Let's get real: An introduction to AR, VR, MR, XR and more

The webinar will begin at 8 am PT | 11 am ET | 4 pm BST





ROAD TO THE METAVERSE CREATOR SERIES

Unity®

Let's get real: An introduction to AR, VR, MR, XR and more

2022

Meet your hosts

Drew Domokos Creator & Developer Advocate Vanesa Mendez Creator Advocate

Jerome Maurey-Delaunay Senior Technical Specialist

@jeromemaurey

Ben Radcliffe Senior Technical Specialist

<u>@lightandalchemy</u>



Agenda

- → Introduction (5 minutes)
- → Let's get real: An introduction to AR, VR, MR, XR and more (45 minutes)
 - What is XR?
 - XR platforms overview
 - Getting started with XR in Unity!
- → Q&A + Wrap-up (10 minutes)
- → Overtime! (30 minutes)
 - XR best practices
 - Visual Scripting Extensions for XR Interaction Toolkit

Survey available here →





Introduction

Tales from the Metaverse!



Road to the Metaverse

Cause + Christi: Sky Temple

A digital twin of the Al Wasl Dome in Dubai





Road to the Metaverse

The Metaverse Minute

https://blog.unity.com/topic/metaverse-minute





Metaverse Minute: Reimagining summertime travel

July 28, 2022 in Manufacturing | 4 min. read

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Topics covered

Manufacturing

By

Community Team

Digital Twin Metaverse Minute

Sha

Metaverse Minute: Reimagining summertime travel

It's July, which means it is time for summer holidays! We hope you're reading this edition of the Metaverse Minute from the beach with a piña colada, but if you're not, we have some options for you. Here are four ways to travel with Unity.



Road to the Metaverse

Road to the Metaverse: Forums!

https://forum.unity.com/forums/road-to-the-metaverse.798/



Road to the Metaverse

Filter by tag:

Unity-Gehan, Jun 9, 2022

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Official Learn Live: Intro to URP	😂 📌	Replies:	20	
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Official Learn Live: Intro to HDRP	😂 📌	Replies:	4	je
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Unwatch Forum Select

ROAD TO THE METAVERSE

CREATOR SERIES

Let's get real: An introduction to AR, VR, MR, XR and more





An introduction to AR, VR, MR, XR and more

What is XR?





What is XR?

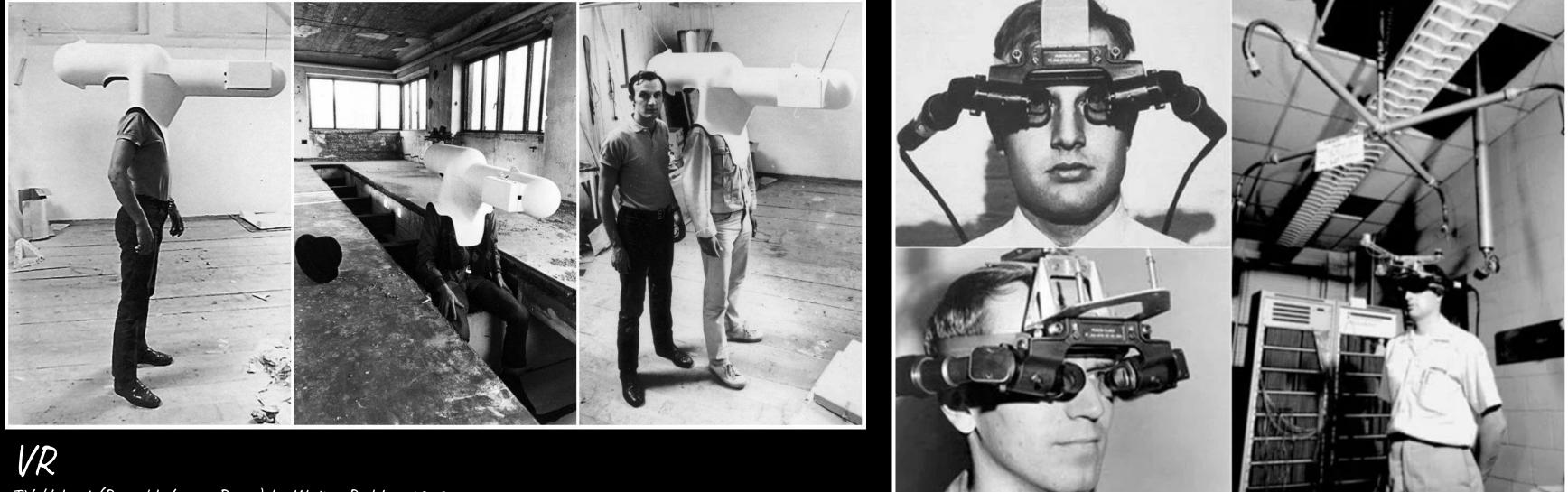
What is XR? It's shorthand for a related set of new technologies that are changing the way we interact with the world and with each other: Virtual Reality, Augmented Reality, and Mixed Reality.

- VR Virtual Reality
- MR Mixed Reality
- **AR** Augmented Reality
- **XR** Umbrella term for all the above



Unity Learn Intro to XR





TV-Helmet (Portable Living Room) by Walter Pichler, 1967

AR

Head-mounted display system for AR was invented by Ivan Sutherland in 1968



Virtual Reality Devices

Modern-day VR headsets come in many shapes and sizes.

These headsets consist of the following elements:

a) Display and optics to generate two separate views, one for each eye.

b) Input controllers to capture input commands by the user.

c) Sensors to infer the position and movement as input.

- **Oculus** \rightarrow Rift, Quest 1 & 2
- **Pico** \rightarrow Neo 3
- **HTC** \rightarrow Vive, Vive Focus, Comos, Flow
- Valve \rightarrow Index
- Varjo \rightarrow VR-3, XR-3
- **HP** \rightarrow Reverb
- **Sony** \rightarrow Playstation VR
- And so much more!







Unity for VR















Augmented Reality - Handheld

a technology that superimposes a computer-generated image on a user's view of the real world, thus providing composite view.

Handheld AR offers the most mainstream ARsolutions today on social media. People may not even realize that the AR filters they use on Instagram are augmented real.., experiences.



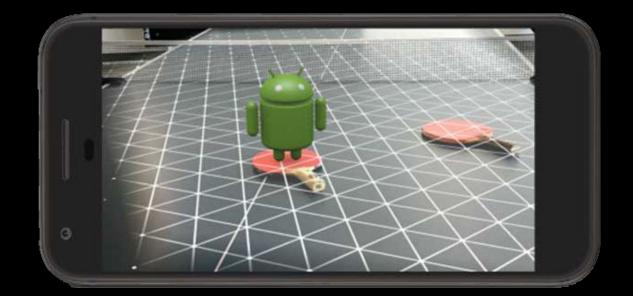
- Google Android AR Core
- Apple IOS ARKit





M







Augmented Reality - Head-mounted

Augmented Reality HMDs also known as Optical head-mounted displays or OHMDs. The displays of these devices are transparent. They allow users to see through them while projecting images and information in front of the users' eyes.

- Microsoft Hololens
- Magic Leap
- Nreal

• Lenovo A3

Intro to Unity for Hololens

Intro Unity for Magic Leap



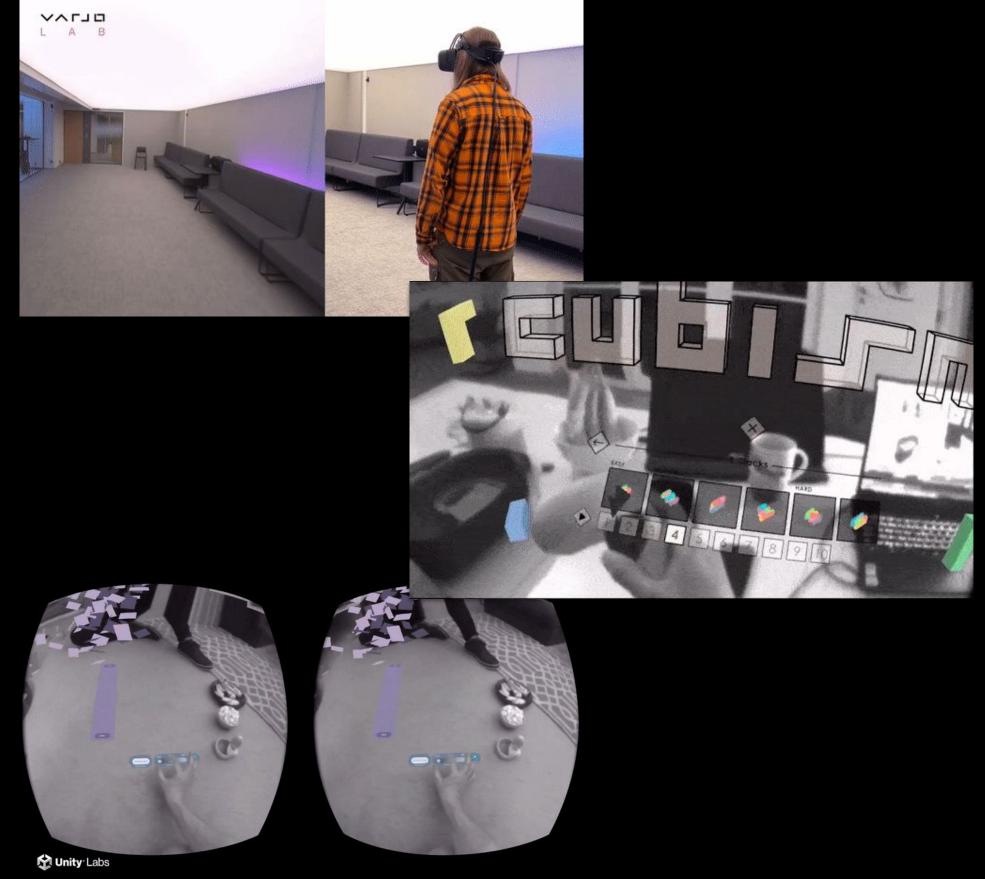


Mixed Reality

Mixed reality is the merging of real and virtual worlds to produce new environments and visualizations, where physical and digital objects co-exist and interact in real time.

