
Microsoft Game Stack. Achieve More.
The products within the Microsoft Game Stack were built for people like us — developers who dream big and need tech solutions that say yes to wherever that dream takes them.

Game Stack brings together our best resources to create a full technology stack that helps you in the development process — no matter where you are on your journey, or how big or small your team might be.

So, whether you're looking to host your game in the cloud, analyze and optimize your live titles, or reach the most passionate and engaged gamers on the planet, Microsoft Game Stack can help you achieve more.

Here’s to making the game of your dreams.
Microsoft Game Stack

Microsoft helps you achieve more, regardless of what stage of the developer journey you’re on.

<table>
<thead>
<tr>
<th>CREATE</th>
<th>OPERATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESIGN</td>
<td>MONETIZE</td>
</tr>
<tr>
<td>BUILD</td>
<td>MEASURE</td>
</tr>
<tr>
<td>TEST</td>
<td>ENGAGE</td>
</tr>
<tr>
<td>PUBLISH</td>
<td>GROW</td>
</tr>
</tbody>
</table>

- Azure Gaming
- Visual Studio
- ID@Xbox
- Simplygon
- Azure PlayFab
- Partner Center
- DirectX
- Havok
- Creators Program
- Power BI
- Visual Studio App Center
- Xbox Live
- Azure Dev Ops
- Microsoft Store
- GitHub
- Mixer Dev Lab
- UWP/WIN32
- Microsoft Office
- GitHub Mixer Dev Lab
Creating a great game starts with great game design. We’re invested in helping you achieve that. aka.ms/gsgdesign

**Azure DevOps**
Plan smarter, collaborate better, automate and ship faster with a complete end-to-end set of modern DevOps services. Use the full toolchain or pick and choose the DevOps components that complement your existing workflows. aka.ms/gsgazuredevops

**Microsoft Office**
Whether it’s Project to manage your game development progress, Excel to model your game play impact, or Teams to bring together a distributed team with chat, Visual Studio integration and meetings and virtual conferencing, Microsoft Office gets your design well underway. aka.ms/gsgoffice

**Mixed Reality**
Develop VR experiences for a range of mixed reality headsets. Build UWP apps for the Microsoft Store, or Win32 apps for SteamVR, the choice is yours. Mixed reality also allows you to target both integrated graphics cards or high-end gaming rigs for immersive experiences. aka.ms/gsgmr

**Simplygon**
Simplygon is the gold standard for on-premise automated 3D Optimization. Adapt your 3D assets to run smoothly on any platform. aka.ms/gsgsimplygon
Part of the success of your game depends on every stage of the development process getting equal attention. Microsoft has a toolbox ready for you to rely on no matter what you’re creating.

**DirectML**
DirectML allows you to use trained machine learning models in your Windows apps (C#, C++, and JavaScript). Hardware optimizations for CPU and GPU additionally enable high performance for quick evaluation results through DirectML.

[aka.ms/gsgdirectml](aka.ms/gsgdirectml)

**DirectX**
Microsoft DirectX graphics provides a set of APIs that you can use to create games and other high-performance multimedia applications. DirectX includes support for both 2D and 3D graphics.

[aka.ms/gsgdirectx](aka.ms/gsgdirectx)

**GitHub**
GitHub is a development community inspired by the way you work. From open source to business, you can host and review code, manage projects, and build games and software alongside 31 million developers.

[aka.ms/gsggithub](aka.ms/gsggithub)

**Havok**
Havok is a modular suite of software development kits for game engines that puts the power in the hands of creators, enabling state-of-the-art believability and interactivity through advanced physics simulation and pathfinding, while mitigating the overall cost and risks associated with creating today’s leading video games.

[aka.ms/gsghavok](aka.ms/gsghavok)

**Orleans**
Created by Microsoft Research, Orleans is an open-source framework for building distributed high-scale computing applications such as multiplayer games. It’s been used by Halo, Minecraft, and PlayFab.

[aka.ms/gsgorleans](aka.ms/gsgorleans)

**Visual Studio**
Building your games with DirectX, Unity, or Cocos? Use Visual Studio to create once and publish to 21 platforms, including all mobile platforms, WebGL, Mac, PC and Linux desktop, web or consoles. Use powerful cross-platform tools to make your interactive content run great on any device.

