

Behind every great game, there's game tech

aws is how





Eric Morales | Head of AWS Game Tech EMEA

LET'S HEAR IT FOR THE DEVELOPERS

Whether you're clashing clans, raiding tombs, or winning your hard-earned chicken dinners, there's little doubt that video games have made an indelible impact on pop culture.

Games help us recharge in quiet moments on the go; they offer catharsis and competition; they thrill us, scare us, challenge us, and teach us new skills.

For that, we have game developers to thank. Prolific and opinionated gamers themselves, these passionate technologists test the limits of hardware, software, and tooling in order to deliver amazing gameplay experiences into the hands of gamers globally. Living at the intersection of computer science, storytelling, and avant-garde art, they challenge boundaries to transport game enthusiasts into a whole other world—even if it's just for a few minutes at a time. They're the unsung heroes behind all our favorite games.

To build a great game, devs still need great game tech. That's why I'm thrilled to introduce you to the first installment in our 'AWS is How' series—a collection of interviews, each focusing on a single game from a studio's portfolio of titles. Each interview focuses on a single game from a studio's portfolio of titles. As we take you through each game's history and evolution, we'll look at how technology has helped bring it to life. These

stories provide an insider's perspective into the games enjoyed by millions of players, and celebrate some of the most talented game devs working in the industry today.

The challenges they've faced are complex and varied. From dealing with petabytes of game data, to building low-latency multiplayer games in the cloud, and training machine learning models to identify gameplay anomalies, these teams have all turned to AWS to deliver more enjoyable gameplay experiences.

Because in the end, the only thing that matters to players and devs alike is that a game is fun. As a team of gamers ourselves, AWS Game Tech is committed to helping developers create amazing experiences. So, to the passionate customers building incredible games on AWS, thank you. This series is dedicated to all of you.

Now let's press start.

Love and unlimited continues,

Eric Morales
Head of AWS Game Tech EMEA



fatshark

VERMINTIDE

GAMELOFT

ASPHALT LEGENDS

ROVIO

ANGRY BIRDS Dream Blast



WARHAMMER
VERMINTIDE



SELF PUBLISHING, FPS CO-OPERATIVE CHAOS

Martin Wahlund is the CEO and co-founder of Fatshark, a self-funded game development studio best-known for its Warhammer: Vermintide series. Before co-launching Fatshark in 2007, this Swedish serial entrepreneur also played a role in founding Northplay (2003) and BitSquid (2009).

Inspired by the vast, world-building tabletop game Warhammer, Fatshark set out to create an intense co-operative FPS game. And the studio certainly delivered. Vermintide introduces gamers to an immersive fantasy universe where players fight side-by-side against the Children of the Horned Rat—the Skaven. The self-published and self-developed series has received critical acclaim for its detailed graphics and how effectively the animation captures the dark, visceral nature of the rat-like Skaven.

Fatshark produces a diverse range of games, including titles developed for other leading publishing houses. The studio's catalog includes Krater, War of the Vikings, Escape Dead Island, Cobalt, and Dreadlands. With more than three million global players, Vermintide 2 is the studio's most outstanding achievement to date—powered by a solid technology stack hosted in the cloud.





“We wanted a squishy adversary that came at the player in numbers”

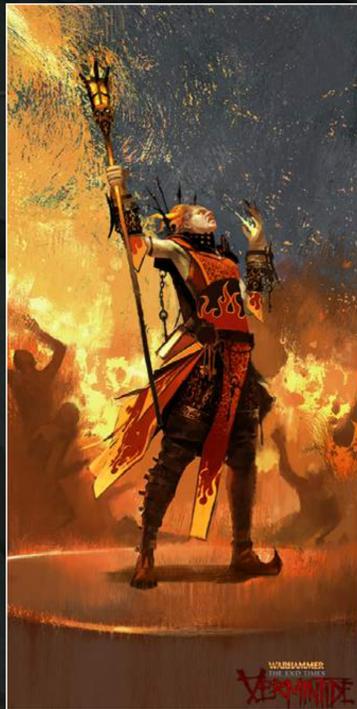
With Vermintide, we wanted to build a co-operative game that allowed players to come together against a common adversary. And we wanted this adversary to be something new and squishy, not just the usual orcs and undead portrayed in many other Warhammer games. The Skaven were the perfect choice. These humanoid rats come in numbers; they don't care for their kin, and they embody chaos. They force players to fight and work together in order to defeat the horde.

Not all gamers want to play versus games; some want to collaborate and build both their skills and their teams. When developing Vermintide, we were inspired by titles such as Left 4 Dead 1 and 2. There hasn't been a new release of these titles for 10 years now, and we believed that the genre needed a boost. Vermintide ticks all the boxes we wanted—FPS, action, co-op, and challenging fun.

“We knew we were onto something special”

We had one chance to get this right. Not many studios get the opportunity to self-fund and self-develop a title, dictating their own destiny along the way. Vermintide was made possible thanks to the sale of BitSquid—another company we'd founded—to AutoDesk in 2014. The money from the sale funded our first AAA self-published game, Warhammer: End Times – Vermintide, and we subsequently released Warhammer: Vermintide 2 to critical and financial success.

