

Professional Certificate in AR/VR Development and 3D Graphics



Summary

Week 12: Introduction to VR Prototyping in Unity



NYU

**TANDON SCHOOL
OF ENGINEERING**

Overview

Using Unity's XR Interaction Toolkit



Build VR maze



Focus on prototyping

Setting Up the XR Environment

To set up your XR environment, follow these steps:

1

Start Unity Hub.

2

Select the 3D template and give an appropriate project name.

3

In the Package Manager, install the following:

- XR Plugin Management
- Oculus XR Plugin
- XR Interaction Toolkit

Setting Up the XR Environment

Prototyping in Unity is done with grey boxes using a technique called greyboxing. Unity provides the following packages to help prototyping:

ProGrids

A more advanced grid for snapping and layering

ProBuilder

An in-Unity editor for building advanced custom shapes

Snaps

A repository of set pieces for Unity built around specific environments

ProGrids

ProGrids adds a green grid to Unity and a toolbar at the top. The toolbar provides functionality to:

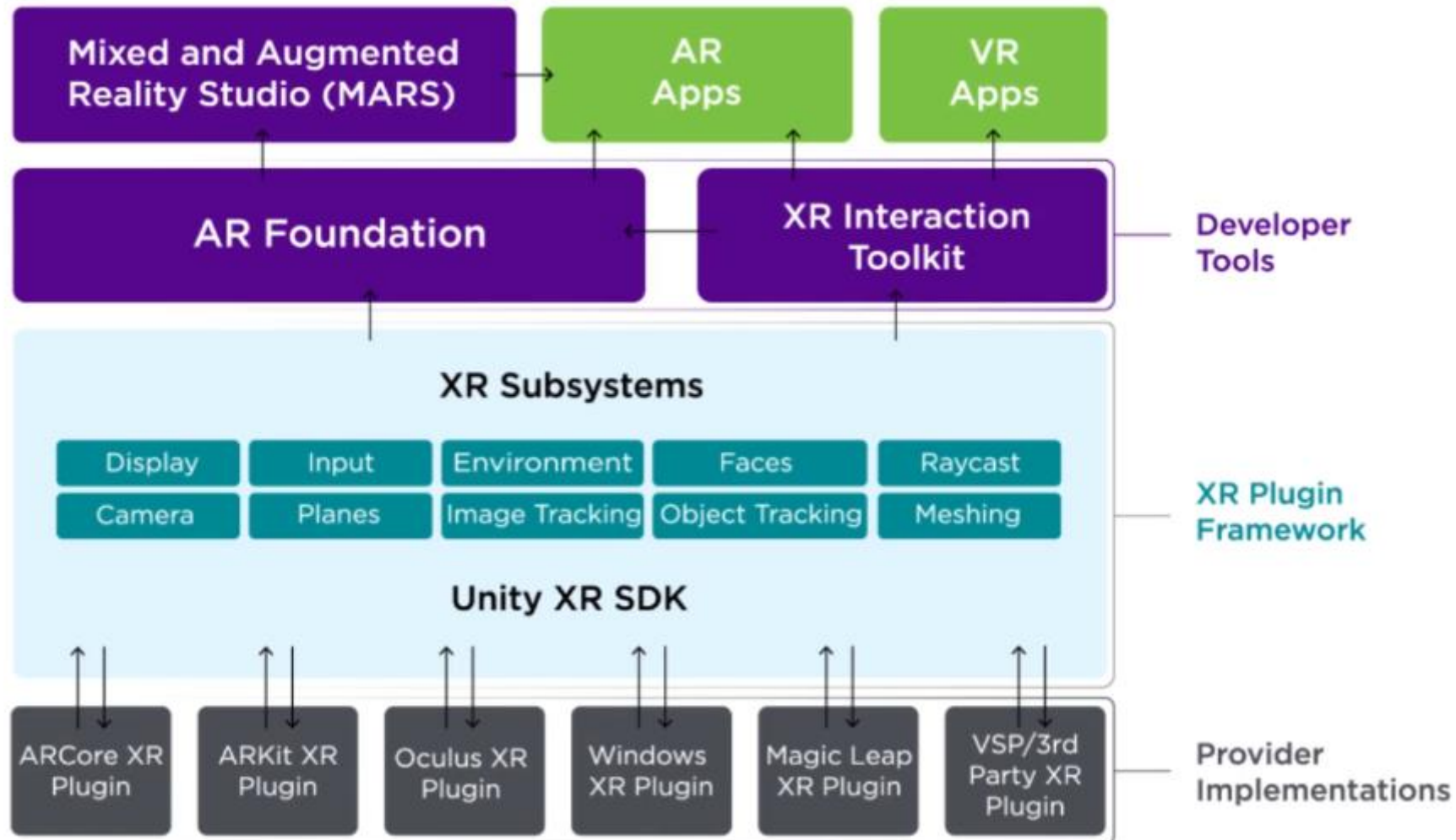
Change the grid size.

