

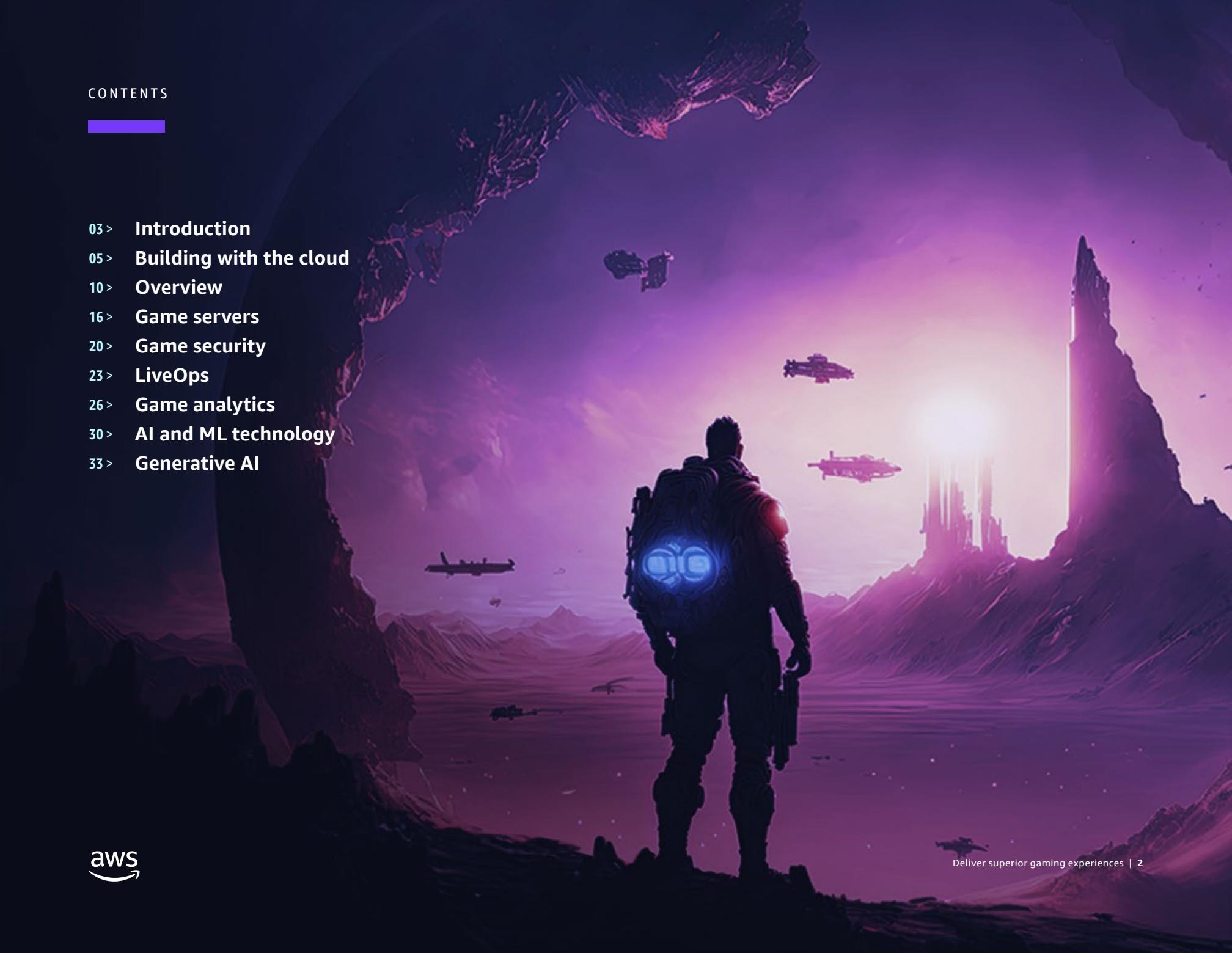


Deliver superior gaming experiences

AWS powers faster, lower-cost game development



CONTENTS

A full-page background image depicting a futuristic sci-fi landscape. In the foreground, a soldier in a dark, tactical suit with a glowing blue backpack stands on a rocky outcrop, looking out over a vast, alien world. The sky is a deep purple and blue, with a bright sun or star on the right horizon. Several futuristic flying ships are visible in the sky. The terrain is rugged and rocky, with a large, jagged rock formation on the left.