We knew we were onto something when we first came up with the idea of Vermintide. We'd done a lot of work for other publishers and developers, so we had a sense of what did or didn't work in the industry. We could see Vermintide's potential. Sometimes you can blame the publisher if a game goes in a direction you don't agree with, but there was nobody else to blame if Vermintide didn't succeed. This challenged the team, and inspired them to achieve something remarkable.



“Why not build our own engine?”

A long time ago we realized that we wanted to build an engine that could parallel well; we saw multi-core was coming and we wanted a platform that was plug-and-play. We thought: “Why not build our own engine?” so we set up a company and built one. We may not use it forever, but it worked for Vermintide.

“Always challenge the definition of fun”

There are several challenges that have to be overcome when designing and building a successful game. The first is to ensure everyone in the team is aligned to the vision, because everyone has to be passionate about the project and focused on keeping it as tightly on track as possible. Throughout the game’s development, you also have to challenge

the definition of fun by ensuring the game’s mechanics and class structures work seamlessly. Players need to enjoy the combat and level of difficulty. We measure player enjoyment all through the development process, using constant iteration, testing, gameplay, and focus groups. With Vermintide, we made these very specific types of combat, weaponry, and enemy, all designed to be as entertaining as possible.

As you build the game, you have to make sure every element works together—sound, gameplay, animation—because if just one thing isn’t done properly, then the player’s impression of the game will be negative. You also have to stop yourself from adding new features all the time. I am the biggest culprit, as I always think of new ideas that could really shift the dynamic of the game. If you’re always adding features at the last minute, then you can also be adding in bugs or detracting from the overall

experience. This can seriously affect the release date and the quality of the game. You have to constantly take a step back and look at the overall game experience. Then, of course, there are all the smaller challenges of developing a game you have to overcome on a regular basis, but these are what make it so much fun for us developers.

“We try to be ideas agnostic”

There are so many different ways to come up with a new game. We host Hack Weeks, where our teams come together once a quarter to generate new ideas and features. We then go through these to see which ones will work and which ones won’t. Right now, we control our destiny with our own titles and games, so we try to be as ideas agnostic as possible. It doesn’t matter who came up with the idea, as long as it’s a good one.



“Scope your game correctly”

The first game we made; we didn't scope it correctly. You really do have to build what you're passionate about while also avoiding the risk of going too niche. You need an audience, otherwise your game won't work. That said, even if you have the scope and the audience, don't expect to build World of Warcraft™ on your first attempt either. It will limit your success and may affect your potential.

It's also really important to find good people to work with and then to look after them properly. They'll share your sad moments and your victories, and they'll be your support group. It's been great for us as the four founders, as we live the highs and the lows, discuss things and support one another.

“A game could be perfect on paper, but if it's not entertaining, people won't play it”

It's hard to know if an idea is going to be a success. In the early stages, we determine whether or not it has a large enough audience before beginning the development process. We use focus groups to ensure our games appeal to our target market. For Vermintide, there weren't many FPS co-op titles on the market, so we felt this was a good genre to move into as a lot of players enjoy this type of game. Then it all came down to hard work. If you build a medical app or a finance app and it works properly, does its job, and is bug-free, then you're done. In games, you can be perfect on paper and your idea might be flawlessly executed, but if your game isn't entertaining, then people won't play it.

I think we've done a really good job of capturing the nature of the vermin—the Skaven—and making them a visceral part of this world. It's hard to always get it right, but the team has created this balanced combat game, based on these squishy, chaotic creatures, and it works.

“The release date is a balancing act”

Meeting the release date is one of the most complex steps in bringing a game to market. We always try to release the best possible version of the game, so there's this need to balance promises made to partners and the market, versus the features and capabilities you want to include in the game. You always think the game could be better, that you should take the risk, but you don't want to discover you've shipped a game full of bugs either. This balance is hard to achieve, especially in the last few weeks.



“It’s an ongoing adventure”

The game we have in play today is very similar to what we started out with in 2015 when we released *Warhammer: End Times – Vermintide*. But a lot has changed. We’ve tried to stay true to the core mechanics, but added in new weapons and introduced new game modes, loot, maps, and adventures. We’re always adding new content. It’s a living world.

We release new game modes, weapons, and maps every four months, because we’re constantly reworking the quality and functionality of the game. The December release of *Warhammer: Vermintide 2* includes a new level from Castle Drachenfels and more customization options in Lomer’s Emporium of Wonders, among other new features. For us, *Vermintide* is an ongoing adventure and these updates give players the opportunity to re-enter this immersive world with their existing characters, uncovering new lore and challenges.

