

Best virtual machine software for Mac

Our expert buying guide rounds up the best virtualisation and virtual machine software packages to help you run Windows apps and games on your Mac.

By Cliff Joseph | 30 May 18



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There are plenty of options available for people who need to run Windows software or games on their Macs. In this article we look at the best virtual machine and virtualisation software packages for the Mac.

Apple likes to do things its own way, and often annoys even its most loyal customers by doing daft things - like ditching the traditional headphone socket when it launched the iPhone 7.

But even Apple recognises that we live in a world - and particularly the corporate, business world - that is dominated by PCs running Microsoft Windows. And, unfortunately, there are a number of important programs and apps used in many industries that will only run on Windows.

The Windows version of Microsoft Office includes the Access database that has never been available for the Mac, and there are many professional graphics and video tools that are Windows-only. And, of course, there are all those A-List games that have never even glanced in the direction of us poor, forgotten Mac gamers.

But, thankfully, there are ways of running Windows on your Mac that will provide access to Access, so to speak, along with all those other professional software tools and terrific Windows games (just remember that most of these solutions do still require you to buy a full, licensed copy of Windows).

Apple's solution to the Windows-compatibility conundrum is Boot Camp, which you can use by launching the Boot Camp Assistant app, located in the Utilities folder within your main Applications folder.

The Boot Camp Assistant sets aside a chunk of your Mac's internal hard drive (or solid-state drive) so that you can install Windows on the drive alongside the macOS itself. When you turn on your Mac you can then choose whether you want the Mac to start up - or 'boot' - with the normal macOS, or to boot into Windows instead - a process known as 'dual-booting'.

Boot Camp will allow you to run Windows and Windows apps at full speed, using all the processor power and memory that are built into your Mac. That's the best solution for running games or professional graphics apps that need a lot of power.

The disadvantage of Boot Camp is that you lose access to the Mac side of things while Windows is running. So if you use Apple Mail for your emails, and your collection of selfies is stored in Photos, then you'll have to shut down Windows and reboot the Mac into the macOS again in order to use those programs once more.

But, of course, switching back to the macOS means that you lose your Windows apps again, and constantly switching between macOS and Windows can quickly become a real chore if you have to do it several times a day.

What is Virtualisation?

But there's another option available, called 'virtualisation', that allows you to run Windows, and Windows apps, from right within the macOS itself. In effect, this means that you're running both operating systems at the same time, and can run your Windows apps on the Mac desktop right alongside all your normal Mac apps.

Programs such as Parallels Desktop, VMWare Fusion, and VirtualBox allow you to create a 'virtual machine' (VM), that runs on your Mac just like any other Mac app. The virtual machine uses software to mimic the workings of a conventional PC - which is possible as Macs use the same Intel processors as Windows PCs - so that you can install Windows on your virtual machine and then install your Windows apps on the virtual machine too.

The virtual machine runs in its own window on the Mac desktop, and can then run your Windows apps on screen at the same time as conventional 'native' Mac apps, such as Apple Mail and Safari.

The ability to run native Mac apps and virtualised Windows apps at the same time is a lot more convenient than dual-booting with Boot Camp, as you no longer have to switch back and forth between the macOS and Windows. However, virtualisation does have some drawbacks.

Your virtual machine is running a full version of the Windows operating system on top of the main macOS on your Mac, so your Mac is going to need plenty of memory and processor power in order to provide decent performance for the virtual machine.

Multi-processor Macs with at least two cores are better for running virtual machines - and quad-cores or more are best, as you can devote one or more processor cores to give all their power to running Windows. It will also help if you can devote 4GB of memory or more to each virtual machine (some people like to run multiple virtual machines with different versions of Windows, which really needs stacks of memory and processor power).

Even then, your virtual machine won't be as fast as an actual physical PC that has its own built-in processor and memory, which means that Boot Camp is still the best option for running high-end graphics software on Windows, or the latest 3D games.