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Accelerating game innovation

Cloud technology continues to transform the games industry—helping developers create next-level gaming experiences and push the boundaries of what’s possible. Instead of spending time, money, and effort supporting on-premises infrastructure, cloud capabilities help game developers, studios, and publishers focus on building great games that people want to play. Cloud services give them access to servers with the capacity to scale up tens to hundreds of millions of players globally, back down as traffic dips, and pay only for what they use.



Optimize player lifetime value (LTV) with databases that can process terabytes to petabytes of ever-changing data. Use analytics solutions that can access that data with millisecond latency. Take advantage of generative AI to target the right response to the right player at the right time. AWS for Games delivers purpose-built services and solutions that can move on-premises workloads to the cloud, onboard diverse talent quickly from anywhere in the world, and facilitate remote and distributed game development.



Building with the cloud

Why build with the cloud?

To understand how adopting cloud technologies translates into real business value, a [survey of game companies conducted by the Hackett Group](#) revealed that cloud services helped them:

Increase developer productivity:

27%

decrease in time to onboard new developers

Improve the overall gaming experience:

38%

decrease in annual network downtime

Enhance speed to market with greater agility:

29%

faster speed to market

Boost revenue and user acquisition growth:

30%

increase in monthly active users (MAU)



Why build with AWS?

In a recent [Market Radar report](#), Omdia analyzed the gaming capabilities of major cloud platforms. Amazon Web Services (AWS) came out on top, earning advanced marks in every category. The report outlines the advantages of working with AWS, including:

- **AWS is the world's leading cloud platform:** Its scalability, reliability, and regional coverage are second to none, and the AWS for Games portfolio offers comprehensive, purpose-built solutions for game developers.
- **AWS divides its solutions for game developers into three broad areas:** Build (cloud-based game development), run (game servers, databases, and security), and grow (analytics and LiveOps). In each case, it is able to use its powerful infrastructure and tools across a wide range of industries to address specific game industry use cases.
- **AWS offers a comprehensive managed game server solution known as Amazon GameLift:** Designed to offer a highly scalable solution for multiplayer game servers powered by AWS's vast global server infrastructure, Amazon GameLift provides an excellent foundation for a low-latency, high-reliability service. This is supported by robust inbuilt tools for session management, matchmaking, and cross-platform play.
- **Amazon Games, the company's games publishing arm, has scaled up considerably:** Since 2021, Amazon Games has been publishing large-scale Triple-A (AAA) games. Although organizationally separate from AWS, the expansion of Amazon Games has given Amazon a greater opportunity to learn firsthand from using its own tools, particularly given that Amazon Games has chosen to specialize in massively multiplayer online games (MMOGs) that make heavy use of cloud infrastructure.





Functionality

AWS has continually expanded its services to support virtually any cloud workload. It now has more than 200 fully featured services for compute, storage, databases, networking, analytics, machine learning (ML), artificial intelligence (AI), the Internet of Things (IoT), mobile, security, hybrid, virtual and augmented reality (VR and AR), media and application development, deployment, and management.



Proven expertise

AWS has unmatched experience, maturity, reliability, security, and performance that you can trust for your most important applications. For more than 16 years, AWS has been delivering cloud services to millions of customers around the world, running a wide variety of use cases, and has the most operational experience, at greater scale, of any cloud provider.



Customer and partner community

AWS has the largest, most dynamic community. The AWS Partner Network (APN) comprises more than 100,000 partners from more than 150 countries. This includes more than 290 game development partners, with almost 70 percent headquartered outside the United States.



Building toward sustainability

According to a [2021 report by 451 Research](#), moving to AWS is more sustainable than on-premises infrastructure because its scale allows it to achieve much higher resource utilization and energy efficiency than the typical on-premises data center. Amazon is on a path to powering its operations with 100 percent renewable energy by 2025. In 2019, Amazon co-founded The Climate Pledge—a commitment to reach net-zero carbon emissions across business by 2040, 10 years ahead of the goal set by the Paris Agreement.



Security

AWS supports **over 100 security standards and compliance certifications**—more than any other cloud provider—including PCI-DSS, HIPAA/HITECH, FedRAMP, GDPR, FIPS 140-2, and NIST 800-171, that meet or exceed compliance requirements for nearly every regulatory agency around the globe. Over 100 AWS services store customer data and offer the ability to encrypt that data.



Global infrastructure

AWS spans 33 geographical regions, 105 Availability Zones with 36 local zones, and 600+ edge locations around the world, with announced plans for 12 more Availability Zones and 4 more AWS Regions in Germany, Malaysia, New Zealand, and Thailand.

