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MAY 2019 IDG

iMAC GETS A PERFORMANCE BOOST

NEW iPad Air and iPad mini announced

+ REVIEWED

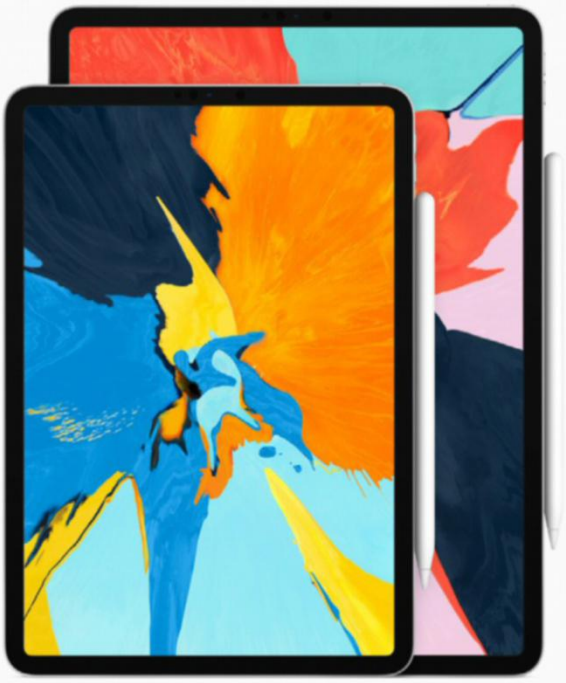
Apple AirPods

CONTENTS

NEWS

APPLE SHOW TIME

REVIEWS



CONTENTS

Apple updates iMac with 8th and 9th generation Intel Core processors

Apple's all-in-one desktop Mac gets a boost in performance. **Roman Loyola** reports

Following the unveiling of new iPads (see **page 8**), Apple revealed upgrades for its iMac line-up, featuring eighth-generation Intel Core processors in the standard configurations, with the option to upgrade to a ninth-generation processor.

The price points of the standard configuration models remain unchanged. The new iMacs are available now from **fave.co/2OT2DCL**.

21.5in iMac

Apple has three standard configurations of the 21.5in iMac, and Apple is changing two of the three configurations. The £1,049 option stays the same, with a seventh-generation 2.3GHz dual-core Intel Core i5 processor, 8GB of memory, a 1TB hard drive, Intel Iris Plus Graphics 640, and a 1,920x1,080 display.

The new £1,249 model features an eighth-generation 3.6GHz quad-core Intel Core i3 processor, 8GB of memory, a 1TB hard drive, 2GB Radeon Pro 555X graphics, and a Retina 4K P3 display.

The new £1,449 iMac also has an eighth-generation 3GHz Intel Core i5 processor, but this model supports 6-core processing, a first for the 21.5in iMac. It also includes 8GB of memory, a 1TB Fusion Drive, 4GB Radeon Pro 560X graphics, and a Retina 4K P3 display.

A new option for the 21.5in iMac is the ability to upgrade the graphics card in the £1,449 iMac to a 4GB Radeon Pro Vega 20, which the company says is 80 percent faster than the previous graphics card. This upgrade adds £315 to the price.

While the standard memory configuration remains unchanged at 8GB, Apple is now using faster RAM clocked at 2,666MHz, up from 2,400MHz. Also, the 21.5in iMac can now handle

32GB of memory, up from the previous limit of 16GB. The RAM is still not user-accessible, so if you want more than the standard 8GB, you either need to customize the RAM at the time of your order, or bring in the iMac to be serviced for a memory upgrade later.

The 21.5in iMac comes with four USB 3 ports, two Thunderbolt 3/USB-C ports, a gigabit ethernet connector, a SDXC card slot, and a headphone jack.

27in iMac

Apple offers three standard-configuration models of the 27in iMac, all of which feature Retina 5K displays. All of the CPUs in the standard configurations are getting two more processing cores, jumping from four cores to six.

The £1,749 27in iMac features an eighth-generation 3GHz 6-core Core i5 CPU, 8GB of memory (32GB max), a 1TB Fusion Drive, and 4GB Radeon Pro 570X graphics.

The £1,949 model has an eighth-generation 3.1GHz 6-core Core i5 processor, 8GB of memory (64GB max), a 1TB Fusion Drive, and 4GB Radeon Pro 575X graphics.

The £2,249 iMac has a ninth-generation 3.7GHz 6-core Core i5 CPU, 8GB of memory (64GB max), a 2TB Fusion Drive, and 8GB Radeon Pro 580X graphics.

For the £1,949 and £2,249 iMacs, Apple has available a CPU upgrade to a ninth-generation 8-core Core i9 processor. The £2,249 iMac

has available a graphics upgrade to an 8GB Radeon Pro Vega 48.

The 27in Mac's rear panels sports four USB 3 ports, two Thunderbolt 3/USB-C ports, a headphone jack, an SDXC card slot, and a gigabit ethernet connector.

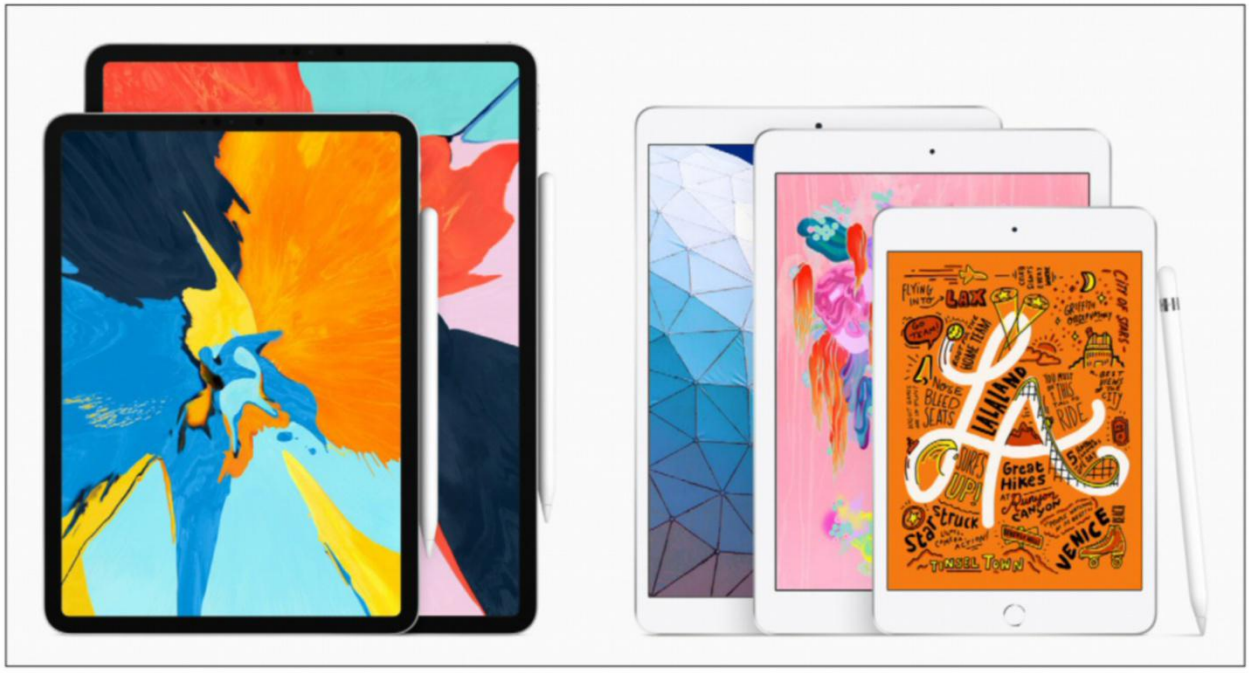
iMac Pro

Apple didn't announce a major update to the iMac Pro (which was released in December 2017), but it did release a couple of new upgrade options. There's now a 256GB RAM upgrade available for the iMac Pro, which adds £4,680 to the £4,899 base price. It also has a Radeon Pro Vega 64X with 16GB of HBM2 memory graphics upgrade available for an additional £630.

Apple's iMacs have been given a performance boost

Apple unveils new iPad Air and iPad mini

What's new and what isn't. **Leif Johnson** reports



Apple has announced updated models of the iPad Air and the iPad mini. Some of us gave up on seeing new versions of these models, but suddenly they're available for purchase. We should have our hands on the new tablets soon, but we wanted to give you a quick rundown on what's new and what remains the same for both iPads.

iPad Air: What's new

Let's kick off with what's new with the iPad Air, which we thought was effectively replaced with

the 10.5in iPad Pro in 2017. In essence, this is the iPad Air 3, but much as with the iPad mini, Apple's dropping the numerals. It's now just the iPad Air.

The price sees a welcome change, as Apple now sells it for a starting price of £479. There's a change in storage options, as Apple only sells the new Air in 64- and 256GB configurations. Before, you could buy the Air 2 with 16-, 32-, 64-, and 128GB options. It's a smart move for a more data-hungry age.

The tablet is also bigger – insomuch it has the same 9.8x6.8in frame as the 2017 10.5in iPad Pro. For comparison, the iPad Air 2 measured 9.4x6.67in. And much like the old iPad Pro, the new iPad Air supports the first-generation Apple Pencil. That could be a big deal if you don't want to pay iPad Pro prices but don't like the smaller screen of the 9.7in iPad – or the new 7.9in iPad mini.

I like that the new iPad Air sports the A12 Bionic processor found in the iPhone XS and XR, which marks a massive jump from the A8X chip in the iPad Air 2. Keep in mind, though, that it's not as fast as the A12X chips that we find in the 2018 iPad Pros.

The display has changed, too, as the resolution is now 2,224x1,668, up from 2,048x1,536. It's also packed with Apple's TrueTone technology that adapts to ambient light in order to deliver a more natural viewing experience. That display is also laminated, which means the glass sits on top of the display. When you use an Apple Pencil, it makes for an experience that feels slightly more like writing on paper than what you'll get with an unlaminated display. Unfortunately, the iPad Air didn't inherit

the iPad Pro's ProMotion 120Hz refresh rate, which makes everything from Apple Pencil strokes to scrolling through web pages a bit smoother.

The Air is also brighter, as it delivers 500 nits of brightness versus the 415 in the older model. That's great if you often have to use your iPad in the sunlight. And last but not least, the front-facing FaceTime camera got a big boost from 1- to 7Mp.

iPad Air: What isn't new

That's a lot of good stuff, especially when you compare it to the iPad Air 2. When you compare to the 10.5in iPad Pro, though, the truth is that we're basically looking at an iPad Pro from 2017 with a better chip. In other words, if you got a 10.5in iPad Pro two years ago, you may not need to upgrade.

The A12 Bionic chips allow the new iPads to take better advantage of augmented reality apps

The new model still has a home button with Touch ID, and that's a little disappointing as the latest iPad Pros have taught me that Face ID is even better suited for iPads than iPhones. It's still LED backlit, so don't expect the OLED displays you find in the new iPhones. Even the new iPad Pro doesn't have that. While the FaceTime camera got a boost, the rear camera hasn't changed much, as it still has an 8Mp rear camera like the iPad Air 2. It's still got a 3.5mm headphone jack, it's still available in space grey, silver, and gold, and it still gives you a battery life of around 10 hours. Plus, it still supports Lightning cables instead of USB-C.

iPad mini: What's new

Let's move on to the new iPad mini. A lot of you have been waiting for this one for a long time, and as you might expect after a four-year wait, it's a massive improvement over the iPad mini 4. What's new?

First off, much as with the iPad Air, this is now simply called iPad mini – even though it's essentially the iPad mini 5. It also sports the A12 Bionic processor, and that's enough of an upgrade from the A8 chip to give you around three times the graphics processing power of the iPad mini 4. It's also got a laminated display and first-generation Apple Pencil support like the iPad Air, along with support for Apple's TrueTone technology. It even has a wider P3 colour gamut, and Apple says its pixel density of 3 million is the highest of any iPad. The display itself is 25 percent brighter at 500 nits, up from the 450 in the iPad mini 4.

At this point, you're almost using a digital Moleskine notebook

The camera remains at 8Mp, but the newer model reportedly offers better low-light performance and HD video recording. And here again we see the boost to 7Mp from 1Mp in the front-facing camera. The iPad mini 4 only sold in a 128GB configuration, but the new iPad mini comes with both 64- and 256GB storage options. For that matter, it now supports the same Wi-Fi and gigabit-class LTE speeds you'll find in new iPads.

iPad mini: What isn't new

What hasn't changed? For one, there's the starting price, which remains the same as the iPad mini 4 at

£399. I'd be annoyed with that considering the 9.7in iPad supports the Apple Pencil and gives you more screen space for £319. Nonetheless, this delivers a lot of upgrades for people who want a smaller iPad.

As for the display, it may have that TrueTone tech and the wider P3 colour gamut, but the 7.9in display itself still has a resolution of 2,046x1,536. Like the iPad Air, it also doesn't support ProMotion.

In fact, I'll probably have a hard time telling the iPad mini 4 apart from the updated iPad mini when we get ours. It still has the same 8x.3in frame, a home button that supports Touch ID, and support for Lightning cables instead of USB-C. And yes, it still comes in space grey, silver, and gold, and it still delivers around 10 hours of battery life.

I know a lot of you have been looking forward to getting your hands on a new iPad mini in particular, so I look forward to seeing if both of these devices live up to expectations.

Apple reveals WWDC19 dates and location

WWDC19 will showcase the latest developments in iOS, macOS, and more. **Roman Loyola** reports

Apple has revealed that its Worldwide Developers Conference 2019 (WWDC19) will be held at the McEnery Convention Center in San Jose, California, from 3 to 7 June. The company also launched the WWDC19 website (**fave.co/2HRzBDO**), where developers can get session information. The conference showcases the newest features in iOS, macOS, and other Apple products. The keynote presentation is not open to the public, but is usually streamed online on Apple's website.

AirPower cancelled

After over a year of silence and rumours, Apple kills off its wireless charging mat project. **Leif Johnson** reports

Were you hoping that Apple would surprise us with a release of the AirPower wireless charging mat at some point in the coming days? Dash those hopes away, as TechCrunch reports, Apple has officially cancelled the project.

"After much effort, we've concluded AirPower will not achieve our high standards and we have cancelled the project," said Apple hardware engineering chief Dan Riccio in a statement. "We

apologize to those customers who were looking forward to this launch. We continue to believe that the future is wireless and are committed to push the wireless experience forward."

For a bit of a recap, AirPower was a multi-device charging mat that Apple announced way back in September 2017. Even recently you could find publicity photos showing how it could charge the Qi-compatible versions of the iPhone, Apple Watch, and the new AirPods charging case all at once.

But over a year went by without an update from Apple, even though we once even saw printed references to AirPower in the instruction booklet for the iPhone XS Max. But by September of last year, as AppleInsider reported, Apple had scrubbed all references to AirPower from its website.

Rumours would occasionally slip out that claimed Apple was having trouble keeping the multi-coil device from overheating in testing

Still, though, rumours that AirPower was coming never went away. In February, noted analyst Ming-Chi Kuo was even claiming that we'd see it within "the first half of the year". At the time, we thought we'd see it with the recent AirPods refresh. As recently as March, former Apple employee Ryan Jones was tweeting photos of boxes for the latest AirPods wireless charging case that showed references to AirPower.

So why did Apple cancel it? In June of last year, "an executive at an Apple Partner" told Bloomberg that it was probably difficult to make the mat because it likely required overlapping charging coils. Indeed, rumours would occasionally slip out that claimed Apple was having trouble keeping the multi-coil device from overheating in testing. That's putting it lightly. In the words of DaringFireball's John Gruber from September 2017, the device was "well and truly f**ked".

AirPower comes off like a product that was announced far too early. No doubt about it, this is a rare genuine fumble for Apple, which has a generally well-deserved reputation for releasing high-quality products that 'just work'. For that matter, it has a reputation for not announcing products until all the kinks are worked out and they're ready to wow the world.

Considering that it has a slew of services on the way, let's hope Apple has learned a valuable lesson.

Apple announces gaming service – Apple Arcade

With the right blend of curation and exclusivity, Apple could elevate the perception of mobile gaming. **Leif Johnson** reports

Apple's new gaming service is called Apple Arcade, and what Apple showed us on stage at its Show Time event looks like a cool service. Beginning sometime in the autumn, you'll be able to pay Apple an unspecified subscription fee that grants access to around 100 'new and exclusive' games. None of the games will have in-app purchases, and they will be playable on iOS devices and Macs only. All of the games will be accessible offline.

This is all smart stuff as games have been among the primary drivers of revenue for the App Store for years now. Apple Arcade could be a sign that Apple is finally taking games seriously, and here's why I'm looking forward to that.

You'll be able to play the same games on iOS and macOS

According to Apple, you'll be able to stop playing a game on an iPhone and then pick up where you left off on your iPad. You can already do this with iOS games, but Apple casually dropped that we'd be able to do this with Macs as well. That's right, you can stop playing a game on a Mac and then pick up where you left off on your iPhone.

Some games that require an Internet connection already allow this – such as Hearthstone – but Apple is underplaying what a massive shift this is. Indeed, it may be a subtle hint that iOS 13 will introduce Apple's 'Marzipan' service, which aims to make it easier for developers to code for both iOS and macOS. As some games will always be easier to play on a computer rather than a smartphone or tablet, it'll be great to have the option.

Apple is focusing on 'artistic' games, which is a valuable niche

Notably, none of the games Apple showed off were of the brutal, bloody, adventure variety that so often characterize 'AAA' games. Instead, many were more 'artistic' creations, such as Monument Valley, that emphasize artistic style over graphical complexity.

In one case, we saw Where Cards Fall – an isometric coming-of-age story. In another, we saw Lifelike, which involves manipulating swarm behaviour, like the type found in a school of fish or a murmuration of birds. As Apple itself said, these are the kinds of games that usually win awards.

Not all the games Apple showed off are from relatively obscure indie developers, as it is also funding storied talent such as Hironobu Sakaguchi, creator of the Final Fantasy series. Other recognizable names involved include Disney, Konami, Annapurna Interactive, and Devolver Digital. It's an appropriate direction for Apple, too. People still associate Apple products with art and design, and every game we saw on the stage pairs well with that reputation.