“Losing touch with the community isn’t good for a game”

We listen to the players and have introduced numerous changes in response to their feedback. We look into areas of concern; we pay attention to different types of gamer suggestions, and try to include as many perspectives as possible. We have around five million players, so there are a lot of different types of fans—the quiet ones, the vocal ones, the ones who just want to wander around and explore the world—and we can’t please all of them. What we try to do is listen as closely as possible and change elements that don’t work or aren’t fun to play. Our goal is to evolve with the community and we’ve learned a lot from them. I believe that if you lose touch with your community, it isn’t good for the game. We get a lot of fan art. Players will send us pictures they’ve created from the game and their experiences. I get decorations covered in rats sent to me in time for Christmas.

Our December update introduced several changes that have been developed based on player feedback, such as new cosmetics in the game. We’re giving players more freedom to express themselves with hats or characters or weapon skins. A lot of gamers have asked us to create a versus mode, and this is something we’ve been putting a lot of effort into right now, but that release date isn’t yet confirmed. When we first started out, we didn’t have the capacity to build the perfect versus mode, but now it’s coming!



“The different player personalities are the best part of the game”

It’s time to redefine the idea of friendship. People have often thought of ‘real’ friendships as those made in real life, but gaming is changing the terms of friendship. We’ve underestimated the power of social gaming. The lines between a real-life friend and one you meet in a game are going to keep on blurring and changing the friendship dynamic. It really doesn’t make a difference if you’re in the same room or in the same dungeon on opposite sides of the world, it’s still an important friendship.

I think that this has contributed to the success of Vermintide and is one of the things I love most about the game. Player interaction is so rare in games and the co-operative nature of Vermintide brings it to life—all these different personalities engaging across the Vermintide world.



“We have a clear vision for the future”

We have core pillars we adhere to in this game to ensure it stays true to its ethos—keeping co-operative play as a centerpiece, enhancing the experience for players, ensuring combat is challenging and fun, and keeping the content fresh and entertaining. We have a very clear vision and we’re constantly working towards it so the game doesn’t just feel like any other game. Success lies in a clear focus and drive, and a commitment to always looking at the experience from the player’s perspective. I play Vermintide 2 a lot myself, so I can see what the player sees, feel what they feel, and make sure we’re always working towards a universe that keeps gamers engaged.

“You have to democratize the game”

There are a lot of enemies in this game and it was technically challenging to ensure that the AI could handle them, and that everything worked seamlessly. You also have to keep the processing data down—this isn’t rocket science, but you have to get it right nonetheless. You need to get the shading right, to consider the CPU and GPU requirements, and you have to contend for the fact that different people have different computers—some are high-end and some are low-end—and you have to give everyone the same experience. You need to democratize the game and usually you do that by removing the graphics, but we wanted to avoid that.

“AWS was closely aligned to our needs”

After evaluating several different service providers, we realized AWS was most closely aligned to our needs. Telemetry is used in many aspects of development, including issue detection and debugging, and provides us with an important basis for informed decision-making. Our telemetry pipeline is built using a combination of [Amazon API gateway](#), [AWS Lambda](#), [Amazon Simple Storage Service \(Amazon S3\)](#), [Amazon Elasticsearch Service](#), and [Amazon Relational Database Service \(Amazon RDS\)](#). We also use [Amazon CloudFront](#) to distribute certain content to clients, as well as for web pages and online stores.

“It’s essential to avoid predatory monetization models”

Players can get burnt if the monetization models used to make games viable are too predatory. The problem is finding the right balance. On the one hand, developers have to be paid and you need to know how much to spend on a game to make it

profitable. On the other hand, there’s the player that prefers to pay a one-off price and not pay into the game constantly. You have to find a way of funding a game’s long-term development without burning out the gamer.

I think we’ll see more subscription services driving the monetization of games. You no longer need all gamers to play your title for it to be profitable, and I’ve seen games succeed where I did not believe they would. It’s going to be interesting to see where games go—the older generation prefers story-led titles, while the younger generation is more interested in free, open world games like Minecraft.

“We need more diversity in games companies”

We need a more diverse developer core. We know that women play games at the same level as men, so it makes sense to have more women building games. Women haven’t always felt welcome in the industry though. Times are changing and the industry is more open than it was, but change isn’t going to happen overnight.

“We made a kid cry”

We’re inspired by seeing people enjoy what we do. Making people happy is why we spend so much time developing games and coming up with ideas. You can get lost in the technical aspects, the project management, and the admin, but then, when you get to a gameshow and meet the players, it changes everything. One of our most ardent fans was a young child and his father brought him to one of our shows to meet the team behind his favorite game. Our game director gave him a signed copy and the kid was in tears.

It’s those moments that make it all worthwhile. You see that people love the game and are immersed in this world that we’ve built. It can be devastating when a game is launched to bad reviews; the effect on the team is terrible as they’ve put so much of themselves into its development. With Warhammer: Vermintide 2, it’s been an incredible journey that’s achieved both critical and player success, and we’re always working hard to maintain this momentum.



