The webinar will begin shortly
Build Immersive Worlds
in Virtual Reality
The webinar will begin at 8 am PT | 11 am ET | 4 pm BST
Unity

ROAD TO THE
METAVERSE
CREATOR SERIES
Unity®
Build Immersive Worlds
in Virtual Reality
2022

Meet your **hosts**

Drew Domokos
Creator & Developer Advocate

Vanesa Mendez
Creator Advocate

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Senior Technical Specialist

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Creative Director

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Agenda

- → **Introduction** (5 minutes)
- → **Build Immersive worlds in virtual reality (VR)** (45 minutes)
  - How to Set Up a VR Project
  - Understand Locomotion Systems
  - Create Grabbable Objects
  - Using VR Sockets
- → **Q&A** + **Wrap-up** (10 minutes)
- → **Overtime!** (30 minutes)
  - Visual Scripting Extension for XR Interaction Toolkit
  - Creating a Jigsaw tool

Survey available here!

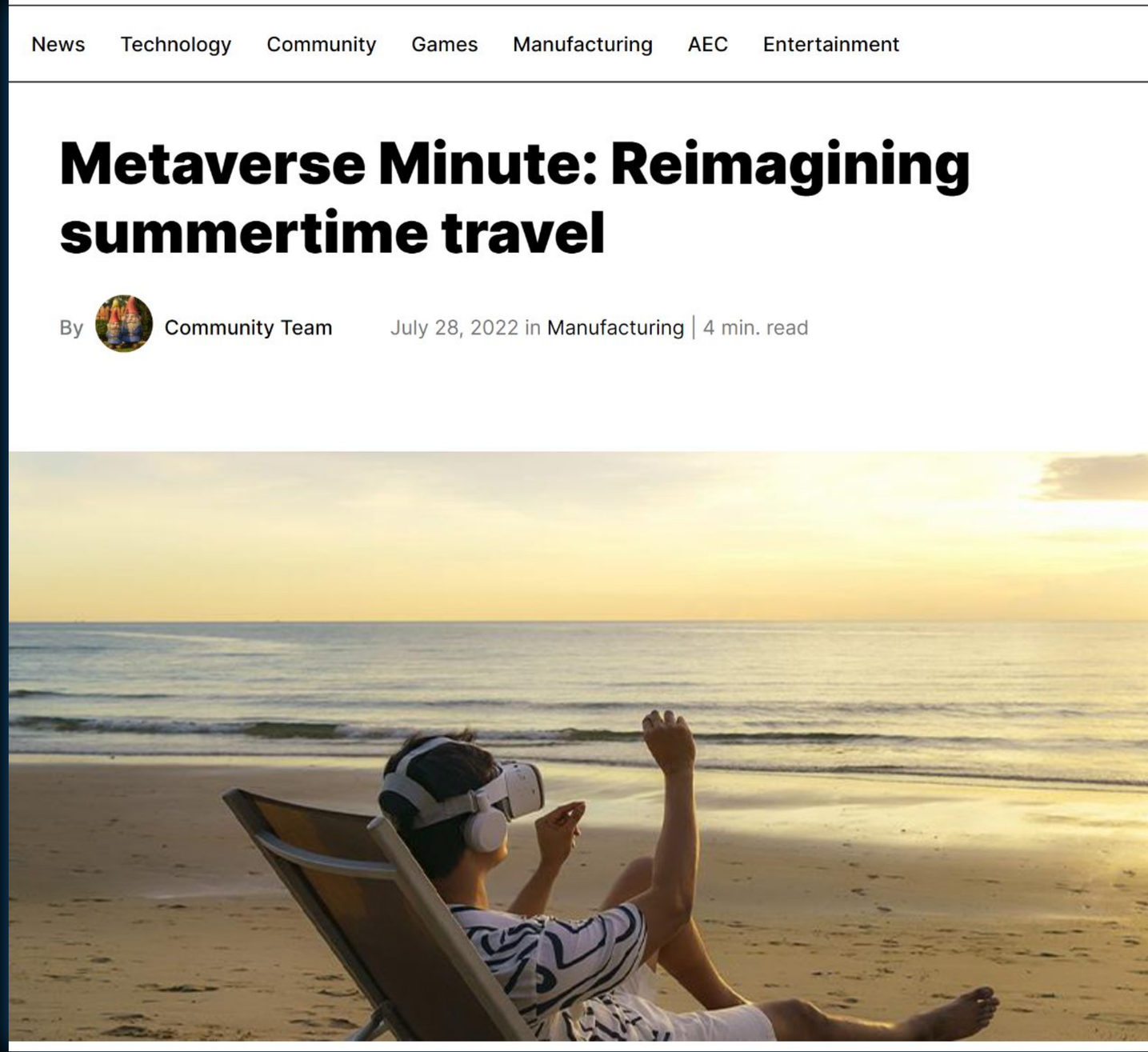
DOWNLOAD ASSETS HERE: https://bit.ly/R2MV_e07_XRI

Introduction

Tales from the Metaverse!

The Metaverse Minute

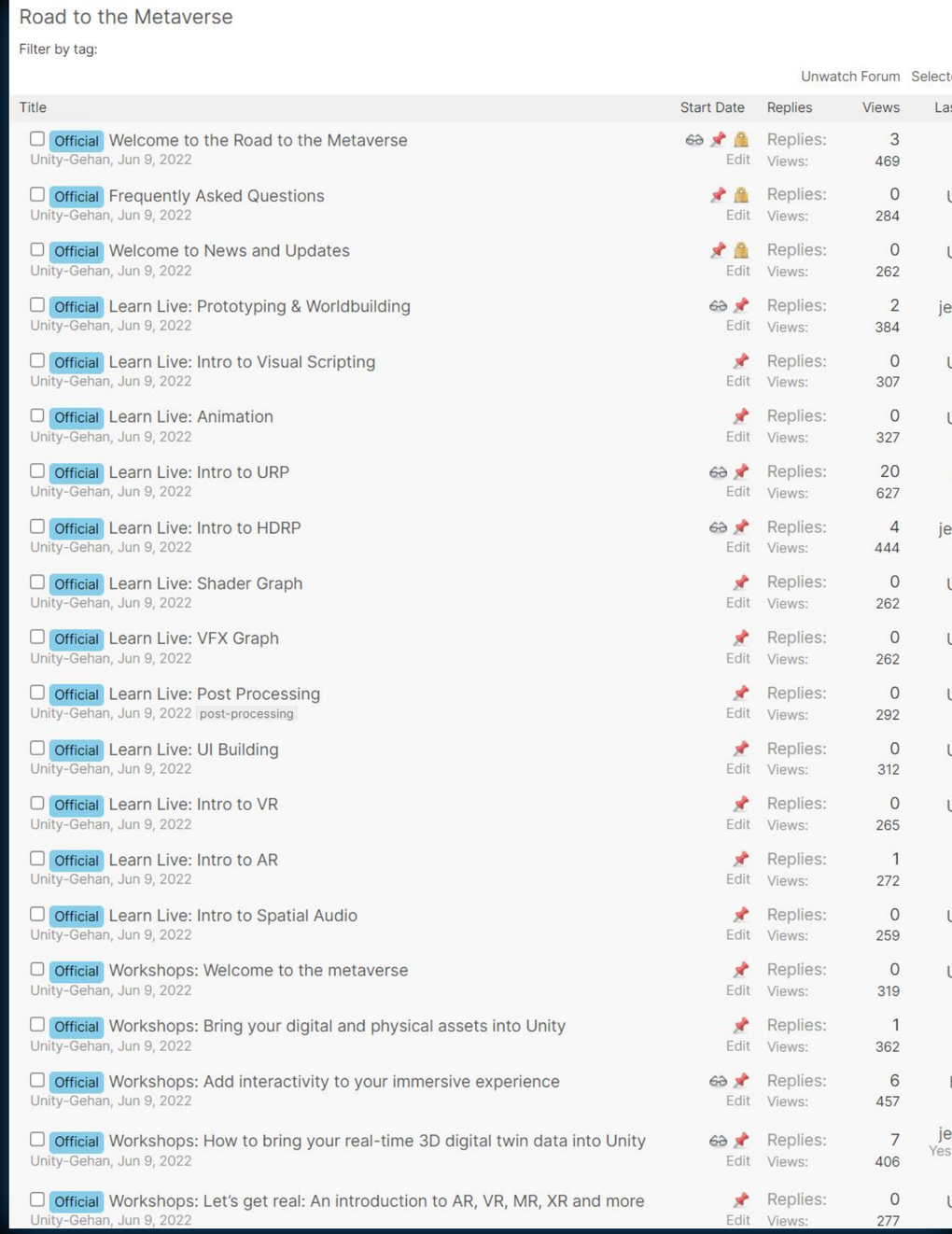
https://blog.unity.com/topic/metaverse-minute



Road to the Metaverse:

Forums!

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



Creator Day 2022

→ **Mission**

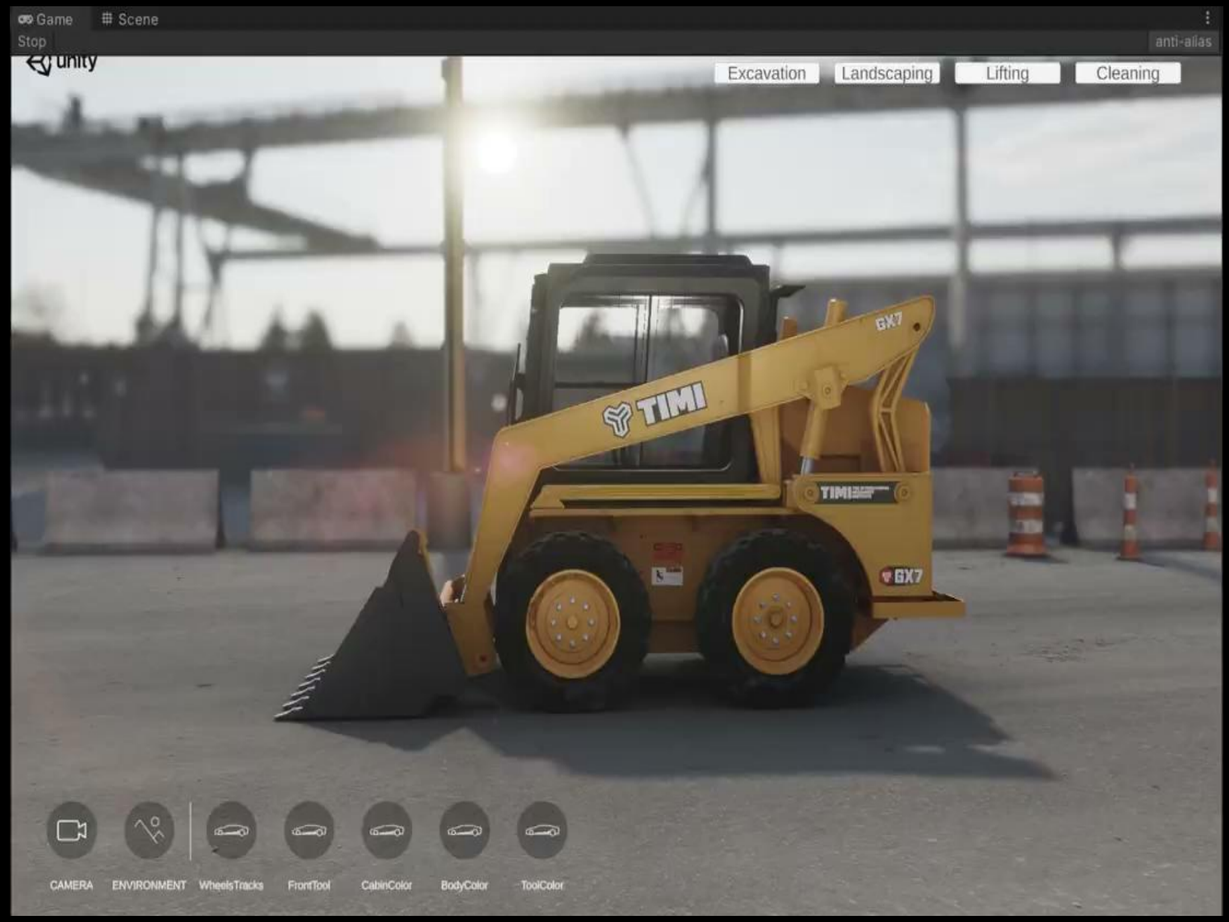
To celebrate our creator community, inspire our users, educate them and connect them to other creators in the Digital Twin and Metaverse space

