Unity 6 未来技术展望

张黎明


Unity 6
previously known as Unity 2023 LTS

Unity 2023.2

Unity 6

previously known as
Unity 2023 LTS
Unity 2023.4

Boosted rendering performance

Accelerated multiplayer creation

New platform possibilities

Elevated and optimized lighting

Runtime dynamic experiences with AI

Productivity upgrades

Rendering and visual effects

URP 3D Sample Project

Learning

- → Explore URP capabilities
- → Build from four scenes
  - Different art styles
  - Multiple platforms
  - Variety in rendering complexities

Availability

- → Currently available for 2022 LTS and will be available for Unity 6
- → **unity.com/URP3DSample**

New URP 3D Sample, including four new Scenes

GPU Resident Drawer

Optimizations

→ Efficiently render larger, richer worlds

→ Up to 50% CPU time reduction

Support

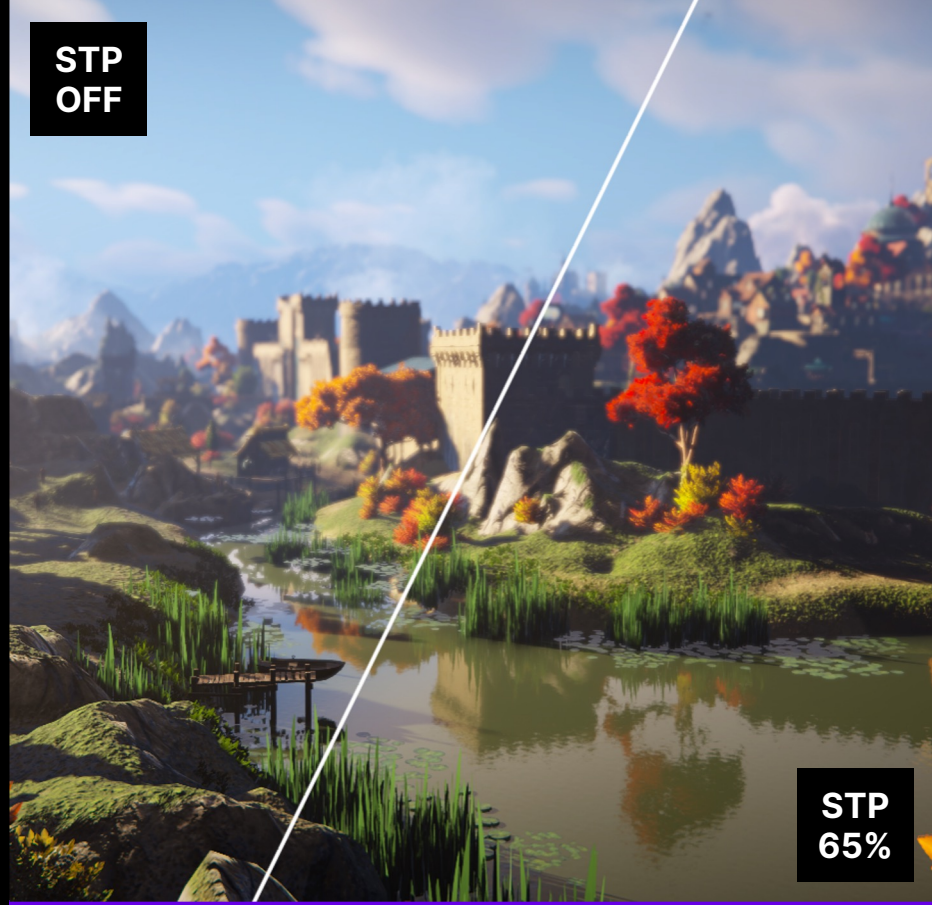
→ HDRP and URP Forward+

→ Cross-platform including high-end mobile (Vulkan and Metal)

Fantasy Kingdom in Unity 6 demo presented at Unite 2023 Keynote, demonstrating GPU Resident Drawer

Spatial-Temporal Post-Processing (STP)

- → GPU Optimization
  - State-of-the-art upscaler
  - Better runtime performance
  - Improved image consistency
- → Support
  - Cross-platform, including compute-capable mobile devices
  - URP and HDRP
  - No content changes needed



Fantasy Kingdom in Unity 6 demo presented at Unite 2023 Keynote, demonstrating STP

Adaptive Probe Volumes (APV)

Design time

→ Simpler probe placement workflows

→ Faster iteration

Runtime

→ Improved image quality

→ Supported for both URP and HDRP

→ Supported on mobile, PC, and consoles

→ Production ready with Unity 6

URP 3D Sample using Adaptive Probe Volumes for indirect diffuse lighting

APV features

APV comparing per-pixel / per-vertex sampling

Per-Pixel / Per-Vertex Sampling

URP now supports per-vertex quality sampling. This is especially useful to boost performance on lower-end devices.

APV integrated lighting with VFX particles

Integration with VFX particles

Particle effects are affected by indirect lighting baked into Probe Volumes.

APV streaming debug view

APV data streaming

APV data can be automatically streamed from disk to CPU, and from CPU to GPU. This helps with large scenes.

APV features

APV blending between multiple lighting scenarios

Lighting Scenarios (URP/HDRP)

Bake and blend multiple lighting scenarios for Probe Volumes to simplify dynamic scene creation.

APV Sky Occlusion with dynamic sky color

Sky Occlusion (HDRP)

Dynamic sky color can be used with Sky occlusion in HDRP.

Using Lordenfel: Castles & Dungeons RPG pack from the Unity Asset Store

APV Sky Occlusion with scripted sky color

Sky Occlusion (URP)

In URP, the sky color to be used with sky occlusion can be scripted or animated.

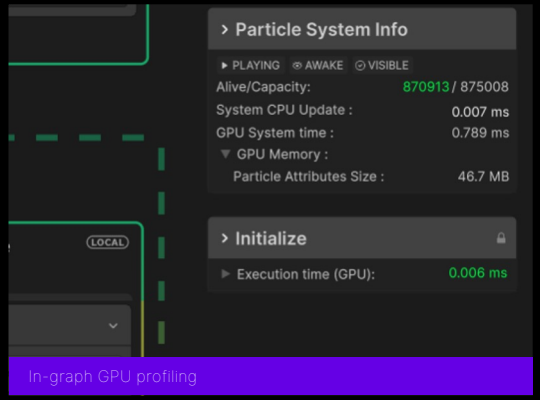
GPU Lightmapper

- → Production ready with 2023.2
- → New light baking architecture
- → Lowered min spec to 2GB GPU
- → Quality-of-life improvements

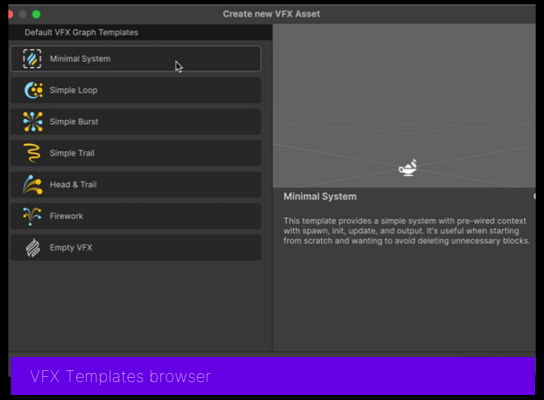
-> bit.ly/unity6_gi

Lightmapped architectural interior environment. Content credit: ArchvizPRO Interior Vol.10

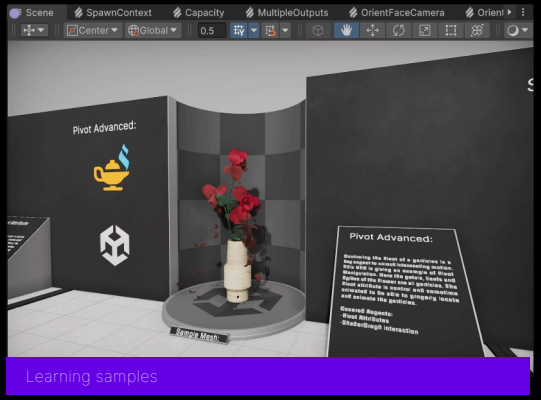
VFX Graph onboarding and productivity



In-graph GPU profiling



VFX Templates browser



Learning samples

Profiling tool

Providing **feedback on memory footprint and performance** to tweak effects and maximize performance