Varjo \bullet

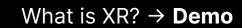
- Quest
- Window Mixed Reality Headsets \bullet





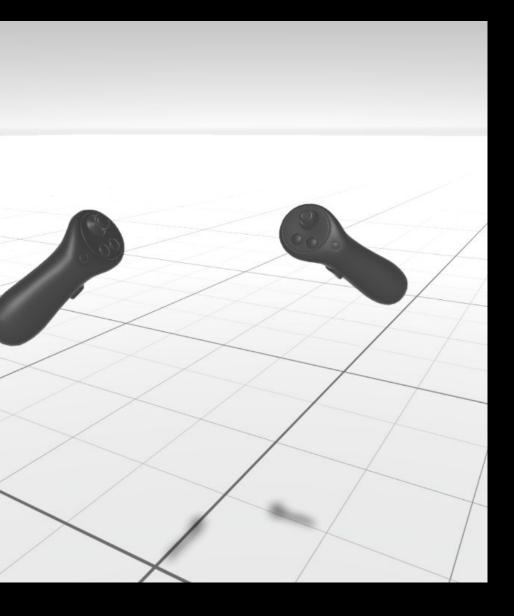
Unity Slices Demo





Let's jump in!

Getting started with the VR Core Template





VR Core Template Demo

Download template via the Unity Hub

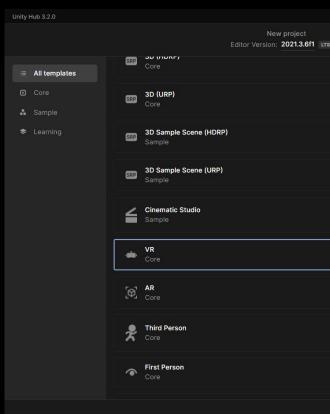
- Fix missing **interaction profile** issues in the OpenXR settings
- Fix camera near plane distance

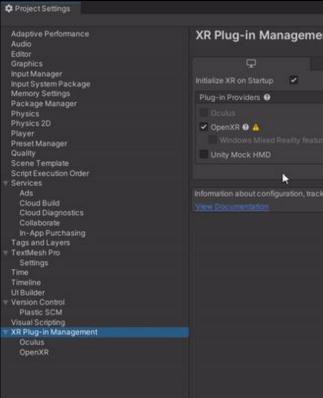
Optional \rightarrow Add Oculus Integration

- Install Oculus Integration package
- Explore Sample Scenes under

Assets/Oculus/Interaction/Samples/Scenes/Examples

- Add all the scenes to Scenes in Build list
- Use the menu to navigate through examples!







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٥	VR Quickstart your Virtual Reality (VR) applications with a sample scene, assets, and the recommended packages and settings.
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Getting started with XR in Unity







All your **Toolkits** are belong to us







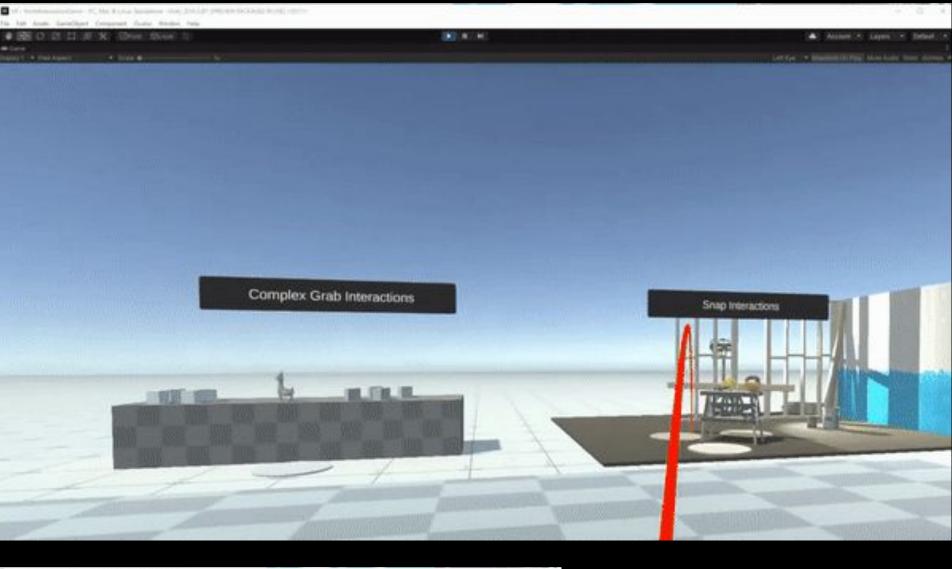
Unity **XR Interaction Toolkit**

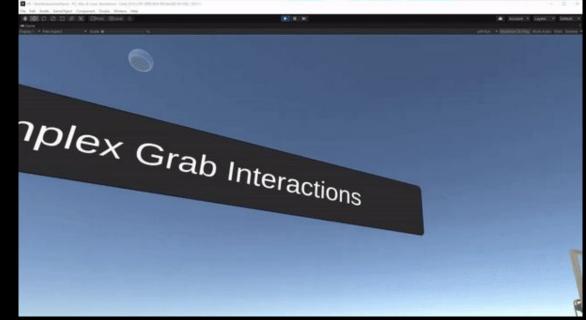
The XR Interaction Toolkit package is a high-level, component-based, interaction system. It provides a framework that makes 3D and UI interactions available from Unity input events.

2022.x → **Release** Package 2021.x → Add Package By Name → **com.unity.xr.interaction.toolkit**

