



# 2021 Gaming Report

Unity insights from 2020  
and predicted trends for 2021

The year 2020 was unprecedented for the gaming industry. The industry has proven its resilience despite the challenges posed by a global pandemic. We covered the immediate impacts of COVID-19 in a [previous report](#). Here we present a comprehensive view of the trends that took shape over the year.

In a year where people were encouraged to stay home, developers delivered welcome diversions and immersive experiences, and Unity is proud to have supported them. At Unity, we believe the world is a better place with more creators in it. Unity is the go-to platform for rapid development, with extensible tools that allow developers to reach their audiences wherever they are. Developers additionally benefit from Unity's Operate Solutions, the bedrock for connecting, engaging, and growing these games and experiences.

We help developers build a thriving business on top of their creations. The Operate Solutions team is dedicated to enabling content creators to run, grow and monetize their games. Whether you're a student learning to build your first experience, an independent developer, or an AAA publisher, we're passionate about supporting your success. We are grateful to our customers for the opportunity to help realize their vision.

Over the years, Unity has produced reports on mobile gaming, monetization and the impact of COVID-19, to name but a few. This year we wanted to combine these topics into one comprehensive report. The 2021 Gaming Report is a deep dive into the key aspects of the gaming industry you care about. Enjoy the read and stay in touch to keep up to date!

### **Ingrid Lestiyo**

Senior Vice President & General Manager,  
Unity Operate Solutions



5B downloads per month of apps built with Unity



2.8B monthly active end users who consume content created or operated with Unity solutions



94 of the top 100 development studios by global revenue are Unity customers



23B+ average monthly ad impressions worldwide in the six months ended December 31, 2020



2.5B+ average number of devices reached per month globally in the six months ended December 31, 2020



164M+ average daily users viewing ads globally in the six months ended December 31, 2020



253M+ new users/installs per month delivered for our developers with Unity Ads

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# Key takeaways

- Unity remains the game engine of choice with 61% of developers surveyed using it, and the second most popular choice as a mobile ad network.
- COVID-19 had a notable impact on the way people play video games. The volume of HD gaming (video games on PC, macOS, and other desktop platforms with graphics typically rendered in high definition) rose by over 38% in 2020. Additionally, play has shifted to weekdays, and this trend held well beyond the onset of the pandemic – the difference between weekday and weekend gaming increased by 52%, in weekday gaming's favor.
- Mobile gaming also saw strong positive impact in 2020. When comparing this year's growth to last year's, first day microtransaction purchases were up more than 50% year over year, and ad revenues saw over 8% growth. This is on top of already strong baseline growth rates for both in-app purchases (IAP) and ad revenue.
- Creating new content to delight and engage players should still be a top priority for game developers. On average, large new content updates for live games resulted in peak concurrent user spikes of over 11%.

Play has shifted to **weekdays**, and this trend held well beyond the onset of the pandemic.

# About the data

Unity Technologies helps more than 60K mobile developers make sustainable revenue from ads and in-app purchases on over 300K apps. We take developer data privacy very seriously, and have omitted information from this report that would individually identify any single game or developer. The mobile analysis in this report is aggregated from our internal data into the publically determined categories on the Google Play and Apple App Store from January 2020 to December 2020. The ad formats that this report encompasses are static display/ interstitial and rewarded video. Data regarding banners was excluded primarily because that format yields a vast range of performance and user behavior.

We've also leveraged data from Unity's deltaDNA platform, Vivox, and Multiplay services, all part of Unity Operate Solutions. These powerful gaming solutions span both mobile and PC/console gaming, which gives us a wide view of the entire gaming industry. Additional thanks go to our survey respondents, from 2015 to the present, who have helped us to understand the shifting landscape of monetization in mobile and free-to-play games.

# About Unity Operate Solutions

Supporting every stage of the game development lifecycle, Unity Operate Solutions works with studios of all sizes to maximize your chance of success. Whether it's running your game, engaging your players, or growing your business, Unity has what you need.

Today's games don't just launch, they live, and Unity is your partner in making your ambitions a reality. Whatever success means to you, Unity can enable you to achieve it faster.



## Unity Ads

**Unity Ads** is a comprehensive **monetization** and **user acquisition** solution that helps mobile game publishers and advertisers reach their revenue and campaign goals. For publishers, monetization key benefits include our Unified Auction, diverse ad formats, advanced analytics and cross development platform use to help them generate revenue without compromising gameplay. For advertisers user acquisition tools such as Audience Pinpointer, Reach Extension, and Report Builder offer unique data insights, premium ad inventory, and self-service workflows to help them grow their app or game with campaigns that deliver valuable new users.



## deltaDNA

Unity's **deltaDNA** provides sophisticated player engagement tools for game makers, powered by deep data analytics.

With cross-platform and rich data capability, this end-to-end solution enables publishers and developers to better understand different player behaviors and create personalized experiences, targeting individual players in real-time.



## Multiplay

Trusted by leading studios worldwide, **Multiplay** delivers resilience and scale to your gaming infrastructure, helping game launches and live ops run smoothly. Server infrastructure is expensive, and it's hard to predict and manage the impact on your bottom line without specialist support. Through efficient scaling algorithms and real-time infrastructure selection across leading cloud providers, Multiplay's Cloud Platform can yield savings of up to 29% compared to single-cloud solutions. Whether your game is built in Unity, Unreal, or another engine, Multiplay integration is simple and works with any gaming platform. With a growing network of data centers across 70 regions, Multiplay Cloud Platform offers worldwide coverage and 24/7 support.



## Vivox

When players can talk, they stay in your game longer. Improve your retention with **Vivox**, one of the most popular and feature-rich comms technology in the gaming industry. Vivox is trusted by the industry's leading titles to deliver the best comms service to their players. It's an easily integrated and managed hosted solution that works with any game engine for any platform. Vivox is used by studios of all sizes to manage comms on PC, mobile or console, wherever in the world their players are. Whether your game is built on Unity, Unreal or another game engine, Vivox can be integrated in less than two days and scaled to millions of players.

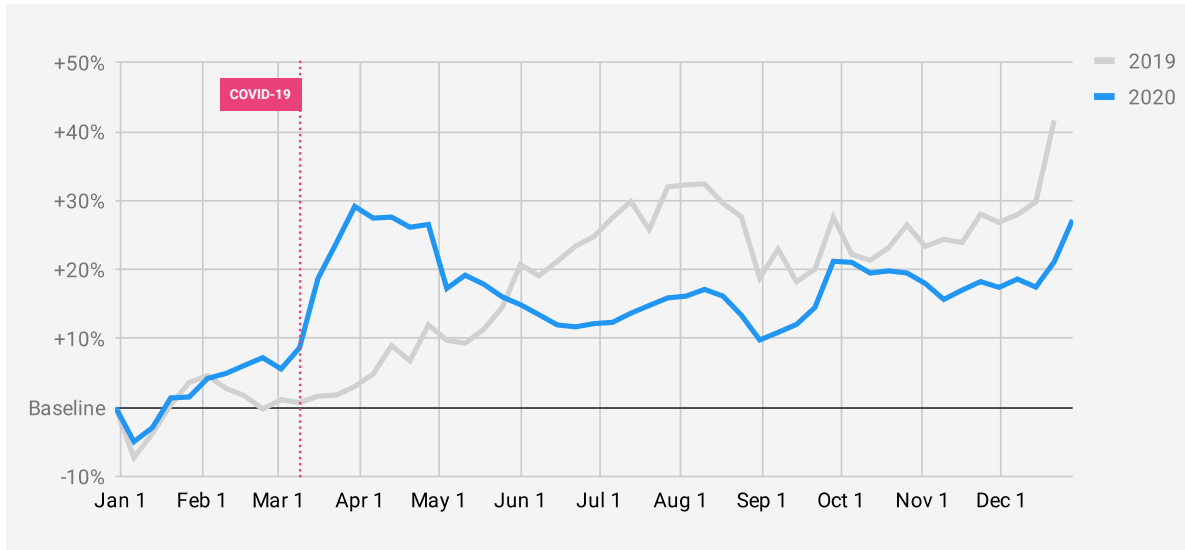
# 2020 in review

The COVID-19 pandemic, social and political unrest and economic recession combined to make 2020 unique, and these factors must be considered in interpreting the data we cover in this report.

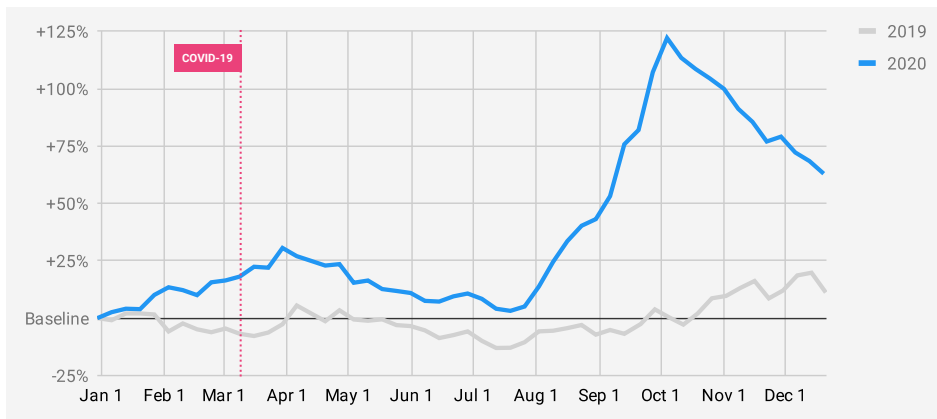
We've identified some key takeaways and added some context and insight into the likely driving factors for the data.

# Gamers are changing what they play on

## Mobile DAU, % change



## HD DAU, % change

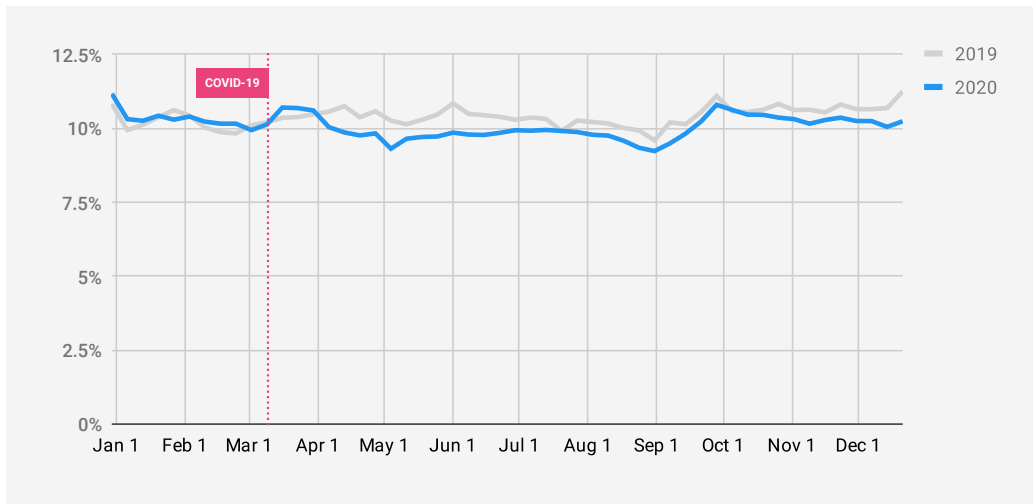


At the start of the pandemic, the popularity of mobile games spiked, but usage settled back down as the year progressed. However, HD games on PC/macOS held steady their initial increase, and then rose significantly during the fall and winter.