→ **Theme**

A showcase of Digital Twins and Metaverse creations by Unity employees and users

→ **Structure**

Following the structure of past Digital Developer Days, Creator Day will be half-day online event featuring multiple speakers, and Q&A



ROAD TO THE
METAVERSE

CREATOR SERIES

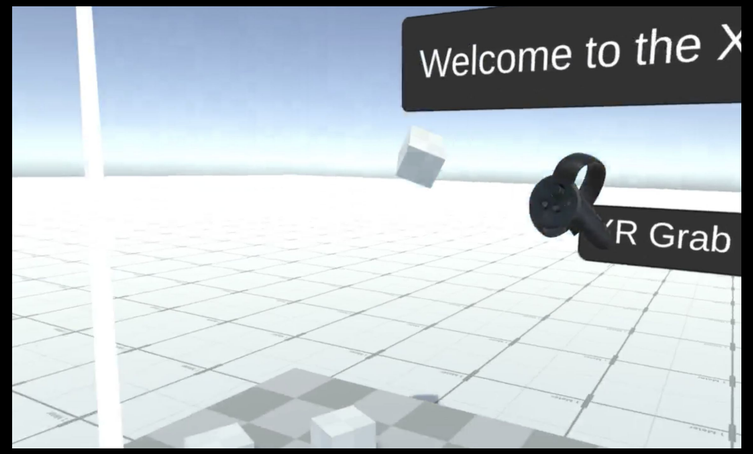
Build Immersive Worlds
in Virtual Reality

XR Interaction toolkit

Interaction toolkit for both Augmented and Virtual Reality

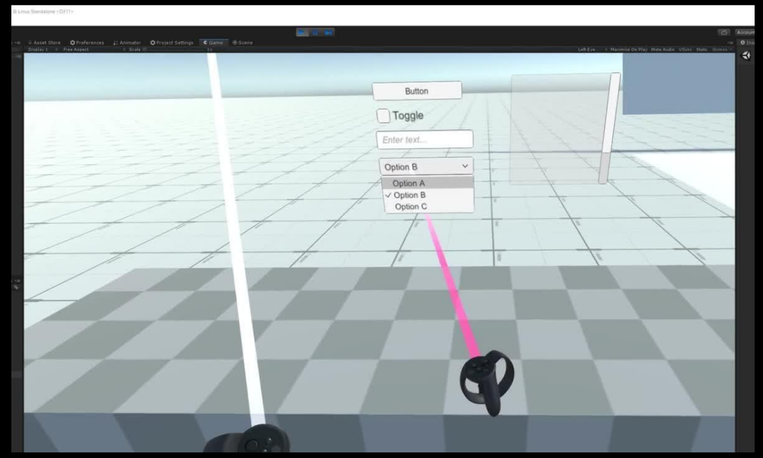
XR Interaction Toolkit features

Physics interactions



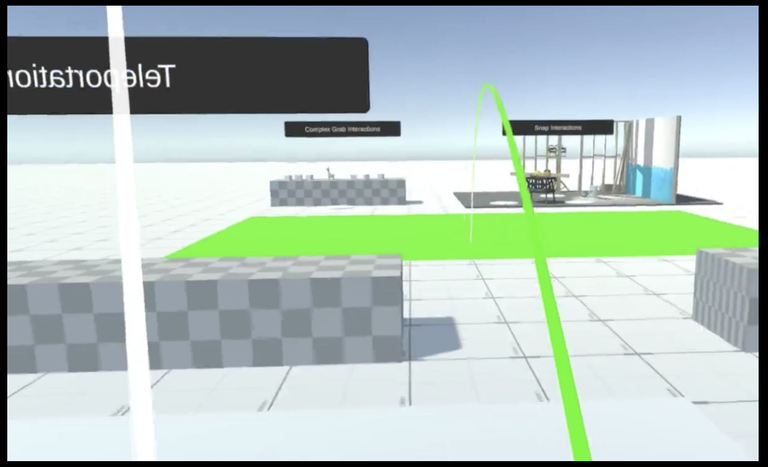
Grab and throw objects with tracked controllers in VR. There are multiple configurations for grabbing and tracking objects.

Native UI support



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

Locomotion



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

XR Interaction Toolkit Examples

Object interactions (AR & VR)

The XR Interaction Toolkit provides the means to hover over, select, grab (directly or from a distance), throw, and rotate objects within a VR scene. The same interactions are compatible with AR as well when used alongside AR Foundation. Additionally, the toolkit supports tap, drag, pinch, and zoom for interacting with AR objects in the world.

Object placement (AR)

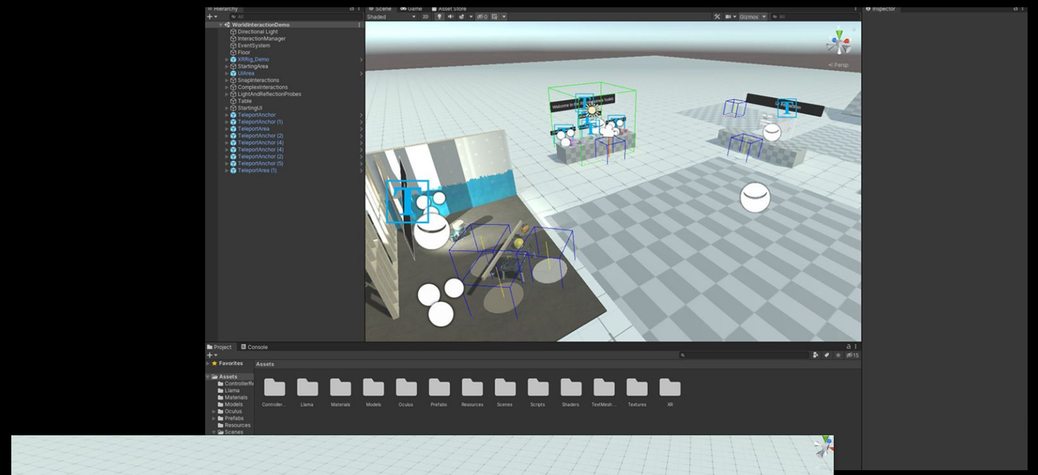
We also provide the means for automatic content creation in AR, allowing for placement and scaling of 3D objects in the world. AR annotations are also supported to display information to users about placed AR objects and possible interactions.

UI interactions (AR & VR)

With this toolkit, basic canvas UI interactions with controllers from all of our supported AR and VR platforms are enabled as well.

Locomotion (VR)

The toolkit provides the means to teleport, including the use of snap turns, within a VR scene. You can extend this locomotion system to include other methods of movement within a room-scale VR experience.



🔗Github

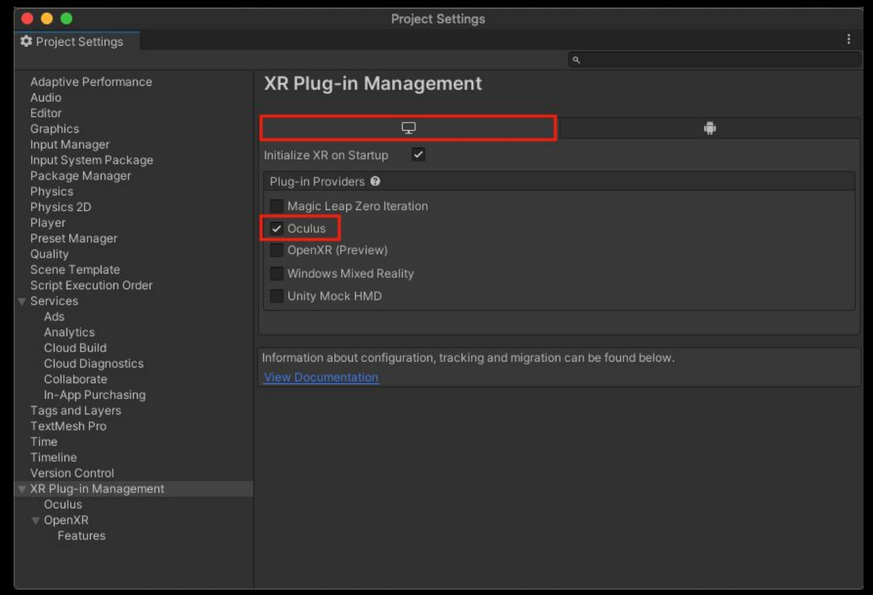
How to
Set Up a VR Project

Let’s dive in!

Setting up a VR-Enabled Project with XRI

Unity

Support for XR hardware is delivered via plug-ins. Plug-ins allow you to develop for an universal XR platform so you don't need to modify your project for different XR headsets. Supporting new XR hardware is as easy as adding the Plug-in Providers in Project Settings.

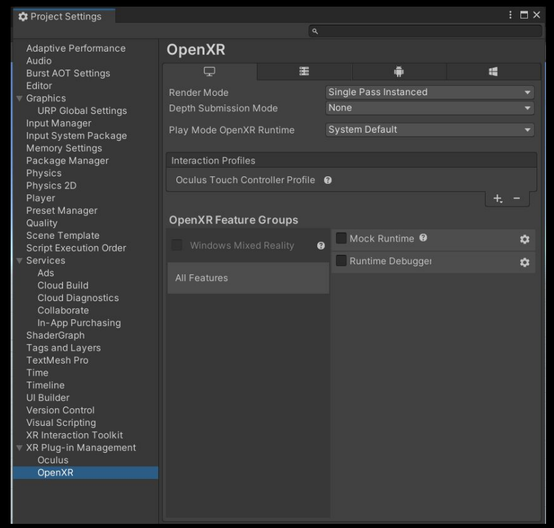


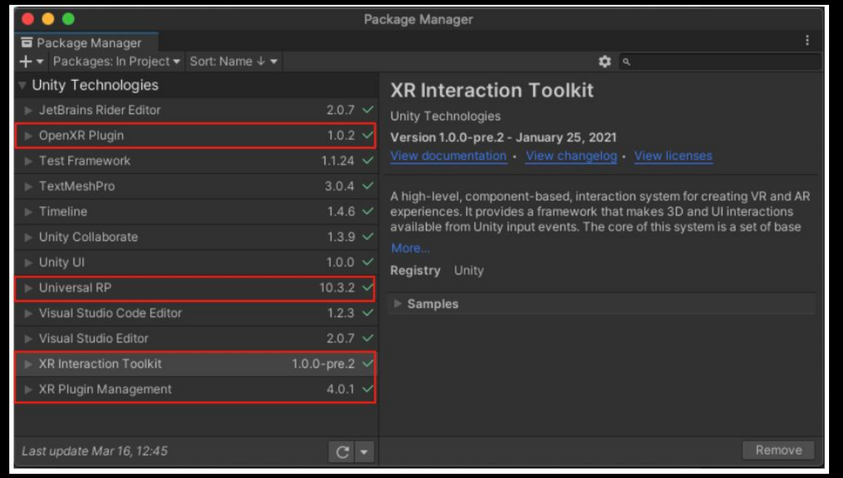
XR Packages via Package Manager:

- ➔ XR Interaction Toolkit (required)
- ➔ Oculus Integration
- ➔ OpenXR
- ➔ XR Plugin Management

XR Plugin Manager:

- ➔ XR Interaction Toolkit (required)
- ➔ Oculus Integration





Understand
Locomotion Systems

What is VR Locomotion?

VR Locomotion

By definition, locomotion is the ability to move from one place to another in physical space. It derives from the Latin origin words locō (place) and mōtiō (movement).

The virtual reality locomotion is the technology that enables movement of the avatar or user (in this case you in first person) through the entire virtual world, using only a small real-world space. Locomotion is one of the pillars of great VR experience.

Setup

- ➔ Set up XR Origin (Action-Based)
- ➔ Create Locomotion System
- ➔ Add Input Action Manager
- ➔ Add Snap turning functionality
- ➔ Create a Teleportation Area
- ➔ Create Continuous Turning
- ➔ Create Continuous Movement

DOWNLOAD ASSETS HERE:

https://bit.ly/R2MV_e07_XRI

Let’s jump in!