[aka.ms/gsgvisualstudio](aka.ms/gsgvisualstudio)
Partner Center
Partner Center and Microsoft Store provide the ability to flight your game updates and fixes, and even provide 5x5 codes and beta access for specific people so you can make sure your game is ready to go.
aka.ms/gsgpartnercenter

PlayFab Content
Make the most of your soft launch window by leveraging PlayFab to run experiments, monitor performance, and tune configuration to boost key stats like retention and monetization.
aka.ms/gsgplayfab

Visual Studio
Write high quality code with comprehensive testing tools. Using Visual Studio, you can write code faster, debug and diagnose with ease, test often, and release with confidence.
aka.ms/gsgvisualstudio

Visual Studio App Center
Whether you’re building your games with Unity, MonoGame or native in Java and Swift, take your game development to the next level with App Center. Run and test on real Android and iOS devices, diagnose with ease, and release with confidence.
aka.ms/gsgappcenter

Before you introduce your game to the world, test with confidence using manual and exploratory testing tools.
aka.ms/gsgtest
When your game is ready to ship, our platform and tools can empower you to reach the most passionate and engaged gamers, no matter where they play.

aka.ms/gsgpublish

---

**Azure Spatial Anchors**

Build cross-platform, multiplayer AR apps that map, pin 3D content to, and recall precise points of interest, enabling you to deliver location-based or large-space social gaming. Deploy across iOS, Android, and HoloLens devices.

aka.ms/gsgspatialanchors

**Creators Program**

Creators Program strives to make it simple for any developer to publish their game to Xbox or Windows. No concept approval required, and a simplified certification process, allows you to quickly publish your game across the Microsoft ecosystem.

aka.ms/gsgxblcp

**ID@Xbox**

The ID@Xbox program enables qualified game developers of all sizes to unleash their creativity by self-publishing digital games on Xbox One and Windows 10 with Xbox Live, giving studios the tools and support needed to maximize their success.

aka.ms/gsgidatxbox

**Partner Center**

Whether you’re an app creator, game developer, or retail partner, we can help you reach more customers, provide greater service, and get help promoting and monetizing games.

aka.ms/gsgpartnercenter

**UWP**

Universal Windows Platform (UWP) is an open source API to help develop apps and games that run on Windows 10, Xbox One and HoloLens without the need to be re-written for each. It supports Windows app development using C++, C#, VB.NET, and XAML.

aka.ms/gsguwp

When your game is ready to ship, our platform and tools can empower you to reach the most passionate and engaged gamers, no matter where they play.

aka.ms/gsgpublish
MONETIZE

The strategies to monetizing your game are constantly evolving. Thankfully, so are we.
aka.ms/gsgmonetize

Microsoft Store
The latest Store options help you reach more customers, improve your productivity, and promote and monetize your apps and games.
aka.ms/gsgstore

PlayFab Commerce
PlayFab’s in-game commerce system, with features like receipt validation, targeted stores, player segmentation, and commerce analytics, allows you to boost revenue, engagement, and retention.
aka.ms/gsgplayfab
Data without insight is just numbers. Use these services to gain the insights that will help you better test, measure, and learn your way to success. aka.ms/gsgmeasure

**Azure Gaming**
With Azure's AI and Machine Learning capabilities, you're set up for success in building cloud-based measurement tools that will be with you wherever your players are. aka.ms/gsgazure

**PlayFab Analytics**
Go beyond simple vanity metrics, to fully actionable analytics, with PlayFab's powerful real-time data pipeline, data exchange, dashboards, and reports. Measure what really matters, then make changes quickly to implement a fully iterative development loop. aka.ms/gsgplayfab

**Power BI**
Business intelligence and analytics from Microsoft Power BI can be customized, extended, and embedded in applications using our comprehensive set of APIs and fully documented SDK libraries. aka.ms/gspowerbi

**Visual Studio App Center**
Monitor the health of your app and triage issues faster with live crash reporting, detailed diagnostics, and full stack traces. Integrate this data into PlayFab for even deeper insights on your player experience and respond accordingly. aka.ms/gsgappcenter
ENGAGE

Ensure your breakthrough game breaks through. These services will help you drive discoverability and richly engage your players.
aka.ms/gsgengage

Mixer
Live streaming video on console, PC, or mobile with sub-second latency and unique interactive capabilities. Mixer is blurring the lines between watching and playing – giving game developers a new way to engage audiences.
aka.ms/gsgmixer