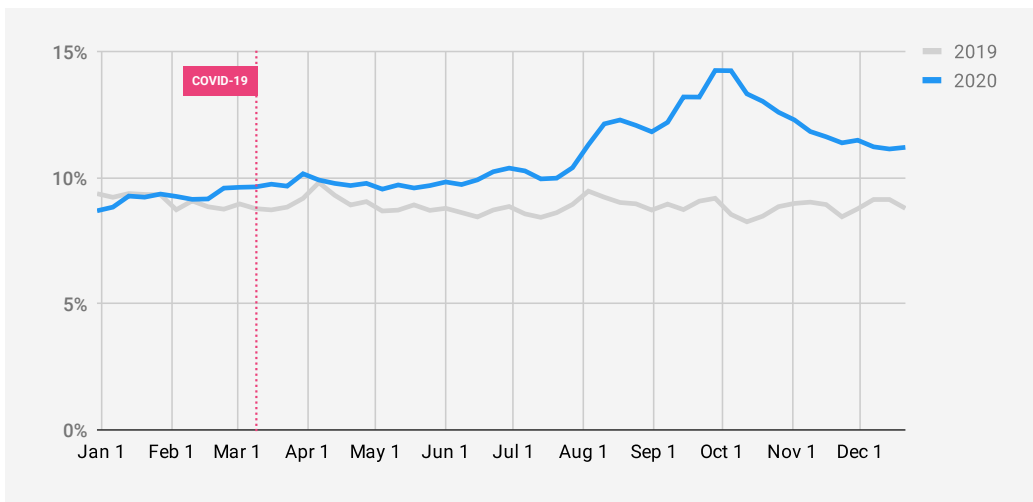
With the onset of colder weather keeping people indoors and other forms of entertainment unavailable, HD gaming became the foremost media that many people turned to. Over the course of the year, HD gaming daily active users (DAU) increased on average by 38.27%.



## Mobile stickiness



## HD stickiness

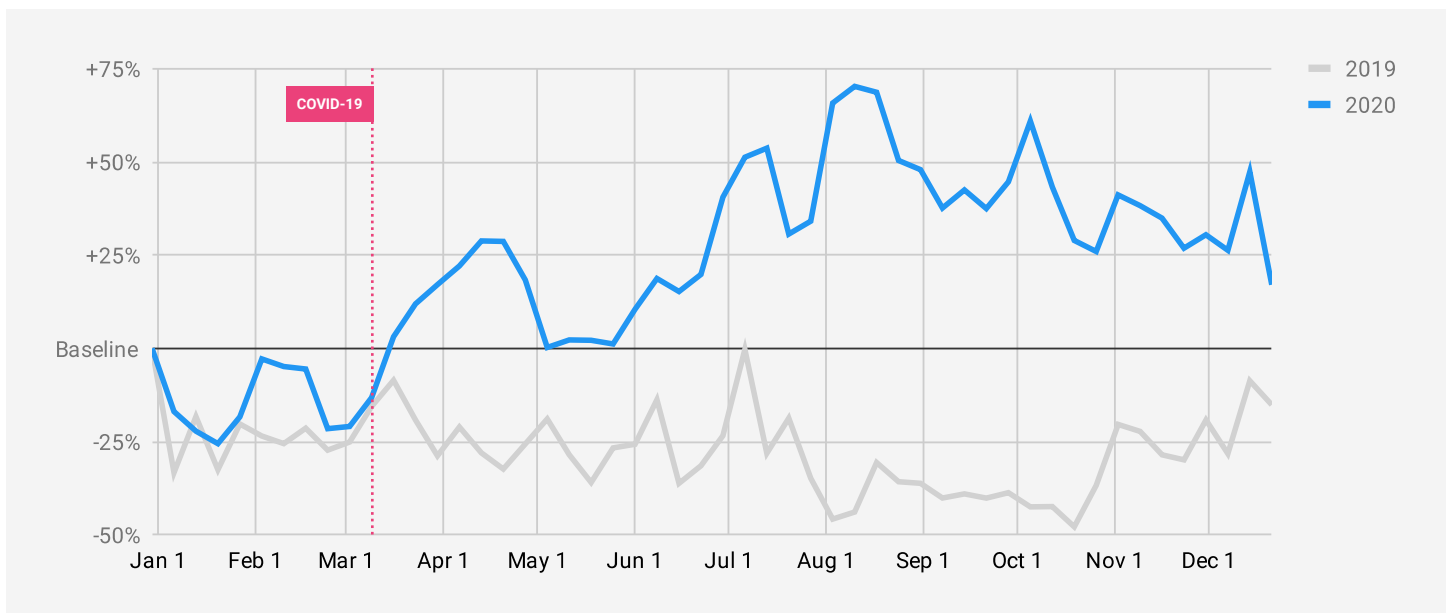


A similar usage pattern emerges with stickiness, which is how often a monthly user of a game plays it daily. Mobile games fell slightly in stickiness, though their stickiness was still higher than that of HD games in 2019.

HD games, on the other hand, showed tremendous stickiness over the course of the year, and ended at an all-time high. This was likely in part due to new console launches, but also thanks to limited access to alternative entertainment. HD game stickiness increased on average by 1.82%. While that number may sound low, given that most games have stickiness of around 10%, it's actually a very significant increase.

# Mobile gamers are spending more than ever

## D1 IAP revenue growth trend

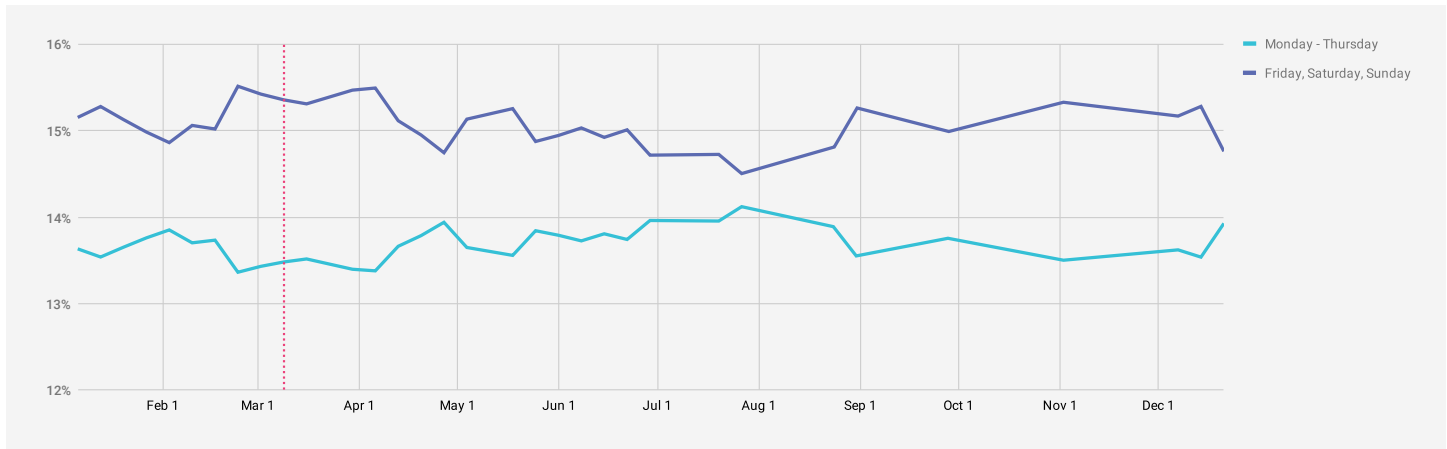


First-day IAP purchases in mobile games spiked with the springtime lockdowns around the world, but quickly ramped back up during the summer and were sustained throughout the rest of the year.

Typically, the revenue stays below the January 1 baseline until the winter holiday season begins in November, but 2020 set new records for the mobile game business. Over the course of the year, first-day IAP purchases rose by over 50% compared to 2019.

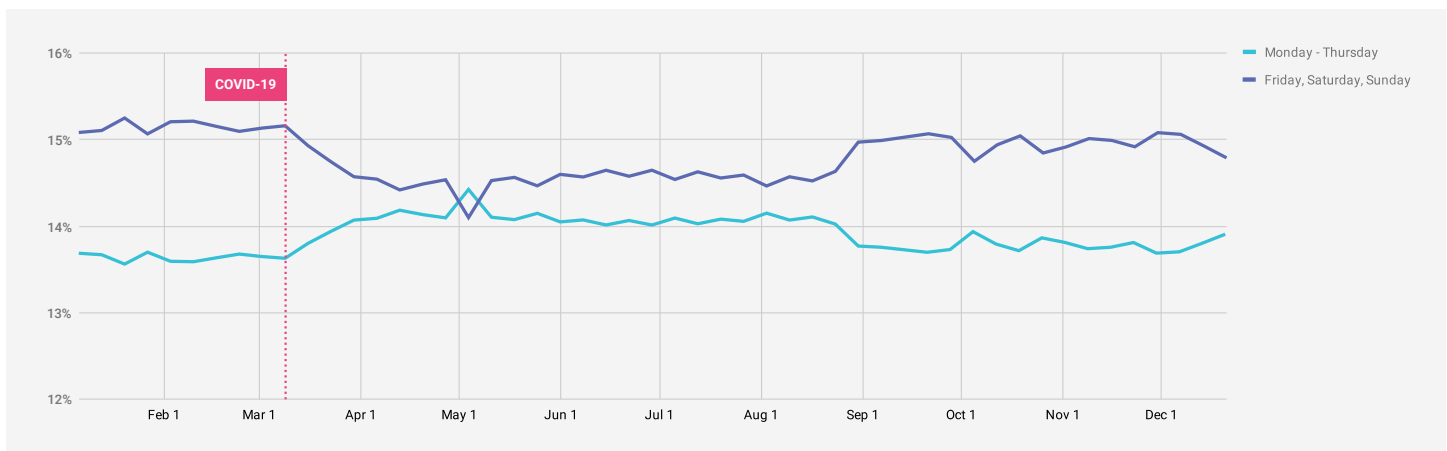
# Gamers are changing when they play

## Average % gaming volume per day (2019)



In 2019, weekday gaming volumes remained lower than weekend gaming volumes. However, during the summer months, that gap shrank – players shifted their play days to weekdays. Then, in the first week of September, gamers shifted their play days back to the weekends as school started back up and vacations ended.