Create an XR Rig

Give your XR Rig locomotion capabilities

➔ In the Hierarchy, select the XR > XR Origin (Action-Based)

Give your XR Rig locomotion capabilities

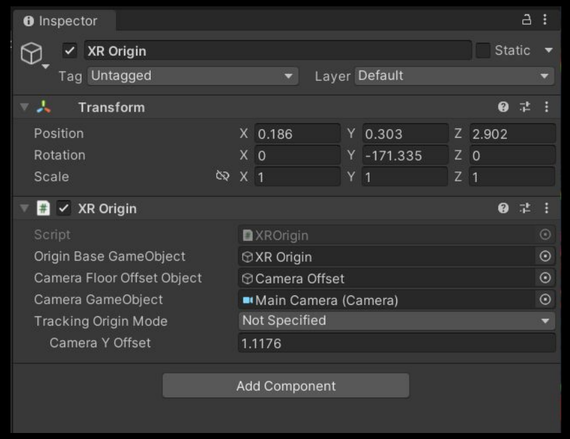
➔ In the Hierarchy, select the XR > Locomotion system (Action-Based)

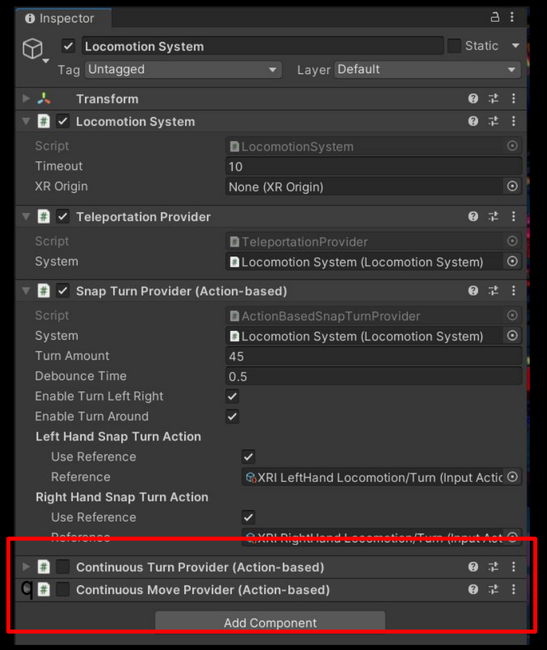
Add the Default Input Actions

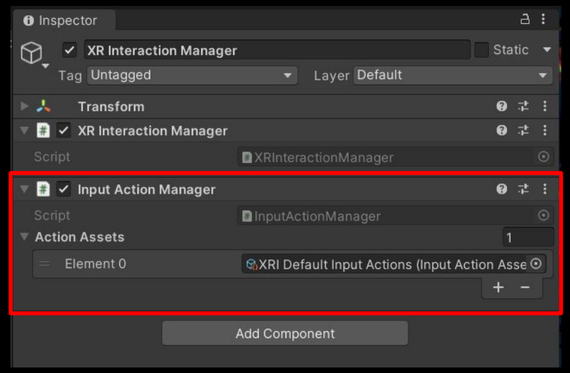
➔ In the Hierarchy, select the XR Interaction Manager
➔ Add the Input Action Manager component
➔ Click the + an dadd an Action Asset
➔ Select the XRI Default Input Actions

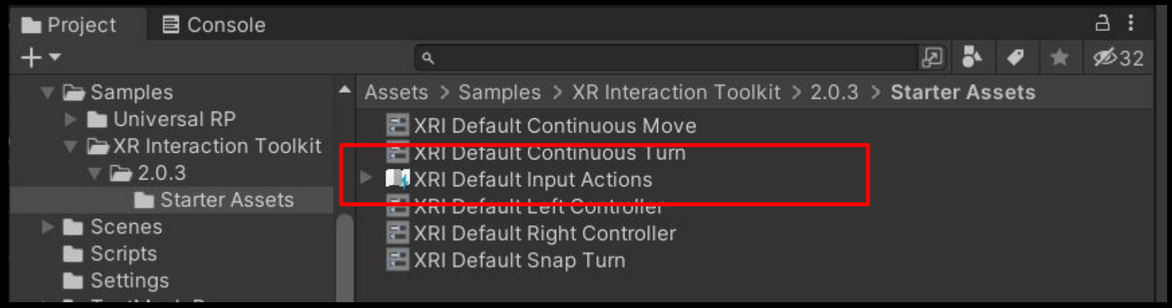
Experiment with continuous turning

➔ Disable the Snap Turn Provider component and add a Continuous Turn Provider (Action-Based) component.









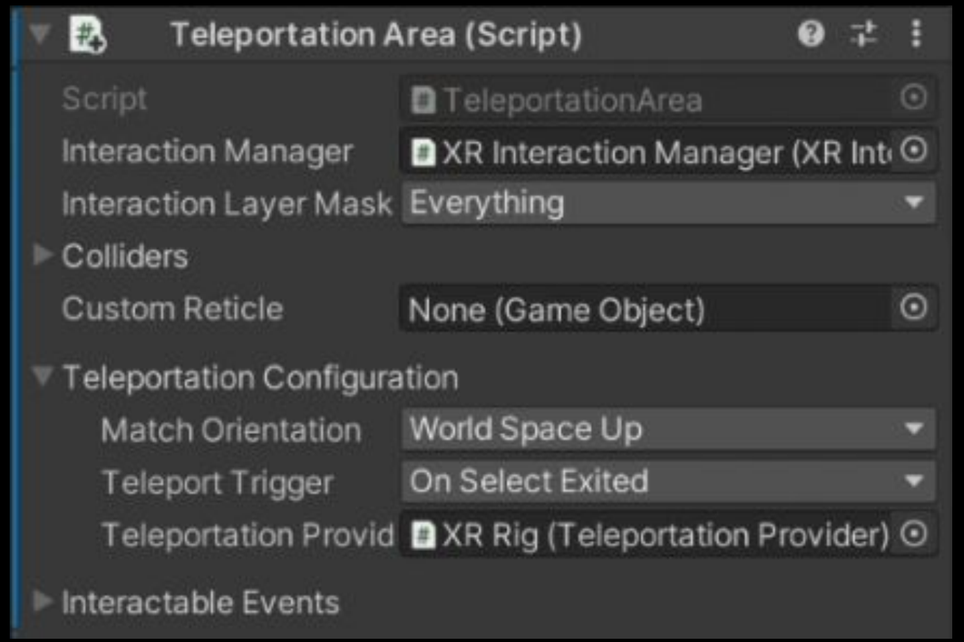
Create a Teleportation Area

Create a default Teleportation Area

➔ In the Hierarchy, select the XR > Teleportation Area

Make the ground a teleportation area

➔ Select the object and add a Teleportation Area component.
➔ At the bottom of the Teleportation Area component, for the Teleportation Provider property, drag and drop the XR Rig object from the Hierarchy to the empty slot to assign it to the property.



Create
Grabbable Objects

Grabbable Objects

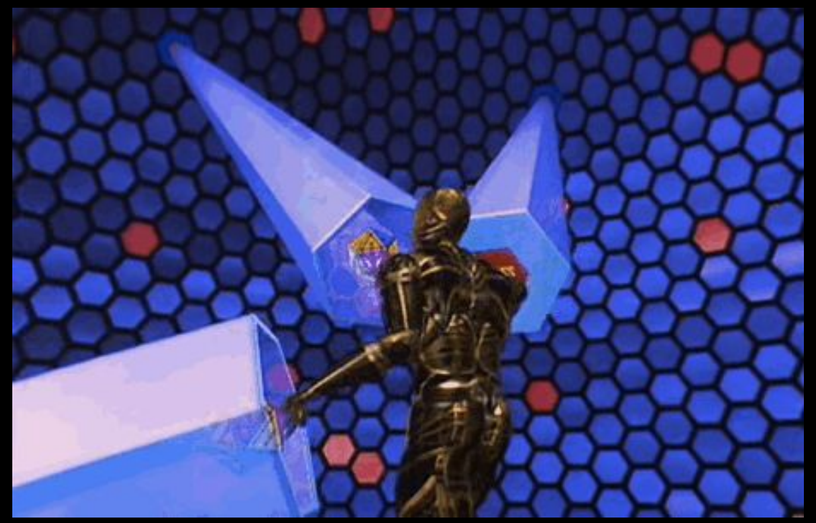
Interactors allow the user to interact with the virtual world. Interactables are GameObjects with which the user can interact.

Interactors offer the user a way to hover, select, and grab objects. They consist of the Interactor component, which works with the Interaction Manager to handle events and interactions; some way of detecting Interactables (via a Collider, or Raycaster); and some way to provide sound, visual, and/or haptic feedback about interactions.

The XR Interaction Toolkit includes the Grab Interactable, a component that allows the XR user to grab a GameObject as one would a physical object.

Grabbable Objects

- ➔ Customize Hand Models
- ➔ Create a Grabbable Object
- ➔ Hide Hands and Disable Anchor Control
- ➔ Fine Tuning Throwing
- ➔ Create Grabbable Handle

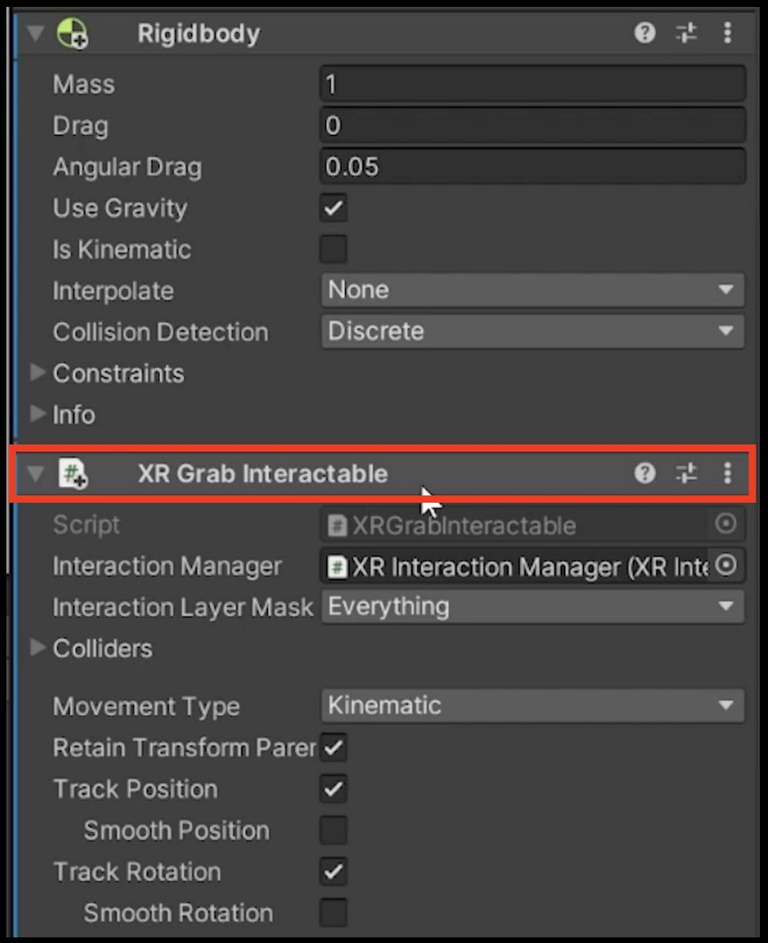


Let’s dive in!

Create a Grabbable Object

Make the Object grabbable

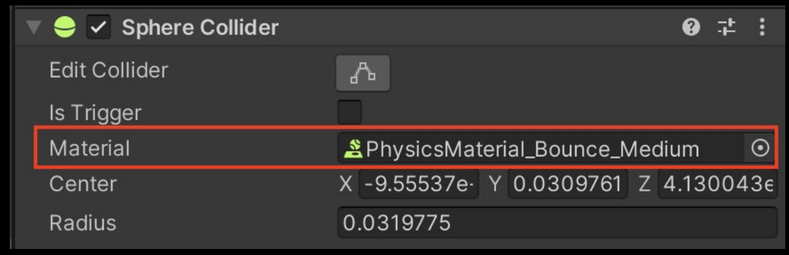
- ➔ Add an **XR Grab Interactable** component to the GameObject.
- ➔ Note: This will automatically add a Rigidbody component to the ball object as well.