Docs

<u>Samples</u>





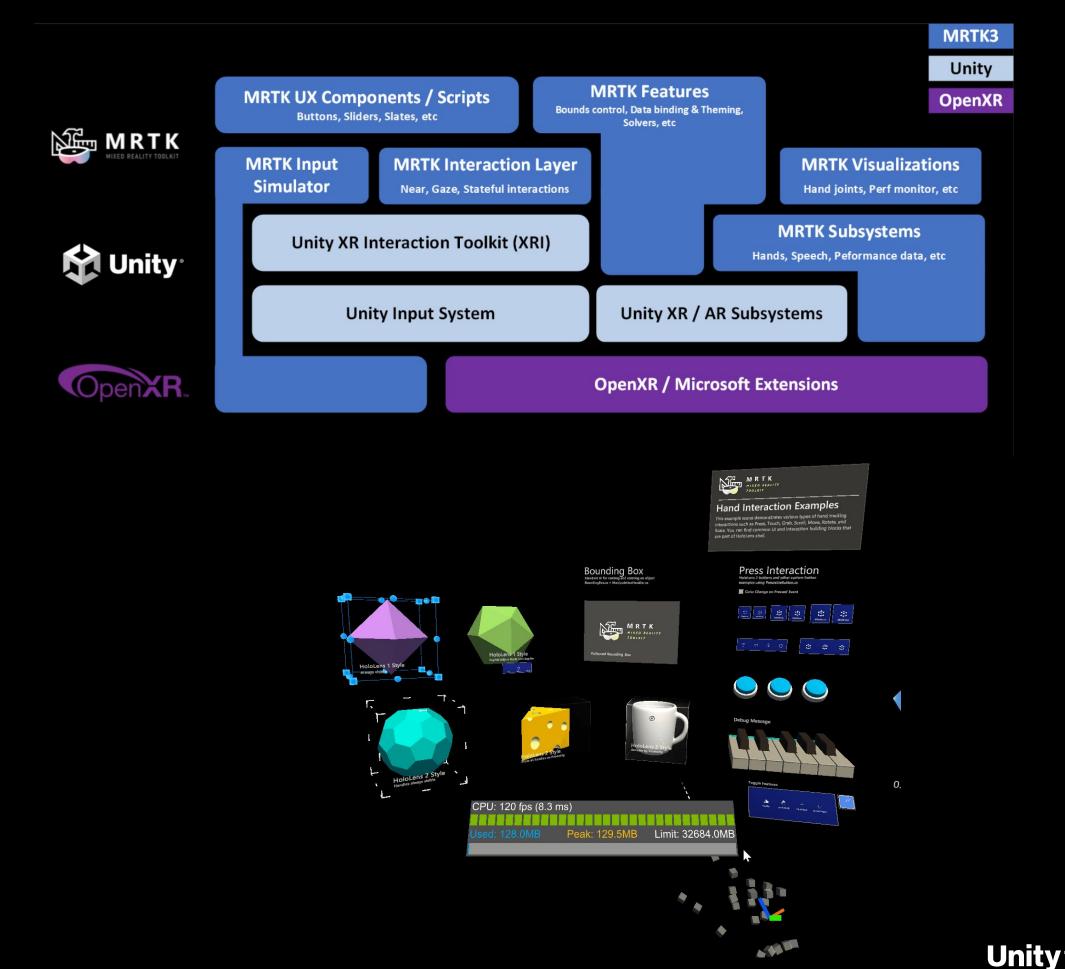


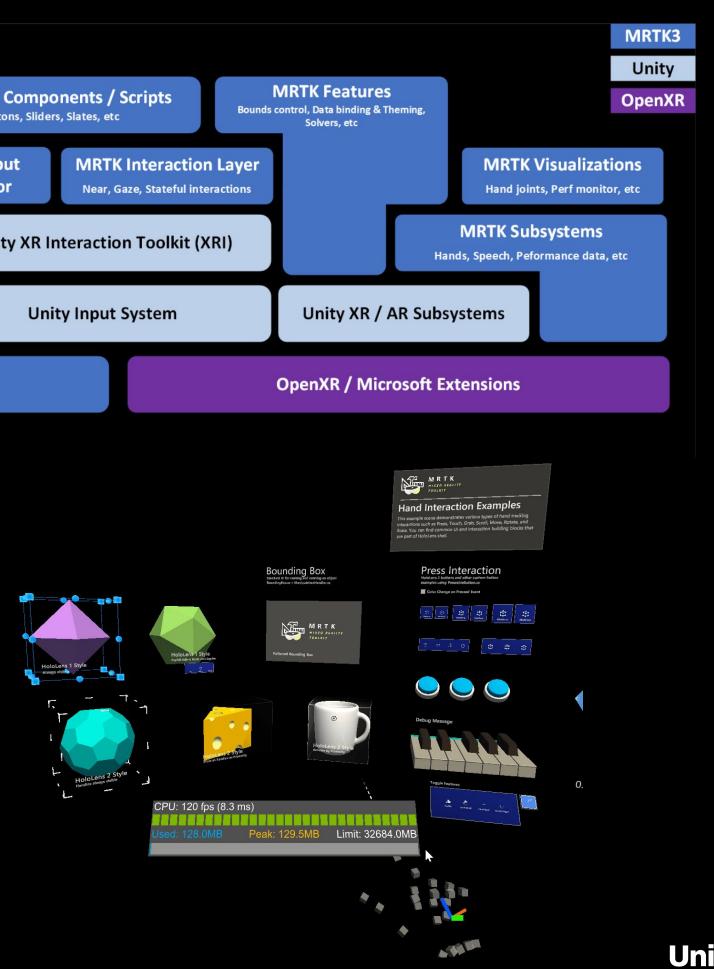
Microsoft **Mixed Reality Toolkit**

Microsoft MRTK3 is distributed as a set of packages that are imported into Unity using the Mixed Reality Feature Tool for Unity and the Unity Package Manager (UPM).

Microsoft MRTK3 leverages the **Unity XR** Subsystem Management infrastructure for writing extensible modules that can help provide cross-platform support for features like speech and hand tracking.

Docs **Initial Setup for MRTK3** MRTK3 packages **Subsystems** MRTK2 to MRTK3 concept migration guide





Holographic Remoting

Stream holographic content to your HoloLens in real time, quickly test and debug your app, **without building** and deploying a full project.

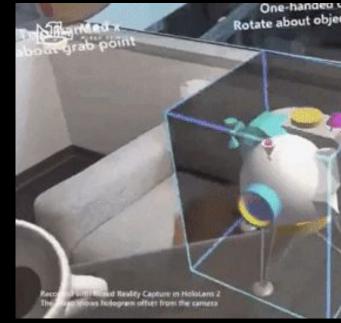
- 1. Download the Holographic Remoting app from the Windows Store on your Hololens
- 2. Enable Holographic Remoting for Play Mode in Project Setting \rightarrow XR Plug-in Management \rightarrow OpenXR
- 3. Click the **O** icon to reveal the settings

There are two options for connecting:

- Wifi for wireless freedom
- USB for speed and stability

When connected via a USB cable, make sure to disable Wifi on the HoloLens.

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Docs

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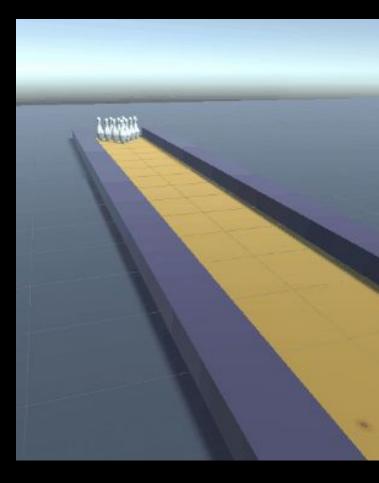
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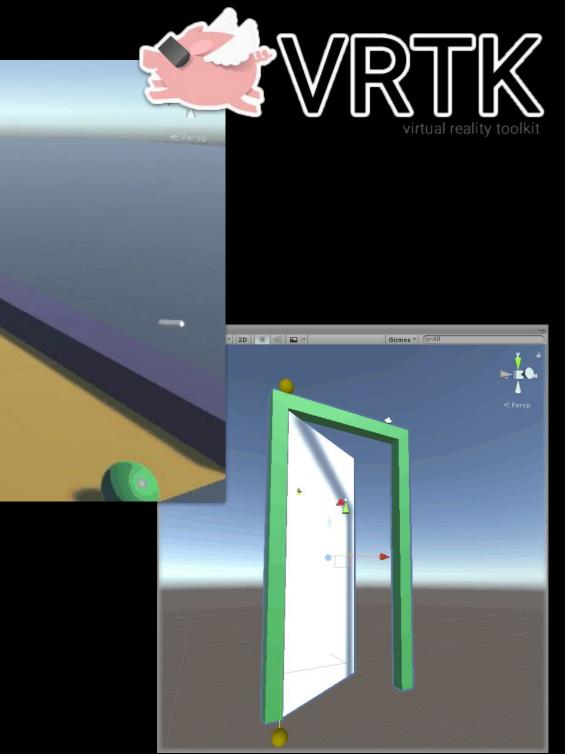
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Virtual Reality Toolkit

VRTK aims to make building spatial computing solutions in the Unity software fast and easy for beginners as well as experienced developers.



<u>Github</u> <u>Docs</u> <u>How-To Guides</u>





Vive Wave Integration

VIVE Wave XR Plugin

M

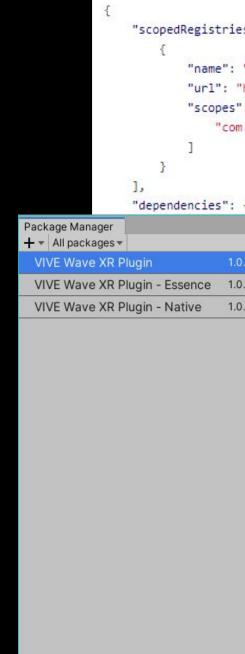
Provides basic Unity XR Plugin Framework support.

VIVE Wave XR Plugin - Native

Provides access to Wave native API through C# wrapper. If you need to use Wave API directly, install this package.

VIVE Wave XR Plugin - Essence

Contains all the exclusive features that Wave provides such as Controller Model, Input Module, Interaction Tool Kit extensions, performance tuning tools and debug tools.



<u>Docs</u> **Getting Started**

Last update Aug 12, 14:03

"scopedRegistries": [

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"name": "VIVE",
"url": "https://npm-registry.vive.com",
"scopes": [
    "com.htc.upm"
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		Links View documentation	
		View changelog	
		View licenses	
		Author	
		HTC Corporation	
		Published Date	
		August 07, 2020	
		Provides Unity XR SDK support for VIVE Wave devices. Based on Wave Runtime version 3.2.0.	
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Valve SteamVR

SteamVR Plugin

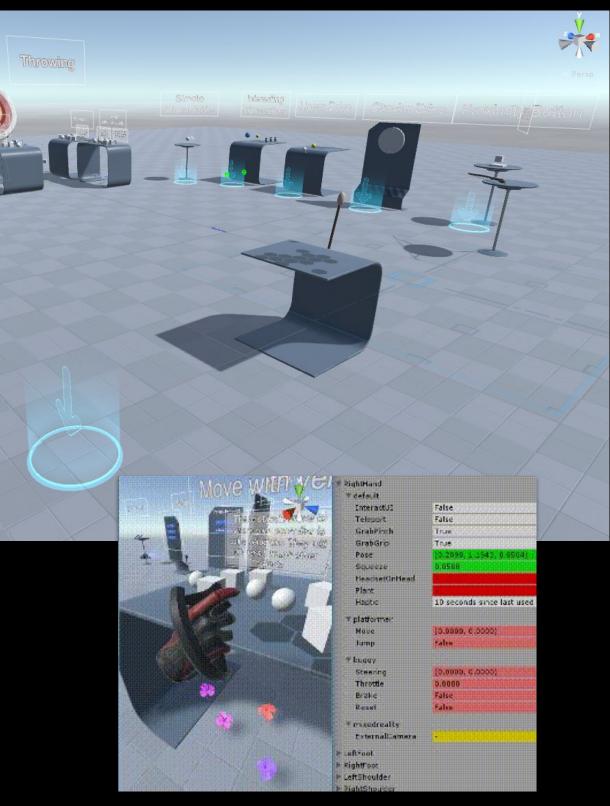
The modern SteamVR Unity Plugin manages three main things for developers:

- Loading **3d models** for VR controllers
- Handling input from those controllers,
- Estimating what your **hand looks like** while using those controllers.



Asset Store

<u>Github</u>









Meta Quest 1 & 2

Oculus SDK

Available on the Unity Asset Store here

Oculus platform Features

- Avatar SDK
- Spatialized Audio
- LipSync SDK
- Hand Tracking \bullet

Resources

- Interaction SDK
- Sample Framework
- Passthrough API ightarrow

Interaction SDK



Debug hand tracking directly in the Unity Editor with Oculus Link!



Passthrough API





VRMADA **UltimateXR**

欱

Free, open source framework and toolkit for

Unity that includes:

- cross-device compatibility
 - Oculus SDK 0
 - Pico XR SDK 0
 - SteamVR 0
 - WaveXR 0
 - Windows Mixed Reality
- state-of-the-art grab and manipulation mechanics
- a library of gender, and race, agnostic hands \bullet
- customizable full body avatar representation
- advanced UI components
- locomotion mechanics, and much more. ightarrow



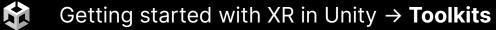
Docs

Source Code



Allow Hand Tracking	~		
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Use Arm IK			
Elbow Neutral Aperture	•	0.5	
Arm Over-Extend	Limit Hand Reach		
Use Body IK	~		
Lock Body Pivot			
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Head Free Range Bend	_	20	
Head Free Range Torsion		30	
Neck-Head Balance	•	0.5	
Spine Bend			
Spine Torsion		0.4	
Chest Bend		0.3	
Chest Torsion			
Upper Chest Bend		0.4	
Upper Chest Torsion		0.2	
Eyes Base Height	1.85	Use Avatar Eyes	
Eyes Forward Offset	0.1	Use Avatar Eyes	
Hand poses based on cont	roller input events:		
nuna poses bused on cont	ionor input events.		
To start using this function			





Unity AR Foundation

AR Foundation allows you to work with augmented reality platforms in a multi-platform way within Unity.