Transition smoothly with AWS for Games

To ensure a seamless cloud transformation, Amazon offers AWS for Games. It aligns purpose-built development capabilities, including AWS services, AWS solutions, and AWS Partners. AWS for Games supports six solution areas to help developers build, run, and grow their games:

- Cloud game development
- Game servers
- Game security
- Live operations (LiveOps)
- Game analytics
- Game ML and AI, including generative AI

These solutions simplify how customers use AWS, making it easier to select the right tools for their desired use cases. They also reduce the amount of resourcing and investment required for cloud adoption to achieve faster time to value.





Overview

AWS for Games overview

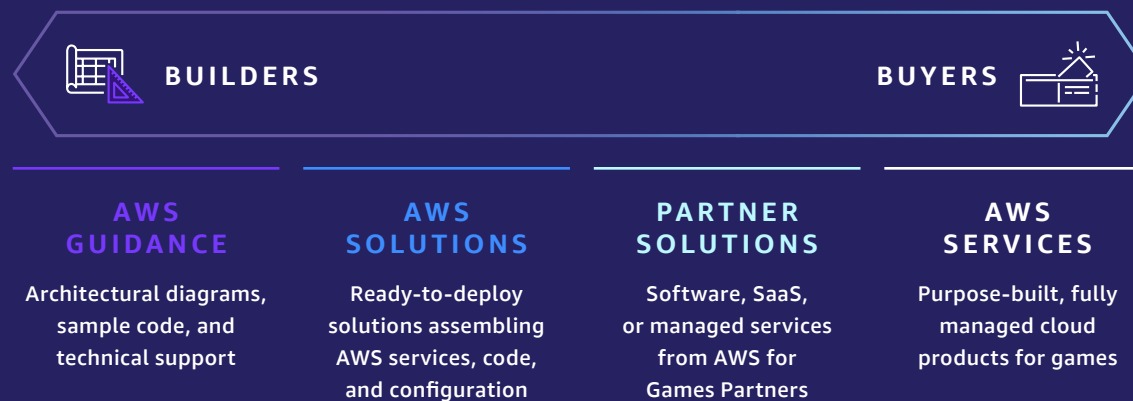
Solution areas

ACROSS THE GAME DEVELOPMENT LIFECYCLE



Solution types

ACROSS THE BUILDER-BUYER CONTINUUM



OVERVIEW

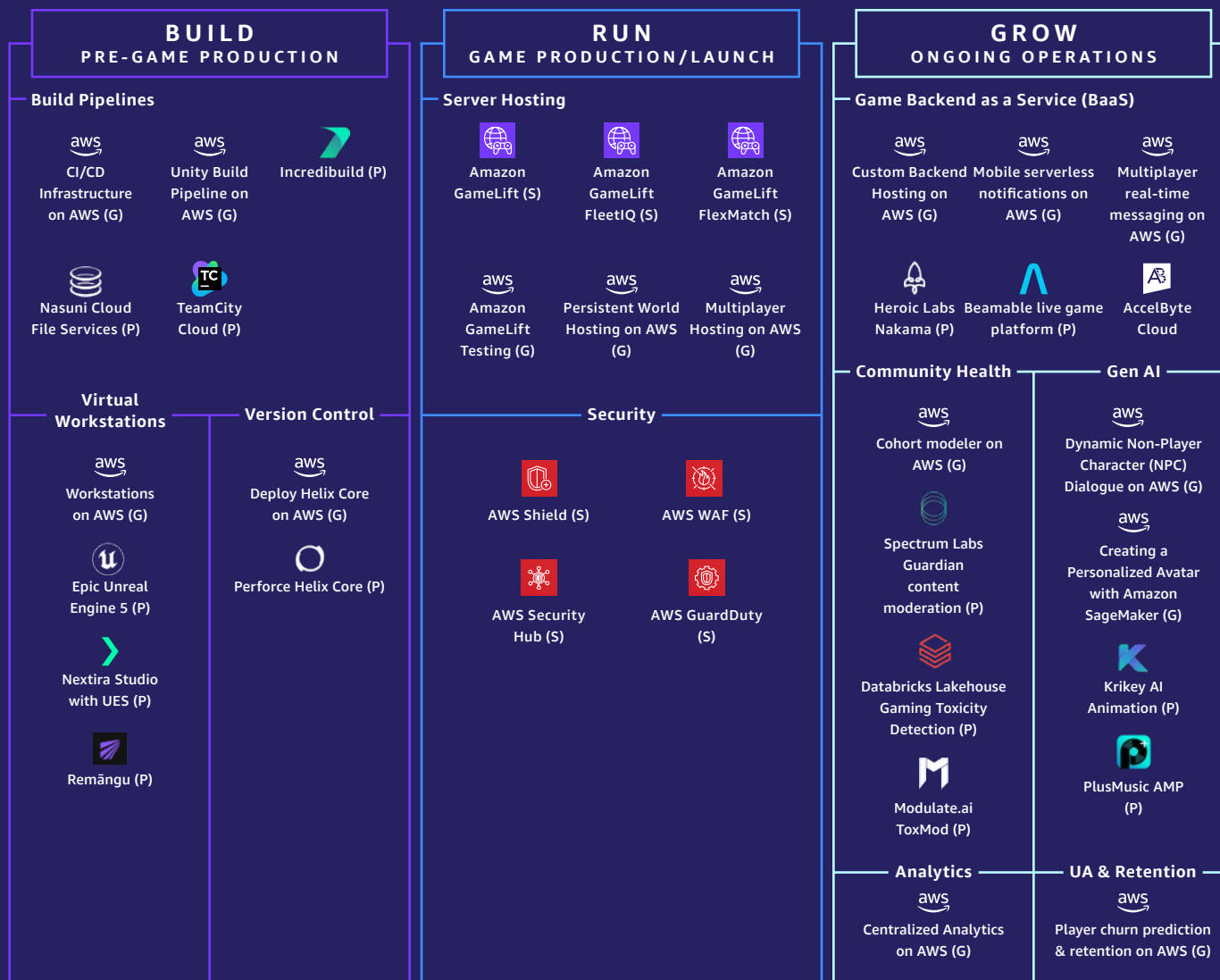
Game use cases and solutions

SOLUTION TYPES:

AWS Guidance (G)

AWS Partner Solutions (P)

AWS Services (S)



Empower your teams and accelerate development

SOLUTION TYPES:

AWS Guidance **(G)**

AWS Partner Solutions **(P)**

AWS Services **(S)**

Cloud game development solutions enable developers to build scalable and highly available development pipelines for distributed teams working anywhere in the world.

Cloud game development (1/2)

BUILD PIPELINES

Quickly build, test, and publish game versions across platforms that leverage managed elastic resources to scale on demand as builds are initiated.



Unity Build Pipeline on AWS **(G)**

Toolkit for building Unity-based games for iOS in the AWS Cloud with Jenkins

[Learn more »](#)



TeamCity Cloud **(P)**

SaaS version of the powerful and intelligent CI/CD platform by JetBrains

[Learn more »](#)



Nasuni Cloud File Services **(P)**

Consolidate NAS, distributed file server, backup, archiving, DR, and multi-site file synchronization

[Learn more »](#)



CI/CD Infrastructure on AWS **(G)**

Engine-agnostic toolkit for remote or on-premises game dev environments to the AWS Cloud with Jenkins