However, most Macs released in the last few years can still use virtualisation to run many business and productivity apps that don't need high-end graphics horsepower, such as Microsoft Office, and the specialised apps and databases that many companies develop for their own internal use.

1. Parallels Desktop 13



- **RRP:** From \$79.99 per year (Standard Edition), \$99.99 per year (Business/Pro Editions)
- **Buy** from Parallels

The latest version of Parallels Desktop provides good performance, and slick integration between the macOS and Windows VMs.

Parallels Desktop has emerged as the clear leader in the Mac virtualisation market in recent years, thanks to its annual cycle of regular updates and new features.

Like VMWare Fusion and VirtualBox, Parallels Desktop allows you to create a 'virtual machine' (VM) that runs Windows within the macOS itself, and you can either run the VM within a window on the Mac desktop, or devote the entire screen to Windows if you prefer (while still using Cmd-Tab to quickly switch back to your Mac apps when you want to).

There's also an option to hide the Windows desktop on your virtual machine, so that Windows apps - such as the Edge web browser - can run right on the Mac desktop, just like ordinary Mac apps.

The latest update to Parallels Desktop even allows you to shrink Windows down into a small thumbnail preview, so that you can just keep an eye on the VM running in a corner of the screen while you carry on working in other Mac apps.

As well as installing Windows on your VMs, you can also run various versions of Linux, and even create VMs that run the macOS as well - perhaps so that you can check out the beta version of a new macOS release, such as the High Sierra beta that was released last summer.

You'll need to supply your own copy of Windows in order to create your new virtual machine, but Parallels helps out by allowing you to buy Windows from within the app itself, or to download various free versions of Linux.

And, if you're already using Boot Camp to dual-boot between Windows and macOS, then you can also create a VM that acts like a copy of your Boot Camp drive. That allows you to quickly run Windows apps from your Boot Camp installation within the macOS, without having to completely shut down the Mac in order switch over to Boot Camp.

Performance when running Windows VMs is very good, as Parallels has been fine-tuning the program for many years now. It's not quite at the point where you can use it for playing the latest 3D Windows games - so BootCamp is still the best option for frustrated Mac gamers - but most recent Macs will be able to run the Windows version of Microsoft Office and other business productivity apps perfectly well.

The regular updates to Parallels Desktop allow it to keep up with new features that appear on the Mac, and also on Windows, and ensure that the two operating systems can work smoothly together.

For instance, Parallels Desktop 13 allows your Windows VMs to use the Touch Bar on the latest MacBook Pro models to control Windows programs, such as the Windows version of Microsoft Office. The Touch Bar can even display items from the Windows Task Bar, such as Cortana or the Windows File Browser. This latest update also includes Parallels Toolbox - a collection of handy utilities that runs on both your Mac and your Windows VM.

Parallels Desktop 13 is actually available in three different editions. The standard edition is aimed at home users and students who simply need to run a few Windows apps every now and then, and costs £70/USD\$79.99 for a single-user licence. There's also a Pro edition for developers and more advanced users, which can create really powerful VMs using multiple processors on high-end machines such as the new iMac Pro.

The third option is the Business Edition, which provides additional admin and management tools for corporate IT departments. But, like a lot of business software these days, the Pro and Business Editions of Parallels Desktop require an annual subscription, costing £80/\$99.99 every year.

2. VMWare Fusion 10

- **RRP:** \$79.99 (Fusion 10); \$159.99 (Fusion 10 Pro)
- **Buy** from VMware

After a couple of quiet years, the latest version of Fusion brings it right up to date once more.

For many years, VMware's Fusion and Parallels Desktop slugged it out for top-honours in the Mac virtualisation market, competing with regular updates that provided two impressive rival choices for Mac users who needed to run Windows apps on their Macs. In recent years, though, Fusion has taken a bit of a back seat, as VMware has seemed to focus more on its corporate software offerings for big business. However, Fusion was updated recently and the current version 10 release brings it right up to date with the latest developments for both Mac and Windows.