Toggle the grid on/off.

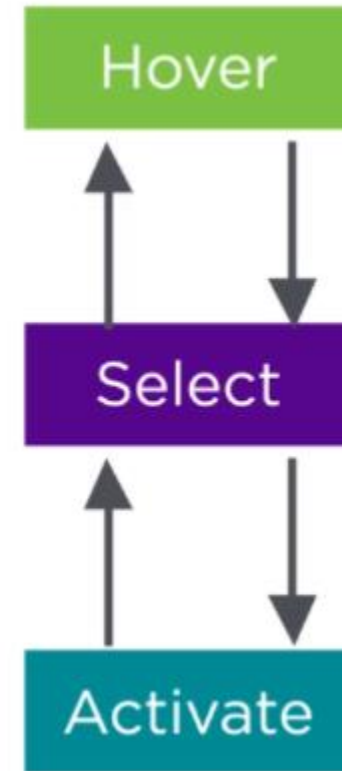
Add a 3D grid.



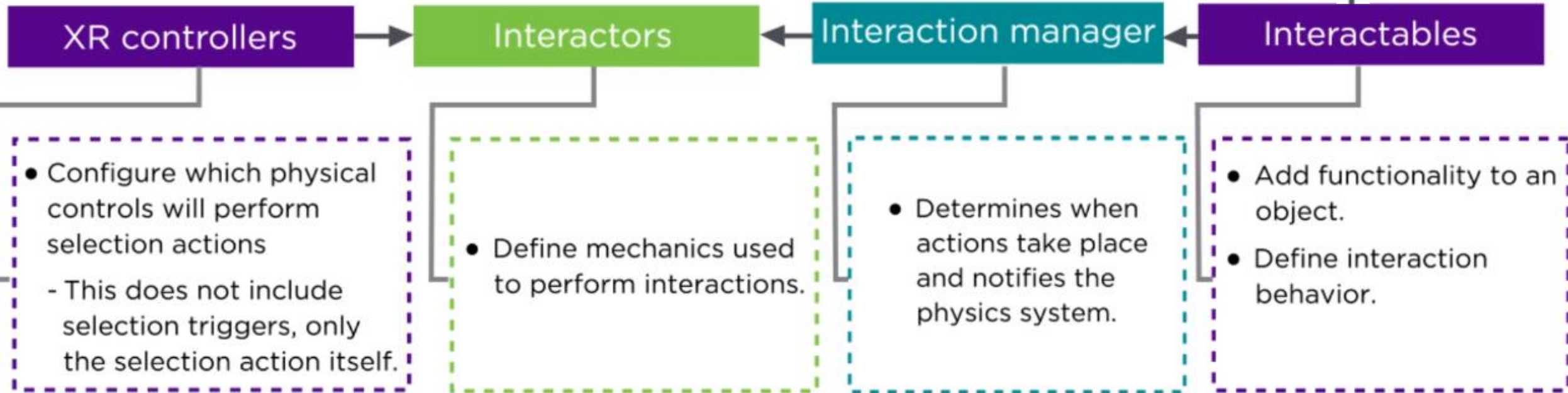