[Learn more »](#)



Incredibuild **(P)**

Allocate AWS Spot or On-Demand instances based on machine types, budget, workloads, and availability

[Learn more »](#)



Empower your teams and accelerate development

SOLUTION TYPES:

AWS Guidance (G)

AWS Partner Solutions (P)

AWS Services (S)

Cloud game development (2/2)



VERSION CONTROL

Deploy hybrid and cloud-native version control systems that scale with game project size while ensuring assets remain secure and easily accessible anywhere in the world.

Perforce Enhanced Studio Pack

Single source of truth for all digital assets that scales to manage global teams and large binary assets

[Learn more »](#)

Hybrid Deployment on AWS (G)

Toolkit for hybrid multi-region deployment using Perforce Helix Core in the AWS Cloud

[Learn more »](#)

VIRTUAL WORKSTATIONS

Set up workstations tailored to a variety of development tools and workflows required to develop a game while providing a secure and performant experience for content producers, wherever they may be.

Studio in the Cloud with UE5 (P)

Virtual desktop infrastructure (VDI) solution custom-made for game development studios

[Learn more »](#)

Epic Unreal Engine 5 (P)

Amazon Machine Image (AMI) pre-loaded with the latest release of UE 5.2 and all its prerequisites

[Learn more »](#)

Remāngu (P)

Includes integrated CI/CD and playtest environments, graphic workstations, and scalable game development infrastructure

[Learn more »](#)

Game Workstations on AWS (G)

Game engine and software agnostic toolkit for streaming remote workstations in the AWS Cloud

[Learn more »](#)

Game Production Environment on AWS (G)

This Guidance helps you set up a complete game production environment for the Unreal Engine that is highly available and delivered with reduced latency to users

[Learn more »](#)

What our customers are saying

"We recognized some of the AWS instance types that were now available resulted in significantly better performance. For our client compiles, we were able to reduce times by 135 minutes, or 75 percent, which helps us iterate quicker."

