December 2021 Update

Cloud Computing

Tricks and Tips

Over 467 Secrets & Hacks

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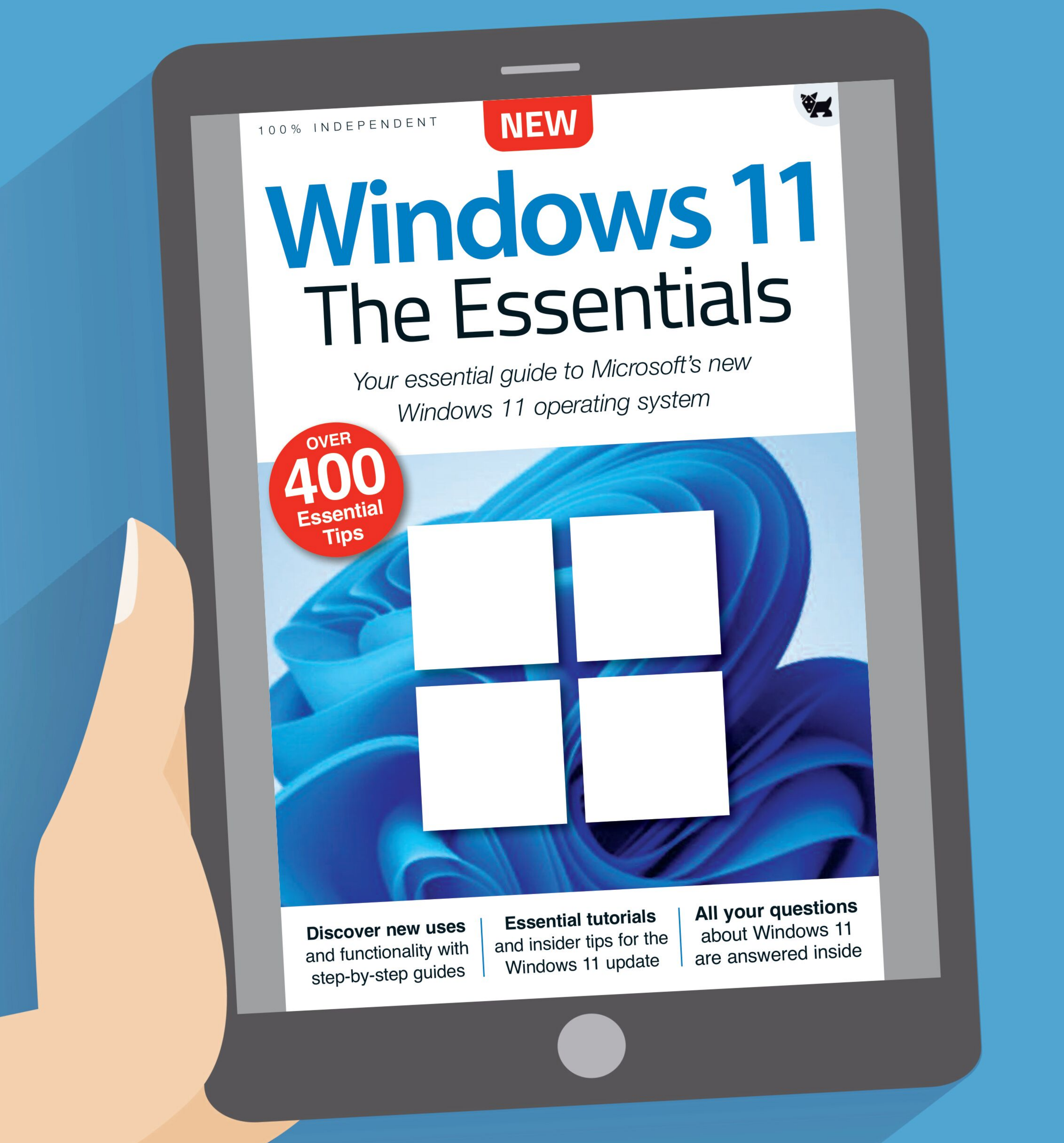


Cloud Computing

Tricks and Tips

Welcome back... Having completed our exclusive For Beginners digital guidebook, we have taught you all you need to master the basics of your new device, software or hobby. Yet that's just the start!

Advancing your skill set is the goal of all users of consumer technology and our team of long term industry experts will help you achieve exactly that. Over this extensive series of titles we will be looking in greater depth at how you make the absolute most from the latest consumer electronics, software, hobbies and trends! We will guide you step-by-step through using all the advanced aspects of the technology that you may have been previously apprehensive at attempting. Let our expert guide help you build your understanding of technology and gain the skills to take you from a confident user to an experienced expert.

Over the page our journey continues, and we will be with you at every stage to advise, inform and ultimately inspire you to go further.

Contents

"In this book you'll discover what the cloud is, how it works, and how it can benefit you can your business. We look at the major players in cloud the storage market, and reveal in-depth analysis of key features. There's guides on how to create your own cloud, how to use Google's Home devices, and tons of information that will get you up to date with the latest in cloud terminology and technology."

Cloud for Business

We've looked at how cloud services benefit and support the home user, but what about your business?

Small to medium business owners are often fighting a losing battle when it comes to implementing technology that works for them, with cost the major reason for lack of technology adoption.

Thankfully, the cloud has a lot to offer the SMB user. It will grow with your business and it can be relatively inexpensive to implement too.

Cloud Services for SMB/SME

As the owner of a small /medium business, cloud technologies are certainly worth considering. They carry the technical impact that an in-house solution can deliver, without the extra cost of administration, space used, or purchasing hardware. But what exactly can you expect from the cloud?

GOOD FOR BUSINESS

Cloud-based tools and services that are best suited for SMB/SMEs are quite varied, depending on the type of business you run. Here then are ten examples of what's on offer.

COMMUNICATIONS

Voice over IP (VoIP), video conferencing, email marketing and social media engagement, are an essential part of the modern business. You're no longer limited to word of mouth within the town in which you operate, with cloud communications services you're a part of the global market.

E-COMMERCE

A web-based storefront is a powerful element of the modern business, but it needs to be flexible enough to work for you and what you're selling. Cloud computing services that cater for e-Commerce solutions are ideal in helping you win more custom and gain ground in an ever-competitive market.

SECURITY

Offering a digitally secure environment for you, your co-workers and your customers is a great benefit when it comes to gaining new business. Tales of companies going under due to a lack of security with their customer database are all too familiar. Cloud services can greatly enhance your security and that of your customers.

CONNECTIVITY

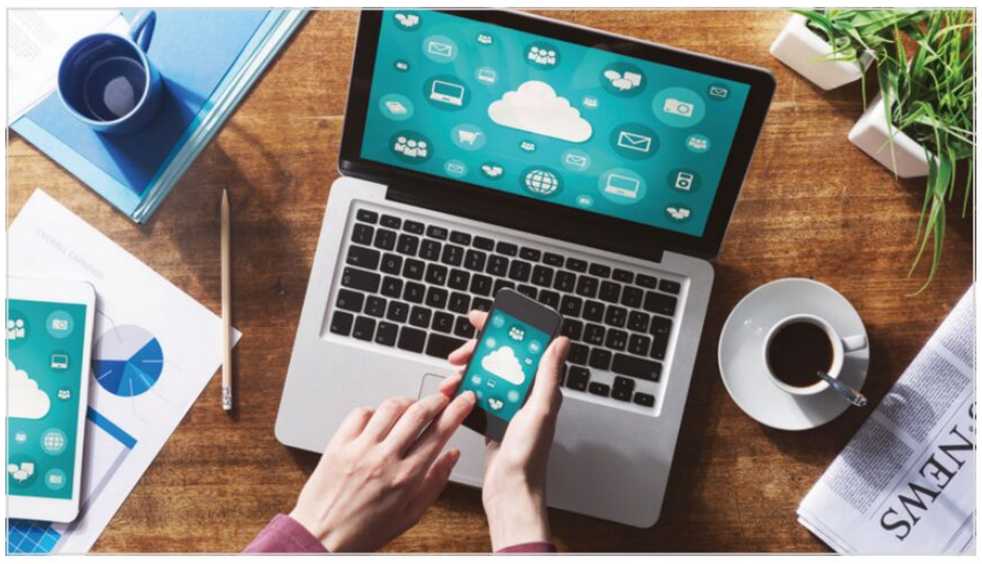
Cloud connectivity tools are far better at allowing remote workers, and customers from around the world, to connect to the services that your business offers. No matter what time, and where in the world a customer or employee is based, they'll be able to access what they need; giving you time to focus on the core business.

FINANCIAL

Small businesses are increasingly turning to a cloud-based accounting and financial solution over the traditional desktop accounting software. Cloud financial services offer secure access to the company's financial records, are cheaper to establish and allow you to access your records from any Internet-connected device.

ONLINE LEARNING

Colleges, training centres and academies can all benefit from the vast range of cloud-based e-Learning services. Whether it's learning a new language, training for work-based qualifications, or creating your own learning content, there are cloud solutions available to create whatever you need.



STORAGE

The biggest draw to using a cloud service is undoubtedly secure and reliable data storage. Many SMBs opt for a complete cloud-storage solution, keeping all their data online to avoid data disasters, and allowing 24/7 access to it. Most, though, tend to lean toward a hybrid solution, where both on-site and cloud storage solutions are at work.

EMAIL

Setting up, building and maintaining your own email server does take a high level of expertise to create and maintain; and that's often quite expensive. Using cloud-based email provision is a cheaper and hassle-free solution that the SMB/SME should really consider adopting.

COLLABORATION

Collaboration in the cloud can have a significant impact on how you and your business work with others. Remote or mobile users can work as if they're in the office, and cross-company projects can be better managed. It's a smarter way of working together, and thanks to cloud technologies, also a lot easier.

HELPDESK

Helpdesk cloud software isn't limited to just the technical side of a company. A good Helpdesk solution can be customised to fit whatever sector your company supplies. What's more, a cloud Helpdesk allows people to contact you from anywhere in the world, widening your customer base.

Team Collaboration Cloud Examples

The ability to work together on a single project, no matter where you are in the world, is what communications technology was originally designed for; consider John McCarthy's concepts from the 50s. Finding the right tool for the right job, though, requires some research.

WORKING TOGETHER

There are countless cloud collaboration services available, which can be quite bewildering. Here are ten proven business solutions to help you fine-tune your choice of provider.

DROPBOX BUSINESS

One of the more popular cloud collaborations services available for businesses is from Dropbox. With companies such as National Geographic, University of Cambridge, AA and more, the service is designed to scale and grow as your collaboration with others does.

HUDDLE

Huddle offers a secure cloud collaboration service for customers such as the Department for Work and Pensions, the NHS, and the U.S. Department of Homeland Security. Files, tasks and team communications are all handled easily and can deliver exceptional results for your business.

CITRIX SHAREFILE

Citrix has a long history of working with collaboration services. The company's newest cloud-based resource is ShareFile, which provides a simple, secure way to collaborate with teams from around the world.

GOOGLE BUSINESS APPS

Aside from offering a complete cloud solution for the home user, Google's apps also cater to the business user. The collaboration tools are the same as what's on offer for free; however, a business can demand more content, space and unique customisations.

OFFICE 365 FOR BUSINESS

The business side of Office 365 offers considerably more than what the home user gets. For a reasonable monthly cost, you get all the usual Office 365 apps, alongside MS Teams, SharePoint, and OneDrive for business; all of which make for an excellent collaboration suite of tools.

BOX

Box prides itself on offering a simple, centralised service where your teams can manage and collaborate on projects more effectively. The workflow is easily managed, and a lot of the setting-up processes are handled automatically.

ASANA

This excellent service gives teams everything they need to stay in sync, hit deadlines and reach their goal. Users can share, collaborate and focus on what's needed to bring together the project or customers. It's a streamlined service that's very visual and comes together really well. There's a ton of features, and the service is continually growing.

YAMMER

Yammer is a part of the Office 365 business suite that focuses on social networking and team collaborations. It's a concise and easy to use service that works seamlessly with Office and fosters great collaborations across the workforce.

TRELLO

Trello is an excellent productivity and collaboration platform. It's designed to help your business increase its workflow with teams from anywhere in the world. It's a reasonably priced, integration app like Evernote, Google Hangouts, Dropbox and more. It's little wonder that the likes of PayPal, Kickstarter, Adobe and Pixar use its services.

MANGOAPPS

Ovum Research has ranked MangoApps as the best mid-market collaboration services in a recent enterprise social networking report. The company's collaboration tools are excellent and cover every aspect of the cloud service to deliver a scalable solution for your business.

Cloud eCommerce Examples

The ability to lower costs, respond quickly to any market opportunity and accelerate sales are why many businesses are turning to cloud-based eCommerce applications. There are countless eCommerce solutions available, so again, some research is needed beforehand.

CLOUD SALES

Businesses need to consider many aspects when it comes to choosing the eCommerce platform that best suits their needs. Out of the many, here are ten excellent examples to investigate.

SHOPIFY

Hailed as one of the best eCommerce cloud services available, Shopify covers pretty much every aspect of sales for your business. It's easy to use, has a vast range of services, and can be customised for your company.

YAHOO AABACO SMALL BUSINESS

Using Yahoo! as an e-Commerce platform may not be every company's first choice. However, Yahoo! Aabaco Small Business is one of the leading e-Commerce services. It offers a stable, secure and scalable platform, as well as best in class SEO and e-shopping integrations.

BIGCOMMERCE

Another of the top names in e-Commerce cloud computing is BigCommerce, a company that prides itself on handling huge volumes and more web traffic. With an average uptime of 99.99%, BigCommerce is an ideal solution for those businesses that can see significant growth in their sector for the future.

VOLUSION

Volusion is another of the big heavyweight names when it comes to e-Commerce and online shopping. With it, you can create your online store quickly and easily, building the e-Commerce front end with numerous themes and all at a reasonable monthly cost.

1SHOPPINGCART

1ShoppingCart is an all-in-one e-Commerce solution offering a range of packages that cover all aspects of getting your online store up and running. There's a high degree of flexibility both for the business and the products your selling, plus it's easy to manage and update.

3DCART

Although not as well-known as some of the other e-Commerce solutions in this list, 3dcart is by no means a minnow in the online shopping ocean. With competitive SMB price plans and plenty of technology available into which the business can grow and expand, 3dcart is an excellent choice.

WIX

Surprisingly Wix, the free website builder, also offers an e-Commerce service. If you're a growing, but still small, business and you want a hassle-free and cheap e-Commerce solution, then Wix may well be worth investigating. While it won't be able to compete with the big e-Commerce names, it's a fantastic resource to consider.

ETSY

Etsy is an interesting addition to this list. It's not as much of a heavyweight e-Commerce platform as most of the companies here, but it can still offer the SMB user exactly what they require. With no monthly fees (just listing, transaction and payment processing fees), and a great selection of tools available, it's an ideal start.

X-CART

X-Cart uses a host of open-source tools to provide an effective e-Commerce platform. The features this company offers are too numerous to list here, but suffice to say it pretty well covers most aspects of your online business. The pricing works from free use, up to several thousand for a lifetime license and top tier support.

PINNACLECART

This is another all-in-one e-Commerce and online shopping solution, very similar to that of 3dcart. With it, you can create some stunning storefronts, and integrate leading business tools into your site. It's easy to use and can expand as your business and customer base grows.

Cloud Accounting Examples

Small business owners no longer need to purchase expensive and time-consuming accounting software, thanks to cloud accounting services. The benefits of accounting in the cloud are well documented: better security, disaster recovery, and accessible data. But what's available for you?

CLOUD FINANCIALS

A typical cloud accounting service offers invoicing, banking, purchasing, expenses, and tax management, with the ability to integrate add-ons such as PayPal.

CLEARBOOKS

ClearBooks is an excellent start when researching cloud accounting for your business. With it, you can create customisable invoices, set automatic payment reminders, and schedule recurring invoices. It's also excellent for keeping up with your tax returns and managing your banking.

ClearBooks
Online accounting to free your time

FRESHBOOKS

According to FreshBooks, you can save 192 hours a year just by using its software. Hailed as one of the easiest to use and implement, cloud accounting services FreshBooks can manage every aspect of your small business accounting needs, together with the ability to integrate numerous apps.

FRESHBOOKS
cloud accounting

XERO

Xero allows online invoicing, a mobile app, stock management, payroll management and bank reconciliation. It can handle multiple currencies, has a significant level of security, and customisable reporting. In short, it's considered one of the best online accounting solutions available.

xero
Beautiful accounting software

QUICKBOOKS

QuickBooks is an excellent choice of cloud accounting services for the small business user. It offers good value for money, is easy to use and covers everything you'll need from financial software, including an easy to use tax return feature.

intuit quickbooks

KASHOO

Kashoo advertises itself as being 'easier than QuickBooks, more powerful than FreshBooks, and more human than Xero'. There are certainly plenty of features available, and it's also good value for money. One worth considering for your SMB needs.

ZOHO BOOKS

This is another interesting, easy to use online accounting platform, specially designed for small business users to help manage their finances. The Zoho Books dashboard is a clean interface, which offers the user quick access to everything they'll need to track and automate their accounting.

KASHFLOW

This London-based cloud accounting service specialises in providing everything the small business user needs from their financial software. It's secure, quick and easy to set up, easy to use, and integrates over 85 eCommerce add-ons. It's also very reasonably priced and provides a wealth of other features.

ONEUP

OneUp is one of the fastest growing online accountancy platforms for small business owners. With advanced automation, a tidy interface, competitive pricing plans and an all-in-one business management services, there's little wonder why over 700,000 users have adopted it.

GO DADDY ONLINE BOOKKEEPING

Formally known as Outright; the acquisition by Go Daddy boosted the company's SMB accounting services, helping smaller companies get the best from an easy to use, cloud-based financial platform. There's plenty on offer here and is certainly worth considering.

SAGE

There can hardly be a list of accounting services without any mention of Sage. The company is a giant in the financial market, and offers everything from individual users, to SMBs, mid-sized businesses and beyond an incredible cloud accounting package.

Data Management Cloud Examples

Data management in the cloud is more than just online storage. A good data management cloud service offers multiple platform access, collaborations, sharing, syncing with devices and operating systems, as well as good value for money and a secure digital environment.

DATA CLOUDS

Cloud storage can greatly improve a business's operation by offering unlimited access to its data, from anywhere and at any time. There are countless services available, so here are ten for your consideration.

DROPBOX

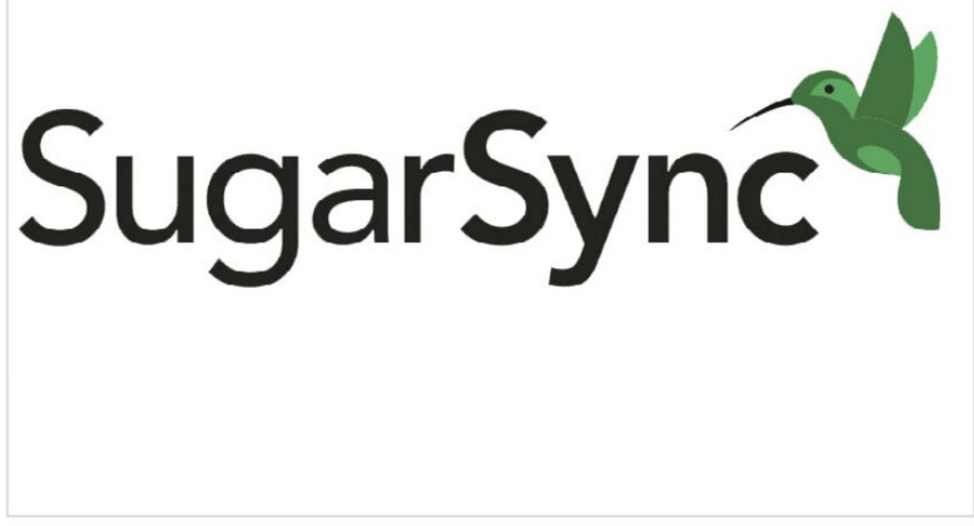
The business side of Dropbox is one of the top, cloud storage choices for the SMB user. It's priced competitively, offers storage, centralised administration and better management of your online documents.

BOX

Box offers the SMB user a great cloud storage platform. Collaboration, file sharing, security, content management and mobility are all catered for using Box's easy to navigate and use interface. You can also integrate popular apps such as Office 365, Google Apps, SalesForce and many more.

SUGARSYNC

SugarSync has been a great value cloud storage provider for many years. The company offers a range of flexible features and solutions for the end-user, along with the usual collaboration, syncing across devices and operating systems, and disaster recovery.



GOOGLE DRIVE

Without a doubt, one of the most used cloud storage solutions available to the business user is from the Internet giant, Google. There's plenty of storage available, up to tens of terabytes, and naturally, you have the backing of one of the biggest companies on the planet.

MICROSOFT ONEDRIVE

Integrating Office 365, its Office Online apps, and the company's server and SharePoint portals, Microsoft's OneDrive is probably one of the first choices of cloud storage for the business user. There are numerous features available, and it's a reasonably priced service too.

CARBONITE

Ideally suited for small business users, Carbonite offers a worry-free cloud data protection service. You can back up your data from a range of devices and computers, even servers, and synchronise mobile data when out and about.

SPIDEROAK

SpiderOak is an interesting cloud storage service, in that it's one of the most secure available. The company uses a No Knowledge feature whereby the company has no knowledge of what's stored in your area, as each user's content is covered with a range of impenetrable cryptographic encryptions.

JUSTCLOUD

JustCloud offers data synchronisation across multiple devices, mobile access, file sharing, and high-level encryption across its data centres. The price plans are reasonable, and for an annual payment, there are additional services to adopt.

ZOOLZ

Zoolz offers the business user a service that utilises artificial intelligence to back up, discover and organise stored data. The company also offers a unique three-layer storage service: Instant, Cold and Local storage, whereby data can be organised into on-demand, rarely used, and hybrid recovery options.

OPENDRIVE

Data management, sharing, online editing, collaboration, and user management are all part of what OpenDrive offers its business customers. There's a lot more on offer too, with competitive price plans for up to 100TB of storage available.

Email Providers for SMBs

Email has become one of the most critical services of the modern business. Customers are won and lost through email, co-workers are better informed and can collaborate, and without email, your company's growth is severely limited.

CLOUDY WITH A CHANCE OF EMAIL

The importance of finding a good cloud-based email provider goes without saying. There are plenty of services to research before choosing, which can be time-consuming. Here's ten to help start you off.

GSUITE

Google's Gmail for business is an obvious first choice for most small business users; there's a good chance you and your workforce already use the personal version. Gmail for business offers 30GB of storage, compatibility with MS Outlook, and a personalised email address for your company.

AMAZON WORKMAIL

Amazon's WorkMail is a good choice for the growing business. It's easy to use and set up, supports existing desktop and mobile email clients, is value for money and uses enterprise-grade security to help protect your inbox contents.

MICROSOFT EXCHANGE ONLINE

The competitively priced Microsoft Exchange Online offers the business user premier, disaster recovery solutions, global server coverage, anti-spam and anti-malware filtering, and a range of plans from which to choose. It's easy to use, familiar with its users, and easy to maintain too.

YAHOO AABACO SMALL BUSINESS

Also called Yahoo! Business Mail, the service offered here for small business users, is certainly worth considering. There are a lot of features available, a management console that's easy to use and understand, and the pricing is reasonable too.

RACKSPACE

Rackspace is an affordable email hosting service for small business users. Outlook, webmail and mobile access are all covered, along with large mailbox storage options, and an easy to set up email migration service. Support is good, and the company even offers several How-To articles to help you out.

ICEWARP

With over 50 million users worldwide, including the likes of Canon, Sony and Marriott, IceWarp is a great email provider with plenty of features to offer. It's an integrated solution for email, document management and communications, with Outlook support and collaboration with other contacts.

GMX

GMX is an interesting, cloud, email service solution. It offers unlimited storage, antivirus protection, a spam filter, the ability to send up to 50MB file attachments, and access via mobile devices. There's a lot more available from GMX, so it's definitely worth checking out.

ATMAIL CLOUD

Atmail Cloud is customisable, simple to manage and use, offers spam and malware protection and filters, is scalable, and can be used as a hybrid solution; meaning it is installed on-premises as well as in the cloud.