Apple Arcade will make iOS gaming less obnoxious

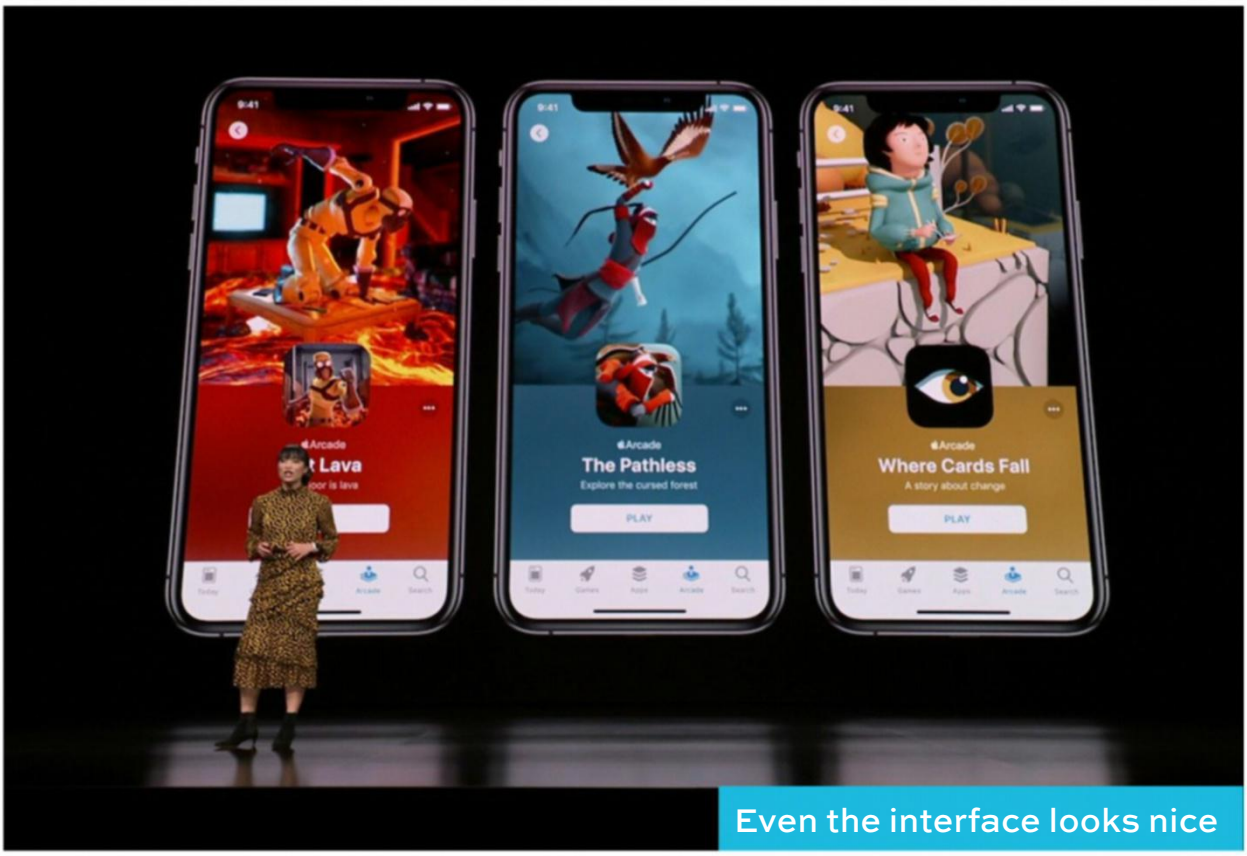
Look, yes, mobile games bring in a tonne of cash. That's partly why Apple was able to call iOS the "largest gaming platform". The fact remains, though, that many people associate mobile gaming with 'free to play' games, which nickel-and-dime players to the point where they could easily end up paying far, far more than they might have if they paid £10 for the game from the start. As Apple pointed out, paid games usually don't require people to make in-app purchases, but the fixed price can scare off users who want to be absolutely sure a game is awesome before they plunk down £5 or more.

Family sharing will be a major plus as well

None of the games included in Apple Arcade will feature in-app purchases. The flat subscription fee is all you'll pay – you won't even have to deal with in-game ads. While we still don't know what Apple will be charging, the value proposition is that you can pick and choose from all the available titles for that fixed rate. Of course, this isn't going to stop you from dropping £30 on an addictive freemium puzzler like Toon Blast or other games outside the Apple Arcade offerings – those will still be available via a separate tab in the App Store – but it's a step in the right direction.

Apple Arcade may finally legitimize mobile gaming

Partly because of issues like in-app purchases and ads, mobile gaming has a bad rap in the wider



Even the interface looks nice

gaming community. Even when mobile games are good, they're often ports of games that were originally found on other systems like Microsoft's Xbox One or Sony's PlayStation 4. As a result, mobile ports often feel like an afterthought. Put another way, the iPhone is where good mainstream games go to retire.

A curated, funded service from Apple that consistently delivers high-quality games could change all that. By prohibiting in-app purchases, Apple would keep its service free from the worst negative associations of mobile games. By curating the games it hosts, Apple could maintain the high standards its known for. And by keeping the games

it hosts as exclusive to iOS and macOS as possible, players will begin to associate Apple Arcade with quality – which may eventually lead to a better respect for mobile games in general.

It's further proof that Apple finally 'gets' games

Subtle clues that Apple wants to get serious about gaming have been dropping for months. With iOS 12, for instance, Apple finally allowed MFi (Made for iPhone) controllers to use the 'L3' and 'R3' buttons, which you normally activate by pressing down on a gamepad's thumbsticks. For whatever reason, Apple previously wouldn't certify controllers that allowed you to do this, which effectively made some iOS ports unplayable. I don't think it's an exaggeration to say that this kept iOS gaming from being bigger than it could have been. The new Rotor Riot Game Controller (see our review on **page 48**) is the first one to take advantage of that, and I have little doubt that others will follow suit in the near future.

For that matter, Apple has also relaxed its stance on remotely streamed games. In 2018, Apple pulled Valve's Steam Link app right before its launch, supposedly because the app allowed you to buy games from Steam without giving Apple its 30 percent cut. Apple recently gave the PS4 Remote Play app the green light, though, which essentially does the same thing but with a PlayStation 4. It's a sign that Apple is more wary of chasing off gamers than in the past.

New Apple TV app and Apple TV Channels

Apple hopes to be a new destination for cord cutters, though Netflix remains a no-show. **Jason Cross** reports

After months of speculation, rumours, and leaks, Apple has finally taken the wraps off its plans for the future of TV, and it comes in two parts: There's a new subscription service coming this autumn called Apple TV+, and an overhaul of the Apple TV app, coming this spring. We've covered Apple TV+ in a separate article (see **page 76**), but here's what you need to know about the new TV app.

A new design, but not many new features

Though the TV app has a refreshed design, you'll recognize many features from the current app. The Up Next section – which shows a list of next episodes for programmes you've watched, as well as TV shows or movies you stopped in the middle of – is still there. So are the sections for TV Shows, Movies, Sports, Kids, and your Library of shows or movies you own.

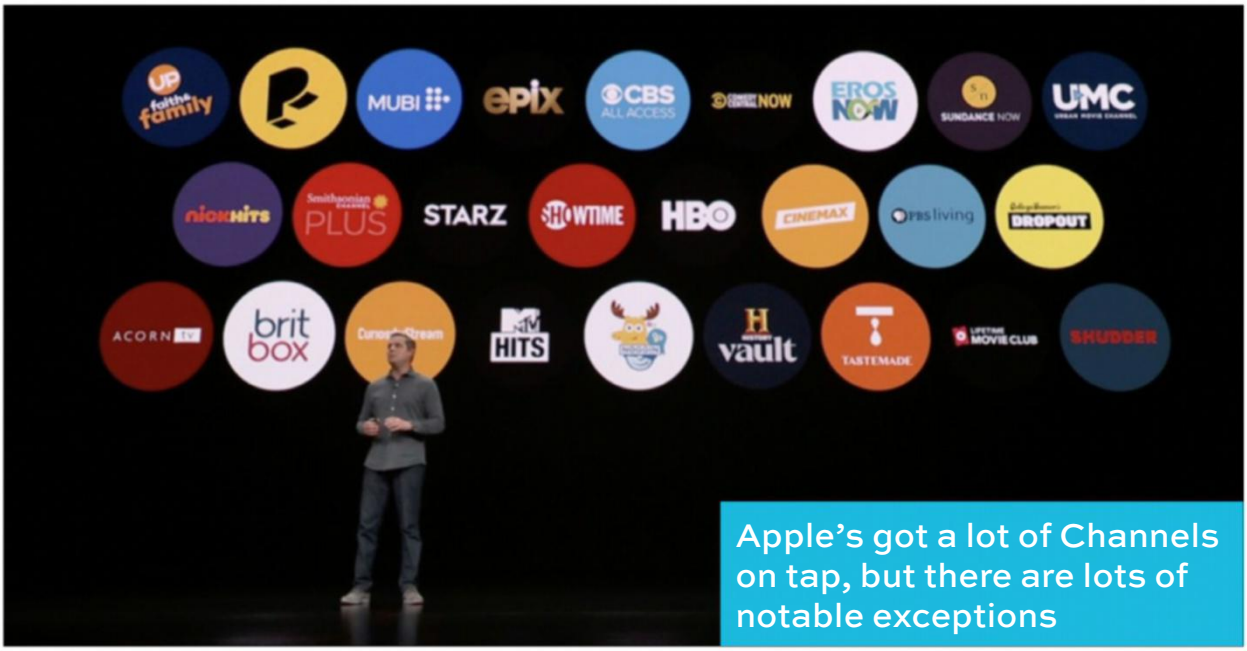
Apple TV Channels integrates on-demand services

The biggest change to the TV app is the addition of Apple TV Channels, where you can subscribe to a host of premium TV offerings right from the TV app. Apple showed a list of 26 partners, including Starz, Comedy Central, and HBO. You'll subscribe (or start a free trial) to any of these from within the app, using your existing Apple ID, with just a few taps.

Then you'll be able to enter each channel to see the content it offers, all available on demand, playing directly within the app. There are no additional apps to install, and Apple promises the highest quality picture and sound available, full Siri integration, and quality of life features such as a 'skip intro' button. Apple also says that Channels content will be downloadable to watch offline.

The Netflix, and Amazon situation hasn't changed

The new and improved Apple TV app still doesn't integrate with Netflix. So, if you want to watch



Apple's got a lot of Channels on tap, but there are lots of notable exceptions

Netflix on your iPhone, iPad, or Apple TV, you'll have to launch the Netflix app. And Netflix shows won't show up in your Up Next queue.

Amazon Prime Video sort of half supports the Apple TV app. If you have it installed, it will integrate the content into recommendations in the Watch Now tab, and you'll see its programmes in the Up Next list. But you won't be able to subscribe to or watch that content directly within the TV app, as you would with Apple TV Channels. Instead, you'll need to jump out to the associated app to do so. In other words, the new TV app treats Netflix, and Amazon Prime Video exactly as it does today.

The new app comes to iOS in May, macOS in the autumn

The redesigned app, with access to Apple TV Channels, will land on iPhones, iPads, and Apple

TV in May. But there is big news for people who like to watch on their Mac: Apple is going to bring the TV app to macOS for the first time. That won't happen until the autumn, presumably as part of macOS 10.15.

Apple is bringing the TV app to smart TVs

Want to watch on the big screen but don't have, and don't want, an Apple TV? Apple is also bringing the TV app to smart TVs. Its partners include Samsung, Sony, Vizio, and LG (all the brands that announced AirPlay 2 and HomeKit support earlier this year). Apple says it will start rolling out to Samsung TVs in the spring, with other brands to follow.

The TV app is coming to Roku and Fire TV, too

Do you already have a Roku or Fire TV box? In a bit of a shocking turn of events, Apple announced that the TV app is coming to both of those devices, too. It hasn't given a time frame for its release on these platforms, though.

Family Sharing is included for Channels

All the Channels you subscribe to will have Family Sharing enabled at no extra cost, so you can share your subscriptions with your family without sharing your password. Just as with Apple Music, your family members will have their own recommendations, Up Next queue, and so on.

Note that free Family Sharing is only for Apple TV Channels, not for external services that

The current TV app is available in 10 countries. The new one will be in over 100

integrate with the Apple TV app, but you subscribe to outside of it (like Hulu or Amazon Prime video).

The TV app will be available worldwide

The TV app is currently available in 10 countries only. The new app will be available in over 100 countries. However, that doesn't mean that every service which integrates with it, and every Apple TV Channels partner, will be available in all 100+ countries. Some regional restrictions will apply.

Apple enters publishing world with Apple News+

Whether it's live covers or cost savings, News+ offers advantages over normal subscriptions. **Leif Johnson** reports

The focus of Apple's Show Time event may have been TV entertainment services, but the company made a big splash right out of the gate with the announcement of Apple News+. As the name implies, it's a premium version of Apple News that offers more content than you'll get with the free app – all with a focus on magazines.

Specifically, for $9.99 a month (£tbc), you and your family get access to more than 300 magazines and other publications ranging from *National Geographic* to *Wired* to *The Wall Street Journal*. We'll dig deeper once we've spent time with Apple News+, but for now, here's what intrigues us the most.

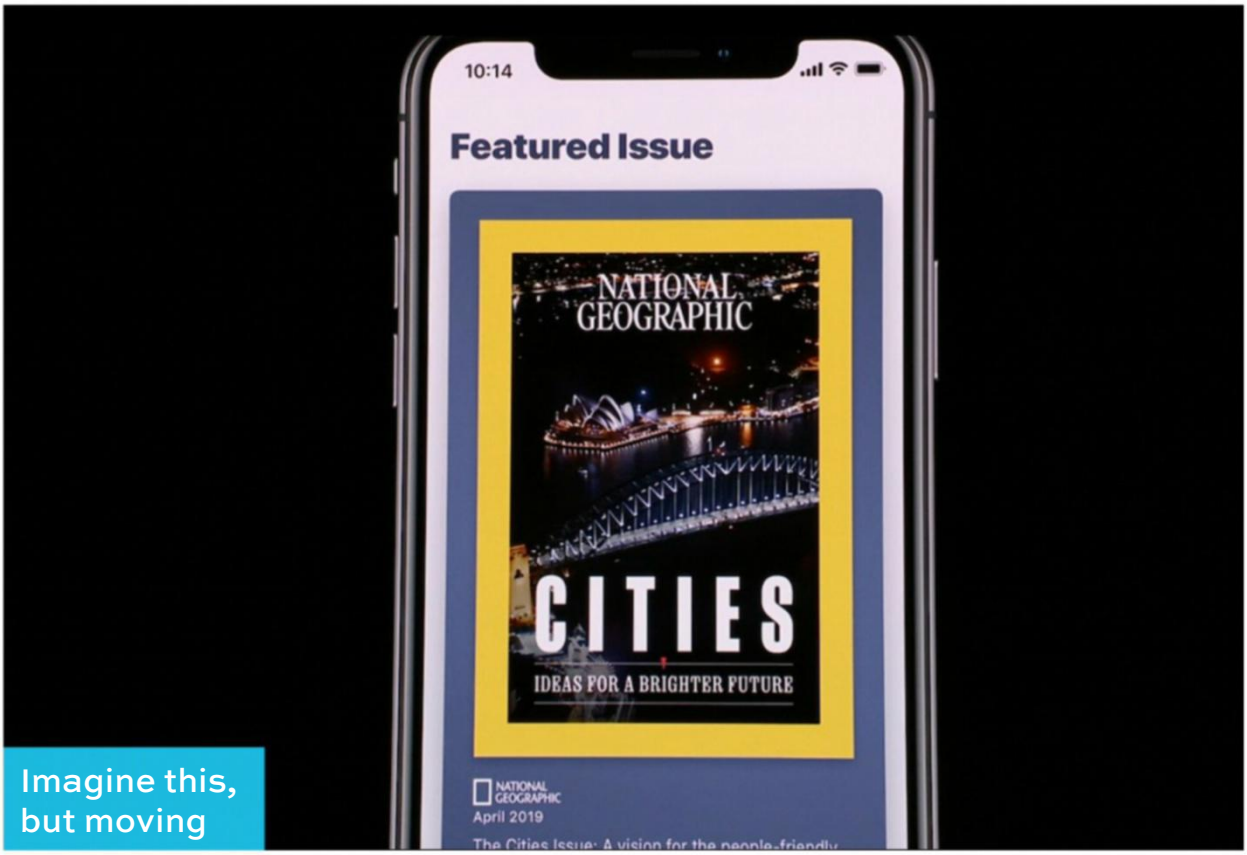
Apple News+ could save you money

I'm one of the people who will likely see a real benefit from using Apple News+ as I pay for subscriptions to *The New Yorker*, *Wired*, and *National Geographic* – all of which are included with the new service. If the app works the way I think it will, that means I'll be able to dump my subscriptions in favour of Apple's far more palatable all-you-can-eat fee. Indeed, Apple says that if you bought subscriptions to all of the magazines included in Apple News+, you'll be saving around $8,000 per year.

At the moment, however, it's not clear if an Apple News+ subscription will allow me to access paywalled content to, say, *The New Yorker* when I access the site through a link on Twitter. That's mostly how I read articles, and I'm not convinced Apple News+ would be a good deal if I always have to access paywalled content through the app.

It captures the magazine experience in digital form

One of the best reasons to buy a physical magazine is that print usually offers a richer visual experience



Imagine this, but moving

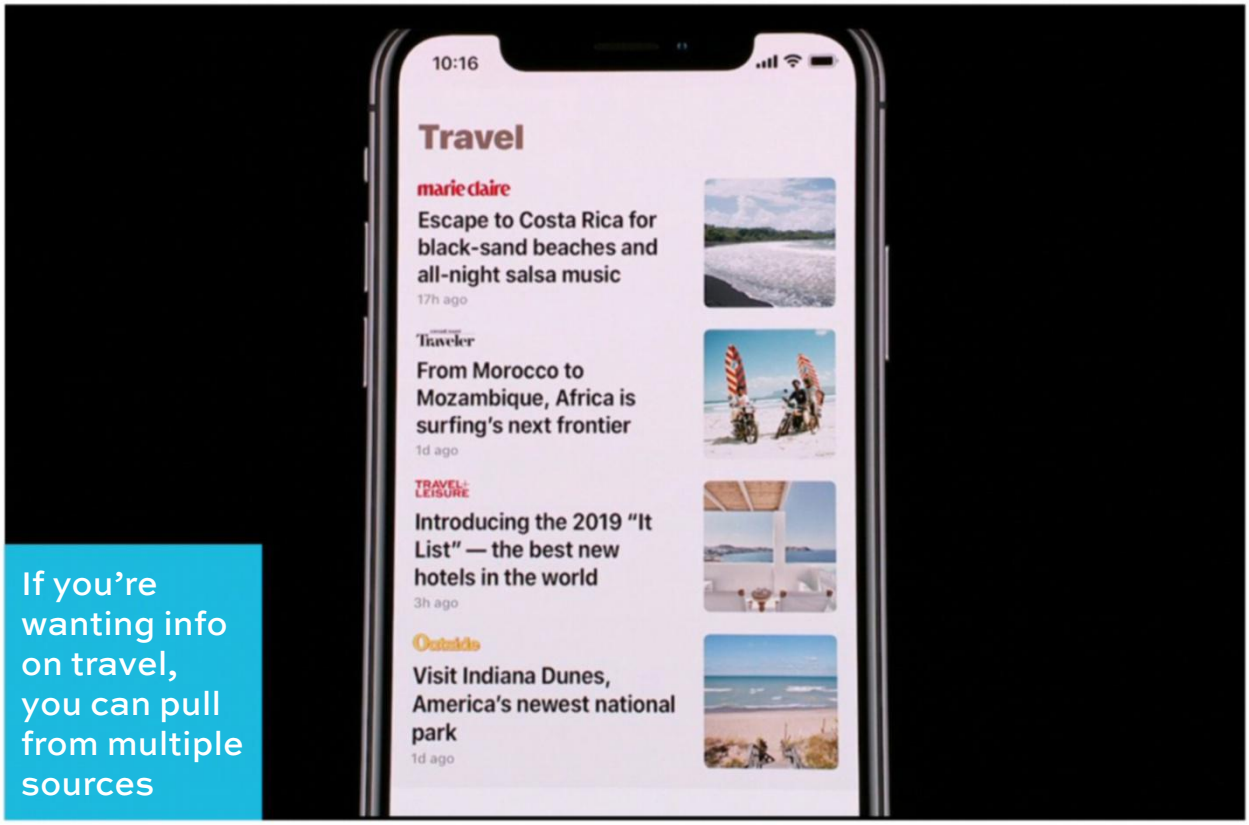
than what you'll get online. Fascinating layouts, great photography, unforgettable graphic design – it's all there. And with Apple News+ you'll get something like that experience in the app. And at times it might be even better.