PlayFab
Extend your game’s lifecycle by deeply engaging your players with targeted experiences using PlayFab’s full suite of LiveOps capabilities, including live events, messaging, offers and promotions, content updates, and more.
aka.ms/gsgplayfab

Xbox Live
Engage gamer communities inside and outside of your game across PC, mobile, console and the web. Xbox Live includes Achievements, Leaderboards, Parties, Clubs, and cross-platform play.
aka.ms/gsgxbox

aka.ms/gsg
Microsoft has multiple solutions to help grow your player base. These tools and services will help lower the cost of user acquisition.

aka.ms/gsggrow

Azure Gaming
As your game grows, so does the needs of your infrastructure. With Azure, you can dynamically scale across 54 Azure regions around the world, including China, more than any other cloud provider.
aka.ms/gsgazure

Mixer
Grow your player base through interactive live streaming video on console, PC, and mobile. Featuring sub-second latency and unique interactive capabilities.
aka.ms/gsgmixer

PlayFab
Configure real-time segmentation and deliver custom experiences with player messaging, leaderboards, tournaments, and commerce to help grow your player base.
aka.ms/gsgplayfab

Xbox Live
Grow your game with a social network for gamers of more than 60 million monthly active users across console, PC, mobile, and the web.
aka.ms/gsgxbox
With Azure, you can bring your game to market quickly, deliver it on any end-point, and scale your game on a global platform with 54 Azure regions.

aka.ms/gsgazure

- Ubisoft’s Rainbow Six Siege uses Azure to dynamically deliver immersive multiplayer games globally
- Halo 5 uses Azure Cosmos DB to elevate social gaming with Spartan Companies
- Funrock runs high performance infrastructure built on Azure
- Xbox Game Studios, previously known as Microsoft Game Studios, delivers epic Xbox experiences by analyzing hundreds of billions of game events each day across Minecraft, Halo, Forza, and Gears of War
- Hitman, from IO-Interactive, slays expectations using Azure to analyze player behavior in real-time

Azure can help you safely and securely store player data, dynamically scale your multiplayer experiences, and save you money as your game grows.

Smart Scaling
- Virtual machines (VMs) with Windows and Linux OS images - scale anywhere from one to thousands of VMs with built-in virtual networking and load balancing, while taking advantage of hybrid consistency with on-premise systems
- Service Fabric - focus on building your game and let Azure solve the hard distributed systems problems such as reliability, scalability, management, and latency.

Data Services
- Blob storage - get cloud storage for game data, including all file types and unstructured data like images, audio, video, and more.
- Azure Cosmos DB is a globally distributed, multi-model, low-latency database solution to read, write, and query game and player data faster and with schema flexibility. Backed by a 99.999% availability SLA.
- Azure SQL Database is the intelligent, fully managed relational cloud database service that provides the broadest SQL Server engine compatibility, all while using your existing licenses.

aka.ms/gsgazure
XBOX

Xbox Live is committed to building a more inclusive gaming network that connects gamers across devices, while providing tools that help developers build richer and more engaging experiences.

This year, Xbox is introducing a new mobile SDK to help developers expand Xbox game services to iOS and Android.

As Xbox Live expands across console, PC, and mobile devices, we are working towards creating a safer, more inclusive gaming community.

aka.ms/gsgxbox

Trusted Game Identity

Use a gaming focused, single sign on identity that works across platforms with privacy controls as well as continuously updated family safety.

Vibrant Gaming Community

Take advantage of Xbox Live's growing community and experiences both inside and outside your game, and across devices to enable richer discovery and gamer engagement.

Frictionless Integration

Xbox Live game services on mobile are available a la carte with no Xbox Live certification requirement, just choose the features that are right for your game and comply with player privacy and on-line safety terms of service.
PlayFab is the complete backend platform to build and operate live games. It’s a mix of game services, data analytics, and LiveOps tools, all in a unified solution.

In a world of ever-increasing competition for attention, PlayFab provides everything you need to launch quickly, optimize player engagement, and extend your game’s lifecycle.