KERIO CLOUD MESSAGING

Kerio Cloud Messaging offers spam filtering, drag and drop attachments, custom filters, desktop notifications, a calendar with invite facilities, contacts, tasks and notes, and instant messaging. The price plans are very competitive, with unlimited mailbox storage from as little as $7/£5.60 per month.

IPSWITCH HOSTED IMAIL SERVER

Reliability and ease of use are the key factors for Ipswitch's Hosted IMail Server. This cloud email service has countless benefits on offer for the small business user and is reasonably priced too.

Green Cloud Providers

Although powering a huge datacentre may not appear to be very 'green', the environmental costs of cloud computing have been assessed by Sustainablebrands.com and found to be of benefit to those businesses looking to reduce the impact on the environment.

GOING GREEN

Fewer machines, efficient climate control, reuse of generated heat, and many more environmental benefits can be delivered from cloud computing. Here are ten cloud providers who are 'going green'.

EVRY CLOUD SERVICES

Based across Scandinavia, this cloud hosting company offers many excellent services through its green datacentres. Powered by hydropower and operating in accordance with ISO 14001 Environmental Standard Guidelines, this Nordic datacentre is one of the greenest in the world.

GOOGLE

Google's entire infrastructure is carbon-neutral, which is a pretty impressive feat considering the size and computing power at which the company's datacentre operates. 35-per cent of the energy that Google uses for its datacentres comes from renewable sources, and the company is aiming to improve that further in the future.

NETAPP

Headquartered in California and ranked in the Fortune 500, NetApp was founded in 1992 and is a cloud data services and data management company. It recently purchased the Icelandic cloud data company GreenQloud, and as such inherited GreenQloud's excellent environmental processes. Further to this, NetApp conforms to ISO 14001:2015, is Energy Star recognised, and holds LEEED Certifications for three of its buildings.

MICROSOFT AZURE

Microsoft Azure offers a set of cloud services through the company's managed datacentres. The company's datacentres and cloud platform services are carbon-neutral; using renewable sources for its energy needs. In fact, Microsoft is one of the U.S.' largest green power purchaser.

CLOUDSIGMA

As well as adhering to the highest possible security standards, Swiss cloud service provider CloudSigma is also carbon-neutral across all its datacentres. It was one of the first datacentres to achieve carbon-neutral status and is one of the most power-efficient in Europe, too.

IBM SMARTCLOUD

IBM's SmartCloud datacentres are exceptionally environmentally friendly. Just a few years ago, the European Commission awarded 'Participants in Datacentre Efficiency' to twenty-seven of the company's datacentres. So as well as offering enterprise-level cloud services, the company is also actively lowering its carbon footprint.

APPLE iCLOUD

Suited for home and business users, Apple's iCloud uses renewable energy across its entire business – specifically the iCloud datacentres – as well as greener materials in its manufacturing and building processes. In 2015, 93-per cent of the company's energy use came from renewable sources, and 100-per cent of the datacentre's energy use is clean.

RACKSPACE

As well as offering excellent cloud services, Rackspace also operates its datacentres from 100-per cent renewable sources. The company is also continually looking to reduce its environmental impact further through the use of greener materials.

DEDISERVE

Dediserve is one of the biggest cloud service providers in the world, operating fifteen datacentres from around the world. This Irish company has taken great steps to reduce its environmental impact over the years; ensuring that its power consumption is considerably less than a conventional in-house server setup.

AKAMAI

– Akamai's delivery servers, consisting of thousands spread across 126 countries, is committed to lowering its environmental impact by using renewable fuels. The company has plans to significantly reduce its energy impact by 2020 and lower its carbon emissions to less than 2015 levels.

Public Cloud Benefits

Public clouds are the standard cloud models, whereby a service provider makes its resources available to the public, and multiple clients, over the Internet – hence Public Cloud. Google Drive, Microsoft Office 365, and so on are all examples of a public cloud.

THE PUBLIC CLOUD

So, what are the benefits of using Public cloud computing over traditional setups, private or hybrid clouds? Let's have a look at what the public cloud model has to offer the SMB user.

PAY AS YOU GO

One of the main benefits of the public cloud is that it's decidedly cheaper to set up than dedicated, in-house hardware, software and everything else. Public cloud servers and space is rented, and therefore you'll only pay for what you use. Plus the initial investment is very low, even zero in some examples.

SCALABILITY

As your company grows, so will its need for more data storage, user licenses, and infrastructure. This is the financial impact of using an in-house approach, along with costing time for the technical staff to set up. Using a public cloud offers elasticity and scalability for the SMB user with limited interruption and less cost.

CHEAPER ENERGY COSTS

To expand the Pay as You Go benefit, if you're considering a traditionally installed server, with other hardware, then you'll also need to factor in climate control and upkeep for that server, and possibly its own dedicated server room. The costs soon mount up, whereas using a public cloud cuts out everything associated with locally installed hardware.

SECURITY

Although there are instances of security breaches in public cloud services, they are far less than the documented security breaches when using an in-house setup. Security is handled by the cloud service provider, to some extent covering you from the fallout of a security breach.

MOBILITY

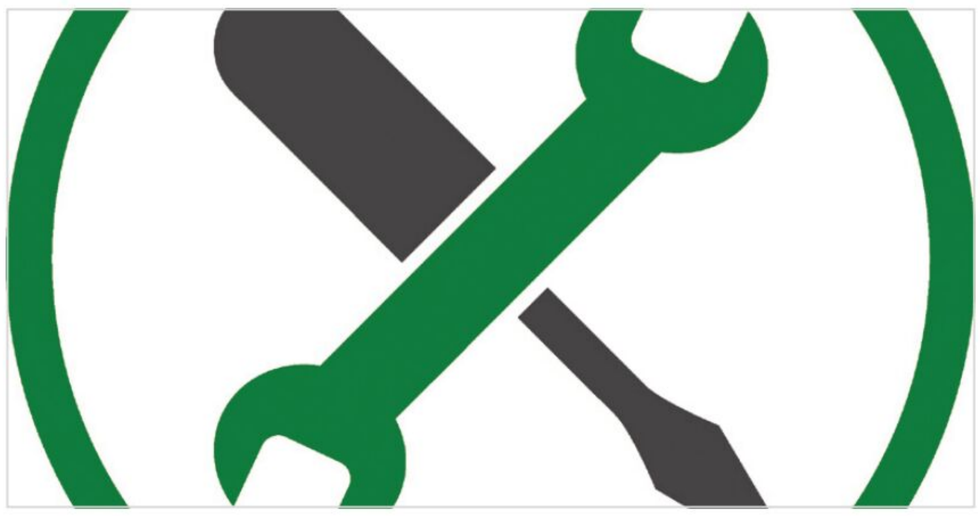
Mobile, home working, collaborations across other companies (and globally), and file sharing are all benefits of using a public cloud setup. As other companies also use a public cloud, the integration is relatively seamless, and as long as you have an Internet connection, you can stay in touch.

EASE OF USE

A public cloud, when compared to other cloud service types and a traditional in-house setup, is relatively easy to set up for your business. You don't necessarily need any significant technical knowledge, and the process is often backed up by 24/7 support from the cloud service provider.

LOW MAINTENANCE

Although you'll still need to maintain your in-house computers and devices, using a public cloud service drastically reduces the high-end levels of maintenance usually associated with running your network. It's not just the maintenance of the servers either, consider the saving in not having to maintain a server room, climate control etc.

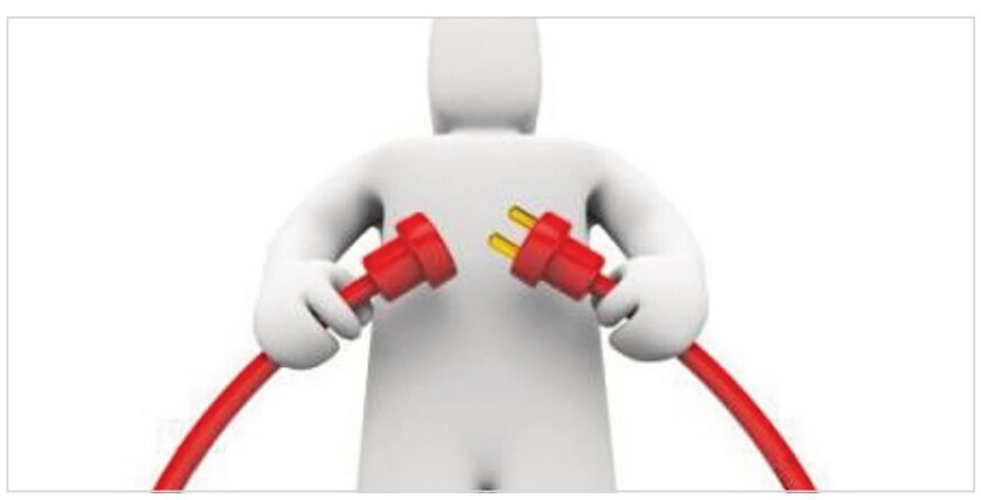


NO CONTRACTS

Public cloud services, by their Pay as You Go nature, are often contract-free. While that won't necessarily impress some business users, others will enjoy the freedom of not having to commit to a long-term contract.

DOWNTIME AND UPGRADES

As you are no doubt aware, upgrading software or hardware within a business can be tricky. Updated software may not work with older versions, hardware may require more expense to implement, and testing times for IT staff can be long and expensive. A public cloud service cuts down on the expense, and time taken during upgrades, keeping downtime low.



PLENTY OF CHOICE

As you are aware by now, there's plenty of choice when it comes to picking a public cloud service provider. You're not limited by geographical location or languages, or by what's available in terms of IT support or skills in your local region.

Private Cloud Benefits

Contrary to public clouds, a private cloud is dedicated to a single organisation offering better control over the cloud setup, better security and privacy, virtualisation, and better resource allocation.

THE PRIVATE CLOUD

While public and private clouds share many benefits, opting for a private cloud can yield better results for a business – depending on what the business wants from its cloud service.

CONTROL

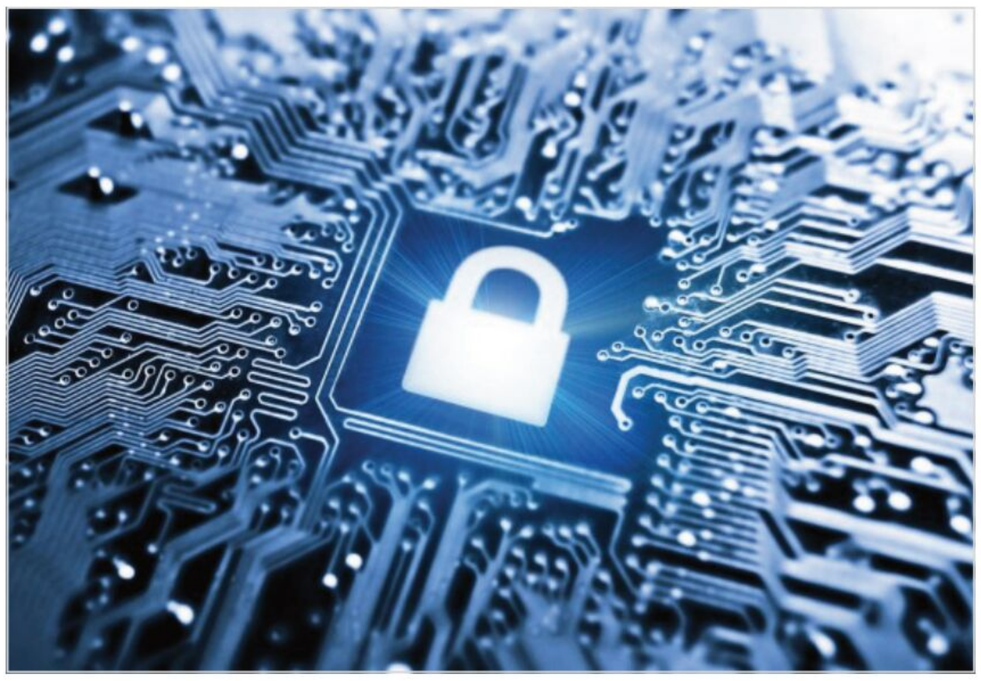
A private cloud setup gives more control to the business over the cloud's servers and configurations. In a private cloud, the servers are dedicated to the business therefore you can tailor it to your own company specifications.

REDUNDANCY

More often than not, a private cloud setup factors in better redundancy than that of a public cloud setup. Disaster recovery solutions are also generally built into the private cloud, allowing you to recover your data quicker, should anything go wrong.

IMPROVED SECURITY

Sensitive data such as banking, medical or other confidential material, requires a higher level of security than that of so-called non-sensitive data. Using a private cloud solution means that your company, and your company alone, has access to your data.



CONTRACTS

On the flip side of no contracts through a public cloud service, a private cloud is a contract between you and the cloud provider. Therefore, should anything go wrong with the service (security, data loss etc.) then, within the legal wording of the contract, you're covered.

CLOUD BURSTING

Cloud Bursting is a term used in private cloud setups. It describes a sudden increase in demand from your business that exceeds your quota on the cloud servers. In these cases, non-sensitive data can be exported to a public cloud setup, freeing up space on your private cloud.

FLEXIBILITY

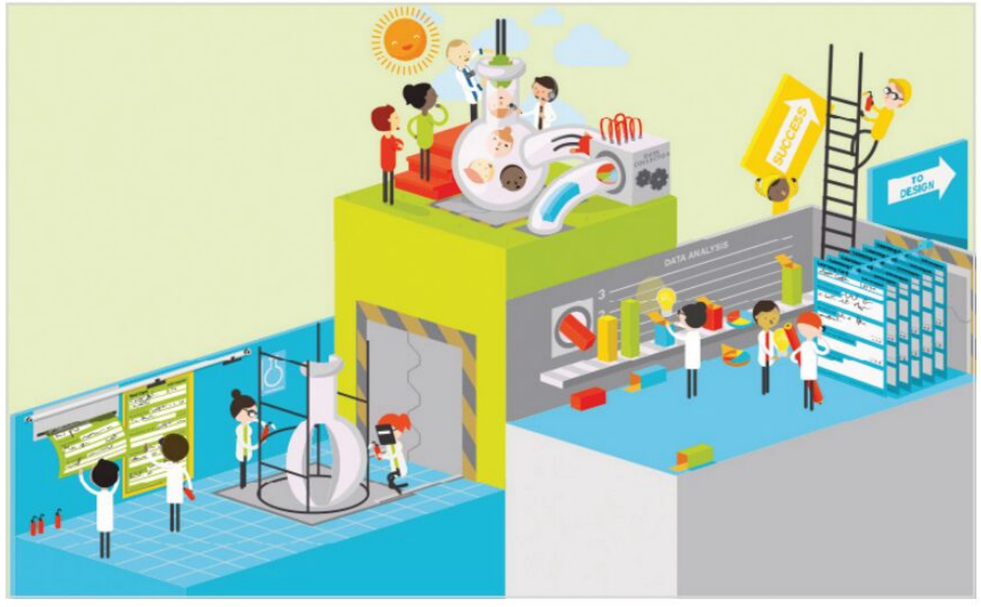
A private cloud isn't as flexible as that of a public cloud. However, if you know what your computing demands are going to be, over a set period, you can configure your private cloud to take that into account; potentially saving money long-term.

PERFORMANCE

As you're using a dedicated server in a private cloud setup - not shared with hundreds of others - you'll see the benefit of improved computing performance. If you deal with big data, AI, or developing your own apps, then private cloud computing will benefit you more.

CUSTOMISATION

In a private cloud setup, you'll be the one who specifies what hardware and software setups you want for your business. You're not limited to what a public cloud offers by default, and you can tweak your needs to suit your business better.

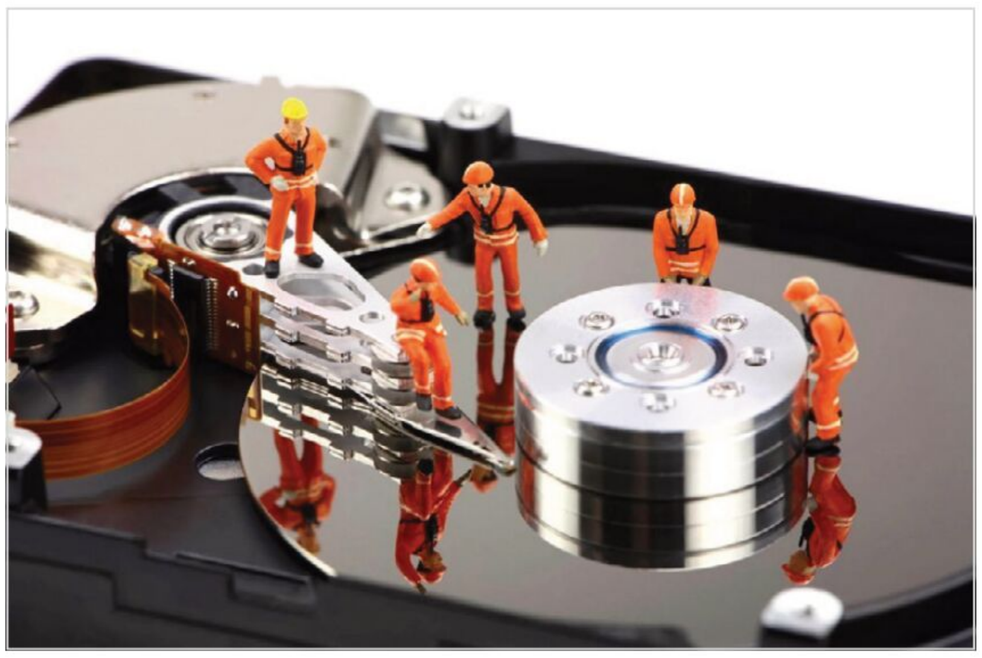


COMPLIANCE

By adopting a private cloud setup, you're able to better comply with business regulations. Whether that's a security compliance, environmental compliance or anything in between, you'll be able to remain compliant with the laws and industry regulations for your business.

EXPERTISE

One of the more important benefits of using a private cloud setup is that your IT is managed in-house. With such a high level of expertise within your business, you'll be able to implement and exercise your company's technology over the competition.



Hybrid Cloud Benefits

A hybrid cloud setup is a best-of-both-worlds approach. You have a mixture of in-house computing with server hardware and software while using both types of cloud-based services. An example is a company with its own server for storage and also using webmail.

THE HYBRID CLOUD

An ideal hybrid cloud setup allows a business to move its workloads between in-house, private and public clouds seamlessly; giving the business a host of extra benefits.

WORKLOAD FLEXIBILITY

Without a doubt, the greatest benefit a hybrid setup offers is the flexibility of an in-house server setup while being able to move into private and public cloud setups. Information, according to its sensitivity, for example, can be arranged between the three models ensuring greater security.

ABSOLUTE CUSTOMISATION

The hybrid cloud approach also ensures that a business has its technology customised to near perfection. Use of in-house and private cloud setups can be personalised to the company as a whole, or, if necessary, for each employee. And pushing information to the public cloud enables ease of access for the workforce.

BIG DATA

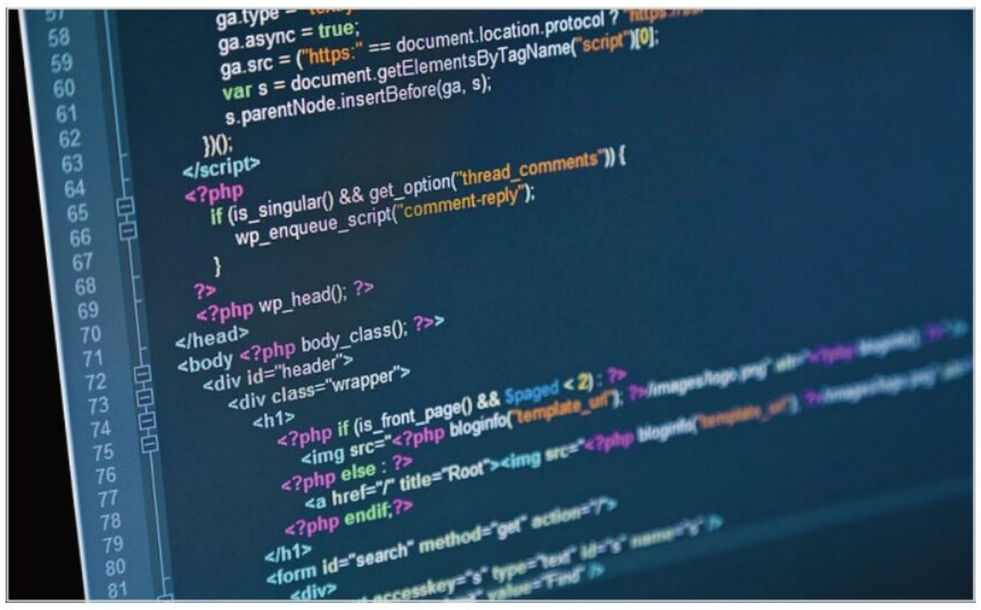
A business that uses Big Data - a term that describes voluminous amounts of data mined for information collectively - can utilise a hybrid cloud approach to store the vast data collection locally, while simultaneously running cloud-based analytics in the cloud.

GREATER SECURITY

The security aspect is improved through the use of in-house and private cloud access. A hybrid cloud setup utilises all the security benefits of every cloud service layer, as well as locked down, on-premises security.

IN-HOUSE DEVELOPMENT

A lot of the time, a hybrid setup calls for a company's unique software and apps development to access all the cloud service layers. This, in turn, can lead to an in-house development team, programming bespoke applications for the company workforce.



EXPANSION AND GROWTH

If a company expands rapidly, a hybrid setup can easily cater to its growing needs and demands; the technology is in place and ready to be utilised. However, that can have a costly negative effect should the company's growth decline.

USE LEGACY HARDWARE

A company using both cloud models, as well as an in-house approach, can make some cost savings by not having to update its hardware as frequently. You can utilise the power of a private cloud, and the storage of a public cloud, while still keeping your legacy hardware in use.

GREATER ACCESSIBILITY

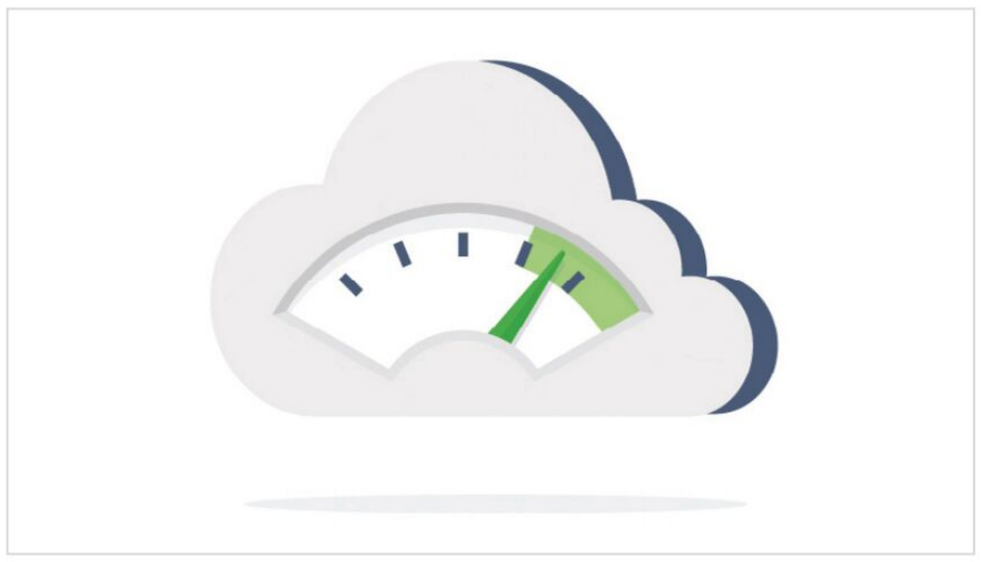
A hybrid cloud setup joins all the aspects of the company's technology – in-house, private and public clouds. A remote worker, therefore, can get to any layer of the technology, or just one aspect of it, should they need to. Increased firewall access also bolsters security.