In the case of *National Geographic*, Apple showed off a 'live cover' of a recent issue featuring Sydney, Australia. Instead of the static photo of the skyline that you'd get with the physical edition, Apple News+ treats you to a video image of the city as it rolls underneath you – as though you're in a helicopter. Elsewhere, Apple showed off wonderful article layouts, many of which looked especially good on the iPad Pro.

But how common will these eye-popping visual will be? They look stunning, but they also look like a lot of work. And during a time when publications are cutting staff, it's difficult to imagine live covers will become the News+ standard.

Apple News+ encourages exploration

It looks as though you'll be able to access a single magazine's content all at once, much as you would if you had a physical copy. But much like we already see with the existing Apple News app, the main interface of Apple News+ pulls from multiple publications so it can offer recommendations based on your interests and trending stories. It's basically a pretty RSS feed.

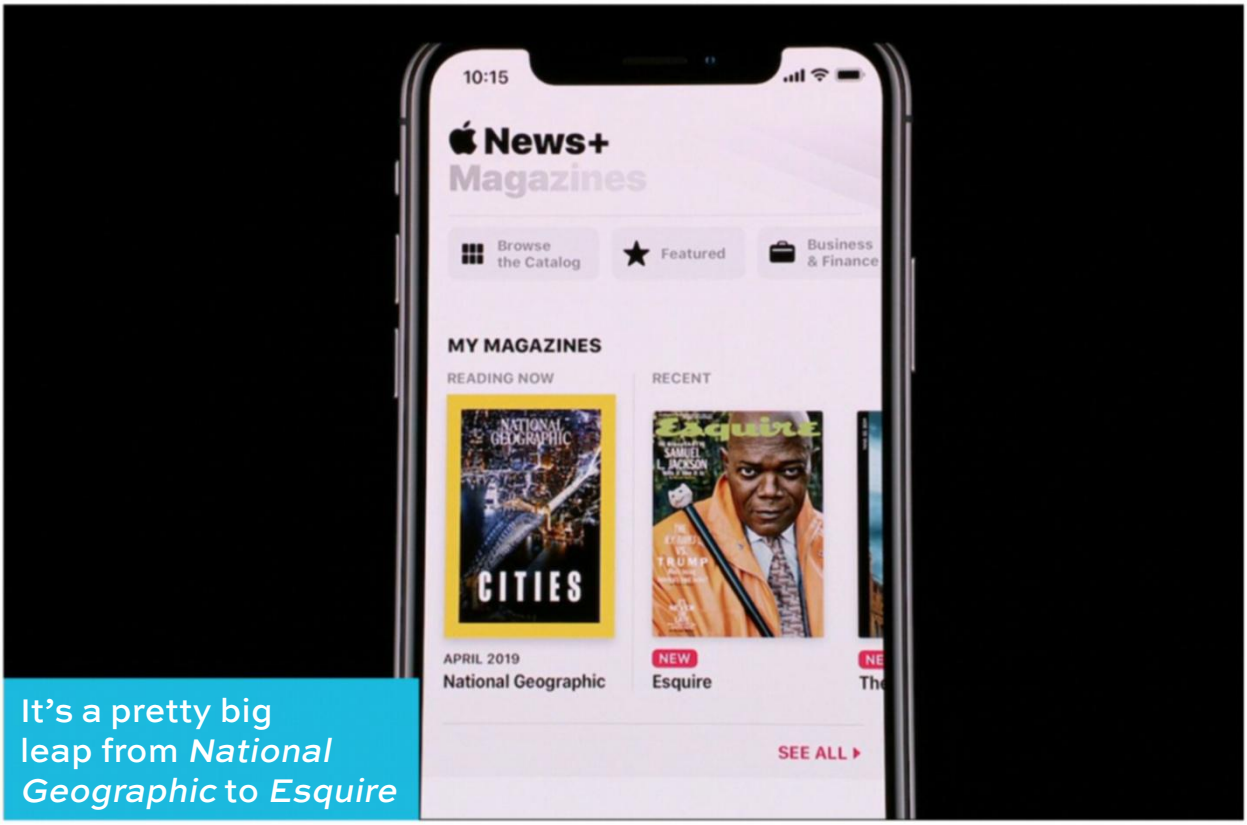


If you're wanting info on travel, you can pull from multiple sources

So even though I normally wouldn't look at *The Wall Street Journal* on a regular basis, Apple News+ would recommend articles to me if their coverage on, say, Apple TV was of interest to me.

Magazines can be downloaded for offline reading

Another great benefit of traditional magazines is that you can curl up with them away from the Internet and get lost in their stories. Apple captures a little of that experience by allowing you to download entire magazines for offline reading with an AppleNews+ experience. This will be especially great if need some reading material on a long flight.



It's a pretty big leap from *National Geographic* to *Esquire*

It supports family sharing

If you want everyone in your family to be able to use Apple News+, you'll only need to pay for one subscription and then everyone else can access it through Family Sharing. It's a simple feature, but a welcome one. It's a little like passing around the latest issue of a magazine once you're done reading it.

The first month is free

Much as with Apple Music, you can try out Apple News+ for one month for free. I'd certainly be taking advantage of this offer, as I subscribe to a lot of the magazines that Apple includes in the package.

Just be sure to unsubscribe once the first month is up so Apple doesn't keep charging you. This used to be a minor hassle, but fortunately Apple has simplified the process in recent months.

Availability

Many of the other services Apple announced won't even be available until autumn, but Apple News+ is live in the US and Canada now. For the rest of us, we'll have to wait until later this year.

Apple on the money with launch of the Apple Card

Apple Card may be the most revolutionary announcement Apple made at its Show Time event. **Michael Simon** reports

We might not have seen a new iPhone at the Show Time event, but Apple did unveil a new product. It's called Apple Card, and it's sure to shake things up. Building on the success of Apple Pay, which will be available in more than 40 countries by the end of 2019, Apple Card – which consists of both a service and a sleek, thin, titanium card – dispenses with the usual confusion around credit cards to simplify and

streamline financial transactions, as well as create an experience unlike any other card on the planet.

It just might be the most revolutionary announcement Apple made. The firm said that by the end of the year Apple Pay will have been responsible for more than 10 billion transactions since its inception, but Apple Card promises to be more than just another tab in your digital wallet. It's smarter, simpler, friendlier, and more fiscally transparent than any credit card – including Apple's own Barclaycard Visa with Apple Rewards.

No fine print

Apple focused on five points to make its new credit card unlike any other: simple applications, no fees,

The Apple Card tab in your Wallet app will show you an overview of your spending

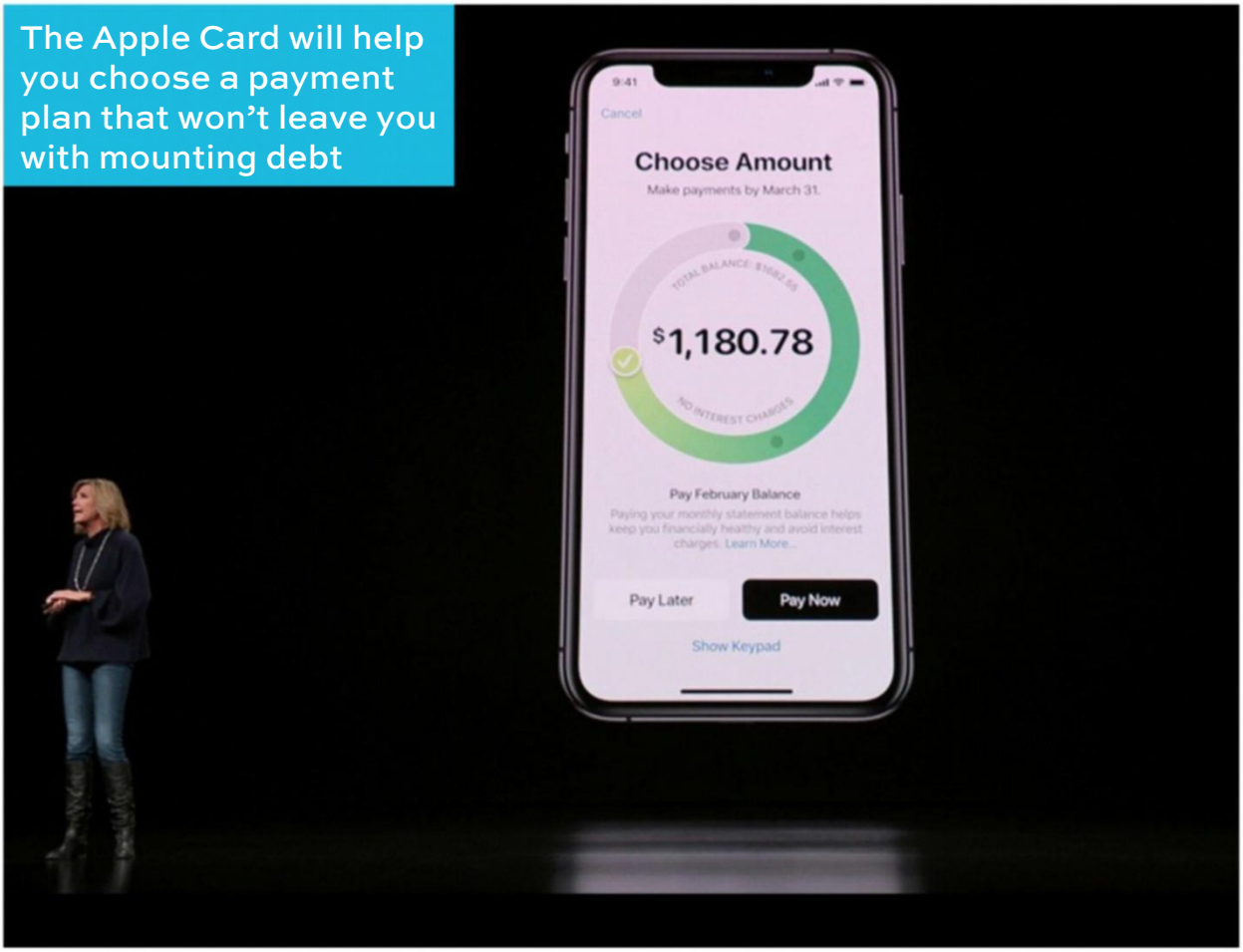
lower interest rates, clear rewards programmes, privacy and security. And, of course, it starts with iPhone. You'll notice the difference from the moment you apply. The entire process is done on an iPhone – sorry, Android users – and Apple says your application will be approved within minutes. And since most of your purchases will be done within the Apple Pay app, you won't have to wait to use your card either. As soon as you're approved, the Apple Card will appear in the Wallet app and you'll be able to start using it wherever Apple Pay is accepted.

You'll also see your transactions, payment due date, and monthly spending reports inside the Wallet app. If you need to get support, you won't have to bounce through an automated call centre until you reach a real person. You'll be able to launch Messages and ask a question 24/7 using Business Chat. It's that simple.

Spending money and saving money

If you're the kind of person who keeps track of your spending, much of what the Apple Card does makes perfect sense. First and foremost, Apple has eliminated fees – as in annual fees, late charges, foreign exchange fees, and overlimit fees. It's part of a focus on a 'healthier financial life', which is where Apple's credit card really separates itself from the pack.

Each time you open the Wallet app, you'll see how much you owe and when you need to pay, as well as a list of your recent transactions. Purchases will be organized into categories, so you can quickly



see what you've spent. Moreover, transactions will use machine learning and location data to show clearly recognizable names, and when your bill is due, any interest you've accumulated will be updated in real time. You'll also be presented with a range of payment options – not just the minimum amount due – so you'll be able to see a true picture of how the payments you make impact your future bills. You'll even be able to schedule frequent, recurring payments to help keep your balances low.

But the coolest feature may be the physical card you get. In true Apple fashion, it's minimal and

gorgeous, but how it looks is a small part of the appeal. If you lose it, you won't have to worry about cancelling your card or changing your number: the Apple Card has no card number, no CVV, no expiration date, and no signature. As Steve Jobs would say, "It just works".

Apple has also developed its own rewards programme for the Apple Card. Instead of rotating categories or a points system, Apple gives you cash back, in the form of Daily Cash, every time you use your card. You get 3 percent back on Apple Store or iTunes purchases, 2 percent back on all other purchases, and 1 percent back on purchases made with the physical card (for those times when Apple Pay isn't available).

And as soon as the purchase clears, the rewards show up as cash. That means if you buy a £1,000 iPhone XS at the Apple Store you'll get £30 back in your Wallet. (Apple didn't say what would happen if you need to return it, however.) And there's no limit on how much Daily Cash you can receive, so you won't need to keep track of rewards calendars or tiers. Cashback isn't a new feature with credit card rewards programmes, but the Apple Card's clear and concise rewards programme is refreshing to see.

Just like the iPhone, privacy and security are baked into the Apple Card. Like other cards, when you make a purchase using Apple Pay, authentication will be done via Touch ID and Face ID, and each payment uses a one-time dynamic security card. Additionally, card numbers are unique

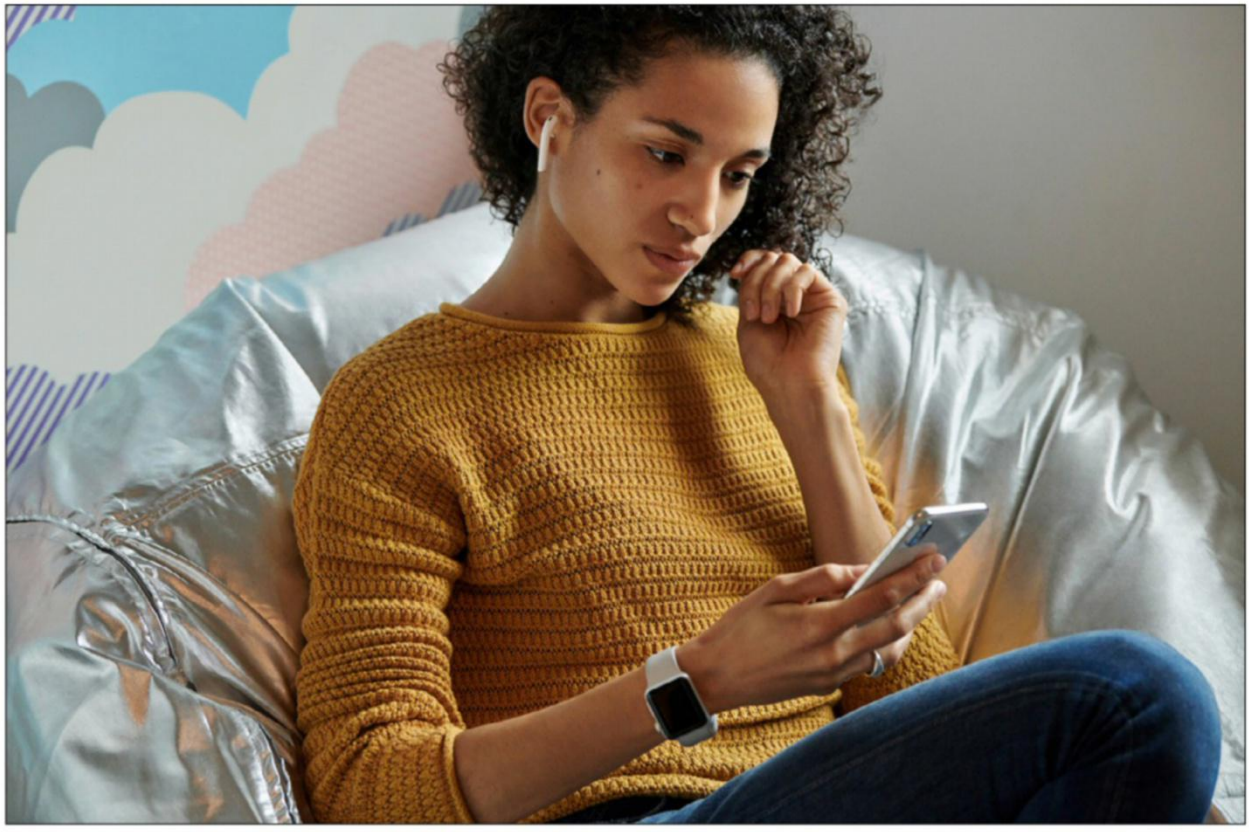
to the device they're issued on and locked up in the iPhone's secure element.

Apple and issuing bank Goldman Sachs are also taking a hands-off approach to your personal information. Since all payment tracking is using on-device intelligence, Apple will never know what you bought, where you bought it, or what you paid. And Goldman Sachs promises to never share or sell your data to third-party vendors.

The future of credit

The Apple Card won't be available until the summer, but the impact on credit card companies might be seen before then. The idea of a largely virtual card with instant rewards is an intriguing one, and with hundreds of millions of iPhone users out there, the threat Apple poses to the old guard is real.

With clear terms, no hidden fees, easy support, and financial guidance, the Apple Card has the potential to change the way credit card companies do business. Apple VP Jennifer Bailey called the titanium credit card "the most beautifully designed card ever", and that may be true. But the real beauty of the Apple Card might not be in how it looks, but how it works.



Apple AirPods

RATING: ★★★★½

Price: **£159 (inc VAT)** from **fave.co/2I9L53V**

When AirPods were first announced in 2016, people were sceptical. Apple wants us to pay £159 for EarPods without wires? What's with those sticks sticking out of your ears? The case looks like dental floss.