Alex Carberry, DevOps Manager: Unreal Engine Infrastructure, Epic Games

"Gaming is a massive and increasingly competitive market. As such, it is becoming more and more important for creators to optimize build acceleration in order to accelerate production and delivery without compromising on performance. As more and more developers move to the cloud, Incredibuild are thrilled to provide support for AWS for Games as they continue to provide their users with leading solutions—resulting in faster builds, less cloud guesswork, increased savings, and ultimately, even more exciting games."

Tami Mazel Shachar, CEO, Incredibuild





Game servers



Run games at scale with purpose-built servers

SOLUTION TYPES:

AWS Guidance (G)

AWS Partner Solutions (P)

AWS Services (S)

Guidance includes infrastructure as code (IaC) automation, configuration scripts for setting up dependencies, and a sample Unity client/server implementation.

Game servers

Game server solutions help your team run games in the cloud at a global scale with secure, resizable compute capacity while taking advantage of the AWS network. Your players get uninterrupted, immersive experiences at the lowest cost.

SERVER HOSTING AND NETWORKING

Design, deploy, and operate dedicated server solutions to support highly variable global game traffic for session-based and persistent-world games.



Amazon GameLift Anywhere (S)

Standalone feature which decouples game session management from the underlying compute resources

[Learn more »](#)



Amazon GameLift (S)

Fully managed AWS service to deploy and manage dedicated game servers for multiplayer games

[Learn more »](#)



Amazon GameLift FleetIQ (S)

Standalone feature to manage your own Amazon EC2 and Auto Scaling resources for game hostings

[Learn more »](#)



Amazon GameLift FlexMatch (S)

Standalone service to customize player matchmaking for multiplayer games

[Learn more »](#)



Amazon GameLift testing on AWS (G)

Toolkit to troubleshoot, debug, and tune your Amazon GameLift infrastructure

[Learn more »](#)



Multiplayer hosting on AWS (G)

Toolkit to using serverless and fully managed AWS services to host game backends and servers

[Learn more »](#)



Persistent-world hosting on AWS (G)

Toolkit to using serverless and fully managed AWS services to host game backend and servers

[Learn more »](#)



How Ubisoft used AWS services to improve gameplay

Employing services including Amazon GameLift, [Amazon DynamoDB](#), and [Amazon ElastiCache](#), the Roller Champions development team at [Ubisoft](#) is shifting its focus away from ongoing operational management to creating online features and gameplay for its players.

"We're using AWS, leveraging a lot of AWS services, which has cut down a lot on human cost as well as operational costs... We don't need to have months of preparation of allocating servers or getting the bare metal servers in for databases."

Naomi Barnes, Live Operations Manager, Ubisoft



More customer wins

"We are excited to be part of the AWS for Games initiative to further revolutionize how players and developers create, publish, and consume gaming experiences. At EPAM, we believe in the power of open platforms. Partnering with AWS, we have helped many of the world's leading gaming companies transform their cloud infrastructures, deliver exceptional seamless user experiences, and develop social services on a scale of 500M+ players."

Vitalii Vashchuk, Senior Director, Head of Gaming Solutions, EPAM Systems, Inc.

"Ubitus has leveraged AWS's GPU capabilities to partner with IO Interactive to release a cloud version of Hitman 3 to a highly portable gaming device. With the introduction of Amazon EC2 G4ad AMD instances, we were able to fit up to 50 percent more concurrent streams per instance without changing any code, allowing us to optimize our costs. The lower cost structure enables us to bring more games such as Hitman 3 to gamers globally."

Wesley Kuo, CEO, Ubitus





Game security

Build and operate games with a security mindset

SOLUTION TYPES:

AWS Guidance **(G)**

AWS Partner Solutions **(P)**

AWS Services **(S)**

Game security



Digital attacks happen. As more games are built live and continuously updated, malicious acts can cripple a game. AWS services for [game security](#) can help.

DDOS ATTACK DEFENSE

Secure game servers and infrastructure from external threats and denial of service attacks.

AWS Shield (S)

Managed distributed denial of service (DDoS) protection service that safeguards your games and data running on AWS

[Learn more »](#)



AWS WAF (S)

Protect against common web exploits and bots that can affect availability, compromise security, or consume excessive resources

[Learn more »](#)



DATA BREACH PROTECTION

Monitor game health, create dashboards to view the health and utilization of infrastructure, and monitor in-game errors and anomalies.

