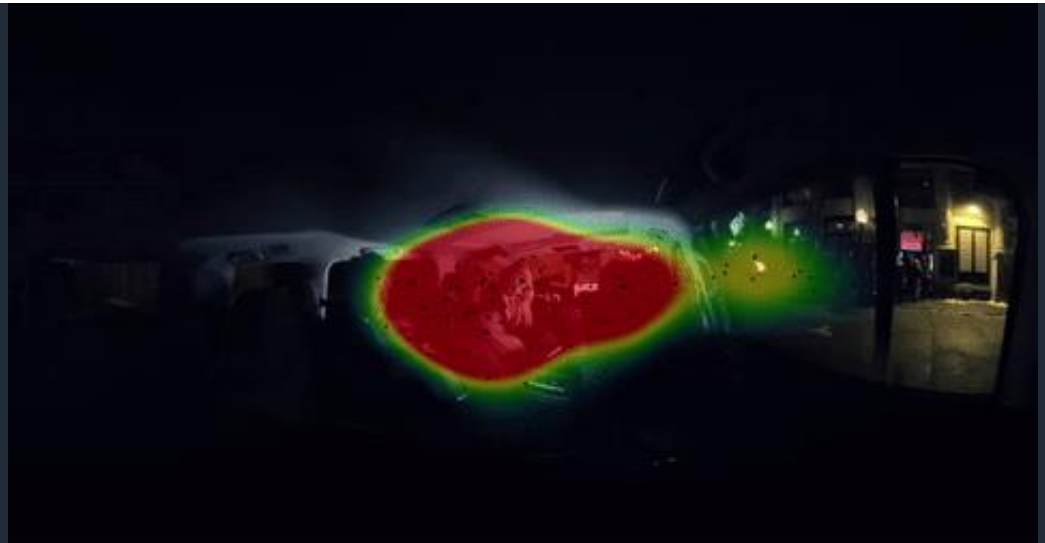


Gravity

No matter what you show the user, gravity is always pulling you down.