The two programs take the same basic approach and, like Parallels Desktop, VMware Fusion allows you to create a 'virtual machine' (VM) that uses software to simulate the hardware of a conventional Windows PC.

The virtual machine runs on your Mac, just like any other Mac app, and allows you to install your copy of Windows - which you do have to provide yourself - and any other Windows programs and apps that you want to use. The virtual machine can then run alongside your normal Mac apps, such as Apple Mail and Safari, allowing you to run Windows and Mac apps on the Mac desktop at the same time.

You can run your virtual machine in a window on the desktop, or expand Windows to full-screen mode if you prefer (while still leaving your Mac apps open and running in the background). You can also use 'unity' mode to hide the Windows desktop so that individual Windows apps, such as the Windows File Browser, can run right on the Mac desktop as though they were ordinary Mac apps.

Like Parallels Desktop, Fusion allows you to create virtual machines that run the macOS and many versions of Linux, as well as just Windows. Fusion 10 also adds support for new Mac features, such as the Touch Bar on the new MacBook Pro, and its interface got a bit of a clean-up, making it simpler and more straightforward to set up your virtual machines.

And even though VMware's emphasis is on its business customers, Fusion 10 supports DX10 and OpenGL for Windows games, as well as Apple's own Metal graphics technology. Boot Camp is still the better option for games with demanding 3D graphics, but it's good to see that Fusion is still paying attention to this side of things.

There are two versions of Fusion currently available. The standard Fusion 10 will be the best option for most people, costing £71/\$79.99 for a single-user license.

There's also Fusion Pro, which costs a hefty £141/\$159.99, but includes many additional features for larger corporate users, such as the ability to work with VMware's vSphere software for managing virtual servers (and, unlike, the Business edition of Parallels Desktop, there's no annual subscription).

The company also makes a Windows counterpart to Fusion, called Workstation 14, that allows business users to share their virtual machines on both Macs and Windows PCs.

That focus on corporate users might deter some people, but there is a 30-day trial of Fusion that you can download from the VMWare web site, and it's well worth checking out the latest version of Fusion to see how it compares with its rivals.

3. Apple Boot Camp

- **RRP:** Free; preinstalled on macOS

Using 'dual-boot' rather than virtualisation technology, Boot Camp provides the best performance for Macs that need to run Windows.

It's important to make a distinction between Boot Camp and the 'virtualisation' programs that we look at here, such as Parallels Desktop, VMWare Fusion, and VirtualBox.

Instead of creating a 'virtual machine' that allows you to run Mac and Windows apps together at the same time, Boot Camp is a 'dual-boot' system that simply allows you to 'boot' (start) your Mac using either the native macOS or Windows (but not both at the same time).

When you run the Boot Camp Assistant on your Mac, it divides your Mac's hard disk or solid-state drive into two sections, called 'partitions'. These partitions can vary in size, as required, and you leave the existing macOS on one partition, and then install Windows on the new partition (and you'll have to provide the copy of Windows yourself, of course).

In effect, your Mac can then act as a straightforward Windows PC, and devote all its processor power and memory to running Windows and your Windows apps. And, crucially, if your Mac has a decent graphics card, it can use the full power of the graphics card to help run your Windows software. That's definitely the best option for people who need to run high-end graphics software or 3D games, as you get much better performance than when running Windows in a virtual machine. (Destiny 2, here I come...)

The disadvantage of using Boot Camp this way is that you lose access to all your Mac apps while you're running Windows. If you use Apple Mail for your emails then you'll need to shut down Windows and Boot Camp, and switch back to the macOS every time you want to send or receive an email. And, if truth be told, the current version of BootCamp 6.1 isn't quite as straightforward to set up as it used to be.

Previous versions of Boot Camp did all the work for you - they would partition your hard drive, install Windows from a normal installer disk, and also install any driver software that you needed so that components such as your graphics card, keyboard and mouse all worked properly within Windows.