This package presents an interface for Unity developers to use, but doesn't implement any AR features itself. To use AR Foundation on a target device, you also need separate packages for the target platforms officially supported by Unity:

ARCore XR Plug-in on Android ARKit XR Plug-in on iOS OpenXR Plug-in on HoloLens

<u>Docs</u>



Feature support per platform

You can refer to this table to understand which parts of AR Foundation are relevant on specific platforms:

Device tracking	
Plane tracking	
Point clouds	
Anchors	
Light estimation	
Environment probes	
Face tracking	
2D Image tracking	
3D Object tracking	
Meshing	
2D & 3D body tracking	
Collaborative participants	
Human segmentation	
Raycast	
Pass-through video	
Session management	
Occlusion	

Note: To use ARCore cloud anchors, download and install Google's ARCore Extensions for Unity's AR Foundation.

ARCore	ARKit	OpenXR
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AR Foundation Samples

Download sample project via the github

- Get Project Here \bullet
- Clone or download this repository to a workspace on your drive \bullet
 - \circ Click the \downarrow Code button on this page to get the URL to clone with Git or click Download ZIP to get a copy of this repository that you can extract
- Open a project in Unity \bullet
 - Download, install, and run Unity Hub
 - \circ In the Installs tab, select Locate or Add to find or install Unity 2019.4 LTS or later
 - In the Projects tab, click Add
 - Browse to the VR folder within your downloaded copy of this 0 repository and click Select Folder
 - Click the project which should now be added to the list to open the project
- To run the AR Foundation sample on a headset, go to File > Build \bullet Settings and build the app. 1

Samples (v4.2) Samples (v5)

Building for iOS Building for Android Unity-Technologies / arfoundation-samples Public

<> Code 🕥 Issues 17 11 Pull requests 🕑 Actions 🖽 Projects

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Meshing

Face Tracking

Image Tracking

Anchors

AR World Map

Point Cloud

Depth

Config Choose

Geo Anchors



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AR Foundation Samples

Example projects that use AR Foundation 5.0 and demonstrate its functionality with sample assets and components

- This set of samples relies on three Unity packages:
- Google ARCore XR Plug-in (documentation)
- Apple ARKit XR Plug-in (documentation)
- ARFoundation (documentation)









PTC **Vuforia**

Vuforia Engine Package

SDK for mobile devices that enables the creation of **AR** applications. Available on the Unity Asset Store <u>here</u>

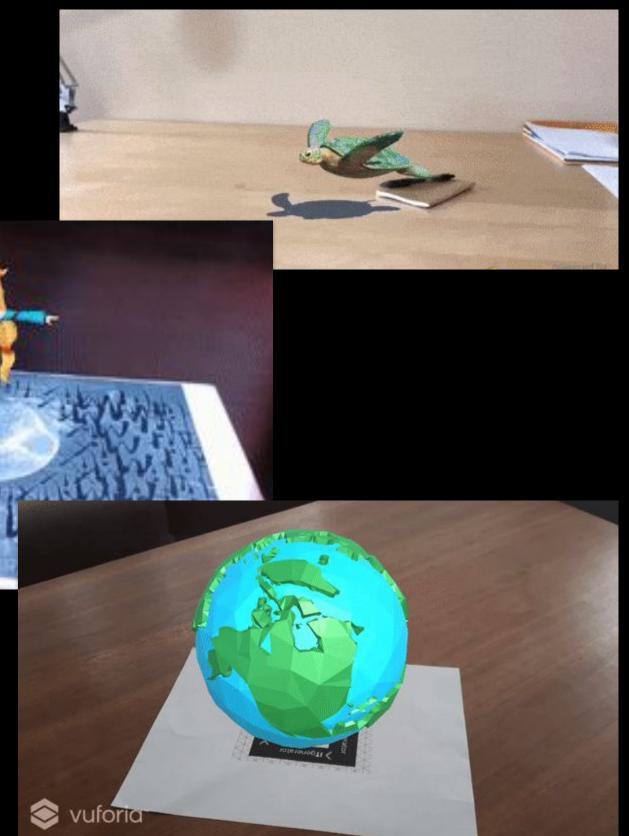
Vuforia Features:

- Image Tracking
- Model Tracking
- Area Tracking
- Ground Plane Detection



Resources

- Project Set Up
- <u>Docs</u>



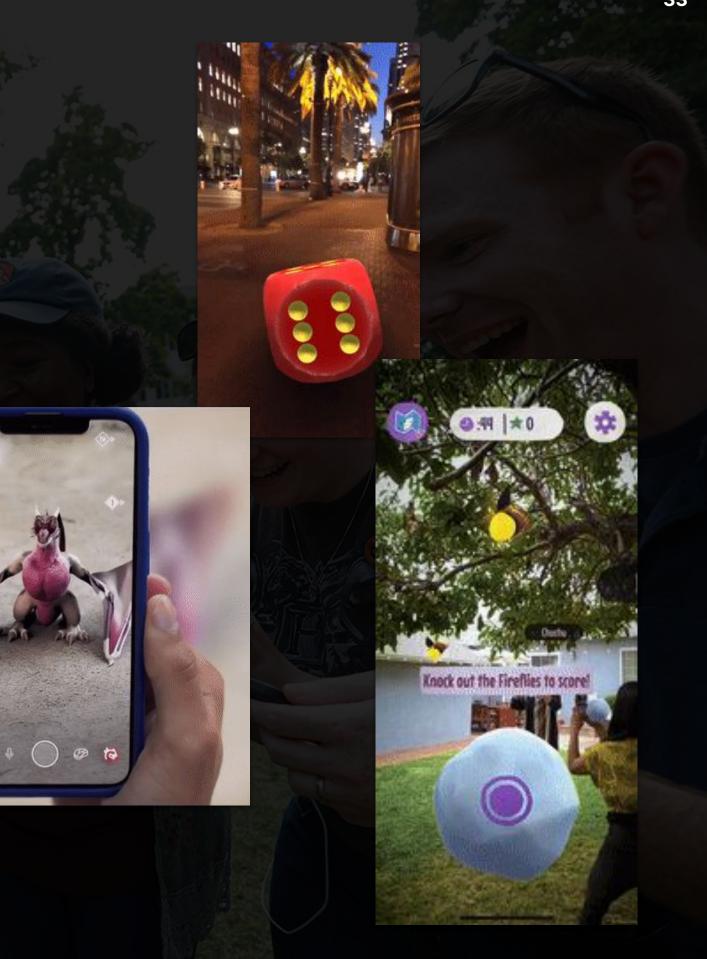


Getting started with XR in Unity \rightarrow **Toolkits**

Niantic Lightship ARDK

Create persistent and realistic experiences. ARDK's meshing feature translates the colors produced by the user's camera, runs them through a neural network, and builds a mesh of tessellated triangles that create a machine-readable representation of the physical world.

website video



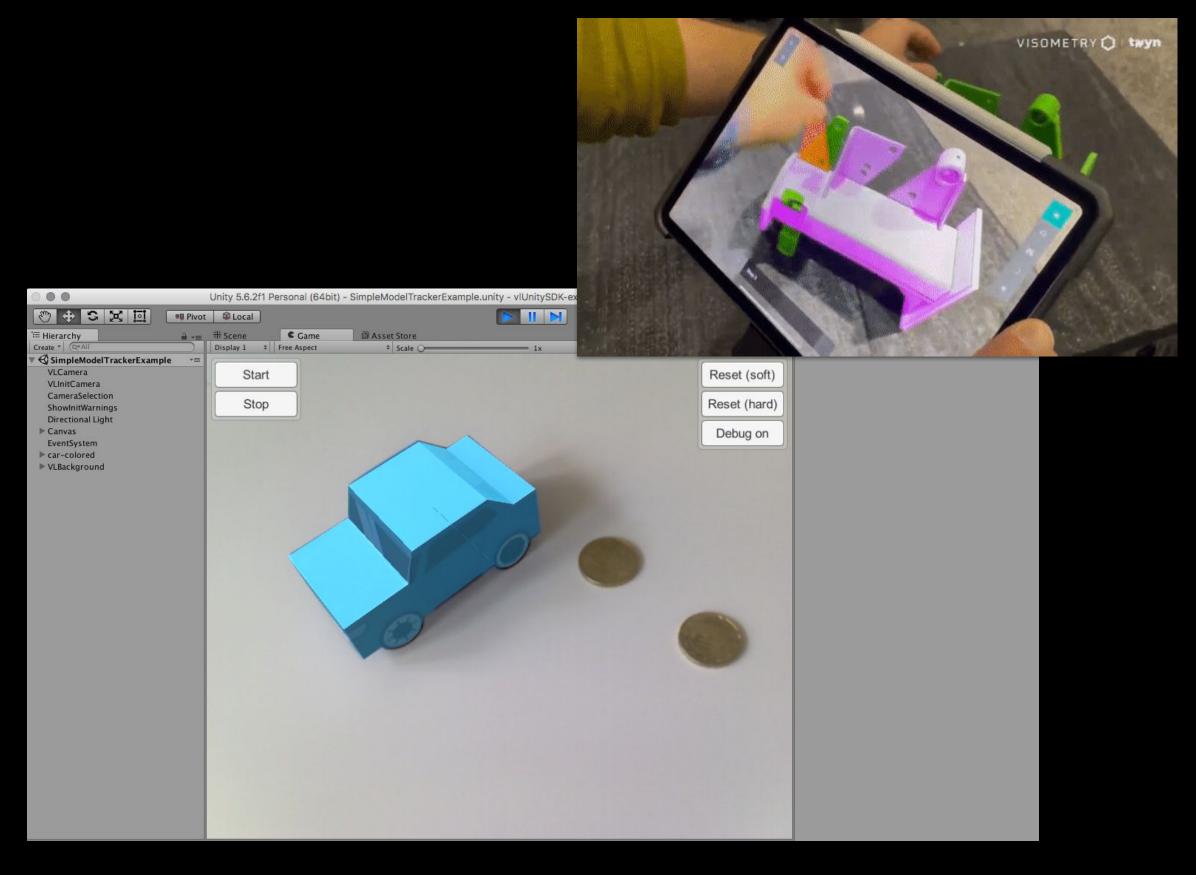




Visometry VisionLib

VisionLib enables 3D object tracking for augmented reality apps on computers, smartphones, tablets, and mixed-reality headsets like HoloLens.