Fine-tune the throwing experience

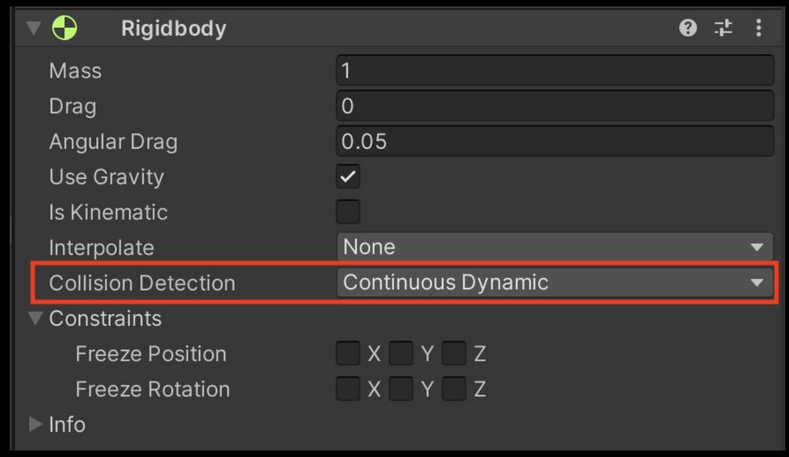
Make the object bouncy

- ➔ In the Ball object's **Sphere Collider** component, locate the **Material** property.
- ➔ Click the circular button to assign one of the provided **Physics Materials**.



Prevent a dropped object from going through the floor

- ➔ In the Ball object's **Rigidbody** component, set the **Collision Detection** setting to Continuous Dynamic.



Allow the ball's rigidbody physics to work while in your hand

- ➔ In the **XR Grab Interactable** component, ensure that the **Movement Type** is set to **Kinematic**.

Smooth the motion of the object

- ➔ In the **XR Grab Interactable** component, enable the **Smooth Position and Smooth Rotation** properties.

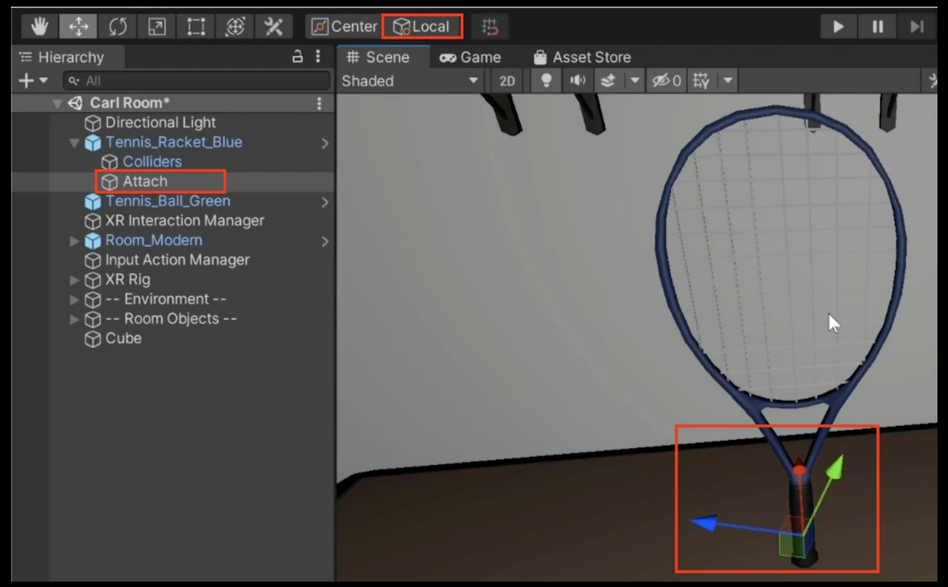
Create a Grabbable Handle

Make the new object grabbable

- Select the new object and add an **XR Grab Interactable** component.
- In the **XR Grabbable** component, enable both the Smooth Position setting and the Smooth Rotation properties to decrease jitter.
- In the **Rigidbody component** (which was added automatically), for the Collision Detection option, select **Continuous Dynamic** to prevent it from going through the floor.

Create a specific attach point for the object

- In the Hierarchy, right-click the object and create an Empty child object.
- Rename this empty object “Attach”.
- Reposition and rotate the Attach object so that it matches the position and orientation your hand model should be when you grab the new object.



Assign the attach point to your implement

- In the Hierarchy, re-select the parent sports object.
- In the **XR Grab Interactable** component, locate the Attach Transform property.
- Drag and drop your new Attach object to assign it to the Attach Transform property.

Customize Hand Models

Browse options for hand models

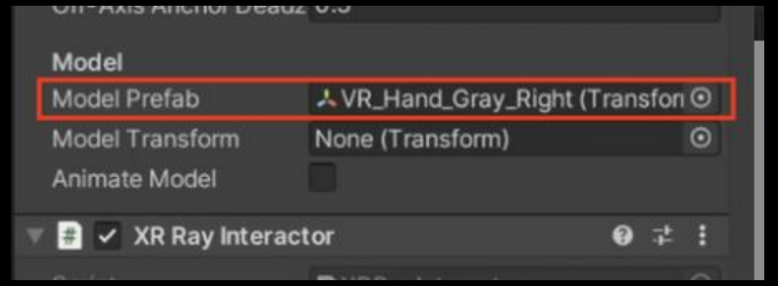
➔ In the Project window, open Prefabs > VR > Hands, then determine which **VR_Hand** option you prefer.

Assign a model to your left hand

➔ In the Hierarchy, select **XR Rig > Camera Offset > LeftHand** Controller.
➔ In the XR Controller Component, for the Model **Prefab** property, drag and drop your hand prefab of choice to assign it.

Assign a model to your right hand

➔ In the Hierarchy, select **XR Rig > Camera Offset > RightHand** Controller
➔ Repeat the same step as above to assign a **prefab** for your right hand.



Hide Hands and Disable Anchor Control Hand Models

Stop the user from moving the object with the left joystick

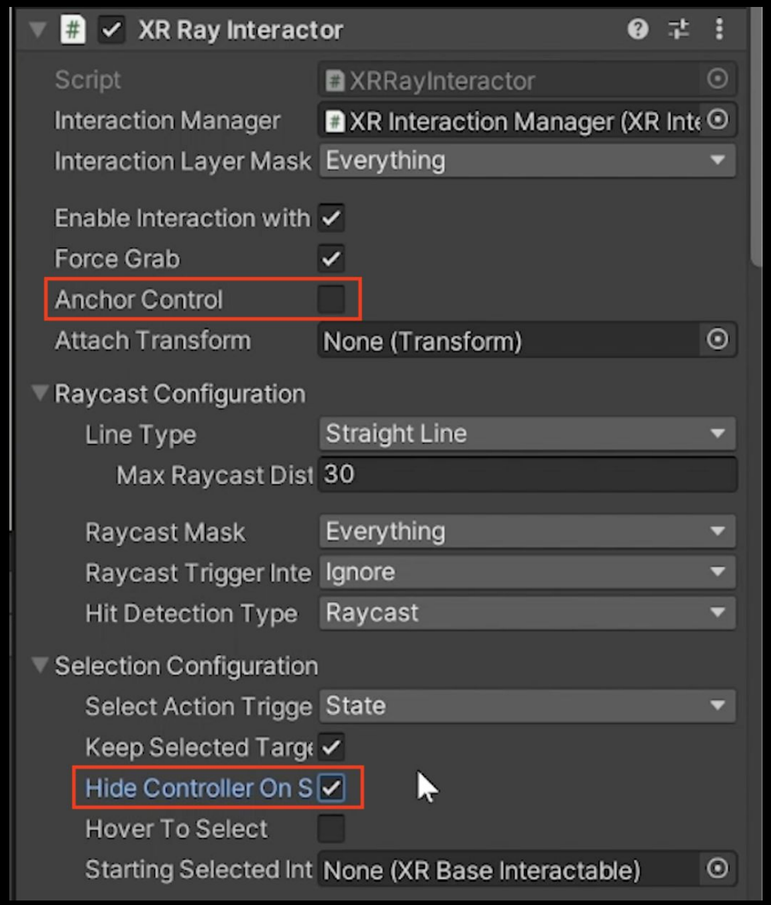
➔ In the Hierarchy, select **XR Rig > Camera Offset > LeftHand** Controller object.
➔ In the **XR Ray Interactor** component, disable the Anchor Control setting.

Make your hand model disappear when you grab an object

➔ In the **XR Ray Interactor** component, enable the Hide Controller on Select setting.

Apply these changes to your right controller

➔ Repeat the steps above on the RightHand Controller object.



Overview of Sockets

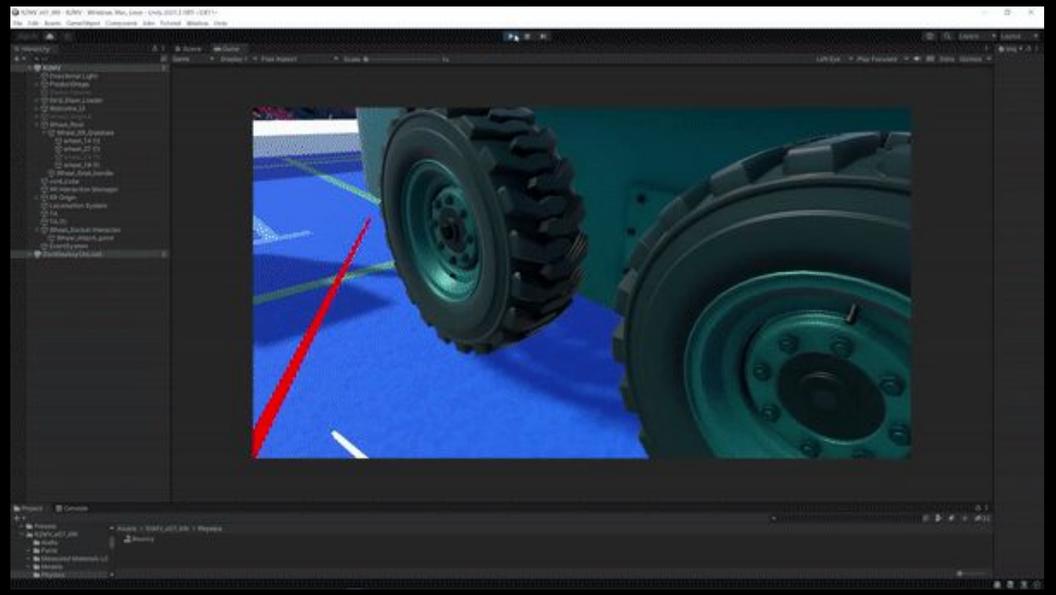
Sockets

The Socket Interactor holds an Interactable in place and fires an event when the Interactable is snapped into (OnSelectEnter) or removed from (OnSelectExit) the Socket.

This is great for traps (e.g., triggering a boulder that chases the player when the idol is removed from the Socket) or puzzles (e.g., unlocking a door when the proper key is inserted).

Setup

➔ Create Sockets



Let’s dive in!

Create a Socket

Position the socket correctly

- ➔ In the Hierarchy, right-click the object and create an Empty child object.
- ➔ Rename the child object “Socket 1”.
- ➔ Reposition the Socket 1 object to the tip of the object, where the hat will rest.

Define the trigger detection area for the socket

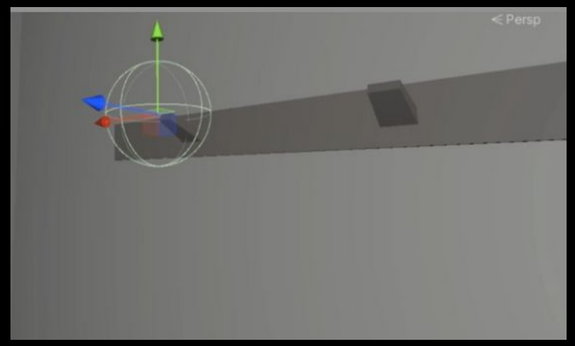
- ➔ Add a Sphere Collider component to the Socket object.
- ➔ Click the Edit Collider button and reduce the Radius to 0.1.
- ➔ Select the Is Trigger check box to prevent it from colliding with the object.