## Average % gaming volume per day (2020)

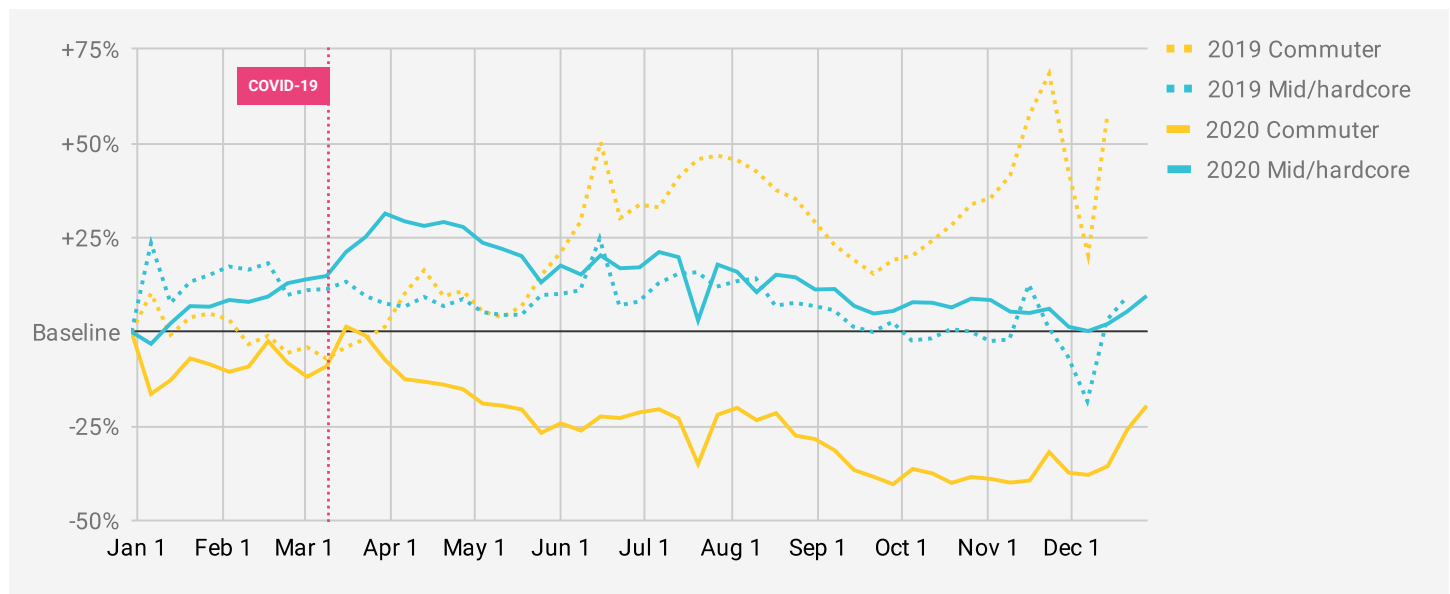


The weekday/weekend split at the beginning of 2020 was similar to that in 2019. However, when lockdown started, the difference between weekday and weekend gaming habits greatly narrowed, especially during the summer months. They even inverted for a brief period in May.

On average, the difference between weekday and weekend gaming activity during 2019 was 1.39% in the weekend's favor. In 2020, this difference was just 0.91%. This represents a shift of 52.7% in redistributing weekend gaming time to the weekdays.

# Commuter mobile games took a hit, while mid- and hardcore games saw increases

Commuter and mid/hardcore DAU, % change



Mid- and hardcore apps saw a substantial boost during the onset of the pandemic as people found themselves with more time to enjoy in-depth gaming experiences. Over the course of the year, player behavior settled back down to 2019's trendline.

Commuter apps, meanwhile, took a plunge and never really recovered the growth trend that 2019 indicated.

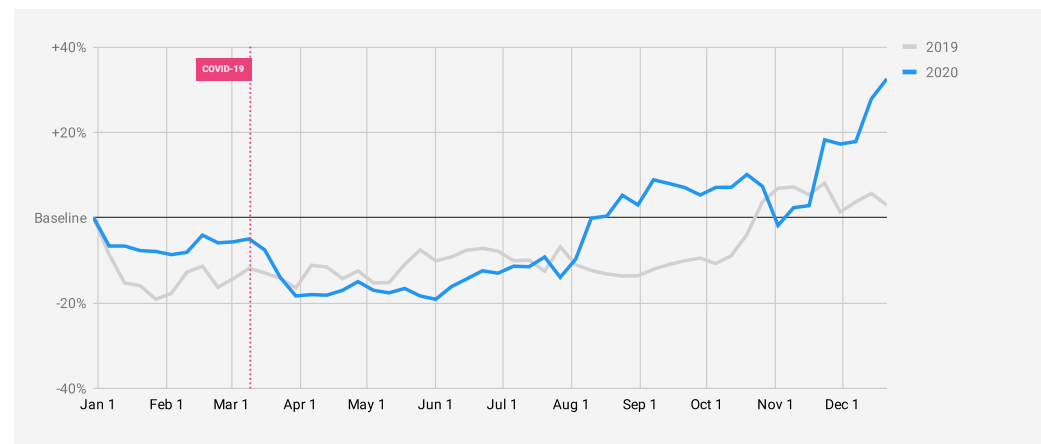
# Mobile game ad revenues recovered and hit new highs

## Mobile gaming ad revenue, % change



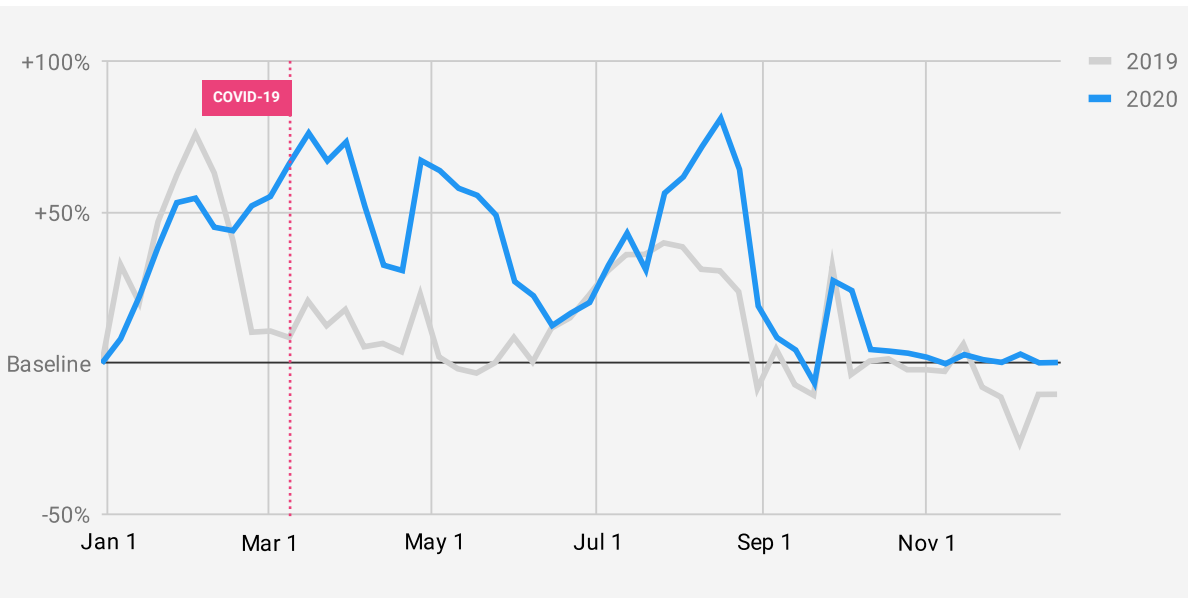
## eCPM, % change

When the pandemic was declared and global lockdowns started, mobile ad revenues surged, but individual effective cost per mille (eCPM) for each ad impression fell. However, as the year carried on, eCPM per ad impression steadily rose, reaching extremely strong numbers by the end of the year. Overall mobile game ad revenues in 2020 grew by over 8% when compared to 2019's growth trend, and eCPMs grew by 5%.



# China offers a glimpse of the future for Western countries

## DAU in China, % change



As countries have responded to COVID-19 in different ways, we can look to countries that have already begun “returning to normal” for an indicator of the future. China was one of the countries earliest affected by the virus and made major strides in containing it. Though new cases arise daily, by the end of 2020 Chinese residents had returned to work and resumed social and economic activities (e.g., movie theaters are open), with lockdowns occurring at a local level when outbreaks are detected.

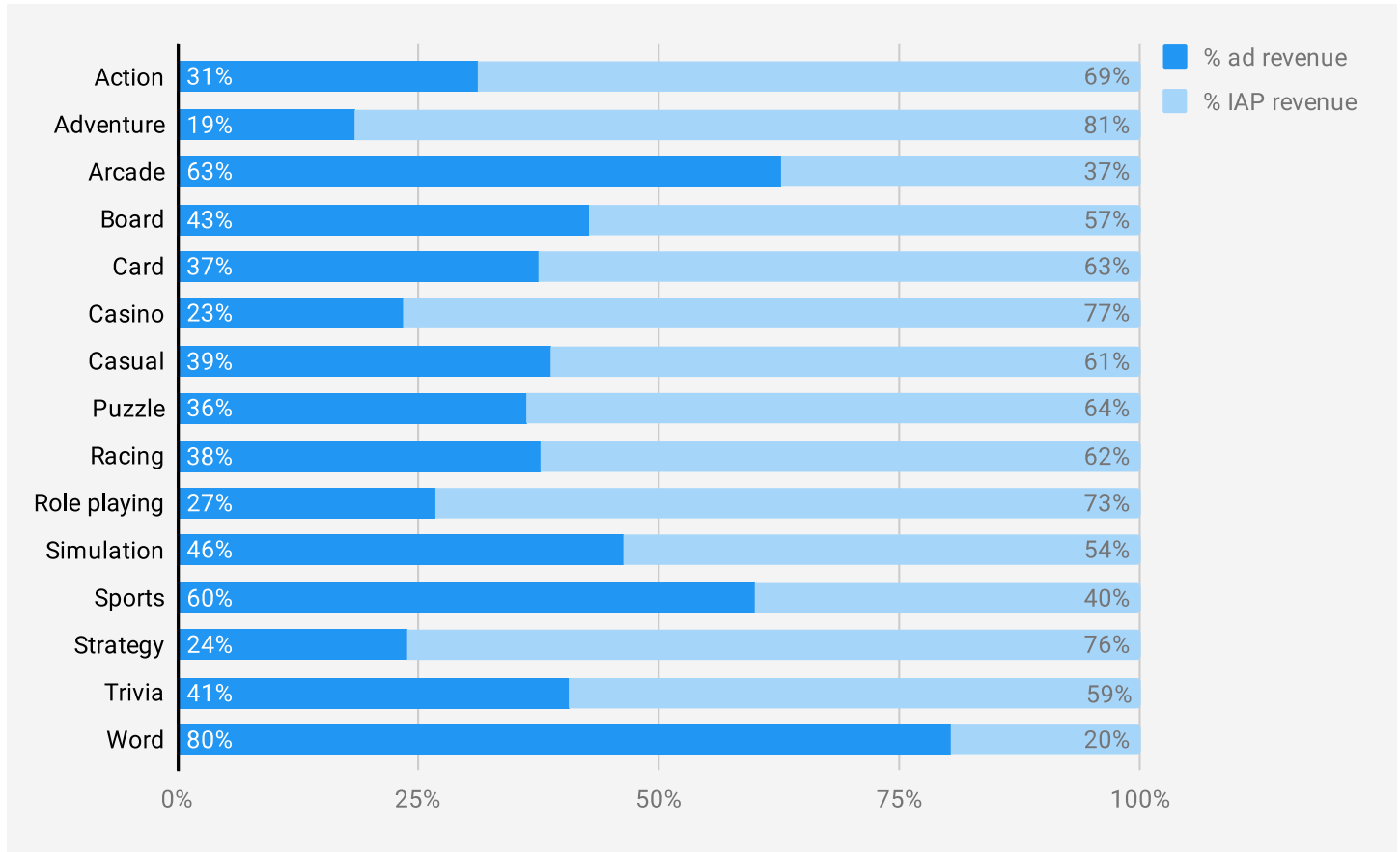
The data shows that the DAU in China returned to levels similar to those in 2019, likely because Chinese players regained the option to spend their spare hours on activities other than video games.