Unity XR Tech Stack



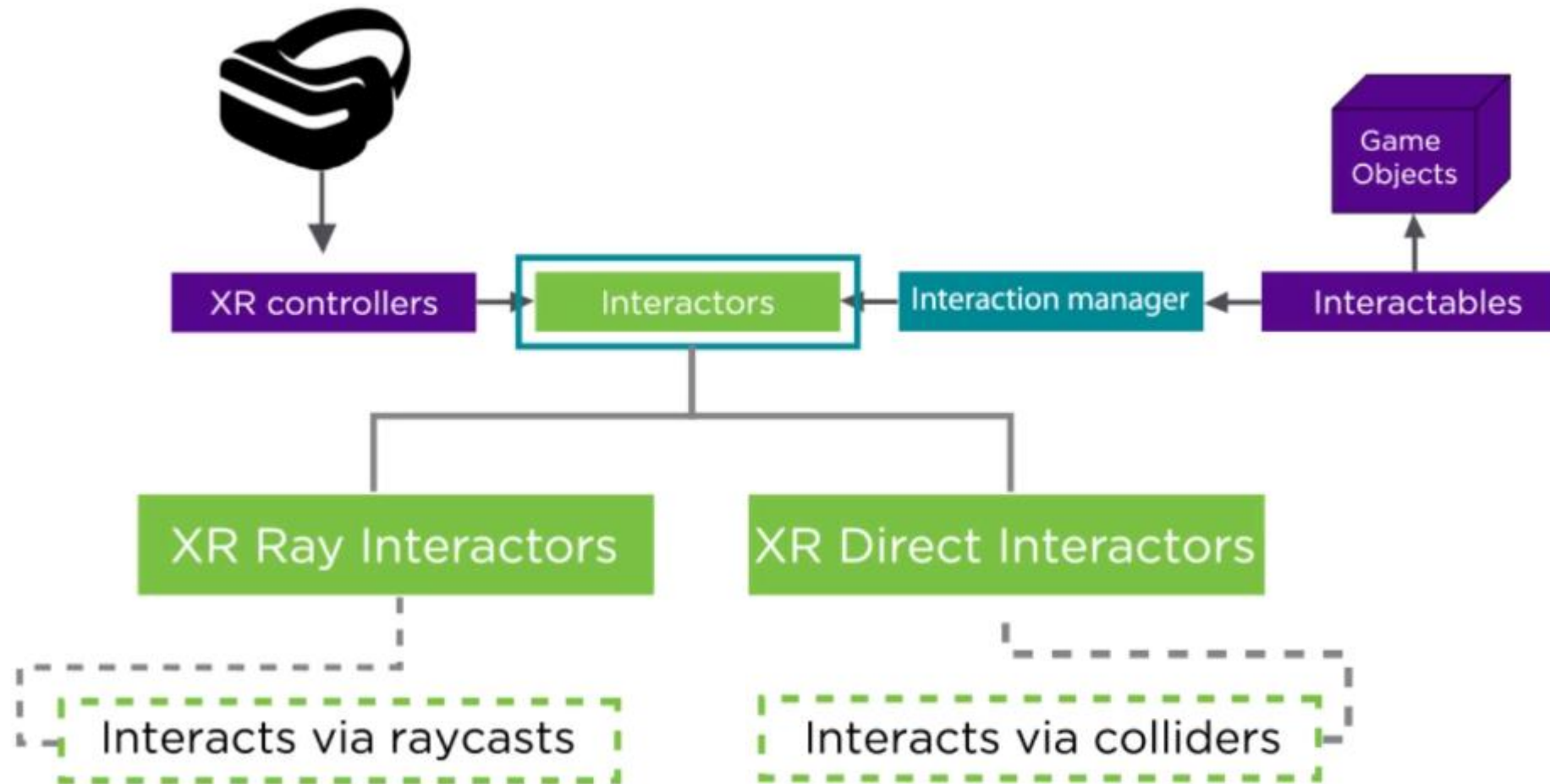
XR Interaction Toolkit Interaction Framework for VR Interactions