- Highly accurate 3D object tracking
- Use 3D or CAD data to create trackers
- Multi Model Tracking
- URP support

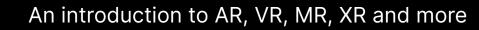


<u>Docs</u>

HoloLens Tutorial







Metaverse Platforms



AltspaceVR

Unity version 2020.3.18f1

<u>AltspaceVR Uploader</u> <u>Mobile Performance Guide</u>



VRChat Unity Version 2019.4.31f1

Setting up the SDK





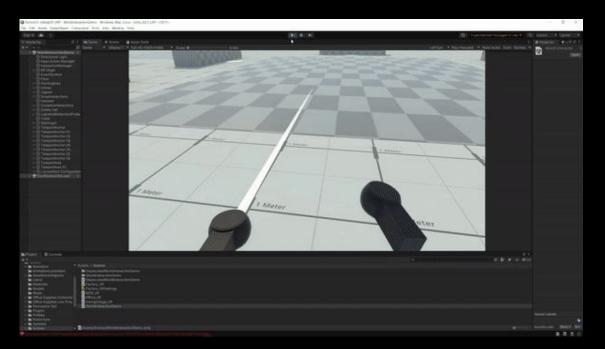
Breakroom

Unity Version 2018.4.36f1

Installing Unity and the Breakroom SDK

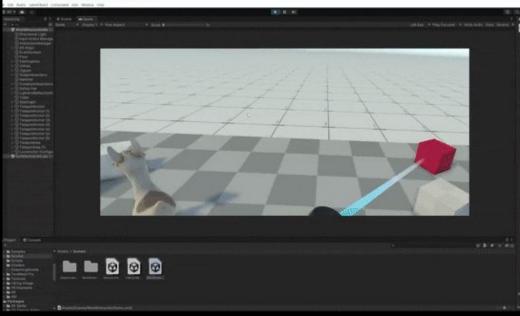


XR Interaction Toolkit Features



Locomotion

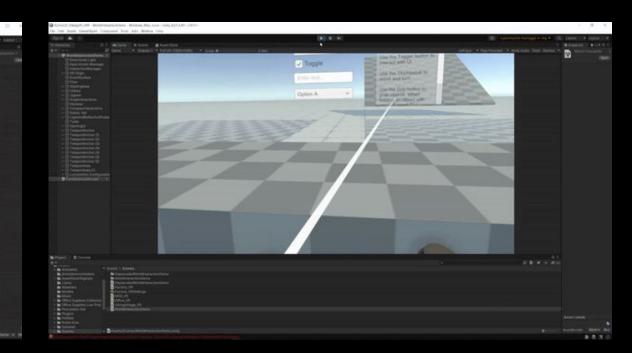
Teleport around a space with support for unique angles and snap to turn.



Physics Interaction

Grab and throw objects with tracked controllers in VR. There are multiple configurations for grabbing and tracking objects.





Native UI Support

Interact with all UI elements built in Unity, including buttons, scroll windows, and more.





Let's jump in!

XR Interaction Toolkit Demo

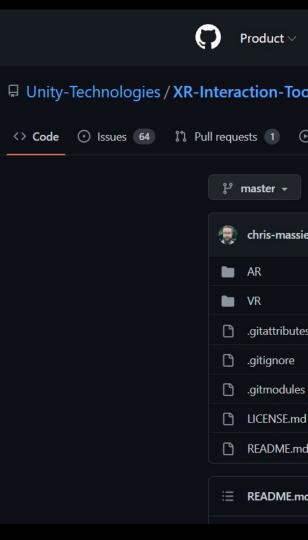


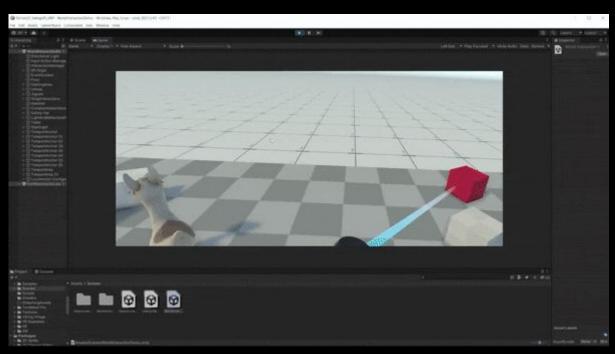
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XRI Toolkit Examples

Download sample project via the **github**

 Get Project Here: <u>https://github.com/Unity-Technologies/XR-Interaction-Toolkit-Examples</u>





Team Enterprise Explo	ore \vee Marketplace Pricing \vee		Search
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🕑 Actions 🛛 🗄 Projects	🕮 Wiki 🕛 Security 🗠 Insights		
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	Update examples for 1.0.0-pre.6	11 mo	nths ago
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nd	Update examples for 1.0.0-pre.2	2 y	ears ago
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Free Sample Assets to Get Started



Viking Village URP Unity version 2020.3.33 or higher

Asset Store Link



Snaps Prototype Sci-Fi / Industrial Unity Version 2018.4.0 or higher

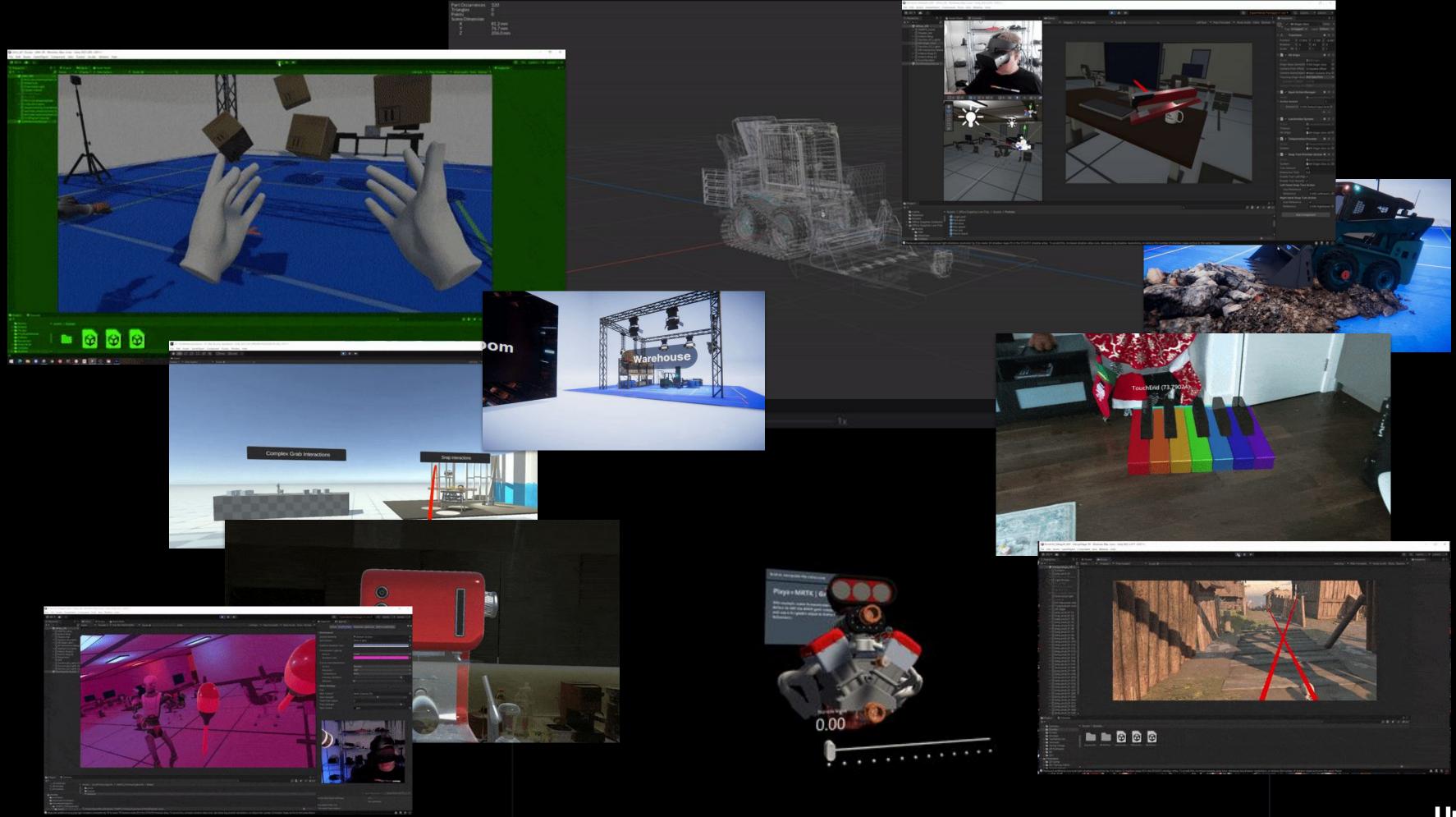
Asset Store Link



Snaps Prototype | Office Unity Version 2018.4.0 or higher

Asset Store Link





Workshops

https://create.unity.com/road-to-metaverse

April	Welcome to the Metaverse!
May	Bring your digital and physical assets into Unity
June	Add interactivity to your immersive experience
July	How to bring your real-time 3D digital twin data into Unity
August	Let's get real: An introduction to AR, VR, MR, XR and more
September	Augmenting reality (AR): Bring digital objects into the real world
October	Build immersive worlds in virtual reality (VR)
November	Improve learning retention with immersive training experiences
December	Build a Microsoft HoloLens experience for training in AR
January	Integrate cloud-based loT data into your XR experience
February	Masterclass: Build a collaborative multi user experience
March	Build geolocated and social experiences in AR



Road to the metaverse

The metaverse is here and it is being powered by real-time 3D technology. Our new series of talks and worksh for decision makers and creators will inspire your journey.

