

# Best advices for indie and small studio

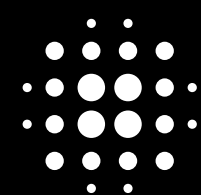
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Unity Technologies  
[hoang@unity3d.com](mailto:hoang@unity3d.com)



**7 out of 10 top iOS and Android  
games are made with Unity.**



# Unity Portfolio Overview



Graphics



Performance



Connected Games



Vivox



Distribution Portal



Ads



Mobile AR



Connected Games



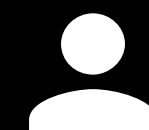
Multiplay



Experimentation



In-App Purchasing and  
Promotion



Personalized  
Placements



Mobile Creator  
Tools



Customer Success  
Services



Create



Operate



Monetize



# One platform to do it all

Create

Operate

Monetize



Performant and customizable  
Scriptable Render Pipeline scales  
for the full spectrum of devices

**Lightweight Render Pipeline (LWRP)**

# The Lightweight Render Pipeline (LWRP)

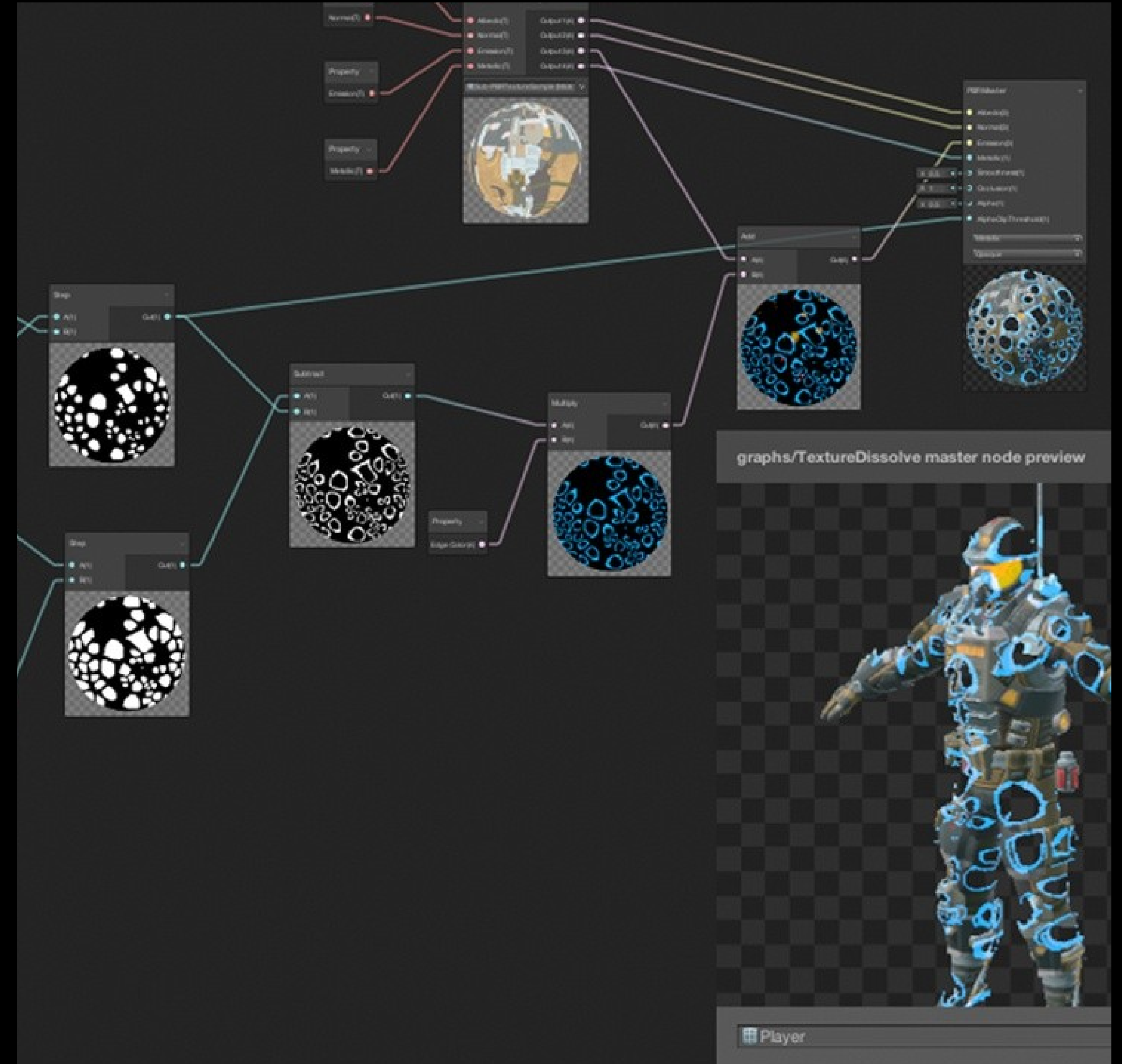
- Performant, scalable graphics, giving you more control than ever before in Unity
  - Pre-built Scriptable Render Pipeline (SRP) optimized to deliver high graphics-rendering performance
  - Perfect for lower-end hardware, mobile devices, and resource-hungry applications like XR.
- More choice and control for developers
  - Configure rendering in Unity from a C# script:
    - Optimize performance for specific hardware
    - Customize rendering processes on a granular level according to your needs
    - Control how your performance resources are used
- Highly extensible
  - Plug-and-play architecture lets you create custom render passes
  - Override the renderer to achieve specific effects
- Flexible
  - Rendering scales between platforms
  - Source code is available to further customize LWRP

Author shaders visually,  
see results in real-time,  
without coding

## Shader Graph

# Shader Graph

- You can do things like:
  - Procedurally alter your surface appearance
  - Warp and animate UVs
  - Modify the look of objects using familiar image adjustment operations
  - Change object's surface based on information about it, such as world location, normals, distance from camera, etc.
  - Quickly tweak shader visuals in the context of a scene using the Material Inspector.
  - Share node networks between multiple graphs and users by creating subgraphs