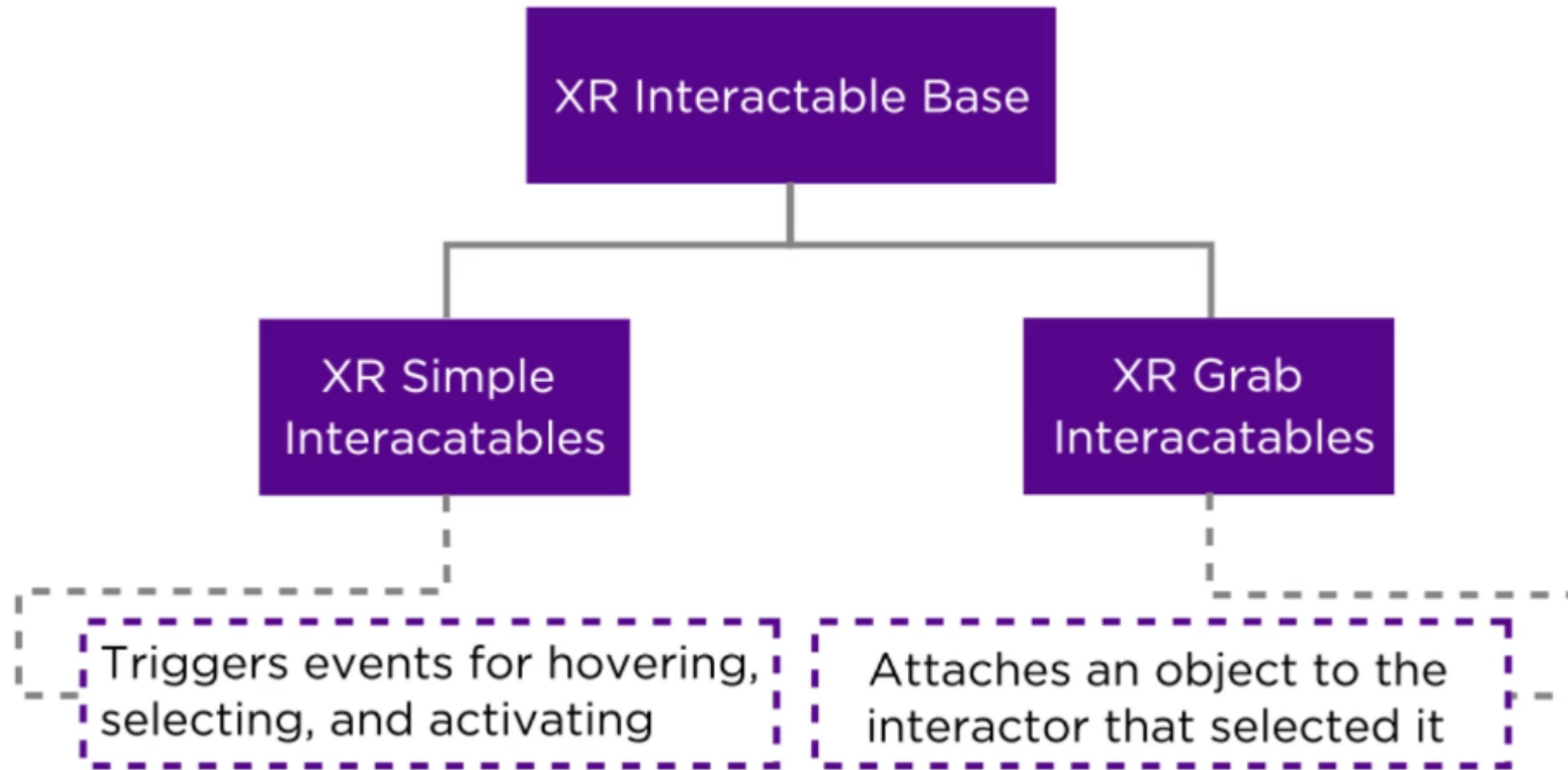
XR Interaction Toolkit: Interaction Framework



XR Interaction Toolkit: Interaction Framework



Behaviors of Interactables



XR Interaction Toolkit

The XR Interaction Toolkit provides XR-specific components such as the Room-Scale XR Rig that represents the tracked 3D play space of the interactable environment.

XR Rig

The XR Rig manages the tracking mode. (This should always be Floor). It includes:

A Camera Offset that positions the Main Camera at the right height.


Left- and right-hand controllers that include an XR Controller component and a XR Ray Interactor.

Interactables

Interactables include an interaction manager and events such as hovering, selecting, activating and deactivating.

The XR Tint Interactable Visual is a debugging component that applies a tint to any interactable on a given event.