**STUDIO**
STATS & FACTS**Founded:**

2007

**Team Size:**

100

**AWS Services include:**

[Amazon API gateway](#), [AWS Lambda](#), and [Amazon Elasticsearch Service](#)

**Biggest hit game:**

Warhammer: Vermintide 2,
3 million units sold

**Key awards:**

Best Indie at the Global
Game Awards 2018

**Follow:**

@fatsharkgames

**GAME**
STATS & FACTS**Genre:**

Co-operative FPS

**Platforms:**

PlayStation 4, Xbox One,
Microsoft Windows

**Players worldwide:**

3 million+

**Units sold:**

3 million

**Launch date:**

March 2018

**Metacritic score:**

82

**Fast fact:**

Warhammer: Vermintide 2 sold more than 500,000 copies in the four days after its PC release and more than one million copies within a month.

**TEAM**
STATS & FACTS**Executive Producers:**

Mårten Stormdal,
Martin Wahlund

**Lead Programmer:**

Joakim Wahlström

**Game Director:**

Anders De Geer

**Music:**

Jesper Kyd

**Lead Designer:**

Mats Andersson

Find out what the Fatshark team gained from self-publishing Warhammer: Vermintide 2 and the crucial advice Martin Wahlund offers new game developers, as he talks to Andjela Kusmuk, games industry expert from the AWS Game Tech team.





Albert Puértolas | Online Technical Director

SUPERCARS, SPIN, AND SPLIT-SECOND TIMING

Albert Puértolas is the Online Technical Director of Gameloft's Barcelona studio. Before joining Gameloft in 2009, the Spanish software engineer spent time as a freelance programmer at Akaoni Studio and as a junior programmer at Gammick Studios.

Created to be 'the ultimate console racing experience on mobile', Asphalt 9: Legends is arcade racing at its most dramatic. Intuitive handling, spectacular locations, and a roster of supercars from the likes of Ferrari, Porsche and Lamborghini, have seen Asphalt 9 amass a fan-base of millions. Drivers need all their wits and split-second timing to dodge tornados in Midwest America, or spin away from landslides in the Himalayas.

Gameloft is responsible for an incredibly diverse range of games, from Gangstar to Disney Magic Kingdoms. One of the studio's most successful franchises is the 15-year-old Asphalt. The latest version of the game proved to be Gameloft's most challenging project to date, and could only be achieved by moving to the AWS cloud.





“I thought it was magic. Out of this world”

The first time I saw a video game, it was a case of ‘mind blown’. I thought it was magic—out of this world. As a young kid, I liked playing games and inventing stuff, and although I hadn’t yet learned how to program, I’d have fun drawing games and writing down how they might work. The challenge of figuring out how to do things I wanted to do, was super-fun. I still prefer more contextualized problems, where it’s a case of: ‘I want to do this, so how am I going to do it?’ rather than: ‘Hey, here’s a puzzle, solve it’.

I always knew I wanted to work with games. My first job was here in Barcelona at a really small games development startup, which doesn’t exist anymore. There were only six of us, and I learned so much in so little time, simply because we had to do a bit of everything. We actually managed to publish a game, which for me was like being on cloud nine. I still get that same feeling today.





DID YOU KNOW ...

Gameloft has one of the most diverse catalogs of mobile games in the world—operating its own established franchises, such as Asphalt, Dragon Mania Legends, Modern Combat, and Dungeon Hunter. It also partners with major rights holders, including Disney, LEGO, Universal, Illumination Entertainment, Hasbro, Fox Digital Entertainment, Mattel, Lamborghini, and Ferrari.

“To justify a sequel, a game has to really stand out”

With Asphalt 9: Legends, we had a good idea of what we wanted to achieve right from the start. The game was already a few years old, so we needed to get it up to speed with the latest in technology and car specs. It was a case of: “This is a game which is already working, so what else can we do to justify a sequel? What will make it stand out, apart from just looking better?” During prototyping, players told us they wanted more control over the cars, and to be able to really feel the difference between a car that accelerates rapidly and one that has better handling. We put a lot of time into trying to make those differences more palpable. We even played around with road surfaces.

“Why not let the car drive itself?”

TouchDrive is one of the main differentiating features between Asphalt 8 and Asphalt 9, and we’re super-happy about how it worked out. There are moments when you want to take every single curve in the best possible way, but other times you just need to complete a race to move onto the next level. Driving normally takes all your concentration, when you might just want to chill and go for a ride. We thought: ‘Why not let the car drive more or less on its own?’ You’re still in charge though, so when there’s a branch in the track ahead of you, you can choose to go left onto the longer-but-safer path, or take a right and face a shorter-but-more-treacherous route.

“We were nervous how fans would react”

All through the 15 years of the Asphalt franchise, the player has always driven the car. The moment we started discussing assisted-drive, well, you can imagine the debate that triggered! Even though TouchDrive doesn’t replace the original driving stance, and players can still choose whether to use it, we were nervous. We didn’t know how long-term fans would view the change. We ran focus groups, brought in people to test the different driving mechanisms, and gathered feedback, but we didn’t truly know what reaction we’d get on launch day. Some gamers have been critical, but overall the move has been a success, with 85 percent of players now using TouchDrive for at least some of their races.