Templates

Accelerating prototyping and creation of new effects

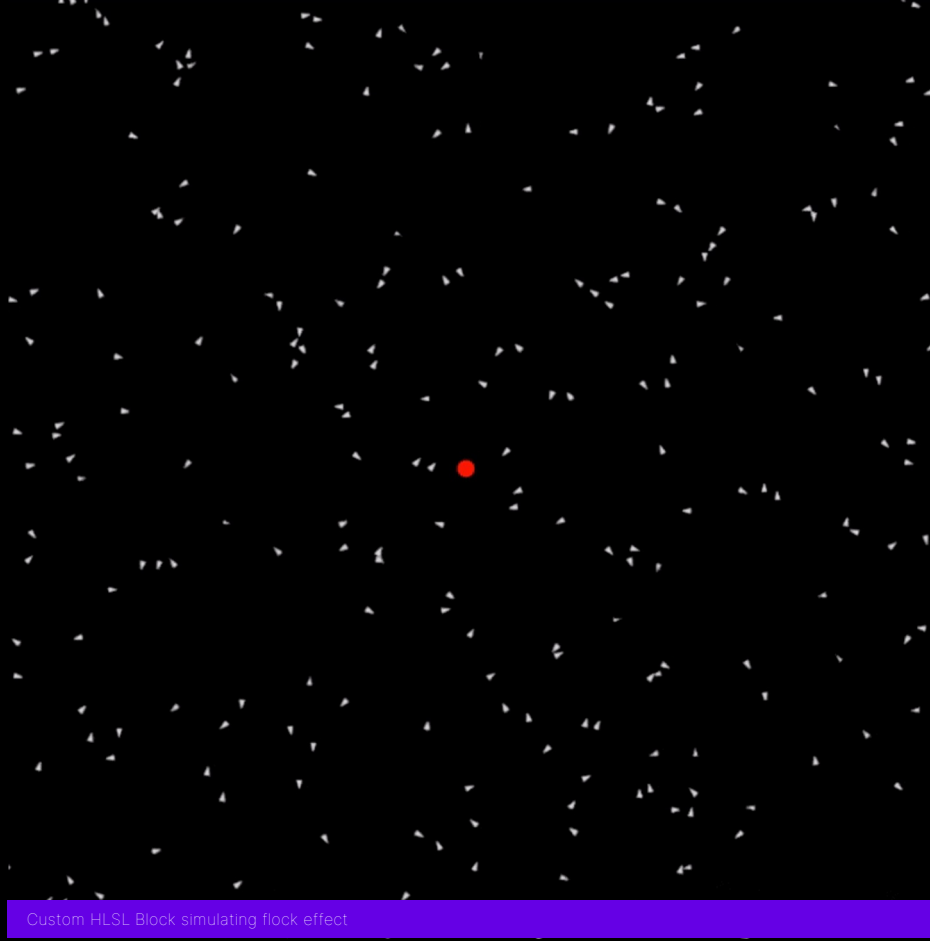
Learning samples

Helping users learn major concepts and features of VFX Graph

VFX Graph Custom HLSL Block

Explore new possibilities, including:

- Flocks (neighbor search)
- Reading back from a buffer to trigger audio

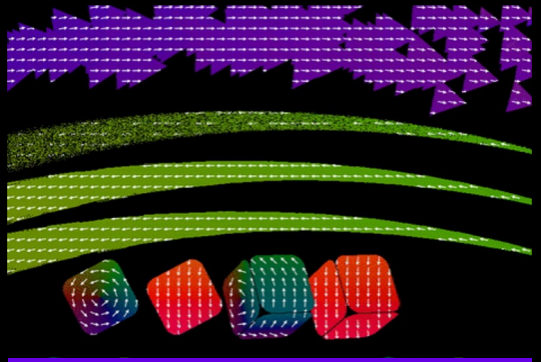


Custom HLSL Block simulating flock effect

VFX Graph-URP compatibility enhancements

URP decals

6-way smoke lighting



Motion vectors output

Decals

Spawn URP decals with VFX Graph and use ShaderGraph to customize VFX Graph decals for both HDRP and URP.

Smoke lighting

6-way lighting enables more realistic smoke effects and the ability to relight them with custom lightmaps that can be baked in content creation tools like Houdini, Blender, or Embergen.

Motion vectors

VFX Graph particles can generate motion vectors with URP, which can then used in conjunction with effects like TAA or Motion Blur.

VFX Graph-HDRP enhancements

VFX can be rendered in ray tracing passes

RTX support

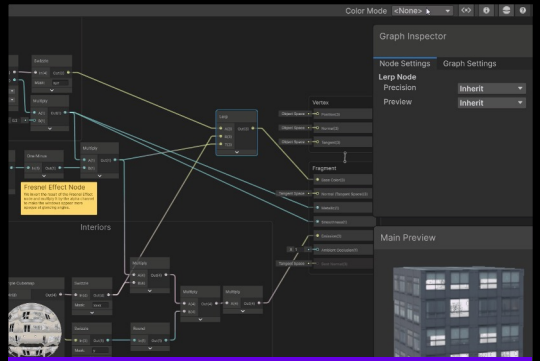
Add the ability to render VFX in ray tracing passes to enable taking VFX into account in ray traced reflections.

Inject VFX Graph particles into Volumetric Fog

Volumetric Fog output

This allows you to inject VFX Graph particles into the Volumetric Fog to generate clouds, smoke, and fire effects, or to make Volumetric Fog more dynamic.

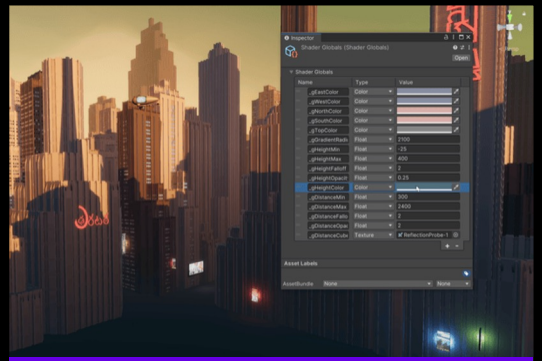
Shader Graph productivity enhancements



Faster editing with hotkeys

Improved productivity

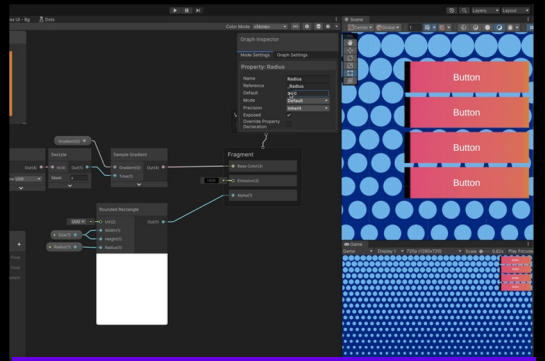
Quality-of-life improvements such as **faster undo/redo**, **hotkeys**, and a **Heatmap Color Mode**



Custom lighting and fog values driven by Shader Globals

Shader Globals

New samples, including **Shader Globals**, for prototyping and implementation of global effects such as custom lighting and weather conditions



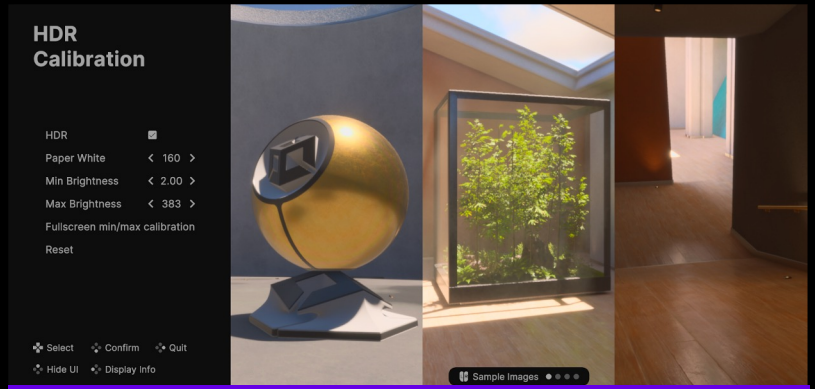
Dynamic UI content made with Shader Graph

UI integration

Create **dynamic UI** backgrounds and shapes using **procedural patterns** and functions

HDR display support

HDR display for both URP and HDRP pipelines



New template to demonstrate HDR calibration

HDR display support

HDR tone mapping and output support across all capable platforms, and full compatibility with URP and HDRP

HDR calibration template

Demonstrates the implementation of an HDR calibration menu for the Scriptable Render Pipelines