# Tools for out-of-the-box, performant 2D

## 2D Graphics



# Performant 2D Graphics

- Tools to make lighter yet impressive 2D sprites & animations

Vector Graphics

2D Animation

2D SpriteShape

- High-end 2D graphics capabilities

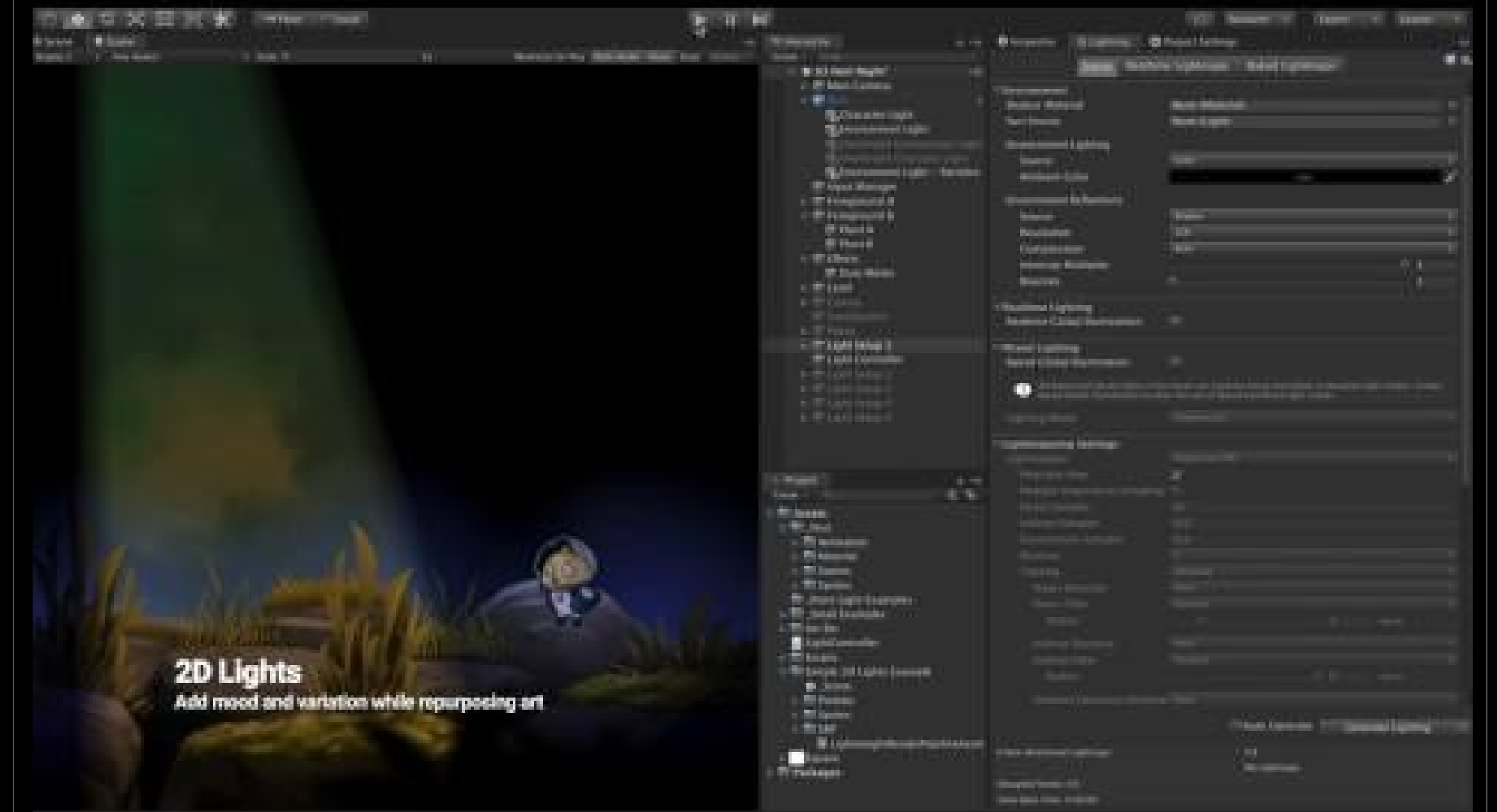
2D Lighting

2D Shadows

- 2D Performance

LWRP with 2D

2D ECS





# Unlocking the full performance potential of devices

**Adaptive Performance**  
**in partnership with Samsung**

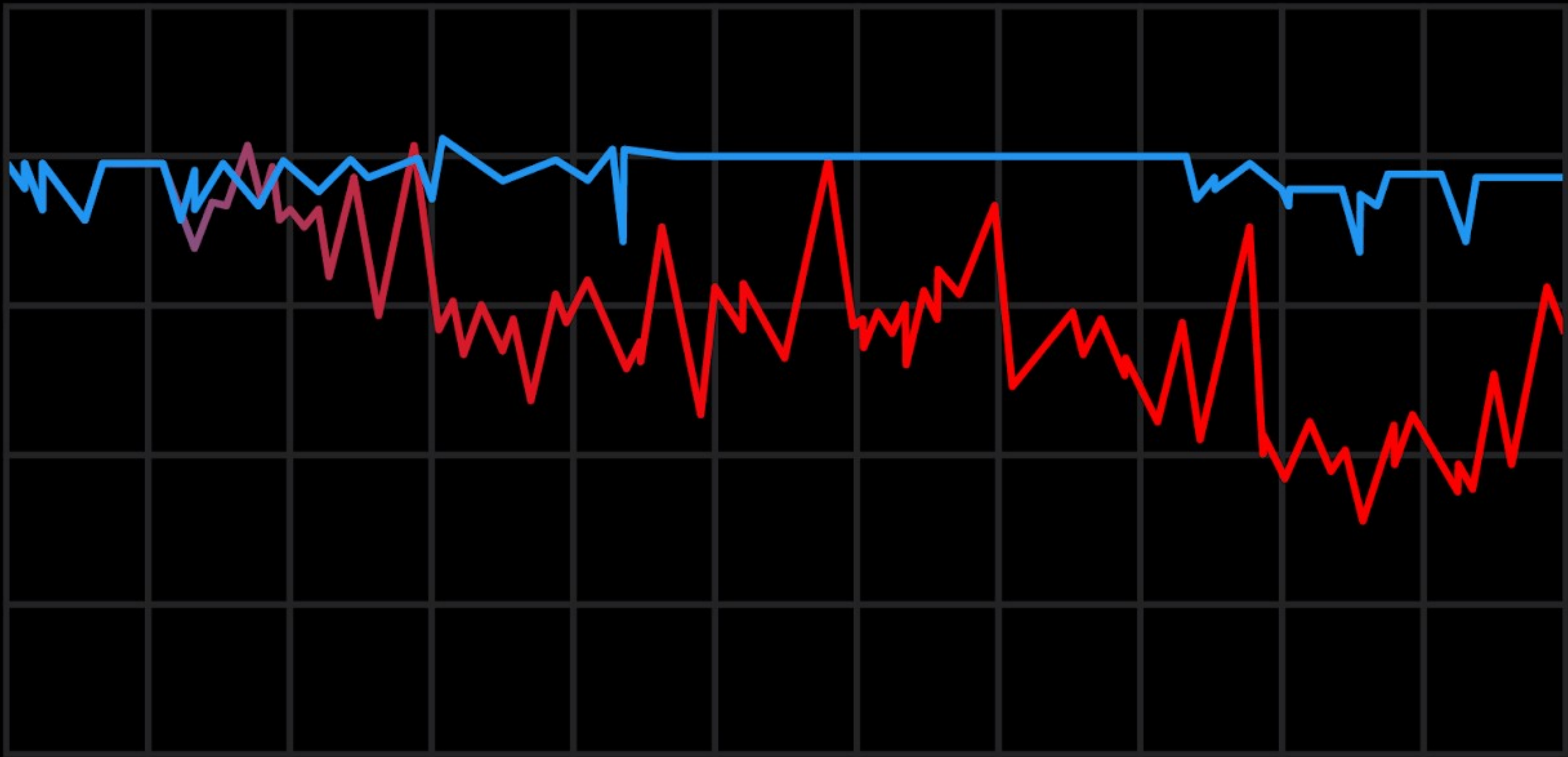




Adaptive Performance helps to predict frame rate drops due to hardware conditions

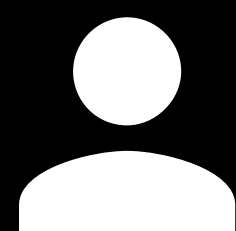
## Frame Rate

- Adaptive Performance
- Without Adaptive Performance



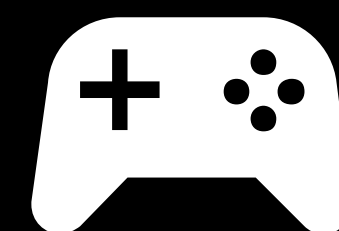


# Unity unlocks the full performance potential of devices



## For devs

Provide the best experience  
with deeper insight into  
hardware and tools