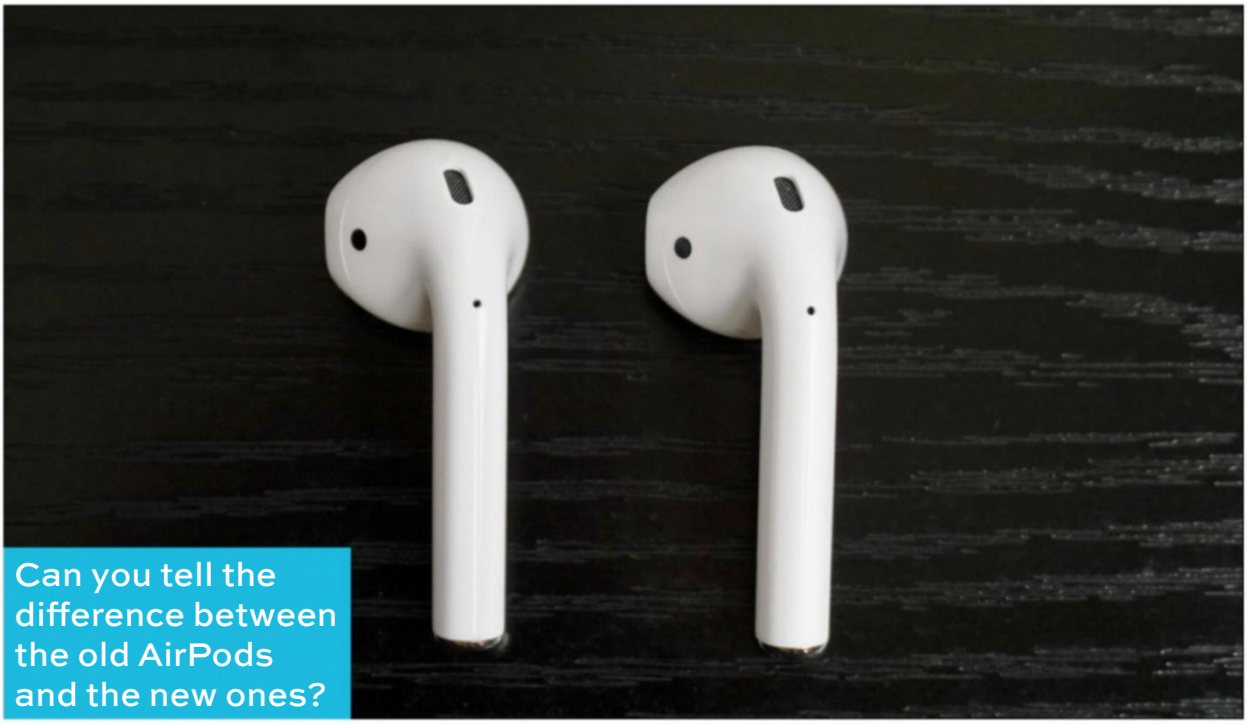
But then, everyone who actually used them fell instantly in love. Easy pairing, auto-pausing, lightweight comfort, and rock-solid connection

– Apple took all the pain points of Bluetooth headphones away. AirPods flew off the shelves and were back-ordered for months as Apple ramped up production to meet demand.

So what does Apple do for an encore? We'll have to wait for a while to find out. Apple's new AirPods are just that – new AirPods. They're not AirPods 2 or AirPods X. They're not a revolution or even a new design. But if you rely on Apple devices, they're still the best true wireless earbuds around.

Everything old is new again

If you go to the Apple site and look up AirPods, you will find this new model and nothing else. The old model has been completely replaced by this new one, still simply called 'AirPods'. When Apple really needs to make a distinction between



Can you tell the difference between the old AirPods and the new ones?

this new model and the old ones, it calls them "AirPods (2nd generation)".

The implication is clear: you should not expect these to revolutionize the wireless earphones market all over again. You should expect AirPods, as you've always known them, just a little bit better. Refined, you might say.

They have the same look, the same shape, the same glossy white finish. The case has the same design. You still pair them with your iPhone by simply holding the case open nearby, just as before. You use them just as you used the old ones: double-tap to skip tracks forward/back or invoke Siri. Music pauses when you take one out of your ear and starts playing again when you put it back in.

In fact, with the exception of a new optional Wireless Charging Case that has a tiny LED on

The new Wireless Charging Case has the reset/sync button in the middle, so the charging coil fits around it

the front, you'd be hard-pressed to notice any difference between the new AirPods and the old ones. The new AirPods have the same battery life as the old ones, too: about five hours of music playback, with the case holding enough power for four recharges. The sound quality is also the same – slightly better than Apple's wired EarPods, slightly worse than most £150 wired earphones.

The H1 chip: Faster sync, hands-free Siri

The second-generation AirPods may look and sound the same, but they've changed inside. They use a new custom-designed H1 chip that Apple says is "developed specifically for headphones" and allow for improved efficiency.

The chip enables the one truly new feature of the AirPods: the ability to invoke Siri by simply saying

The 2nd-gen AirPods do everything the original AirPods do, plus hands-free 'Hey, Siri'.

"Hey, Siri" instead of double-tapping (though double-tapping still works). In my testing, it worked quite well, even on a fairly noisy street. Sound playback will dim after a couple of seconds to let you know Siri is listening, but you don't have to wait for that. As with your iPhone, simply say your entire command without pausing for best results.

We still think Siri needs to get a lot better, and desperately needs the ability to fully function with third-party music services just as well as it does with Apple Music. But AirPods are best in situations where your hands are occupied: at the gym, riding a bike, bundled up in freezing cold weather. I didn't realize how useful it would be to use Siri with my phone in my pocket and my hands full until I had the ability to.

The H1 chip enables a few other minor improvements, too. The new AirPods switch from one device to another twice as fast, connect to phone calls up to 50 percent faster, and offer slightly lower latency (up to 30 percent less). These may sound like big improvements, but in practice, taking two to three seconds to switch from my iPhone to my Mac isn't all that different from taking four to five seconds. Gamers crave lower latency, but the difference is quite small. You have to be really sensitive to that sort of thing to notice it, and the new AirPods still don't compare to wired headphones in that regard.

Remember when I said battery life was the same? There's one important exception to that. The battery life when making calls has risen from

two- to three hours. If you make lots of long phone calls with your AirPods, that's a huge benefit you'll immediately notice. Long dial-in meetings would regularly decimate my old AirPods' battery life, while the new ones have plenty of power left.

Wireless Charging Case optional

Together with refreshed AirPods, Apple introduced a Wireless Charging Case. It was meant to go with the AirPower charging mat before Apple cancelled it. It does work with any Qi-compatible wireless charger, though.

The new case is optional – you can still get AirPods with the standard Lightning-only charging case for the same £159 price the old ones cost. If you want the ability to juice up your AirPods by setting the case down on a little pad, you can get

For this particular product, wireless charging isn't a big deal. It's probably not worth £40 extra

the Wireless Charging Case together with your AirPods for £199. It works with the old AirPods, too, so you can buy just the case alone for £79.

In my experience, the case charges more slowly on a wireless charging pad than plugged in. Given the relative infrequency of charging up your AirPods case (compared to, say, your iPhone) and the inability to work with wireless charging stands (which don't lie flat), I would say it's probably not worth the extra money. It's a curiosity, but it doesn't solve a pressing need.

Macworld's buying advice

If you already own a pair of AirPods, you probably shouldn't upgrade to the latest model. The improvements in switching speed and latency aren't game changers, and the ability to use Siri hands-free, while useful, isn't worth the cost alone. Those who make a lot of long phone calls will love how much longer the battery lasts, but everyone else will notice no real difference in longevity.

If you haven't bought AirPods yet, the improvements in this second-generation model make them a little more compelling. Still, we can't help but anxiously await a true successor to Apple's near-ubiquitous wireless headphones. **Jason Cross**

REVIEW

Rotor Riot Game Controller

RATING: ★★★★☆

Price: **£59 (inc VAT)** from **fave.co/2OHXM7l**

Game controllers have been a part of the extended iPhone experience for years, but Apple's older certification requirements kept them from fully mimicking the same experience you get from an Xbox One controller or Sony DualShock 4. Even with the best ones, there's usually a catch.

Sometimes you need to mash the buttons before they register. In other cases the latency is awful (particularly when the controllers run on Bluetooth). Worst of all, you usually can't press down on either of the controller's thumbsticks, which effectively makes some games all but unplayable.

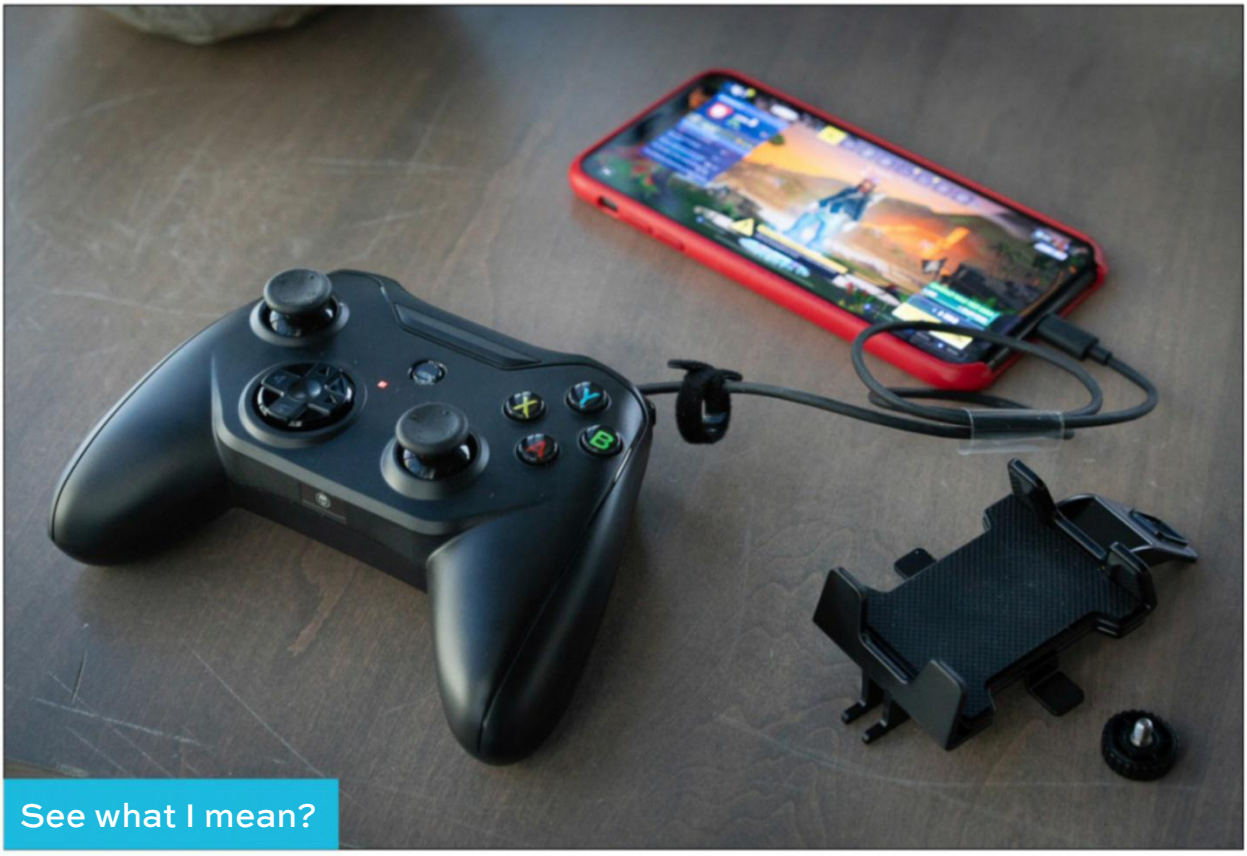
That's why I'm so happy to see the Rotor Riot Game Controller. It's the first MFi (Made for iPhone) controller that takes advantage of Apple's looser restrictions that dropped with iOS 12. It has a handful of its own drawbacks, but it doesn't fall into any of the traps mentioned above, and its new support for the thumbstick buttons makes it particularly well-suited PS4 Remote Play at a time when it's a fairly hot item on iOS. Considering gaming's outsized presence on the App Store, I'm just a little surprised that a company that's best known for making drone parts was the first one to pull it off.

Dopplegämer

The Rotor Riot even gets the look and feel right. Toss it in a box with your other controllers, and you'll likely accidentally pick it up when you mean to reach for your Xbox One controller. The thumbsticks are in the oddly satisfying staggered position you find on the Xbox controller as opposed to the side-by-side design of the Sony DualShock 4 It feels a little light when it's on its own compared to controllers that have batteries, but it feels just right when you're holding it with the phone attached in its case.

I'd worried I wouldn't like the disc-style D-pad as much as the cross on the SteelSeries Nimbus, but it usually did what I wanted

Indeed, you don't even need to charge it as a 25in Lightning cable extends from the controller so it can plug directly into your iPhone, thereby giving you better latency than you'll get with a controller that connects through Bluetooth. (Of course, this also means you can't charge the iPhone while you're playing a battery-battering game like Fortnite.) The cord is long enough that you can also hook it up to an iPad other than the UBC-C equipped 2018 iPad Pros, but I wouldn't really recommend it. In heated moments, I'd be afraid it would cause me to accidentally yank the entire tablet off the table and shatter my self-esteem, my display, and possibly my bank account all at once.



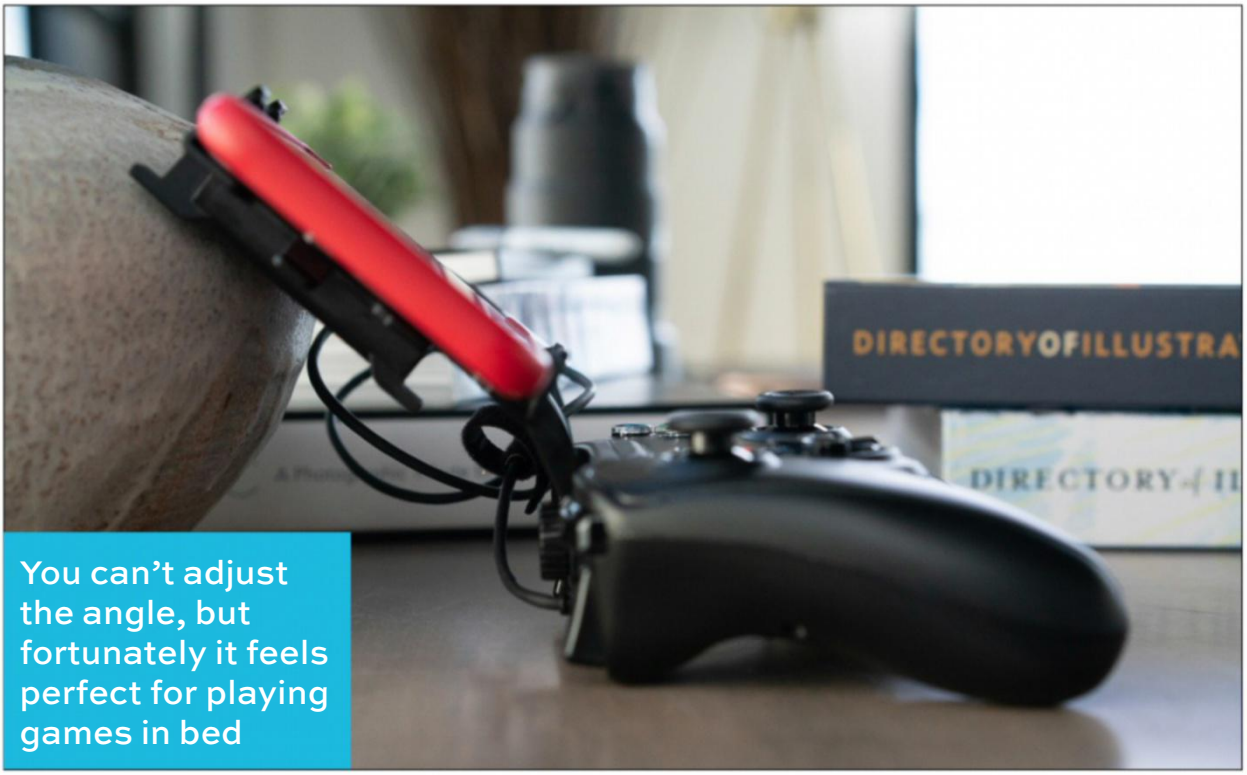
See what I mean?

The optional plastic phone holder keeps that from happening with your iPhone. I say “optional”, but it’s silly to play without it as it keeps your phone anchored to a convenient spot. Its extendable clamp is just big enough that it can hold my XS Max while it’s still in its silicone case, although I’m a little disappointed that I can’t adjust the slightly steep angle. I’m also annoyed that the phone holder adds an extra step when I want to use it on the road. The entire controller takes up a lot of room when I slip it in my bag with the holder still attached, so every time I go somewhere I find myself unscrewing it so I can pack the pieces separately. I’m almost certain this will lead me to lose the phone holder one day.

Worth the wait

Those concerns melt away once you see the Rotor Riot controller in action (and you'll see that action soon, as it asks for permission to pair the very second you plug it in). Unlike some other controllers, every button here does exactly what I want to – and when I want it to. As far as iOS games go, this is true enough for everything from minimalist artsy adventures like Alto's Odyssey (which really only uses one button) to complex, frantic multiplayer shooters such as Fortnite.

It boasts a familiar placement of buttons, and most importantly, it lets you press down on either of the two thumbsticks so you can use them as two additional buttons. These are typically known as true L3 and R3 buttons on console



You can't adjust the angle, but fortunately it feels perfect for playing games in bed

game controllers like the Sony DualShock 4, and no other MFi controllers currently support them because of Apple's weirdly restrictive old certification rules. Even Fortnite doesn't support them yet – although I'm hoping that Epic Games can fix that in an upcoming patch.

For that matter, the controller itself didn't support the L3 and R3 buttons at launch, but that changed with a recent update. There's a good chance you'll have to install that update yourself, but fortunately it's not hard; the update process begins the very second you first plug the Rotor Riot into your iPhone. First, it asks for permission to pair. Then it asks for permission to download the affiliated Ludu Mapp app that lists compatible games. After that the Ludu Mapp app asks for permission to download the firmware.

And that's it. You don't even need to restart the phone. After that, you can play God of War on the PlayStation 4 through PS4 Remote Play better than any other MFi controller at the moment. The secret sauce is all in those thumbsticks. Press the left one, and God of War's protagonist Kratos starts sprinting. Press on the right, and the mad Spartan locks on to an enemy.

It sounds so simple, but other MFi controllers were forced to scrap this functionality for years. In fact, if you watch me trying to play God of War with Remote Play with the Gamevice in a recent how-to video (**fave.co/2Uvr2nd**), you can see Kratos flailing about at a lethargic pace because the Gamevice can't let me use two of the most

important buttons in the game. There's no way I would play the entire game like that.

Mind you, the Rotor Riot controller doesn't provide corresponding buttons for every button on a DualShock 4, but fortunately the Remote Play app itself makes up for that. Along the bottom of the app's display, you'll see a digital bar that delivers access to the Options, Share and PlayStation buttons, and I've rarely felt a pressing need to have them on the controller with this setup. The one exception would be the Options button, but fortunately the big central button on the Rotor Riot automatically remaps to that.

Short of playing with a DualShock 4 – which is impossible on an iPhone, if you're wondering – it's as close to a seamless experience as you're going to get.

Macworld's buying advice

Not every game currently supports the L3 and R3 buttons on the Rotor Riot Game Controller – including Fortnite – but the design of the gamepad is such that functionality could be unlocked with a patch. Right now, though, it's the only MFi controller that supports them. With PS4 Remote Play, it lets me play everything from God of War to Persona 5 as easily as I might play it on an actual PS4. Until its competitors catch up, this is the controller I'll be reaching for. **Leif Johnson**

Pro or no? How the high-end 2019 iMac compares

It depends on the software you use most. **Jason Snell** reports

High-end iMac (pictured) or iMac Pro? Ever since the iMac Pro was released in 2017, that's been a key question for pro-level Mac users who aren't sure if taking the perilous leap from the summit of the iMac product line across to the £4,899 (and up) iMac Pro was worth

the financial risk. With the 2019 updates to the iMac line, the gap between the two products has narrowed even more, making the question that much harder to answer.