“It’s all about intuition and gut feeling”

You come up with so many ideas as a team, but few of those are strong enough to convince everyone. You know you’re onto something when there’s a clear consensus that a new feature is worth investing a lot of time and money in. A lot of that is down to intuition and gut feeling. Normally in the development process, if something doesn’t show a palpable improvement after the second or third alteration, or isn’t contributing towards a key goal, we’ll let it go.

“You can’t please everyone”

We made a lot of changes to Asphalt 9 based on player feedback. Players ask for many different things though, so it’s not always easy to arrive at a true consensus of what the community as a whole wants. You can’t please everyone, but regular community checks allow us to see what most people like or dislike about the game. If there are low-hanging fruits there, we log and action them when we can. Sometimes, actioning a community request involves a considerable amount of work, but we always try to incorporate feedback if we can.

“The biggest challenge was our own ambition”

Some of the things we set out to do for this latest game were incredibly hard. We knew in advance what we were getting into, but it was still massive—by far the biggest and most complicated project we’ve ever done. There were points where we knew we were making our own lives a lot harder, but we really, really wanted to go that extra mile to make this new game so much better than the last. That commitment is what ended up making Asphalt 9 what it is today.

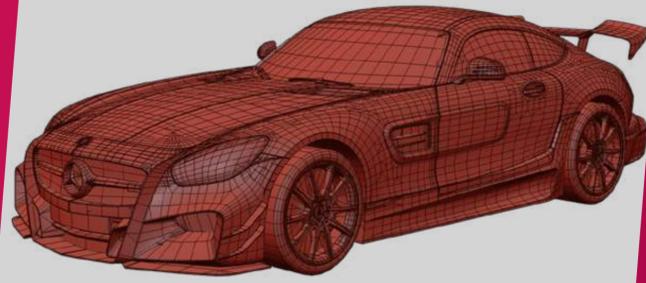


FROM CONCEPT TO REALITY

Concept



3D model



Final render



“We built the game engine from scratch”

We realized early on that if we were going to do a sequel, we couldn't do it with the in-house tech stacks we had. The game engine for Asphalt 9 was built from scratch, and it was the first time we'd used physically-based rendering with HDR. It changed how we produced backgrounds and all the other game assets, as it allowed us to effectively represent how light refracts and reflects on different surfaces in the game, resulting in much more natural and realistic graphics.

The new physics engine also allowed us to play around with the road surface that you're driving on. For example, you can drive across the sidewalk for a shorter route, but there's less grip so it's riskier, and you're more likely to crash. It means there's a bigger tactical element for the player.

“We are constantly coming up against new challenges”

On the development side, there are so many unknowns in the art of putting together a game. It's almost impossible to predict what challenges you're going to come up against, because we're not always making the same cookie-cutter games. If we always worked on tic-tac-toe, dominoes or poker games, maybe that issue would be reduced, but today we could be working on a racing game and tomorrow a platform game, so we're constantly coming up against all sorts of different challenges we haven't faced before.

“Doing it ourselves would've been prohibitively expensive”

With Asphalt 9, we wanted to be fully online, so we knew we needed a cloud service. We thought of AWS first, because it's the longest running cloud provider, well-documented, and used by a lot of

companies. As soon as we started to play around with it and saw what it could do, we realized it was the full package, and decided to run our servers on AWS' [Elastic Compute Cloud \(Amazon EC2\)](#). It wasn't that we couldn't do it ourselves, it was more that it would have been prohibitively expensive. We typically process thousands of requests a minute—dozens of millions a day. On launch, we had five to 10-times more, and if we'd tried to handle that within the company, we'd have been provisioning for way more than we'd need later.

“We used hundreds of thousands of bots”

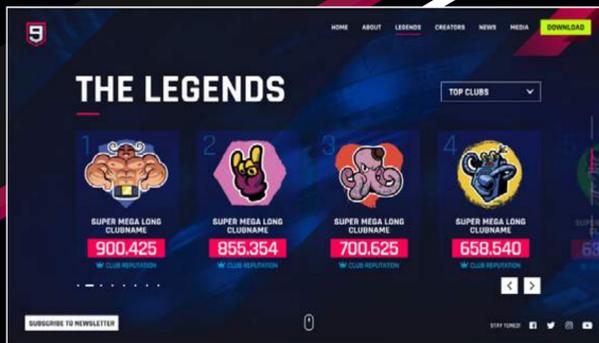
We also used [Amazon Elastic Container Service \(Amazon ECS\)](#), before and during the first weeks of launch. We set up bot tests, where we had AI running the game and mimicking human players, and then tried to stress the whole infrastructure, to check everything was scaling in and out correctly, and there were no major issues.

We wanted to generate a volume of traffic similar to launch, so we ran hundreds of thousands of bots on AWS. We use [Amazon Simple Storage Service \(Amazon S3\)](#) for backing-up server logs, so we don't need to worry about how much we back-up, which is fantastic.