## For players

Games run more smoothly thanks  
to optimized battery usage on  
Samsung Galaxy devices\*

Hardware-oriented design for  
maximum performance... without  
the hardcore programming.

## Data-Oriented Tech Stack



# The Core of the Data-Oriented Tech Stack

## **C# Job System**

Takes full advantage of the multicore processors currently available without all the programming headache.

## **Entity Component System (ECS)**

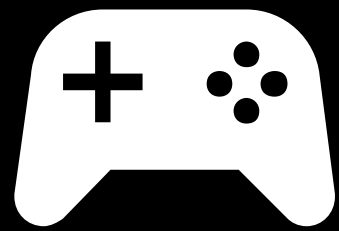
Provides an optimal way of organizing your data to run well on hardware.

## **Burst Compiler**

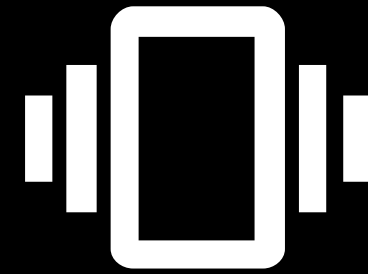
Provides highly-optimized code for your specific platform without all the hard work.



# What does this mean for mobile?



Create richer worlds and  
more complex gameplay



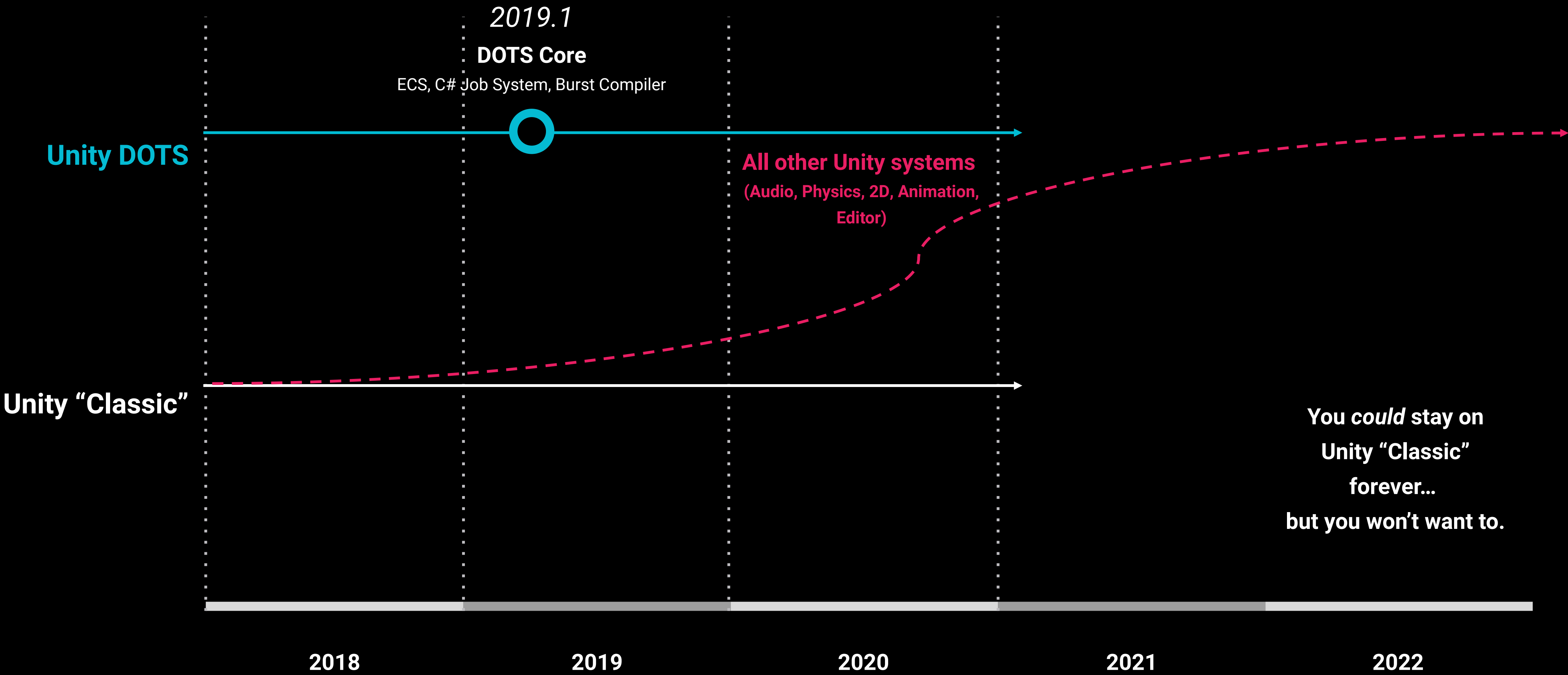
Run on more devices,  
maximize your  
audience reach