DISASTER RECOVERY

Although a hybrid cloud setup can be quite costly, there's usually a far better disaster recovery plan factored into that initial expenditure. Your in-house servers can be backed up to the private cloud, and non-sensitive data in the public cloud, to ensure that your data is always recoverable.

GREATER PERFORMANCE

Having your apps and data in-house means you're able to call them up faster than when they're stored in a cloud. A hybrid setup usually has better network support and utilises faster, higher-performing hardware to get the most from the in-house and cloud layers.



DIY Cloud

If you want something a little more personal, or you don't fancy paying for terabytes of storage, then why not make your own cloud?

Surprisingly, making your own cloud isn't as difficult as you'd first imagine. There are plenty of options available and, thanks to modern storage devices, implementing a home, or business cloud from your desktop can be done with very few steps.

Why Would You Consider a Do It Yourself Cloud?

While using one of the many services available is perfectly fine, a small business or home user may want a little more than the service is offering. That little extra could come in the form of far more space without monthly payments or complete control over the cloud contents.

YOUR VERY OWN CLOUD

In such circumstances, having your own cloud is preferable to that of using one of the current solutions. A home user, for example, can set up their own cloud with the computer hardware they already own; making it available for friends and family to access, or just for their own private use.

Likewise, a business can opt for their own cloud, again using available computer hardware connected to the company's router and providing as much storage as needed for home workers, or those on the road.

Taking a few points into consideration here, let's see what advantages and disadvantages a DIY cloud can offer both the home and SMB user:

SECURITY

A DIY cloud may not have the backing of the likes of Google; however, it is going to offer a secure environment for you and any employees to access the content. It's not often that a home user or a small business is targeted by a legion of international hackers, whereas the big cloud names are probably running a constant battle with nefarious forces attempting to gain access to any of its cloud users' contents.

SETUP

Although most folks are more technically savvy than they think they are, setting up a DIY cloud can be a somewhat complex affair. Thankfully, there are easy to use apps and programs, available for a range of operating systems, that help make the process simpler - especially when compared to the previous procedure for setting up an online, available storage solution.

PRIVACY

To link the security aspect of the cloud, a DIY cloud offers a higher degree of privacy. Mainly due to the simple fact that you own the space, it's your storage so you can populate it with whatever you want. When it comes to privacy, some cloud providers may well be limited, for various reasons, controlling a DIY cloud, gives you considerably more freedom.

MAINTENANCE

Once you've setup your DIY cloud there's very little needed to keep it running. However, beyond the core cloud software, the computer on which it's set up will, inevitably, require operating system updates, the occasional reboot and, from time to time, some TLC. Updates can have a reputation for 'breaking' some feature further down the line, which can be costly when that feature has something to do with your DIY cloud setup.

COST

The initial cost of setting up your own DIY cloud may be a factor worth considering. If you've any computer hardware going spare, such as a motherboard, processor, memory, hard drives, case and so on, you're able to use them to build your own cloud server. If you don't have the kit to hand, then you'll need to buy them in. It needn't be particularly expensive; refurbished computers work just as well as ones that cost thousands. Incidentally, you're able to create a Raspberry Pi cloud with the right components.

DISASTER RECOVERY

One thing to be especially aware of is that using your own DIY cloud eliminates the disaster recovery protection you'll get through an average cloud service. If something goes wrong with a cloud service provider, generally, your files are still safe within the company's backups. Should your house or business ever fall foul of something disastrous, let's hope not, then losing your DIY cloud will effectively lose all your cloud data. You'll, therefore, need to factor in another level of backup and disaster protection.

RAINY-DAY PROJECTS

Despite the few disadvantages, building your own DIY cloud covers the 'interesting project' and 'worthwhile addition to the company' scenarios quite interestingly. Perhaps a compromise for the business owner, then, where a DIY cloud setup suits one section of the business - the road warriors - while still giving access to the on-site workforce.

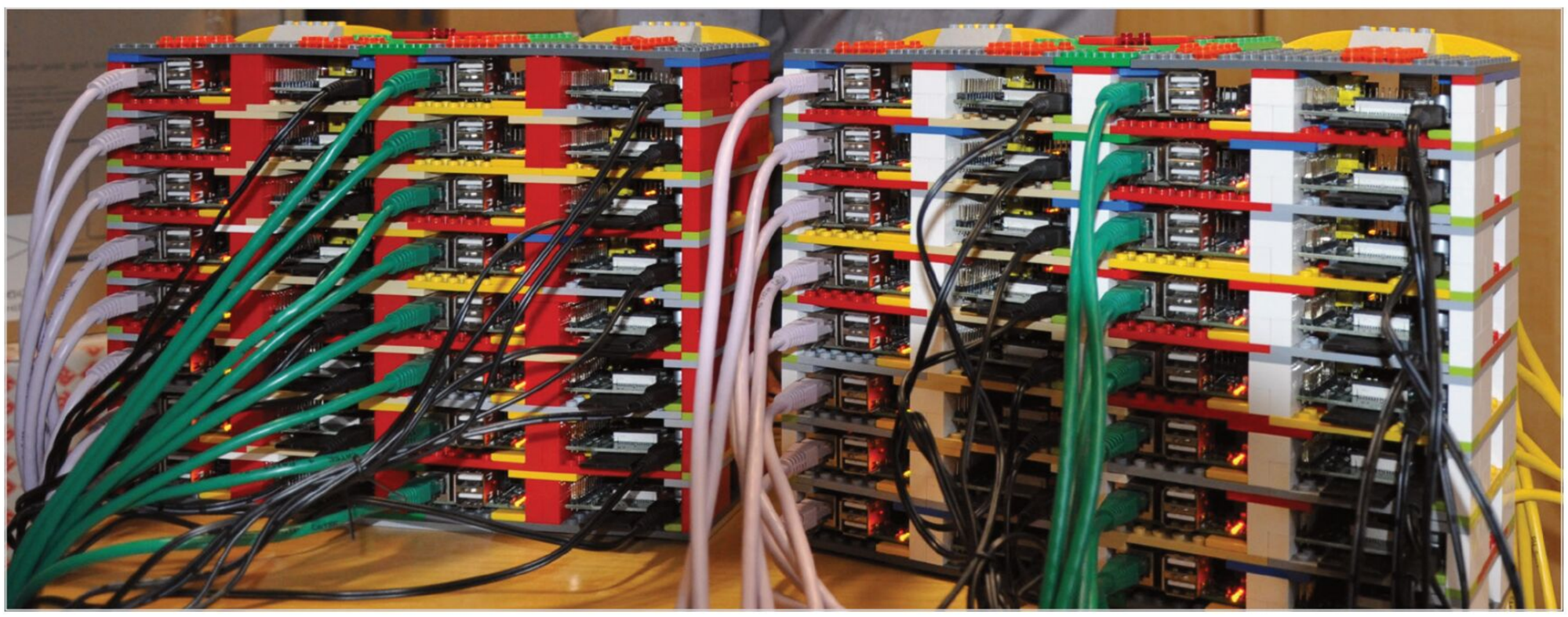
For the homeowner, imagine being able to retrieve your music, movie, and photo collections from any Internet-connected device, and offering that level of access to the family members living on the other side of the planet. It certainly makes for a tantalising, rainy day project.

IS IT DIFFICULT TO SET UP?

It's all very well talking about the benefits of a DIY cloud setup, but in real-world terms, is it a mammoth project that'll require intricate IT skill levels?

A short, simple answer to the above question: no. Yes, you need some IT skills. Knowledge of how to install an operating system and any third-party software, is certainly advantageous. However, you needn't be a computing guru to set up a DIY cloud service; it's not something that takes up too much time either. Within an hour, you can be up and running and hosting your own cloud.

A DIY cloud needn't be an ultra-powerful spec PC. Cobble your left-over hardware together and see what you can make.



A Raspberry Pi and LEGO cluster of servers, perfect for the DIY cloud project builder.

Setting Up Your Own Cloud

If the thought of building your own cloud storage setup doesn't intimidate you, then you're in luck. However, there are plenty of solutions available, utilising a variety of components and hardware, all achieving some excellent results.

If you're interested in making a cloud storage solution at home, or the office, then you'll need to factor in a few elements first. Some work better than others; some can be quite tedious to set up and get going, whereas others are really very simple. Either way, here are some examples of what you'll need to begin.

COMPUTER

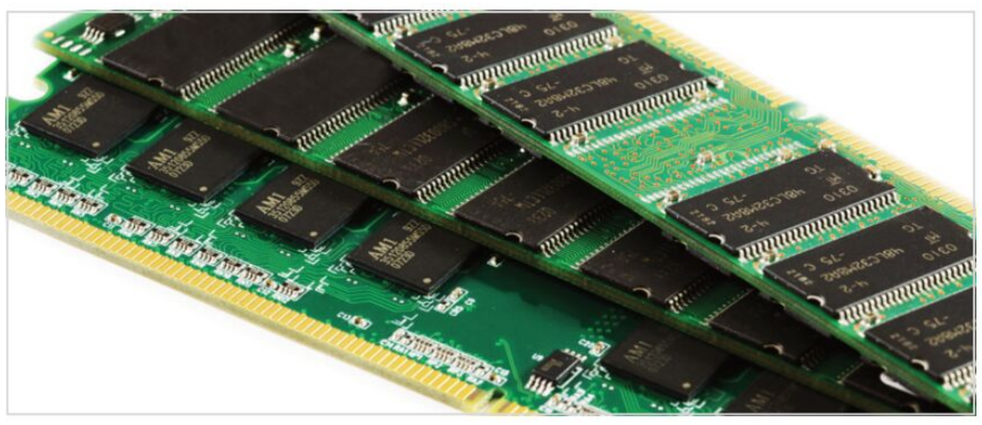
A fairly obvious component, in this case. The computer itself doesn't need to be the most powerful PC available, so don't go spending thousands on a new PC for a cloud at-home project. Nevertheless, you are going to need a few extra components to make it work better.

STORAGE

Inside the computer, you're going to need ample storage for you, and your friends and family if you want, to which content is uploaded. You can, of course, use a single hard drive, perhaps up to 500GB, and partition it into two sections: one for the computer's operating system, the other as the cloud storage partition. Use around 160GB for the operating system partition, and the rest dedicated to the cloud partition. Alternatively, you could opt for a smaller hard drive for the operating system and a second, much bigger capacity, hard drive for the cloud storage. This way, you could potentially have terabytes of cloud storage available to whomever you include in the access list.

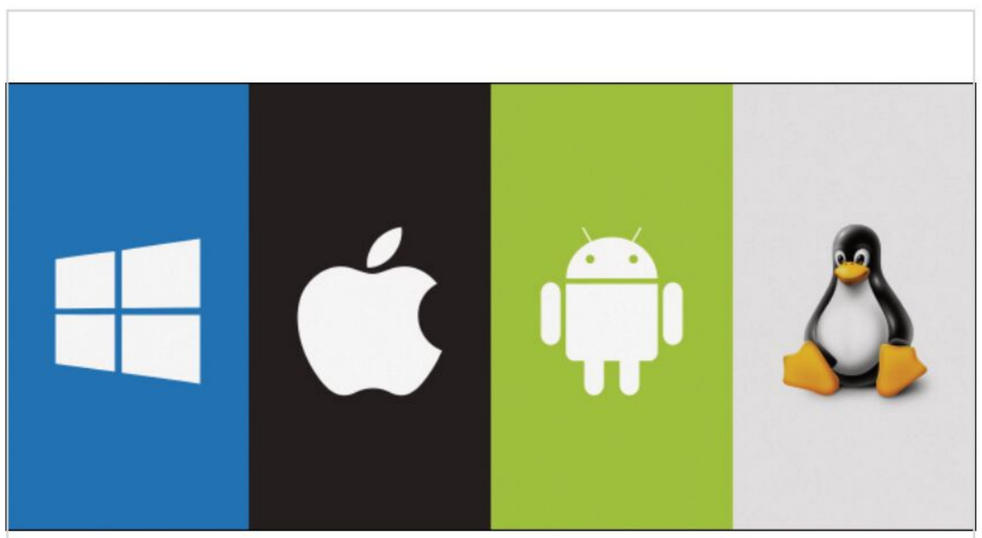
MEMORY

Although you won't need a huge amount of memory (or RAM), it's worth trying to get as much as possible. Accessing storage on a remote PC, as in this case a DIY cloud, doesn't require much memory but the software that controls the cloud access, sharing and everything else, may. If a regular PC has 4 or 8GB of memory, then look to installing 12 or 16GB. That should cover you for the overhead of hosting the cloud storage and any extra software to get it all up and running.



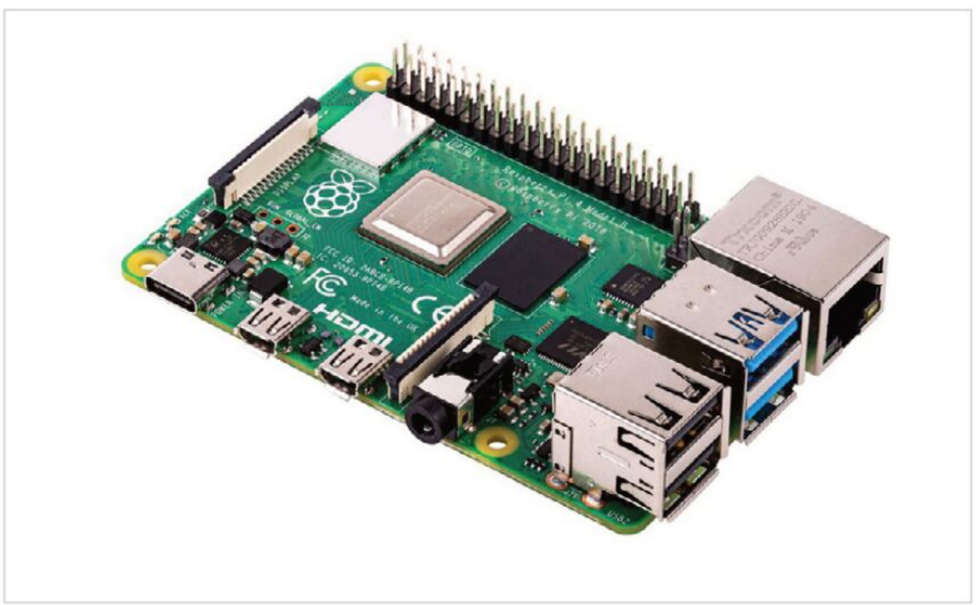
OPERATING SYSTEM

Binding all the hardware together is the operating system or OS. The software you use to create and host the cloud storage depends on the OS you've got installed on the computer. For example, Windows-based cloud software such as ownCloud Server work on Windows, Linux and macOS, but it's considered more stable on Windows and macOS systems. Nextcloud, however, another cloud server app, only runs on Linux-based systems. Most users are familiar with Windows, so it makes sense to stick to that, especially if you've never used Linux or don't own a Mac. Using an unfamiliar OS, only increases your learning curve and workload.



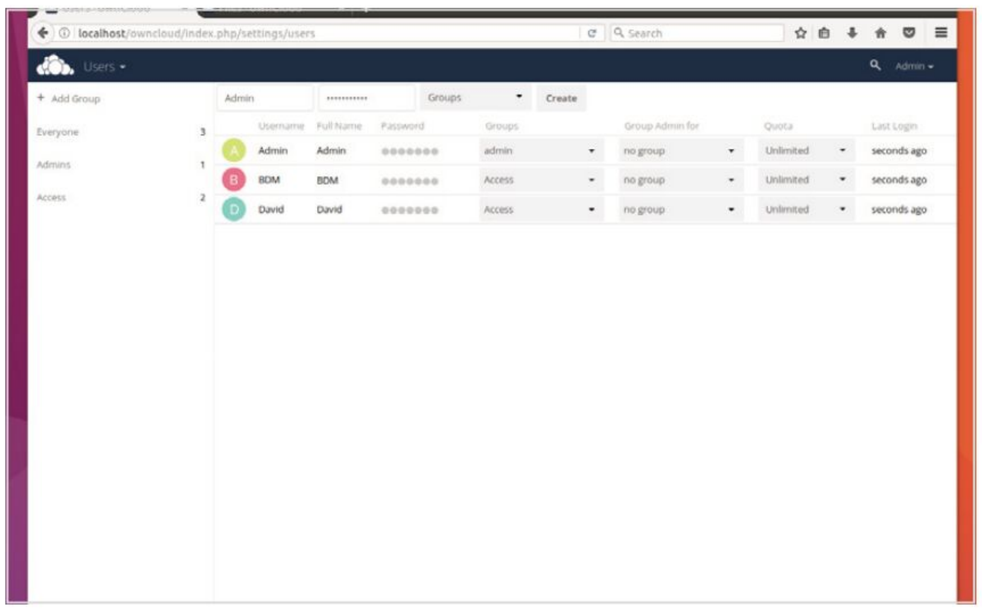
RASPBERRY PI

The Raspberry Pi makes for a great little cloud storage setup. With its small footprint and relatively low power use, you can happily have your Pi set up and running all day, every day. You don't need to opt for the new, 4GB Raspberry Pi 4; however, the extra memory and added processing power ensures the cloud server is running well. If you've got an older Pi 3 model, then it doesn't take long to install a PI NAS Drive, or something similar, and begin using it to host your cloud storage. However, you will need to include an external hard drive for increased capacity. The Pi's use an SD card as the main system drive and there's not a lot of space available on those things - plus it's not ideal to host cloud storage on an SD card. An external hard drive will be slower than the hard drive fitted directly to the inside of a computer, but if you're not too bothered by slight lag when reading and writing, it's a project worth considering.



CLOUD SOFTWARE

This is where things begin to get interesting. There are lots of cloud server software solutions available for all the leading operating systems. However, although they all do pretty much the same job, some do it better than others. Most of the time it comes down to personal taste, as one user may enjoy the interface of one piece of software over another, despite both offering the same features. Some cloud software models are faster but can be a pain to set up and maintain. Others are very simplistic, and there's not much help online should something go wrong. It's, therefore, a good idea to pick a few and install and use them, to see how they operate and how easy they are to keep working over time. Once you've picked the one you like, remove the others and give it a try for a couple of months, to work out all the bugs and nuances it may have. Check out the Cloud Software List boxout for some suggestions to get you started.



MONITOR, KEYBOARD AND MOUSE

You need a monitor, keyboard and mouse, to begin with, to set up the cloud server software and make any changes to the operating system. But once you've set everything up, you can easily install a remote viewing server that allows you to connect to the cloud server's desktop from another computer. This way, you can do away with the monitor, keyboard and mouse, and place the computer, or Raspberry Pi, in a more suitable location. Keep the peripherals handy, though, as you may need them for maintenance and updates.

CLOUD SOFTWARE LIST

Here's a list of some our favourite cloud server software examples:

- **ownCloud (https://owncloud.org/)**
  One of the best examples of cloud server software. There's plenty of features, and it can be set up simply or with some complexity, depending on your skill levels.
- **Resilio sync Home (https://www.resilio.com/individuals/)**
  A good, free cloud, share and sync server software. Not quite as feature-rich as ownCloud, but simple to use and effective.
- **Seafile (https://www.seafile.com/en/home/)**
  Seafile is an open-source file sync & share solution designed for high reliability, performance and productivity; Sync, share and collaborate across devices and teams, it's easy to use and looks good too.
- **Cozy (https://cozy.io/en/)**
  Cozy Cloud is a smart digital home solution.
- **Nextcloud (https://nextcloud.com/)**
  A comprehensive and powerful cloud server that only runs on Linux systems. It can be a complicated setup, and there's a lot you can do with Nextcloud, but if you want to increase your skills, this is the one for you.

Virtualisation for the Consumer

Virtualisation in the cloud, also known as Virtual Desktop Infrastructure (VDI), is a technology that allows users access to an entire operating system. The operating system is an image, naturally, housed on a cloud server, where you can work on the desktop as if it was installed locally on your computer.

DESKTOP ANYWHERE

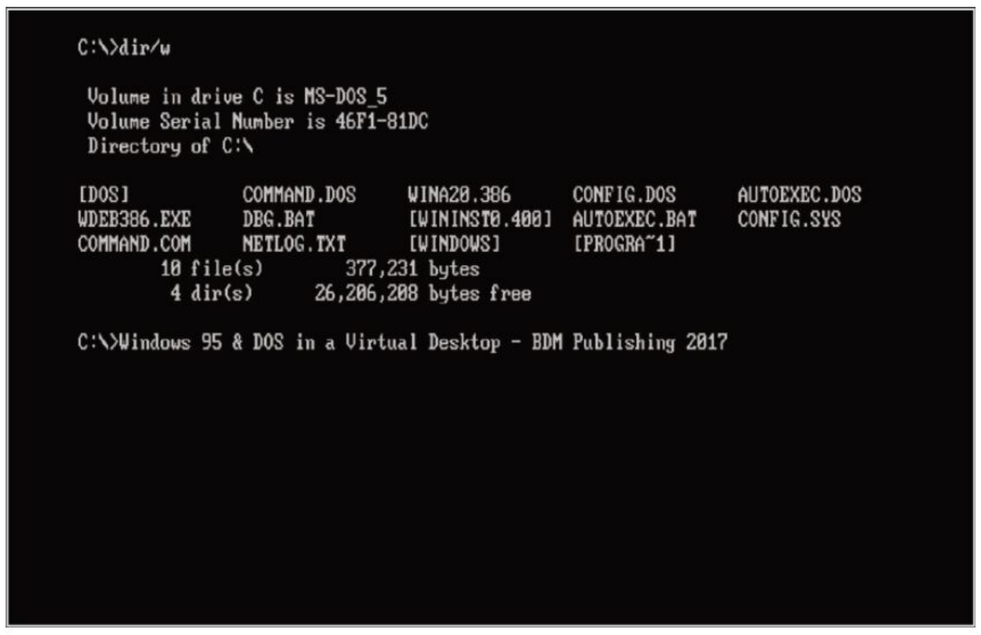
What are the advantages of setting up or using a cloud-based virtual desktop, then? As it happens, here are ten examples of where a VDI will help you out.

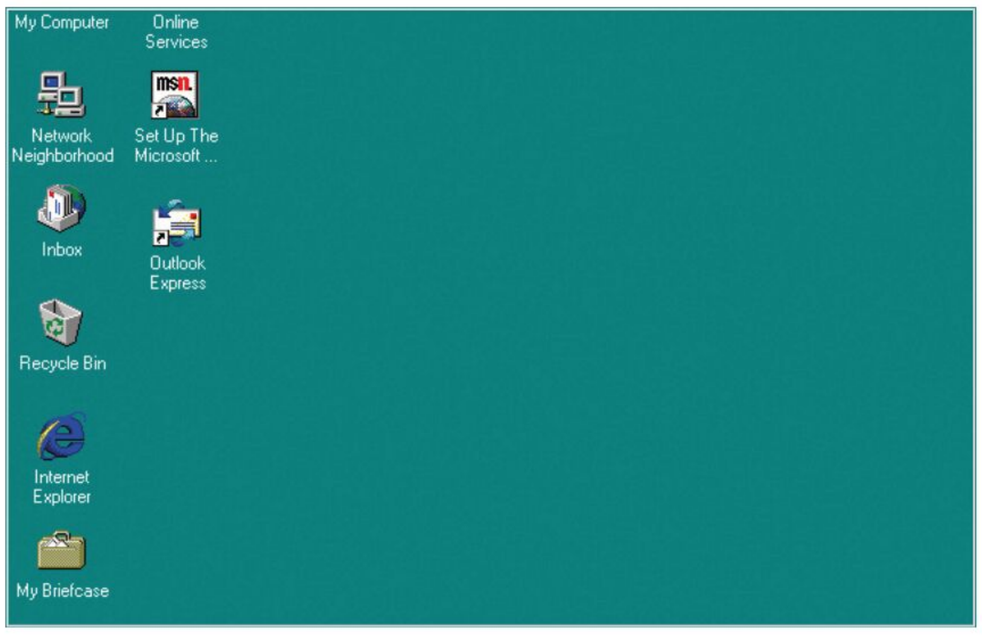
RUN LEGACY PROGRAMS

One of the advantages of running a virtual desktop in the cloud, is the ability to execute old programs and apps in the operating system environment for which they were designed. For example, running a DOS 6.22, or Windows 95 virtual desktop in the cloud allows you to play all those DOS classic games and programs.