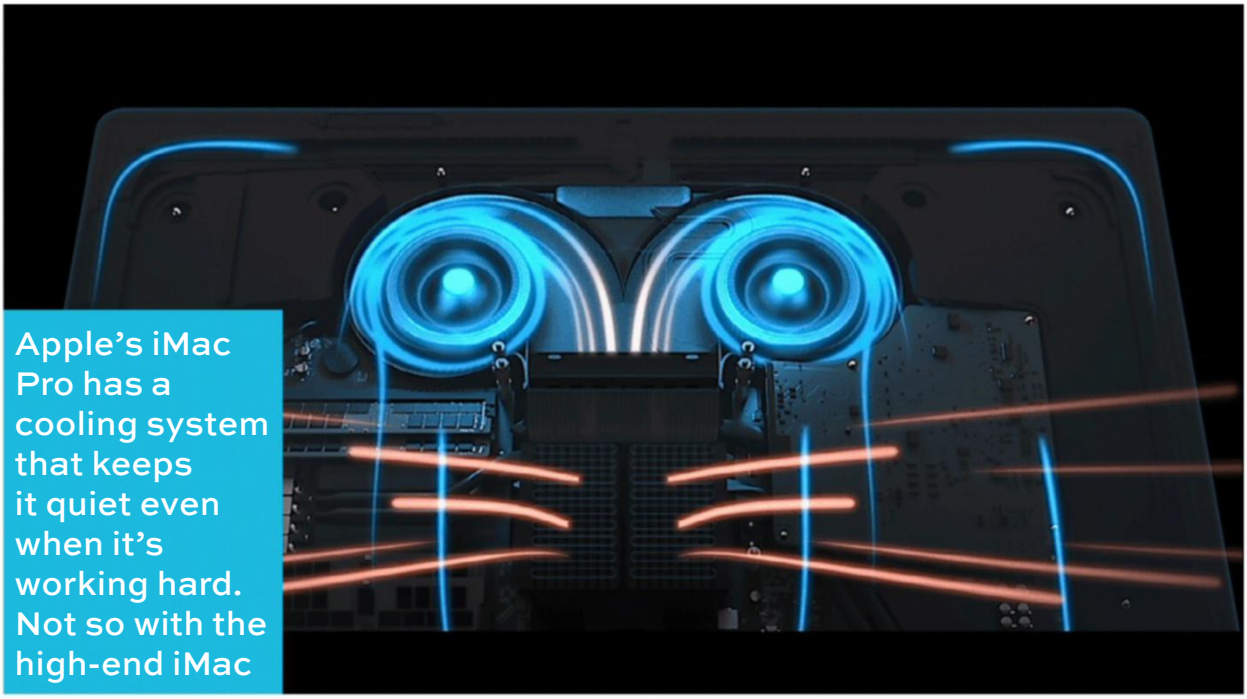
I've been using a base-model iMac Pro as my primary computer since it shipped, and Apple recently sent me a high-end 2019 iMac, so as I write this I am literally sitting in that iMac Pro gap. (It's comfy here, thanks for asking.) The 5K iMac is equipped with the 3.6GHz 8-core ninth-generation Core i9 processor, 16GB of RAM, a Radeon Pro Vega 48 GPU, and 512GB of SSD storage – a configuration you can buy today on Apple's website for £3,284 – a saving of £1,615 from the price of the base-model iMac Pro.

If you're in a market for a new, powerful desktop Mac, should you buy the top-tier iMac or leap across the gap and into the warm embrace of the iMac Pro? Reader, you will be shocked to learn that it all depends on your priorities.

Better all around: iMac Pro

Here's the truth of it: the iMac Pro is a better system all around, a bit like buying a luxury car instead of a standard model. There are so many touches, little and big, that you get when you buy an iMac Pro – even if it's the base model. It's possible that some combination of these features will clinch the added value of the iMac Pro over the regular iMac.

The first one, and probably the biggest, is the improved cooling system. The iMac Pro has been completely redesigned on the inside, with the space



Apple's iMac Pro has a cooling system that keeps it quiet even when it's working hard. Not so with the high-end iMac

reserved for spinning hard drive configurations in standard iMacs replaced with a new fan system that's quiet and efficient. For comparable levels of work, such as a video export from Final Cut Pro X, my iMac Pro is nearly silent and the iMac emits a constant buzz of white noise.

Though I don't have a previous-generation model to compare it to, it does seem like this generation of iMac is a bit less aggressive at blowing its fans full blast – perhaps aided by improvements in how Intel and AMD manage CPU and GPU temperatures, respectively. Who knows, maybe the thermal paste Apple is using on these systems is of a higher calibre? In any event, the iMac tries hard to not blow those fans while still maximizing processor speed.

Another advantage the iMac Pro has over the iMac is that it's a true, modern Mac, equipped with

the Apple-designed T2 coprocessor to handle security, storage, and more. The only other current Mac models being sold without an Apple-designed ARM processor at their heart haven't been updated in ages: the non-Retina MacBook Air, the 12in MacBook, and the low-end 13in MacBook Pro that lacks a Touch Bar. It's not a good sign that the 2019 iMac is among them, because it strongly suggests that the iMac is the last of an older generation of Apple tech, while the iMac Pro is part of Apple's modern Mac architecture.

The iMac Pro's T2 processor handles audio and system management, acts as disk controller for high-speed encrypted SSD storage, drives the high-resolution FaceTime camera, and enables a secure boot system that validates that your software hasn't been tampered with. The iMac has to make do with separate, discrete controllers for audio, system, and disk, has a lower-resolution and lower-quality FaceTime camera, and offers somewhat reduced storage speeds that lack the extra security of on-the-fly hardware encryption via the T2.

The iMac Pro also uses ECC RAM, which improves system stability. It's got four Thunderbolt 3 ports rather than the two on the iMac. It supports two external 5K displays or four external 4K displays, compared to the iMac's one and two, respectively. The FaceTime camera is higher quality (with image quality monitored and adjusted by the T2, using the same image-management magic that Apple uses on iPhone cameras). The iMac Pro has

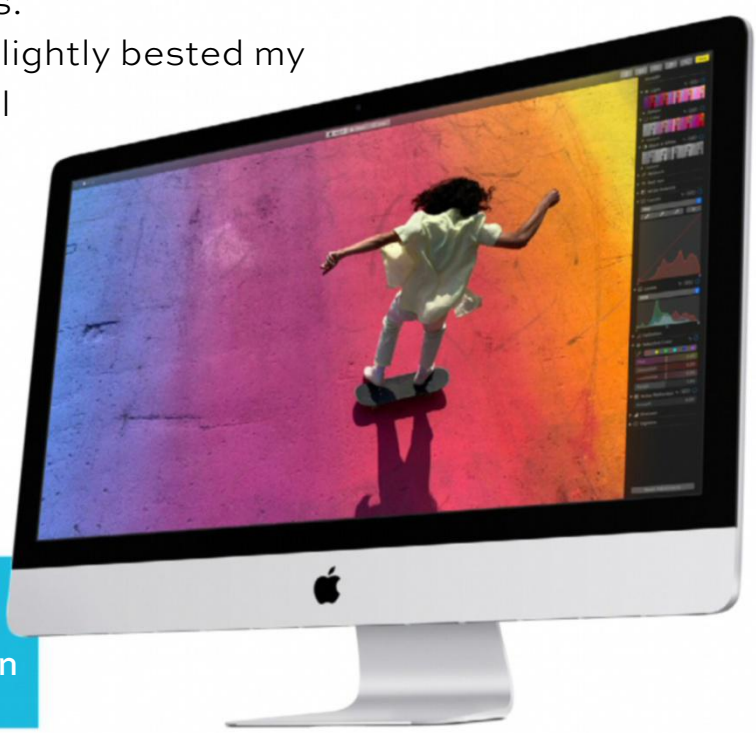
four microphones for better Siri input (the iMac has one), can handle up to 256GB of RAM (the iMac can only handle 128GB), can be configured with SSD storage up to 4TB (the iMac only goes to 2TB), and has an ultra-fast 10GB ethernet port (the iMac only has a 1GB ethernet port).

There's a lot. But is it enough?

Big speed, bargain price: High-end iMac

Now the good news. If you forego the niceties of the iMac Pro, you can get a massive amount of performance from a 2019 iMac and save yourself a couple of thousand pounds. I ran a load of different benchmark tests on the iMac and iMac Pro and the results were very close. On Geekbench, the Core i9 iMac was faster than the iMac Pro on single-processor tests and only slightly slower on multi-core tests.

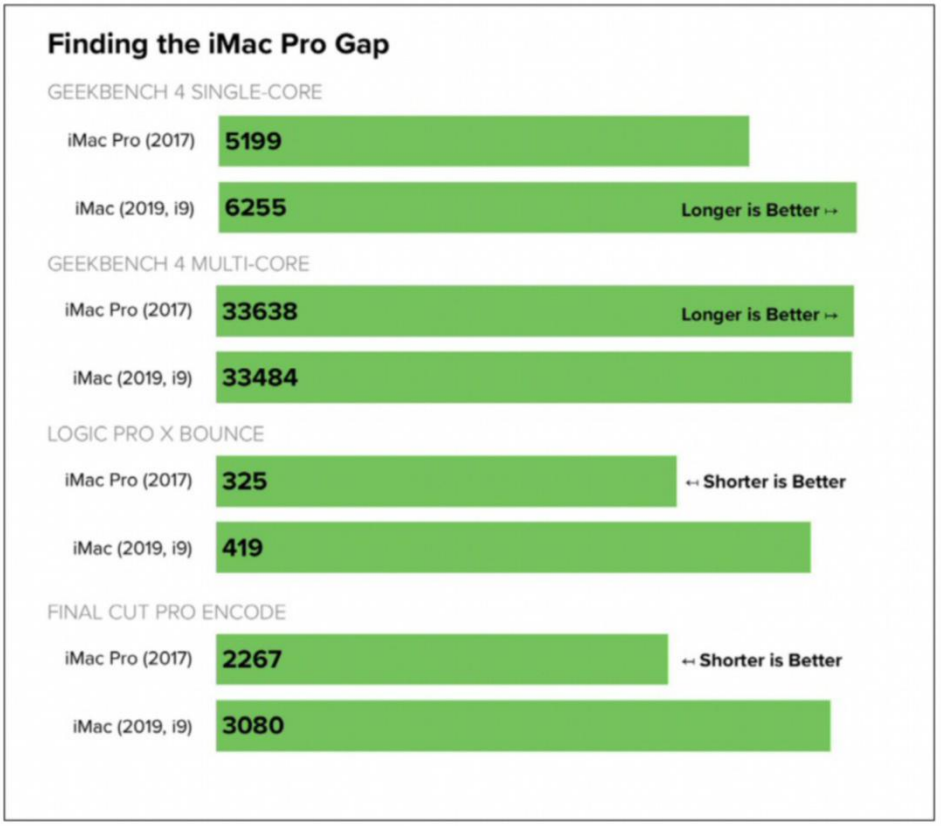
The iMac also slightly bested my iMac Pro in several audio tests that I ran in iZotope RX 7, and outscored the iMac Pro on



The high-end Core i9 iMac was faster than the iMac Pro in single-core tasks

the Cinebench rendering test. Across the board, the Core i9 iMac appeared to be faster than the iMac Pro in terms of single-core tasks (unsurprising given its superior Turbo Boost speed) and about the same in multi-core tests.

In terms of a reality check, most of the work people do on their Macs is not optimized for multiple processor cores. If you are encoding video or audio or working in high-end graphics, you will have workflows that are built to take full advantage of multiple cores, but a lot of software just doesn't care. Even some of my iZotope plug-ins, high-end audio software designed for professionals and costing hundreds of pounds, failed to keep the eight cores of either system engaged.



There's a plot twist, however. In my tests of Logic Pro X and Final Cut Pro X, both professional media applications published by Apple itself, the iMac Pro scored notably better than the iMac. I'm not sure why this is, but my suspicion is that Apple is going the extra mile to optimize its software to take advantage of the performance of the iMac Pro. The iMac Pro is a strange beast, since it's powered by Intel Xeon processors, not Core processors, and it's also got that T2 processor that the iMac lacks.

Pro Macs for pro apps

What this all suggests is that the iMac Pro is exactly what Apple says it is – a high-end iMac with a whole bunch of special high-end features that's most appropriate for people who use high-end professional apps that have been optimized for Apple's professional Mac architecture. If that sounds like you, congratulations – you're ready to take the leap across the iMac Pro gap. (You may want to consider buying an even higher-end iMac Pro than the base model – many of my friends agree that the 10-core model might be the best mix of price and performance.)

But if you're not one of those people, if you don't need all the added niceties and the extreme performance in pro apps, there's good news. You can configure a 5K iMac with Intel's latest and greatest ninth-generation Intel Core processors, a bunch of SSD storage, and a load of RAM, and have an iMac that matches or beats the iMac Pro on most tests… and walk away with £1,600 in your pocket.

FEATURE

9 iMac improvements we'd like to see

The current iMac design feels out of date. A new all-in-one Mac is long overdue. **Jason Cross** reports

The current iMac design is positively ancient, by computer design standards. The 27in Retina iMac, with its slim design and 5K resolution, was launched in the autumn of 2014. It was really only a small tweak on the existing

'slim unibody' iMac that dates back to 2012, itself only a thinner version of the unibody iMac design that goes back to 2009. The basic look and physical features of the iMac have barely changed in a decade.

It's a testament to the elegance of the design that it's still desirable after all that time, but it's well past time for a change. Last month, Apple updated the iMac line with new internal hardware, but it the design and features remain fundamentally unchanged.

We can't tell you what a new iMac should look like (we want Apple's design prowess to surprise us), but we can describe some feature gaps we really want to see addressed.

1. Height adjustment

Set an iMac down on almost any desk, and its display will be at least four- to six inches lower than it should be. You can tilt it up, but that doesn't really solve the problem. This is why there's an entire cottage industry of risers and stands for the iMac, and why every single iMac I've ever seen outside of an Apple store is resting on top of something. Usually a stack of books.

An iMac's display needs to sit much higher above your desk than it currently does. Maybe a new iMac could have a base with most of the computer parts in it and an adjustable display. Apple hasn't done that since the iMac G4 (the 'lamp' iMac). Maybe it just needs to come with two or three replacement stands in the box, of various length. Perhaps Apple

There's a whole industry of iMac stands, because they're simply not high enough on their own

could do something slick with a telescoping stand that doesn't look like a telescoping stand.

Whatever the solution, the next iMac should be able to move the display up and down enough to sit at the proper height for most desks and work tables.

2. ProMotion

Currently, iMac displays are all limited to a maximum refresh rate of 60Hz. That's not necessarily a problem, but it's no longer cutting-edge tech. In the PC space, we regularly see 4K monitors with refresh rates up to 144Hz.

It's tempting to think of that as mostly a gaming thing, and iMacs are not great game machines (and certainly aren't going to run top-tier games at high

resolutions in excess of 60 frames per second), but anyone with an iPad Pro can tell you that fast refresh rates are not just for games.

Apple should take its ProMotion branding from the iPad Pro and apply it to the iMac. Give us variable refresh rates that top out at 120Hz. It would be great for content creators (who can lock the refresh rate at multiples of 24- or 25Hz when creating content at those frame rates) and for movie-watching, too. Plus, every desktop movement, every scrolling browser window, every swooshing interface animation, would look so smooth. Once you experience computing at 120Hz, everything else feels sluggish.

3. HDR

Apple has always taken display quality very seriously, and we've seen that present itself in iMac display upgrades: first to Retina resolution and then to the DCI-P3 colour gamut. But it's definitely time for the iMac to take the next big leap and incorporate high dynamic range (HDR) capability. Apple doesn't need to go crazy with Dolby Vision certification and over 1,000 nits of peak brightness: A maximum brightness over 800 nits and HDR10 support would be plenty.

It would be a huge boon to content creators, who want to edit and publish HDR content for YouTube and Vimeo, but it also meshes well with the rest of the Apple ecosystem. The latest iPhones and iPad Pros all have HDR displays. Apple's iTunes video store (and upcoming

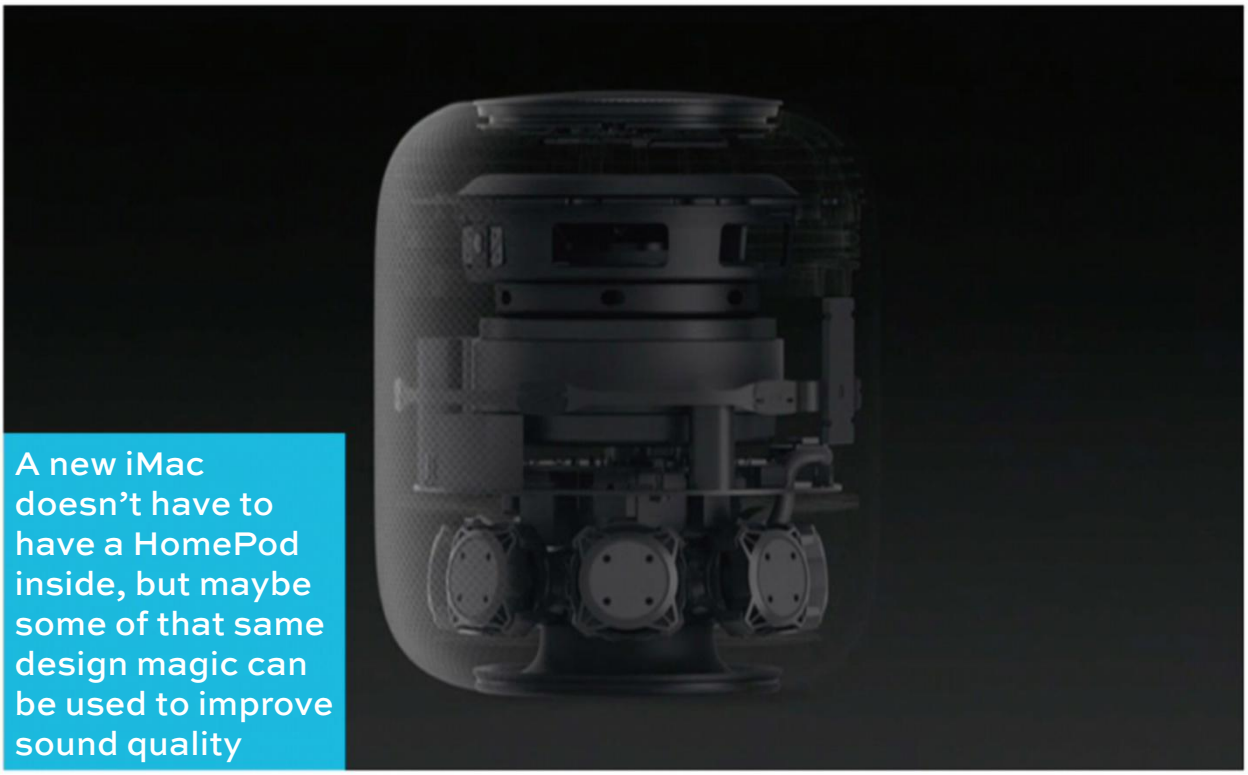
streaming service, we assume) is full of HDR-enabled videos. It's also great for Netflix.