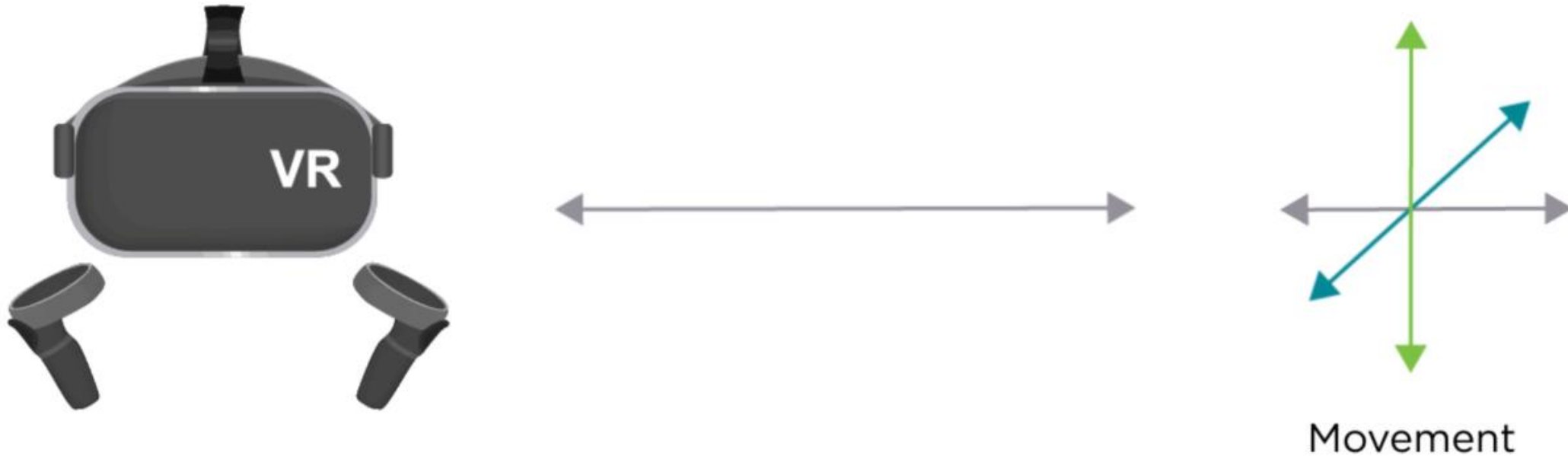
Interaction Layers



The XR Ray Interactor has a Raycast mask that can be used to mask what controllers on specific layers can be seen.

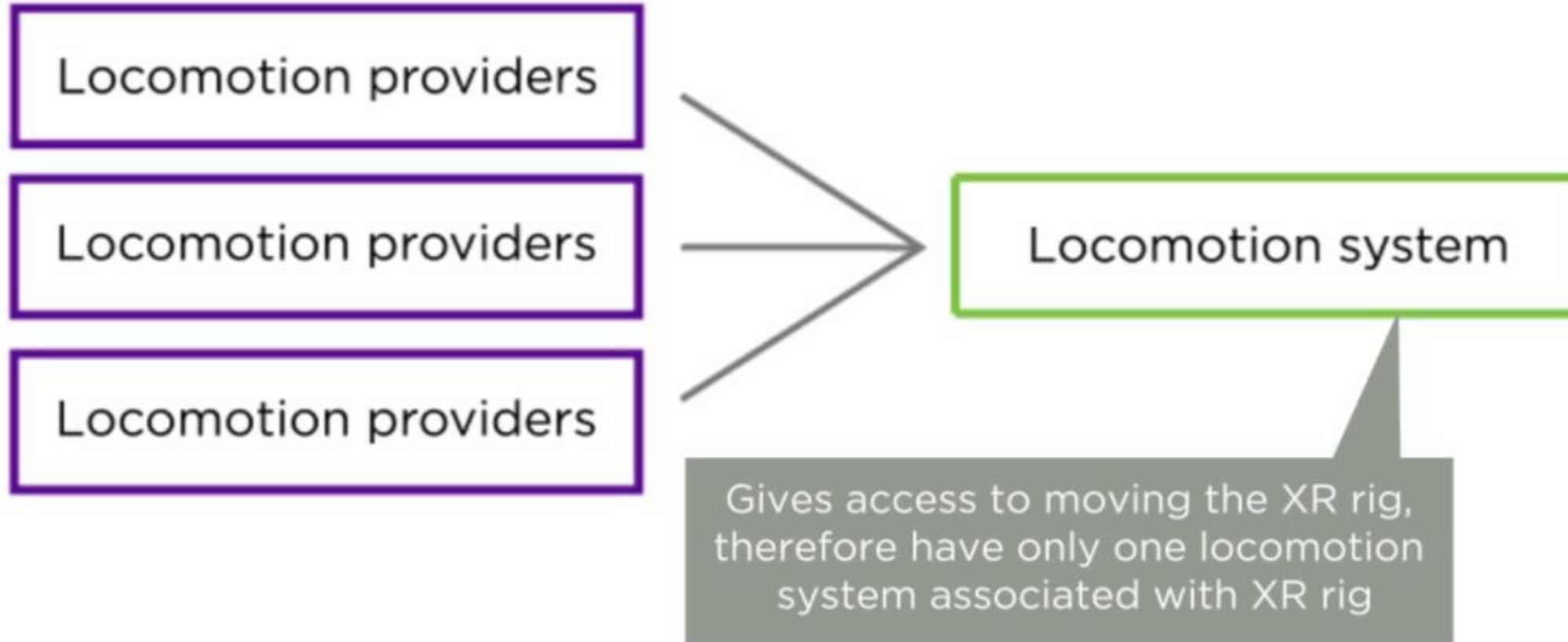
The XR Interactable component has an Interaction Layer mask that can be used to mask out what controllers on specific layers are interactable.