AWS Security Hub (S)

Cloud security posture management service that automates recommended checks, aggregates alerts, and can trigger automated remediation

[Learn more »](#)



Amazon GuardDuty (S)

Threat detection service that monitors for malicious activity and anomalous behavior to protect AWS accounts, workloads, and data

[Learn more »](#)



How Sony used AWS analytics to enhance fraud prevention

EVE fraud system is a big data platform built by Sony Interactive Entertainment to aggregate users' transactional activity, resulting in substantially increased approvals with no increase in declines or chargebacks from banks.

"We were able to reduce our latency from the current provider, which had taken about 2 seconds to assess fraud and risk, down to under 200 milliseconds, which is a pretty amazing feat. We are also able to improve our risk decline and accuracy, reducing false positives, allowing more 'good' customers to buy the things they wanted when they wanted to buy them, which is creating that world-class experience."

Eric Krauss, Senior Engineering Manager, Sony Interactive Entertainment





LiveOps

Future-proof games with LiveOps

SOLUTION TYPES:

AWS Guidance (G)

AWS Partner Solutions (P)

AWS Services (S)



Live Operations

GAME BACKEND AS A SERVICE

Live operations solutions, or LiveOps, help studios and teams of all sizes configure and deploy game service functionality to reduce development time. These solutions can scale with player demand while improving experience and increasing revenue through monetization, player acquisition and retention.

Custom Game Backend Hosting (G)

Toolkit to deploy a custom, lightweight, and scalable cross-platform game backend components on AWS

[Learn more »](#)



Player Messaging (G)

Toolkit to build real-time messaging to player in multiplayer games with Amazon ElasticCache

[Learn more »](#)



AccelByte Cloud (P)

Studios can start testing the core game loop without having to invest in a large backend engineering team and can rapidly deploy without a LiveOps team

[Learn more »](#)



Nakama on Heroic Cloud (P)

Managed offering from Heroic Labs to manage and monitor your Nakama instances

[Learn more »](#)



Mobile Notifications (G)

Toolkit to build a scalable serverless notification pipeline for mobile games with simultaneous transaction processing

[Learn more »](#)



Beamable Live Game Platform (P)

Solution to add social, commerce, and content management features

[Learn more »](#)



Serverless Games Messaging System (G)

Build a scalable, serverless push notification messaging system for games; the architecture supports both player-specific event messaging and batch messaging for groups of players

[Learn more »](#)



How Wemade Play increased scalability and stability

By migrating with AWS, Wemade Play (formerly SundayToz) was able to optimize costs while improving security and stability for its game portfolio. Wemade Play now has the ability to focus on maximizing the user experience by posting a regular server maintenance notice in the game rather than stopping the service.

"With only 20 server developers, we have been able to develop games, address server and infrastructure issues, and operate our services stably."

Chang-myeong Lee, CTO, Wemade Play



Game analytics

Make better design decisions with game analytics

SOLUTION TYPES:

AWS Guidance **(G)**

AWS Partner Solutions **(P)**

AWS Services **(S)**

Game analytics

CENTRALIZED GAME ANALYTICS

Grow your game with data using AWS [game analytics solutions](#). Configure and deploy purpose-built analytics pipelines that use managed infrastructure components to reduce operational overhead and scale to match changes in data traffic.

Game Analytics Pipeline (G)

Toolkit to deploy a scalable serverless data pipeline to ingest, store, and analyze telemetry data generated from games and services

[Learn more »](#)



How WB Games uses AWS for data-driven storytelling

Using AWS services such as [Amazon SageMaker](#), [Amazon Redshift](#), and [Amazon S3](#), **WB Games** can capture, ingest, and analyze insights to help developers become more opportunistic and agile with their approach to storytelling.

"With the accessibility and variety of tools we can get on AWS, we can go from a business challenge to an idea prototype very, very quickly... having all of our data accessible in Amazon Redshift for analysis means that if someone's curious, they can write a query and they get a result back."

Shawn Connor, Director, Data Science, WB Games

More customer wins

"Personalization, driving smarter monetization, and executing with agility are the top priorities for every game tech company across the globe. Databricks is proud to partner with AWS for Games to unlock the value of big data, AI, and analytics for game tech platforms, including joint customers like Riot Games, Sega, and WildLife Studios."

Steve Sobel, Global Industry Leader –
Communications, Media & Entertainment, Databricks

"With unparalleled scale and reliability, AppsFlyer and AWS enable gaming customers to attract, retain, and engage high-value players while ensuring data privacy and compliance. We deliver real-time insights to gaming giants such as FunPlus, Playrix, and Playtika so they can make good choices for their businesses."

