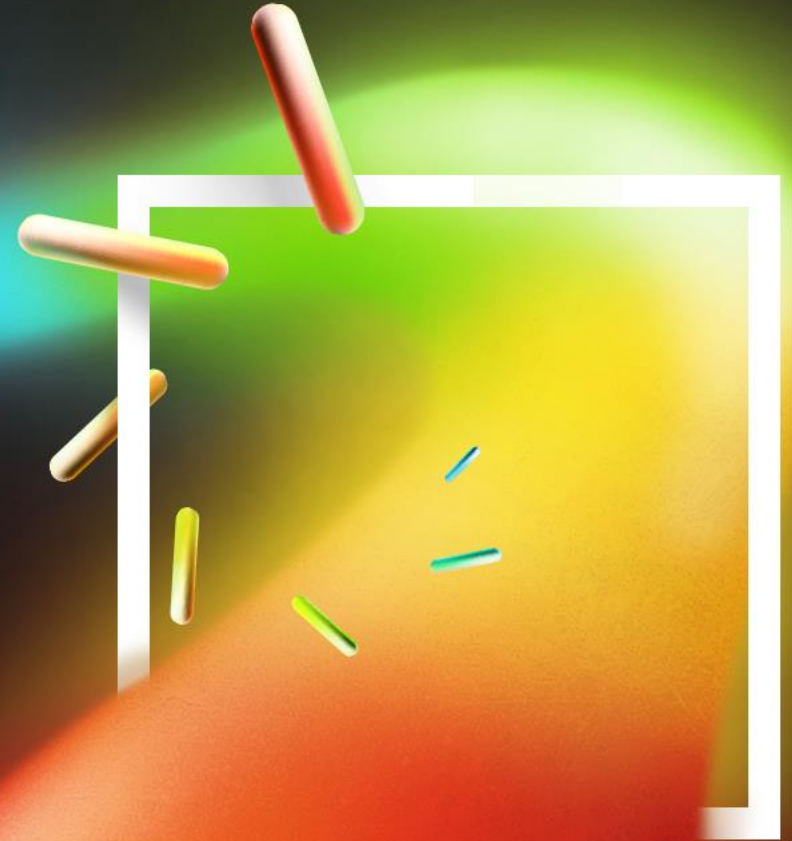




Microsoft Everywhere 2022



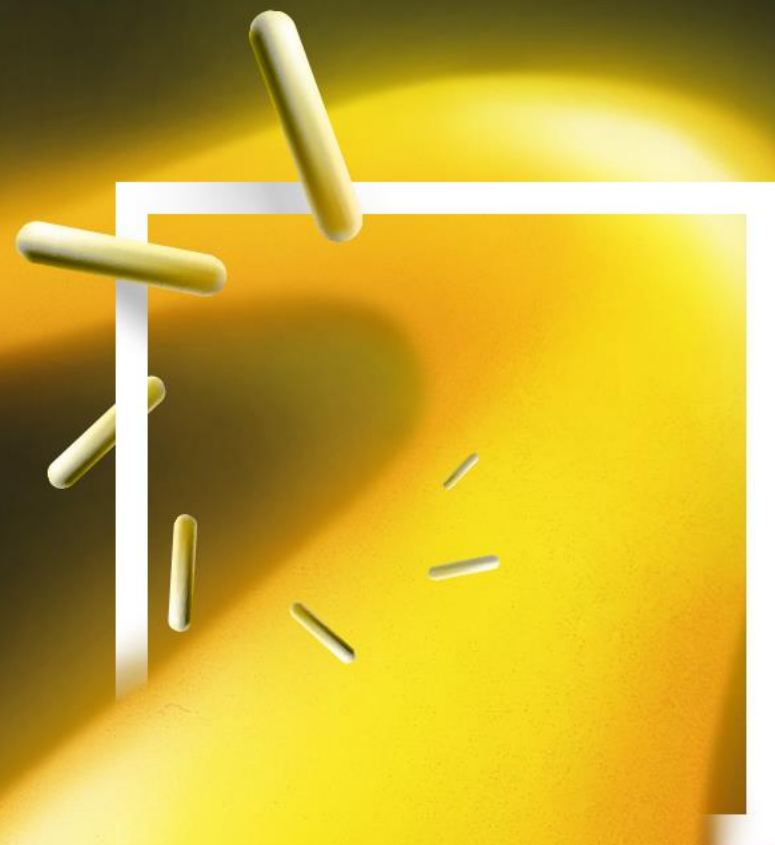


Microsoft Everywhere 2022

Series 4

Enable: 새로운 가능성을 만드는 개발

2022년 4월 27일(수) 오후 2시 - 6시





MR (Mixed Reality) 개발자를 위한 개발 학습 여정 소개

최재형 매니저, 한국마이크로소프트

Microsoft Everywhere 2022

Series 4

Enable: 새로운 가능성을 만드는 개발



Q: Mixed Reality?



전문가를 통한 원격 지원



공동 트레이닝/학습



몰입형 밋업



현장감있는 정보 공유



함께 디자인 작업



서로 연결하여 함께 만들기

Microsoft Everywhere 2022

Series 4 Enable: 새로운 가능성을 만드는 개발

Mixed Reality for Developers

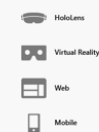
나만의 방식으로 빌드