Locomotion Framework

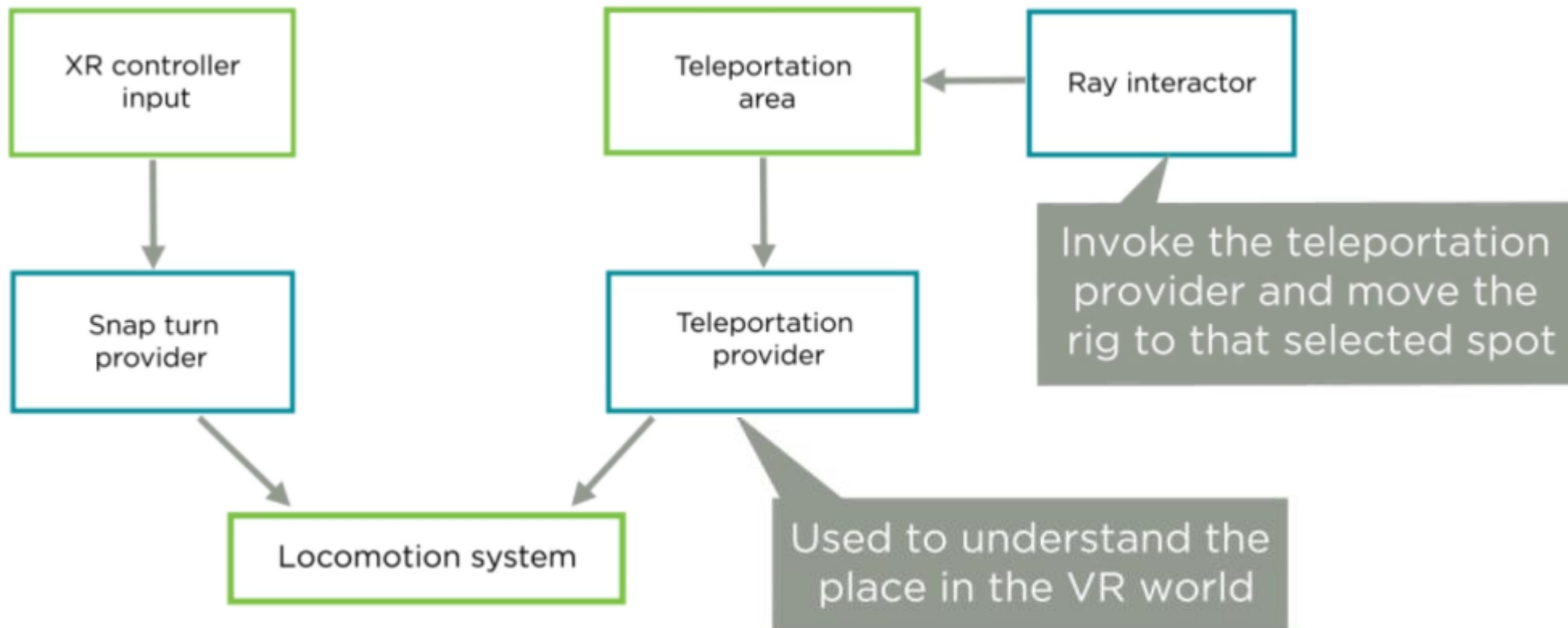


When room-scale is not enough to move around in a virtual world, therefore a mechanism called locomotion for moving from place to place is required

Aspects of a Locomotion System



Locomotion System Framework



Teleportation

In order to move a rig around, use:

Locomotion
System

Snap Turn
Provider

Teleportation
Provider

Win State

Triggers can be used to detect if a user reaches the end of the maze, triggering a win state.

A script is used to check if the main camera enters a trigger volume using the `OnTriggerEnter` function.

Objects can be made grabbable by setting their Interaction Layer Mask to a direct interaction.

ProBuilder

ProBuilder can be used to create basic shapes and build them in more complex forms using functions such as extruding, combining, and so on. The ProBuilder toolbar allows:



Object selection

Face selection

Vertex selection

Edge selection



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