Achieve better battery  
performance and  
thermal control



# Timeline



Build instant games and  
experiences that are small,  
light, and fast

## Project Tiny



# Get out ahead of the pack and capture the opportunity with Project Tiny



## Complete control over size

Beat long load times with small runtime sizes that loads content fast



## Scalable performance

Deliver fast game-play performance on broad range of devices



## Robust Editor experience

Unity's familiar, easy-to-use developer tools speed up production

**Unity's new highly-modular runtime and Editor mode lets you build 2D instant games and playable ads that are small, light, and fast.**

## Tiny Arms Revenge

Running on  
iPhone 6

Engine - 244 KB  
Art - 625.71 KB  
**Total - 1.7 MB**





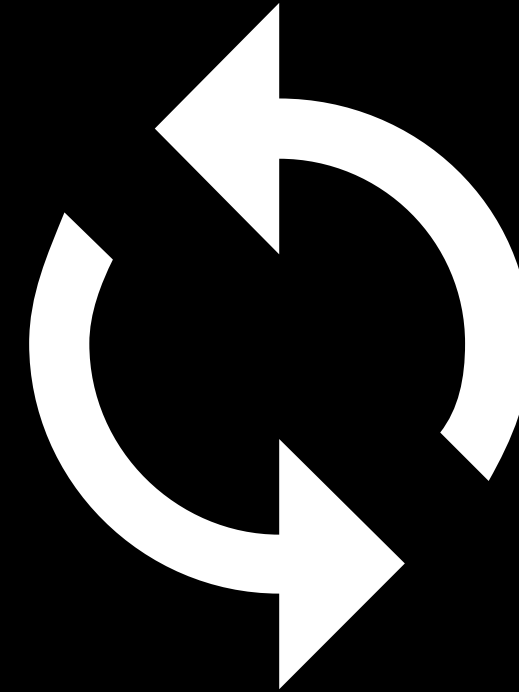
# The tools to build mobile AR experiences that bring your game into the real world

## Mobile AR

# Creating mobile AR games is easier than you think



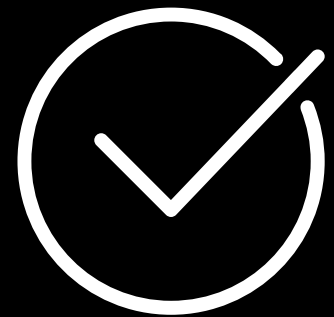
**Reuse assets**



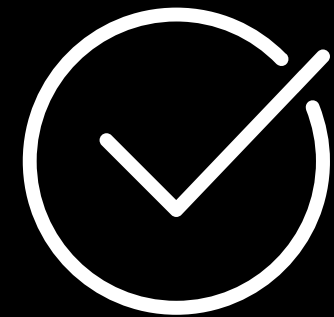
**Unity skills = AR skills**



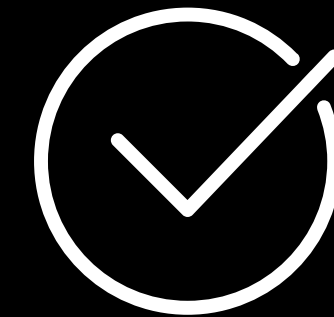
# AR Foundation, a powerful framework for AR creators



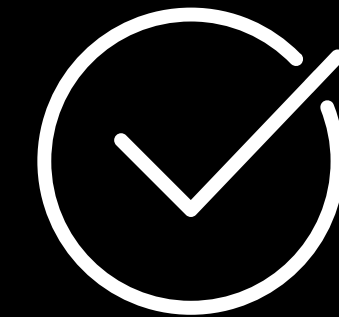
**Build once to  
deploy to ARKit  
and ARCore**



**Higher graphical  
fidelity**



**Anchoring objects  
to real world**



**Resizing for scale**

# Future-proof apps with AR Foundation

✓ AR Foundation supported feature

x Feature not known to be in development\*

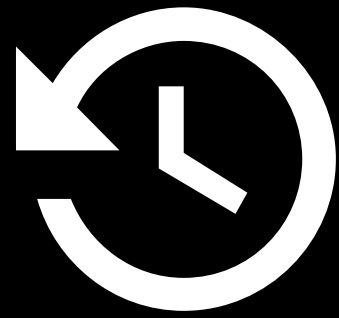
Core Platform Feature	AR Foundation	Google ARCore SDK for Unity	Unity ARKit Plugin
Plane Detection (Vertical)	✓	✓	✓
Plane Detection (Horizontal)	✓	✓	✓
Feature Point Detection	✓	✓ + Oriented Feature Points	✓
Light Estimation	✓	✓ + Color Correction	✓ + Color Temperature
Hit Testing (Feature point and Plane raycasting)	✓	✓	✓
Image Tracking	In preview 2019.1	✓ (Static Only)	✓
3D Object Tracking	In preview 2019.1	x	✓
Environment Probes	In preview 2019.1	x	✓
World Maps	✓	x	✓
Face Tracking (Pose, Mesh, Blendshapes)	✓	✓	✓ iPhone X + Variants Only
Cloud Anchors	In development	✓	x
AR Remote	In preview 2019.1	✓ - Instant Preview	✓ - ARKit Remote



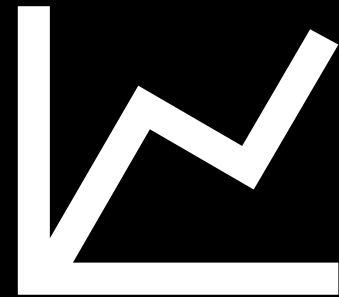
A flexible, performant network  
library, made for scale

**Connected Games, Network Stack**

Creating real-time multiplayer games is hard...  
especially on mobile.