Ray tracing API production ready

- → Improvements to API, stability, and performance
- → New inline ray tracing API
- → Supported on Windows, Xbox Series X|S, and PlayStation®5
- → Accessible for both URP and HDRP
- → RT effects available out of the box in HDRP
- → Memory usage reduction

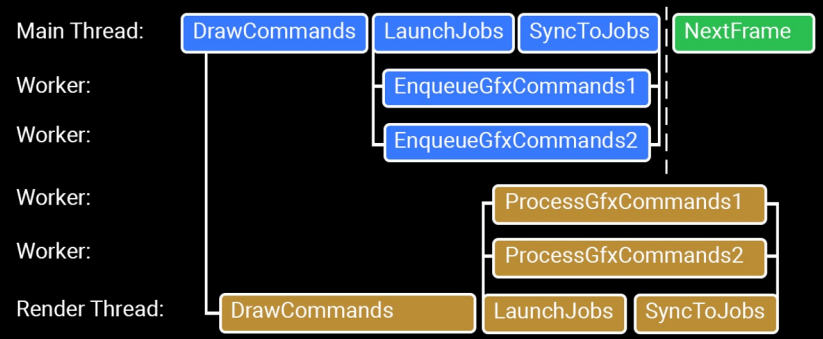
HDRP Sample Scene with ray traced GI, reflections, shadows, and AO enabled

Graphics Jobs improvements

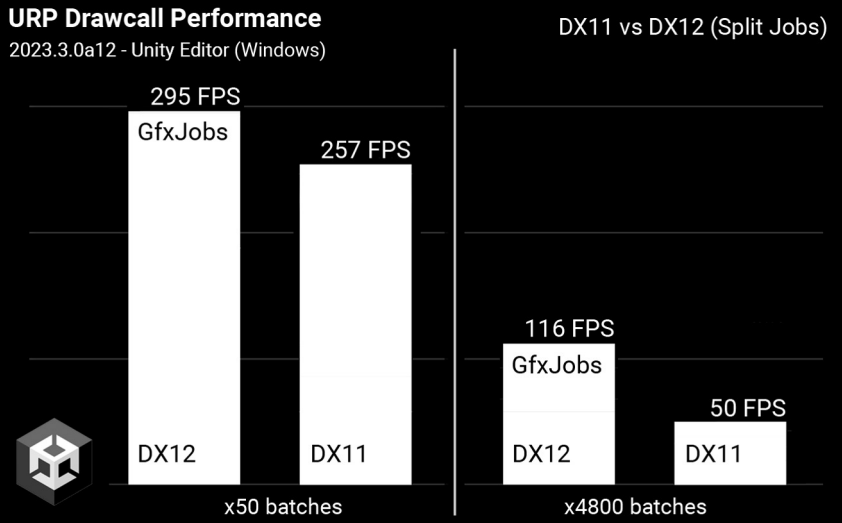
→ Split Graphics Jobs for Windows (DX12), Xbox, and PlayStation platforms

→ Improves CPU performance

→ Includes Unity Editor support on Windows

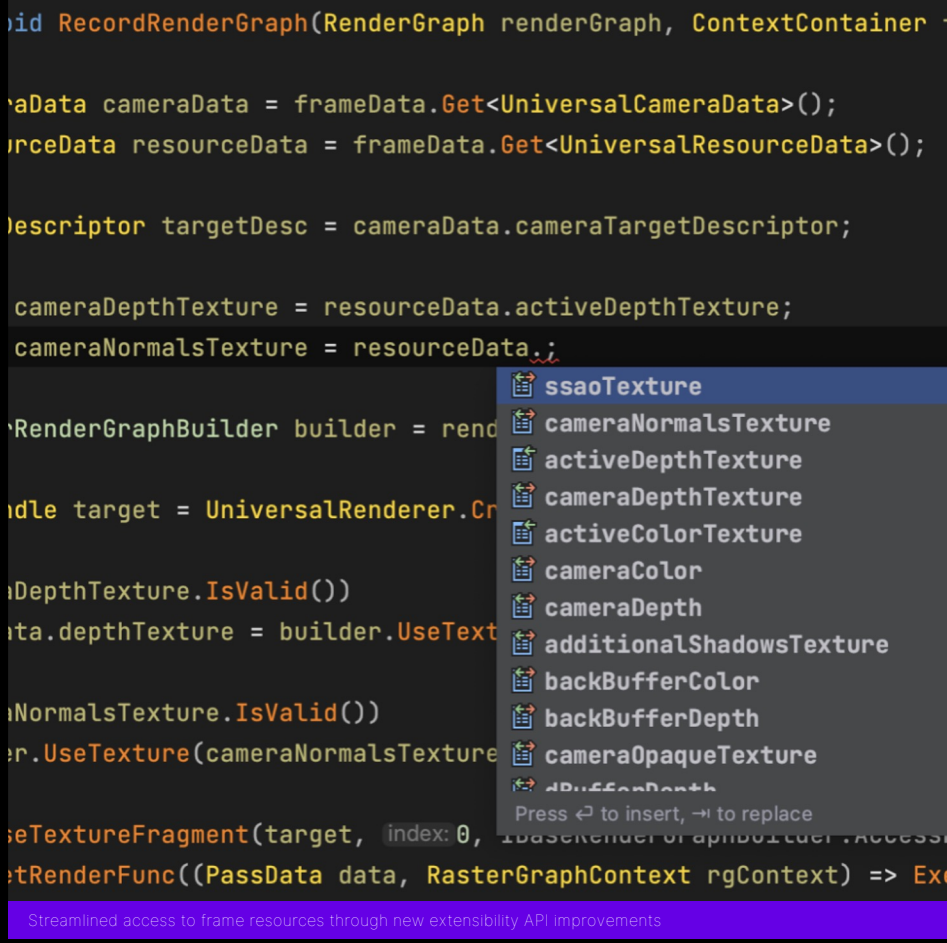


Multi-threaded graphics command processing and submission



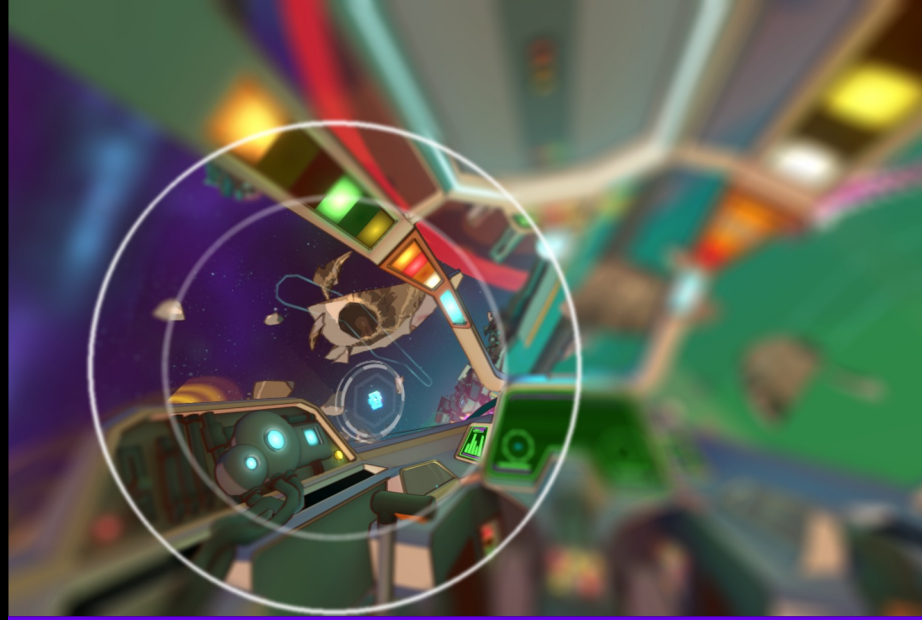
URP Render Graph

- → Powerful rendering extensibility
  - Performance by default
  - Increased access to rendering data
  - More guardrails
- → Optimized GPU performance
  - Leverage mobile GPU architecture for lower bandwidth and battery usage
  - Optimized resource memory usage