“Despite the huge surge of users, the launch went without a hitch”

Asphalt 9 was the first time the Barcelona studio had done a cloud launch. After doing all the work for the game, stress levels were massive as everyone was thinking of all the things that could still go wrong. If there wasn't enough provision, we could have ended up with a nightmare scenario where users couldn't launch the game. Seeing the launch go without any issues, despite the huge surge of users that came in, was a huge relief.





“Cars you can only dream about racing”

Part of the reason behind Asphalt’s success is it’s a very long-running franchise. If you look at the versions from several years ago, they don’t look anything like they do today. Clearly, players from back then love the way the game is now, even though it looks and plays completely differently. There’s still that feeling it’s the Asphalt they played all those years ago, so they’re more likely to give it a shot again now. Open the game today and you find this monster with realistic-looking graphics, high-pace, and sports car brands that racing fans (including me) go gaga about. What’s not to like?

“AR and VR are getting there slowly”

AR and VR have a lot of possibilities, and there are some great VR games out there, but for the player, there’s the barrier of having to purchase a big, heavy, expensive headset which is only for gaming, plus accessories, and needing to be cabled into a terminal. The technology is advancing rapidly, but the interface isn’t ready.

The day we can do that with something like my sunglasses, it’ll be a completely different story. There are a lot of non-gaming applications for all these technologies, and at some point, they’ll converge to the point where interfaces for VR and AR have multi-use, so you’ll be able to use them to play games, call your parents, and browse the internet. The problem is, it’s not a mainstream market right now. It’s getting there, but slowly.

“Playing on your mobile will look like you’re on a \$4,000 PC”

When we get 5G across the globe consistently, with such huge bandwidth, and as long as the quality of the connection is good, we’ll really feel the advance in streaming solutions. There are games where it’ll be more noticeable, like a fighting game where there are super-fast reflex reactions. You’ll be able to play amazing-looking games that will always look and feel the same, no matter where you’re playing them from. You’ll be able to play from your mobile phone, and they’ll look as if you’re playing on a \$4,000 PC. It’s also going to be great for cross-platforming because you won’t have to worry about the differences between Android, iOS, Switch, or PC—the platform platform won’t matter, because the game will look the same everywhere.



“We’re always looking for a fresh twist to keep players entertained”

We take quality of service very seriously and try to stay on top of how players are finding a game. We’re always thinking ahead: ‘Players don’t like this aspect as much; let’s see if we can understand exactly why. What’s the next twist that will make this bit better?’ You need new things to keep players entertained. It’s not just a matter of bringing out new cars or environments. Obviously, those are a huge part of a new game, but they’re the easy bits.

The hardest thing is coming up with new special events in the game. These tend to be bigger, have slightly different rules, and enable gamers to play differently. Spoiler alert: There’s another special event coming up, which will be considerably different to anything else, but I can’t say any more!

S
STUDIO
STATS & FACTS



	Founded: 1999
	Barcelona Team Size: 150
	AWS Services include: Amazon EC2 and Amazon ECS
	Biggest hit game: Minion Rush, 900m+
	Key awards: PG Legends Award for Best Publisher 2006-2016'; Apple's 2019 Design Award; Pocket Gamer's 2019 Best Audio/Visual Accomplishment Award; Webby's 2019 Best Sports Game Award
	Follow: @Gameloft

G
GAME
STATS & FACTS



	Genre: Racing
	Platforms: iPhone, iPad, Windows 10, Android and Nintendo Switch
	Units sold: +80m downloads
	Launch date: July 2018
	Metacritic score: 74
	Fast fact: On worldwide release, Asphalt 9 reached four million cross-platform downloads in less than a week.

T
TEAM
STATS & FACTS



	Executive Producer: Sylvain Billaud
	Producer: Ignacio Marín, Aska Suzuki
	Lead Software Engineer: Arnau Font Riera
	Lead Game Designer: Marc García
	Principal Game Designer: Antoine Cabrol
	Art Leads: Dmitri Mangiagalli, Nacho Yagüe, Jimmy Lorente
	Composer: Vincent Labelle, Martin Courcy, Nicolas Dubé



ANGRY BIRDS
Dream Blast



David Mason

Senior Vice President
of Technology

ANGRY, DESTRUCTIVE, AND EXPLOSIVE PHYSICS FUN

David Mason is Senior Vice President of Technology and Head of Development at Rovio Entertainment. He leads Rovio's cloud services development, and plays an instrumental role in defining the company's technology vision for the future.

Angry Birds. Very angry birds that explode, fly, destroy, and pop pesky pigs, form the foundations of Rovio Entertainment. This games company cemented itself in the annals of gaming history with its highly immersive mobile game—Angry Birds. A game that won awards, broke records, and redefined what casual gaming could mean for hundreds of millions of gamers. Today, the company maintains its reputation for fun, engaging, and highly entertaining games with Angry Birds Dream Blast, a physics-powered and compelling addition to the Angry Birds universe.

With Angry Birds Dream Blast, Rovio took the birds and their rage, added a sophisticated technology stack, and created a tight, engaging, and satisfying game that keeps players coming back for more. It's a tap-a-thon of strategic thinking and smart planning that thrills every time a player beats a level.