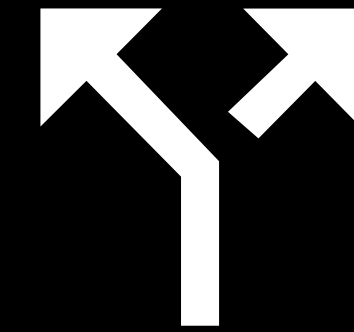
**Latency**



**Scale**



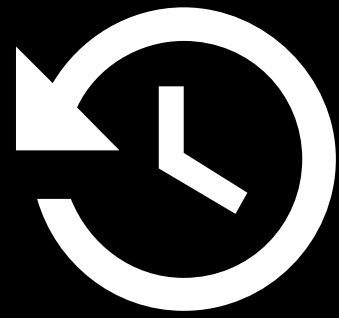
**Security**



**Flexibility**

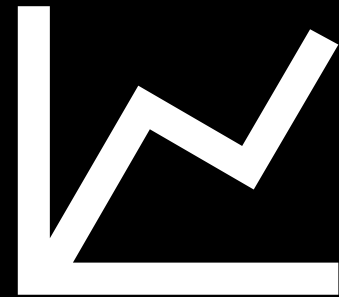
- ! **Limited Bandwidth**
- ! **Disconnect on cell/wifi transitions**

Building the solution with a mobile-first focus.



### Latency

- ✓ Bandwidth profiling
- ✓ Reconnect



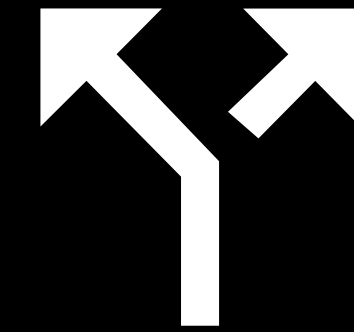
### Scale

- ✓ DOTS-ready & multi-threaded



### Security

- ✓ DGS topology



### Flexibility

- ✓ Built with modularity in mind
- ✓ Source code available
- ✓ Archetype specificity



Manage, host, and deliver the right content to the right users at the right time.

## Hosted Addressable Assets

**“For every 6 MB increase to an APK’s size, we see a decrease in the install conversion rate of 1%.”**

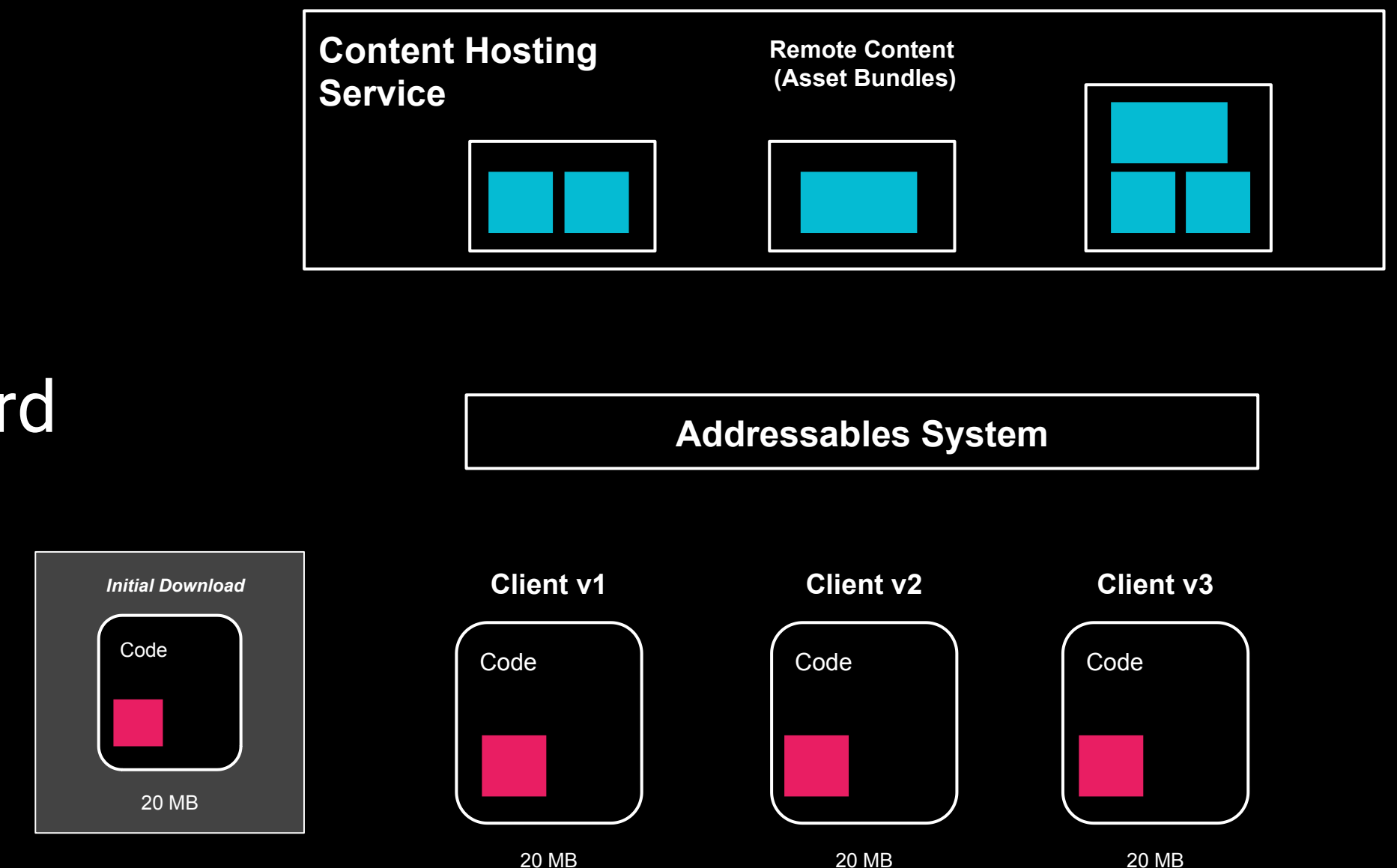
**“The download completion rate of an app with an APK size of around 10 MB will be ~30% higher than an app with an APK size of 100MB.”**

**– Google Play**

# Unity Hosted Addressable Assets

## Key Features

- Integrated with Addressables workflows and UI
- Service APIs
- Online Documentation and Integration Guide
- Basic Monitoring and Management in Unity Developer Dashboard
- Supports multiple environments/staging (dev, production, etc.)