# Mobile monetization in 2020

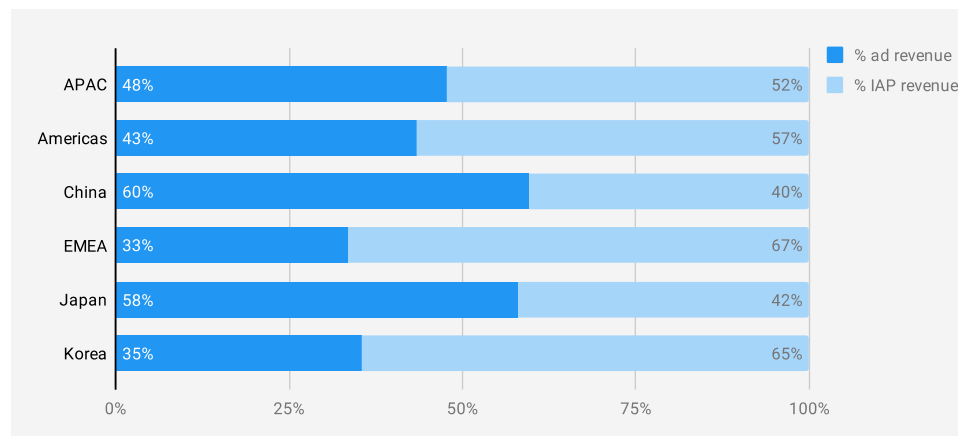
The impact of COVID-19 lockdowns continued to be a factor for both ad and IAP growth throughout 2020. With more users turning to mobile games for entertainment at home, overall growth was positive. In analyzing the ad and IAP growth, specific regions and game categories stood out as high performers.

# Ads vs IAP

% ad and IAP revenue by category



% ad and IAP revenue by region

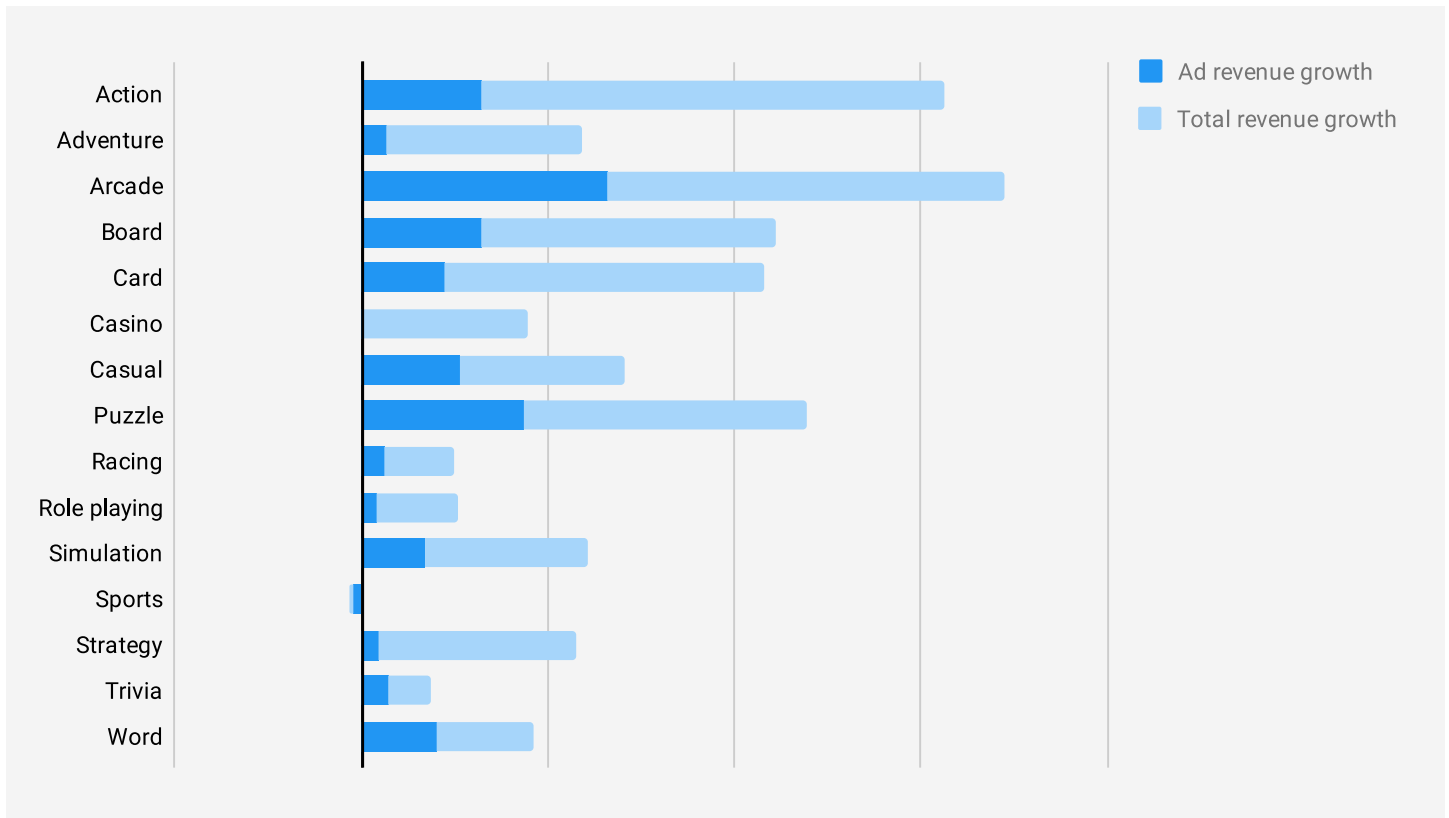


In 2020, IAP revenues took a larger percentage of total game revenues, compared to our [2019 report](#). However, when broken down by region, developers in Asia-Pacific (APAC) countries ended up deriving more revenue from ads in 2020 than 2019.

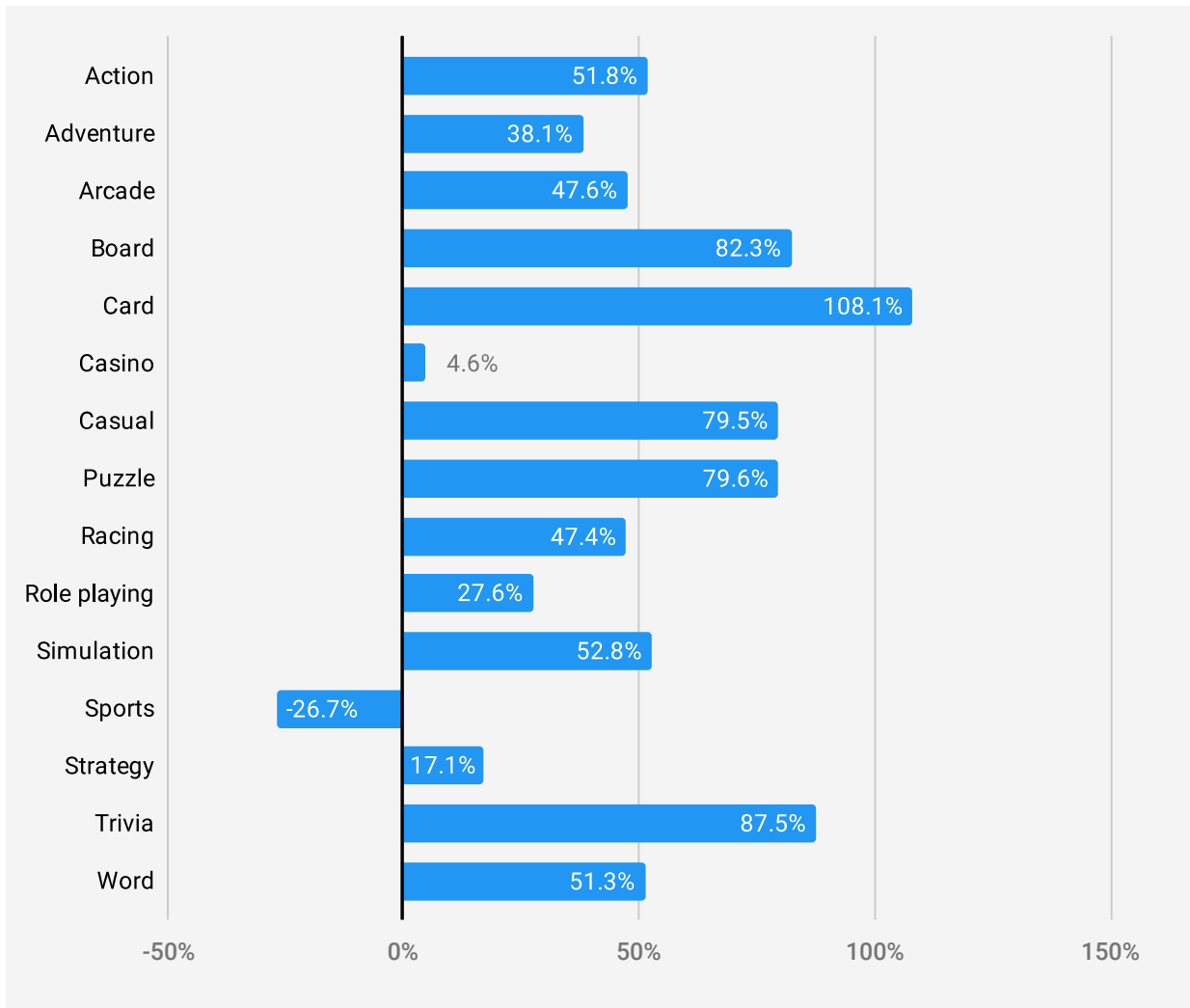


# Ad performance in 2020

## Ad revenue growth as a proportion of total revenue growth, 2019-2020

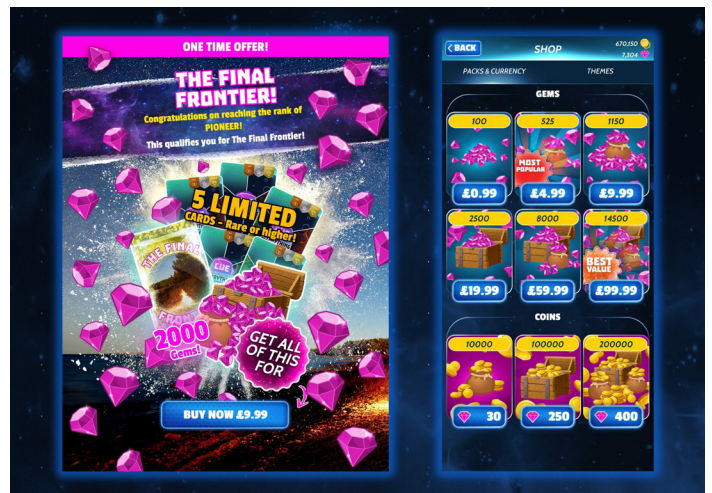


## % ad revenue growth, 2019-2020



Nearly all mobile gaming categories, with the exception of sports games, demonstrated significant ad revenue growth in 2020. With real-life sporting events on pause in 2020, interest in this gaming category declined alongside it; ad revenue for sports games had -26.7% growth.

Two standout ad revenue growth leaders for this year were action and card games. Our 2019 report showed ad revenue for action games grew by 1.9% and card games grew by 66.5% compared to the previous year. In 2020, action games have come back into the spotlight with 51.9% growth in ad revenue, while card games ad revenue grew by 108.1%, surpassing their already strong 2019 performance.