머리에 착용하는 디스플레이에서 웹 또는 모바일 게임까지 혼합 현실 프로젝트가 배포되는 곳이면 어디나 디바이스, 언어 또는 환경과 상관없이 Microsoft가 지원합니다.

작업 방식



작업 위치



수행 작업

개발
디자인 및 프로토타입 생성
앱 배포
디바이스 배포
관련 정보 및 예시 보기

[개발자를 위한 Mixed Reality - Microsoft 개발자](#)

Microsoft Everywhere 2022

Series 4 Enable: 새로운 가능성을 만드는 개발

MR Cloud service for collaboration with HL



- Azure
 - Spatial Anchor and Object Anchor
 - Remote Rendering

[Mixed Reality for Education | Microsoft Education](#)

Q: Mixed Reality?



전문가를 통한 원격 지원



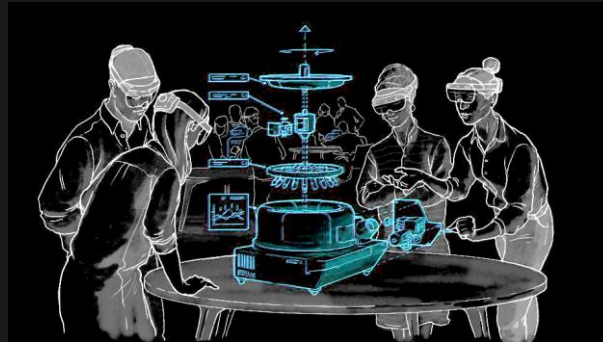
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함께 디자인 작업



서로 연결하여 함께 만들기



The Mesh Developer Platform (MR)