A 27in iMac could be a killer way to watch TV shows and movies, especially in small flats. The content is there, the display has the resolution and colour for great 4K, but it can't really shine until it also supports HDR.

4. Better audio

Speaking of turning the iMac into a great media consumption device, it really could use a bit more oomph in the audio department.

It's impressive how much sound Apple gets out of the current design, given the relative thinness of the iMac and the fact that the entire computer is crammed in behind the display. But



A new iMac doesn't have to have a HomePod inside, but maybe some of that same design magic can be used to improve sound quality

it could definitely be better, especially in the bass department. A new physical design might take into account how best to deliver a better audio experience, and that includes replacing the single omnidirectional microphone with a more robust microphone array. Everyone who makes a FaceTime call (or records a quick bit of voice-over for a podcast or video) would appreciate it.

5. TrueDepth module and Face ID

Speaking of FaceTime calls, the webcam on the iMac is an embarrassment. Even the improved 1080p FaceTime camera on the iMac Pro just doesn't deliver a good experience, and pales in comparison to the front-facing cameras on iPhones.

Apple should incorporate the TrueDepth module into the top bezel of the iMac display instead of the current webcam. It could just use the same exact one you find on the iPhones today, or whatever next-generation version Apple has in its labs.

Think of the benefits. Everyone using an iMac would be instantly recognizable on the their company group video call, only now it will be because they have by far the best video quality, not the worst. You could have support for Animoji and Memoji Messages on Mac. You would get Face ID authentication for logging in, resuming from sleep or lock state, making web purchases, entering passwords, and more.

After all, you can't really put Touch ID on an iMac's wireless keyboard – not without blowing up the cost and decimating battery life. You could even

do Mac-specific stuff with it, such as automatically blanking and locking the screen if your face isn't visible for a user-specified amount of time, or automatically logging in different users based on what face is recognized by the system.

6. T2 (or T3) chip

The T2 chip first appeared in the Mac Pro, and is now in the MacBook Pro, MacBook Air, and Mac mini. It handles security (including the secure enclave used for Touch ID), storage encryption, secure boot, audio input and output, and processes the FaceTime camera data.

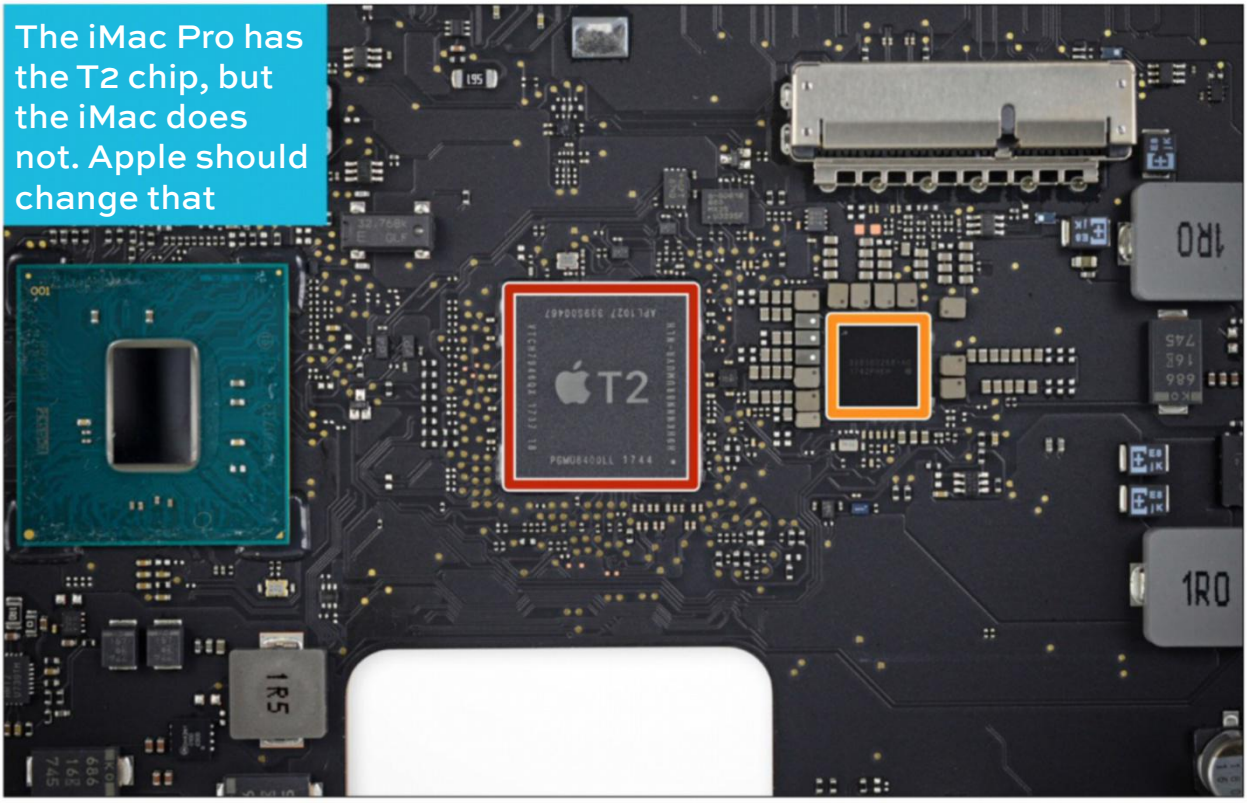
It's still not in the latest regular iMac, though. The latest update was just a spec bump, not a new internal design, and so the T2 is still absent.

We'd want a new iMac to have the T2 chip, or perhaps, a future T3 chip that could do even more. For example, a hypothetical T3 chip might have the same Neural Engine as the A12 Bionic to seriously speed up machine learning and AI functions in all sorts of applications.

7. Flash storage only

If you buy the most affordable iMacs – either the old 21.5in 1080p model for £1,049 or the just-updated Retina 4K model for £1,249 – you are graced with a 1TB 5,400rpm hard drive.

More expensive iMacs, including all the 27in models, include a Fusion Drive, which combines a big, slow spinning hard drive with a small chunk of flash memory to create a single virtual disk. It



The iMac Pro has the T2 chip, but the iMac does not. Apple should change that

should, in most cases, perform a lot better than a traditional spinning disk hard drive.

But let's face it, it's still too slow. Way too slow for a brand-new computer that costs £1,200 or more. It's easily the slowest part of an iMac.

I mean, we get it. SSDs are more expensive, and Apple doesn't want to ship an iMac with a small amount of storage. These are meant to be computers that get filled up with huge photo libraries, iMovie projects, and GarageBand recordings. Apple should absolutely not drop the minimum configuration to 256GB just to go all-in on fast SSDs.

It shouldn't have to, though. Flash storage prices are plummeting. You can now buy a 512GB SSD

for under £80. And that's online retail pricing, not the bulk purchase price a huge company like Apple would pay. The base iMac models could have a 512GB SSD and strike a much better compromise between cost, performance, and capacity, and even a 1TB SSD wouldn't cost Apple a whole lot more than their 1TB Fusion Drive setup today.

The switch to SSD-only storage might be a necessity in future iMacs, assuming they incorporate the T2 chip (or its future successor). Those chips act as the storage controller, and it would appear they are only capable of doing so with flash storage.

8. Slimmer bezels

The black bezels around an iMac's display are about an inch wide. That kind of thing might have flown in 2012, but here on the other end of the decade, they look positively primitive. Then there's the huge silver 'chin' beneath the display... maybe it's a necessary function of trying to fit the whole computer, with proper ventilation and cooling, behind the screen, but it should be the first thing to go in a newly-designed iMac.

9. Colour options

Remember the bright fruit colours of the iMac G3? I miss the days when there was a bit of life in Apple's computer line. Today your iMac can be any colour you want, as long as it's silver.

I don't necessarily think we need to see a return of lime, strawberry, blueberry, grape, and

Maybe we don't need a return of the fruit flavours, but a little colour would bring the iMac line to life

tangerine, but it would be nice to have a few colour options. In the iOS line, Apple often makes its top-end hardware available in only silver, space grey or black, and maybe rose gold. But it's more affordable phones, from the iPhone 5c to the iPhone XR, pop in a rainbow of colours. Why not do the same with the computer line? Let the iMac Pro fade into the background in boring space grey, while the iMacs for everyone make a statement with a splash of colour.

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IDG APRIL 2019

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Why Apple's iPad, and AirPod launches were a smart strategy shift

Resurrect beloved products? Continual surprises? What's not to like? **Leif Johnson** reports

I expected 'one more thing' after Apple announced new iPads, AirPods and an updated iMac, and I was annoyed when I didn't get it. Sure, I was disappointed, but my anticipation for another hardware refresh only proved that Apple's experiment with dribbling out modest product releases is working.

On each of the first three days of the third week of March, Apple dropped updated versions of existing products with little of its typical fanfare or event theatrics. It began with the iPad mini and iPad Air, then on the Tuesday progressed to the iMac, and finally the AirPods on the Wednesday. Nobody would call these earthshaking updates. Certainly none would have made the crowds ooh and ahh during a keynote. You could even argue they were disappointing on some level.

But I'd started to look forward to them, as each drop suggested Apple was building to a crescendo. For that matter, each reveal kept Apple in the minds of the tech press for a whole week before Apple's Show Time event, event in the face of news cycle competition from the likes of the Game Developers Conference, Nvidia's GPU Technology Conference, and standout news such as the reveal of Google's ambitious Stadia service.

At first, it didn't seem like Apple had any plans to slow the pace. It left me excited for more, and I'd like to see more of this kind of thing from Apple in the future.

A new release style for a new era

It's a smart strategy, especially in an age when Apple's line-up is increasingly crowded with spec-focused upgrades of older models that no longer have the flair of the so-called 'game changers' Apple used to reveal on stage.

First, the slow-roll strategy reminds onlookers of Apple's past successes, which in turn helps

Remember this little fella?

generate optimism for unannounced projects. Secondly, the strategy helps Apple preserve the razzle-dazzle of new products – like a whole new streaming service, which now can own the spotlight on Monday, untarnished by, well, old stuff. Thirdly, and most importantly, the slow roll gets everyone talking about Apple for several days in a row – and the hardware releases also deflected attention away from that whole Spotify thing.

Could Apple have done even better? Oh, without a doubt. By the time Wednesday rolled around, it was easy to believe Apple would maintain the momentum for the rest of the week. We found ourselves thinking that Thursday could bring the rumoured iPod touch refresh, and Friday could bring AirPower, though this has since been killed by Apple (see **page 15**).

It's possible, of course, that Apple just didn't have five days' worth of hardware. Whatever the reason, its slow-roll proved that Apple hasn't forgotten how to put on a good show.

FEATURE

Apple TV+ video streaming service: 9 burning questions

We don't know much beyond the name. **Michael Simon** reports

At long last, Apple took the wraps off of its new TV service. It'll be called Apple TV+ and will include a variety of shows from the likes of Jennifer Aniston, Reese Witherspoon, Steven Spielberg, J.J. Abrams, Kevin Durant, and Rupert Grint. Several of the major players were on hand at the event to outline their vision, and Apple basically billed the service as the greatest collection of talent ever assembled on TV.

But after the songs, standing ovations, and flowery rhetoric was complete, we didn't learn much about the new service that we didn't already know. It may be the first time Apple has confirmed that it is indeed working on its own original content, but that was hardly a secret. It didn't actually answer any of the questions we have about Apple TV+.

1. How much will Apple TV+ cost?

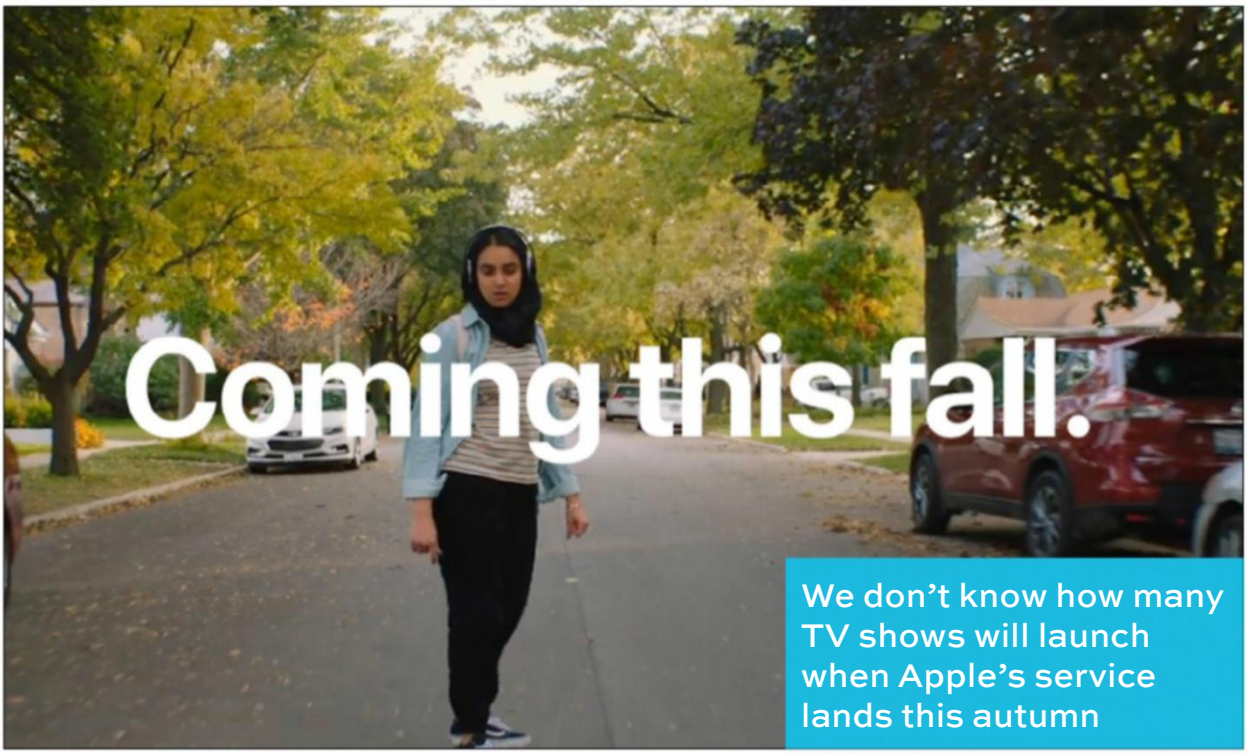
The most surprising thing about Apple TV+ is that Apple didn't tell us how much it will cost. There were rumours before the event that it could be free, but that doesn't seem to be the case, as Apple called it an "ad-free subscription service" and said it would be available in the new TV app on smart TVs (as well as Apple devices), implying we'll need to pay something for it. That price is still a mystery.

2. How many programmes will be available at launch?

Apple showed off a small handful of specific shows, but it gave no indication as to whether they would all be launching when the new service goes live in the autumn. Apple also showed off a lengthy list of talent that has signed on to work with Apple TV+, but didn't mention how many shows are actually in production. So we don't know how full the Apple TV+ catalogue will be when the service launches.

3. How will episodes arrive?

Netflix has turned binge-watching into a weekly ritual by dumping entire seasons of new shows all



We don't know how many TV shows will launch when Apple's service lands this autumn

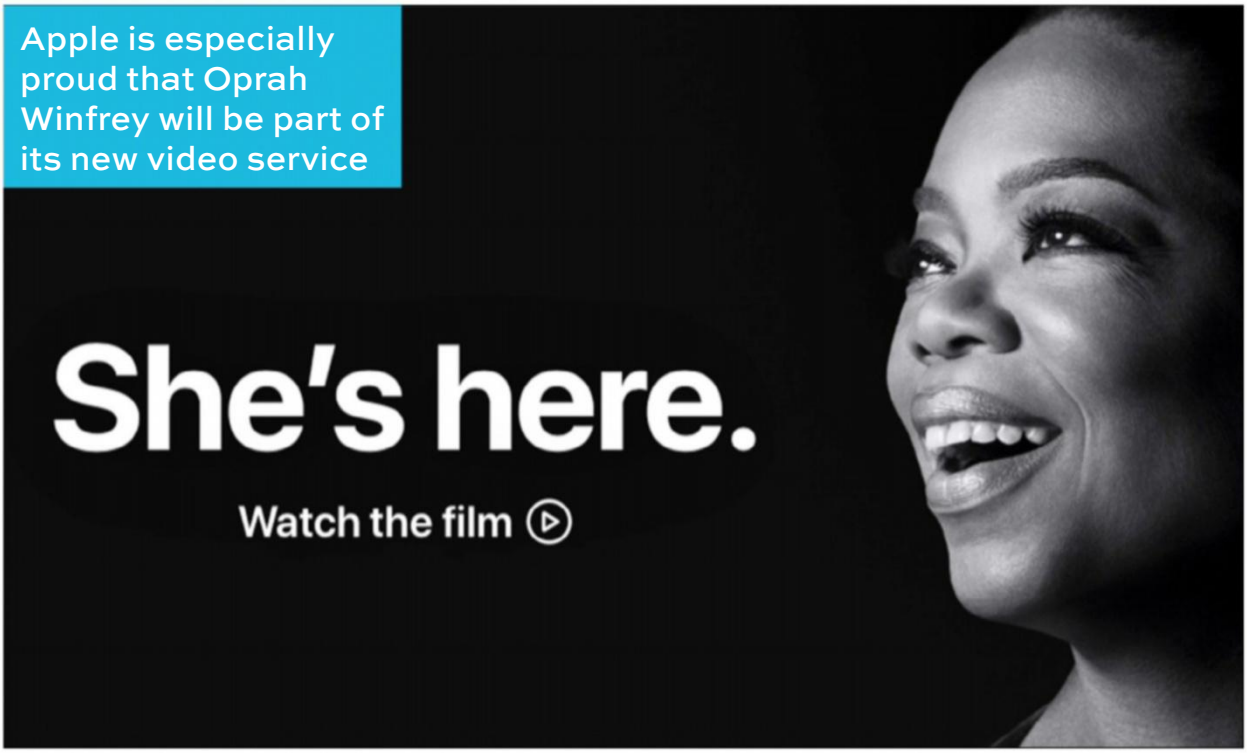
at once, but we don't know if Apple plans on doing that with its new shows. With *Carpool Karaoke*, Apple opted for the traditional weekly release of episodes, and Hulu does the same with *A Handmaid's Tale*. So will we be bingeing or waiting?

4. Will all shows be in 4K?

We assume that everything on Apple TV+ will be presented in 4K, but Apple didn't actually tell us that either.

5. Will non-Apple shows be available?

Apple focused on original content at the unveiling of Apple TV+, but we don't know if the service goes beyond that. Hulu, Netflix, and Amazon all offer a smattering of shows and movies on their services,



Apple is especially proud that Oprah Winfrey will be part of its new video service

but Apple gave no indication that it would be doing the same on Apple TV+.

6. Will there be bundle pricing?

Along with the monthly price of the service (or lack thereof), we also didn't get any indication that Apple would be offering bundles with Music and News. Leading up to the event, rumours were swirling that Apple would be offering various tiers for its new TV service, but we didn't get any peek at what they might look like. If not, Apple's services could get expensive real quick.