DID YOU KNOW ...

Rovio Entertainment Corporation is a global, games-first entertainment company. Its mobile games have been downloaded 4.5 billion times to date. Rovio is best known for the global Angry Birds brand, which started as a popular mobile game in 2009 and has since led to two films, the first of which opened number one in theatres in 50 countries. Rovio is headquartered in Finland.

“We’re always trying out new ideas”

Our game development is very iterative; we’re always trying out new ideas. Our approach is to develop a concept internally, work on the best ideas with a small team who take them to prototype, and then we’ll decide if a game is worth taking further. If it’s the right game, we’ll move to preproduction and then assess the market by putting a simple playable version into the hands of players to get their feedback through play testing. Then, if we believe in the game, we try a soft launch to see if we can attract an audience and scale in a profitable way.

“We have 40 nationalities in the company”

Rovio is a very diverse organization—we have around 40 nationalities in the company and there are 19 different nationalities in our technology team alone! We’re always looking for great, global talent so that our games appeal to a global market. We want to work with individuals who are passionate about creating great mobile games—this is why we’re always talking about what we’re doing and why we’re on the cutting edge. Conversations like these help us attract the right talent that believes in the work.

“We can build and deploy infrastructure to the cloud in hours”

We built Angry Birds Dream Blast on AWS because of the multiple benefits AWS brings to the game. To speed up our time to market, we’ve created common technology and services for our game teams so they can focus on developing the game itself. Angry Birds Dream Blast exploits these common cloud services through our platform, Beacon, including player identity, analytics, ads and cross-promotion, personalization and live ops, and payments—all built on AWS. Angry Birds Dream Blast also leverages our game server infrastructure templates and machine learning capabilities.



“We serve tens of millions of players every month”

Each month, we serve tens of millions of players in our games, which means thousands of requests per second from all corners of the globe. We capture two to four billion analytics events per day with more than 1TB of data, and run more than 1300 instances on [Amazon Elastic Compute Cloud \(Amazon EC2\)](#).

“Teams can pick game services out of a box”

We provide Beacon services to our teams through an SDK, REST APIs and our own dashboard. This takes away the pain of having to integrate third-party solutions for ads, analytics, and attribution. We ship the services to the game team so they get all the services they need out of the box.

“We provide challenges and events that bring people back every day”

All our games run live events and create challenges that bring people back every day. Thanks to our Beacon Live Ops calendar, game teams can create event templates—the calendar can then schedule events on demand while reusing previous templates. It can simply change the reward and the art, and apply it. This allows for multiple games to use the same tool really effectively.

“You don’t need to be a hardcore infrastructure engineer”

AWS gives us the tools to template. In the past, we built our game servers with the Google App Engine, which is a fairly wrapped service that was quite expensive to run at the scale we generate. Over the last four years, we’ve moved to AWS and have started to template our game server infrastructure. For Angry Birds Dream Blast, the move helped to reduce the

hours spent on infrastructure. Part of the joy of this game is that we’d already built an entire template and already had other games running on it, so we could just focus on building the best possible game.

Our management layer uses [AWS Management Console](#), and our technology stack includes [Elastic Load Balancing](#), [Amazon Route 53](#), [AWS Shield](#), and [AWS Networking and Content Delivery](#). Enabling the deployment of different environments, testing environments, and production environments is done through [AWS CodeDeploy](#) and [Amazon Elastic Container Service \(ECS\)](#).

Then, when developing the actual infrastructure, game teams pick the services they need to run, such as [Amazon RDS](#), [Amazon Elasticsearch Service](#), or [Amazon ElastiCache](#)—all of these are packaged in the templates. Our templating enables our game teams to leverage AWS’ comprehensive stack and takes away the need to be a hardcore infrastructure engineer.

Technology has enabled us to run the game with global reach to players 24/7. This infrastructure lets us scale at demand to all corners of the earth, because it’s so cost-effective.



“Machine learning helps us understand the playability of the game”

There’s so much innovation that’s made possible with machine learning these days. It’s changed how we’ve managed the playability of levels in Angry Birds Dream Blast. Machine learning has given us the ability to predict the playability of levels and to test before we release them into the game.

In the past, we would play the levels and every week would shift new levels into the game, then we would learn and iterate the experience over the next two to six weeks. Gamers playing the levels would teach us if the levels were too easy or too hard. If it’s too easy, players lose interest; if it’s too hard, they leave. You have to find the right balance.

Now, with machine learning, we can optimize the levels so our players get the best experience from the moment the levels are released. So our hardcore players that are waiting for fresh content get optimized levels straight out the gate.

“Sometimes you just want to walk down the hill”

Machine learning allows us to bring our churn score and lifetime value into our targeting, and to change the player experience on the fly based on their behavior. We also aim to measure the fun of the game. Sometimes a player wants to climb the hill and sometimes they just want to enjoy the walk down. The levels need to vary in complexity, so we get those peaks and troughs right. To customize the game for the individual, we have to understand what different types of players want from the game. Machine learning can give us this understanding.