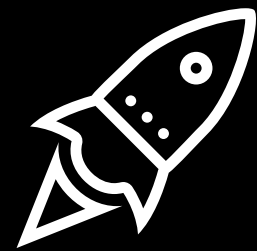
**The combination of Addressables and Unity's Content Hosting Service provides the most efficient way to manage, host, and deliver your content to users.**

**Available Q4'2019**



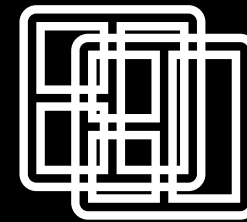


# Unity Hosted Addressable Assets



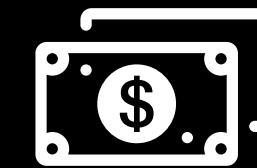
## Convenience

Tested and integrated tooling  
with Unity's platform of  
existing services



## Easy Content Management

A smart service to more easily manage  
their content across a myriad of  
production builds and client versions



## Competitive Costs

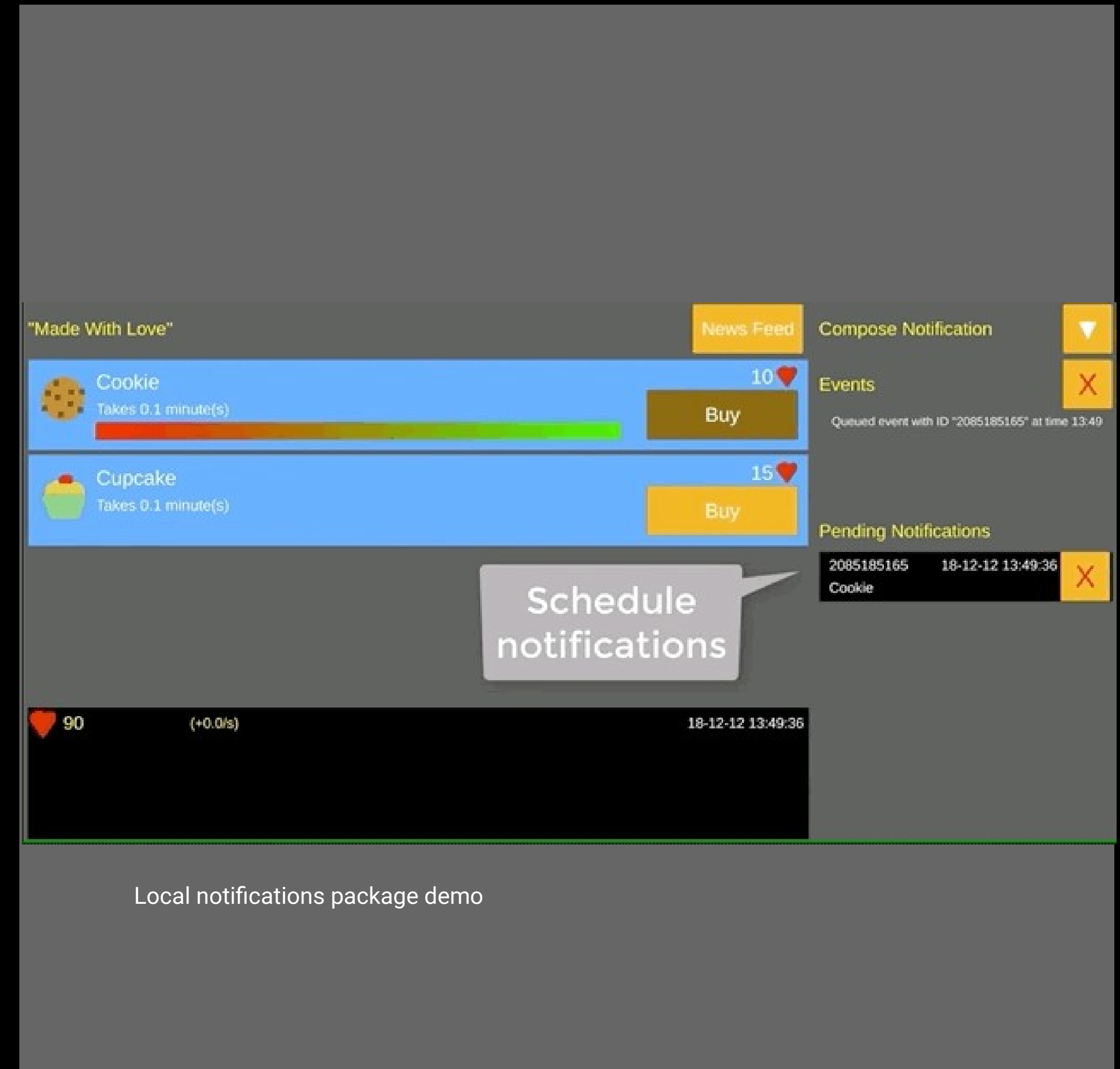
Familiar business models  
and competitive rates make  
the decision easy

# Reducing the time spent in day-to-day tasks for mobile creators

## Mobile Workflow Improvements

# Reducing the time spent on day-to-day tasks

- Faster iteration on device
  - New Patch Mode for Script Only Build (2019.1/Android)
- Updated screen safe-areas
  - To account for notch placement on Android and iOS (2019.2)
- Manage/schedule notification queue for your mobile apps
  - Local Notifications package (2019.2)
- Improved performance/processing of high-frequency touch events
  - New Input System (2019.3)





A time-saving toolbox so you can  
do what really matters on mobile:  
build *fast*