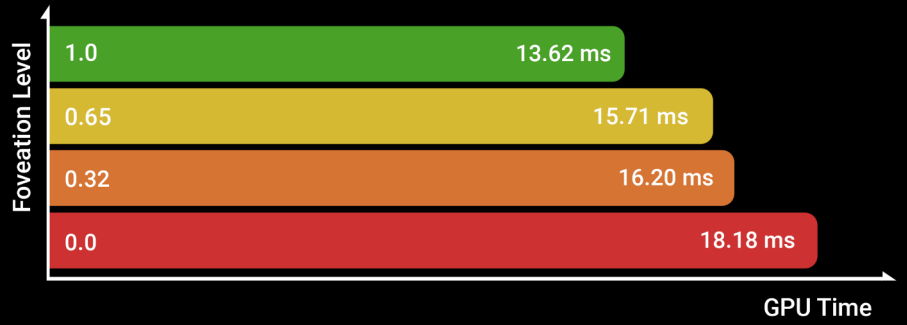


URP VR foveated rendering

- → Optimization
  - GPU performance at the cost of peripheral shading quality
  - Stable frame rate for improved immersion
- → Support
  - Gaze tracking
  - PlayStation®VR2 support
  - Oculus XR and OpenXR integration coming in Unity 6



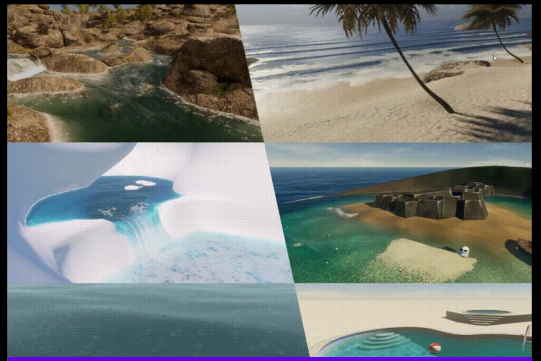
Cockpit template scene benchmarked for foveated rendering performance on Quest 2



HDRP water enhancements

Flow maps, foam generators for floating objects

Custom water line



Sample scenes for common use cases

Currents, foam generator, deformers, excluders

Currents with flowmaps and foam generator for floating objects

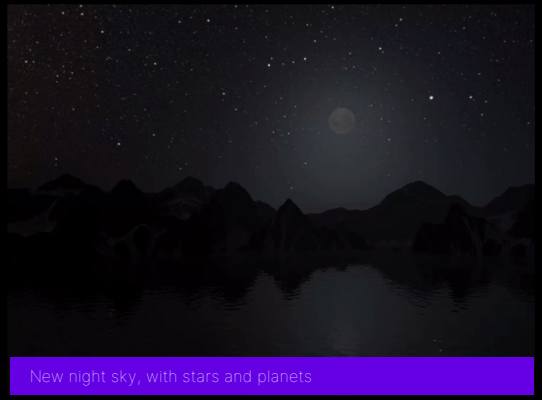
Improved rendering

Compatibility with transparents and clouds, added water line and custom post processing capabilities

Samples scenes

Sample scenes to get started with oceans, rivers, and pools

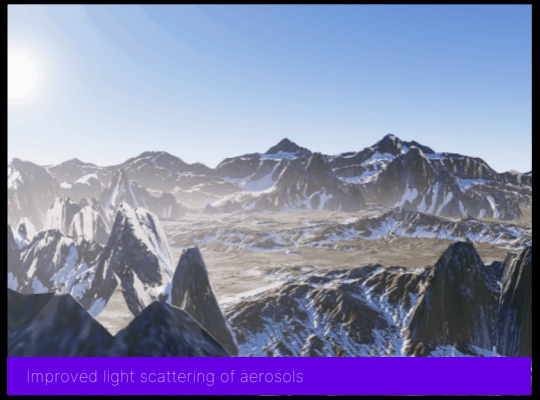
HDRP sky enhancements



New night sky, with stars and planets

Night sky

New night sky, with stars and planets, for more variations in time of day scenarios



Improved light scattering of aerosols

Atmospheric scattering

Improved light scattering of aerosols in the distance, even with low-distance fog

Comparing ozone layer on/off

Ozone layer

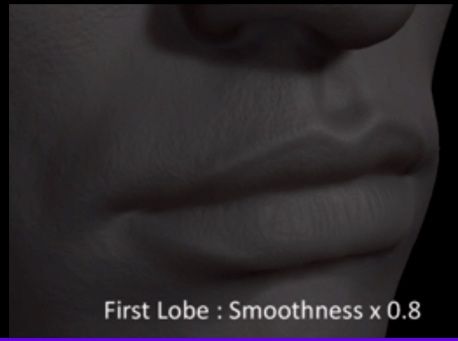
Improved visual fidelity of the physical sky, including ozone layer simulation

HDRP character rendering enhancements

Improved lighting and performance for hair strands

Line rasterizer

Improved lighting, performance, and anti-aliasing for hair strand rendering



Simulate skin shading more accurately

Improved skin shading

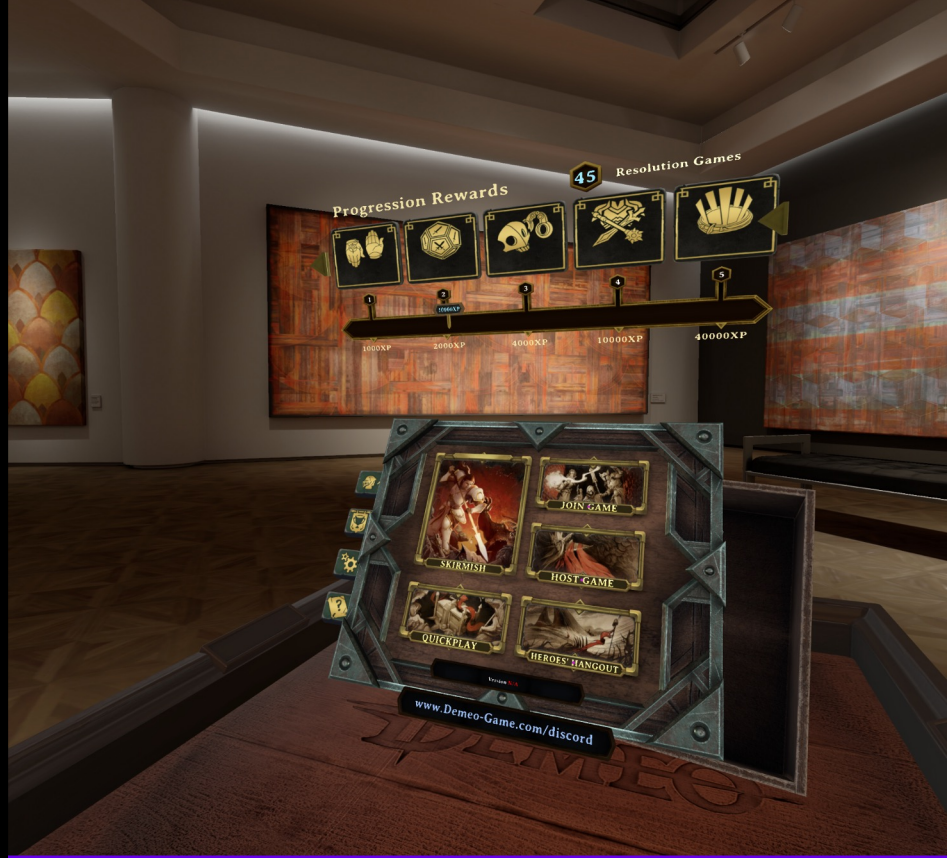
Added an optional dual lobe option to simulate the oily layer covering the epidermis for characters close-ups

Maximizing your platform reach

Reach more players on XR platforms

Apple visionOS

- → Beta now available for Unity Pro, Enterprise, and Industry subscribers. Get access at unity.com/spatial
- → Initial platform support for building mixed reality apps, alongside support for virtual reality and windowed apps
- → Next, further integration of core Unity features and improvements to iteration and debugging tools for mixed reality app development



Demeo (Resolution Games) screenshot in visionOS simulator for Apple Vision Pro

Reach more players on XR platforms

Meta Quest 3

- → Official mixed reality support through AR Foundation
- → VR and MR project templates in Unity Hub
- → Unite 2023 session: “Elevating your mixed reality with Presence Platform and Meta Quest 3”