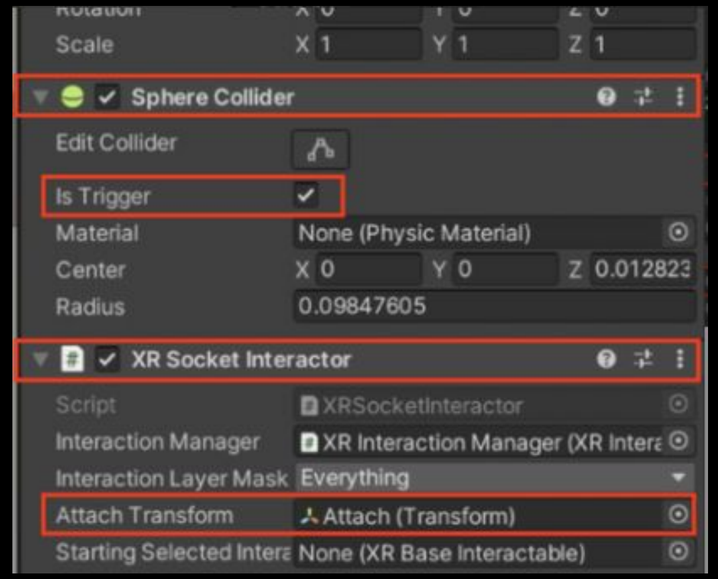
Make the Socket 1 object behave like a socket

- ➔ Add an XR Socket Interactor component to the object.

Make the OBJECT downwards when attached to the socket

- ➔ Create an empty child object of Socket 1 and rename this child object “Attach”.
- ➔ Rotate the Attach object to face downward.
- ➔ Assign the Attach object to the Attach Transform property of the Socket Interactor component.
- ➔ Note: The local Z axis of the attach point should align with the desired forward direction of the hat and the local Y axis should align with its desired upward direction.





Let’s Explore!

Overview of
Audio and Haptics

Add haptic feedback

1 - Edit both controller objects at the same time:

➔ In the Hierarchy, expand XR Rig > Camera Offset.
➔ Ctrl/Cmd+select both the **RightHand Controller** and **LeftHand Controller** so they are both selected.

2 - Locate the haptic events:

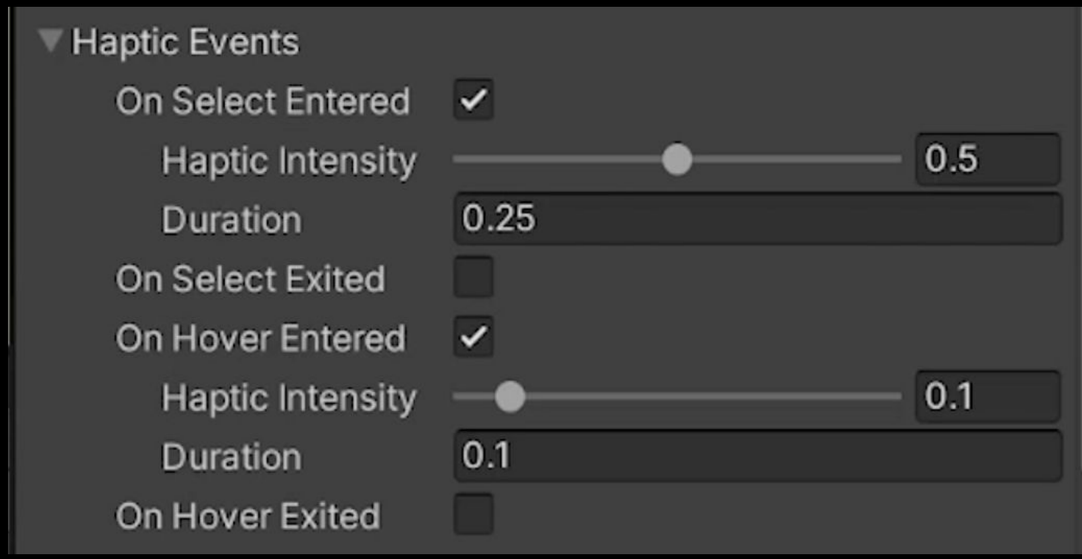
➔ At the bottom of the Controller objects' XR Ray Interactor components, expand the Haptic Events fold-out.

3 -Create subtle haptic feedback when the user hovers over an object:

➔ Click the On Hover Entered check box to enable it.
➔ Set the Intensity to a low value (e.g. 0.1-0.5).
➔ Set the Duration to a very low value (e.g. 0.1 seconds).

4 - Create more noticeable feedback when the user grabs an object:

➔ Select the On Select Entered check box.
➔ Set the Intensity and Duration values to slightly higher values (e.g. 0.25 seconds)



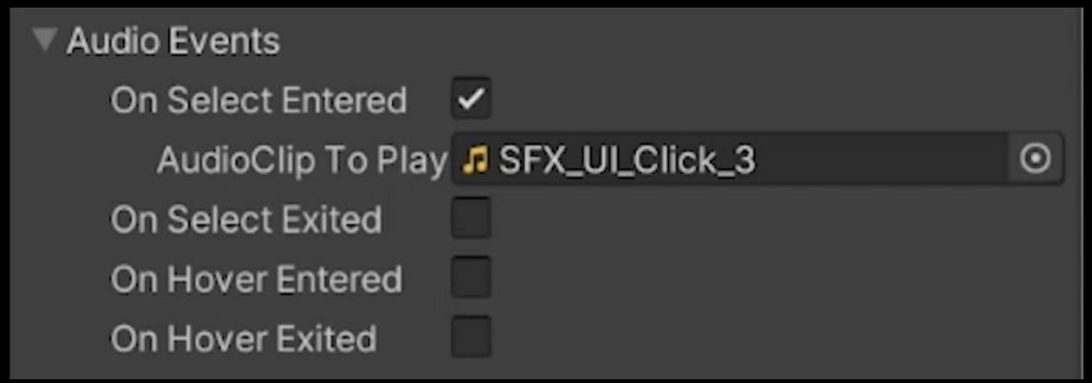
Add audio feedback

Select the sound you want to use:

- From the Project Window, determine which subtle UI sound effect you want for the hover or select event.
- To preview the sound, you may need to drag up the Preview panel from the bottom of the Inspector window.

Apply this sound effect to both controllers:

- From the Hierarchy, select both the RightHand Controller and LeftHand Controller objects.
- In the XR Ray Interactor component, expand the Audio Events fold-out.
- Click to enable either the On Select Entered or the On Hover Entered setting.
- and then assign your chosen sound effect.



Add 3D audio Source

Give and object a sound effect:

➔ Add an Audio Source component to the particle object.
➔ For the AudioClip property, assign the sound effect from the Project Window

Make the sound play automatically and loop:

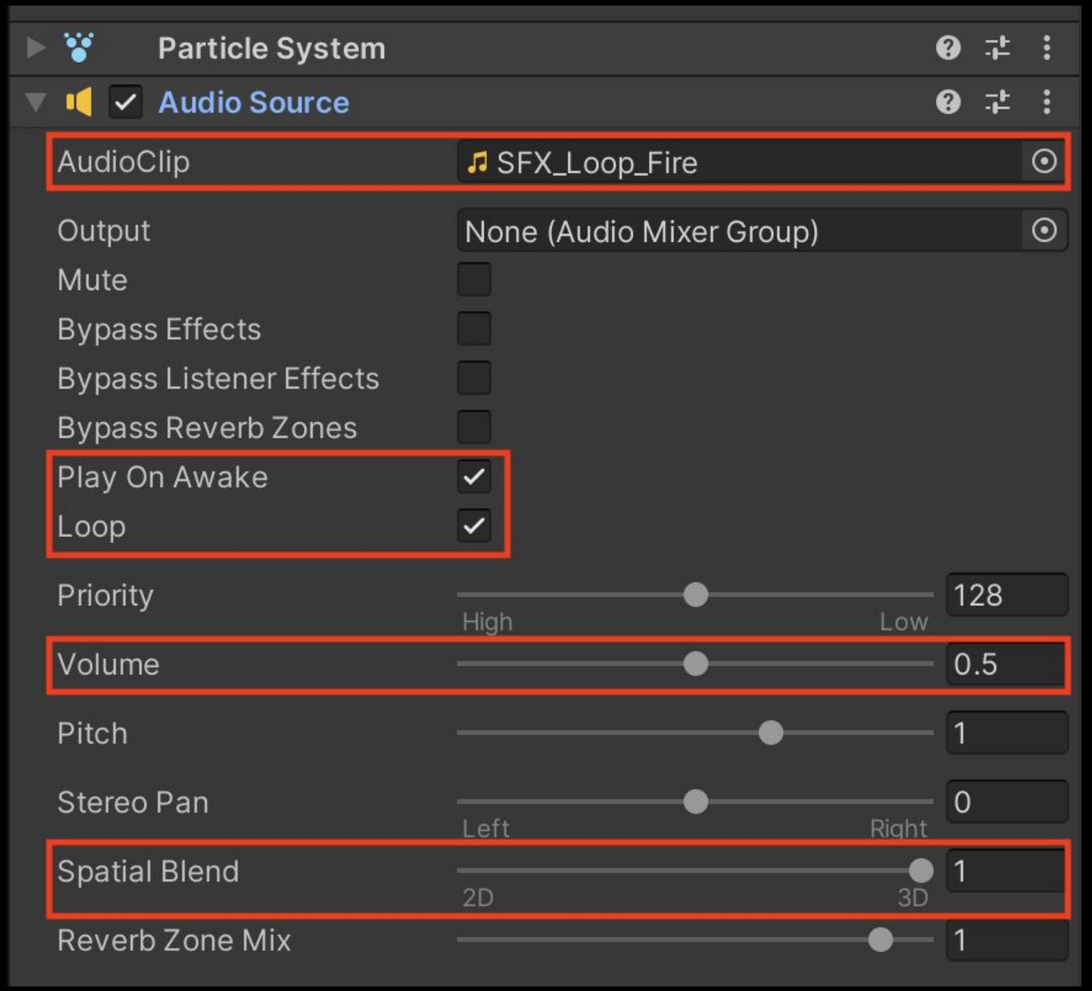
➔ In the Audio Source component, make sure both the Play on Awake and Loop settings are enabled.

Configure this component as a 3D sound:

➔ Adjust the Spatial Blend property by dragging the slider all the way to the right 3D setting (or by setting the slider to 1).

Edit the overall volume and volume roll-off of the fireplace:

➔ Edit the Volume property.
➔ Expand the 3D Sound Settings fold-out, then adjust the Min Distance and Max Distance values.



Add a Reverb Zone

Add a new Audio Reverb Zone as a child of the object:

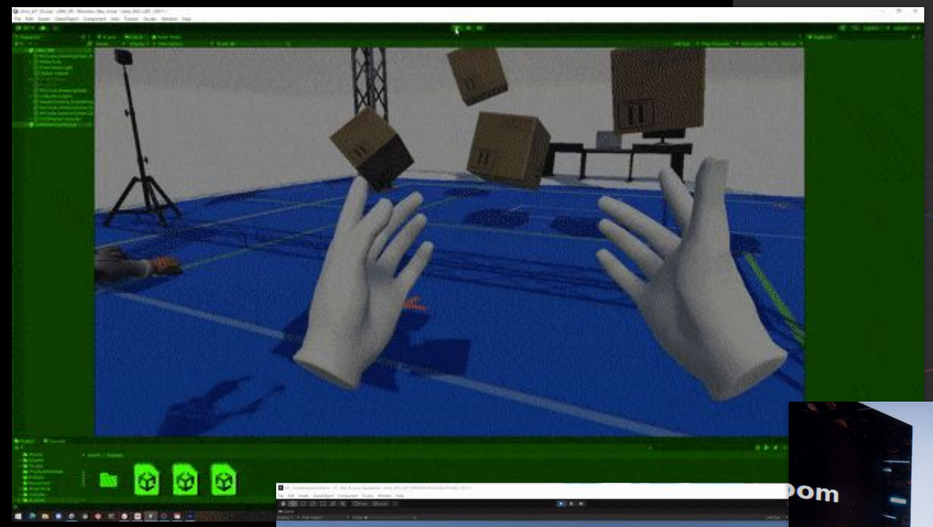
- ➔ In the Hierarchy, right-click the object.
- ➔ Click Audio > Audio Reverb Zone.