Toolkit

Capabilities

Immersive Presence

Representative Avatars
Photorealistic
Holoportation
Realtime N-way
interaction

Spatial Maps

World locked
holograms
Object locked
holograms
Sharing and Persistence

Holographic Rendering

Uncompromised fidelity
Range of formats
and filetypes
Drag and drop to MR

Multiuser sync

Realtime pose updates
Spatialized audio
Holographic transforms

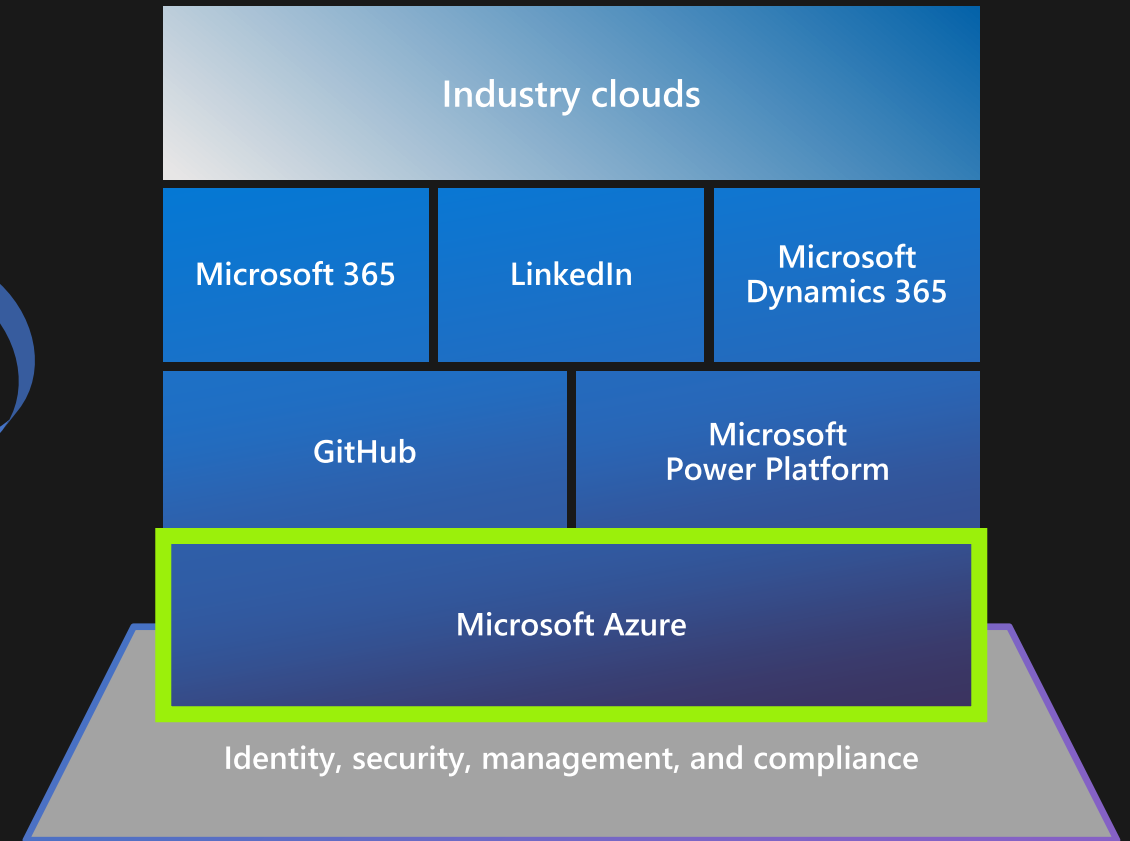
Core Platform



Microsoft Mesh



Microsoft Cloud



The evolution of computing



Software on computers



Applications on mobile devices



Experiences in mixed reality



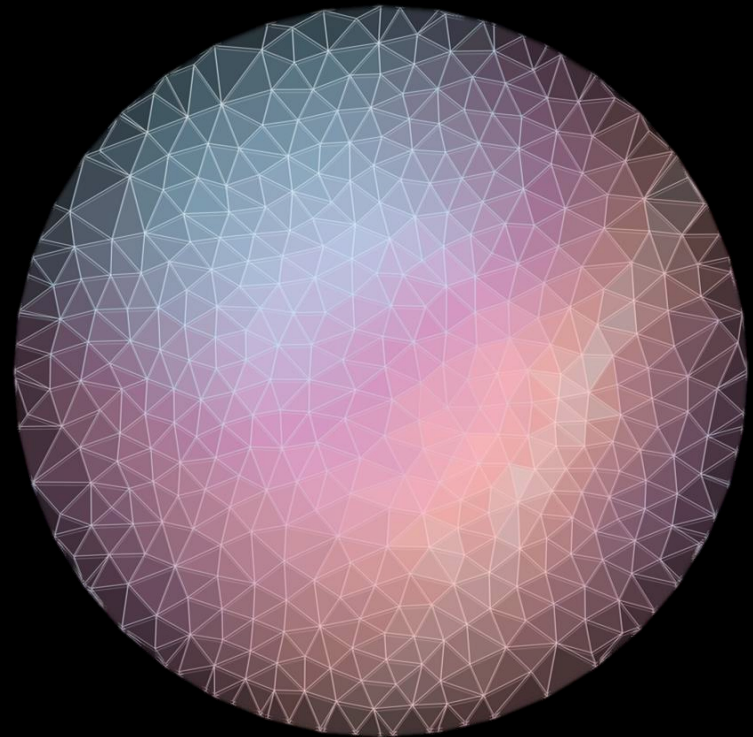
물리적 공간 + 디지털 공간과의 혼합

PHYSICAL WORLD



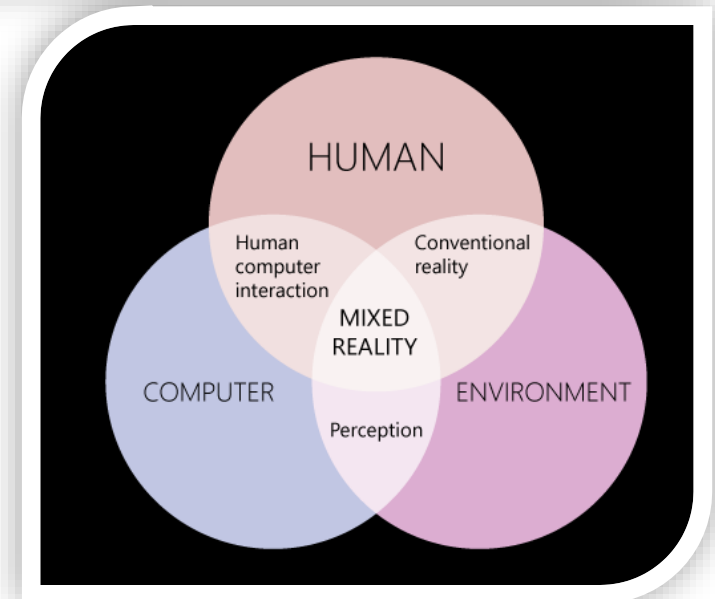