Start creating mixed reality games on Meta Quest 3 today

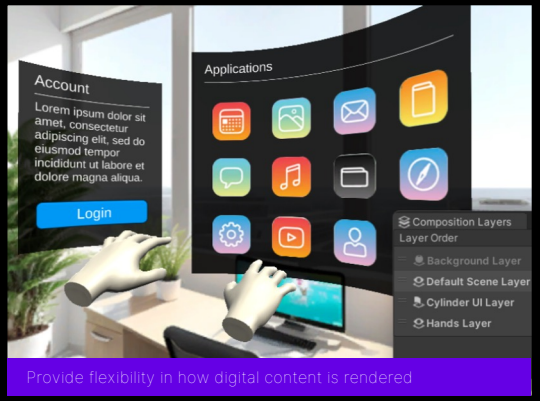
Bring the real world into your game with AR Foundation and OpenXR

Place digital content in the real world

Spatial anchors

Persistent, shared, and cloud anchors for precise placement of virtual objects in the physical world across player sessions

Coming 2024
Unity 6



Provide flexibility in how digital content is rendered

Composition layers

Enables high-quality XR rendering effects, allowing you to make UI text, images, and videos even clearer

Coming 2024
Unity 6

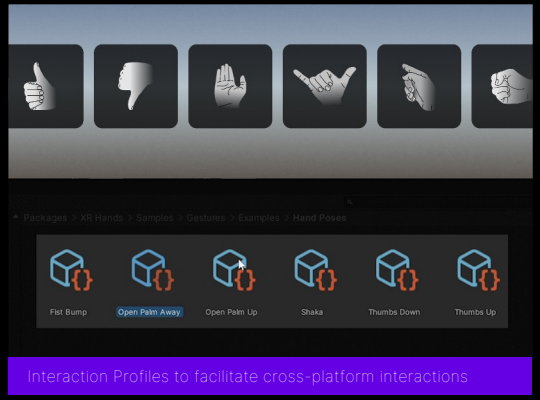
Bring the real world into your game

Environment data

Including plane tracking and geometric mesh representations of environments on new platforms and bounding boxes that quickly identify real-world objects

Coming 2024
Unity 6

Build rich experiences with input and interaction frameworks

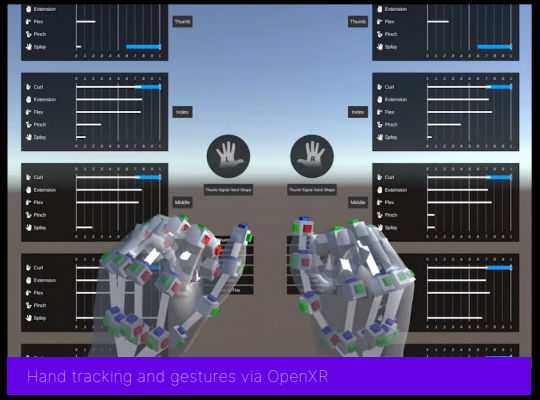


Interaction Profiles to facilitate cross-platform interactions

Cross-platform input

Interaction Profiles convert common gestures and action poses into interactive XR commands, facilitating effortless cross-platform interactions.

Coming 2024
Unity 6

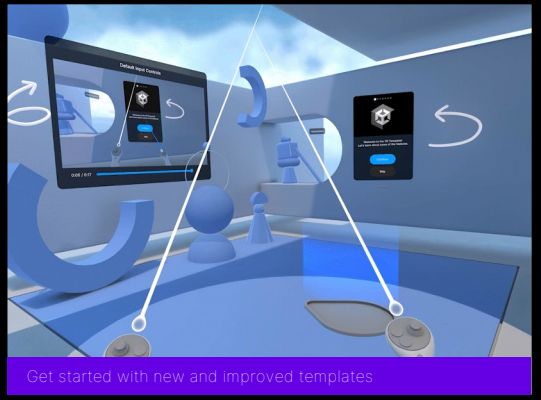


Hand tracking and gestures via OpenXR

Hand tracking and gestures

Unity's integration with OpenXR now facilitates seamless hand tracking and custom gestures without requiring headset-specific SDKs.

Coming 2024
Unity 6



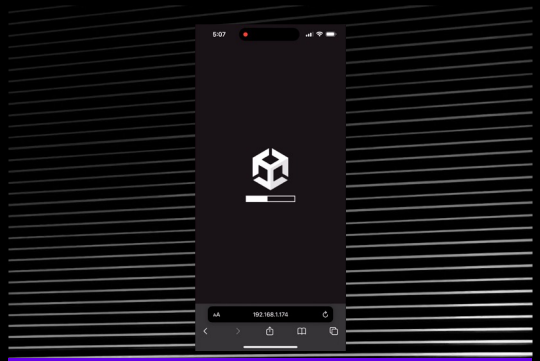
Get started with new and improved templates

Project templates

Quickly get started with improved templates for virtual reality, mobile AR, and mixed reality, plus a new networked multiplayer template coming next year.

Available now
2023.2

The future of web

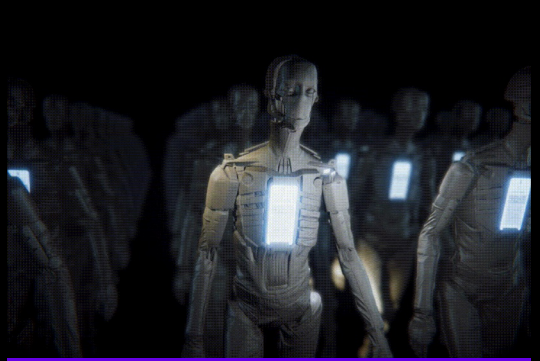


Unity Web supports Android and iOS in Unity 6

Mobile web support

Run your Unity games anywhere the web exists, including mobile browsers.

Coming 2024
Unity 6



WebGPU early access available in Unity 6 Preview

WebGPU

Experiment with the latest WebGPU graphics API integration.

Coming 2024
Unity 6

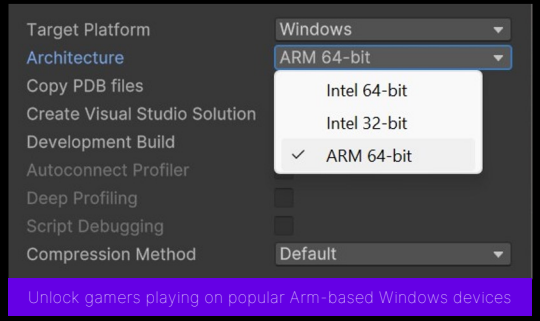
Bring your games to Facebook and Messenger in 2024

Instant Games

Support for Instant Games on Facebook and Messenger is coming late next year.

Coming 2024

Microsoft ecosystem



Unlock gamers playing on popular Arm-based Windows devices

Windows on Arm runtime

Reach an even wider audience across Windows on Arm devices by selecting “ARM 64-bit” as an architecture for Windows builds.

Available now
2023.1

The Unity Editor is ready for Arm on Windows

Windows on Arm Editor

Create with Unity using Arm-based Windows devices utilizing the same performant tools you already know and love.

Coming 2024
Unity 6

Microsoft

GDK

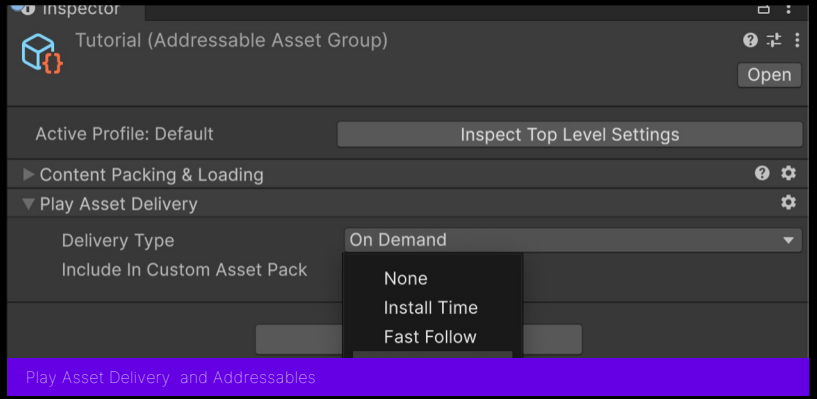
Build Win32 games for the Windows Store

Game development kit on Windows

Build your Windows standalone games with support for build automation options and scriptable configurations.

Coming 2024

Mobile – Android



Play Asset Delivery and Addressables

Addressables ❤ Google PAD and TCFT

Get the power of Addressables with the dynamic delivery of Play Asset Delivery (PAD). Reduce initial download size and help your game look great across devices with targeted textures.

Available now
2023.2

AGDK game activity

Game activity application entry

Benefit from improved threading support over core runtime events with the updatability of AndroidX.