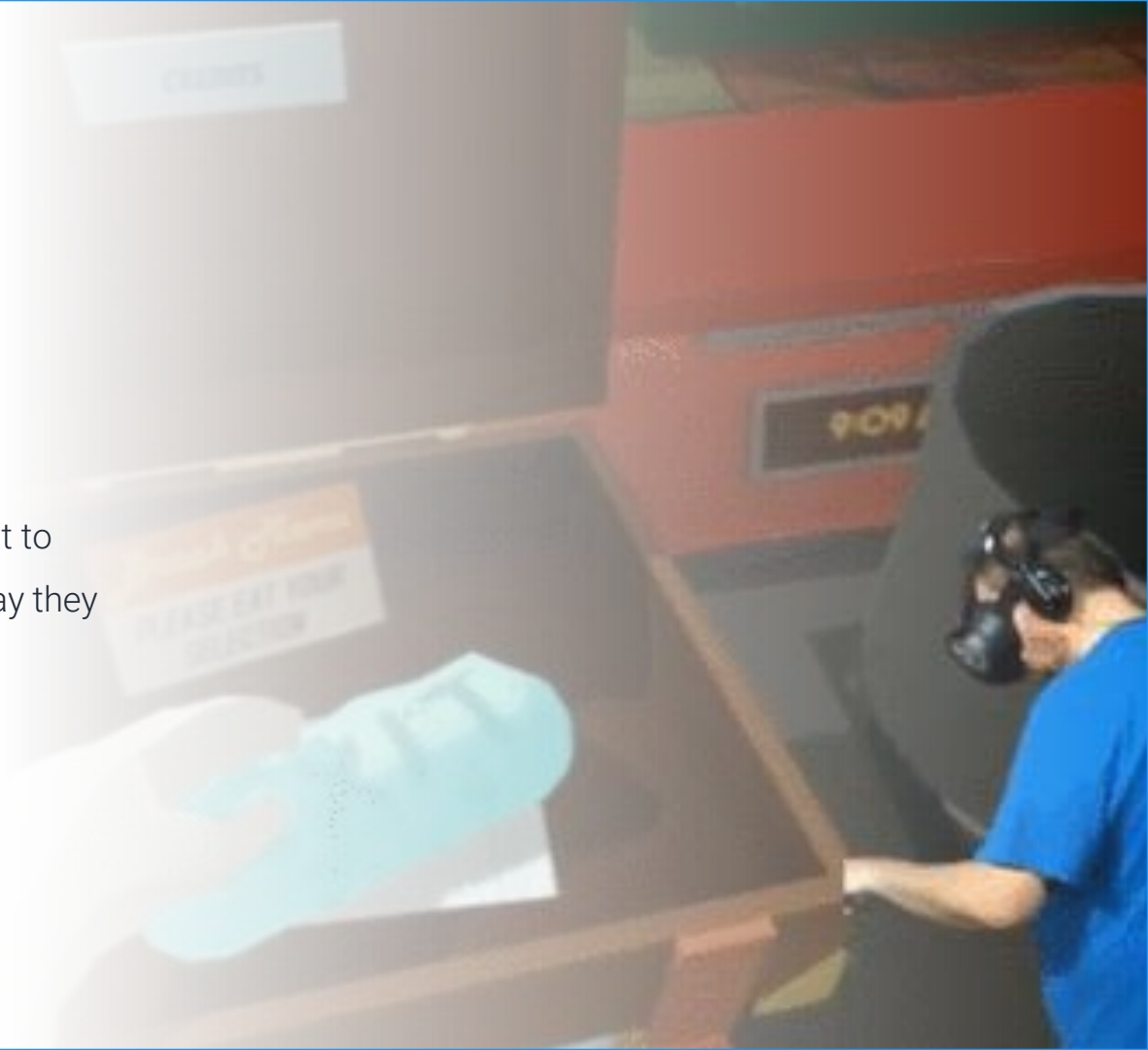
Focus

The human eye tires very easily.



Input

Being immersed means users expect to interact with objects the exact same way they do in the real world.



Agency

People need to be grounded in reality.

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Agency

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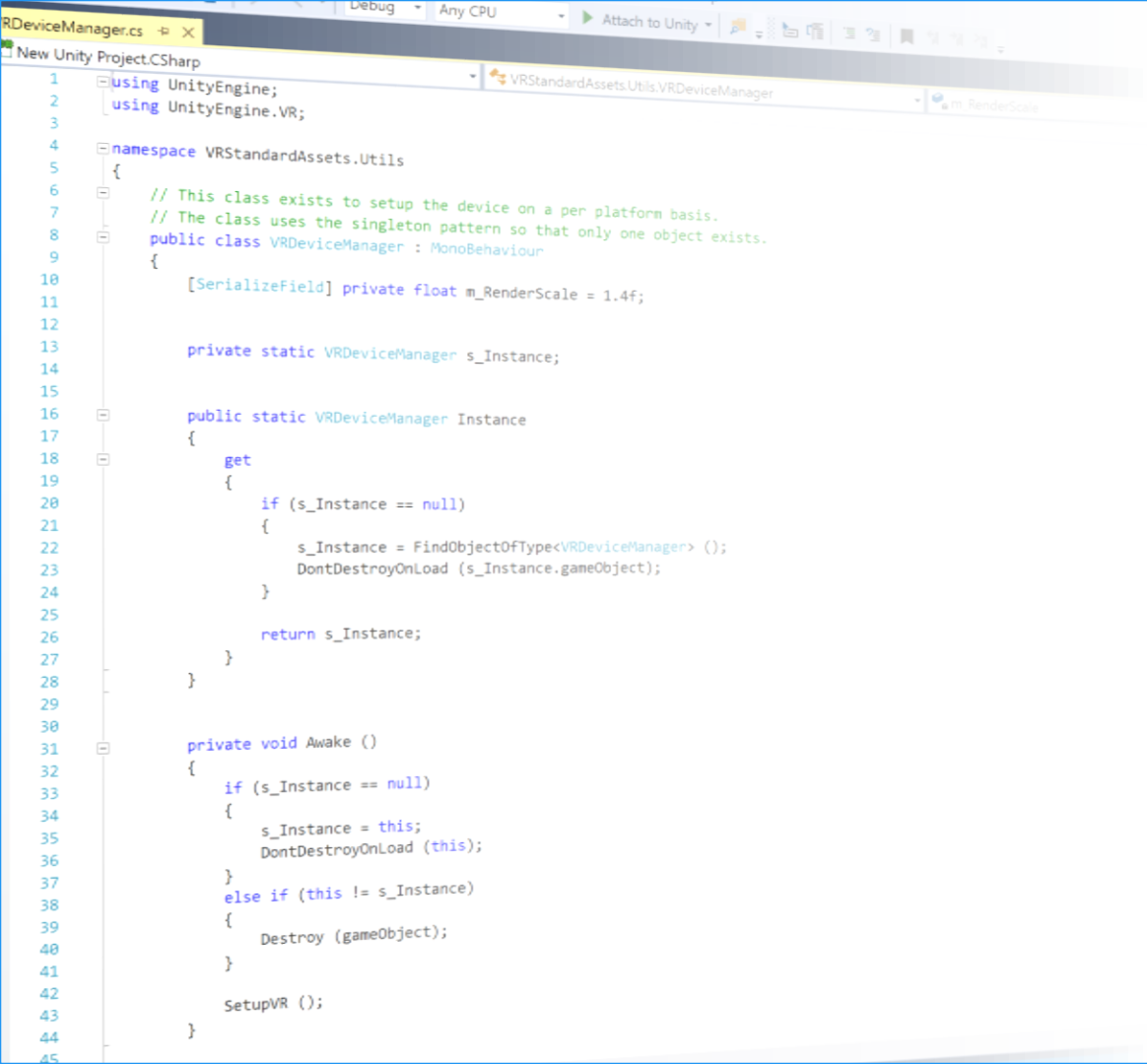
Ghosts