MIXED REALITY

DIGITAL WORLD



Microsoft Mixed Reality for Dev Component

- 직관적인 3D 인간, 컴퓨터 및 환경 상호 작용
- 컴퓨터 비전, 그래픽 처리, 표시 기술, 입력 시스템 및 클라우드 컴퓨팅의 발전을 기반
- 환경 이해: 공간 매핑 및 앵커
- 인간 이해: 손 추적, 시선 추적 및 음성 입력
- 공간 음향
- 실제 공간과 가상 공간 모두에서 위치 및 위치 지정
- 혼합 현실 공간의 3D 자산에 대한 협업



[혼합 현실이란? - Mixed Reality | Microsoft Docs](#)



Mixed Reality for Developers

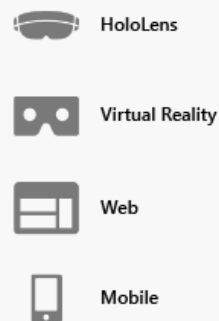
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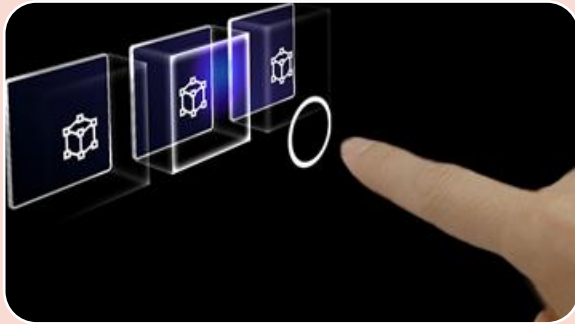
디바이스 배포

관련 정보 및 예시 찾기

[개발자를 위한 Mixed Reality - Microsoft 개발자](#)



Mixed Reality 개발도구 분류



MRTK - 공유 UX 구성
요소

- [Mixed Reality Toolkit for Unity](#)
- [Mixed Reality Toolkit for Unreal](#)

코드 중심 MR 개발

- [StereoKit](#)