SANDBOX ENVIRONMENT

A virtual desktop is what's known as a sandbox environment. Meaning it's a virtual space where new, untested, or untrusted software and coding can be executed without fear of it damaging the host PC. You're also able to browse securely as your personal data isn't on the VDI.



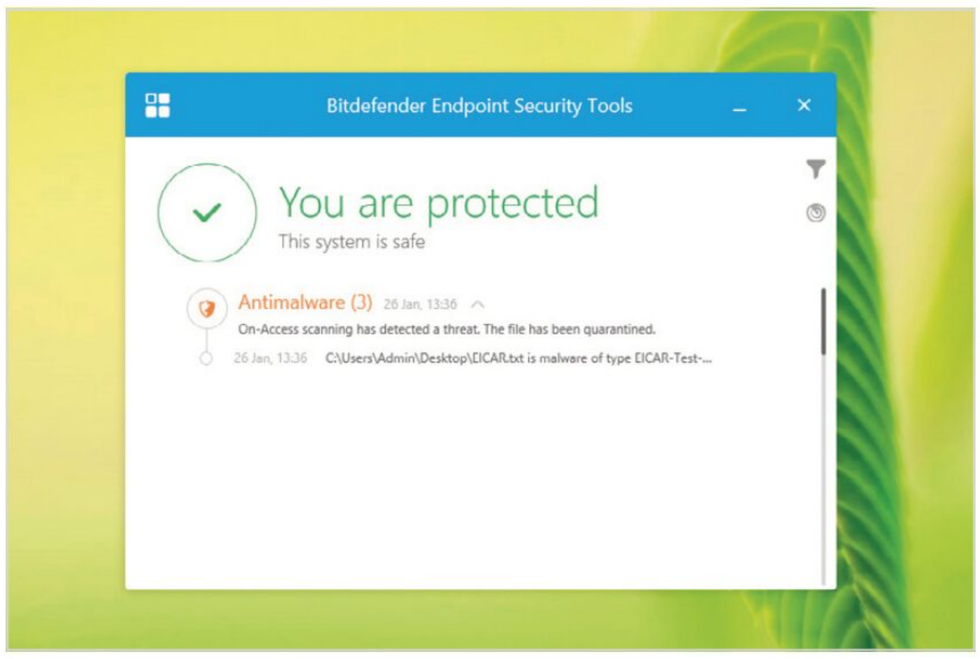


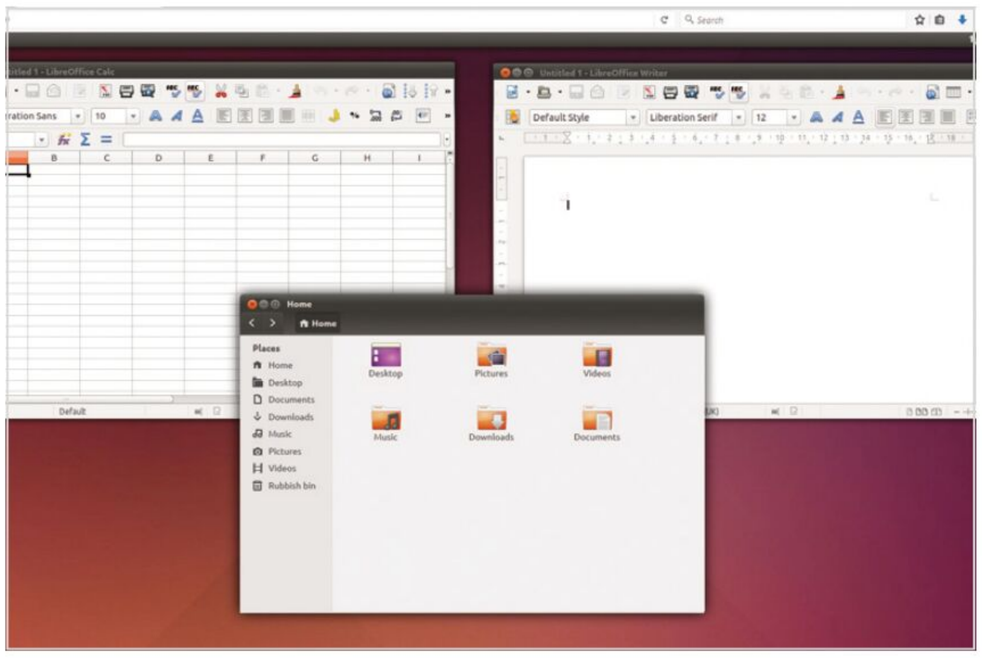
VIRUS TESTING

If you think a downloaded file from a website may contain a virus, you can safely experiment with it in a virtual desktop in the cloud. This way your actual PC isn't going to be infected, and, thanks to the fact that the VDI is simply a file on a server, it's scanned and cleaned too.

USE OTHER SYSTEMS

As expected, you're able to use and test other operating systems within a virtual environment. The handy thing here, on the cloud, is that your local system's storage isn't being used to hold the virtual desktop image.



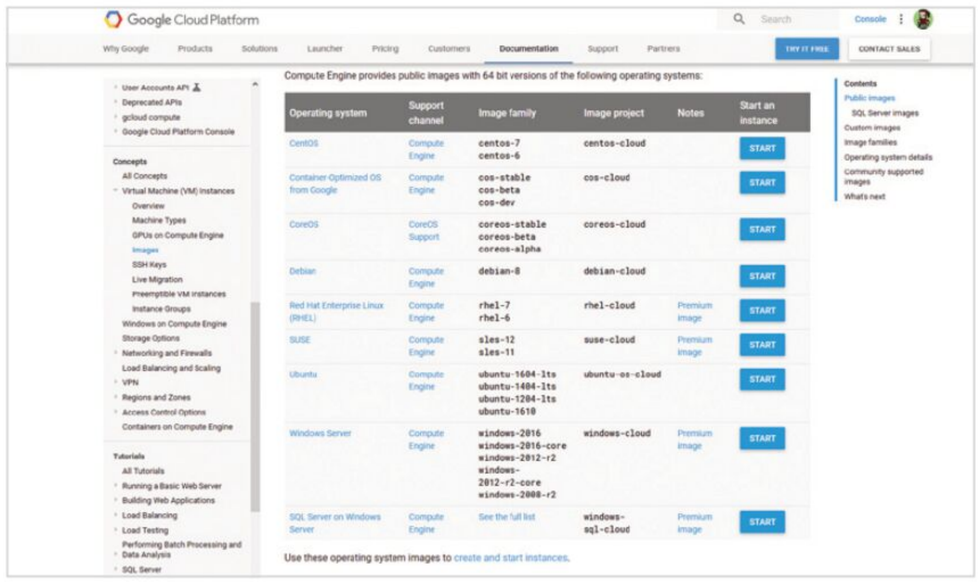


REMOTE WORK

Let's take a common scenario: while on holiday, you suddenly need to do some work. Using a virtual desktop in the cloud gives you access to a fully working computer, so you can complete what you need to while sharing it with others.

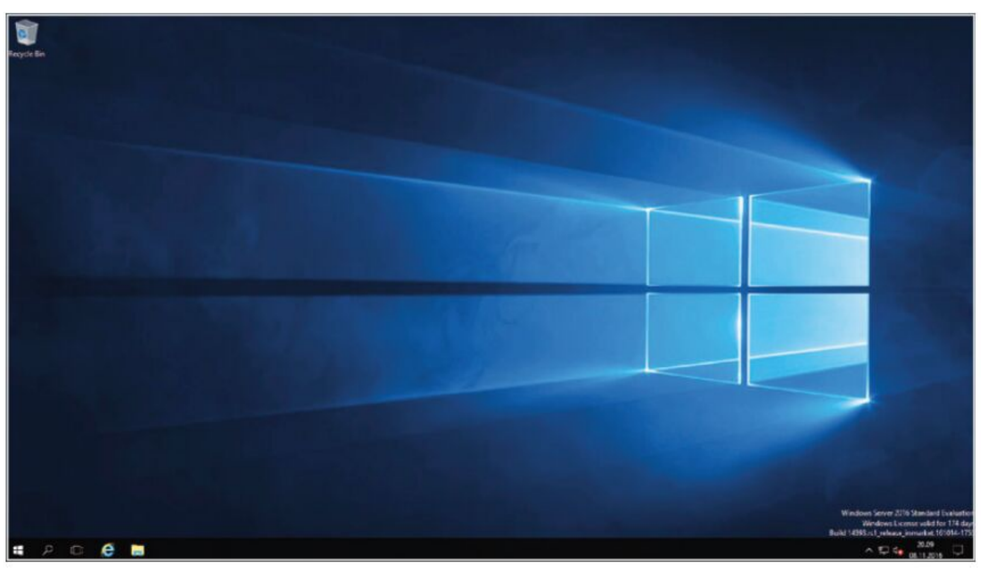
BACKUPS

Having a secure backup is always a good idea, even for a home user. Utilising a cloud-based virtual desktop is undoubtedly one way to achieve that goal. You can, with some examples and services, create an exact copy of your locally installed operating system in the cloud; so it's always backed up and ready for a quick restore.



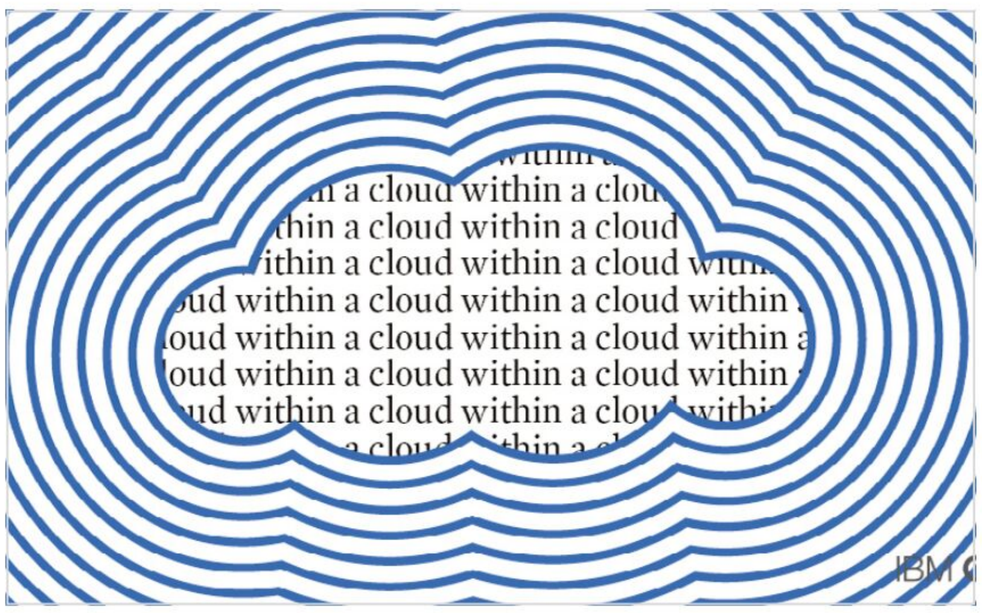
SKILLS IMPROVEMENT

It's a tricky business being able to keep up with the latest technology and software, and more often than not, expensive. Not all of us can test and get to grips with the latest version of Windows Server, for example. Here, a cloud-based virtual desktop allows the public to test, and experience the latest software.



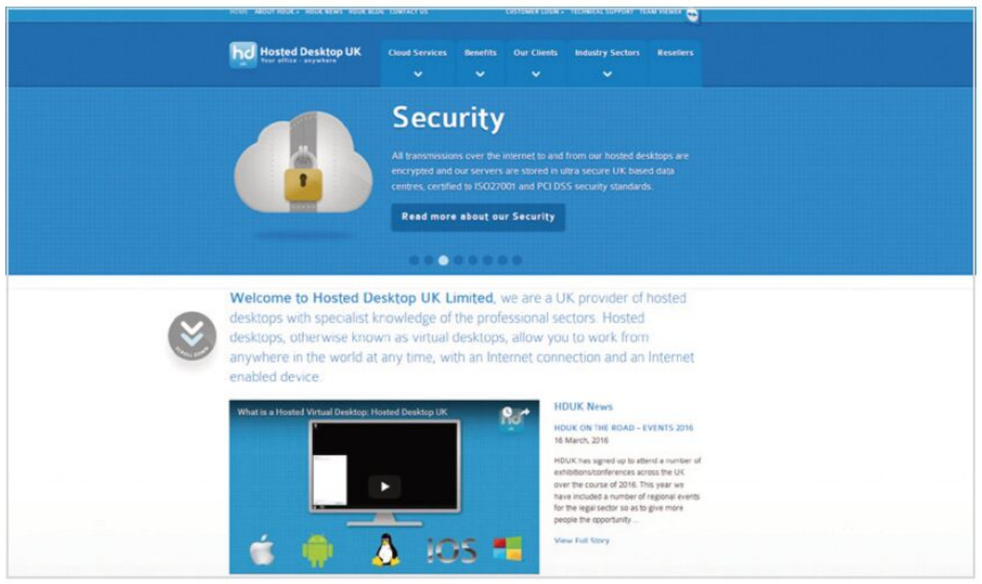
CLOUD SETUP

Oddly enough, if you've access to a cloud-based virtual desktop then you can set up your own cloud server within the, already cloud-hosted, virtual environment. This way, you can create secure tunnelling for the users to access the cloud, and have everything hosted remotely.



CUTTING COSTS

If you need to access multiple desktops, the initial costs in terms of hardware, software licensing and time to set everything up - not counting a backup routine or anti-virus support - can be high. You can, alternatively, opt for a hosted virtual desktop platform, with multiple desktops available for as little as £25 per month.



USE OLDER HARDWARE

As you're accessing a virtual machine online, there's little need to fork out for a £2000 computer. While you probably won't be able to run complex 3D imaging, or the latest graphically demanding game on a cloud-based virtual machine, you can use it for everyday work without needing to buy a new computer.

Virtualisation for SMB/SME Users

Virtualisation for the home user is certainly beneficial, in some respects. However, virtualisation in the cloud for the business user can be a far more powerful tool. Cost savings, remote working, support and security are all achievable with a hosted, virtual cloud desktop service.

DESKTOP AS A SERVICE

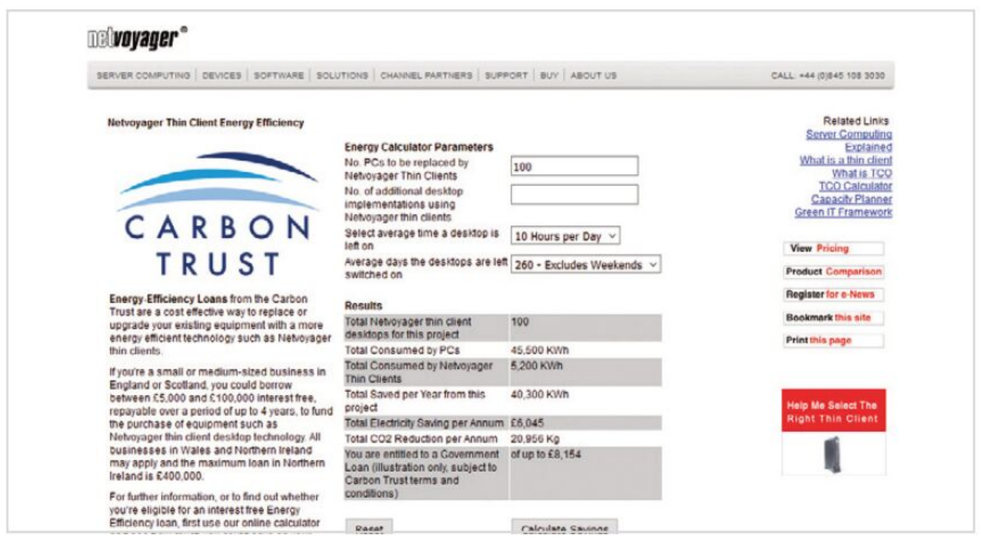
For business, many of the benefits of virtualisation in the cloud cross over with those of the home user; however, for a business, those benefits can yield great advantages over the competition.

REMOTE WORKING

Remote workers can help make substantial savings across the entire business. You don't need to provide office space, or the power costs therein, and you can reduce software and hardware costs. Aside from these savings, your workers can access their desktops from anywhere in the world.

REDUCED BILLS

Looking again at cost-cutting, using a virtual desktop to access multiple, non-identical operating systems lets you install Thin Clients, as opposed to full PCs. A Thin Client can access the remote desktop, and work as a normal computer, but with an estimated £70 saving per machine annually in electricity.

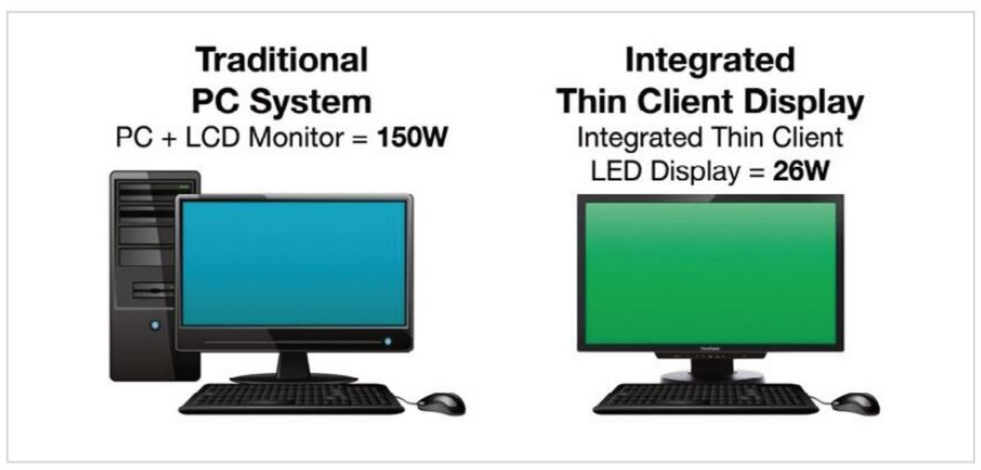


EASIER SUPPORT

Using a virtual desktop hosting service ensures that you receive the highest possible support, 24/7, without the need to have an extensive in-house IT team. Any issues with the virtual desktop setups are quickly resolved, and broken images easily replaced with a previous snapshot.

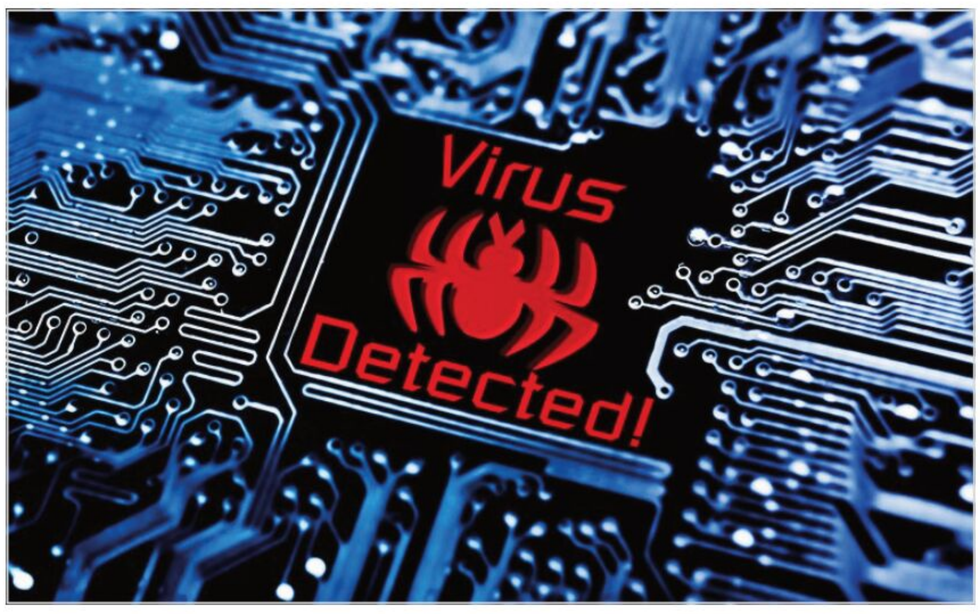
ENVIRONMENTAL SAVINGS

Further to the last entry, using Thin Clients to replace a PC, and accessing a virtual desktop service, produces a CO2 reduction of 20,956KG per year, and a total energy saving cost of 40,300 KWh - based on 100 NetVoyager Thin Clients replacing PCs.



VIRUS PROTECTION

A virus hitting an individual home user is bad enough; however, when one gets loose in a company, it can be disastrous. Using a virtual desktop service greatly reduces the chance of a virus spreading through the company network and other PCs.



BACKUP PROTECTION

Workers using a virtual desktop can quickly recover from any disaster by restoring a recent snapshot of their desktop. The downtime, therefore, for a 'broken' virtual desktop is minimal compared to that of a standard, in-house desktop restore.

SECURITY

A business that uses virtual desktop services is also better placed to secure the desktops it's offering. You're able to fine-tune the security settings so workers can't access unnecessary websites, or run illegal copies of software. This is all possible on a traditional in-house setup too, but much easier for the virtual desktop service to set up and utilise.

MULTIPLE OPERATING SYSTEMS

It's often difficult for a business to merge all its departments and users' operating system needs. Marketing and design require Macs, office staff PCs, and developers may want Linux, PCs, Macs or even mobile operating systems. With a virtual desktop service, you can specify, and use, all the available operating systems across your entire business.

SCALABILITY

As with most cloud service offerings, you're able to easily scale up or down your virtual desktop numbers as your business demands increase or reduce. New workers are quickly added, and allocated a virtual desktop, while former workers or contractors can be removed to save bandwidth and support costs.

LEGACY APPS

As with the home user, a business can use a virtualised older desktop operating system to keep supporting its apps and software. If you've already paid for a piece of software which a new operating system won't support, then using a legacy system, within a cloud virtual desktop setup, will keep you up and running.

Using a NAS Drive as a Cloud Server

While creating your own cloud server is a great solution to an online offering, it's not always practical, secure, cost-effective, or easy to manage. NAS, Network Attached Storage, drives are a far better solution. They're small, efficient and powerful units designed to store and share data.

NAS BENEFITS

NAS technology has come a long way in the last few years. No longer the monolithic boxes dominating the room, in fact, they're now quite discreet, media-type installations hidden away in the corner of a living room or office.

They are remarkably powerful these days too. With specifications that surpass those of a top of the range PC from not so long ago, a modern NAS is a far more capable 'computer' than some of the PCs found on desks. This improved processing power allows more services to be run simultaneously, and with support for more users.

In terms of service and software, many modern NAS units run a customised version of Linux, which serves as the backbone to their file and media sharing capabilities. There's also a range of installable apps that can further improve the scalability and use of a NAS, such as cloud server software, for example.

COST

A NAS drive is a reasonably inexpensive investment for both home and business users. A single bay, which means a NAS unit with space for a single hard drive, can be picked up for well under a hundred pounds. Dual bay, two hard drive capable, NAS units can be around the hundred-pound mark. The only expense is the actual hard drives you buy to install within the NAS unit. Therefore, depending on the capacity hard drive you require, and how many, you could be looking at anything from £40 up to £400.

PERFORMANCE

A NAS drive, by this we mean the entire unit and the hard drives within, has a reasonable set of specifications. You can easily expect to see dual or quad-core processors, gigabytes of memory, high performance read and write speeds and gigabit Ethernet ports. In general, a NAS will outperform a similar specified PC, at the same file serving duties, due to its low memory use operating system and the limited number of processes the hardware is required to run; freeing up a lot of resources for its sharing duties.

A consumer NAS is just as capable as a business model, it depends on what capacity you want.

Businesses who want ultra-scalability can opt for enterprise level NAS solutions, with 24 drive bays possible.

VIRTUALISATION

We've already looked at the benefits of virtualisation for home and business users. If finding a virtual desktop hosting solution isn't working for you, then a NAS drive may be a good alternative. Some NAS drive manufacturers have implemented a virtualisation app that can be downloaded and installed to the NAS, which, when set up correctly, will serve the user base with a variety of virtual desktop images.