7. How many shows will Oprah make?

Apple made a big deal out of its partnership with Oprah Winfrey – which was previously announced

– but we don't know what it means for Apple TV+. Oprah was quite vague in her speech and only said she was working on a pair of documentaries. Will there be a talk show component? Is there a commitment to develop a specific number of shows beyond the ones that are in development?

8. Why do we have to wait until the autumn?

In case you don't have a calendar handy, it's barely spring. But the Apple TV+ service won't be available for at least another six months, likely around the same time the next iPhone launches. So why announce it now?

9. Where are the trailers?

If there was one thing we hoped to see, it was trailers. But we didn't get a single one. All Apple gave us were lengthy (and oftentimes cloying) descriptions of shows, a sleepy Sara Bareilles ballad, and an overall teaser that barely showed any footage from any of the upcoming shows. We know Apple is new to TV and all, but someone must have forgotten to tell it that trailers are the way to get people excited for a new show.

Can Apple's product expertise make TV+ a hit?

The skills that make great hardware aren't really the same skills that make great television. **Jason Snell** reports

I've seen numerous celebrities in the audience at Apple events over the years, but the event at the Steve Jobs Theater was different. Captain America himself, Chris Evans, was in the audience. On stage were plenty of famous entertainment-industry faces, from directors like Steven Spielberg and J.J. Abrams to actors including Jennifer Aniston and Reese Witherspoon. Even Oprah was there.

This was an Apple event unlike any other, and for many different reasons. There wasn't any new hardware or software to speak of, for one, and such a concept would've seemed impossible for Apple even a couple of years ago. Stranger still, the event was aimed as much at the entertainment industry as at the people who buy Apple's products – but then, Apple waded into some pretty strange waters when it became a full-fledged movie and TV producer.

Ready or not, the secret sauce

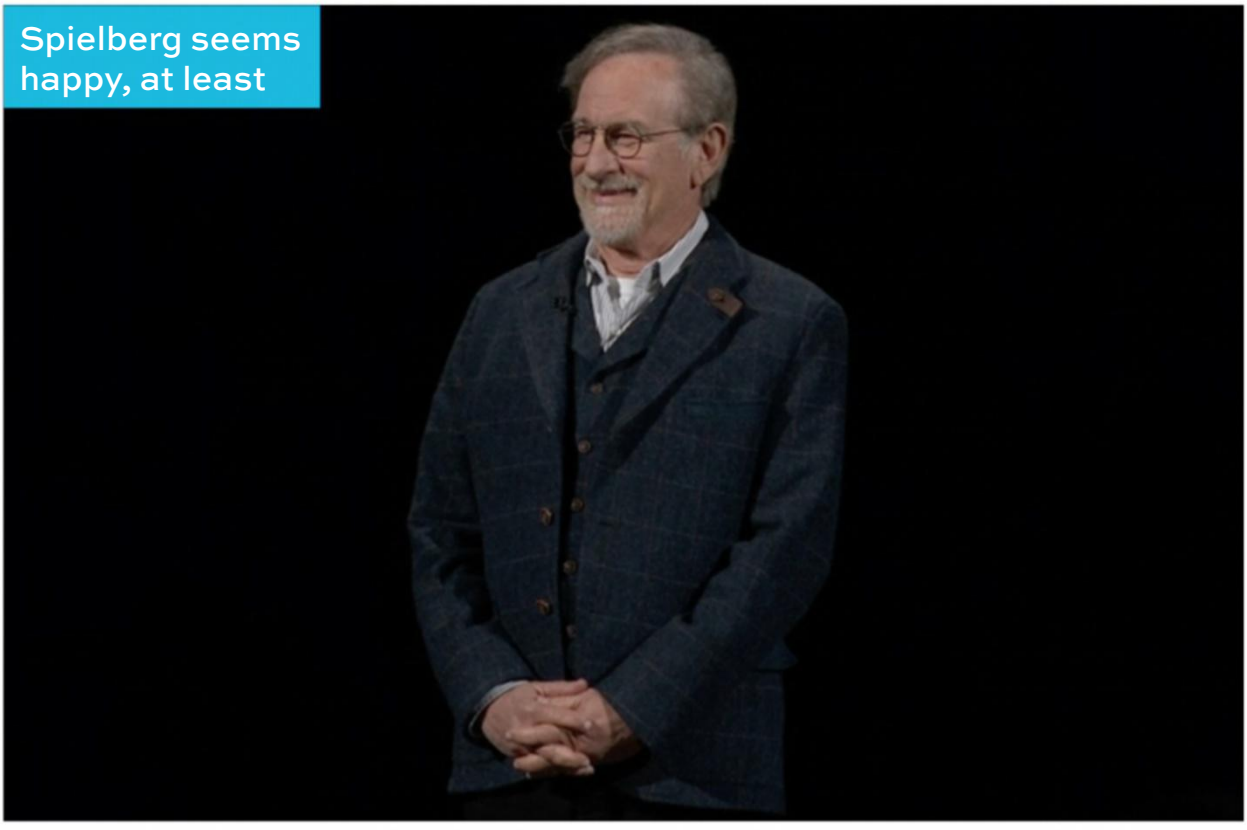
For years Apple has rightly sold itself as a company that can provide unique value by combining hardware and software in a single package, but at Show Time Apple CEO Tim Cook rolled services into that equation as well. We're in an era where iPhone growth has flattened, and Apple has been talking for a few years now about moving its growth into services, an area it's had limited experience with.

We're already seeing good examples of how Apple can meld hardware, software, and services together in order to create something unique. Apple's new credit card, for example, is a clever package deal that unites the Apple Pay hardware on iPhone and Apple Watch with banking services with some special iOS features.

But where does this expertise cross over into making TV shows? That's a tougher question. Apple can't really use its expertise in hardware and software to make a better TV show, so it needs to rely on its production executives, Zack Van Amburg and Jamie Erlicht, to work with TV writers

and producers to make those programmes. And in that way it's really no different than any other company that's in the business of making filmed entertainment today.

Some of the largest and most dynamic firms have deep technological roots these days, and the entertainment industry is in a massive transition forced upon it by products sold by some of those very same tech giants. Put these two factors together and is it any wonder that Amazon and Apple are now TV producers with buys in the billions? Netflix, a business that started as a fusion of a web app and a DVD delivery infrastructure, has ridden its technological prowess to a point where it's as much an entertainment giant as a tech company.



Spielberg seems happy, at least

It's enough to make you wonder whether there's any point in distinguishing between the two these days. Tech companies are entertainment giants and, in turn, some entertainment giants are becoming tech companies. (Disney spent several billion on BAMTech a few years back, and it's busy rolling out its own multi-tiered streaming video strategy.)

But while tech skills can theoretically help you design TV apps and streaming back ends, the skills required to make great TV are different. Van Amburg and Erlicht may succeed or fail with Apple TV+, but that result will have less to do with Apple's ability to sell iPhones than with Van Amburg and Erlicht's skill as development executives.

There's perhaps one exception: Apple does bring its brand along with it, and that can help inform the feel of the content Apple produces. Apple's self-image, as seen through its commercials and promotional videos, is optimistic and bright and creative. The lengthy scripted portion of the Apple TV+ roll-out hit a lot of the same points, and while it's safe to say that I never need to hear the word 'storytelling' again, I think Apple was trying to establish an ethos and style for what an Apple TV+ show represents.

Settle down, Hollywood

So why roll out a TV service in March that won't arrive until the autumn? There are two reasons, I think. First, the event lets Apple tell a much broader story about how it's approaching services. It's more effective to tell this story all at once rather than

spreading it out across multiple events and press releases, especially when it's likely to be eclipsed by whatever hardware or software revelations anchor the proceedings. At Apple's invitation, Wall Street is especially focused on the tech giant's services revenue, and this event allowed it to show off a large chunk of its strategy, even if some of the items are as-yet incomplete.

Another reason is, quite frankly, to get Hollywood to settle down a little bit. Apple is an extremely secretive company when it comes to product launches, and Hollywood doesn't really work like that. Apple executives who are used to bits of its hardware plans leaking from its supply chain were probably taken aback by all of its

Big Bird may have been in town, but has Apple learned the ABCs of TV production?

Hollywood deals being reported immediately by *The Hollywood Reporter*, *Variety*, and *Deadline*. And recently, a series of negative stories have appeared in larger outlets, generally expressing frustration from creative types about a lack of clarity about Apple's video plans. I'm sure that it's no fun to spend a year working on a new TV project while not being able to talk about it or know anything about its final destination. And the fact is, the more frustrated Hollywood types get with Apple's silence, the harder it is for Van Amburg and Erlicht to make deals.

After Apple's event, things are a lot clearer. The service has a name (though not a price), a launch date (at least vaguely), and a core of announced shows. Apple's also now free to promote new

It looks like a party, but will everyone stick around?

series for Apple TV+ at will, rolling out sneak previews and trailers and the like, because the service is finally announced.

Will it work?

So here's the big question that's been underlying this entire endeavour since the day Apple hired Van Amburg and Erlicht back in June 2017: can Apple successfully compete as a video service? In its favour, the TV app comes pre-installed on a billion-ish devices. On the other hand, Apple is competing with a growing number of streaming services, including forthcoming major efforts from Disney and WarnerMedia.

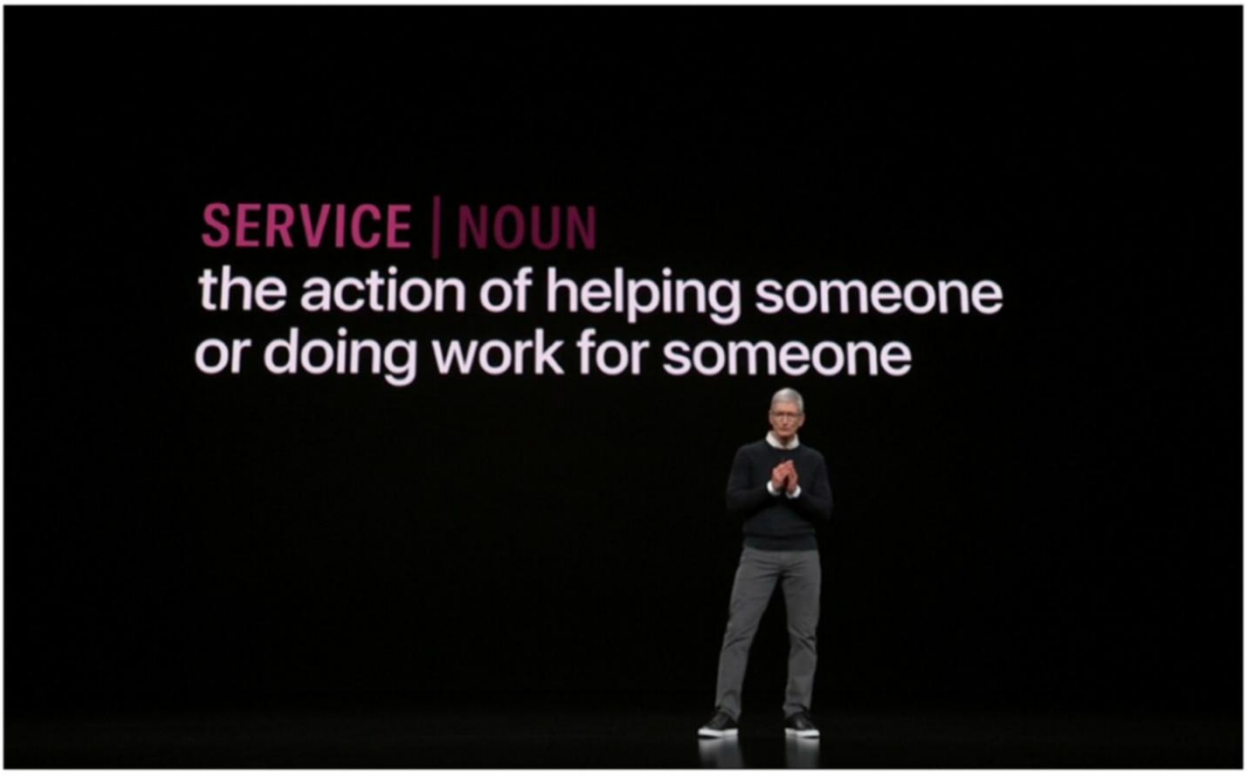
But the truth is, Apple's video service won't stand or fall through the efforts of the people developing the TV app or crafting a subscription strategy. The success or failure will largely be determined by those people on stage, and their producers in the audience. If the programmes are good, Apple has a chance of making it work. But no amount of marketing power will make a collection of lousy TV shows a success.

The proof will be on the screen.

FEATURE

Apple services mark move away from iPhone

Apple's new services are seeds that will grow into a multibillion-dollar garden. **Michael Simon** reports



As it turns out, it's not time to play the music or light the lights. It's not time to put on make-up or dress up right. It's not actually 'show time' at all. Apple unveiled several services at its star-studded Show Time event, and they all have one thing on common: they're not ready yet. The only service that's available to try out now (if you live in the US) is Apple News+, and a

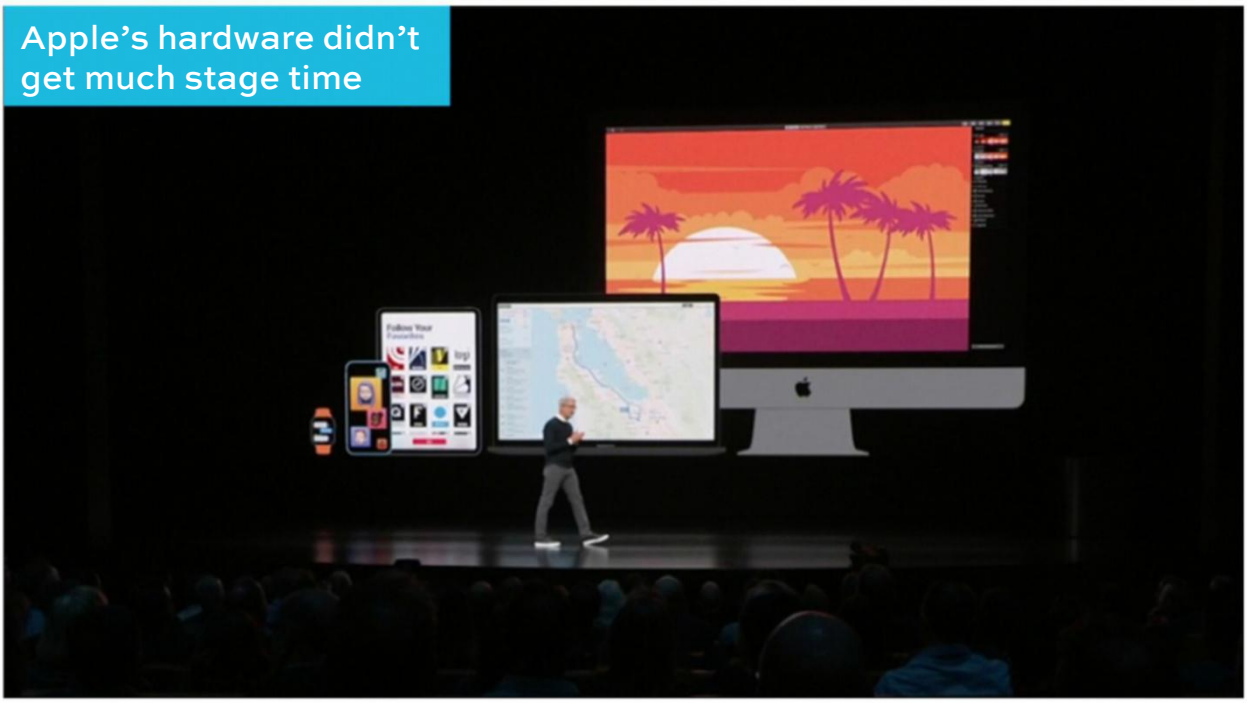
quick scan of the titles available reveals that the majority of them haven't been formatted to take advantage of the Apple News Format, so you're basically getting PDFs. As far as the other services Apple announced, you're going to have to wait:

Apple TV Channels: May
Apple TV+: Autumn
Apple Arcade: Autumn
Apple Card: Summer

So what was the point of holding an event in March when most of the announcements are months away from release? To start a major transition. Apple's event felt underwhelming and confusing because it's a dramatic new direction for the company. Selling pretty hardware is easy, but getting people to subscribe to a service each month requires a different kind of commitment and focus. Just like the Mac's Intel transition long ago, or the iPhone and iPod transitions, investors, fans, and anyone else who follows Apple is going to need time to adjust to what is a massive policy shift for the company.

Services with a smile

It didn't take long to realize that the Apple event was very different than its usual spring keynote. Right off the bat, Tim Cook told the audience that the show would be "different", focusing solely on Apple services, a term he defined as "the action of helping or doing work for someone".



Apple's hardware didn't get much stage time

But more importantly they make money. Potentially lots of money. While Apple has gradually been growing the Services section of its balance sheet with iCloud, Apple Music, and the cut it takes from developers through the App Store, it's only scratched the surface of what it can become with the right mix of content, delivery, and experience.

But it remains to be seen if Apple can bring all that. While the event was heavy on pomp and circumstance, it was remarkably light on specifics, and the list of things we don't know is a lot longer than what we do. Most notably, we have no idea what these upcoming services will cost. But those details will come. For now, Apple is content to tease us with big names and let the industry know that it's no longer happy with its 30 percent revenue cut. It wants it all.

Time for a new shift

Apple is no stranger to transition. There was the move from Macs into handheld devices like the iPod, iPhone, and Macs. The switch from OS 9 to OS X. And the biggest of all, the Intel transition.

It doesn't seem like much now, but the move from PowerPC to x86 processors was a huge deal for Apple. At the time of its announcement in June 2003, Macs were still Apple's primary product, and the transition meant apps had to be rewritten or run in a virtual environment called Rosetta. Older Macs suddenly had a definite expiration date, and a whole cottage industry of FireWire accessories was thrown into doubt. In short, everything was changing.

While it took six months for the first Mac to ship, however, the whole transition was complete in a year. And users barely noticed. Rosetta was fast and versatile enough to keep up with PowerPC apps. All of the same ports were available. And Macs were faster than ever. What we didn't realize was that the Intel transition was the first step in a larger shift away from the Mac, a move that would take another decade to fully materialize.

The services transition is likely to be just as long. Even if everything Apple promised is indeed delivered by the end of the year, its new services are a tougher sell than a new processor or device. With the Intel transition, Apple simply had to convince people that new Macs were just as good as before. But with Apple TV+, Apple Card, and Apple Arcade, the company

When Apple TV+ arrives in the wall you won't need an Apple device to watch it

is asking its customers to fundamentally change the way they use their devices.

Streaming with the enemy

While Apple isn't necessarily moving away from hardware, it's recognizing that the way people use their iPhones and iPads are changing. And it's getting ahead of the inevitable transition away from devices into screens, no matter who makes them. Apple may still sell tens of million of iPhones each quarter for the foreseeable future, but the reality is that fewer people are buying them less often than they once did.