로우 코드와 높은
생산성


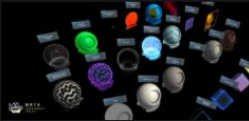



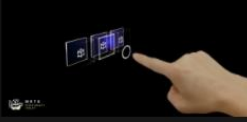



- [Power Apps의 혼합 현실](#)



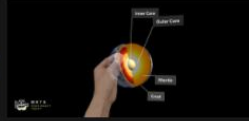





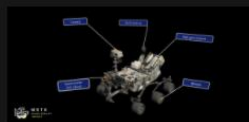


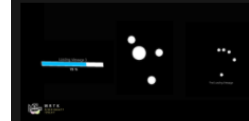
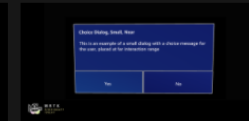



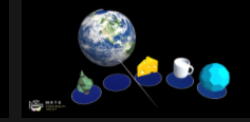


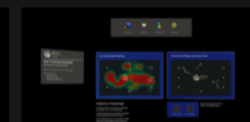
Mixed Reality Toolkit (MRTK) for Dev - Example



MRTK for Dev - UX building blocks

| | | |
|--|--|---|
|  <p>Slider Slider UI for adjusting values supporting direct hand tracking interaction</p> |  <p>MRTK Standard Shader MRTK's Standard shader supports various Fluent design elements with performance</p> |  <p>Hand Menu Hand-locked UI for quick access, using the Hand Constraint Solver</p> |
|  <p>App Bar UI for Bounds Control's manual activation</p> |  <p>Pointers Learn about various types of pointers</p> |  <p>Fingertip Visualization Visual affordance on the fingertip which improves the confidence for the direct interaction</p> |
|  <p>Near Menu Floating menu UI for the near interactions</p> |  <p>Spatial Awareness View Make your holographic objects interact with the physical environments</p> |  <p>Voice Command Scripts and examples for integrating speech input</p> |

| | | |
|---|--|--|
|  <p>Button A button control which supports various input methods, including HoloLens 2's articulated hand</p> |  <p>Bounds Control Standard UI for manipulating objects in 3D space</p> |  <p>Object Manipulator Script for manipulating objects with one or two hands</p> |
|  <p>Slate 2D style plane which supports scrolling with articulated hand input</p> |  <p>System Keyboard Example script of using the system keyboard in Unity</p> |  <p>Interactable A script for making objects interactable with visual states and theme support</p> |
|  <p>Solver Various object positioning behaviors such as tag-along, body-lock, constant view size and surface magnetism</p> |  <p>Object Collection Script for laying out an array of objects in a three-dimensional shape</p> |  <p>Tooltip Annotation UI with a flexible anchor/pivot system, which can be used for labeling motion controllers and objects</p> |

| | | |
|--|---|--|
|  <p>Progress Indicator Visual indicator for communicating data process or operation</p> |  <p>Dialog UI for asking for user's confirmation or acknowledgement</p> |  <p>Hand Coach Component that helps guide the user when the gesture has not been taught</p> |
|  <p>Hand Physics Service [Experimental] The hand physics service enables rigid body collision events and interactions with articulated hands</p> |  <p>Scrolling Collection An Object Collection that natively scrolls 3D objects</p> |  <p>Dock [Experimental] The Dock allows objects to be moved in and out of predetermined positions</p> |
|  <p>Eye Tracking: Target Selection Combine eyes, voice and hand input to quickly and effortlessly select holograms across your scene</p> |  <p>Eye Tracking: Navigation Learn how to auto-scroll text or fluently zoom into focused content based on what you are looking at</p> |  <p>Eye Tracking: Heat Map Examples for logging, loading and visualizing what users have been looking at in your app</p> |

MRTK for Dev - Feature areas

기능 영역



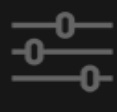
입력 시스템



손 추적
(HoloLens 2)



시선 추적
(HoloLens 2)



Profiles



손 추적
(Ultraleap)



UI 컨트롤



해결기



다중 장면
관리자



공간
인식



진단
도구



MRTK 표준 셰이더
예제 보기



음성
& 받아쓰기



경계
시스템



편집기 내
시뮬레이션



실험적
기능

Feature areas



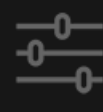
Input System



Hand Tracking
(HoloLens 2)