BACKUPS

NAS drives aren't useful for merely sharing your media. With the right setup, all your desktop computers, regardless of whether you're an individual or a business, can be backed up to a NAS. You can even store multiple backups across days, weeks, or months if you have enough storage available.

CLOUD SERVING

Naturally, using a NAS as a cloud server is a great solution. You can utilise the huge capacities of the installed hard drives, up to 10TB, while offering the users an easy to connect and use cloud solution. Most of the NAS drives also offer a simple management setup, allowing even non-technical users the chance to get up and running with their own cloud within a matter of minutes; and often without the security hassle of opening up a hole in the router and firewall.

REDUNDANCY

Dual bay, or more, NAS drives offer the user a set of RAID (Redundant Array of Independent Disks) options with the installed drives. A RAID setup simply offers different kinds of configurations or levels. Each of these levels can implement a different type of redundancy. For example, RAID 1 offers data mirroring, so any data written to one drive is mirrored by the second. This way, should one drive fail, you can replace it and rebuild the data from the other one. Depending on the RAID level, you either lose some or use all of the drive(s) capacity installed. Two 10TB disks at RAID 1 only allow you to use 10TB, as the other drive is the mirror.

THE IDEAL SOLUTION

A NAS is an excellent one-stop solution for any type of user. An individual can house their media collection, family photos and data backups on a NAS, while using a cloud app to host photos and music to other family members.

A business user can use multiple NAS units to backup, provide cloud server access and virtualisation to the workforce, and all from an inexpensive and easily manageable box.

Mostly though, an SMB will be more than satisfied with just as powerful NAS drives, offering more than ample capacity.

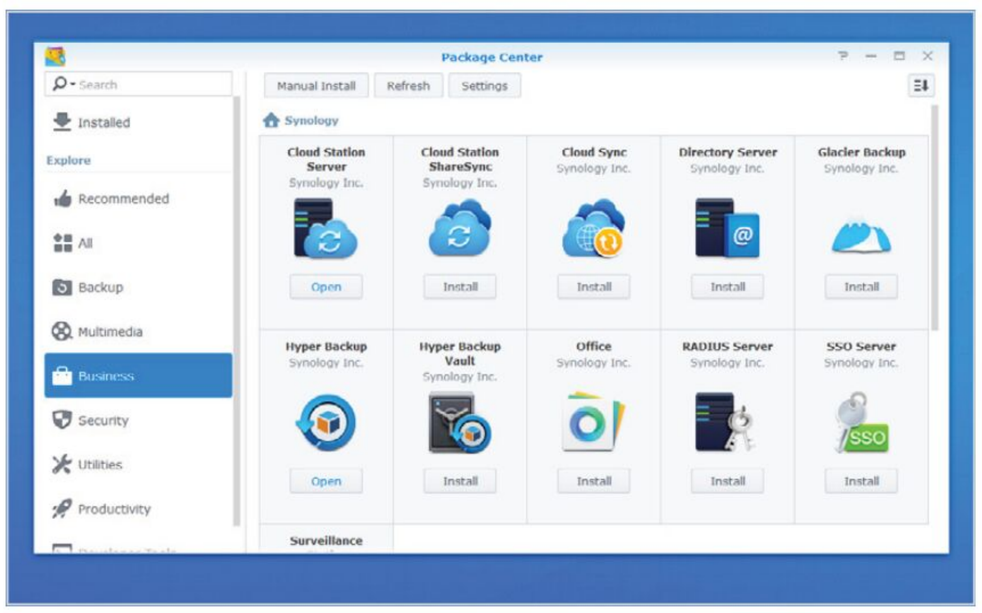
How to Set Up a Cloud Solution Using a Home NAS

Creating your own NAS-based cloud server is remarkably easy, thanks to the modern operating systems and apps available for a NAS drive. In this example we're going to use a Synology NAS fitted with a pair of 6TB Seagate IronWolf hard drives.

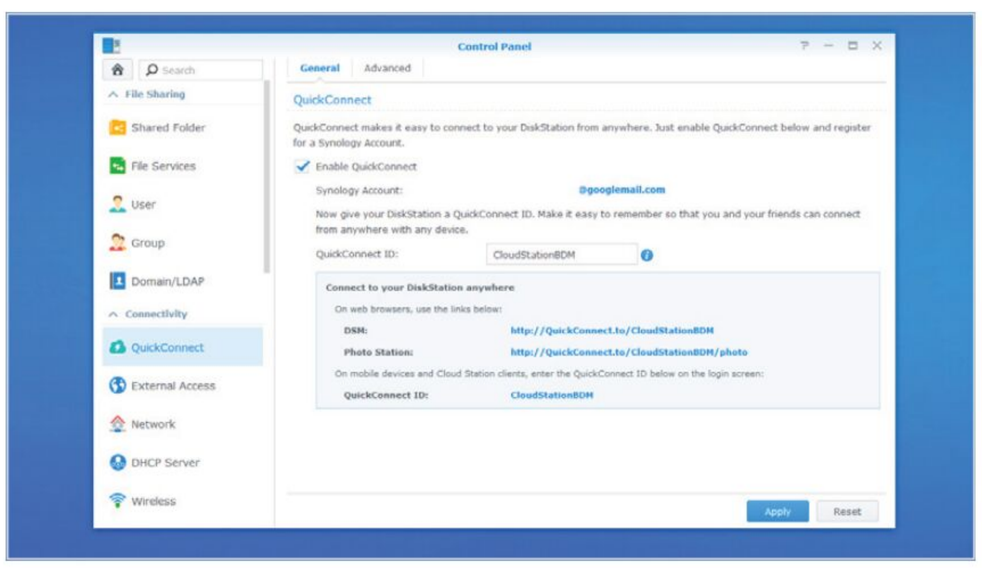
CREATING YOUR CLOUD

We've pre-fitted the two IronWolf drives, and run through the initial setup process. Note: changes to NAS firmware and the OS can result in different screens from shown below.

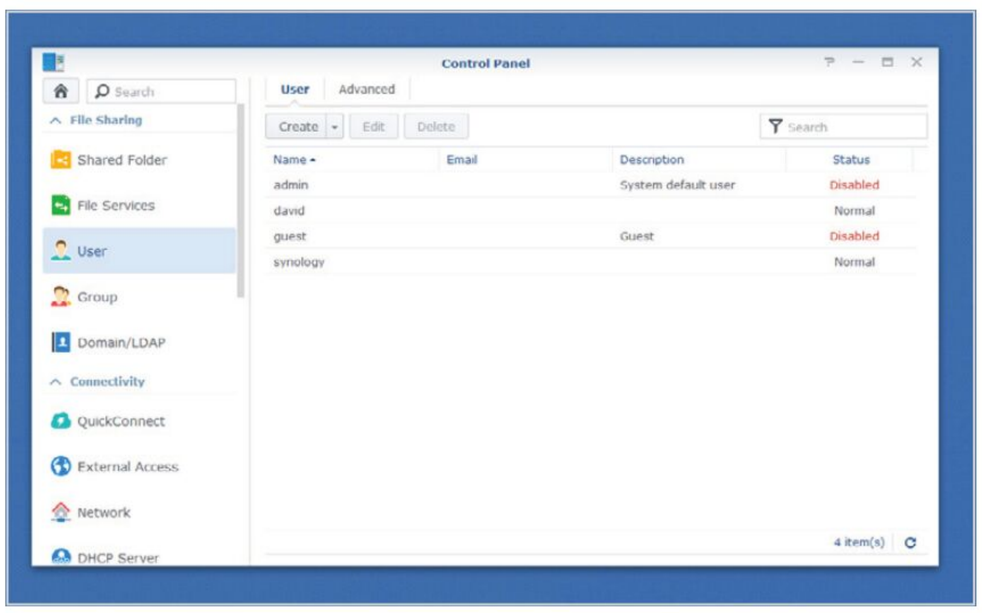
STEP 1 First we need to install the Cloud Station Server from the **Package Center**, located on the DSM desktop. In the Package Center, you'll find the **Cloud Station Server** app in the Business section. Click on Install and agree to allow the new app to install on your Synology NAS.



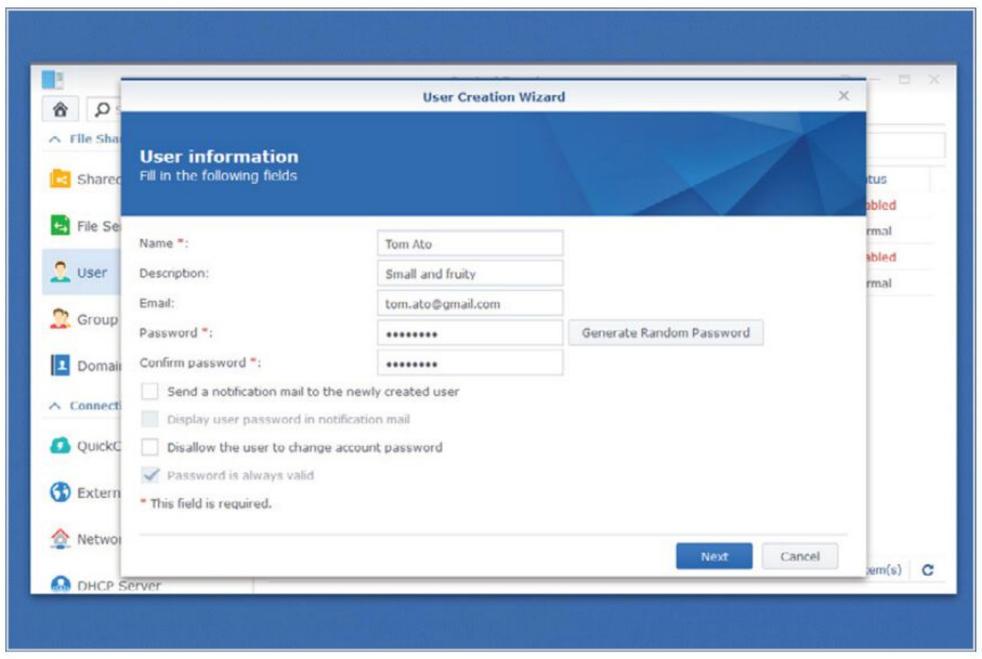
STEP 2 Open the Control Panel from the DSM desktop, and scroll down the side panel until you come to **QuickConnect**. Click the **QuickConnect** link, and in the right-hand main pane, tick the **Enable QuickConnect** box. You'll need to enter your email and sign up for a Synology account, but QuickConnect allows a connection to the cloud server without opening your router.



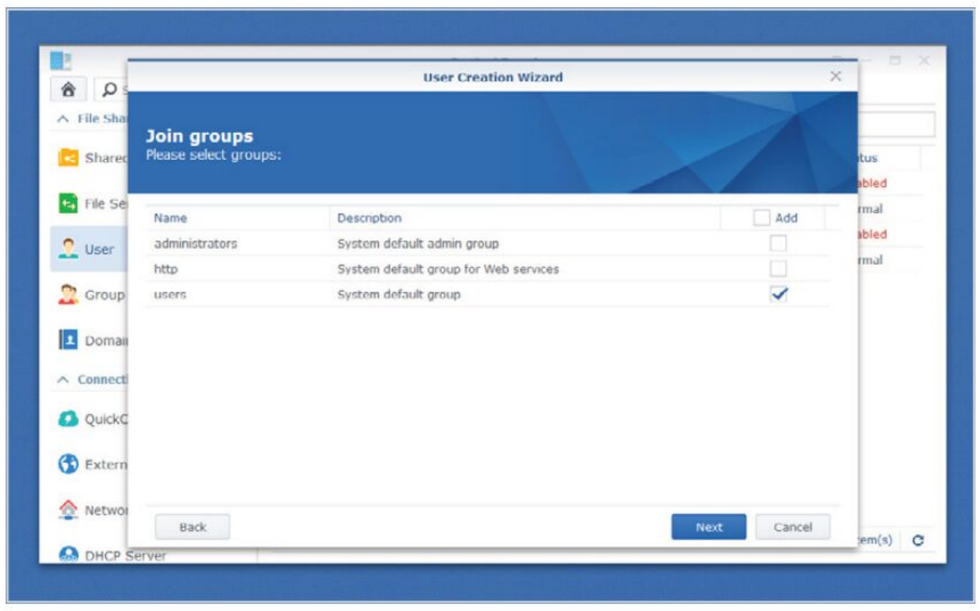
STEP 3 With QuickConnect enabled, and once you've confirmed the new account with Synology (via an email sent to you), click the **Apply** button in the Control Panel. Scroll up a little way in the Control Panel until you come to **User**, and click on it. The right-hand pane of this section will detail the current accounts with access to the NAS.



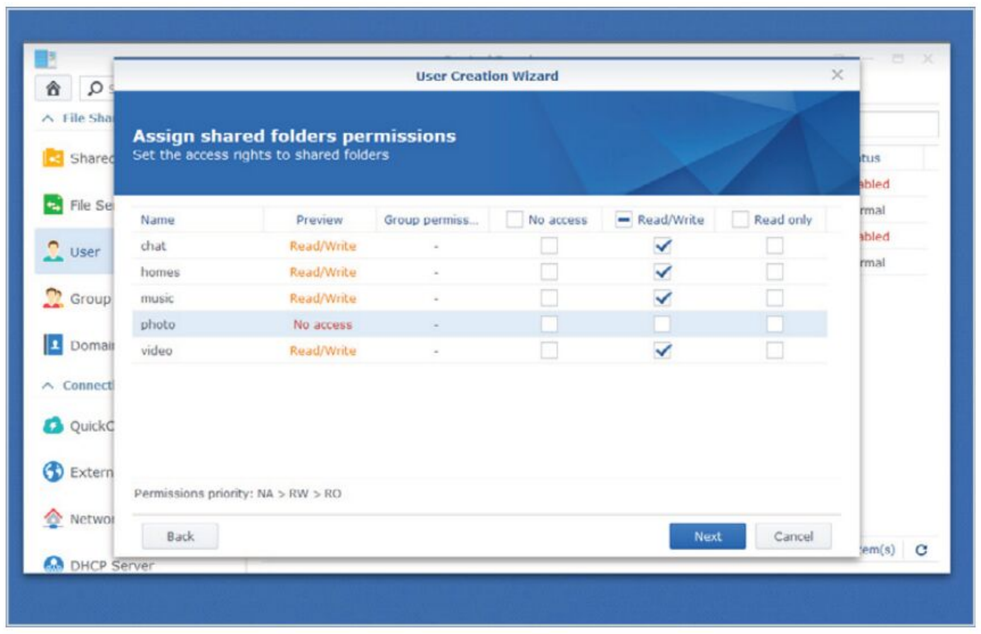
STEP 4 To create a new user, click on the **Create** button, and fill in the form detailing Name, Description, Email, and Password. You can tick the boxes to send the user an email to inform them of their new account. Click the **Next** button when you're done.



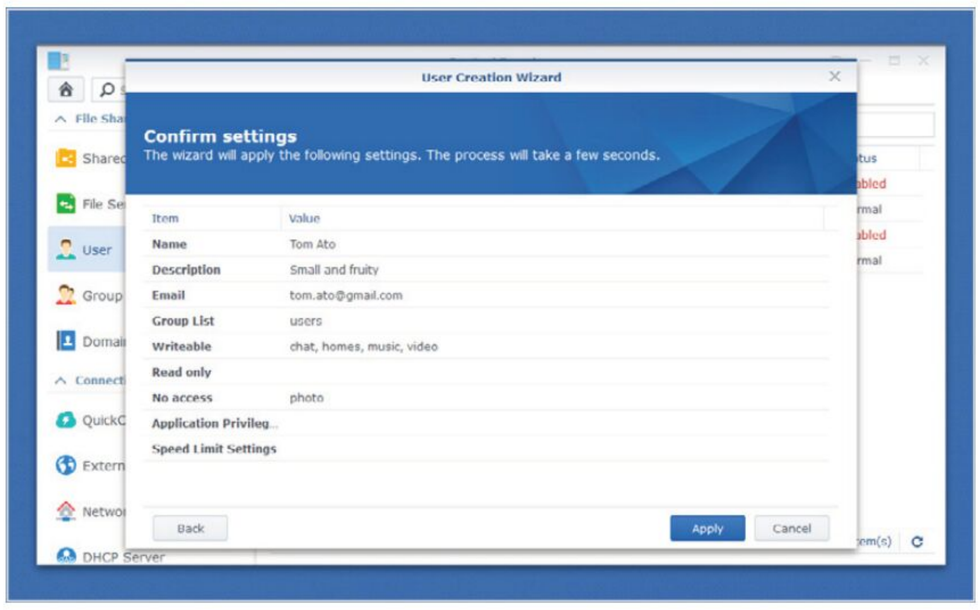
STEP 5 The next page will list the current groups you have active on the NAS. For the average consumer sticking with the built-in Users group is more than sufficient, but try and limit the number of Administrators to just yourself. Click **Next** when you're ready to continue.



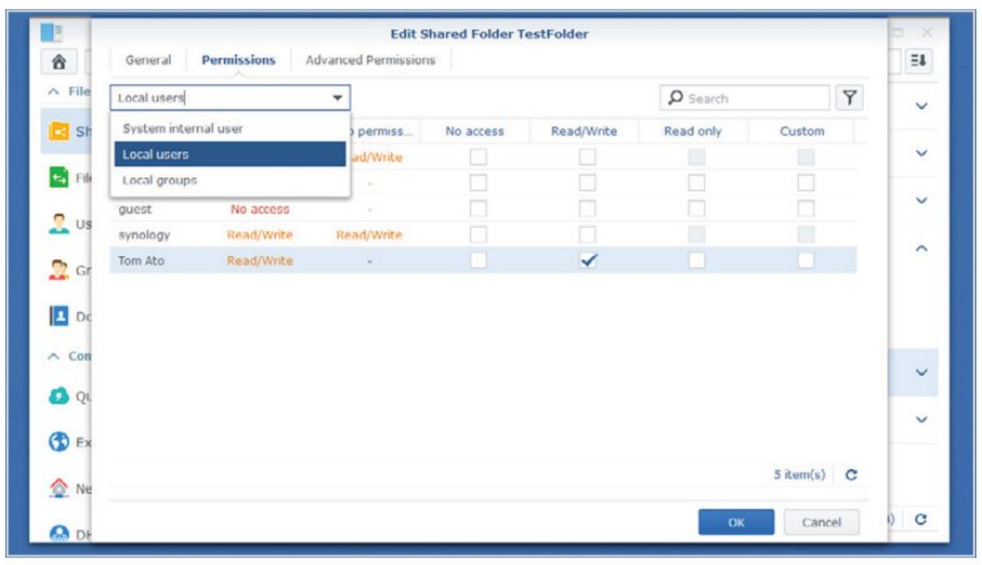
STEP 6 The built-in shared folders within the NAS are: Homes, Music, Photo and Video. In the next page you're able to select the type of permission the new user will have to each of those folders. Don't worry too much about the shared files, as you'll create one in a moment. Click **Next** when you're ready to continue.



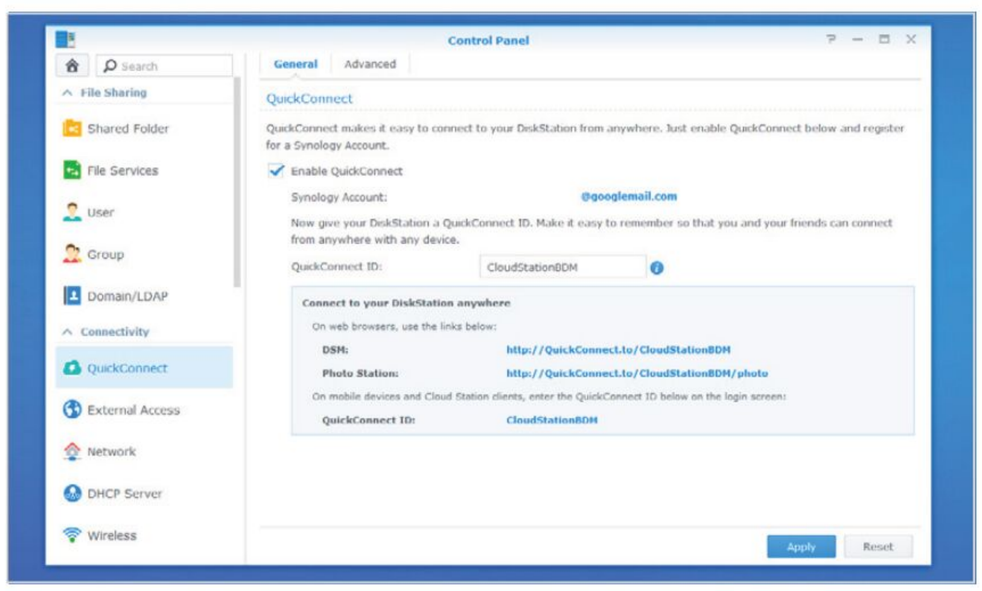
STEP 7 The remaining steps cover the disk quota allowed for the new user, and the application access they'll have. You can assign permissions beyond the default if you like, or return later to redefine the permissions. When you've finished with the quotas and assigned apps, click the **Apply** button to create the new user.



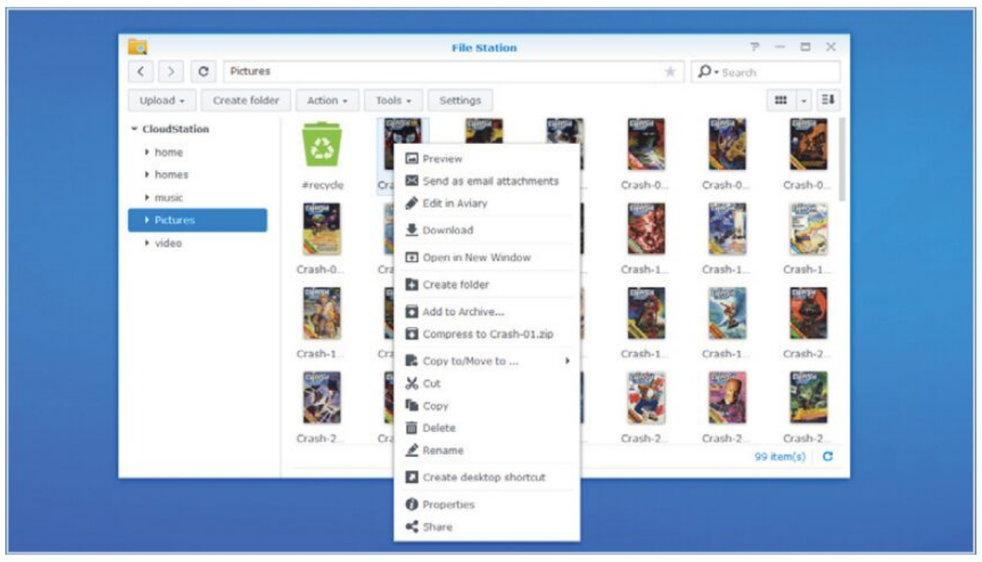
STEP 8 Still within the Control Panel, scroll up to **Shared Folders** and click the **Create** button. Enter a new name for the cloud-accessible new shared folder, and a Description and click **OK** to create the folder. On the next screen you're able to assign permissions to the new User or Groups; adding the group permission saves you adding individual users.



STEP 9 With an example user and shared folder created, we can now attach to the cloud server using the QuickConnect app. For outside users to gain access to the NAS, you'll need to inform them of the QuickConnect address, which is listed on the QuickConnect app page. It'll be h**ttp://QuickConnect.to/NAMEOFNAS**, where **NAMEOFNAS** is the QuickConnect name you setup.



STEP 10 Once the user has entered the address, they'll be taken to the DSM page where they'll enter their NAS login details. They'll have access to a customisable DSM desktop similar to the one used as the NAS admin. Clicking on **File Station**, they'll be able to upload, download, view and share any content they have permission to on the NAS.