**Asset Store**

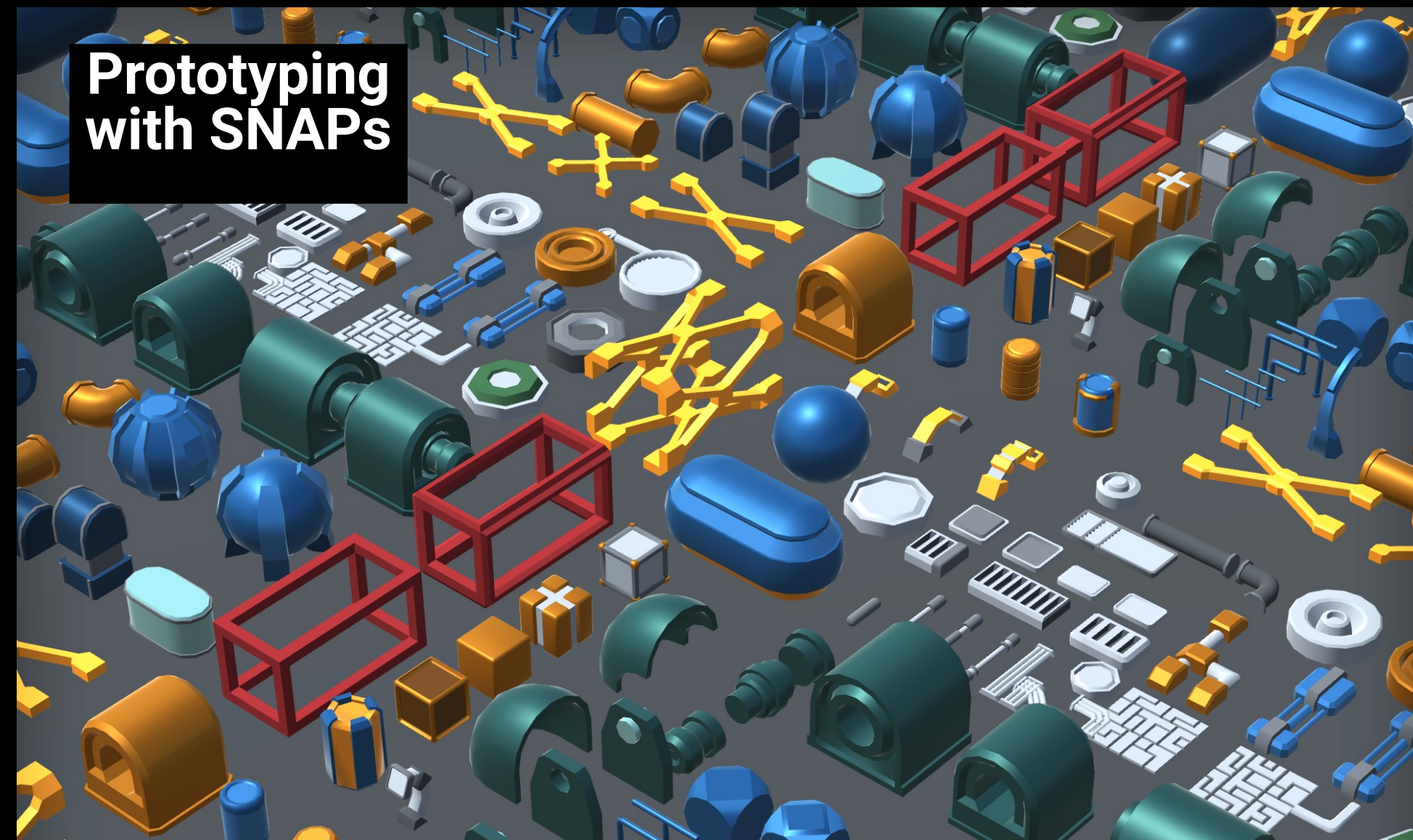
From prototyping assets to  
AAA production assets with the  
flip of a switch

**SNAPs**

**presented by Unity Asset Store Originals**



Get to final results faster with Unity-produced, themed packs for prototyping and production.



Low poly, non-textured, ProBuilder assets



High-quality meshes with materials, shaders, textures that are HDRP and LWRP compatible



## Before

Drastically improve production time by streamlining prototyping and art production.

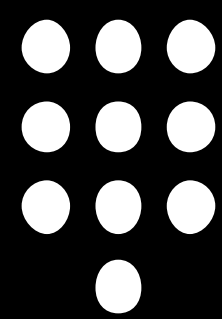
## After

With SNAPs, you can go from prototyping assets to AAA production assets with the flip of a switch.

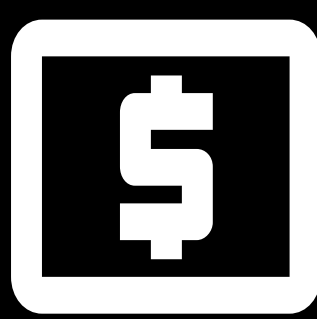
Spend time building unique  
gameplay, not common systems

**Game Foundation**

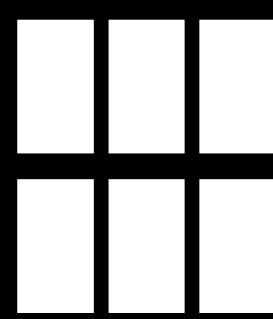
# Common systems in F2P



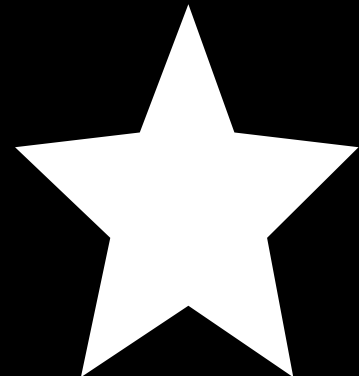
**Inventory**



**Virtual  
Currency**



**Product  
Catalog**



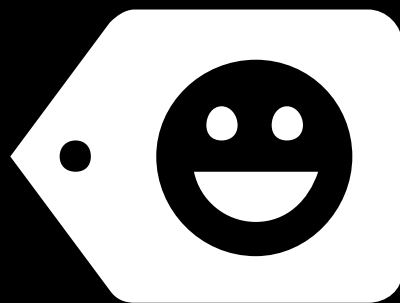
**XP**



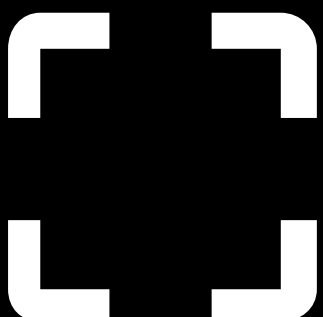
**Player  
Profile**



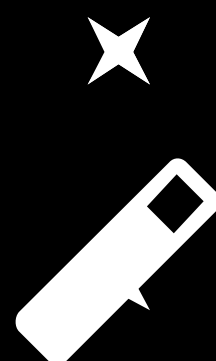
**Resource  
Management**



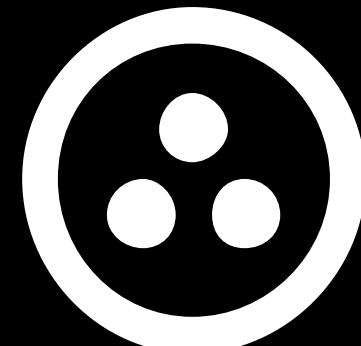
**Promotion**



**Player Wallet**



**Virtual Goods**



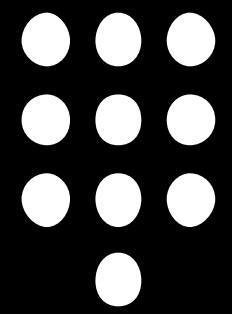
**Bundles**

## Challenges of building common game systems

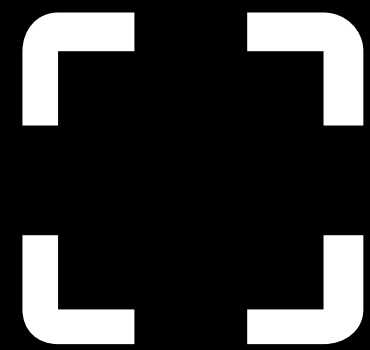
- ✗ They take weeks or months to build
- ✗ Limited flexibility with third party systems
- ✗ “Simple” systems are not always simple