Eye Tracking
(HoloLens 2)



Profiles



Hand Tracking
(Ultraleap)



UI Controls



Solvers



Multi-Scene
Manager



Spatial
Awareness



Diagnostic
Tool



MRTK Standard Shader
Example View



Speech
& Dictation



Boundary
System



In-Editor
Simulation



Experimental
Features

GitHub – Unity and Unreal

- [GitHub - microsoft/MixedReality-UXTools-Unreal: UX tools and components for developing Mixed Reality applications in UE4.](#)



- [GitHub - microsoft/MixedRealityToolkit-Unity: Mixed Reality Toolkit \(MRTK\) provides a set of components and features to accelerate cross-platform MR app development in Unity.](#)



개발 도구 - Mixed Reality Toolkit

- 공유 UX 구성 요소
 - 공간 상호 작용 구성 요소, UI, 기본 구성 요소 등을 사용하여 인기 있는 게임 엔진에서 혼합 현실 개발

- Unity

- [Mixed Reality Toolkit for Unity](#)



- Unreal

- [Mixed Reality Toolkit for Unreal](#)
 - [UX Tools for Unreal](#) - Hololens 2 애플리케이션용 UX 기능 구현을 위한 코드, 청사진 및 예제를 제공
 - [Graphics Tools for Unreal](#) - 성능 예산에 맞추면서 혼합 현실 애플리케이션의 시각적 충실도를 개선



Required software



Windows SDK 18362+

To build apps with MRTK-Unreal and UX Tools, you need the Windows 10 May 2019 Update SDK



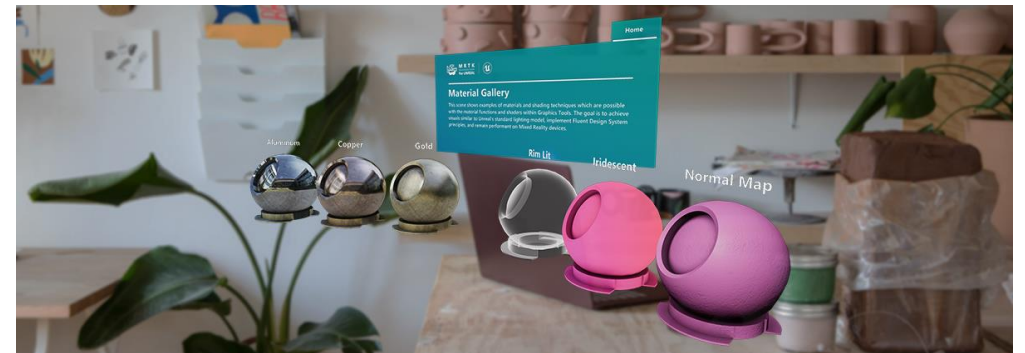
Unreal 4.27.0+

The Unreal Engine provides support for building Mixed Reality projects in Windows 10



Visual Studio 2019

Visual Studio is used for code editing



개발 도구 - 코드 중심 MR 개발

• 코드 중심 MR 개발

- C#, OpenXR 및 MR 개발의 가장 일반적이고 어려운 문제를 다루는 오픈 소스 라이브러리를 사용하여 크로스 플랫폼 혼합 현실 환경을 만드세요.

• StereoKit



Getting started

Follow [this guide](#) for a detailed introduction! Or check out the [additional learning resources](#), sample projects that show how to build full StereoKit applications.