Available now
2023.1

Mobile – Android

Better memory feedback

- Three usage levels
- Google Memory Advice API

Available now
2023.1

Predictive back gesture

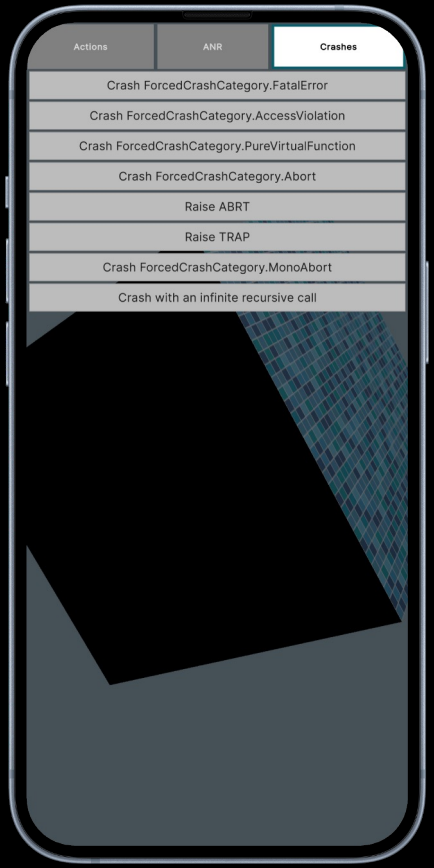
- Avoid unwanted quits

Coming 2024
Unity 6

Application exit information

- Access to exit reasons from C#
- Stacktraces and historical events

Available now
2023.2



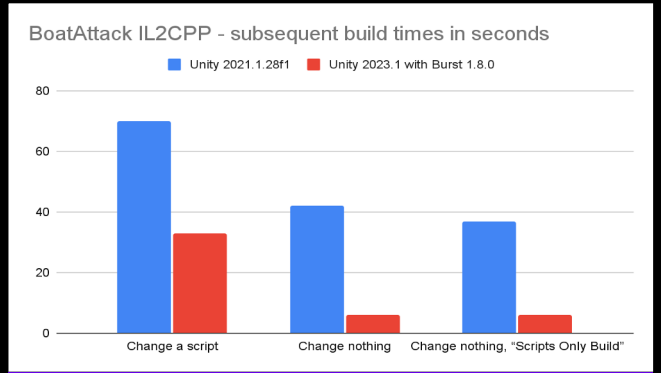
Console support

Made with Unity in PlayStation®VR2

PlayStation®VR2 support launched

More than 50% of PlayStation VR2 launch window titles were made with Unity. With new cross-platform toolkits, it's easier to create and port.

Available now
2022 LTS



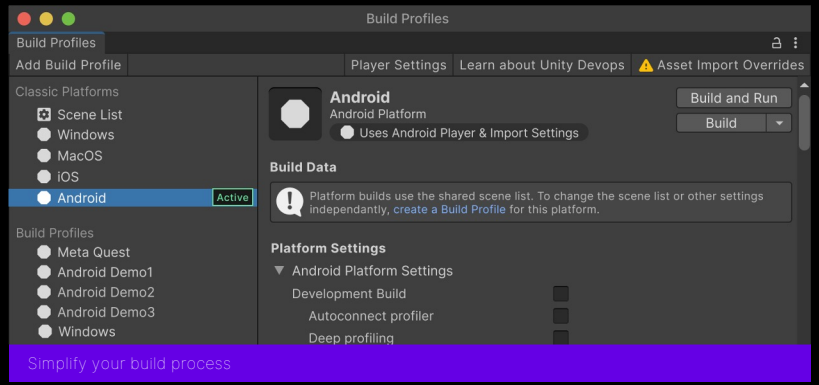
Push out iterations faster

Incremental build pipeline

For faster iteration during development, Unity uses an incremental build pipeline that only rebuilds parts of the application if they have changed since the previous build – now supported on console platforms.

Coming 2024
Unity 6

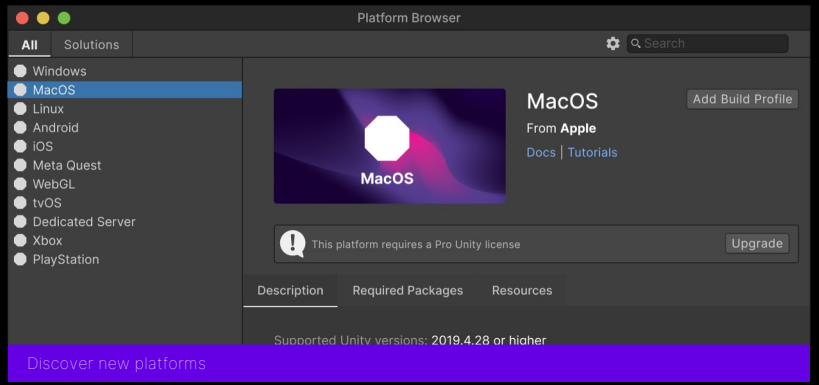
Core platform improvements



Build Profiles

Configure multiple build profiles with different settings and scene lists for each. Share them with your team using version control and streamline cross-platform development.

Coming 2024
Unity 6



New platform browser

Browse all the platforms Unity supports and find out more about our closest partners and get info on how to onboard to new platforms.

Coming 2024
Unity 6

Accelerating the creation, launch, and scale of multiplayer games

UOS一站式游戏云服务解决方案，助力开发者轻松打造游戏

13:30-14:00

Breakout session

Unity AI

Sentis and Muse

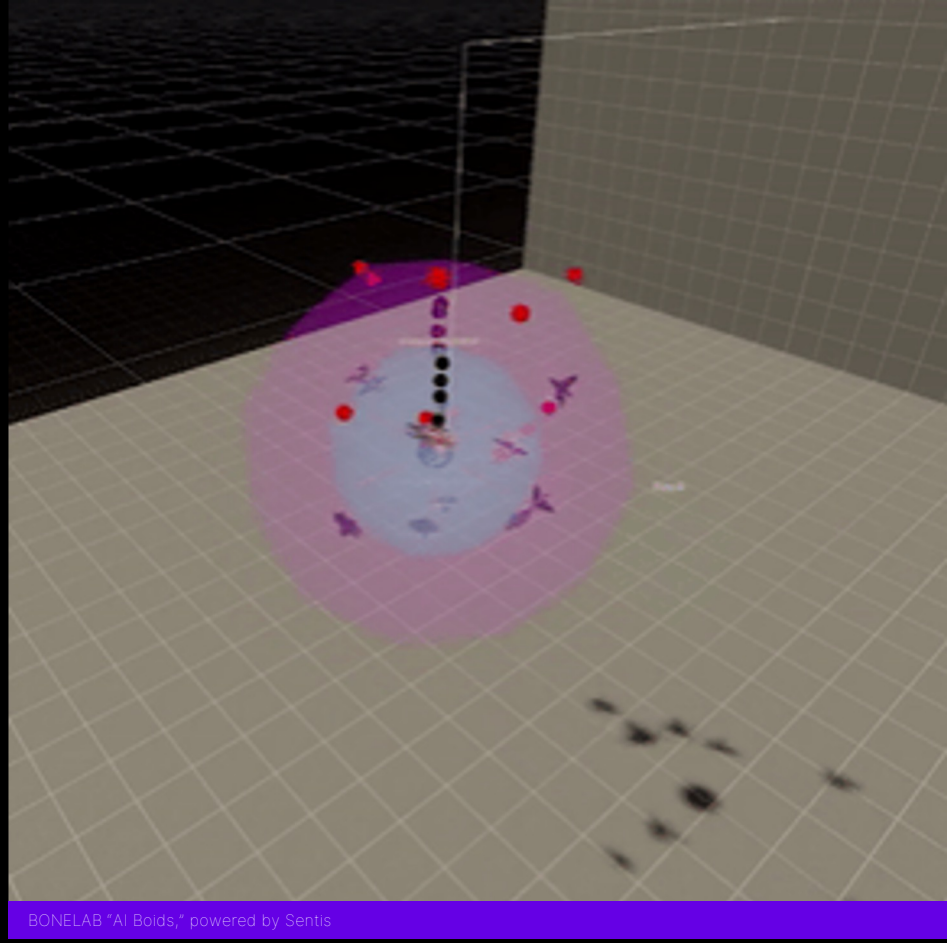
UNITE/


Sentis

Sentis

Available now

- → Unlock new experiences with AI models in the runtime that traditional code can’t deliver
- → Standard AI model implementation that runs on all Unity Runtime platforms
- → Local inference means no network latency, unlimited free use, and no data sent to the cloud