Build with the platform used by Rainbow Six Siege, Idle Miner Tycoon, Sea of Thieves, and many others.

aka.ms/gsgplayfab

Fast
Launch sooner, and more cost-effectively, than doing it all yourself
- Simplify development with full access to all backend services from day one
- Monitor and react to game data in real-time

Global Scale
Launch smoothly and confidently
- Bet your business on a reliable and secure cloud infrastructure that spans 54 data centers worldwide.
- Go global with support for China hosted multiplayer services

Real-Time
Easily operate your live game with real-time experiences that are unique and targeted
- Monitor real-time player activity and respond intelligently with data driven actions
- Deploy content configuration changes on-the-fly (rules, triggers, A/B testing)
- Configure real-time segmentation and deliver custom experiences with player messaging, leaderboards, tournaments, and commerce.
THE PLAYFAB LIVEOPS PLATFORM

- Multiplayer
  - Build social experiences with cross-platform play

- Player Mgmt
  - Stronger, secure relationships

- Automation
  - Customize experiences with cloud-hosted logic

- Analytics
  - Measure and react in real-time

- Commerce
  - Sell more virtual goods more easily

- Communication
  - Foster healthy player communities

- Multiplayer
  - Build social experiences with cross-platform play

- Authentication
  - Player profile
  - Support
  - Banning
  - Real-time segmentation
  - Roles and permissions

- Virtual currencies
  - Item catalog
  - Stores
  - Promotions
  - Inventory
  - Receipt validation
  - Drop tables
  - Subscriptions

- Leaderboards
  - Tournaments
  - Prize tables
  - Matchmaking
  - Server orchestration
  - Guilds / Clans
  - Gifting / trading

- Real-time voice chat
  - Voice transcription
  - Push notifications
  - Email
  - In-game messaging

- Serverless scripting
  - Actions
  - Rules
  - Scheduled tasks
  - Webhooks
  - Admin APIs

- Remote configuration
  - Storage
  - User-generated content
  - News
  - Real-time updates
  - Localization support
  - Integrated CDN

- Real-time voice chat
  - Voice transcription
  - Push notifications
  - Email
  - In-game messaging

- Remote configuration
  - Storage
  - User-generated content
  - News
  - Real-time updates
  - Localization support
  - Integrated CDN

- Authentication
  - Player profile
  - Support
  - Banning
  - Real-time segmentation
  - Roles and permissions

- Virtual currencies
  - Item catalog
  - Stores
  - Promotions
  - Inventory
  - Receipt validation
  - Drop tables
  - Subscriptions

- Leaderboards
  - Tournaments
  - Prize tables
  - Matchmaking
  - Server orchestration
  - Guilds / Clans
  - Gifting / trading

All thoroughly tested and always up-to-date.

Platforms

- iOS
- Android
- Steam
- PS4
- Xbox One
- Switch
- Twitch
- Facebook

Engines

- Unity
- Corona Labs
- Unreal Engine
- Lumberyard
- Java
- C++
- Rust
- Node.js
- Python
- PHP
- JavaScript

- Dashboards
- Reports
- A/B Testing
- Data warehousing
- Event search
- AI-driven insights
- Import 3rd party data

- Serverless scripting
- Actions
- Rules
- Scheduled tasks
- Webhooks
- Admin APIs

- Real-time voice chat
- Voice transcription
- Push notifications
- Email
- In-game messaging

- Automation
- Player Mgmt
- Analytics
- Commerce
- Communication
- Multiplayer
- Authentication
- Virtual currencies
- Leaderboards
- Real-time voice chat

- Remote configuration
- Storage
- User-generated content
- News
- Real-time updates
- Localization support
- Integrated CDN

- Authentication
- Player profile
- Support
- Banning
- Real-time segmentation
- Roles and permissions

- Virtual currencies
- Item catalog
- Stores
- Promotions
- Inventory
- Receipt validation
- Drop tables
- Subscriptions

- Leaderboards
- Tournaments
- Prize tables
- Matchmaking
- Server orchestration
- Guilds / Clans
- Gifting / trading

- Real-time voice chat
- Voice transcription
- Push notifications
- Email
- In-game messaging

- Automation
- Player Mgmt
- Analytics
- Commerce
- Communication
- Multiplayer
- Authentication
- Virtual currencies

- Remote configuration
- Storage
- User-generated content
- News
- Real-time updates
- Localization support
- Integrated CDN

- Authentication
- Player profile
- Support
- Banning
- Real-time segmentation
- Roles and permissions

- Virtual currencies
- Item catalog
- Stores
- Promotions
- Inventory
- Receipt validation
- Drop tables
- Subscriptions