Register now

Notify me of future sessions

Monthly sessions for creators and decision makers

Get access to curated sessions designed for creators and decision makers.

As a leader in real-time 3D technology, Unity is poised to prepare its community for new modes of interaction t enable data discovery and insight. Explore strategies and get training on the tools required to build connected immersive experiences across industries.



Creator series

Build a strong foundation and develop your skills with Unity experts during these monthly sessions. Ranging from beginner to advanced, these deep-dives are curated specifically for creators looking to gain the knowledge and skill to succeed in the metaverse.

View all sessions



Executive series

Journey with Ryan Peterson, Unity's VP of professional services, as he and special guests tackle the why and how behind this new era of consumer and social experience. These intimate chats are designed to spark your imagination, and will end with a live Q&A.

View all sessions

Learn Live

https://learn.unity.com/project/road-to-the-metaverse-live

March	Prototyping and world building.
April	Intro to Visual Scripting
May	Animation
June	Intro to Universal Render Pipeline
July	Intro to High Definition Render Pipeline
August	Shader Graph
September	VFX Graph
October	Post Processing
November	UI Building
December	Intro to VR
January	Intro to AR
February	Intro to Spatial Audio

Unity Learn My Learning

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Pathways

Browse *

Live

For Educators ~

Q What do yo

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Live Learn: Road to the Metaverse

Project • Beginner • +0 XP • 10 Hours • 🗆 41

😟 Unity Technologies

Live Learn: Ro

UPCOMING LIVE LEAR

Metaverse - In Associated project: **Road to the Metaver**

April 20, 2022

() 5:00 - 7:00 pm B

Learn More

Overview Skills Live Groups

Summary

The road to the metaverse is paved in real-time 3D. But the challenges for creators are plenty – from capturing, transforming, visualizing and optimizing right-time data to creating, distributing and operating rich, interactive, immersive experiences that will engage stakeholders anywhere. Get ready to start your journey and learn the skills to thrive in the next era of computing.

Select your version @

Last updated: March 21

2022.1

Language English

Project Objective

By the end of this series, you should understand the following topics:

- Intro Unity
- Polybrush
- Probuilder



Executive series

https://create.unity.com/road-to-metaverse#executive





EXECUTIVE SERIES

Building successful B2C brands in the metaverse

August 25, 2022 9 am PT / 12 pm ET / 5 pm BST Duration: 60 minutes

Join Ryan and Media.Monks' SVP, Tim Dillon, as they discuss what it's going to take for B2C brands to make it in the metaverse. Hear from Tim as he shares lessons he's picked up from working with large consumer brands and walk away with strategic tips on how to get started, how to leverage real-time 3D technology to make an impact, and much more.



The Metaverse Minute

https://blog.unity.com/topic/metaverse-minute





Metaverse Minute: Reimagining summertime travel

July 28, 2022 in Manufacturing | 4 min. read

	The state of the second second second second	

Topics covered

Manufacturing

By

Community Team

Digital Twin Metaverse Minute

Sha

Metaverse Minute: Reimagining summertime travel

It's July, which means it is time for summer holidays! We hope you're reading this edition of the Metaverse Minute from the beach with a piña colada, but if you're not, we have some options for you. Here are four ways to travel with Unity.



Road to the Metaverse: Forums!

https://forum.unity.com/forums/road-to-the-metaverse.798/



Road to the Metaverse

Filter by tag:

Unity-Gehan, Jun 9, 2022

				5-576-57288
Title	Start Date	Replies	Views	Las
Official Welcome to the Road to the Metaverse	😂 📌 🔒	Replies:	3	
Unity-Gehan, Jun 9, 2022	Edit	Views:	469	
Official Frequently Asked Questions	📌 角	Replies:	0	ι
Unity-Gehan, Jun 9, 2022	Edit	Views:	284	
Official Welcome to News and Updates	📌 角	Replies:	0	ι
Unity-Gehan, Jun 9, 2022	Edit	Views:	262	
Official Learn Live: Prototyping & Worldbuilding	😂 📌	Replies:	2	je
Unity-Gehan, Jun 9, 2022	Edit	Views:	384	
Official Learn Live: Intro to Visual Scripting	📌	Replies:	0	ι
Unity-Gehan, Jun 9, 2022	Edit	Views:	307	
Official Learn Live: Animation	📌	Replies:	0	ι
Unity-Gehan, Jun 9, 2022	Edit	Views:	327	
Official Learn Live: Intro to URP	😂 📌	Replies:	20	•
Unity-Gehan, Jun 9, 2022	Edit	Views:	627	
Official Learn Live: Intro to HDRP	😂 📌	Replies:	4	je
Unity-Gehan, Jun 9, 2022	Edit	Views:	444	
Official Learn Live: Shader Graph	📌	Replies:	0	ι
Unity-Gehan, Jun 9, 2022	Edit	Views:	262	
Official Learn Live: VFX Graph	📌	Replies:	0	ι
Unity-Gehan, Jun 9, 2022	Edit	Views:	262	
Official Learn Live: Post Processing	📌	Replies:	0	ι
Unity-Gehan, Jun 9, 2022 post-processing	Edit	Views:	292	
Official Learn Live: UI Building	📌	Replies:	0	ι
Unity-Gehan, Jun 9, 2022	Edit	Views:	312	
Official Learn Live: Intro to VR	📌	Replies:	0	ι
Unity-Gehan, Jun 9, 2022	Edit	Views:	265	
Official Learn Live: Intro to AR	📌	Replies:	1	
Unity-Gehan, Jun 9, 2022	Edit	Views:	272	
Official Learn Live: Intro to Spatial Audio	📌	Replies:	0	ι
Unity-Gehan, Jun 9, 2022	Edit	Views:	259	
Official Workshops: Welcome to the metaverse	📌	Replies:	0	ι
Unity-Gehan, Jun 9, 2022	Edit	Views:	319	
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Official Workshops: Add interactivity to your immersive experience Unity-Gehan, Jun 9, 2022	😂 📌 Edit	Replies: Views:	6 457	
Official Workshops: How to bring your real-time 3D digital twin data into Unity Unity-Gehan, Jun 9, 2022	63 📌	Replies:	7	je
	Edit	Views:	406	Yes
Official Workshops: Let's get real: An introduction to AR, VR, MR, XR and more	*	Replies:	0	ι



277

Edit Views:

Unwatch Forum Select

Social

→ Please use **#R2MV**



Jerome Maurey-Delaunay **@jeromemaurey**

...



Jerome Maurey-Delaunay nior Technical Specialist for Automotive, Transport & Manufacturing at Uni...

Getting ready for our Road to the Metaverse workshops, like using #MRTK and Visual Scripting!

Want to learn Unity from the ground up? This is your chance! Learn the skills needed to build the Metaverse with Unity.

https://lnkd.in/dmDGcErZ

#R2MV





Ben Radcliffe **<u>@lightandalchemy**</u>

Ben Radcliffe @lightandalchemy · Feb 7 ···· There's a lot of uncertainty about the Metaverse these days. One thing that is certain is that the Metaverse is going to need good coffee!!!

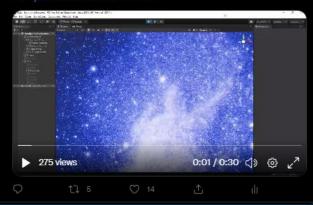
#unity3d #metaverse #AR #MRTK #hololens2 #espresso #coffee



Ben Radcliffe @lightandalchemy · Mar 29 Building some content for our new series "Road to the Metaverse"

Join us on this year-long journey to harness the power of real-time to transform the way we create!

Sign up here: eate.unity.com/road-to-metave..

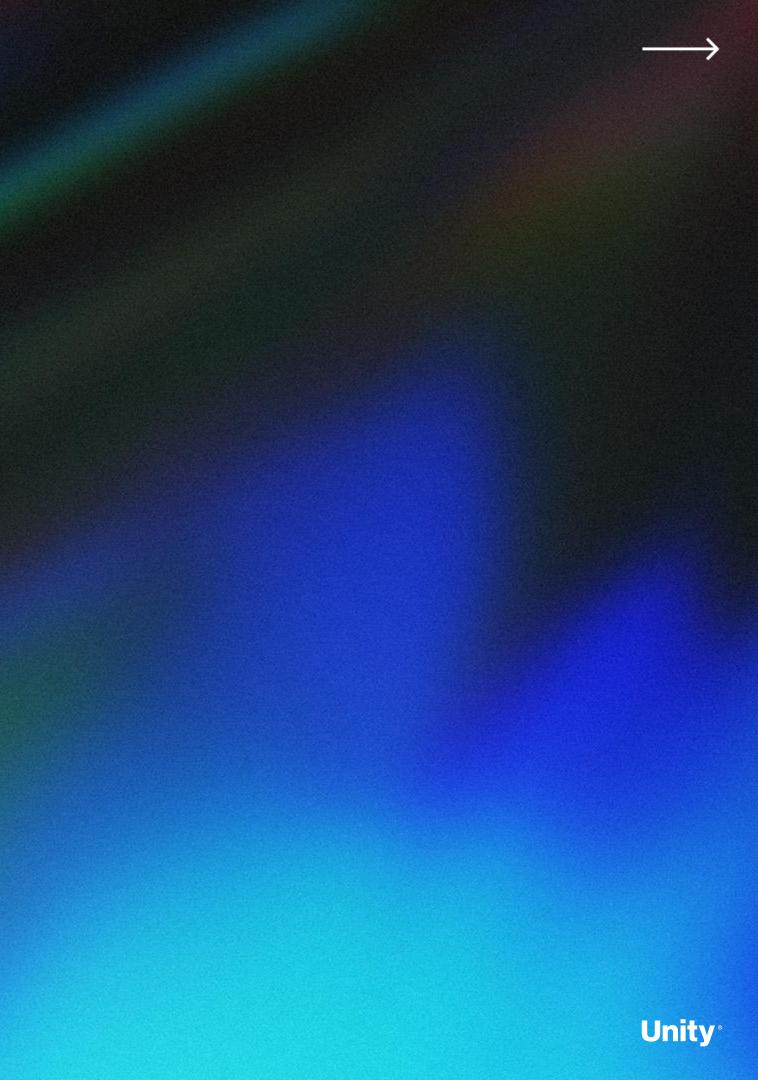








Any questions?