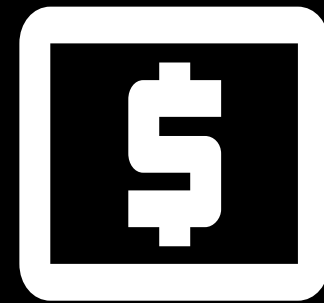
# Game Foundations V1 Modules - Q2 2019



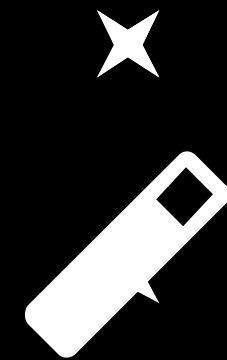
**Inventory**



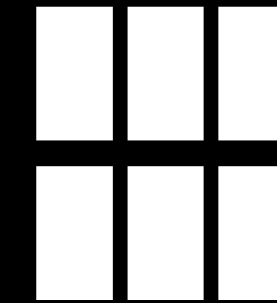
**Player Wallet**



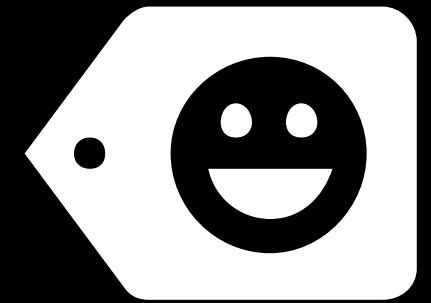
**Virtual  
Currency**



**Virtual Goods**

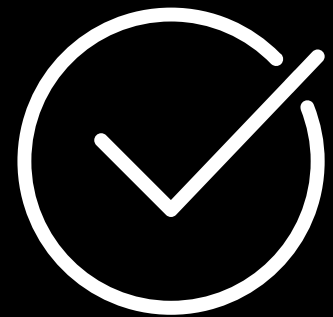


**Store  
Management**

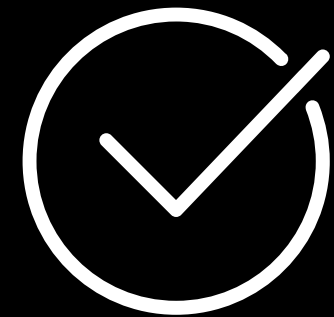


**Promotion**

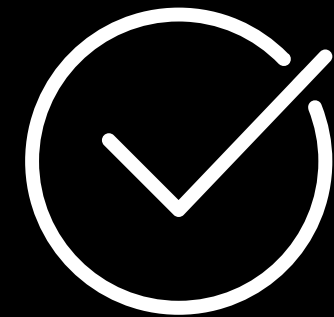
# Game Foundation Benefits



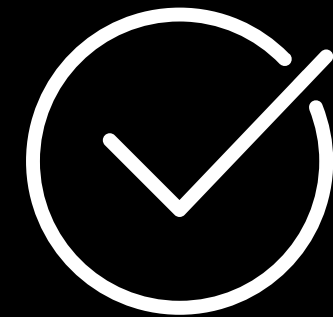
**Low iteration  
cost**



**Analytics  
automatically  
enabled**



**Common vocab  
for gameplay  
systems**



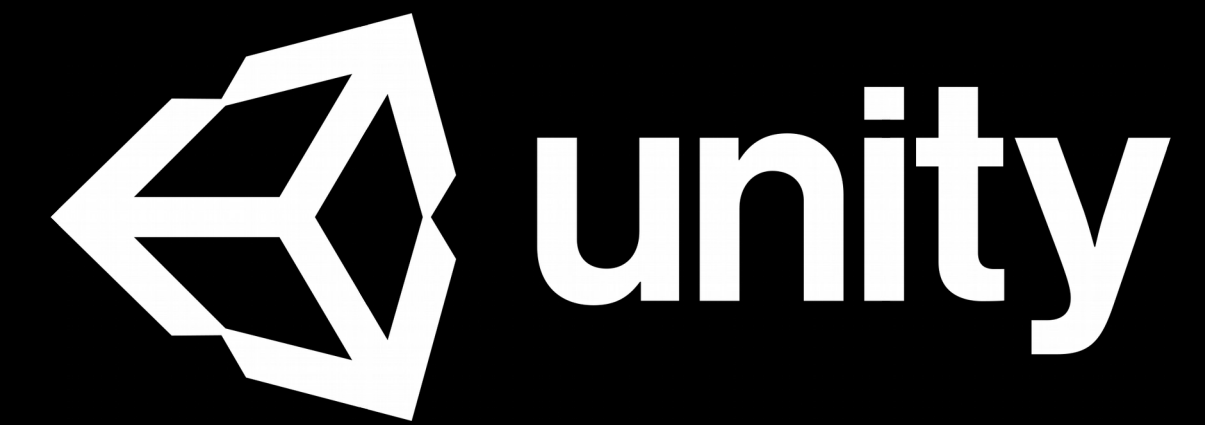
**Flexible Editor  
Workflow and  
API**

# Native app + Unity view

- <https://forum.unity.com/threads/using-unity-as-a-library-in-native-ios-android-apps.685195/?fbclid=IwAR2xJAaxdivAF6z9MaY-sd56nV7nfpbYmo6MtgTDib2HFHVbs0Btc-eRROY>

**Using Unity as a library in native  
iOS/Android apps**





Contact: [hoang@unity3d.com](mailto:hoang@unity3d.com)  
[yiren@unity3d.com](mailto:yiren@unity3d.com)