StereoKit focuses on getting you productive with the least amount of code possible. You can actually do most tasks with a single line of code, including UI! Here's hello world with StereoKit, this is all you need to get up and running!

```
using StereoKit;

class Program
{
    static void Main(string[] args)
    {
        SK.Initialize(new SKSettings{ appName = "Project" });

        Model helmet = Model.FromFile("Assets/DamagedHelmet.gltf");

        while (SK.Step() => {
            helmet.Draw(Matrix.TS(Vec3.Zero, 0.1f));
        });

        SK.Shutdown();
    }
}
```

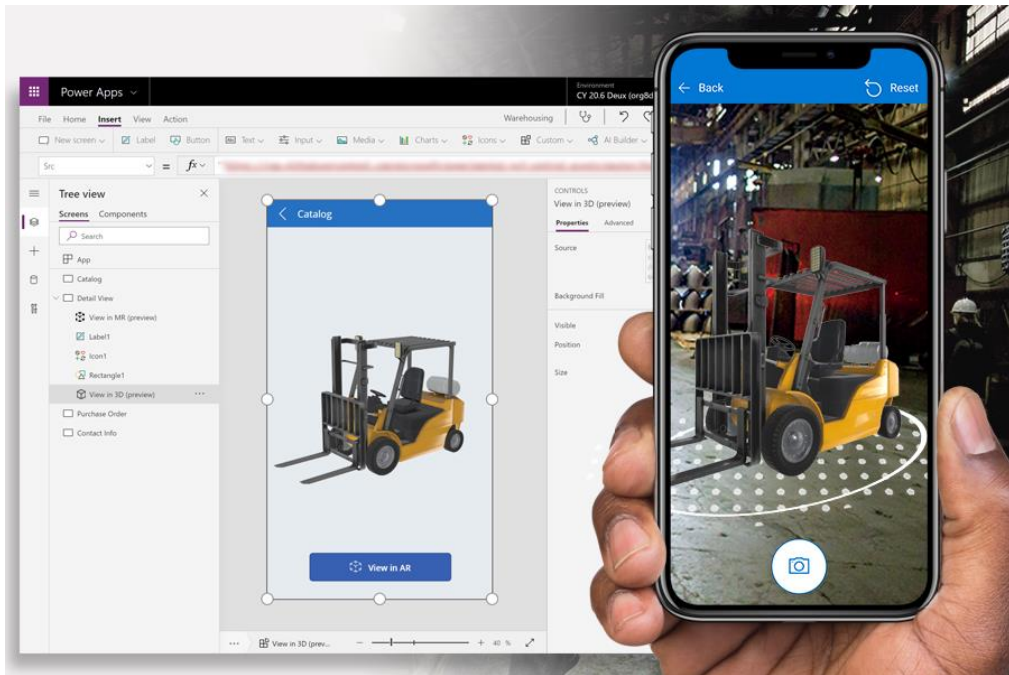
StereoKit Features:

- Platforms: HoloLens 2, Oculus Quest, Windows Mixed Reality, Oculus Desktop, SteamVR, Varjo, Monado (Linux), and eventually everywhere OpenXR is!
- Flat screen mode with input emulation for easy development
- Builds your application to device in seconds, not minutes
- Mixed Reality inputs like hands and eyes are trivial to access
- Easy and powerful UI and interactions
- Model formats: .gltf, .glb, .obj, .stl, ASCII .ply, procedural
- Texture formats: .jpg, .png, .tga, .bmp, .psd, .gif, .hdr, .pic, .qoi, equirectangular cubemap, procedural
- Runtime asset loading
- Physics
- Performance-by-default instanced render pipeline
- Flexible shader/material system with built-in PBR
- Skeletal/skinned animation
- Documentation generated directly from the source code, including screenshots