Thank You

Survey available here →

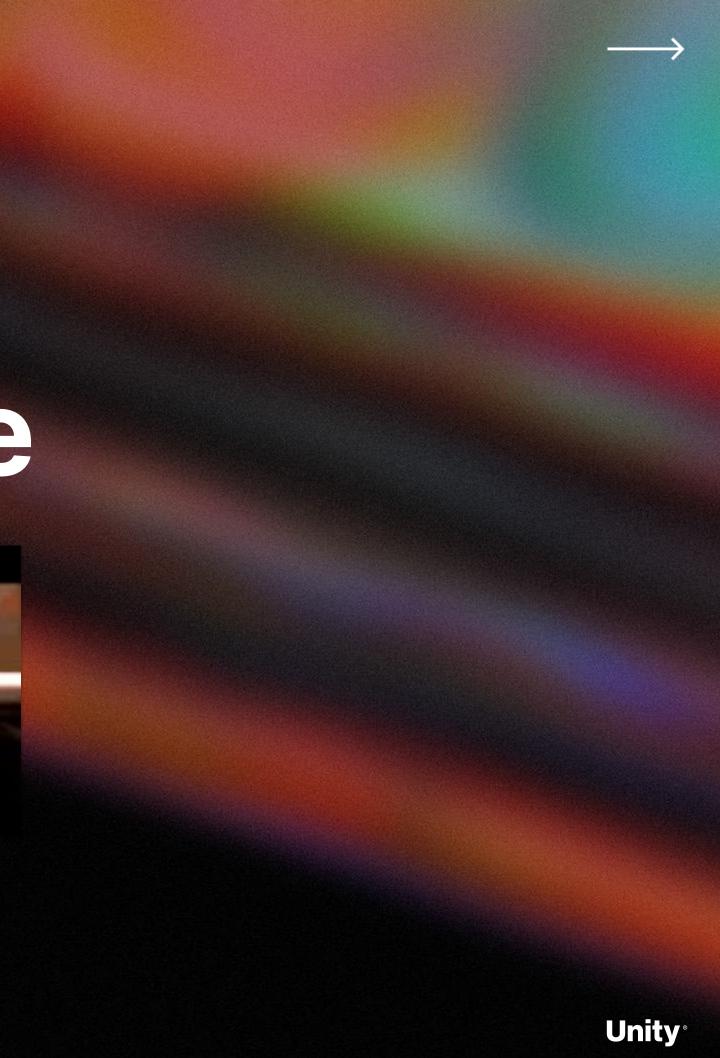






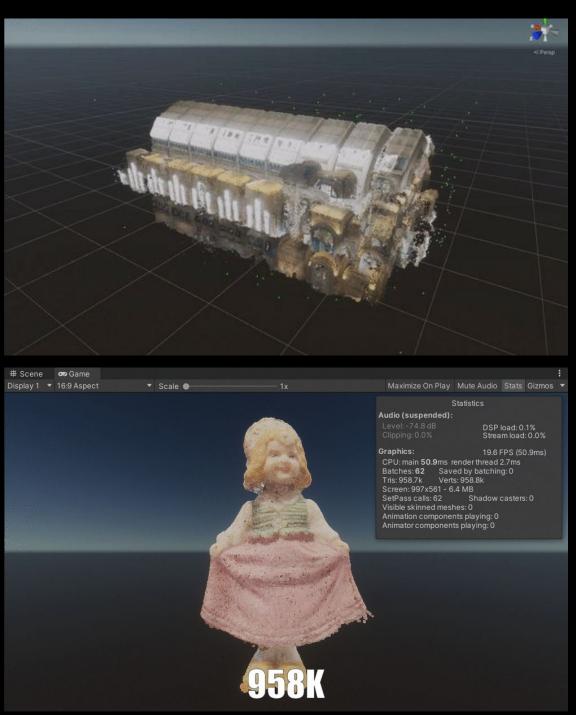
Overtime

WE NEED TO GO





XR Best practices



Hololens 2

欱

	Low-scene complexity	Medium-scene complexity	High-scene complexity
Objects per scene	1-3	4-10	10+
Triangles	<100,000	<30,000	<10,000
Materials	1-2 per object		

Quest

Draw Calls

Triangle count

Quest 2

	•	
a 0		

	Light Simulation	Medium Simulation	Busy Simulation
CPU Budget		14ms	
GPU Budget	12ms		
Triangle count		200k to 400k	

\rightarrow Windows Mixed Reality

- Performance recommendations for Unity
- Optimize your 3D models
- \rightarrow Magic Leap
 - High Performance Graphics Optimizations in Tónandi
- \rightarrow Quest
 - Performance and Optimization

Draw	Calls	

Triangle count

Desktop VR Headsets



Light Simulation	Medium Simulation	Busy Simulation
200-400	150-250	50-150
	350k to 500k	

Light Simulation	Medium Simulation	Busy Simulation
400-600	200-300	80-200
	750k to 1.0m	

	Low-scene complexity	Medium-scene complexity	High-scene complexity
9	1-3	4-10	10+
	<15,000,000	<500,000	<150,000
	1-2 per object		



Best Practices

- Reduce materials and surfacing
- Reduce textures size
- Remove hidden and unused data
- Reduce triangles
- Reduce draw calls
- Reduce hierarchy complexity
- Bake!
 - Ambient Occlusion
 - Normal Maps
 - Cookies!

Resources:

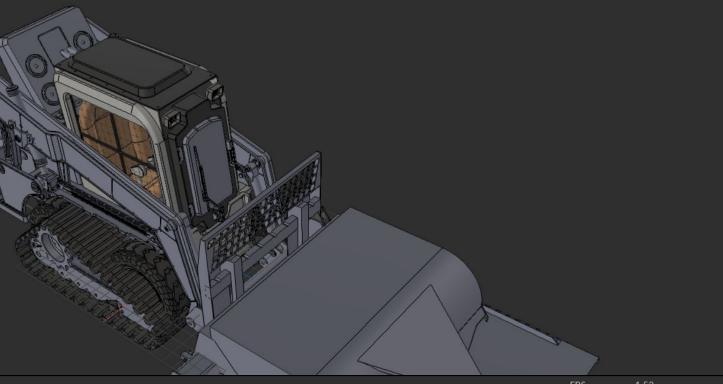
- Best practices for converting and optimizing
 real-time 3D models
- Use Pixyz Studio to prepare 3D models

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Part Occurrences Triangles Points Scene Dimension X Y Z	320 200 000 0 2.0 m 1.9 m 5.2 m	

320 4 369 418

2.0 m 1.9 m

Part Occurrences Triangles FPS 6.18 RAM usage 32.05 / 127.85 GB VRAM usage 3.16 / 24.00 GB