That trend is only going to continue. Apple's solution is to sell services that both supplement

and augment its devices and give them value over longer periods of time. But it's also about expanding the Apple brand. Most telling about the new shift is that its new Apple TV channels and TV+ service will work on devices that aren't made in Cupertino. I'm willing to bet that Android phones are next. It started with Apple Music and Android. What seemed like a small recompense to existing Beats Music subscribers has given way to a larger strategy that brings the Apple brand to a wide variety of devices. Apple Music works on Android Auto, and support was recently added for Chromebook. It even works on Echo devices.

By expanding to smart TVs and Roku devices, Apple is splitting itself into two parts: the hardware seller and the services purveyor. Apple wants to eventually become as ubiquitous in services as both Netflix and Google. As we've seen with other transitions, things will get lost along the way. Namely, Apple's identity as a hardware maker.

A brand apart

A new identity doesn't necessarily have to be a bad thing, but it all depends on how Apple handles it. Selling a video service or a credit card is very different than selling a shiny piece of hardware, especially since there are established big-name players that control the game.

Apple has a knack for entering a new industry and turning it on its head, but the event didn't exactly instil me with confidence. Sure there was a lot of firepower, but big names don't equal

success. The product needs to be worth buying, and when all is said and done, we don't really know if it is. The truth is, we just don't know if Apple can be successful studio. Apple may have a built-in audience of billions of eyeballs, but that doesn't mean they're willing to spend another $10 (£tbc) per month.

But if one thing is clear, it's that Apple isn't worried about selling anything just yet. Like Apple's other transitions, the point of the Show Time event was to start the ball rolling and send a message that things are changing. It's just going to take a long time to get there.

Help Desk

Glenn Fleishman answers your most vexing Mac problems

What you can do with an internal SSD module from a vintage Mac

In 2010, Apple started to release Macs with solid-state drives (SSDs) that used a socket and – with varying amounts of effort – could be removed and upgraded by the owner or by an Apple or third-party technician. But starting in 2016, nearly every

Mac released has the SSD soldered directly to the motherboard. The iMac is a notable exception, but see the note at the end of this answer.

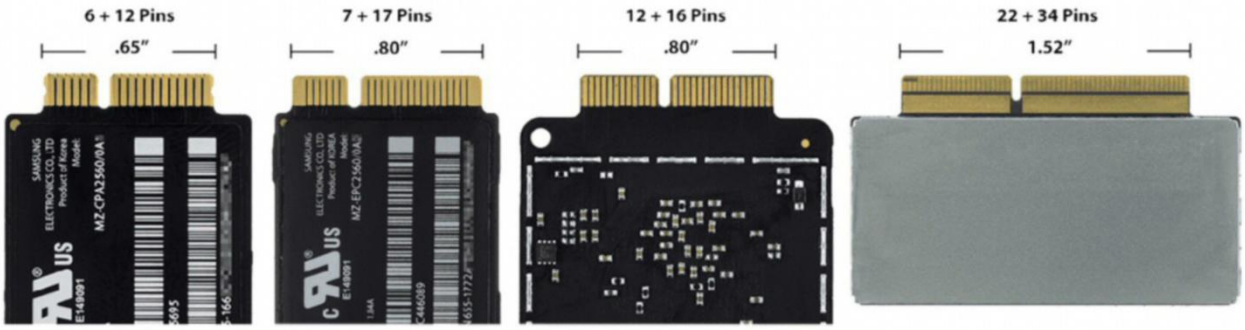
If you have a Mac of the proper vintage, it can be from vanishingly easy to exceedingly difficult to get the 'blade'-style SSD out of the Mac and replace it with a higher-capacity model. These blades plug into a slot, something like RAM but with a narrower connector. Apple developed multiple, proprietary connectors across its use of blade SSDs. In my wife's recently purchased 2014 MacBook Pro, nothing is easily serviceable except for the SSD, which is a cinch to access, remove, and replace.

But what to do with the SSD you removed? If it's 256GB or greater, it seems a shame to waste it, and it's hard to sell lower-capacity drives to a Mac user with a compatible computer, as most people who want an SSD are upgrading from a lower capacity already.

Put it in an external case

You could purchase an external case from OWC, which offers USB 3 enclosures compatible with Apple drives. Make sure and figure out the right model to buy based on the particular type of SSD blade that came out of your Mac. The Envoy Pro (**fave.co/2UqEnNJ**) is the most likely match, as it supports drives shipped with Macs from 2013 to present. But there are three other Envoy and Envoy Pro models for earlier generations of Mac and drive.

The price may be a snag. At £79, the Envoy Pro for 2013 and later blade SSDs makes little sense for



Apple has used a variety of blade-style SSD connectors

up to a 500GB drive, as you can purchase a 500GB SSD in a USB 3.0 or 3.1 external enclosure new for about £80. For a 1TB drive, it makes much more sense, but it's unlikely many of you are upgrading from 1TB to 2TB, and the 1TB blade SSD has a lot more resale value to owners of compatible models.

For somewhat older Macs, the OWC enclosure can be just £50, making it a more cost-effective arrangement for a 500GB drive, but likely not for lower capacities. (OWC's enclosures make much more financial sense as part of their kit upgrade bundles that come with a higher-capacity SSD.)

You should also run the SSD through DriveDx (**fave.co/2WEJ7NO**), which will give you a sense of the remaining lifespan: SSDs eventually wear out, and it doesn't make sense to buy an enclosure if the drive doesn't have much time left on it.

A note on iMacs

If you own a more recent iMac, you may be tempted to upgrade its SSD. I'd suggest you carefully review the iFixIt guide first (**fave.co/2UArkcI**). I recently

was at a repair shop and talked to a technician who had just disassembled and reassembled a modern iMac. They told me they'd hoped to never do so again: the risk of damaging the computer was so huge due to fragile cables and the process of separating the display that it was hard to take in such jobs. If Apple takes an iMac in for repair and hits a snag that makes it unusable, they can simply swap in a new computer for you from their stock. Not so for third parties – or you.

Can you replace a fan in Apple's AirPort Extreme?

A mysterious whirring and grinding noise from his late-model AirPort Extreme Base Station disturbed one reader. Why would it make such a sound? He hadn't turned it on for a year, but was about to reactivate it with a new broadband connection.

My reply: the polite verbal equivalent of a shrug, because – I wrote – there's no fan in an AirPort Express, and only a Time Capsule has a hard drive. Time Capsule drives certainly fail, like any spinning storage media, but the grinding described would surely have meant the drive was on its way to failure, if not already destroyed.

But your faithful Help Desk columnist failed to do his research. I own a newer AirPort Extreme – one of the 'crackerbox' models that looks like a gleaming white micro-tower. It's never made a peep. I even thought I'd even looked at pictures of the insides of this version from Apple's now-discontinued series of routers.

My correspondent was persistent, though, and he sent me a recording of the AirPort Extreme making a loud and ugly noise. And sure enough, when I dug into iFixIt to see their disassembly of the model, there's a fan. Apparently, in my setup, the base station has never heated up enough to activate the fan or it's remained whisper silent despite a lack of, ahem, dusting on my part.

The fix

Replacing the fan is somewhat elaborate, and an Apple-branded or -certified fan replacement part isn't available directly from suppliers. But it can be done. Compatible fans can be found on Amazon and eBay.

There's one potential for people who purchased an AirPort Extreme at just the right moment, however. If you bought an AirPort Extreme and then within two years purchase a Mac of any model and bought the AppleCare extended warranty from Apple (**fave.co/2IciCdO**), you gain up to five years of warranty coverage for your Wi-Fi base station (two years, then a Mac purchase, then three years). It's worth checking your purchase dates to see if you qualify.

What to do when the Mac App Store won't assign applications to your account

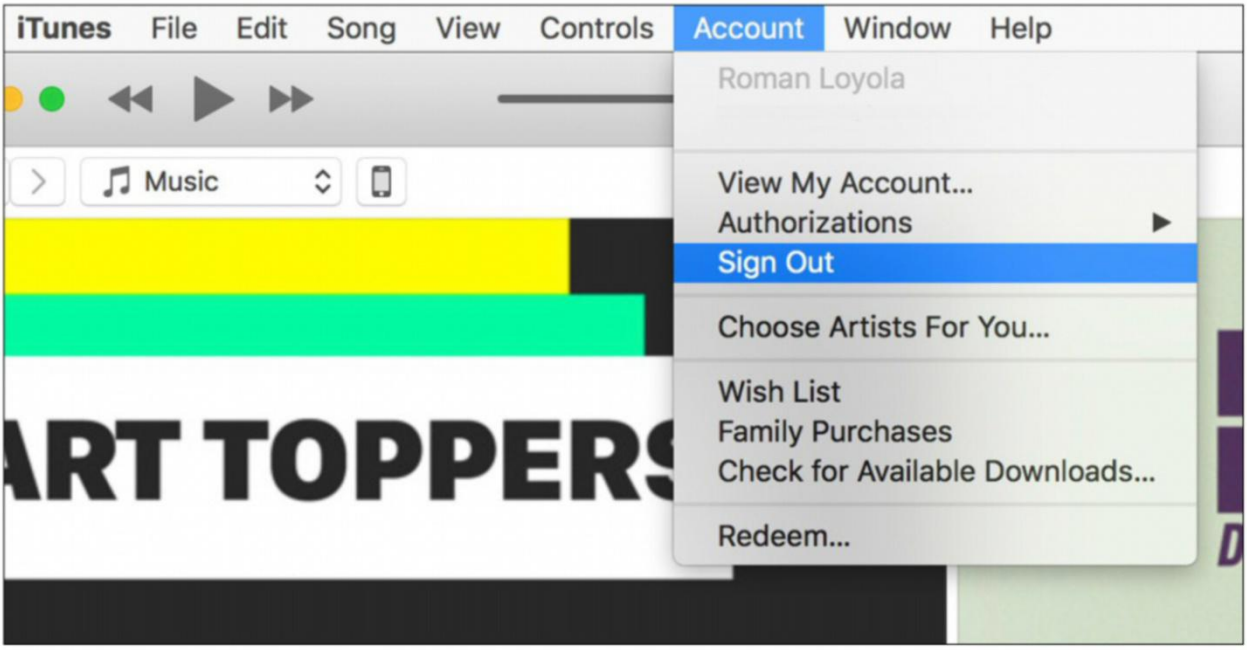
The Mac App Store sometimes throws out odd errors when you try to download and install software, errors that lack information on Apple's support pages. These seem to come up most often with Apple's own software, especially GarageBand, iMovie, Keynote, Numbers, and Pages, which require an Apple ID, but no prior purchase.

Here are four ways that may resolve the problem and let you download the apps you're attempting to.

- Sign out of your iTunes account (Account > Sign Out) and then sign back in.
- Sign out, quit or restart your Mac, then sign back in.
- Update your iTunes payment method in Account > View My Account.
- Contact Apple directly (**fave.co/2Icf23j**), and a support person may provide you with a download code to redeem, according to some forum posters.

A number of people report that despite having no payment errors they were able to clear the error by confirming their payment method (usually by re-entering information), updating it, or changing it. Others discovered that Apple had been unable to charge their listed payment method, but they hadn't received a notification about it. Clearing up that charge solved the download issues as well.

What you get when you export Calendar and Reminders in macOS, and how to use those files



The Calendar and Reminders apps in macOS let you create backups through an export option. In Calendar, you can select File > Export > Export or Export > Calendar Archive. Reminders lets you select File > Export. The exported files can used for recovery or imported into other apps and systems.

What's the difference between these options, and why select one over another? All the options produce some variation on an ICS file, a standard calendar format supported by Apple, Google, and Microsoft, among others.

- The export in Reminders produces a single ICS file that contains all to-do items you've ever set and never deleted when complete, as well as all active items.
- Select a particular calendar in the Calendar's left sidebar and then choose File > Export > Export

and an ICS file containing all that calendar's associated events will be exported, past and future. This file doesn't include reminders that are associated with that calendar, however.

- Select File > Export > Calendar Archive, and the Calendar app produces an ICBU file. This is a macOS package (a folder that acts like a file) that contains the entire structure of all calendars and their events as well as all reminders, all in ICS format. Apple highlights that by naming the export 'Calendars and Reminders', plus the current date and time.

Because the underlying calendar and reminders files get backed up by Time Machine and drive cloning (if not third-party cloud backup software, which can vary), there's typically no good reason in modern times to back up the data. But it's a useful interchange format if you're changing calendar software (from Apple to Microsoft) or setting up a new system in some very clean way in which you don't want to sync from an old account.

4 ways Apple could return the MacBook to glory

Since Apple is apparently updating everything recently, I want a new MacBook next. **Michael Simon** reports

Following Apple's iPad Air and iPad mini announcements, it updated the entire iMac line with faster chips, better graphics, and more memory.

That makes the £1,749 iMac one of the best buys in the Apple Store. Not only do you get a glorious 5K display, you also get a 3GHz 6-core 8th-generation Intel Core i5 processor, Radeon Pro 570X with 4GB of GDDR5 memory, and 8GB

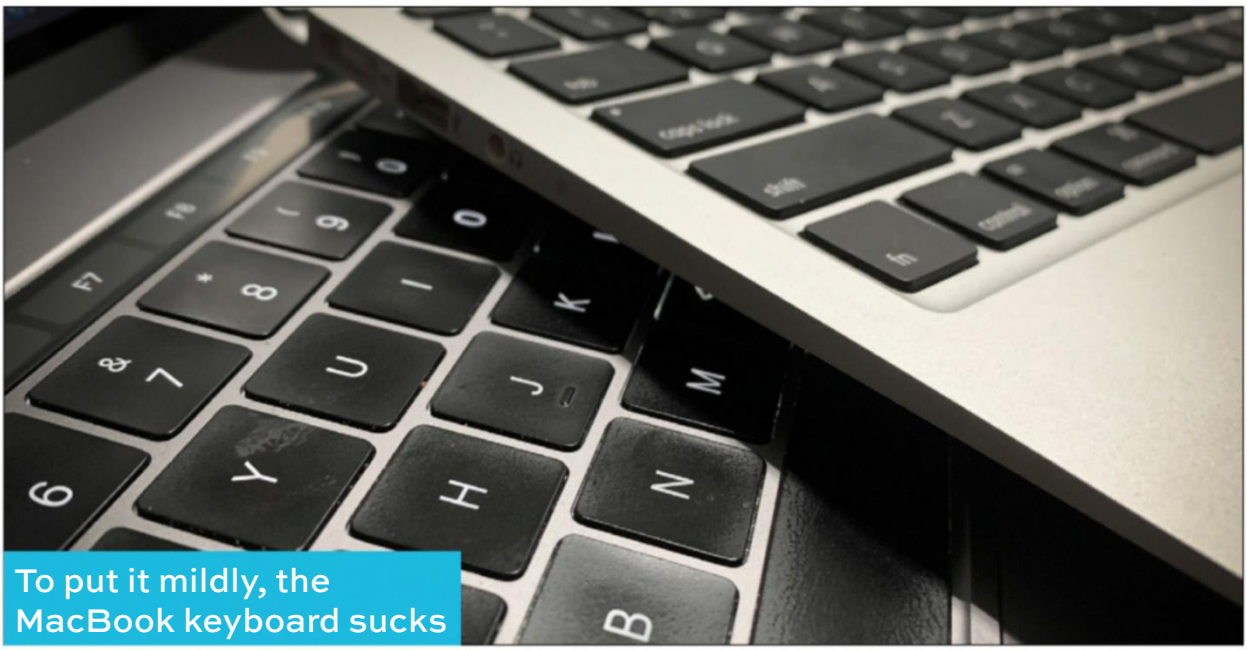
2,666MHz DDR4 memory. That's a beast of a machine, and with upgrade options that go all the way up to a 3.6GHz 8-core 9th-generation Intel Core i9 processor and a Radeon Pro Vega 48, it even gives the iMac Pro a run for its money.

But the sweet spot is the new £1,449 model, which comes with a 6-core 3GHz Intel Core i5, 8GB of 2,666MHz DDR4 memory, Radeon Pro 560X graphics, and a 1TB Fusion Drive. And I want that in a laptop. Now. As sexy as the iMac is, I haven't bought a desktop computer in years, so whenever Apple refreshes its iMac line it gets me excited about the next round of laptops, in this case, the where-does-it-fit MacBook.

Apple's MacBook currently has the smallest screen of any Mac laptop but costs more than the newer MacBook Air. It only has a single USB-C port. And it's running an extremely old processor. Yet, whenever I see that it has gone on sale for around a thousand pounds (which is basically becoming a weekly occurrence), I always want to buy one. But even for £200 to £300 off, it's hard to justify what is essentially a two-year-old machine. However, with a few changes, Apple could turn the MacBook into the £1,449 iMac, a perfect combination of price and features for people who want more than an entry-level machine but aren't quite pros.

1. A better keyboard

This is the big change everyone wants: a new laptop keyboard that dumps the butterfly mechanism for something new. I wouldn't mind a system like the



To put it mildly, the MacBook keyboard sucks

one inside the Magic Keyboard or even a return to the 'chiclet' keys of the old MacBook Air, but something has to give. The MacBook keyboard – even the newer one with the silicone membrane – has been the subject of countless tweets and posts, with users railing against noise, travel, dust, dirt, and numerous other issues. The bottom line is it just doesn't feel right.

I'd love to see Apple experiment with a new keyboard on the MacBook before it comes to the Pro or the Air. After all, it was the original MacBook that introduced the butterfly keyboard, so what better way is there to usher in a new one?

2. A custom processor

There have been rumours for years that Apple is working on a custom processor for its Macs, and the MacBook is the perfect machine for it. The

MacBook currently has a seventh-generation Core m3 processor upgradeable to a 1.4GHz dual-core seventh-gen Core i7, neither of which are going to win any speed awards. Any 2019 Intel update Apple would offer likely wouldn't mean all that much to day-to-day use, which is probably why it hasn't bothered.

But a custom processor would inject excitement into the MacBook. We already know how powerful Apple's A12X chip is in the new iPad Pro, and it would surely be just as capable in the MacBook, a machine that isn't meant to be used for processor-intensive tasks like video rendering. With its own silicon, Apple wouldn't need to rely on old processor or charge outrageous amounts for newer ones.

3. Face ID

Apple has yet to bring its new secure unlocking biometric to one product where it makes the most sense: the MacBook. On the iPad and iPhone, the camera isn't always in the best spot for scanning your face, but on the MacBook, Face ID would be perfect. As soon as you open your laptop, you face is front and centre, and it would dramatically cut down on keyboard and Touch ID use. From unlocking to Apple Pay purchases, Face ID on the MacBook would be game changing for convenience and security.

4. An iPad Pro-inspired design

The MacBook may be one of the best-looking laptops on the market, but it's getting a little long in

I want the iPad Pro design in my MacBook please

the tooth. The wedge design isn't all that impressive anymore, and besides, that's more of a MacBook Air thing. So, I'd like to see Apple take the iPad Pro design and build a laptop.

The iPad Pro's flat design would look great in a laptop, as would its uniform, ultra-slim bezels and rounded display corners. And I wouldn't say no to a 2,732x2,048 12.9in Liquid Retina screen either. Bending issues aside, the iPad Pro is one of the best products Apple has ever made, with a simple, understated design and industrial good looks, and I'd love to see it make its way to the MacBook.