- Leaderboards
- Tournaments
- Prize tables
- Matchmaking
- Server orchestration
- Guilds / Clans
- Gifting / trading

- Real-time voice chat
- Voice transcription
- Push notifications
- Email
- In-game messaging

- Automation
- Player Mgmt
- Analytics
- Commerce
- Communication
- Multiplayer
- Authentication
- Virtual currencies

- Remote configuration
- Storage
- User-generated content
- News
- Real-time updates
- Localization support
- Integrated CDN

- Authentication
- Player profile
- Support
- Banning
- Real-time segmentation
- Roles and permissions

- Virtual currencies
- Item catalog
- Stores
- Promotions
- Inventory
- Receipt validation
- Drop tables
- Subscriptions

- Leaderboards
- Tournaments
- Prize tables
- Matchmaking
- Server orchestration
- Guilds / Clans
- Gifting / trading

- Real-time voice chat
- Voice transcription
- Push notifications
- Email
- In-game messaging

- Automation
- Player Mgmt
- Analytics
- Commerce
- Communication
- Multiplayer
- Authentication
- Virtual currencies

- Remote configuration
- Storage
- User-generated content
- News
- Real-time updates
- Localization support
- Integrated CDN

- Authentication
- Player profile
- Support
- Banning
- Real-time segmentation
- Roles and permissions

- Virtual currencies
- Item catalog
- Stores
- Promotions
- Inventory
- Receipt validation
- Drop tables
- Subscriptions

- Leaderboards
- Tournaments
- Prize tables
- Matchmaking
- Server orchestration
- Guilds / Clans
- Gifting / trading

- Real-time voice chat
- Voice transcription
- Push notifications
- Email
- In-game messaging
**VISUAL STUDIO**

Visual Studio is Microsoft’s best-in-class integrated development environment. When it comes to game development, the Visual Studio family, including Visual Studio, Visual Studio Code, and Visual Studio for Mac, empowers you to create amazing games on the platform of your choice while targeting the broadest range of devices.

Whether you’re using DirectX, Unity, Unreal or Cocos to create games and immersive experiences for your users, Visual Studio provides a powerful set of tools for developing and debugging your code, enabling you to identify issues quickly and efficiently directly from within the editor.

Take advantage of the AI-powered IntelliCode to get bespoke code completion recommendations based on your source code. Set breakpoints and evaluate variables and complex expressions whether you’re running within the engine editing environment like Unity Editor or if you’re debugging an externally managed DLL your project uses.

No matter the language or the OS you’re programming with, when you need to collaborate, Visual Studio’s Live Share will instantly share your project with a teammate. Co-edit and co-debug while sharing audio, servers, terminals, diffs, comments, and more without teammates needing to clone a repo or set up their environment.

And when you need to use the cloud, Visual Studio can connect to Azure services directly from within the IDE itself, making it easy and efficient to build out scalable solutions for any game type.

aka.ms/gsgvisualstudio

**DIRECTX**

Microsoft DirectX is the choice to make for the highest performance 2D and 3D graphics and multimedia. DirectX 12 is faster and more efficient than any previous version. Direct3D 12 enables richer scenes, more objects, more complex effects, and full utilization of modern GPU hardware on Windows 10 PCs and Xbox One. The extensive features and deep platform integration of DirectX provide the power and performance needed by the most demanding games.

aka.ms/gsgdirectx

**OTHER PRODUCTS IN THIS GUIDE**

- Azure DevOps aka.ms/gsgazuredevops
- Azure Spatial Anchors aka.ms/gsgspatialanchors
- Creators Program aka.ms/gsgxblcp
- DirectML aka.ms/gsgdirectml
- GamePass aka.ms/gsggamepass
- GitHub aka.ms/gsggithub
- Havok aka.ms/gsghavok
- ID@Xbox aka.ms/gsgidatxbox
- Microsoft Office aka.ms/gsgoffice
- Microsoft Store aka.ms/gsgstore
- Mixed Reality aka.ms/gsgmr
- Mixer aka.ms/gsgmixer
- Orleans aka.ms/gsgorleans
- Partner Center aka.ms/gsgpartnercenter
- Power BI aka.ms/gsgpowerbi
- Simplygon aka.ms/gsgsimplygon
- UWP aka.ms/gsguwp
- Visual Studio App Center aka.ms/gsgappcenter
Microsoft Game Stack. Achieve More.

aka.ms/microsoftgamestack