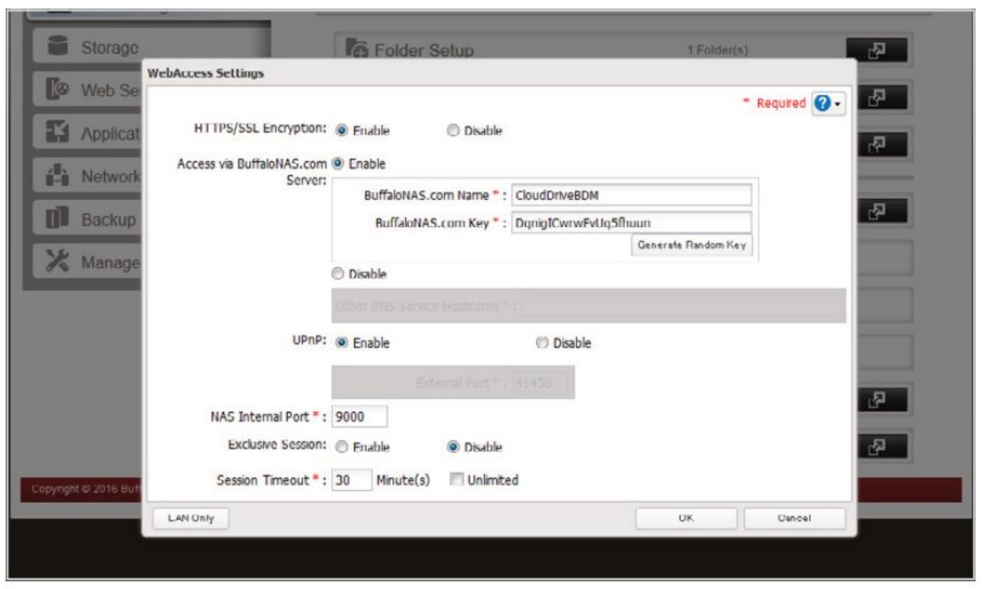
How to Set Up a Cloud Solution Using a Business NAS

Setting up a cloud server on a business NAS is very similar to that of the home NAS user. The web-based administration of a NAS drive makes it incredibly simple to configure and use. In this example, we're using a Buffalo TeraStation.

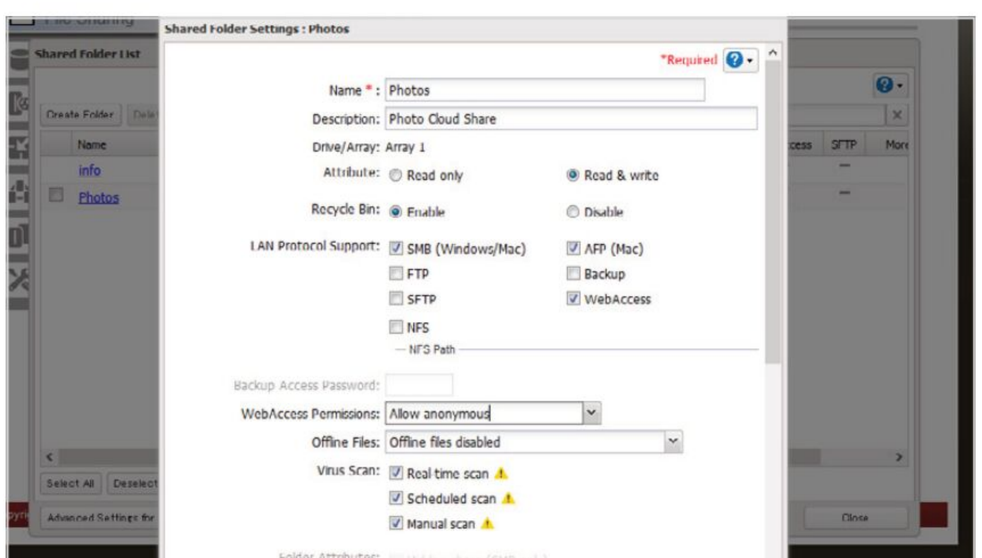
CREATING YOUR CLOUD

The Buffalo TeraStation we're using is updated to the latest firmware and has cycled through the initial set up process. Note: Changes to models can alter the screenshots and steps below.

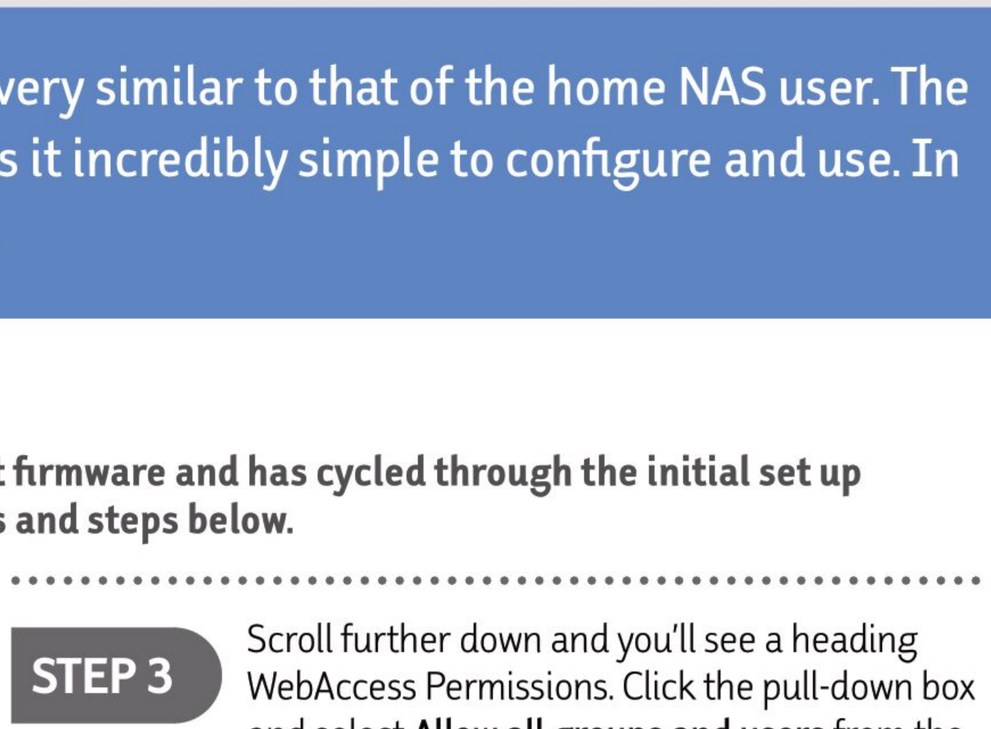
STEP 1 Log in to the Buffalo TeraStation admin page. When loaded, click on the **File Sharing** link in the left-hand sidebar, followed by the link button to the far right of the **Web Access** entry. Enable HTTPS/SSL Encryption, enable Access via BuffaloNAS.com, click the **Generate Random Key** button, and enter a name for the cloud server in the BuffaloNAS.com Name box



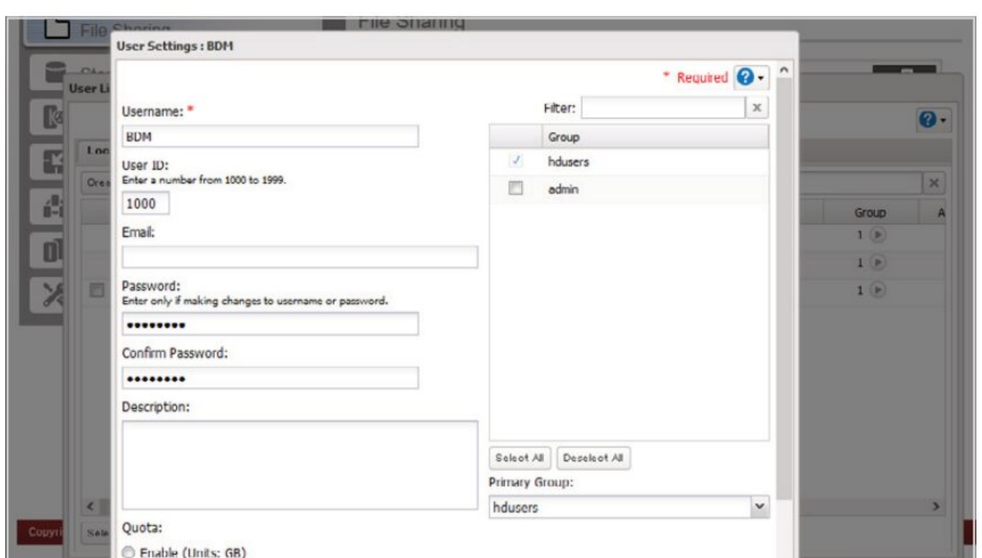
STEP 2 Once you've named the cloud server, click **OK** to save the details. Still in the File Sharing section, click on the **Folder Setup** link button, located at the top of the screen. In the Shared Folder List window, click **Create Folder**, and when the Shared Folder Settings window appears, enter a name for the folder and tick **WebAccess**.



STEP 3 Scroll further down and you'll see a heading WebAccess Permissions. Click the pull-down box and select **Allow all groups and users** from the list (you're stopping anonymous access from entering the cloud folder). Click the **OK** button when you're done.

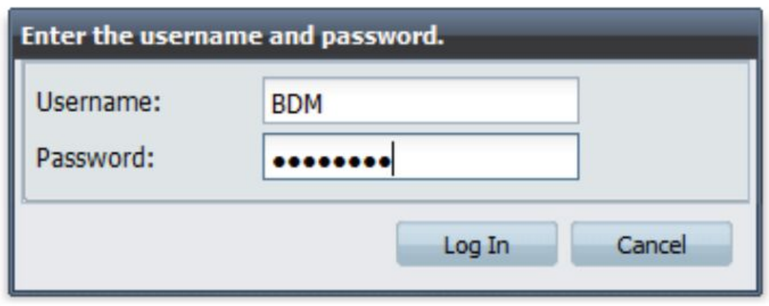


STEP 4 Close the Shared Folder List window, and click the link button next to **Users**. In the User List window, click the **Create User** button. Enter a name for one of your users and a password. You can set a unique User ID if you wish, and any storage quotas. Click the **OK** button when you're done.

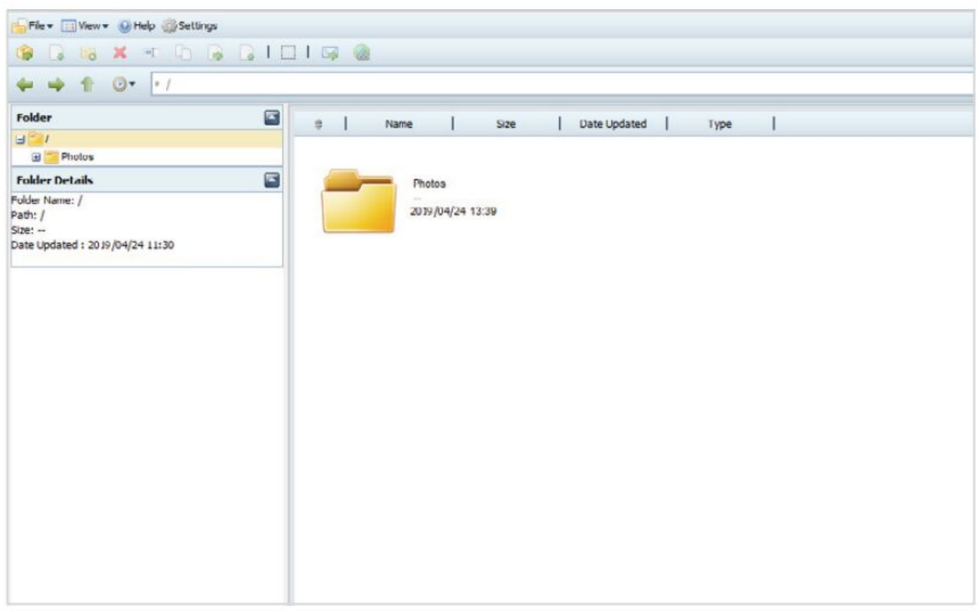


STEP 5 Click the **Close** button to exit from the User List. Open a new browser tab, or on a separate computer, and enter the address: **https://buffalonas.com**. When it's loaded (you may need to add an exception in your browser to access it), enter the name of the cloud server you created in the box provided. Click **Connect** when ready.

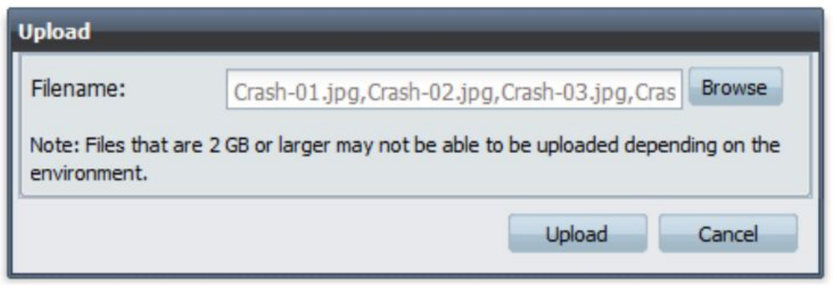
STEP 6 To begin with, you'll have a blank interface, without any folders or files. Click on the **Log In** button in the top right, and enter the username and password of the user you've just created. Click the **Log In** button when you've entered the details of the user.



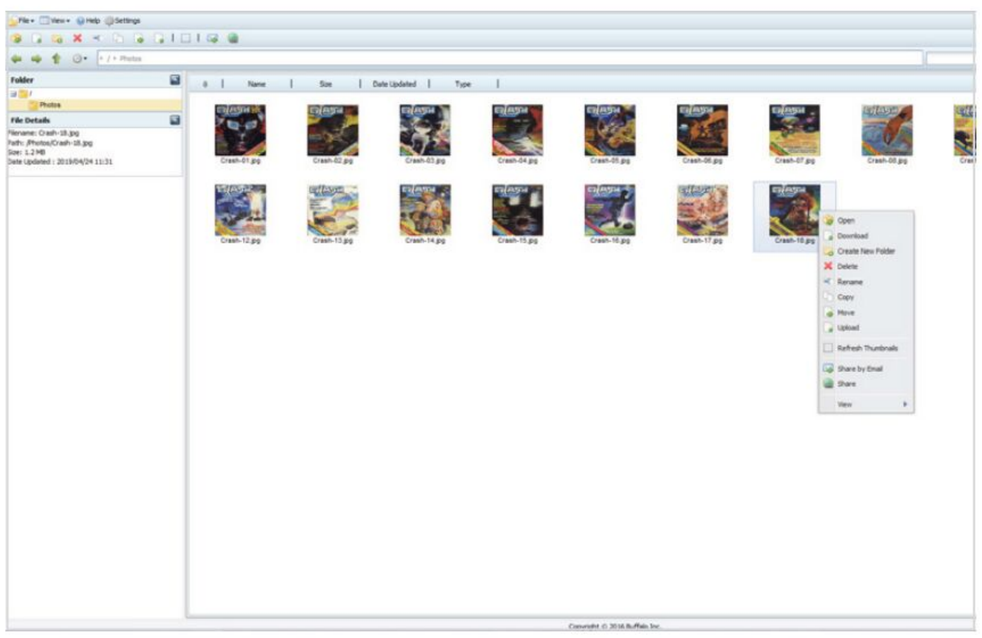
STEP 7 Once logged in, the interface changes to display the folders available to the user. This view depends on what folders you've given them access to, either from the user level or the group level. Double-click on the folder you created earlier, in the main pane of the cloud interface.



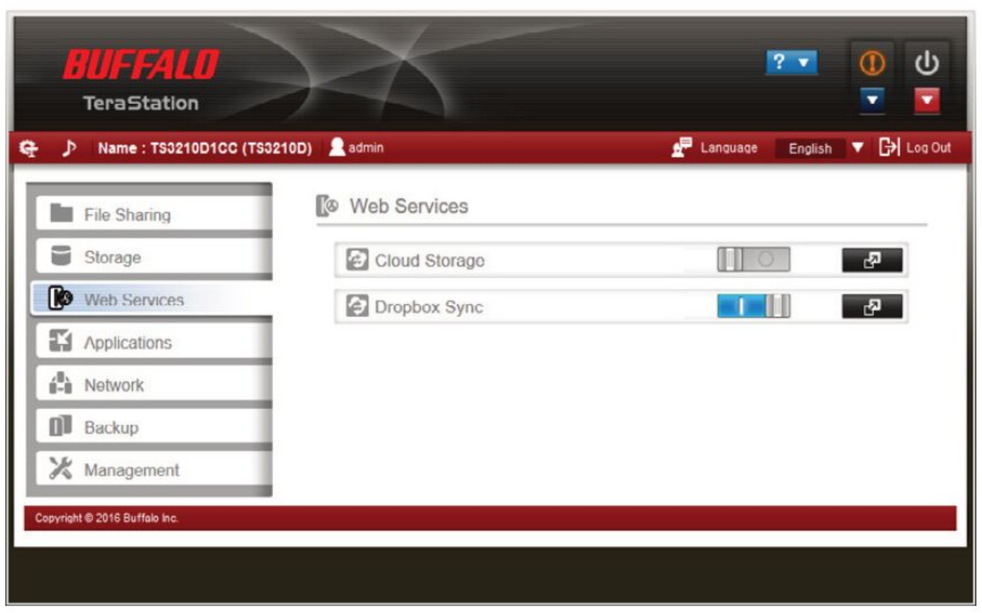
STEP 8 You can right-click the main pane to view the possible actions your user can do with the privileges they have. For example, right-click and choose **Upload** from the menu. Click the **Browse** button, and select some files to upload to the cloud server, then click the **Upload** button when ready.



STEP 9 Once the upload is complete, click the **OK** button. The interface refreshes, displaying the folder contents. You can right-click each of the individual files and select **Share** to create a link to send to a user. You can also create and share folders with other users, download files, copy and move.



STEP 10 Back in the Buffalo admin page, you can also synchronise Amazon cloud storage services and Dropbox content with the folders on your Buffalo NAS. Users can then access the Buffalo cloud server you've created, edit or update any content, and have it synchronised with the company's Dropbox account.



Cloud Security

The biggest issue that faces every user of a cloud service, regardless of whether they're a home or business user, is security. How can you be certain your data is safe from hackers in the cloud? Nothing is 100% secure, but we can take precautions.

SAFE CLOUDS

Ensuring Cyber security is often endeavoured by having multiple layers of security in place. Here then are ten golden rules for cloud security.

RULE 1 Always use a cloud service that offers full encryption for your data. Ideally, the cloud service should offer 256-bit AES military-grade encryption across all its communications and storage. This way, it's going to be exceedingly difficult for a hacker to gain entry through brute force alone.

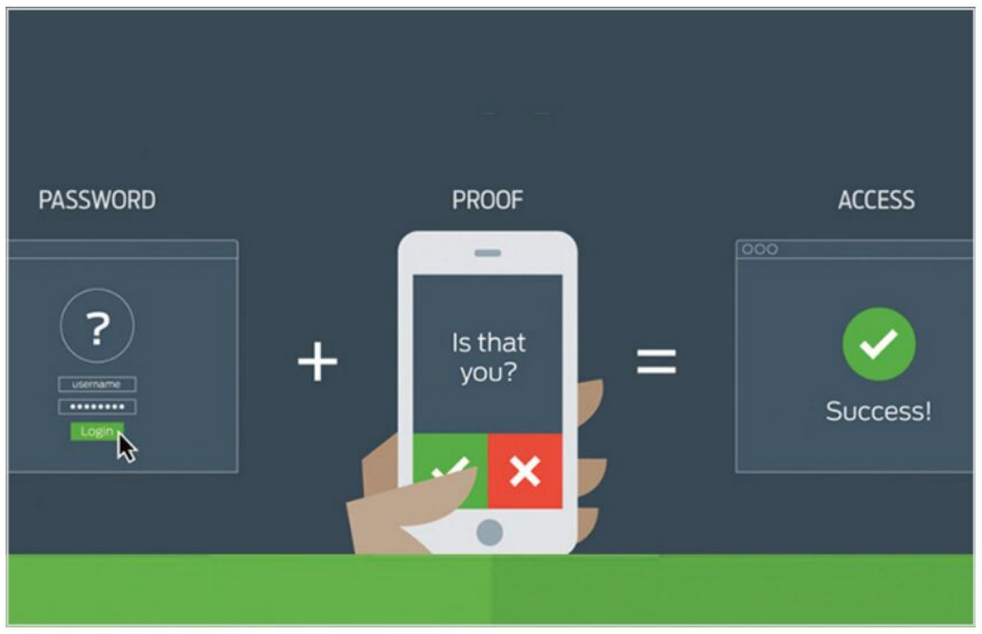
RULE 2 Encrypting your data before uploading it to a cloud service is a highly sensible idea. Providing you take steps to ensure the encryption keys are safe then, should someone ever gain entry to your account, all your data appears as a jumble of characters.

RULE 3 If you're going to use a cloud service to store your data, it's best to fully read and digest the Terms of Service of the cloud provider. You'll be able to see where they store your data, what actions they'll perform to ensure its safety, and what they'll do in the event of a breach or data disaster.

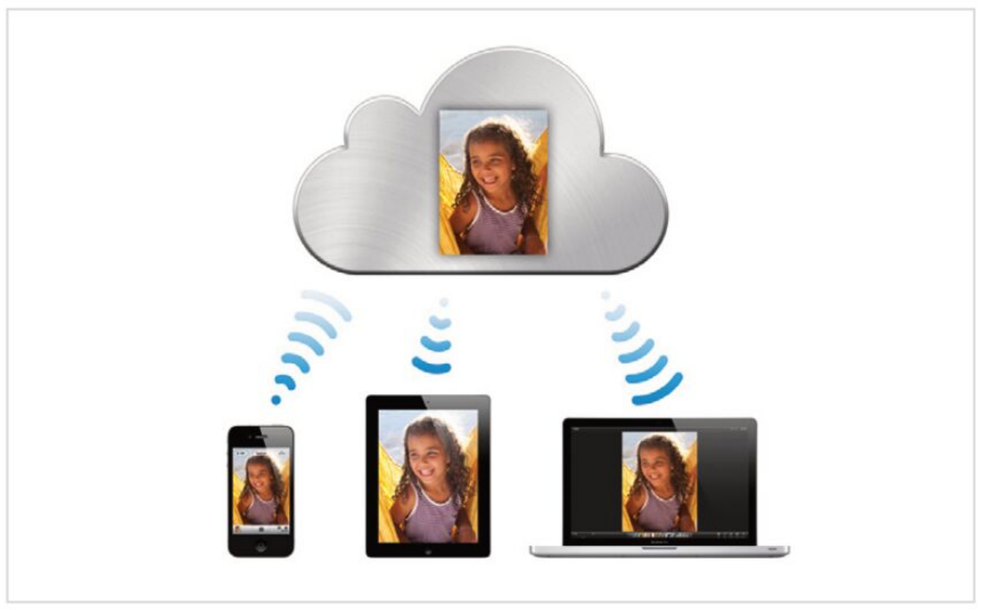
RULE 4 If possible, try not to store any sensitive and extremely personal data on the cloud. However, if you do, then make sure it is encrypted before being uploaded to the cloud. Bank details, names, addresses, credit card number, etc. all are worth their weight in gold to a hacker. Also, don't store any text files containing passwords on the cloud.

RULE 5 Make sure the password used to access your cloud service is strong and doesn't contain anything relating to you - such as your surname, street name, and so on. The number of people who still use 'password' as their password is unbelievable. Try instead to insert numbers, capital letters, and symbols.

RULE 6 If a cloud service offers a two-step verification process, then it's best to use it. A two-step process involves you entering a password, which you receive via SMS, and often includes an email informing you of when and where the login has taken place. This way you're doubling up on the security access layer.