Ziv Peled, CCO, AppsFlyer





AI and ML technology

Build, run, and grow your game with AI and ML

SOLUTION TYPES:

AWS Guidance **(G)**

AWS Partner Solutions **(P)**

AWS Services **(S)**

Using AI or ML technology, you can:

- Identify different player cohorts within a game community
- Detect toxic behavior and interactions to improve player experience
- Use smart acquisition and retention solutions to optimize player long-term value

Machine Learning AI/ML

Take advantage of artificial intelligence, machine learning, and deep learning to build, run, and grow games.

COMMUNITY HEALTH

Access cloud-based content moderation and reputation tools to help grow a healthy, inclusive, and enjoyable online community.

Cohort Modeler (G)

Toolkit to bring together different types of datasets and merge them into a single, consolidated view

[Learn more »](#)



Databricks Lakehouse (P)

Steps to build a lakehouse and detect toxic game comments in real time

[Learn more »](#)



Modulate.ai ToxMod (P)

Proactive, voice-native moderation solution built on advanced machine learning technology

[Learn more »](#)



PLAYER ACQUISITION AND RETENTION

Understand player segments and detect the signs of player churn based on game interactions to optimize long-term player engagement.

Player retention (G)

Toolkit to use to predict player churn and trigger retention actions with Amazon SageMaker

[Learn more »](#)



How customers keep players engaged with AWS

"For gaming companies, building the best player experience, free from toxic behaviors, will be the key deciding factor in which platforms player communities choose. Spectrum Labs is proud to offer Guardian for Games to gaming companies and developers in cooperation with AWS."

Justin Davis, CEO & Co-Founder, Spectrum Labs

"At Voodoo, we need to keep a millions-and-growing player base actively engaged. By standardizing our machine learning and artificial intelligence workloads on AWS, we're able to iterate at the pace and scale we need to continue growing our business and engaging our gamers. Using Amazon SageMaker, we can decide in real-time which ad should be shown to our players, and our endpoint is invoked over 100 million times by over 30 million users daily, representing close to a billion predictions per day. With Amazon machine learning, we were able to put an accurate model into production in less than a week, supported by a small team, and have been able to build on top of it continuously as our team and business grow."

Aymeric Roffé, CTO, Voodoo





Generative AI

Elevate player experiences with generative AI

SOLUTION TYPES:

AWS Guidance (G)

AWS Partner Solutions (P)

AWS Services (S)

Generative AI, powered by machine learning models, can create and transform visual and audio assets, as well as text. Your team can use generative AI in a number of ways, including to:

- Accelerate game development
- Create interactive experiences
- Optimize publishing operations

More importantly, it's all built for your data, your players, and your use cases.

Dynamic game content generation solutions



Krikey AI Animation (P)

Partner solution that helps companies train their own Animation model

[Learn more »](#)



Guidance for Creating a Personalized Avatar with Amazon SageMaker (G)

Guidance that shows how to calibrate and deploy a Stable Diffusion model to generate personalized avatars with a simple text prompt

[Learn more »](#)



Guidance for Dynamic Non-Player Character (NPC) dialogue on AWS (G)

Resources that help developers automate the creation of NPC for their games and infrastructure

[Learn more »](#)



PlusMusic AMP (P)

Adaptive Music Platform that automatically arranges artist-created music for interactive playback

[Learn more »](#)



How Scenario produces thousands of images daily using generative AI on AWS

To get its product together quickly, Scenario used Amazon Elastic Container Service (Amazon ECS), a fully managed container orchestration service, to construct its generative AI offering. Through Scenario's API-first approach, studios can effortlessly generate hundreds of characters, landscapes, and props for their games within minutes, either directly within their games or from collaborative workspaces.

"Without AWS CDK, Scenario wouldn't have been possible. All the infrastructure is deployed through it, so we are doing almost nothing manually."