개발 도구 - 로우 코드와 높은 생산성

- 혼합 현실 환경을 구현하는 미리 빌드된 구성 요소를 사용하여 로우 코드 앱을 빌드하세요.
- Power Apps의 혼합 현실

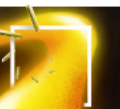
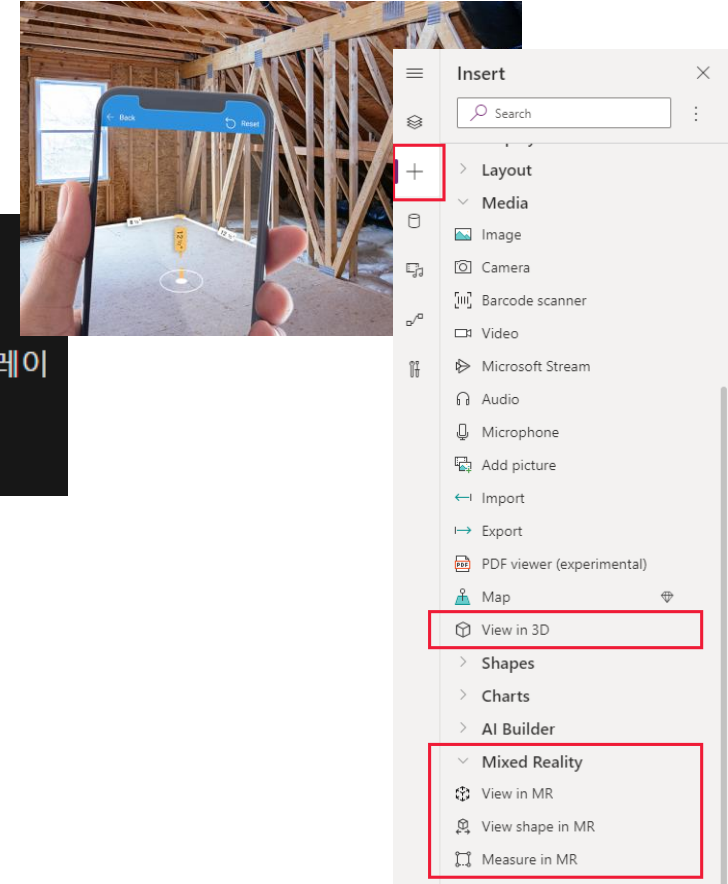


MR 컨트롤 용도.

- 3D 콘텐츠 보기 및 조작
- 카메라 피드에 3D 콘텐츠와 2D 이미지 오버레이
- 거리, 면적, 부피 측정
- 공간과 위치 식별

• 자신만의 컨트롤을 구축

- ✓ 3D로 보기
- ✓ 혼합 현실에서 보기
- ✓ 혼합 현실에서 측정
- ✓ 혼합 현실에서 형체 보기



MR Cloud service for collaboration with HL



- Azure
 - Spatial Anchor and Object Anchor
 - Remote Rendering

Microsoft MR on Azure, M365, D365 and HW

Biz – Enterprise

- Azure
 - Spatial Anchor and Object Anchor
 - Remote Rendering
- Microsoft 365
 - 3D in Office
 - Sharepoint Space - [SharePoint spaces - SharePoint \(microsoft.com\)](#)
- Dynamics 365
 - Guides ← Layout
 - Remote Assist
 - Product Visualize Preview

Metaverse and Creator

- AltSpace VR + Microsoft Mesh
- WMR – Window Mixed Reality
- Microsoft Maquette – Beta
 - [Microsoft Maquette 구매 - Microsoft Store ko-KR](#)
- Visual Studio and MRTK
- Windows 10
 - 3D Viewer, Paint 3D, Print 3D,
- HW
 - HoloLens 2, 1
 - Azure Kinect DK 2

3D - Microsoft Maquette



Microsoft Maquette
소유함

Microsoft Maquette is a general purpose mock-up tool for spatial prototyping within virtual reality. It was built from the ground up to

[Unity Addon - Microsoft Maquette Beta](#)
[Microsoft Maquette | App Review – YouTube](#)
[Creating 3D Objects in Microsoft Maquette VR - YouTube](#)

Tip for 3D (vs. DevOps)

- 3D Content Guidelines for Microsoft
 - [Microsoft용 3D 콘텐츠 지침](#)
- 3D from Photogrammetry
 - [Best Photogrammetry Software in 2021 \(Some are Free\) | All3DP](#)
 - [Meshroom](#)
 - [AliceVision | Photogrammetric Computer Vision Framework](#)
 - [GitHub - alicevision/meshroom: 3D Reconstruction Software](#)
- Point Cloud
 - ToF and Lidar vs. Photogrammetry
 - PCL(Point Cloud Library)
 - Azure Kinect DK
- 3D SW in PC
 - Unity, Unreal, Blender
- 3D SW in VR
 - Microsoft Maquette - [Microsoft Maquette Beta – Home](#)