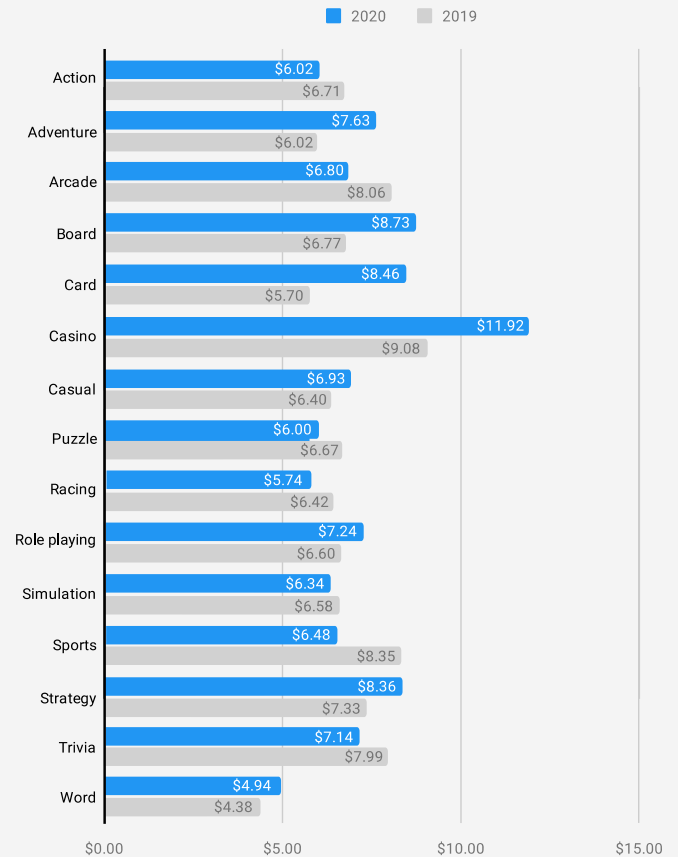
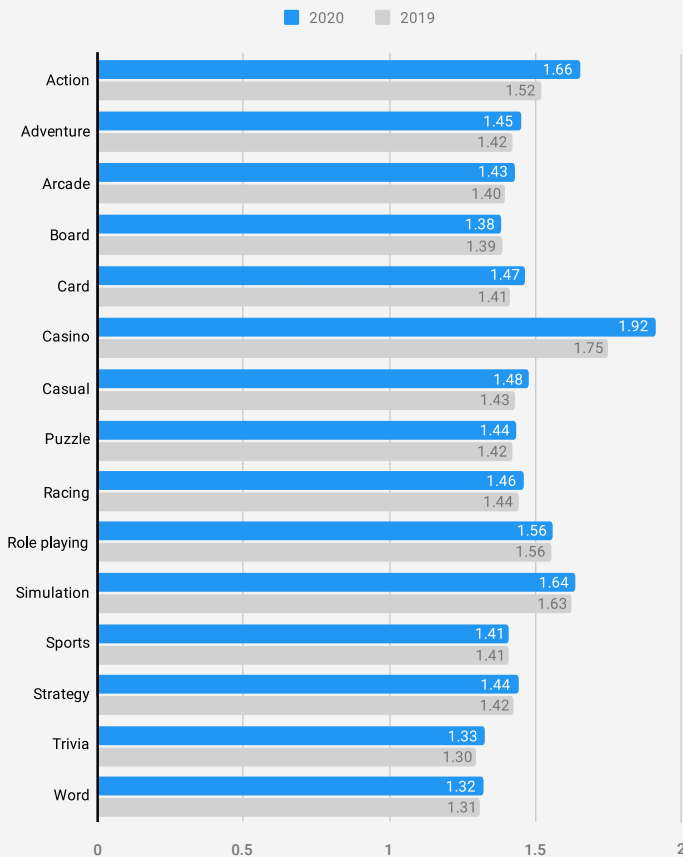


Cards, The Universe and Everything by Avid Games

# IAP performance in 2020

Average # of transactions per payer

Average \$ of transactions per payer



Across all game categories, in 2020 the average number of in-app purchases per paying user rose. However, with this increase in volume, the average amount spent per transaction decreased slightly for 7 of the 15 game categories analyzed.

Comparing 2019 to 2020, casino games were a standout performer, with a notable increase in both the average number of in-app purchases per paying user, as well as the average amount spent per transaction. For casino games the average number of in-app purchases per paying user rose by a respectable 0.17, while the average dollar amount per transaction rose by an impressive \$2.84.

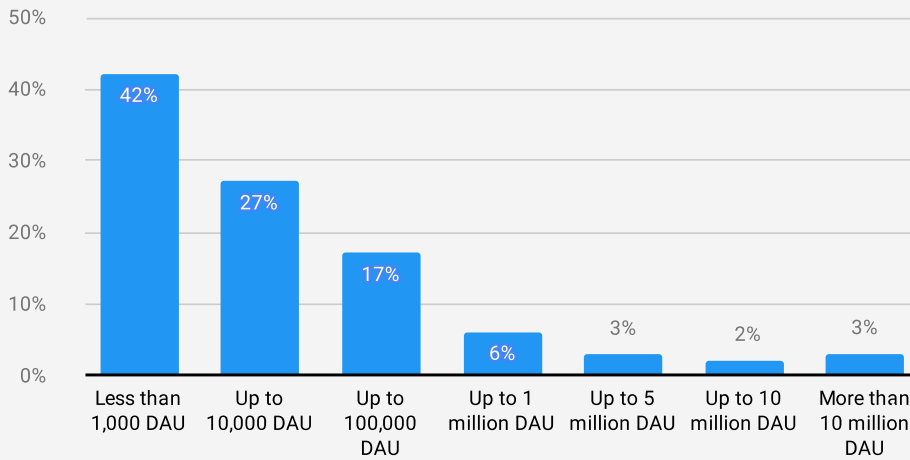
Even sports games held steady at an average of 1.41 transactions per paying user, despite a decrease in the dollar amount per transaction.

# 2020 F2P mobile games survey

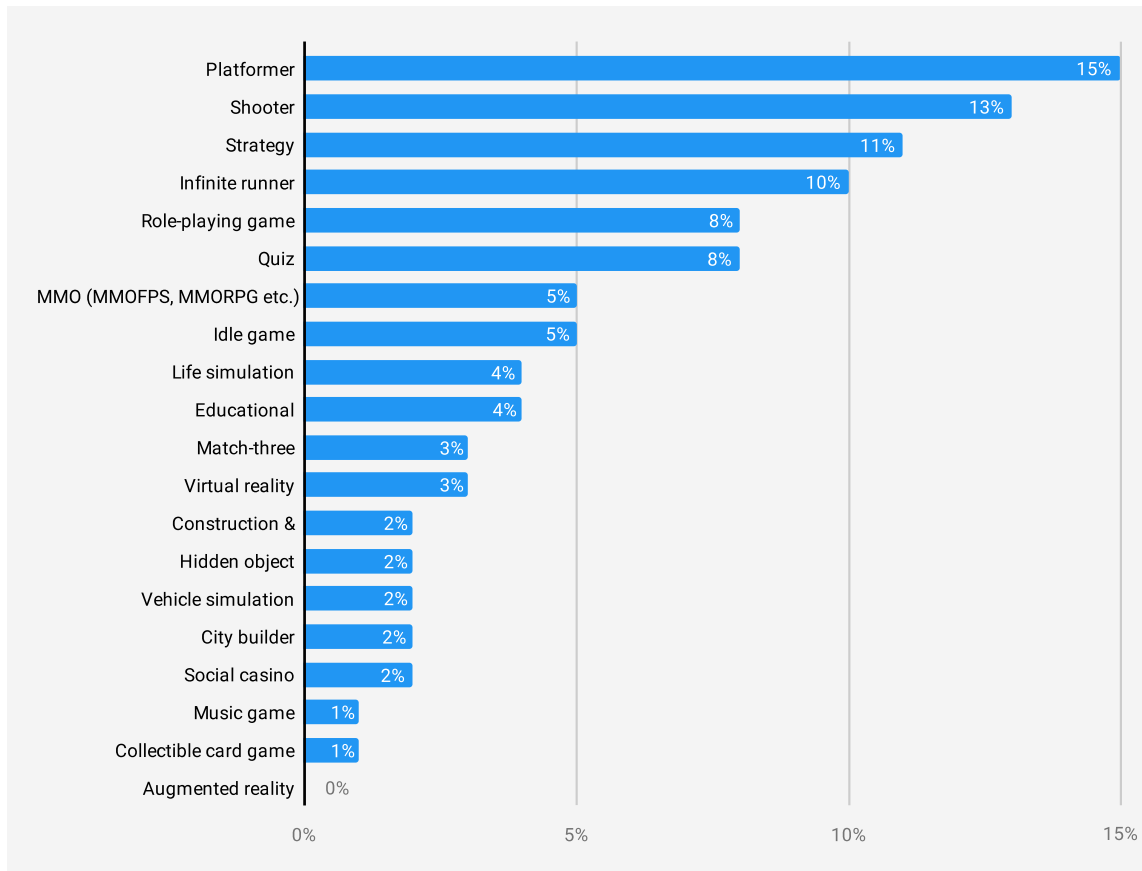
Every year since 2015, the deltaDNA team surveys developers of free-to-play (F2P) mobile games to get first-hand insights into changing industry trends, issues, and sentiments. As ad revenues have steadily increased their fraction of total industry revenues, developers' attitudes and strategies have evolved significantly.

We survey a broad and varied range of respondents – from casual to hardcore game developers, games with under 1,000 DAU to over 10 million DAU, and developers that are heavily dependant on ad revenues to those that don't serve ads to their players at all.

## Which option best describes the peak traffic volume in DAU for this F2P mobile game?



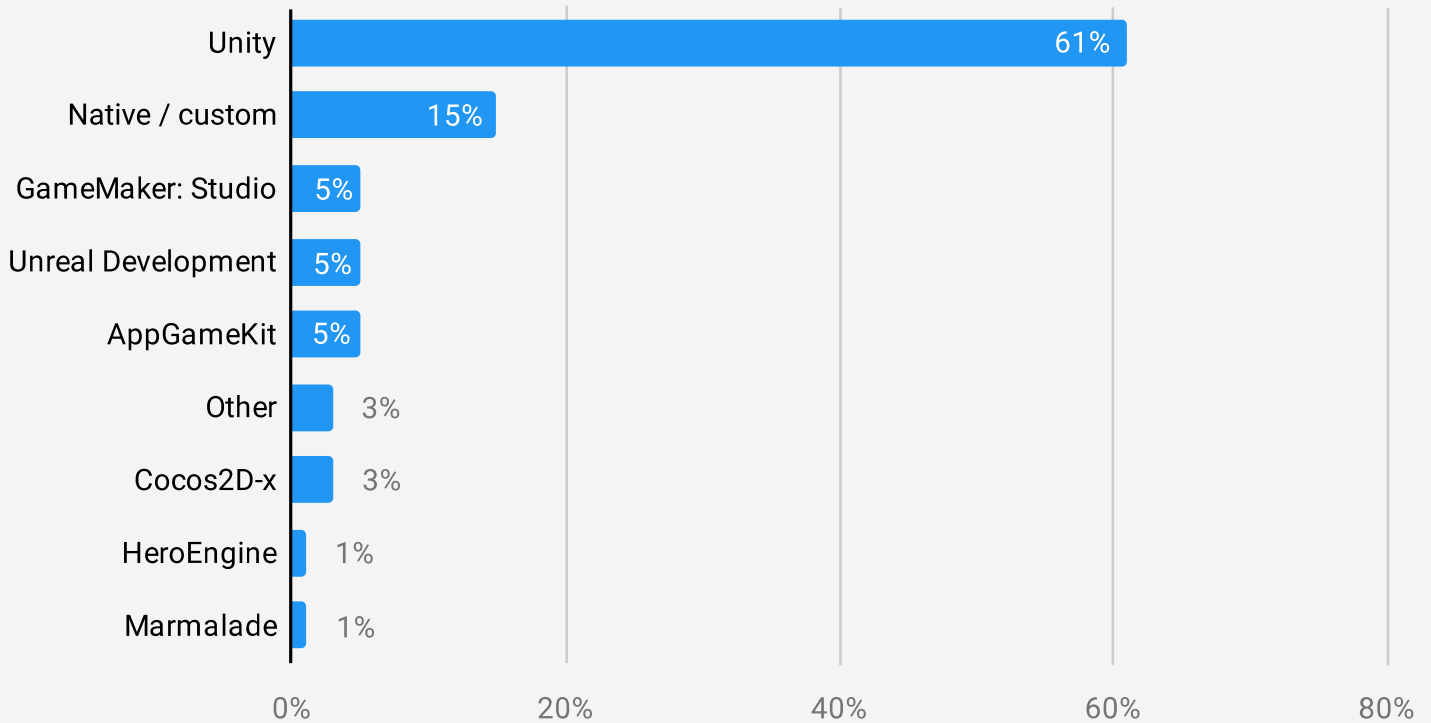
## Which one of the genres listed below most closely describes your highest monetizing F2P mobile game?