“Angry Birds Dream Blast is in the top 100 grossing games”

The technology we’re using has taken us to market, allowed us to really engage our players, and helped us place in the top 100 grossing games globally. Angry Birds Dream Blast has been a huge achievement and the machine learning, the player experiences, and the technology stack have all helped to write this success story. We’re delighted by the success of the game. When we set off, we knew we had something different. The way the game is played—the physics and interaction—means the elements that make up the game are not the same as other casual games out there today.

“Focus on what you believe in”

Rovio has been developing games since the early 2000s, and when we launched Angry Birds classic, it was actually our 52nd game. It was the right game at the right time. The App Store had just come to market, and there was a consistent platform with the iPhone that had consumer traction. Today, with thousands of apps pushed to the App Store every day, it’s about focusing on where you believe you have something unique and trying to iterate, learn quickly, test ideas, and build games you believe in.

“I’m on level 920. I love this game”

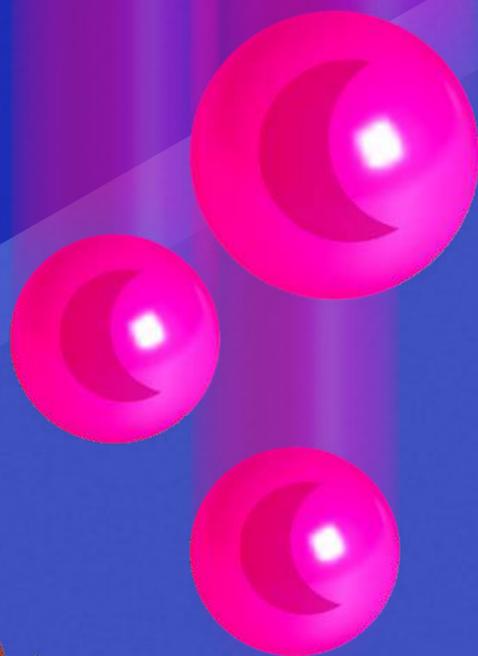
Angry Birds Dream Blast is something you can pick up and play whenever you want. It’s both challenging and rewarding. I enjoy trying to overcome each level and because there are so many different challenges and levels, it means there’s always something I need to overcome. I’m now on level 920. I really do love this game. It captures the fun, the anger, and the destruction of the brand.



“We’re inspiring another generation of builders”

When I first got offered a job interview at Rovio and told my kids about it, they wanted to know which Angry Bird was going to do the interview! My best friend’s son designed his own level for the game; he was so inspired by it.

The mix of creativity and technology helps people see how things are built. It’s how started—I was playing Elite and other games as a teen, then I started writing code, and then I went off to do software. So when I see our games making people want to become game developers themselves, it’s a great moment. We’re inspiring another generation of builders.



STUDIO STATS & FACTS



	Founded: 2003
	Team Size: Circa 400
	AWS Services include: Amazon EC2 , AWS Management Console , Elastic Load Balancing , AWS Shield , AWS Networking and Content Delivery , AWS CodeDeploy , Amazon Elasticsearch Service , and Amazon ElastiCache
	Total number of downloads: Over 4.5 billion
	Follow: @Rovio

GAME STATS & FACTS



	Launch Date: January 2019
	Genre: Tap to match puzzle game
	Platform: Mobile
	Fast Fact: A polished, physics-led puzzler that’s just as angry and destructive as the classic, Angry Birds Dream Blast was named one of Google Play’s Best games of 2019.



DOWNLOADS



Self-publishing is never easy, but Fatshark is proof it can definitely work. The studio has already sold more than three million units of its self-funded game, Warhammer: Vermintide 2. The co-op FPS sees players fight side-by-side in a fantastical universe against nightmare-like opponents. Fatshark's telemetry pipeline, built with services such as [Amazon API gateway](#) and [Amazon Elasticsearch Service](#), helps to streamline its development process.



Gameloft was nervous about how fans would react to the latest installment in the hit Asphalt racing franchise. The studio needn't have worried. Asphalt 9: Legends achieved four million cross-platform downloads in less than a week. The team used physically-based rendering with HDR to create realistic, reactive environments for players to race their supercars across. Asphalt 9: Legends is the Barcelona studio's first cloud-based game, but [Amazon EC2](#) provided the capacity needed to handle the huge surge of users.



In Angry Birds Dream Blast, Rovio has created a highly engaging tap to match puzzle game that lives up to its namesake's reputation. New levels are released each week to a captive audience clamoring for new challenges. The studio uses a series of AWS services in its templates—enabling game development teams to progress from the start of production to a global soft launch in just a few months.





Ready to follow in these studios' footsteps and introduce your game to the world? Whether you're itching to create a new immersive landscape or have ambitious plans for the next hit mobile game, AWS is here to support you through every stage of your game's lifecycle.

WELCOME TO AWS

Amazon Game Tech helps optimize the development process, by giving you the tools to build, innovate, and bring your game to market.

- Get started with Amazon Game Tech

USING AWS

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- Grow your game with Twitch

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