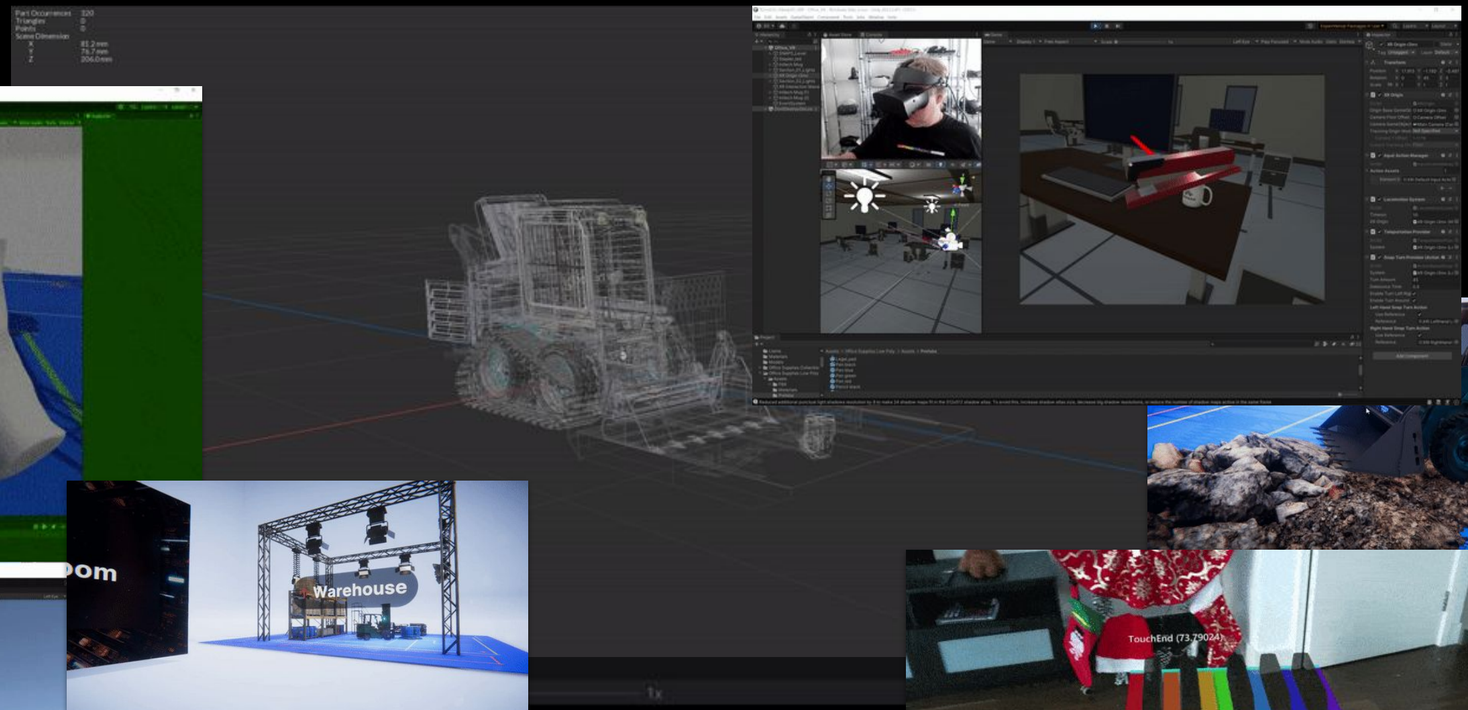
Make sure the reverb zone encompasses your whole environment:

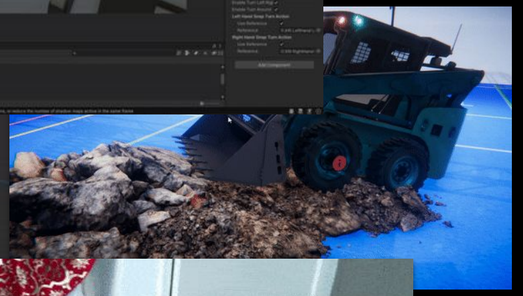
- ➔ In the Audio Reverb Zone component, make sure the Min Distance property is set to at least the width of your room (10).

Make your reverb zone match your enviornment:

- ➔ Use the Reverb Presets drop-down to experiment with different styles of reverb.
- ➔ Select a setting that matches your room (Room or Living Room).

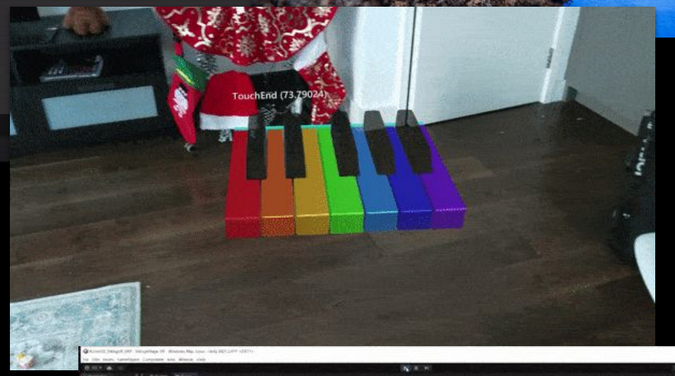






Warehouse

Complex Grab Interactions
Snap Interactions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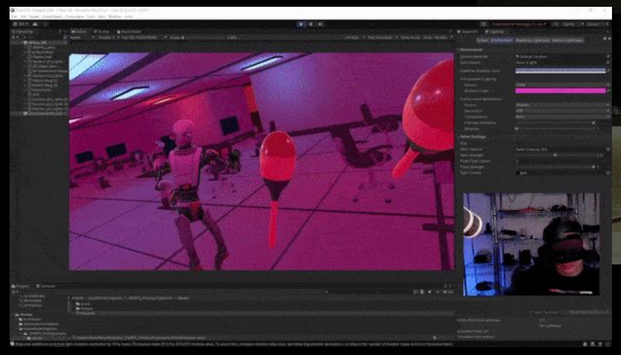

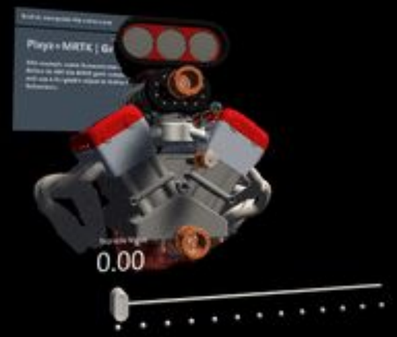
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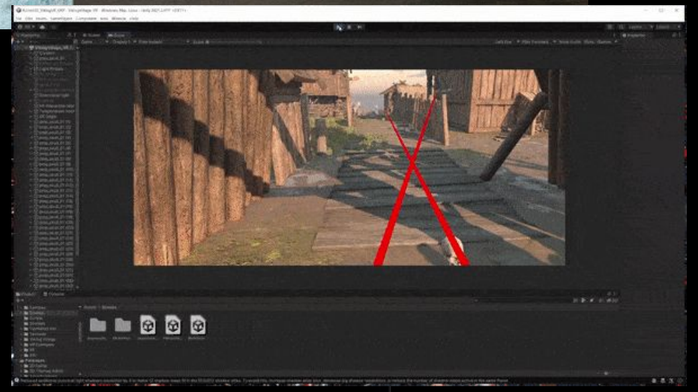

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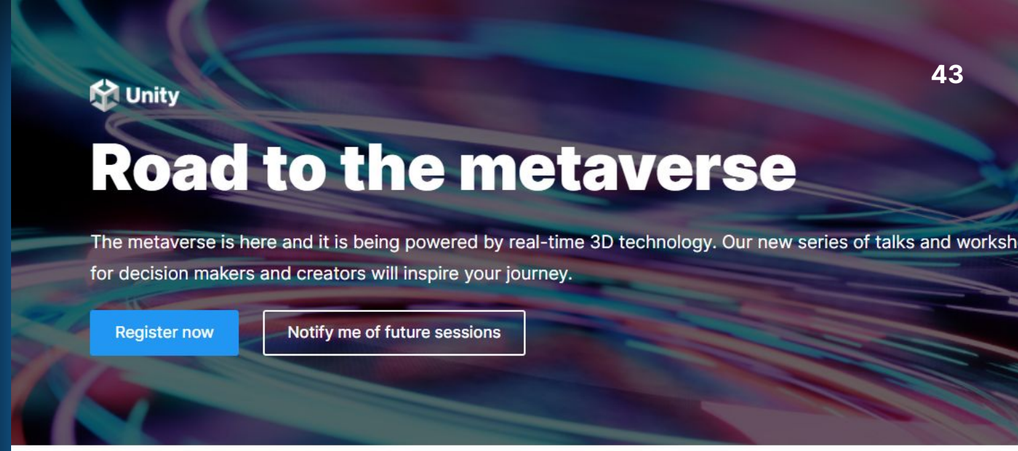
Workshops

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 IoT data** into your XR experience
February	Masterclass: Build a **collaborative multi user** experience
March	Build **geolocated** and **social** experiences in **AR**



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

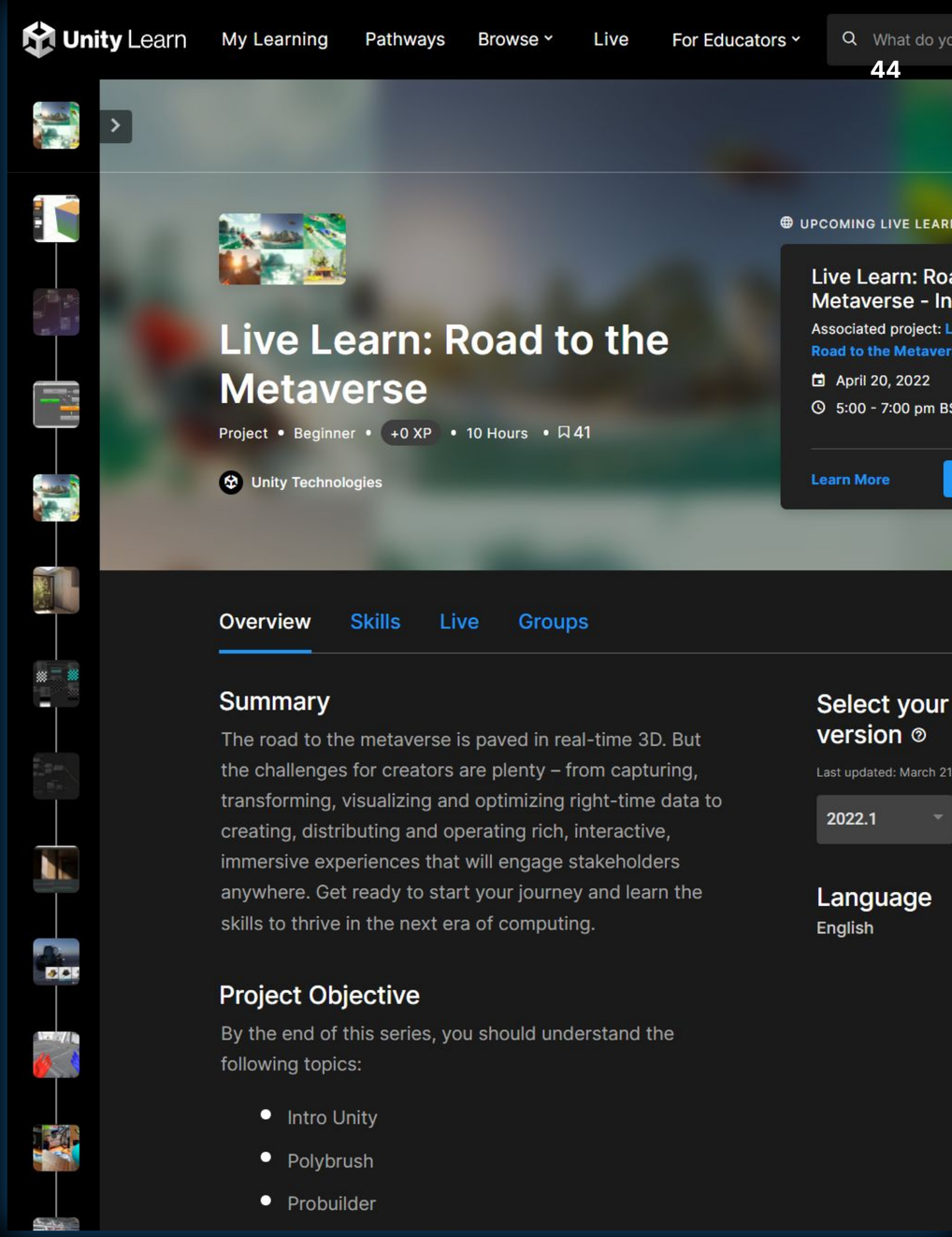
Journey with Ryan Peterson, Unity's VP of professional services, as he and special guests tackle the why and ho
behind this new era of consumer and social experience. These intimate chats are designed to spark your imagination, and will end with a live Q&A.