The majority of respondents still operate games on a smaller scale. In terms of more granular game genres, platformers are some of the most popular games to develop.

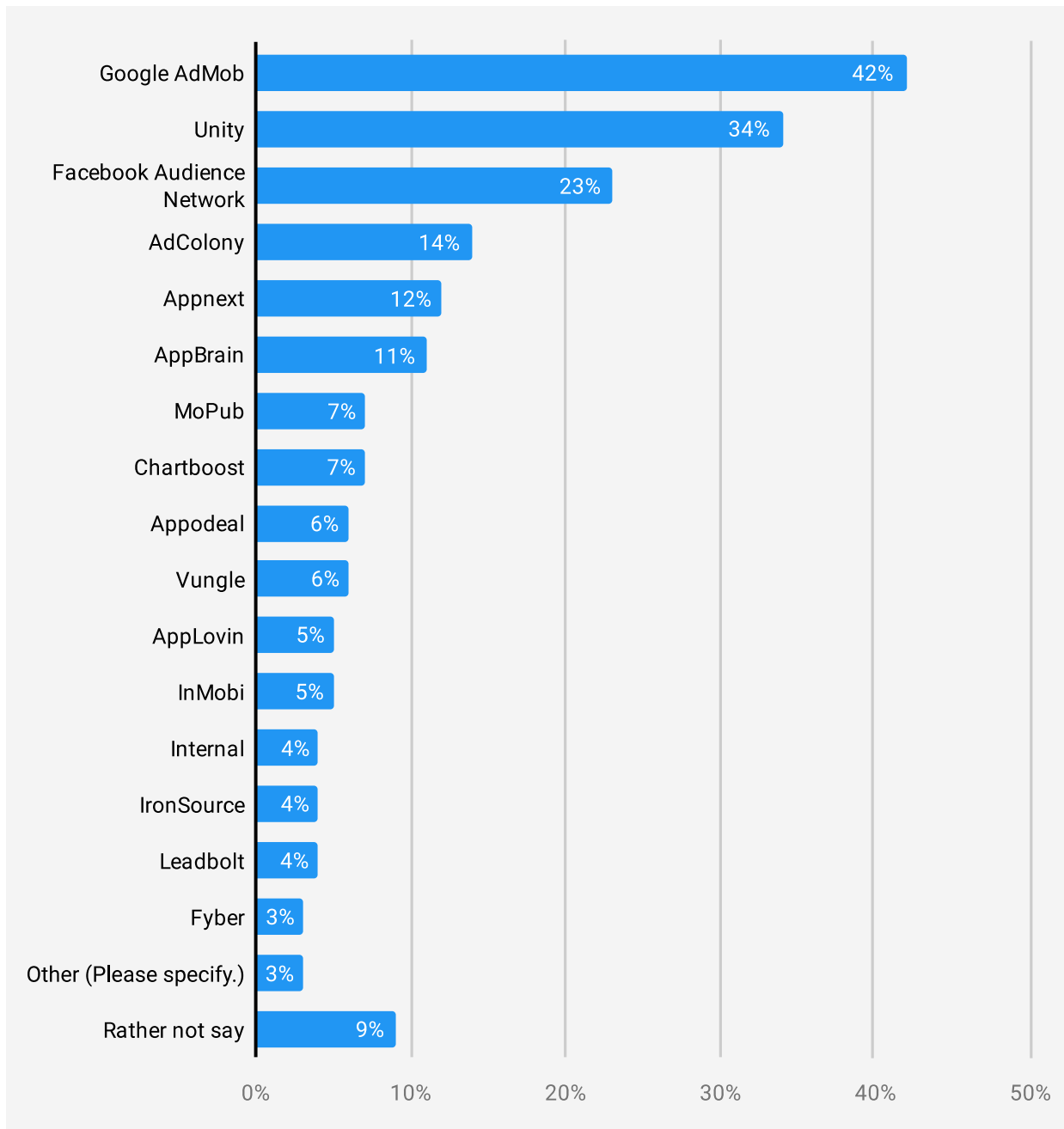
# What technologies do they use?

What game engine did you use to develop your game?



Unity continues to be the game engine of choice for developers of all sizes on mobile devices. Second choice is native or custom engines, with other engine toolkits trailing further behind.

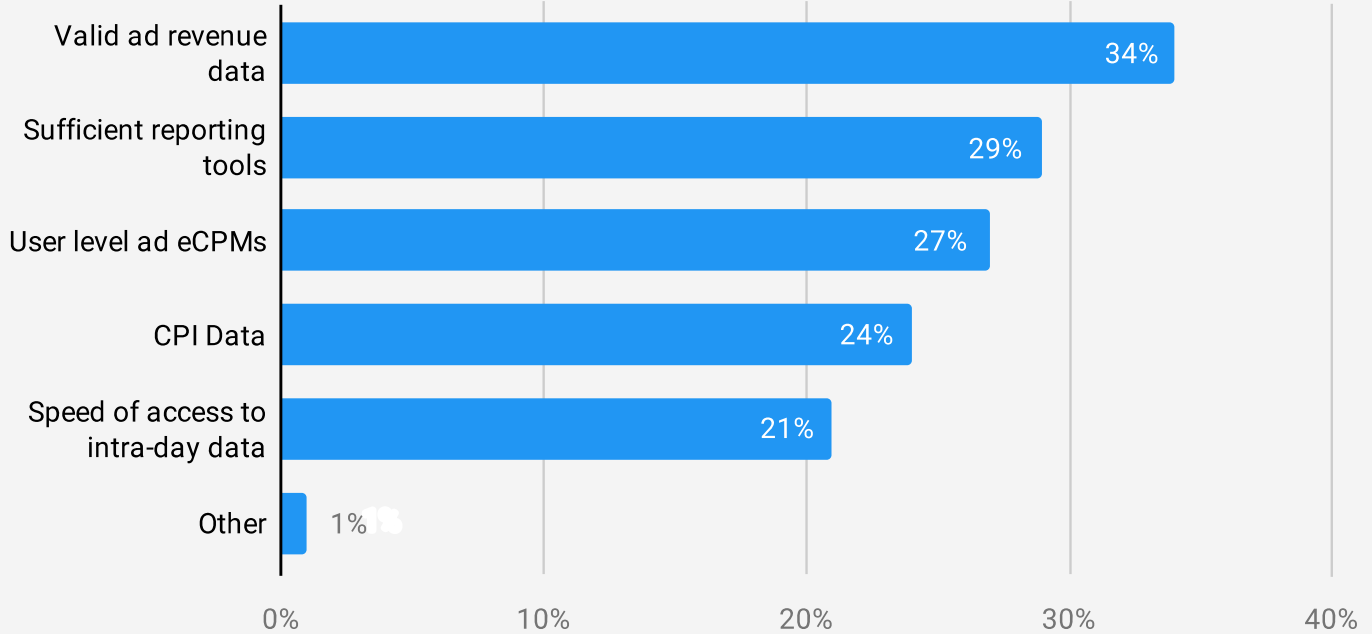
## Which ad providers have you used? (Please select all that apply.)



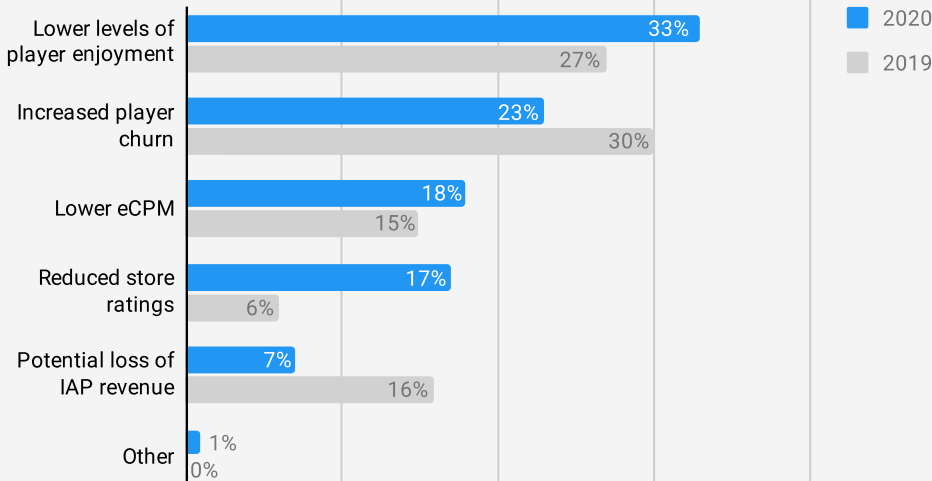
In terms of ad networks, Google, Unity, and Facebook remain the top three choices for 2020. It's no surprise that given their reach, Google and Facebook are strong contenders. The popularity of Unity Ads increased in 2020, likely owing to its ease of integration through the Unity engine, its diverse ad supply and demand, and tools and features to make app monetization and user acquisition more effective.

# What are they concerned about?

What is lacking from your current setup? (Please select all that apply.)



Which of the following factors concern you most when setting the frequency of ads in a game? (Please select all that apply.)



Data and reporting tools continued to be a top concern for game developers in 2020.

While developers were not as concerned about increased player churn with ad frequency in 2020 as in previous years, they're showing more interest in holistic measurements like lower player enjoyment and store ratings. Potential loss of IAP revenue as a concern decreased significantly compared to 2019, as developers have become more thoughtful about their ad implementation.