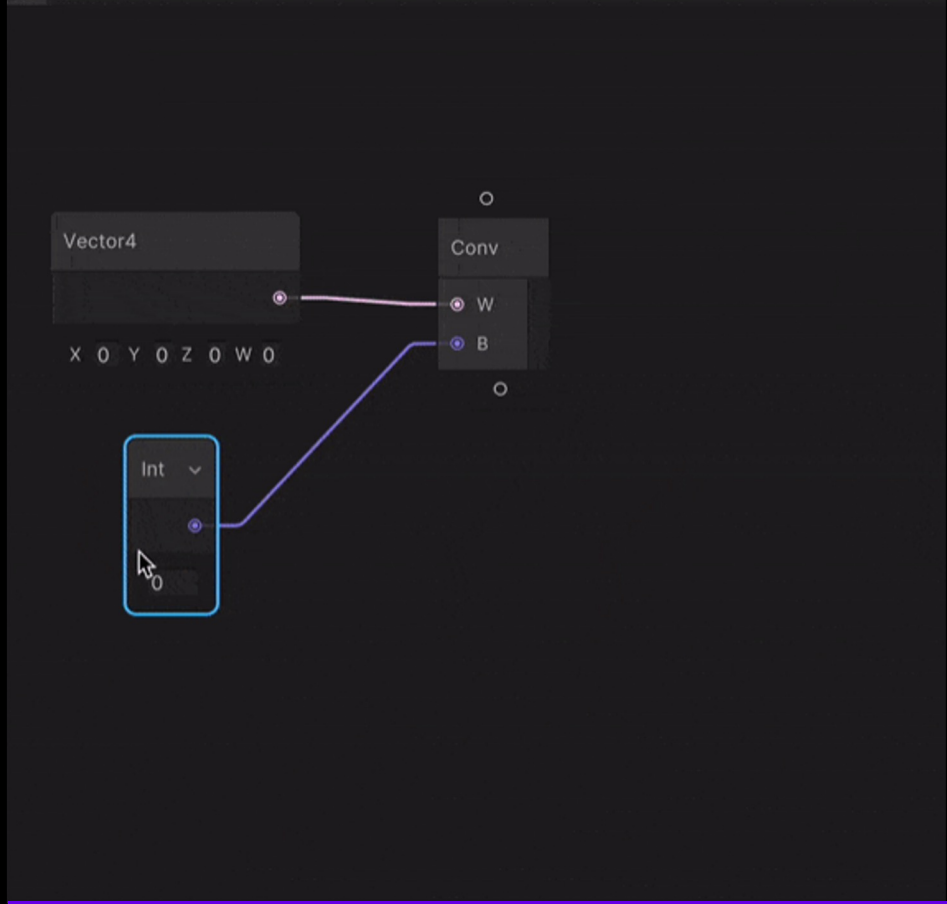


BONELAB “AI Boids,” powered by Sentis

Sentis

Sentis in 2024

- → Neural chip integrations for faster for AI model inference and to offload work from the CPU/GPU
- → Graph editor for AI models enables visualization and optimization edits
- → Cloud inference HTTP wrapper for server API calls without changing the C# code



Sentis graph editor tool for AI models


Muse

Muse

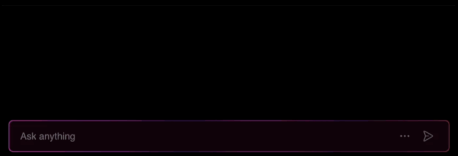
Unity Muse early access

→ One subscription, many generative AI features

→ Muse subscribers can explore all capabilities, including unreleased alphas

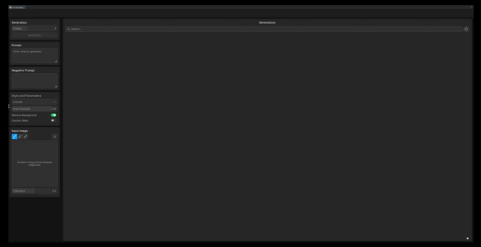
UNITE/ Available now **Early access**

Unity Muse



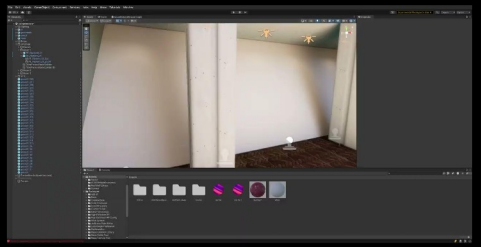
Chat

Solve problems, get ideas, and generate usable code.



Sprite

Craft 2D art through prompts and modify directly in the Editor.



Texture

Rapidly generate PBR-enabled textures using natural language.

coming soon

Behavior

Set up character interactions through natural language in Editor.

Animate

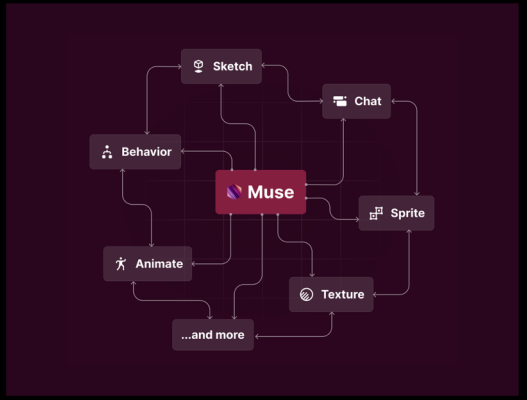
Bring human characters to life with just a few text prompts.

Sketch

Rapidly mock up scenes with natural language prompts.

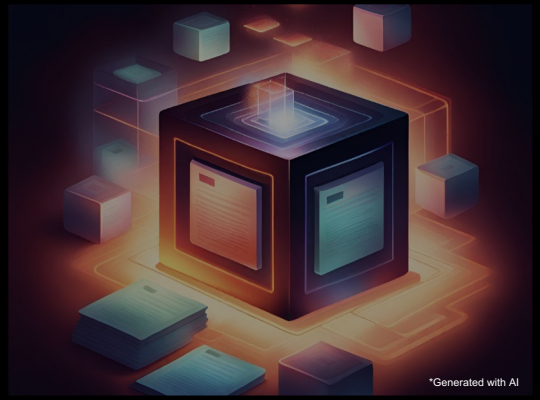
Muse

Chat in 2024



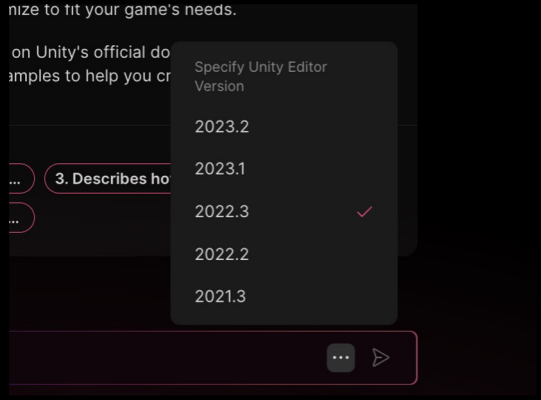
Muse interconnected

Chat will continuously become more of a connector across Muse and Unity to help you access and activate more capabilities with natural inputs.



Rapid resource expansion

We will continue increasing Unity product coverage and incorporating new Unity materials as they become available.

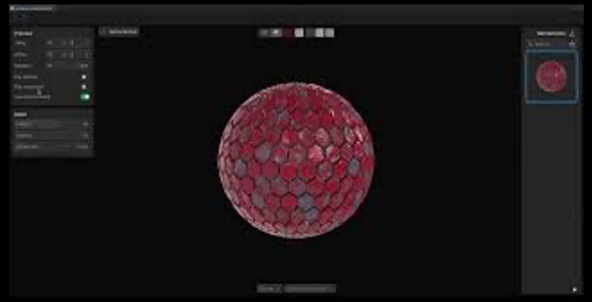


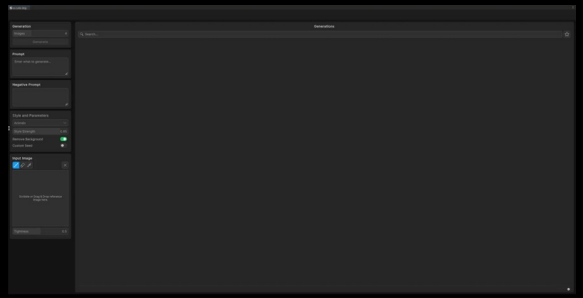
Unity for every developer

We're elevating our Chat feature set to welcome developers at every skill or familiarity level and ability.