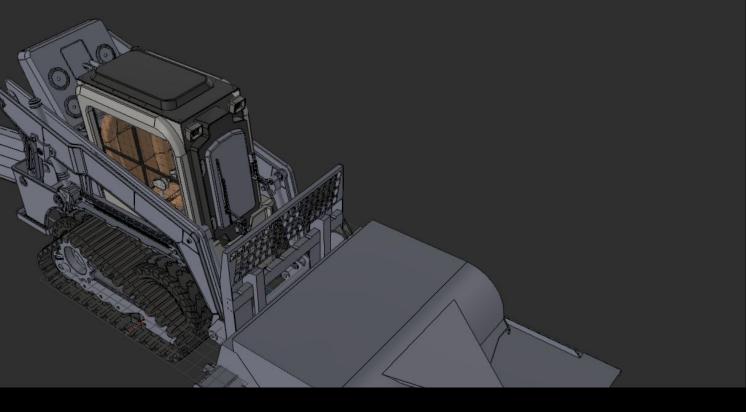


 FPS
 1.53

 RAM usage
 31.73 / 127.85 GB

 VRAM usage
 2.96 / 24.00 GB







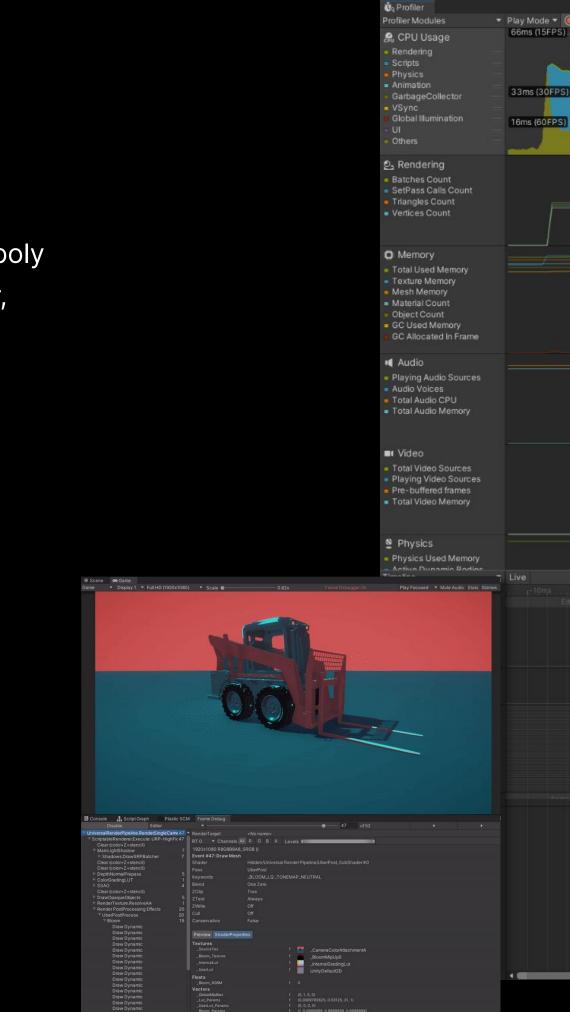
Things to keep in mind

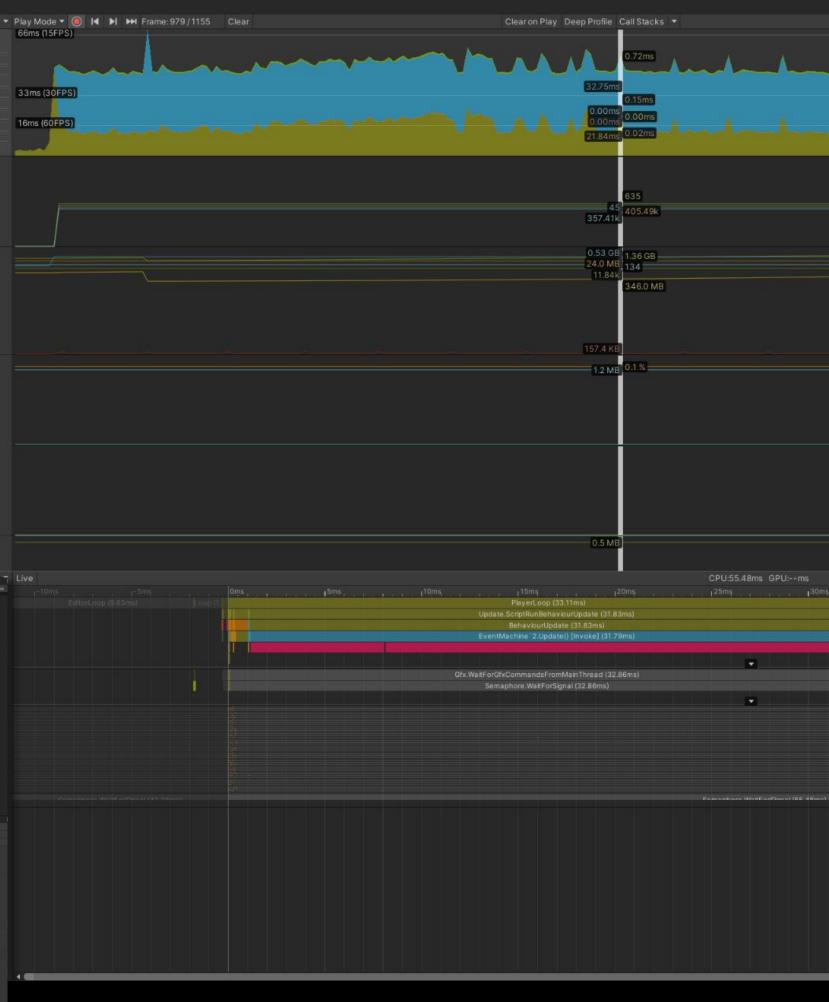
Use the **profiling tools** to keep track of poly count, draw calls, CPU time, GPU render, physics simulation, etc.

• <u>Profiler</u>

公

- Profile Analyzer
- <u>Memory Profiler</u>
- Frame Debugger
- <u>Physics Debugger</u>







Project Auditor

Project Auditor is an experimental static analysis tool that analyzes assets, settings, and scripts of the Unity project and produces a report containing:

• Code

M

- Assets
- Settings
- Last Build Report

<u>Github</u>

Package Manager \rightarrow Add Package From Git URL

 \rightarrow

https://github.com/Unity-Technologies/ProjectAuditor.git

Project Auditor	
Analyze View: Settings 🔻	
▼Filters Area: Select All Search: Show: Muted Issues	Match Case
Show . Muleu issues	
▼Actions	
Selected : Mute Unmute	
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Zoom •	Expoli
Issue	
Player: Prebake Collision Meshes	BuildSize, Lo
Player: Optimize Mesh Data	BuildSize, Lo
Physics: Layer Collision Matrix	CPU
Physics2D: Layer Collision Matrix	CPU
Time: Fixed Timestep	CPU
Quality: Async Upload Time Slice	LoadTime
Quality: Async Upload Buffer Size	LoadTime
Graphics: Forward Rendering	GPU
Player: Mipmap Stripping	BuildSize
Physics: Reuse Collision Callbacks	Memory
Player: Splash Screen	LoadTime

Note that this package is not officially supported by Unity, and it is not on Unity's roadmap at this time.

Project Auditor Analyze View: Summary 🔻

Project Auditor is an experimental static analysis tool that analyzes assets, settings, and Unity project and produces a report that contains the following:

* Code and Settings Diagnostics: a list of possible problems that might affect performa other areas.

* BuildReport: timing and size information of the last build. * Assets information

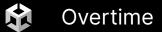
To Analyze the project, click on Analyze.

Once the project is analyzed, Project Auditor displays a summary with high-level informa possible to dive into a specific section of the report from the View menu. A view allows the user to browse through the listed items and filter by string or other searc

Project Auditor Analyze	View: Cod
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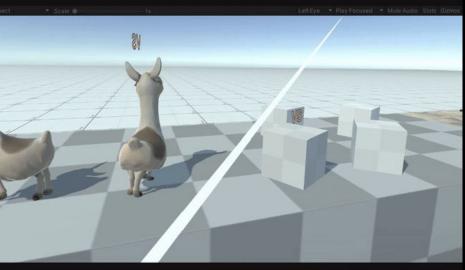
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ly-CSharp Muted Issue 👻 😧 🔻 Details Expand All Flat Viev Component.GetComponentsInChildren() allocates managed memory Recommendation Ensure you are using one of the versions of GameObject.GetComponentsInChildren() which : 🗆 × accepts a List<T> as a parameter and populates it with the components it finds. E 🖬 0 ▼ Details - 0 The current build target uses forward rendering, as set in the "Rendering Path" settings in Graphics Recommendation This rendering path is suitable for games with simple rendering and lighting requirements - for instance, 2D games, or games which mainly use baked lighting. If the project makes use of a more than a few dynamic lights, consider experimenting with changing "Rendering Path" to Deferred to see whether doing so improves GPU rendering times.



XR Interaction Toolkit Visual Scripting Extensions

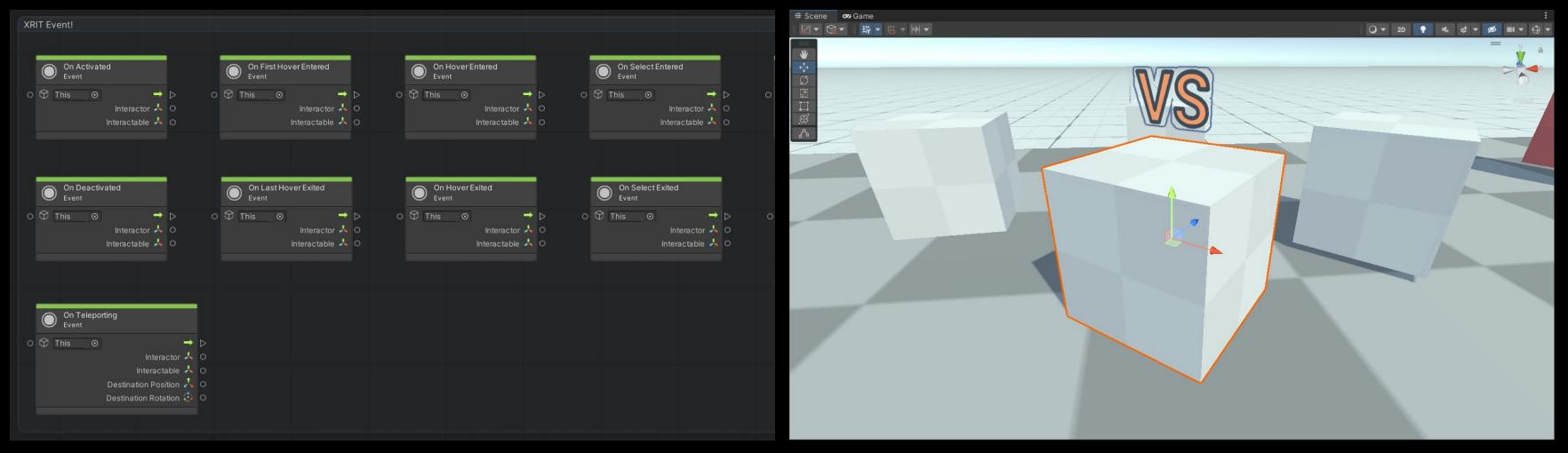




un F		On Update Unity GameObject Events Play Bubbles	
r Release		Animation Enve8hoots one particle	



Check them out on GitHub!



Visual Scripting extensions for XR Interaction Toolkit

A set of custom nodes to handle XRI events in your Visual Scripting Graphs, hand wrapped in a convenient Package!

XR Interaction Toolkit Examples

A fork of the XRI Examples using the Visual Scripting extensions to test, and re-create the custom C# behaviors.

<u>GitHub</u>

<u>GitHub</u>