Everything needs to be intractable.

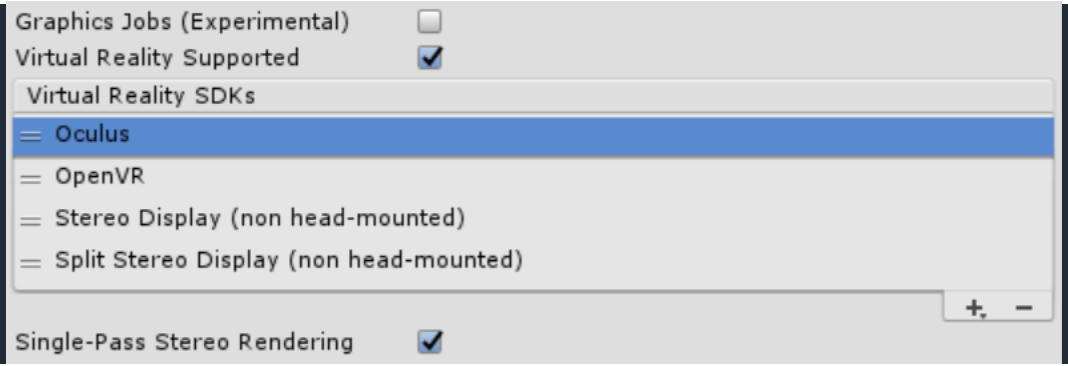
Reality

Reality stays smooth and consistent…



Optimizations

Other Settings



Player Settings -> Other Settings -> Single-Pass Stereo Rendering

Player Settings -> Other Settings -> Graphics Jobs

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Don’t do things more than once

- Don’t use Image Effects
  - Except Anti-aliasing
- Reduce draw calls
  - Use LODs
  - Turn on Culling
  - Atlas textures and share materials
    - Optimize lightmaps
- Reduce Skinned Meshes

Optimizations

- Static Lighting
  - Blob/No shadows
  - Light probes

- Avoid CPU spikes
  - Avoid GC spikes
  - Use coroutines (sparingly)

Optimizations

- Reduce render texture updates
- Simplify visuals
  - Fewer Objects
  - Lower Poly meshes
  - Use Hi-res texture to compensate
  - Consider flat shading

Optimizations

- Profile
  - Profiler
  - Frame debugger
- Dynamic performance

Roadmap

- Editor VR
- VR Interaction Kit
- Performance
  - NVIDIA VRWorks & AMD LiquidVR
- Improve mobile workflow

http://bit.ly/sdd-sea

Thank you