Boot Camp 6.1 can now only be used to install Windows 7, Windows 8.1 or Windows 10. But not all Macs will work with all three versions of Windows, so before you even start to run the Boot Camp Assistant you'll need to check the compatibility tables on Apple's website to see which version of Windows will work on your Mac.

You can't install Windows from an old installer disk anymore either, so you'll either have to download a disk image file for Windows - called an ISO file - from Microsoft's own web site, or use your Windows disk to create one. BootCamp includes driver software for setting up Windows 8 and Windows 10, but if you're a fan

of Windows 7 (which some people prefer for gaming) then you'll have to hunt around on Apple's web site for the drivers you need and make sure you follow the correct procedure when copying them onto your Boot Camp partition. But, if you persevere with all that, then you will eventually have Windows running at full-speed on your Mac, giving you access to a wide range of Windows software and games that require more power and speed than you can get from using virtual machine technology.

4. VirtualBox 5.2

- **RRP:** Free (personal/education); \$50 per user (Enterprise Edition - minimum 100 users)
- **Buy** from Oracle

This open-source virtualisation program is free for personal use – but more at home in a corporate environment.

VirtualBox is a bit of a mixed bag. Like Parallels Desktop and VMWare Fusion, VirtualBox allows you to create a virtual machine that can run Windows and Windows apps from within the macOS itself. If you want it for personal or educational use then VirtualBox is free - it's actually been made available as an open-source program by Oracle, the big database company that owns the core code.

There are Linux and Windows versions of VirtualBox too, which allows you to use your virtual machines on many different types of computer (although you'll still need to pay for your own Windows license to get started).

The disadvantage of open-source software is that VirtualBox isn't as polished or easy-to-use as Parallels or Fusion. To be fair, the latest version 5.2 update is a bit more straightforward than previous versions, but it still throws a lot of jargon at you and if you don't know the difference between a 'virtual hard disk' and a 'virtual machine disk' then you might find it a bit tricky to get started.

And, as the program is free, you don't get any technical support - although there is a busy user forum where you can ask a few questions when you need to.

To be honest, Oracle is really aiming VirtualBox at large corporations who have a proper IT department to help them out. However, business users do need to pay £40/\$50 for the VirtualBox Enterprise edition, and you may need to commit to buying 100 licences at a time, which pretty much rules it out for all but the largest businesses.

5. Wine 2.0

- **RRP:** Free
- **Buy** from Wine

The third technology option - after Boot Camp and virtualisation - is Wine, which can run Windows apps without Windows itself.

If you don't mind rolling up your sleeves and getting your hands a bit dirty, then Wine is an unusual option for running Windows software on your Mac. Like VirtualBox, Wine is an open-source program that you can download for free. However, it doesn't use virtualisation technology to create a virtual machine for installing Windows - in fact, Wine is the only program in this group that doesn't even require a copy of Windows at all.

Instead, Wine acts as a kind of software middleman that translates the programming routines - called APIs - in Windows apps so that they can talk directly to the macOS, without needing a full copy of Windows itself. And, as you don't need a lot of extra memory or processor power in order to run Windows, you may find that Wine can often provide better performance than using a virtual machine (especially for games and graphics apps). The downside is that Wine can be spectacularly confusing for beginners - to the point that we can only really recommend it to hobbyists who like a bit of a challenge.

CrossOver

There is an alternative, though. A company called CodeWeavers makes a special version of Wine for the Mac, that it calls CrossOver for Mac, which is (a little) more straightforward to use. You have to pay £38 (about \$53) for CrossOver - or £48 (\$68) with extra telephone technical support - but CodeWeavers does a lot of work testing the program to ensure compatibility with a wide range of Windows software.

Admittedly, CrossOver is still fairly complicated to use at first, but there's a 14-day trial version available so that you can try it out and see what sort of performance and compatibility it provides for your main Windows apps and games.

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