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**



Ryan Peterson
VP, Accelerate Solutions, Unity

Executive series

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

EP 4

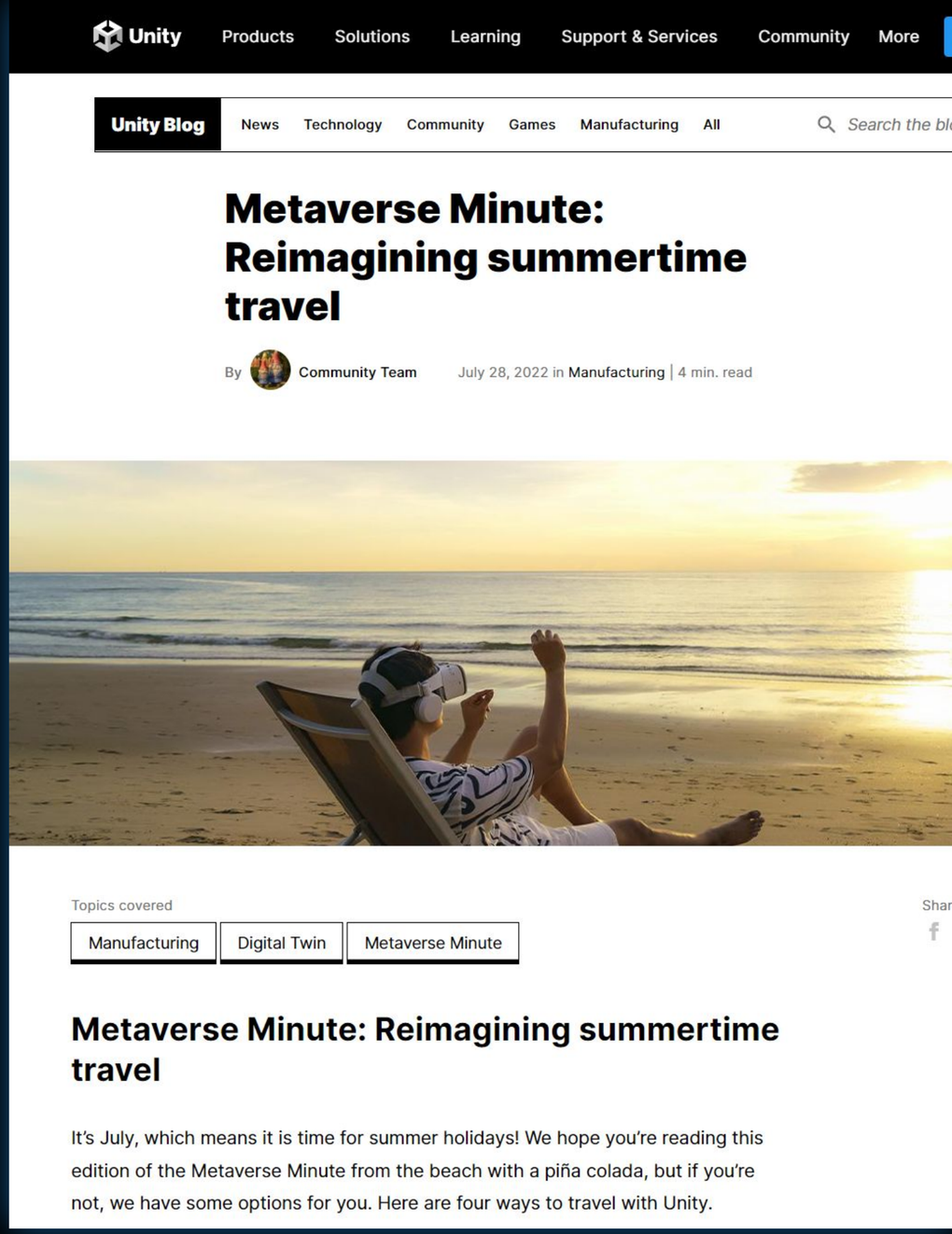
Metaverse avatars and the importance of an interoperable identity

October 27, 2022
9 am PT / 12 pm ET / 5 pm BST
Duration: 60 minutes

One of the defining factors of the metaverse will be its ability to unify avatars, technology, and economies. In this next episode, Unity's Ryan Peterson will be joined by Ready Player Me's CEO, Timmu Tõke, as they have a fireside chat about the importance of building an interoperable identity in an open metaverse, how this will affect monetization, and much more.

The Metaverse Minute

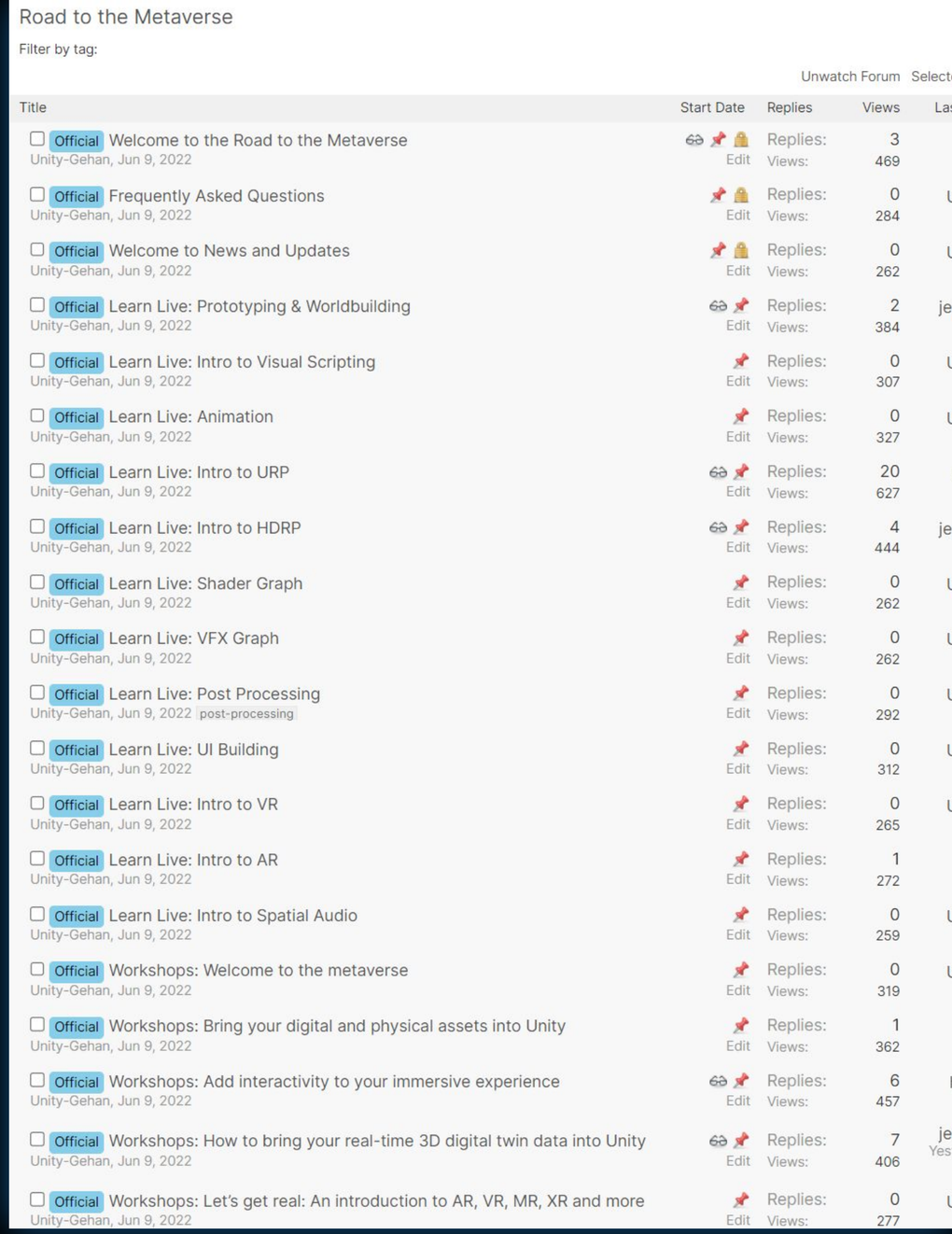
https://blog.unity.com/topic/metaverse-minute



Road to the Metaverse:

Forums!

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



Creator Day 2022

→ **Mission**

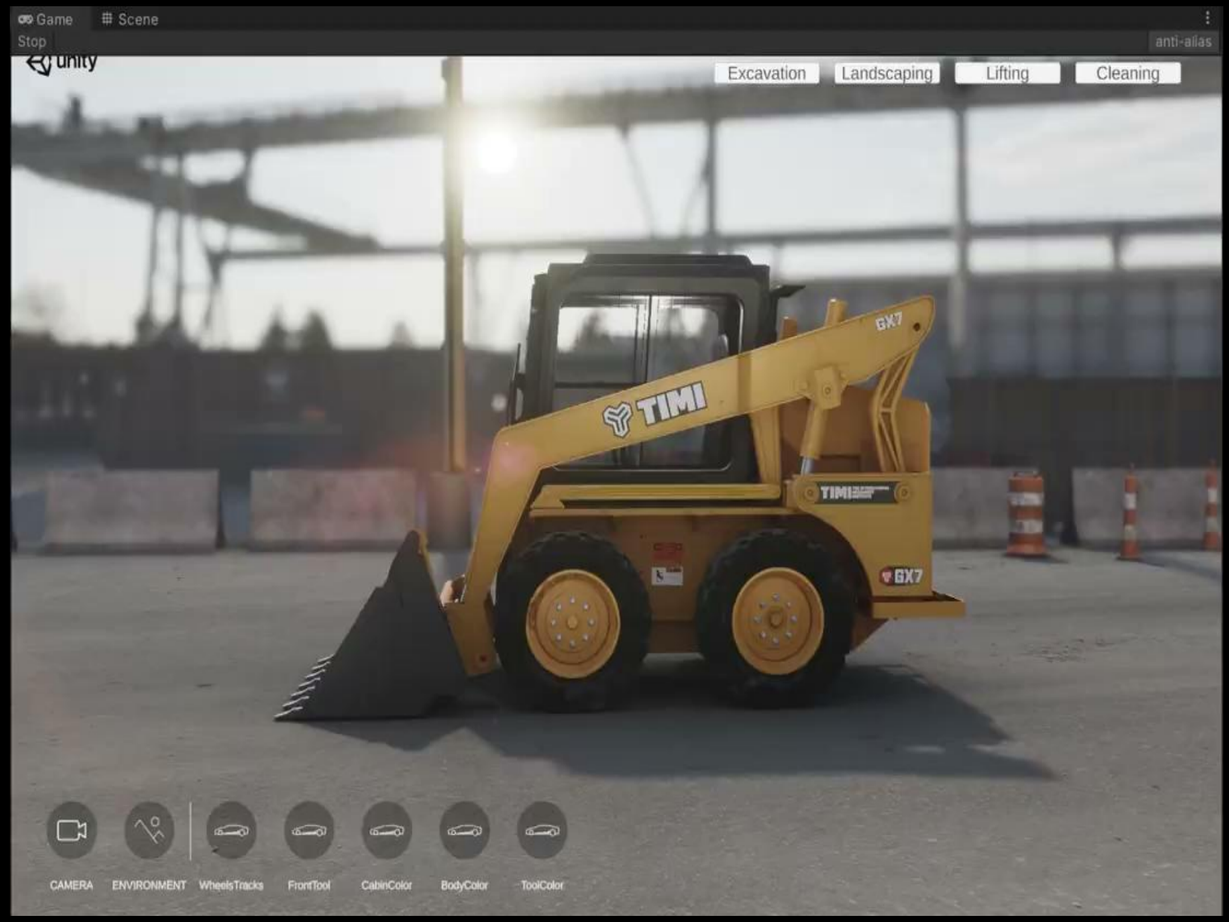
To celebrate our creator community, inspire our users, educate them and connect them to other creators in the Digital Twin and Metaverse space