# Gaming engagement in 2020

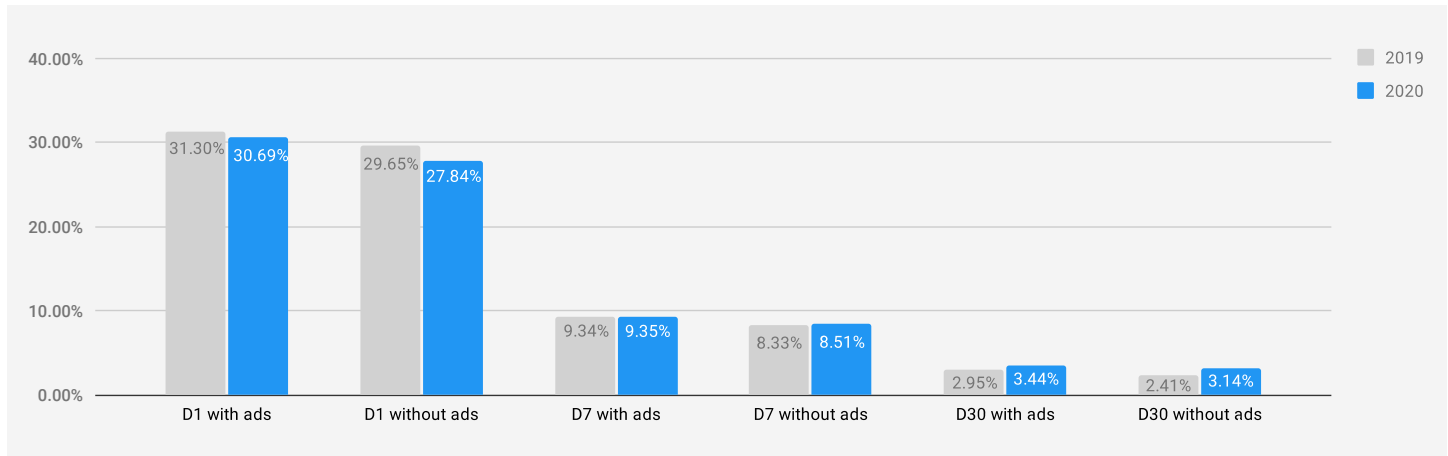
Understandably, engagement levels for games on all platforms rose during 2020. With COVID-19 resulting in lockdowns and therefore more downtime, people turned to their favorite games to pass the time.

In this section, we explore engagement across mobile platforms, using data from the Unity platform and ad network, and across console and PC games, using data from Multiplay and Vivox.

# Retention for mobile games

While gamers in 2020 had ample time to try out new games, our data showed that most game genres showed retention improvements on new installs. In the majority of game genres, best practices in ad strategy and placement continue to drive engagement and extend player lifecycles year over year.

## D1, D7, D30 retention with and without ads



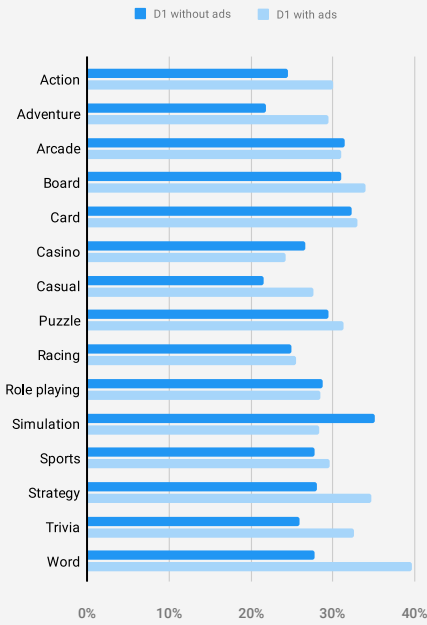
Overall, day 1 retention dropped for mobile titles in 2020 compared to 2019. However, the drop was steeper for games without ads. Surprisingly, day 7 and day 30 retention actually increased year over year.

The day 7 and day 30 retention numbers show that games with ads have higher long-term retention. Intelligent and thoughtful ad implementation is just as important this year as it was last.

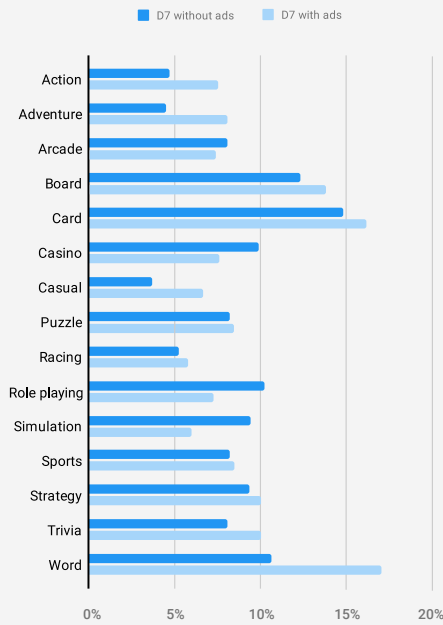


My Spa Resort by Cherrypick Games

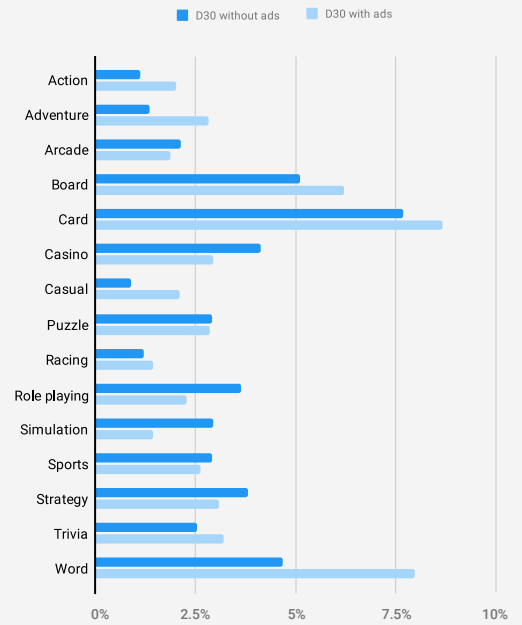
D1 retention % (2020)



D7 retention % (2020)



D30 retention % (2020)



We also examined the retention rates for games in similar categories with and without ads. Overall, games with ads had stronger retention across all categories except role-playing games and simulation.

Even within each of these categories, games had intelligently implemented ads into their core gameplay loops so as to not impact retention metrics, usually in the form of rewarded videos. For these mid- and hardcore genres, forced interstitial videos can lower long-term retention, so it's important to look for rewarded video opportunities to capture the non-payer part of mobile audiences.

# Multiplayer games: PC and console

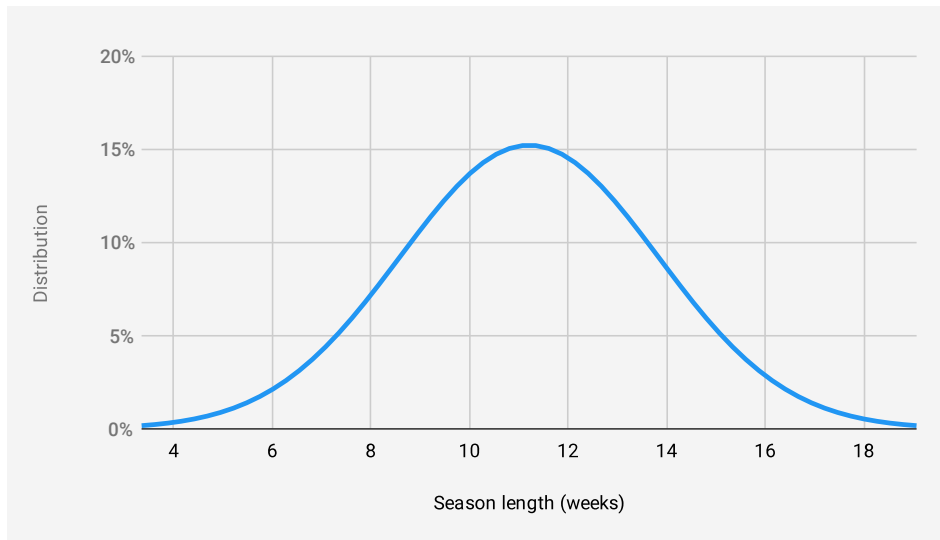
With more games and devices on the market than ever, and people seeking a way to connect with friends online, 2020 brought to the forefront the importance of thoughtful player engagement strategies, especially for F2P games that rely on engaged players to remain profitable.

Multiplayer games have been using season passes and content updates for many years, from the early days of physical expansion pack releases to the live games of today with frequent meta-shifting updates.

But how effective are these updates at keeping players in your game? What's the payoff of working hard to deliver fun experiences for users in your F2P multiplayer title?

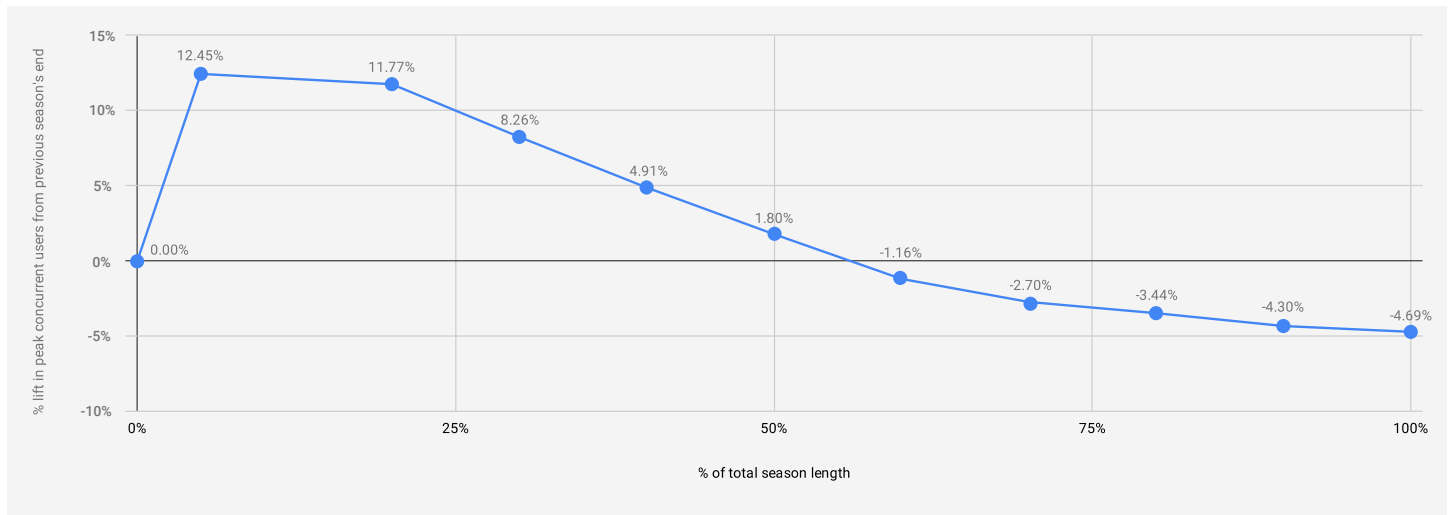
To find out, we measured the average length of a season in multiplayer games and the boost to player engagement over time.

## Multiplayer season length distribution



Fitting a normal distribution against the 2020 seasonal content analyzed yields the bell curve shown here. The average season length in the games analyzed (online multiplayer games using Multiplayer or Vivox) lands at 11.2 weeks, with a standard deviation of 2.7 weeks.