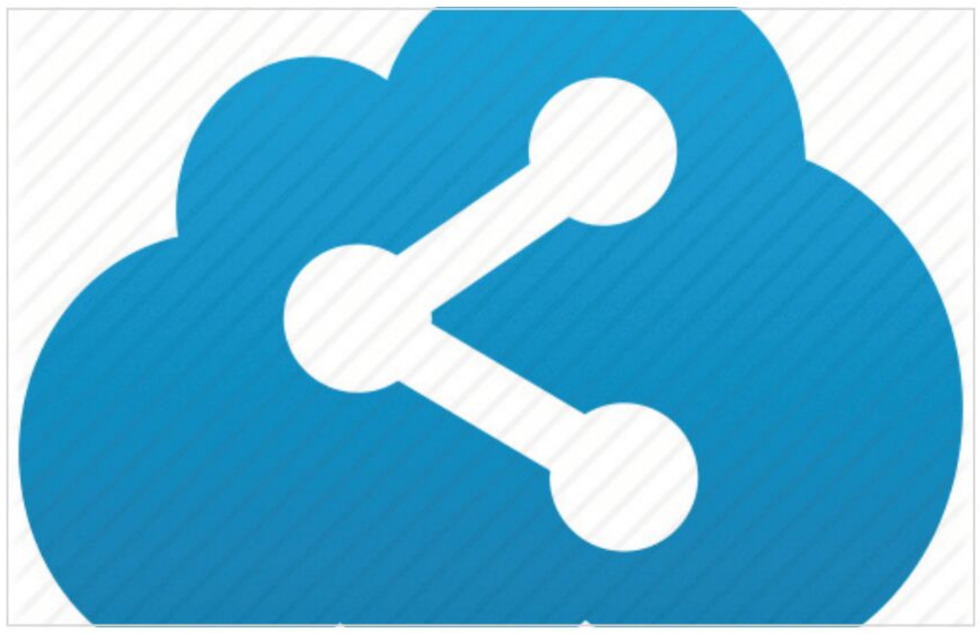


RULE 7 While having the ability to upload everything to the cloud automatically is certainly helpful, there is a concern that items you don't want in the cloud could get uploaded by mistake. Automatic syncing is great, but as celebrity news often dictates, it's not always beneficial.



RULE 8 Attempts to access your data in the cloud don't always come from some hacker in front of a multi-monitor setup. We're all familiar with social engineering being used to obtain personal information, with callers claiming to be from top organisations needing to gain access to your computer. Don't fall for it.

RULE 9 Be careful when it comes to sharing files and folders from the cloud. While it's the ideal solution for collaboration, mistakenly giving someone the wrong level of access, or access to something they shouldn't be viewing, can have disastrous consequences for an individual or a business.



RULE 10 Although your cloud data is pretty secure, it's always best to have at least a couple of extra backup locations to hand. As the saying goes, don't keep all your eggs in one basket. While Google Drive isn't likely to go bankrupt anytime soon, it's still worth having another recent backup within easy reach.

Cloud Technologies:
Education in the Cloud

There's no doubt cloud computing is changing the way we work, live, entertain ourselves, and so on, so it's logical to assume it's going to help us, as a society, move forward in terms of education. According to Eduserv, over 35% of UK universities have adopted a cloud approach to education, and that's set to increase significantly over the coming years.

The education in the cloud concept takes on many forms. Cloud technologies are used in a variety of ways throughout the education sector; from enrolling students, to providing course materials, aiding teachers in the delivery of their lessons, and even teaching entire lessons remotely over the cloud. There's a lot the education sector can get from using cloud resources, so it seems strange that it's taken so long to get to this point.

CLOUD IN SCHOOL

One of the main reasons why education is moving exceedingly slowly into the cloud is thanks to the government, in the UK at least. The formation of academies in 2000, the brainchild of former UK Prime Minister, Tony Blair, was to help drive up standards in schools where local authorities were struggling. However, that transition created its own set of problems, and it's taken several years for the uplift to settle down; also, due to recent austerity measures under the Conservative government, funding has been tight for schools.

That is beginning to change, however. A guidance report published by the government in April 2019, titled: Moving your school to the cloud, outlined many of the benefits of moving existing systems and services to the cloud. These included helping to make current systems more useful and engaging, remote access for students and staff who are unable to make it into school, cost savings and increased and improved security.

The move to the cloud is gradual, but the ball has started rolling. It is estimated that by 2025, 75% of current academies will have moved 90% of their services and systems to the cloud.

BENEFITS OF THE CLOUD FOR EDUCATION

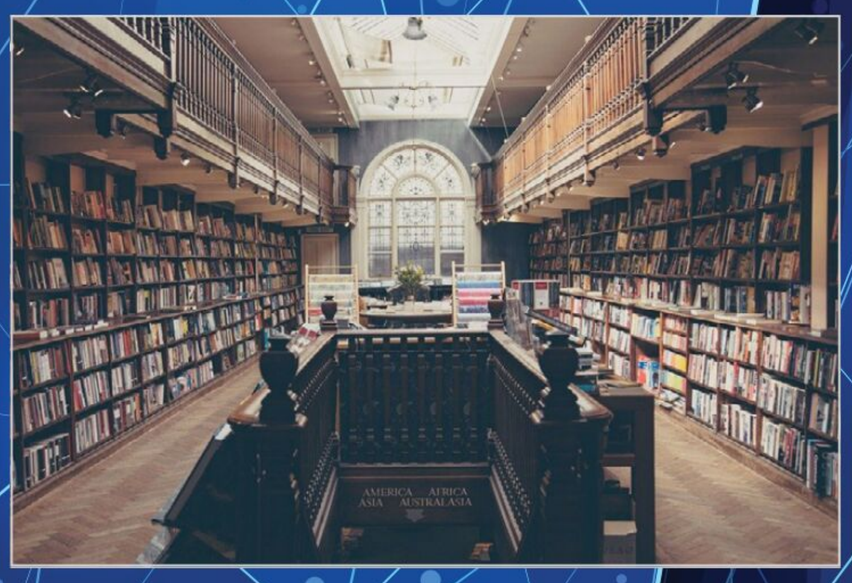
The entire education sector has many systems and services that can greatly benefit from moving to the cloud, or even some form of hybrid cloud setup. Elements within a school, college or university, such as management information systems, enrolment, curriculum software and content, can all be directly run from a central, government-led cloud solution; Ensuring that all educational establishments are conforming to a single policy. For example, Capita Education Software Solutions is named as the Crown Commercial Service for delivering cloud-based systems to education through its UNIT-e Management Information System.

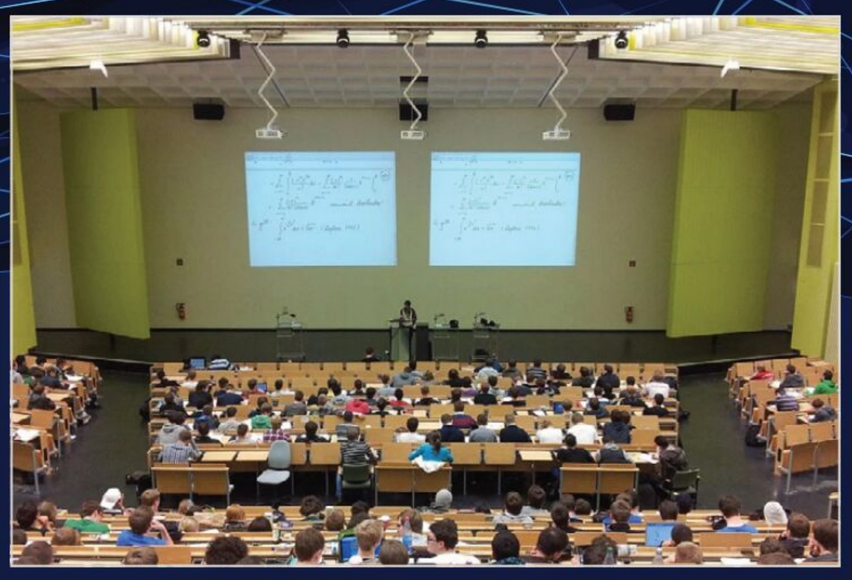
Security is a bonus for education in the cloud, as the technology ensures a reliable and continuous service that removes the risk of downtime from site maintenance, as well as keeping an educational establishment's data safe, with higher levels of security than an individual school or college may be able to offer.

Reduced costs due to licensing, less need for on-site servers and server rooms, and the management of complex IT systems can be factored in. Limited user licenses for costly software can be better managed, so the school isn't wasting money on a license that isn't being used.

Accessibility is a key element that's often overlooked here. The ability for a school, college or university to enable remote access to its systems, as if the student were sitting in front of a computer within the premises, is a huge benefit to everyone. It doesn't matter if a student is unable to attend classes, due to illness or some other factor, or if that student is located on the other side of the world. Providing they have access to the Internet, they'll be able to log in to the establishment's cloud area and attend virtual classes, catch up with homework, and have access to the vast Intranet library that most education establishments offer.

Teaching will undoubtedly benefit from the cloud through most of the points mentioned above, plus it'll enable the teacher to incorporate teaching ideas and concepts from other schools, colleges and universities. The majority of cloud services are aimed at collaboration, so, with this in mind, teachers from across the country, and indeed the world, would be able to work together to deliver better lessons. There's also the possibility that teachers from other countries would be able to deliver unique content to students who live in another part of the world





The Future

It's not science fiction to think that the next generation of students could well be distance learning more than face-to-face. While physically being in front of the teacher is believed to be the best approach, it's worth considering that cloud technologies make it possible for a student to log in to their educational account at any time to complete a lesson. Whether that'll work in practice isn't for us to say, but it's certainly worth considering.

Where Next for the Cloud?

The cloud has moved on from being the latest buzzword to a modern user's must-have service. SMBs and large-scale enterprise organisations would probably admit to being so reliant on cloud services that their companies wouldn't exist without it. So, what's next for cloud technology?

RISE OF THE MACHINES

Big Data, AI, Machine Learning, cavernous datacentres and quantum computing are all terms bandied about when it comes to discussing the future of the cloud.

In truth, no one really knows which direction cloud technologies will take over the next five to ten years. However, it's generally agreed that the aforementioned terms will play a big role in defining what the future of the cloud will look like.

Cloud technologies are still in their infancy, in technical terms at least. As consumers, we've only just started to use the cloud for everyday tasks. Equate to physical technology, and we've just reached the point in the early '80s when the home computer became accessible and popular.

While it's a little disconcerting to think that we're putting our trust into technology at the equivalent level of a Commodore 64, it does mean that the future is going to be pretty spectacular.

DATACENTRES

Looking through a mid-sized datacentre is something you don't forget in a hurry, just imagine what it'll be like looking through the datacentre of the future? These impressive structures, with their labyrinthine corridors of monolithic servers will dominate the cloud future. It's already been emphasised that, although power-hungry, a datacentre using carbon-neutral energy sources is far more ecological and economical than a city full of companies' server rooms.

QUANTUM COMPUTING

Although still quite exotic, quantum computing is quickly becoming a real thing. You can, even now, access quantum processors and experiment with their in-built semi-mythical tunnelling, entanglement and Q-Bit architectures. As the future will no doubt show, quantum computing will improve and finally leave behind traditional computing models. When this happens, expect to see a new generation of AI evolution and near-instantaneous cloud data access.

BIG DATA

A popular term at the moment, Big Data is set to transform the way cloud computing works in the future. Significantly, with the big names in cloud computing all vying to support bigger and better Big Data, it's obvious that being able to analyse huge volumes of data will be second nature in the next five years. How this will trickle down to the consumer level isn't clear at present, but the pundits have their bets on near-unlimited storage available for personal cloud use.

CLOUD GAMING

One of the most significant moves in the cloud industry we'll see throughout 2020, and beyond, is the rise of cloud-based gaming. Google's Stadia has started off on rocky ground, and Microsoft's Project xCloud looks to be the bigger player moving forward. With more powerful servers at the disposal of big companies and faster to-the-user broadband speeds, there's no reason why cloud gaming should fail. The only bugbear will be the levels of graphical processing on the gamer's side. With heightened realism in games, a bottleneck of graphics throughput will happen sooner rather than later, so perhaps the console isn't going to die just yet - but it may evolve into more of a graphical processing unit for online content in the future.

AI AND MACHINE LEARNING

Off the back of the Big Data surge come ever-impressive leaps in Artificial Intelligence and Machine Learning. Preparing hundreds of terabytes of Big Data for analysis takes up considerable time for those involved, so having a powerful computer do this for you will certainly make sifting through that data easier. Of course, Machine Learning can expand on that, helping to create the cloud-based apps of the future that the consumer will access via their mobile devices. Despite the Hollywood negativity of AI, it's the future of cloud computing.

Cloud Technologies:

Gaming in the Cloud

With the release of Google Stadia, the gaming community has officially entered a new era of content delivery: Gaming in the Cloud, or Gaming as a Service. Nevertheless, is it the future we want, or just some kind of cloak and dagger way for hardware companies to further throttle the games industry into dancing to their tune?

Sony, Nintendo, Amazon, Electronic Arts, NVIDIA and Microsoft; each of these companies must look to the future of gaming in the cloud, and change the way that games are played, distributed, sold and owned.

Google's Stadia project launched in November 2019, and, while the hype behind it was reaching a fever pitch, the actual launch was something of a damp squib. A catalogue of issues, mostly due to latency issues, meant the company's first foray into gaming in the cloud didn't quite rock the boat as the Google team had hoped.

Not that the Stadia is a bad idea, on paper it's great. Create a device that's capable of delivering games as a service that can be played on any medium, be that a PC, tablet, phone or even just the TV. There's no need for a several hundred-pound games system, or thousand pound-plus gaming PC, as all the graphical processing is done in the cloud, on Google's impressive datacentre servers, then sent through the broadband lines to the gamer at home.

The service itself will be subscription-based, with the Sadia costing somewhere in the region of £120 and an obligatory monthly subscription of around £8.99 per month – correct at the time of writing. However, the promise of this golden era of game-anywhere falls far short of the expectations. Stadia is a bit of launch flop; many of the promised features, such as recording to Twitch, and 4K gaming, are missing, and the overall quality of the service lacks considerably.

The problems stem mainly from latency or lag. Those who have reviewed the Stadia on launch say that gameplay is hindered by poor graphics and problems around the game keeping up with the player, even when connected to faster than average broadband lines. And, let's face it, latency issues are a major thorn in the side of the Stadia, especially as it's being sold to a community obsessed with having the lowest latency possible.

PROJECT XCLOUD

Project xCloud is Microsoft's answer to the gaming in the cloud service. The service that Microsoft offers is very similar to its Xbox Console Streaming program. However, in the case of Project xCloud, the player doesn't need to own an Xbox console.

xCloud enables the player to pair an Xbox controller with an Android device, and play titles through the Xbox Game Streaming App. The game is hosted on Microsoft's datacentre servers, which are handling all the heavy-duty graphical elements, as well as the huge amount of processing power needed to drive a modern game. The app connects the player to the cloud service and begins streaming the game to the player's Android device.

It's very early days, and Microsoft has the advantage here of learning from Google's mistakes. It's taking the time to ensure that the dreaded latency is kept to an absolute minimum come the official launch of Project xCloud.

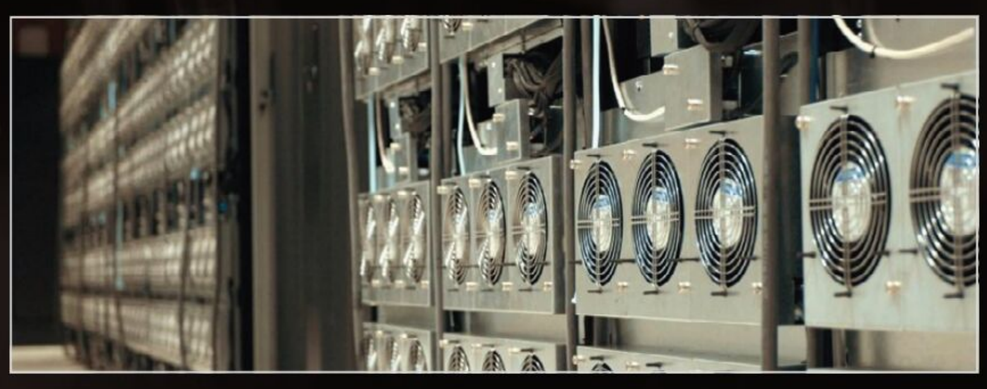
Whether they'll be successful remains to be seen, though.

PROBLEMS

The concept of gaming in the cloud isn't new, but it's only now that companies have the processing hardware in their datacentres to supply the vast resources necessary to host a complex modern game for millions of potential players around the world.

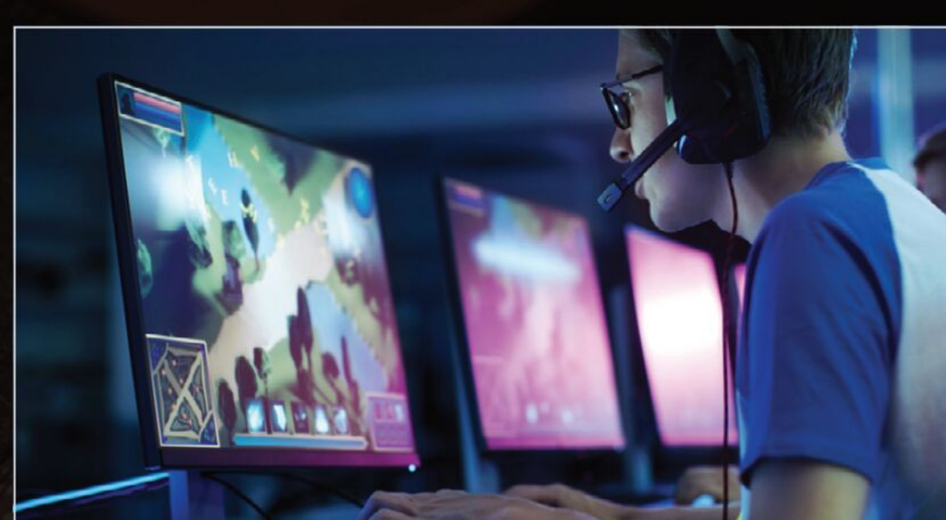
Thanks to the likes of NVIDIA, a lot of the datacentres used for gaming in the cloud contain specialist NVIDIA hardware that's capable of delivering the kind of frame rates that the modern player demands from their game. The datacentre can certainly handle the load of millions of gamers, providing they live next door.

The problems stem from the lack of consistent, good bandwidth to the gamer's home. Some of you reading this will have 100+Mbps lines to your ISP, resulting in near-perfect streaming of a game. But, a lot of you won't. In fact, most of the people reading this will average around 30Mbps, to the front door. So, once you take into account the other elements of the home network, contention on the line and the fact that broadband speeds peak and dip throughout the day (despite what the ISP would have you believe), you're left with a substandard connection to a server that's trying to send you a huge volume of information.



Will it ever work?

We believe it will, yes. However, there's a lot of bridge crossing necessary before we get to that point. While we've got the hardware to deliver such services, the average home user isn't anywhere near able to receive that level of traffic without problems. And currently, what's the point of paying £120 plus £107 per year for a service that'll only deliver a fraction of what's sold. As a gamer, you may as well pay £300 for a console and enjoy pure 4K content without the problems of latency or lag.



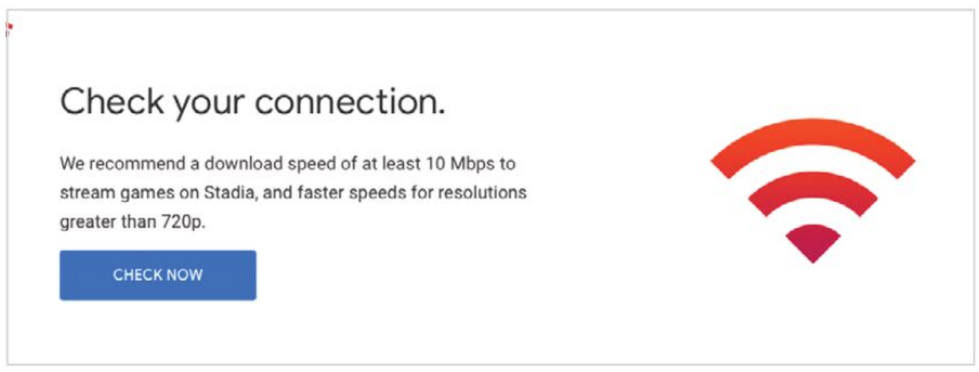
How to Use Google Stadia

With their Stadia project, Google hopes to revolutionise how we play games in the home and on the move. Their vision for the future is one where it is possible to play games on virtually any hardware without the need for expensive consoles or high-end desktops. Let's take a look at the hardware and explain how it works.

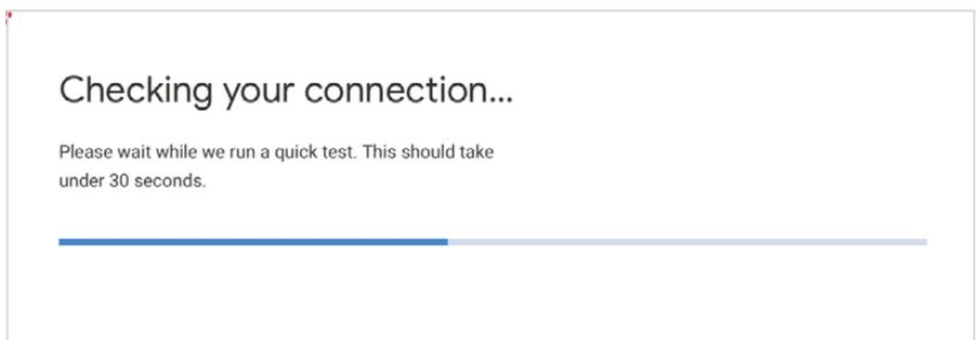
STADIA SPEED TEST

Before you begin your Stadia set-up, you need to ensure that your Internet connection is fast enough. Google has provided an online tool to do just that.

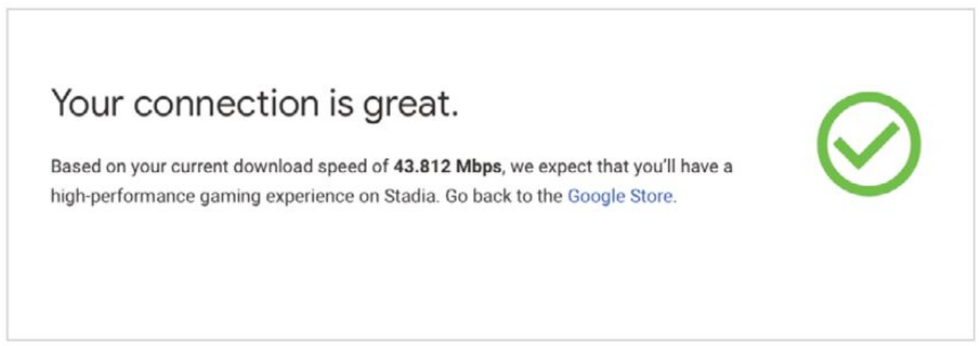
STEP 1 Open a web browser, preferably on the device with which you intend to use Stadia, and enter the following URL: projectstream.google.com Before you start testing your Wi-Fi speed you are advised to limit web traffic, such as downloads or streaming.



STEP 2 Once your Wi-Fi connection is free of other users, and clear of apps, tap the blue Check Now button on the left side of the web page. This activates the process, so you can simply sit back and wait for the results to appear.



STEP 3 When your Internet connection test is complete, it displays the results; this should take no longer than 30 seconds. These come in the form of a green tick for a pass and a red cross for a fail. A fail essentially rules out Stadia compatibility.



HOW STADIA WORKS

Google Stadia is a hardware free game streaming service that will enable players to play a catalogue of game titles on a large variety of devices. All you will need to play is a joypad, a screen and an Internet connection.

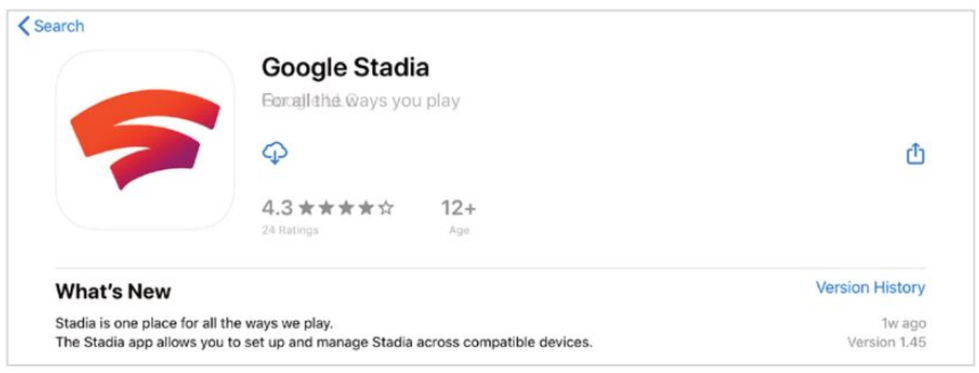
Stadia will allow play on existing desktops/laptops computers, Smart TVs, tablets and smartphones. Play is enabled via the Stadia controller that may indeed resemble a traditional joypad, yet is much more than that. Unique features exclusive to the joypad, include the ability to capture and share your gaming footage directly to YouTube.