Hervé Nivon, Co-Founder and Chief Technology Officer, Scenario

AWS for Games customers



AWS for Games partners



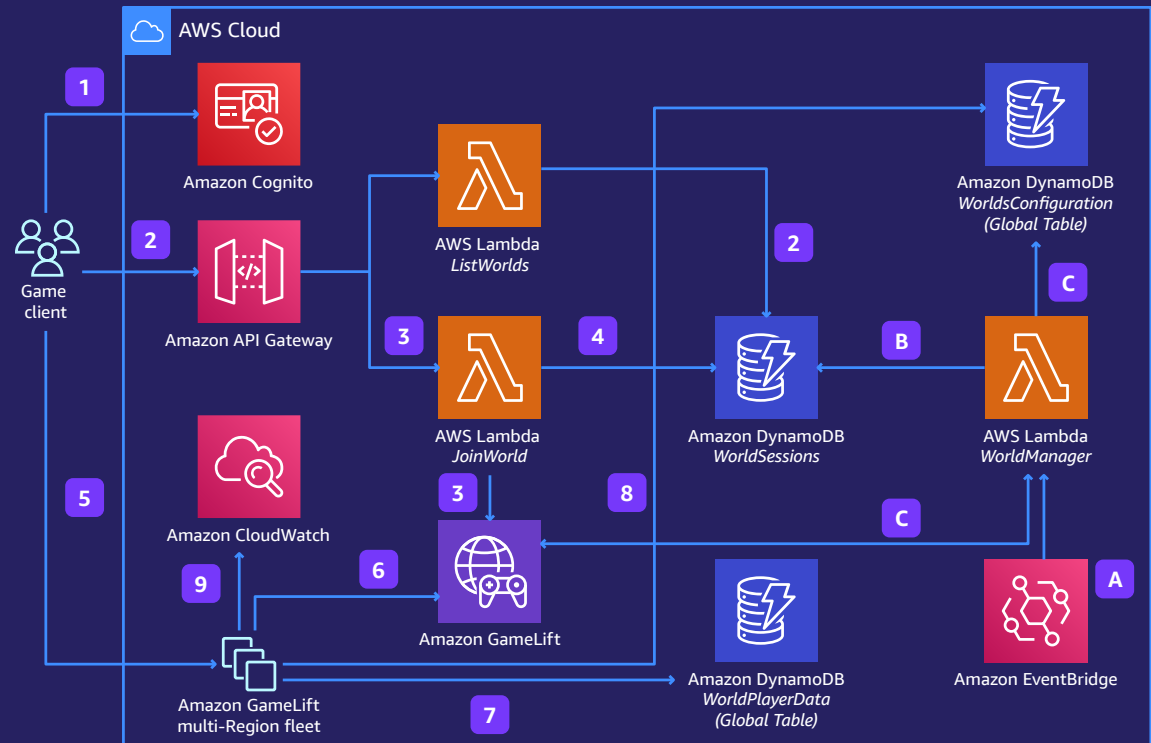
QUICK START

Persistent World Game Hosting on AWS

The architecture uses managed and serverless components to reduce operational effort and scale based on player demand. Developers can use this architecture to get started with persistent virtual world game development on macOS and Windows.

Get started:

Guidance includes infrastructure as code (IaC) automation, configuration scripts for setting up dependencies, and a sample Unity client/server implementation.



BACK END

- A > **Amazon EventBridge** triggers WorldManager **AWS Lambda** function every one minute. The function checks existing worlds' status through the **Amazon GameLift** API.
- B > WorldManager **Lambda** function stores the current state of the sessions and worlds to **Amazon DynamoDB** for faster back end access.
- C > WorldManager queries configured worlds from **DynamoDB** and creates any worlds that are not running by calling the **Amazon GameLift** API CreateGameSession.

FRONT END

- 01 > Game client requests an identity and credentials from **Amazon Cognito** Identity Pool to sign authorized API requests.
- 02 > Game client requests the world list through **Amazon API Gateway**. **API Gateway** triggers ListWorlds **Lambda** function that checks game session information in the defined Region from **DynamoDB**.
- 03 > Game client requests to join a specific world in a specific Region by calling JoinWorld **Lambda** function through **API Gateway**.
- 04 > **Lambda** function creates a player session for the player, increases the amount of players for that world in **DynamoDB**, and sends the connection information to the game client.
- 05 > Client connects to the **Amazon GameLift** session directly over transmission control protocol (TCP) and sends the player session ID.
- 06 > **Amazon GameLift** session validates the player session ID with the **Amazon GameLift** server software development kit (SDK).
- 07 > **Amazon GameLift** checks for world-specific player data and updates the player data as needed. It will store the latest player location after the player leaves.
- 08 > **Amazon GameLift** session checks **DynamoDB** for scheduled termination and terminates if requested.
- 09 > Game server sends logs and metrics to **Amazon CloudWatch** using the CloudWatch Agent.



Ready to level up?

Find the latest AWS for Games solutions in the [Solution Library](#).
Start building next-generation gaming experiences with [AWS for Games](#).

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