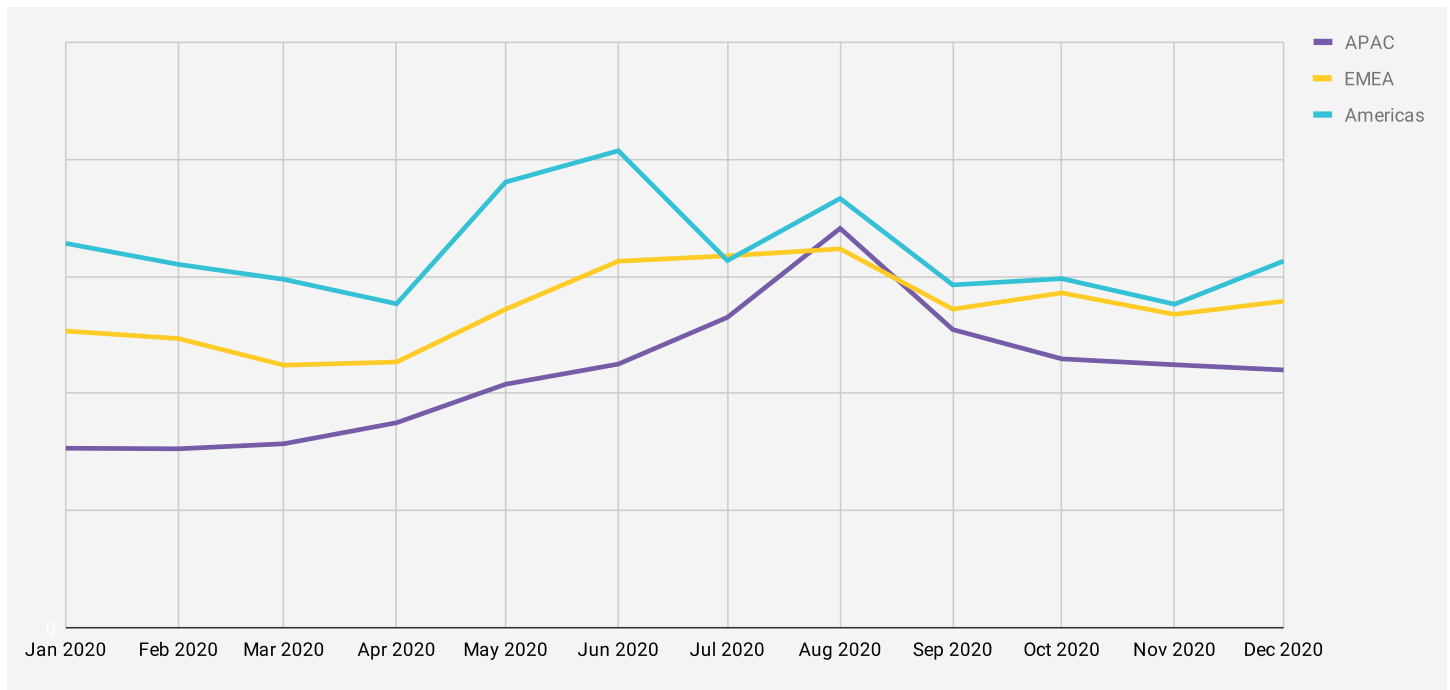
## Player engagement through season lifespan



Using the weekly average of daily peak concurrent users (PCU) figures for F2P online multiplayer games, we normalized the lifts in engagement throughout the duration of their seasonal content. We aggregated many games, each with several seasons, throughout 2020 and compared the data to the week preceding the season launch (0% on the chart).

The average weekly PCU shows a strong bump in the first week of launch (12.4%), which remains above baseline (week before season launch) PCU performance until week 6. After that, PCU dips below the previous season's ending PCU.

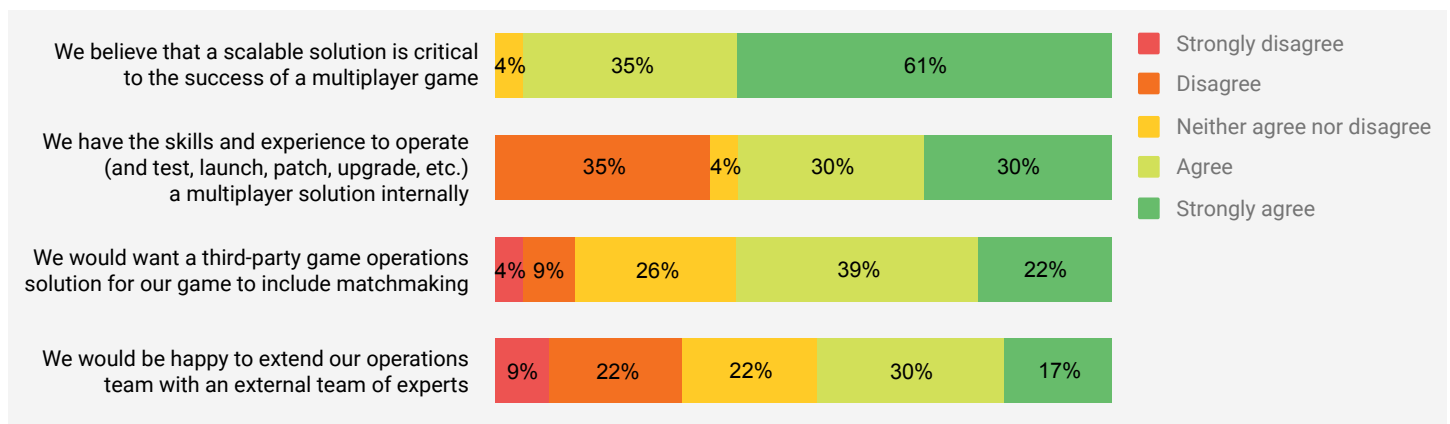
## Active Multiplay virtual machine count by region



The trends in seasonal engagement span geographies. Multiplay servers are located all over the world, and are deployed automatically to keep up with player demand and keep game latency to a minimum. Using the average number of virtual machines deployed by region by month, the APAC and EMEA (Europe, the Middle East and Africa) regions demonstrate sustained growth. The Americas region showed substantial growth immediately after the pandemic lockdowns, and gradually returned to expected levels as the year went on.

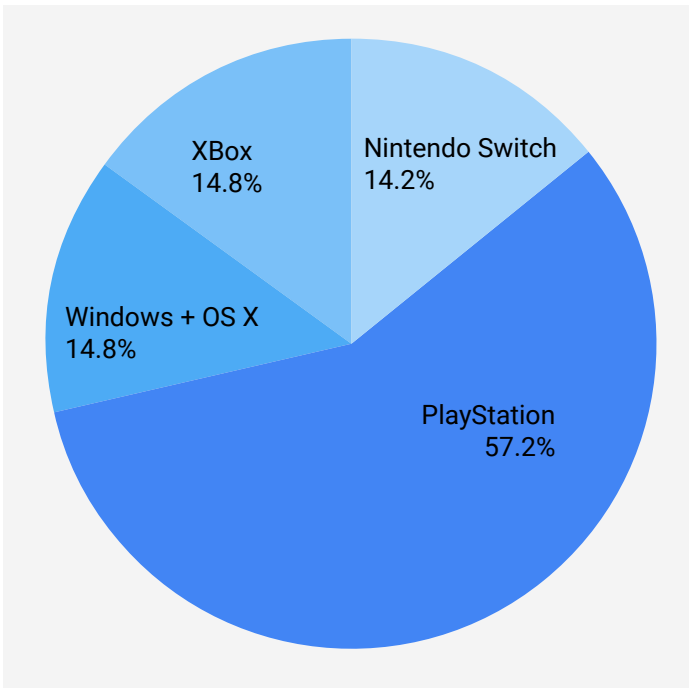
To gain some qualitative context on the importance of multiplayer, we surveyed a group of multiplayer game developers.

## To what extent do you agree or disagree with each of these statements about your games multiplayer operations?





## % of total voice traffic in cross-platform multiplayer games



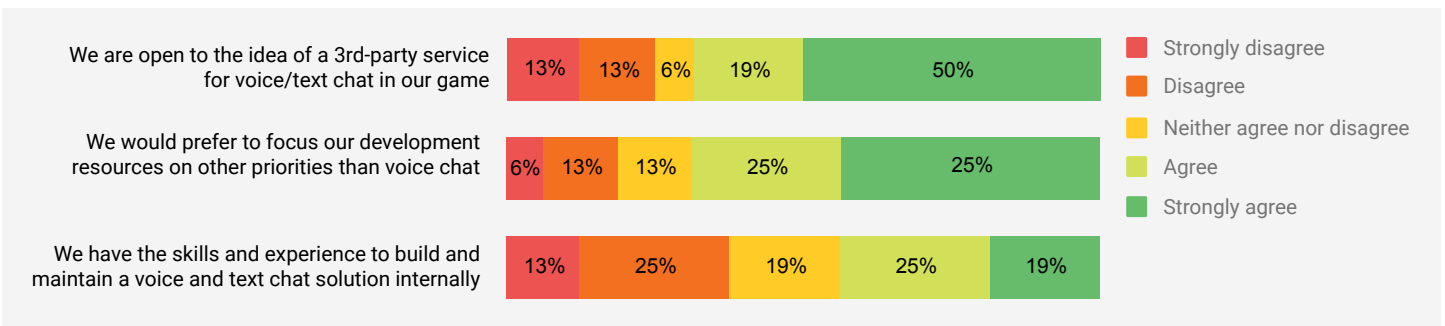
Strong voice communication is an essential element of player engagement for F2P multiplayer games, especially with people looking to substitute their regular in-person social time. We recently [spoke to Riot](#) about how important having a versatile, solid voice comms solution was for their titles, including their latest, competitive tactical FPS VALORANT.

This graph shows the split of voice activity across platforms for multiplayer games that are released on every major HD gaming platform (Windows + OS X, Nintendo Switch, PlayStation, and Xbox). PlayStation takes 57.2% of overall share with a near-even split among the remaining platforms.

Of all the platforms, Switch is the only one that does not feature an out-of-game voice system. Xbox and PlayStation have party chat features. Windows and OS X use third-party options like Discord.

It's clear that voice chat across all platforms is important to engaging players in multiplayer games. When developers use services like Vivox, they're able to spend more time on gameplay and content updates to continue to engage their players season after season. In fact, when we surveyed a diverse group of multiplayer game developers, their responses supported this conclusion.

## To what extent do you agree or disagree with each of these statements about voice chat in your game?



A majority of developers would rather use a third-party service for voice and text chat; staffing up an internal team just to handle voice in-house isn't something that developers are interested in.

# Predictions for 2021

For many reasons, 2020 was an unusual year, but it still produced some clear data trends that let us anticipate the future. Here are some predictions about gaming in 2021.



## Privacy changes will impact mobile's ecosystem

Upcoming privacy changes from Apple will impact gaming advertisers' abilities to affordably acquire users. As targeting power for specific audiences will decrease, we could see a shift away from the hyper-casual games that thrive on acquiring users cheaply, then churning them quickly – it will become more problematic to rapidly launch those titles profitably. Additionally, both mobile game publishers and advertisers will face challenges as user data becomes less available to them.

## Cross-platform between mobile and HD is the future

In the past, a pretty clear divide existed between games played on mobile devices and those played on HD gaming platforms like PC and consoles. However, games that allow players to cross-play, like 2020's *Among Us* and *Genshin Impact*, have demonstrated success. With mobile games supporting mid- and hardcore gameplay loops that were once only available on PC or console, the line is blurring. The Unity engine allows developers to easily deploy their games to both mobile and HD platforms. Cross-play is likely to continue in 2021.

## Even after COVID-19, the number of gamers will stay high

COVID-19 forced people to stay indoors for much of 2020, so developers are concerned that once the world returns to normal, people will leave games in favor of other entertainment. While overall gaming volumes will be impacted, we predict that some of the newly converted "pandemic" gamers will have formed new habits, leading to overall gaming growth in the future.

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Emory has over a decade of experience in games, and has been honored in publications like Forbes 30 under 30 for his work in the gaming industry. Before leading Unity's Publisher Operations team, Emory worked on multiple indie games and AAA franchises like *The Sims* and *Call of Duty*. He's currently playing *Magic the Gathering: Arena*, *Monster Hunter*, *Among Us*, *Brawl Stars*, and too many other mobile games to name.

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## Special thanks

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