→ **Theme**

A showcase of Digital Twins and Metaverse creations by Unity employees and users

→ **Structure**

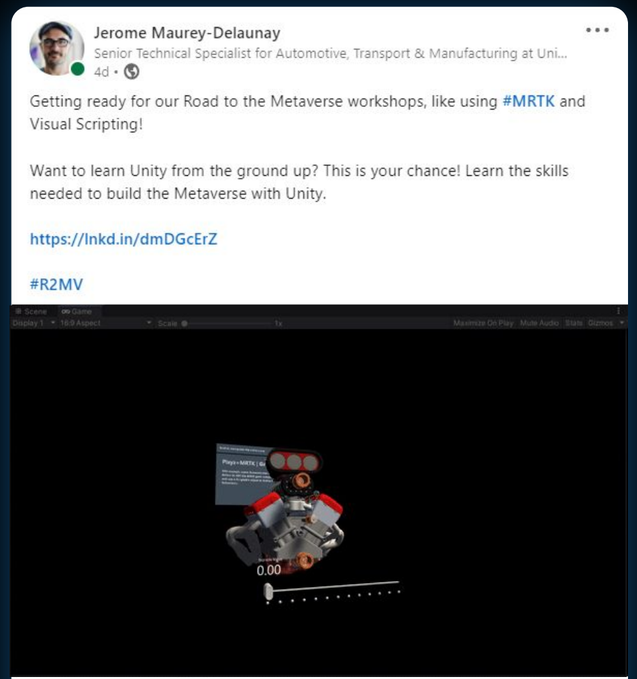
Following the structure of past Digital Developer Days, Creator Day will be half-day online event featuring multiple speakers, and Q&A



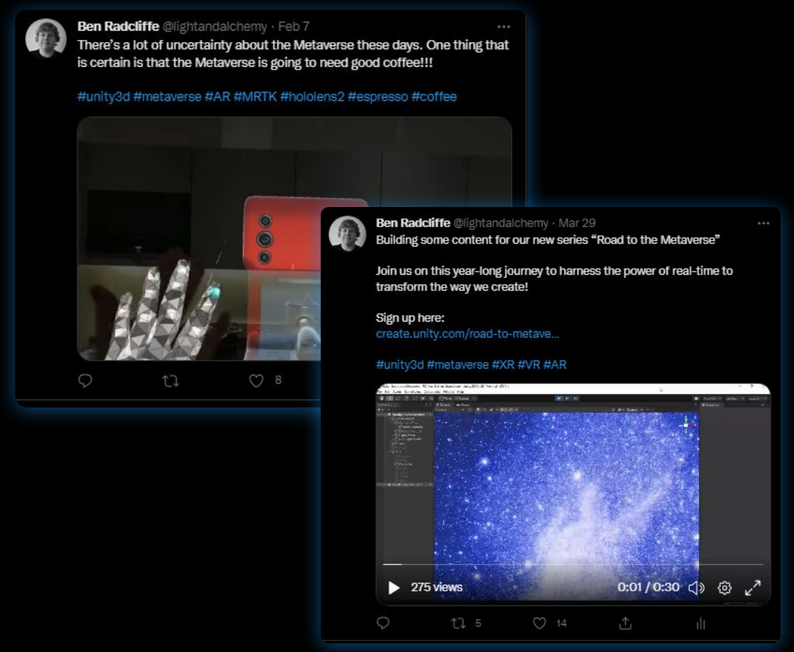
Social

→ Please use **#R2MV**

Jerome Maurey-Delaunay
@jeromemaurey



Ben Radcliffe
@lightandalchemy



Q&A

Any questions?

Unity®

Thank You

2022

Survey available here!

Overtime

Visual Scripting Extensions

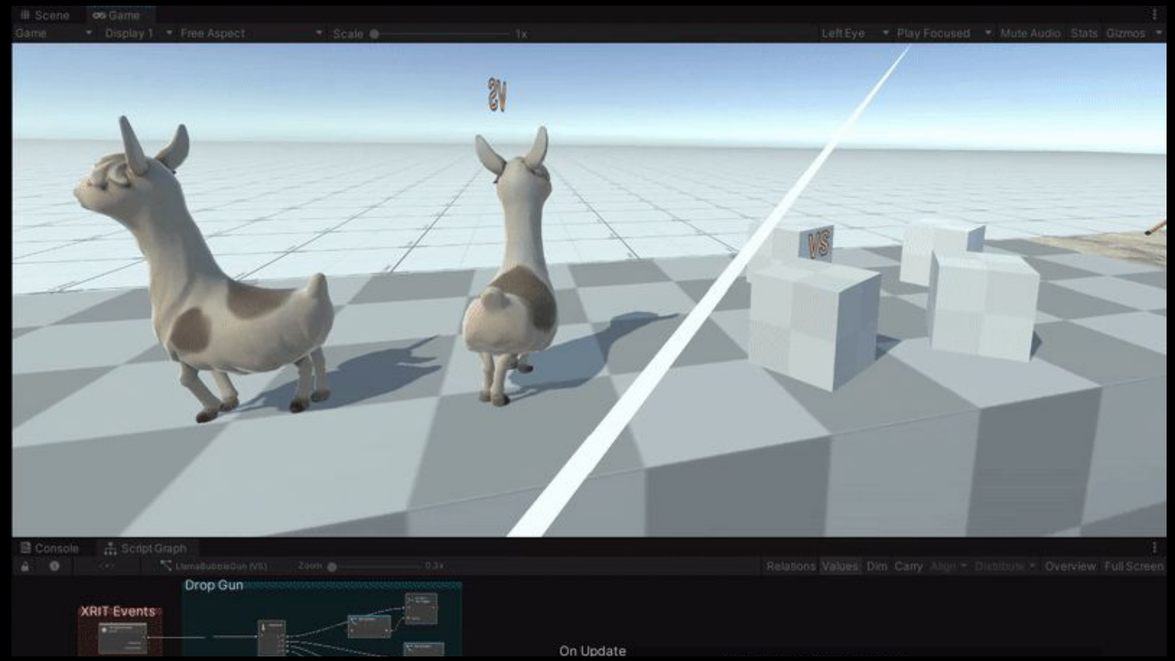
for XR Interaction Toolkit

VS + XRIT = ❤

Visual Scripting extensions for XR Interaction Toolkit

Experimental package is developed by me, to provide main XRIT events handling in graphs.

Github



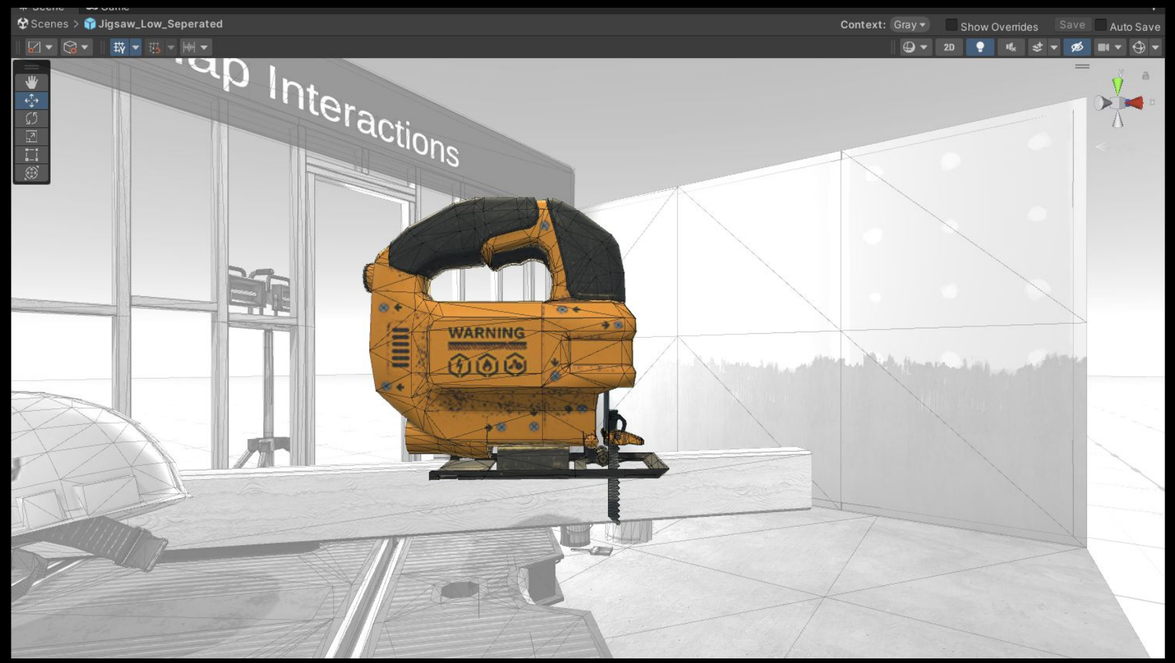
XR Interaction Toolkit Examples

Fork of the XR Interaction Toolkit (XRIT) Examples using the Visual Scripting Extensions to recreate C# scripts!
Github

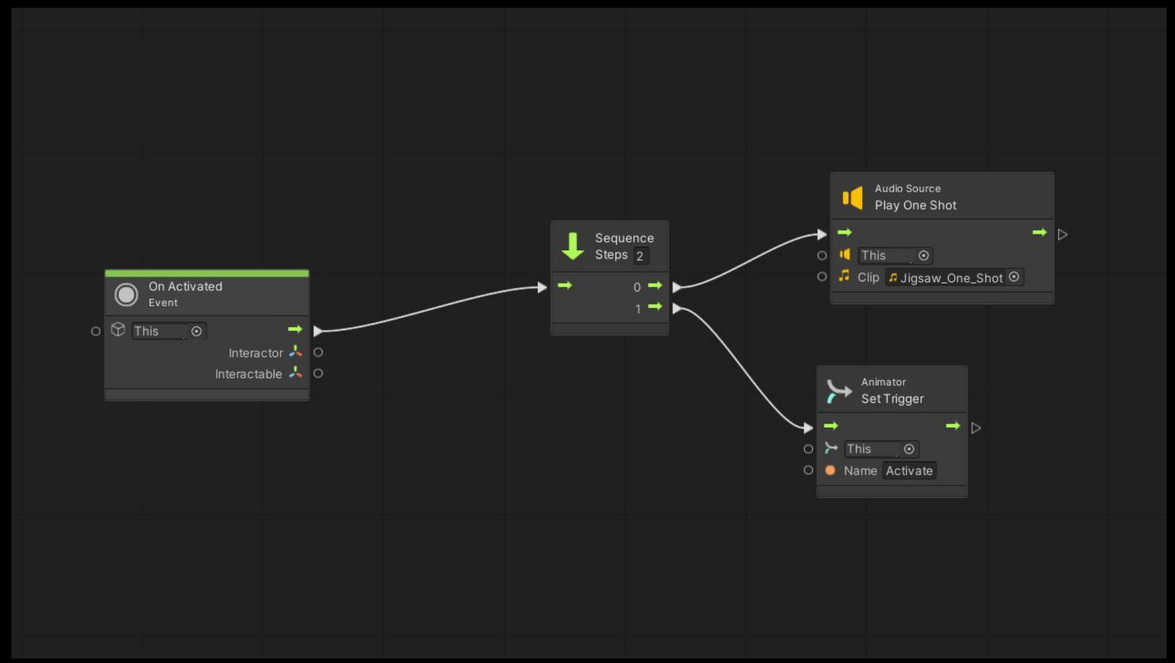
Let’s explore!

Creating a Jigsaw tool

Using XRIT and Visual Scripting Extensions



Preparing our asset Creating an animated jigsaw and adding an audio source.



Using the Visual Scripting Extensions Handling controller events, playing a sound and triggering an animation.

Let’s jump in!

Questions?