Muse

Texture and Sprite in 2024





Continuous model improvements

Continuous improvement of our generative AI model to provide more diverse and higher-quality outputs

More user control

Continue adding features to give creators more control

Workflow improvements

Continue improving workflows for an even better user experience

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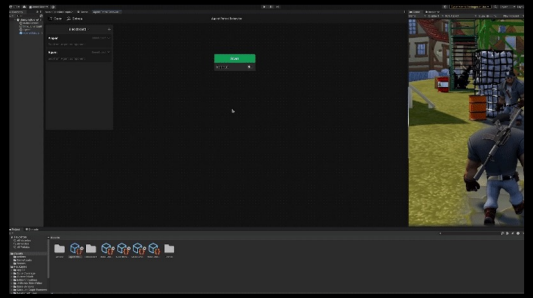
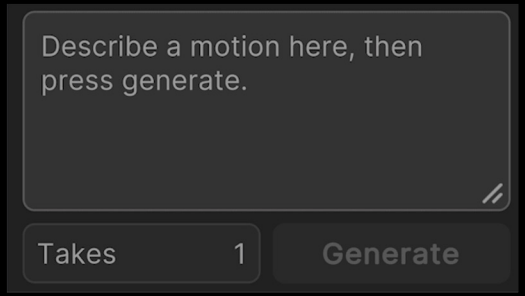
Muse

In alpha and coming soon



Behavior

Set up character interactions with Muse Behavior. Simply describe the desired behaviors, and Unity Muse will create behavior trees in the Editor.



Animate

Bring humanoid characters to life with just a few text prompts, saving hours of traditional setups.

Sketch

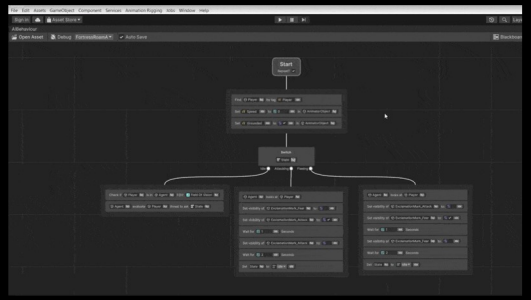
A rich 3D canvas where teams can rapidly mock up scenes with natural language prompts.

Muse

Behavior

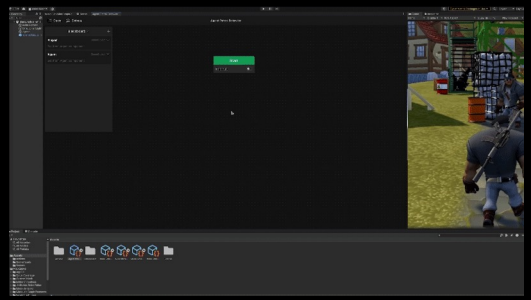
Native Unity integration

Muse Behavior seamlessly integrates with Unity, providing a direct platform for creating and managing behavior trees without third-party tools.



Easy behavior tree editing

Muse Behavior features a nodal editor, simplifying the creation and management of behavior trees through an intuitive visual interface.



Natural language processing

Text-to-Behavior tree and Text-to-Actions features transform textual descriptions into behavior trees and C# actions, simplifying AI design.

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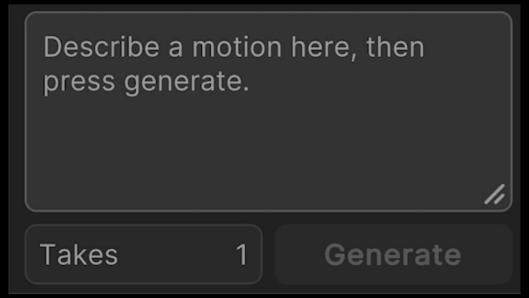
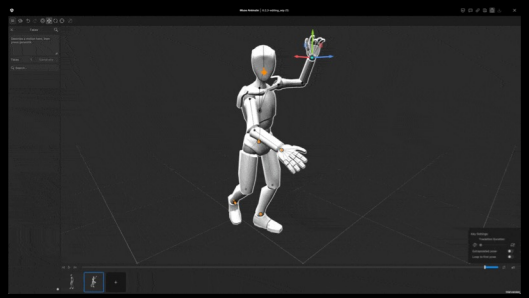
Muse

Animate





Text to animation

Muse Animate's text-to-motion feature translates text prompts into preliminary animations, simplifying animation creation for indie developers and small teams.

AI powered customization

You can manually edit animations with AI-assisted posing, blending control with AI-driven suggestions for refined, personalized animations.

Easy export

Supporting USD and FBX formats, Muse Animate facilitates seamless transitions of animations to Unity and other 3D software, streamlining the development workflow.

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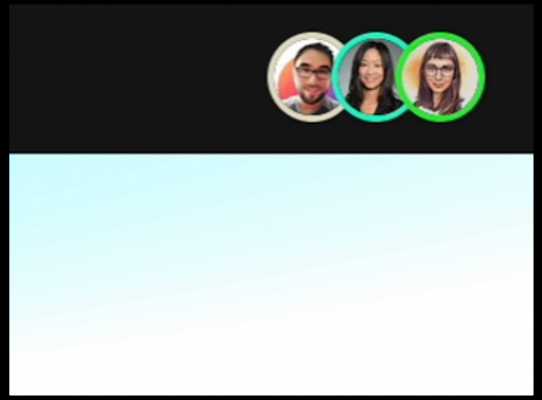
Muse

Sketch

AI-powered prototyping

Leverages artificial intelligence to streamline the prototyping process and enable speedy ideation.



Real-time collaboration

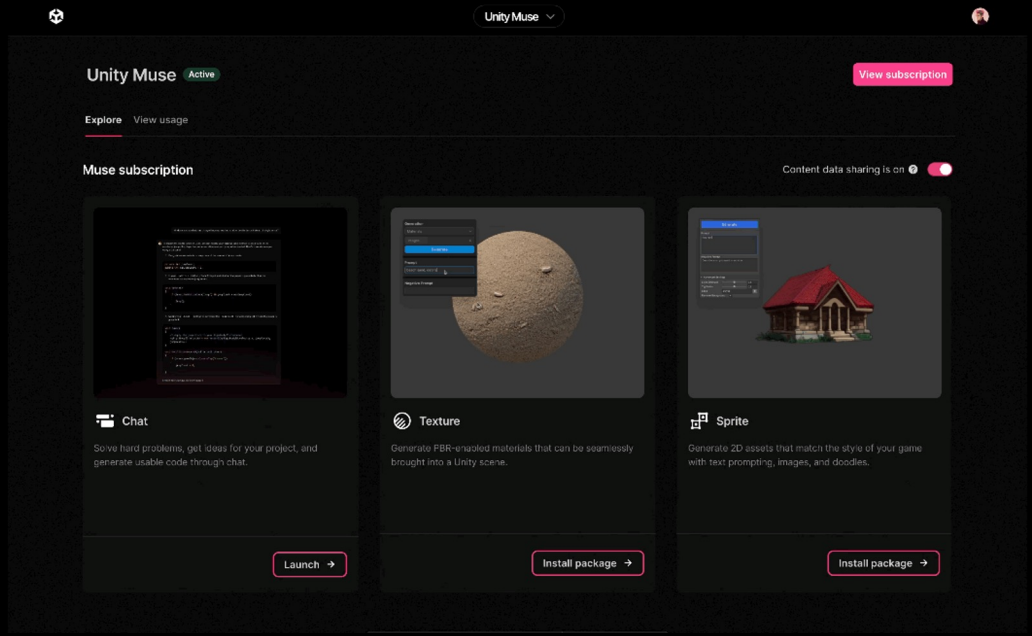
Teams can work seamlessly in a shared space, even in the Editor.

Unity ecosystem integration

Work in real-time with collaborators in the Editor, enhancing workflows with seamless interoperability.

Responsible data sharing

- Data sharing helps improve our models and your experience.
- Unity is committed to responsible data sharing, so only users who choose to opt in to data sharing will data share.
- It’s easy to turn your data sharing off and on, so you’re always in control.



Muse

More to come in 2024

→ Muse will continue to improve and introduce new capabilities to power ideation and iteration.

Available now
Early access

Thank you.