So basically get your device online, connect your joypad and press play, that's it!

GETTING STARTED WITH STADIA

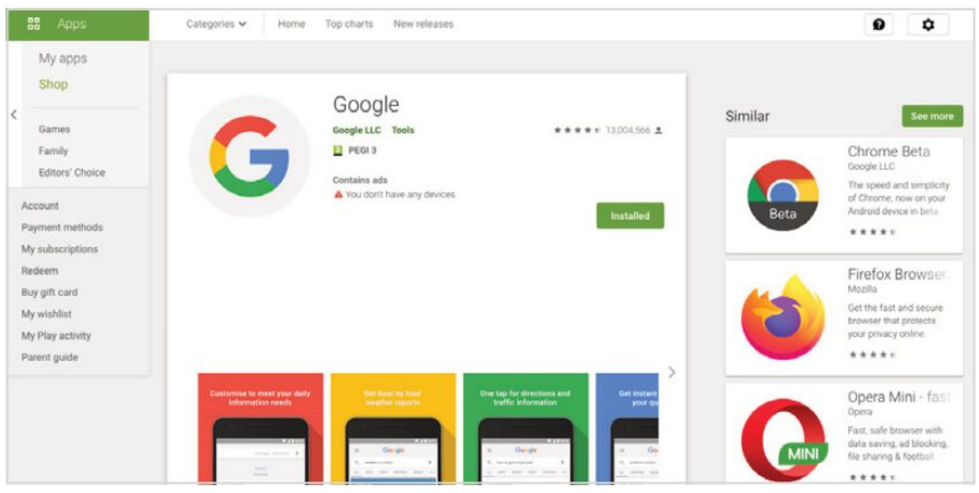
Are you ready to play some games? Let us take you through the set-up of your Google hardware with your monitor or TV so you can press Start with Stadia.

STEP 1 Using a mobile device (smartphone or tablet), you need to open the App Store on iOS, or Google Play on Android, and download the Stadia application. At this point, enter the invite code that was emailed to you at purchase.

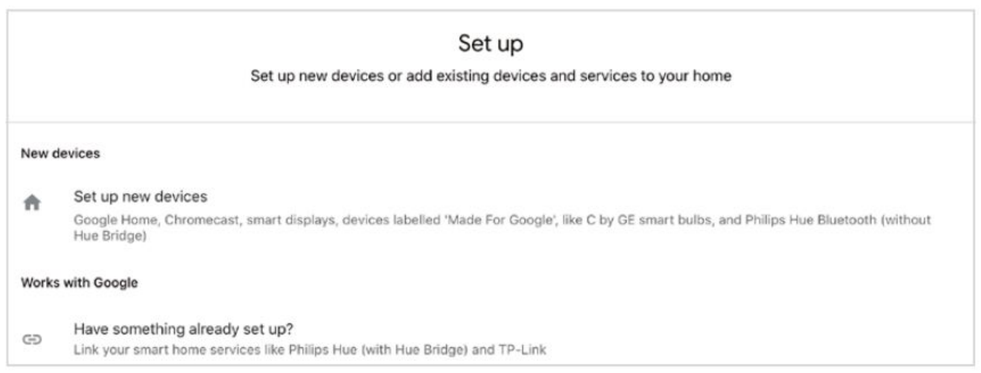


STEP 2 If you wish to use your Google Stadia on your TV, you need to set up your Google Chromecast Ultra first. NOTE: You need an Android or iOS mobile device to complete setting up Chromecast.

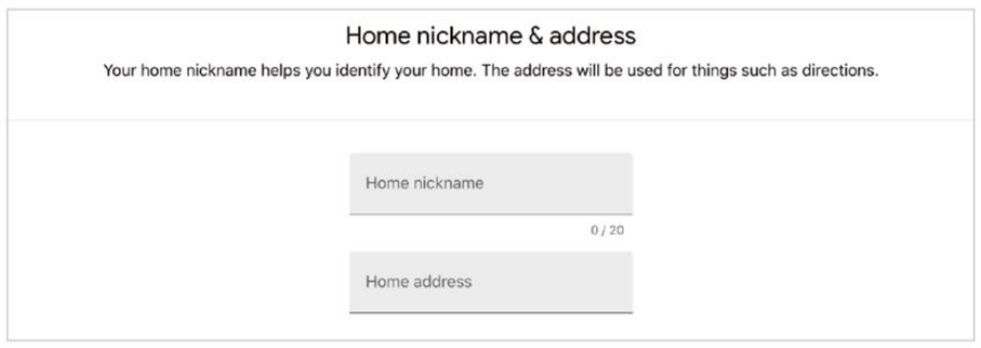
STEP 3 On your Android device, you need to download the latest build of the Google Home App. Sign in using your Google account and then connect the Chromecast to your TV via the HDMI input and USB for power.



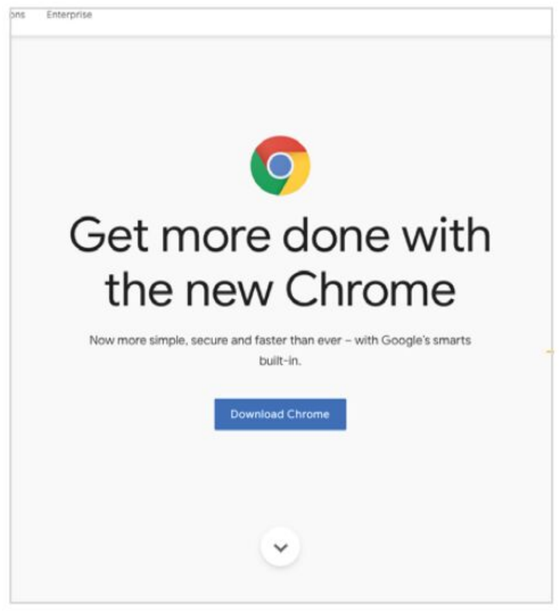
STEP 4 Ensure your Android mobile device connects to the same Wi-Fi network you want to link to your Chromecast Ultra. Open the Google Home app and, from the home screen, tap Add +›Set up device›Set up new devices.



STEP 5 Find your Chromecast Ultra from the list of new devices. Once selected, follow the instructions and the Google Home app pairs your device to your home network, thus enabling Stadia streaming via your Chromecast.



STEP 6 Finally, if you wish to play games on your desktop or laptop, you need to open a web browser on the video device you wish to use and visit: google.com/chrome and download the latest build of the Chrome browser.



WHAT'S IN THE BOX?

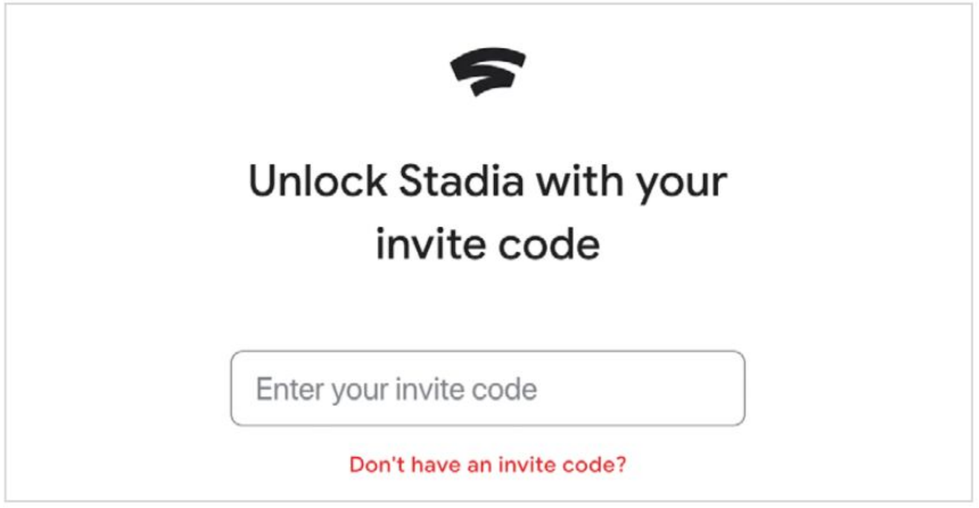
Having confirmed Wi-Fi compatibility, let's start unboxing your Google Stadia. Here's what's in store when you peel back the lid of your Stadia Premiere Edition.

- A Single Google Stadia Controller
- A Chromecast Ultra
- A Mains Charging Cable
- Three Months Subscription to Stadia Pro
- Documentation

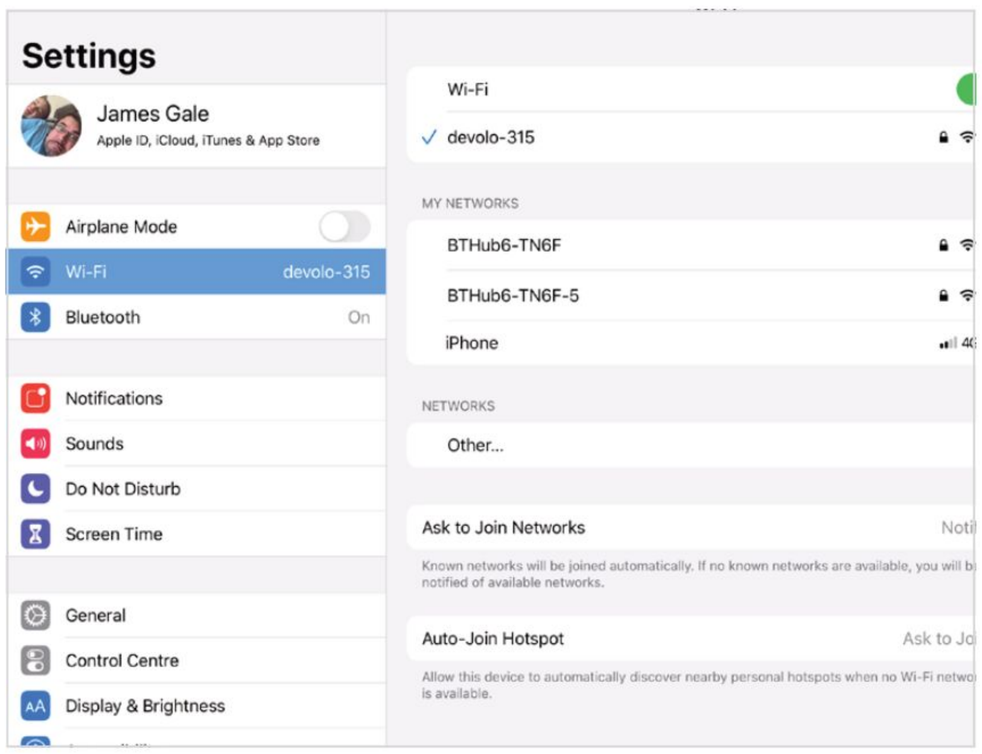
STEP 7 Now let's turn our attention to the Google Stadia Controller, once out of the box you need to ensure that your device is fully charged before you start setting up the controller itself.

STEP 8 Once the device is fully charged, unplug the power cable. Press the Stadia logo button on the controller for two seconds to turn it on. A vibration confirms that you have powered up the device

STEP 9 Switching to your mobile device, open the Stadia app, using your invite code (if required), and tap the Controller icon to the top right, you may need to enable Location access first. Select your controller from the list of devices.



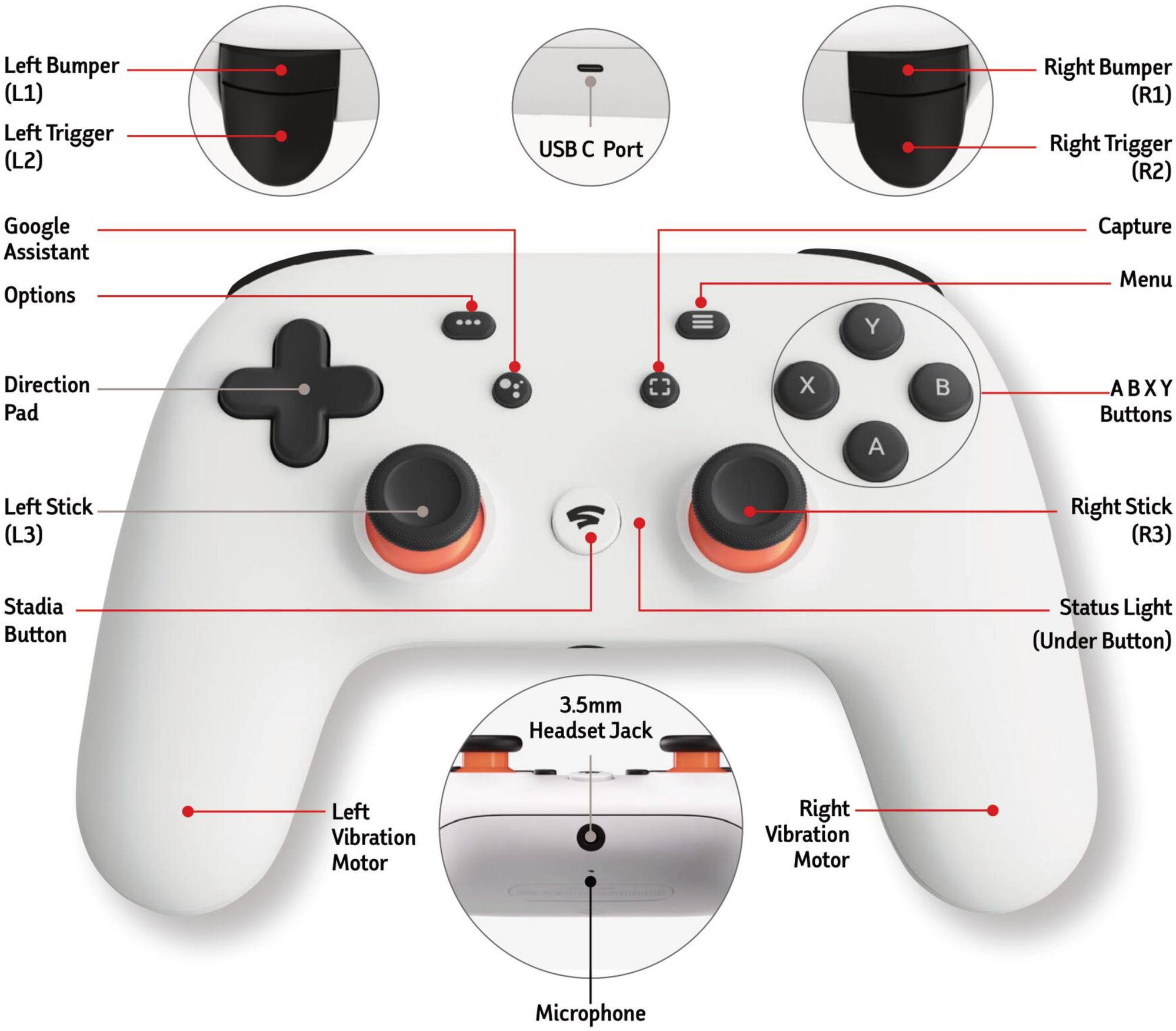
STEP 10 Your Stadia controller starts to vibrate to confirm connection and then, when prompted, tap Yes on the mobile app. Now tap Connect to your network using the same account as your mobile device.



STEP 11 You need to enter your Wi-Fi password and then tap Connect to Wi-Fi to complete the process. Your controller may automatically install an update, if it is required, and then you are ready to play.

GOOGLE STADIA CONTROLLER CONTROLS EXPLAINED

With Stadia, the controller is the console, so understanding how this all-in-one device works is going to be essential to your gaming experience.



UNDERSTANDING THE STATUS LIGHT

Blinking White: Your controller is charged and ready to access your network via the linking code.

Solid White: The controller is powered on, linked to a screen and ready for use.

Blinking Orange: The controller needs connecting to a Wi-Fi network.

Solid Orange: The controller is charging, when complete, the light turns off.

CAPTURE AND SHARE FOOTAGE

If you have a YouTube channel, or simply want to share your gameplay footage via social media, you can capture gaming using this button. Press once to take a screenshot or hold to capture video.

STADIA OFFICIAL SPECS

Weight:	268g
Dimensions:	163mm x 105mm x 65mm
Internals:	Custom 2.7GHz hyper-threaded x86 CPU with AVX2 SIMD and 9.5MB L2+L3 cache. 16GB of RAM with up to 484GB/s of performance. SSD cloud storage
Colours:	Clearly White, Just Black, Night Blue & Wasabi

Glossary of Cloud Terms

There are a number of confusing and bewildering terms used in technology, and, since the cloud became a real thing, those terms have expanded to encompass everything we do both online and in a cloud service.

CLEAR SKIES AHEAD

Here's a quick list of some of the terms you're likely to come across as you explore cloud technologies further. Needless to say, the industry loves its terminology, so expect many more as you delve deeper into this sphere.

AGILITY Refers to the faster implementation of IT within a company, specifically cloud implementation; Often referenced when a company moves from in-house to cloud technologies particularly quickly.

AIRFRAME An open-source cloud platform that targets businesses in the thinking stage of adopting a private cloud service model.

BACKUP AS A SERVICE Another form of online mass storage; whereby a company can effectively back up its entire system's data to the cloud. This service is of interest to audits, as off-site backups are secure and safe from accidental damage.

BPaaS Business Processes as a Service. The complete business process including HR, accounts, payroll, advertising, and so on, in a single cloud package from a Cloud Service Provider.

CLOUD The Cloud, an online set of globally connected services, with which individuals and businesses can interact.

CLOUD BACKUP Being able to back up your data to a cloud storage service; used by both consumer and businesses alike. Offers support for multiple platforms, operating systems (from computers to mobile devices) and even games consoles.

CLOUD BROKER A company that liaises between several cloud service providers and clients to help find the best solution.

CLOUD BURST A hybrid cloud-deployment feature, whereby a private cloud is able to utilise public cloud resources when demand for computing tasks spikes.

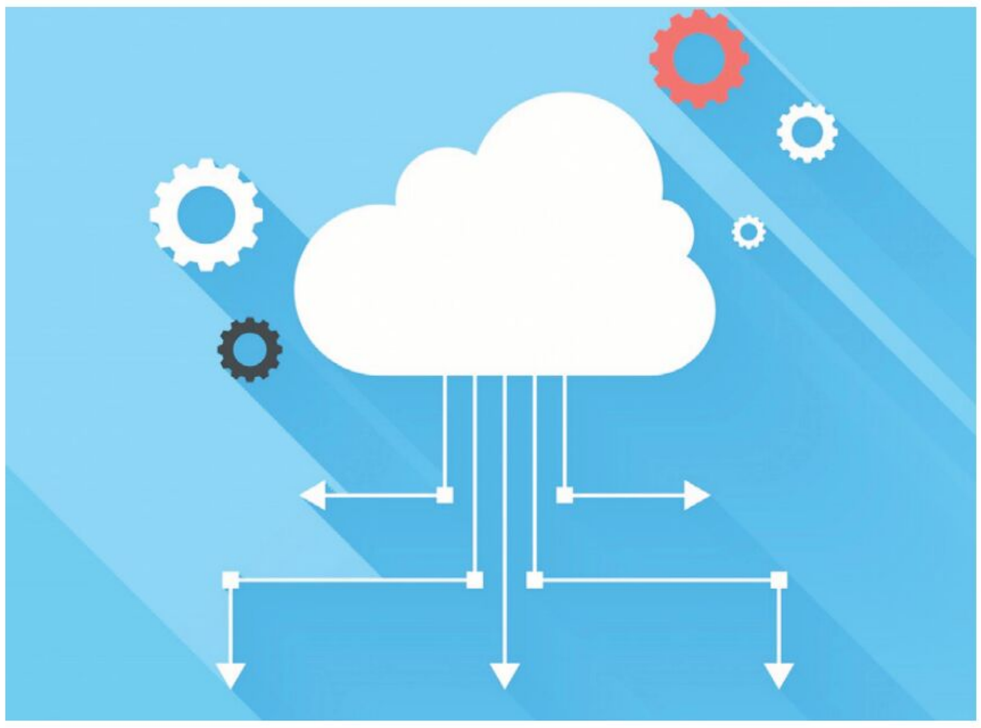
CLOUD INFRASTRUCTURE The physical hardware, software and connectivity that makes up a cloud-based datacentre. The servers, apps, networking and so on.

CLOUD PYRAMIDS A visualisation of a cloud providers infrastructure that shows, usually via colour coding, the services it offers on different platforms.

CLOUD SERVICE The solution that's offered from a remote cloud server that can be storage, email and so on. And categorised as Private, Public or Hybrid.

CLOUD SERVICE PROVIDER The company that provides cloud-based solutions such as storage, email, virtualisation and more. The company may or may not own its datacentre and cloud infrastructure.

CLOUD STORAGE Online mass storage, housed on servers in datacentres, with quotas set for those who utilise the storage.



CLUSTER A group of linked computers that work together as if they were a single computer, for high availability and or load balancing.

COMMUNICATIONS AS A SERVICE Cloud-based telecoms, messaging and video conferencing services. The likes of Skype, Facebook and Twitter come under the CAAS heading.

DESKTOP AS A SERVICE A form of cloud-based remote working, whereby a user can access their desktop from any Internet connected device, regardless of the device's operating system.

DATABASE AS A SERVICE Cloud housed and driven database, freeing up the company's investment in in-house hardware and significantly lowering power costs.

DATACENTRE A self-sufficient building with specialised climate control housing lines of servers. The servers work in a cluster to provide the various cloud services.

ELASTICITY The ability for a cloud service to expand or retract its services, depending on the demand to its servers.

EC2 Amazon's Elastic Compute Cloud. A web service that provides Elasticity capacity in the cloud, designed to make working with web-scale computing easier for developers.

GAMING AS A SERVICE Cloud-driven gaming servers that host games for multiple platforms: PC, PS4, Xbox, etc. and provide unique gamer-specific rewards, trophies and events.

HYBRID CLOUDS A cloud service that uses public and private clouds, as well as i n-house hardware, to provide cloud services.

HOSTED APPLICATIONS A web-based application that runs on a remote server, hosted in the cloud. The same as Software as a Service.

INFRASTRUCTURE AS A SERVICE A cloud model that provides users with a virtual server and network. The online server can be accessed from any Internet-connected device.

MOBILE CLOUD STORAGE Simply a service designed to house mobile data storage for an individual or business.

NIST National Institute of Standards and Technology. Founded in 1901, NIST provides standards for most electronic and digital services.

PLATFORM AS A SERVICE A cloud model that provides developers with a coding platform to programme new apps. The platforms can be any operating system, offering greater scope for multi-OS app development.

PUBLIC CLOUD A cloud service, available to everyone, that provides everything from email and storage, to virtualisation and collaboration.

PRIVATE CLOUD A cloud service that's managed by a single business, providing the same duties as a public cloud but having exclusive access to the business only.

SOFTWARE AS A SERVICE A cloud model that provides online access to software such as productivity apps, email etc.

SERVICE MIGRATION The act of moving all your company, or individual, data from one cloud service to another. Can also mean moving from all in-house to a cloud-based service provider.

VIRTUALISATION Creates an image of an operating system on virtual hardware. Users can create virtual machines for any hardware type, on which they can develop or test programs.

VPC Virtual Private Cloud. A private cloud that exists within a shared or public cloud. Such as a company's private cloud hosted within Amazon's EC2.

Google Hardware Guides

For many people Google's hardware is fast becoming an essential piece of home kit, but what is it, and how does it work?

Throughout this section we look at what Google's Home devices are, and where the cloud fits in - bringing the power of cloud and AI technology to your home. There's in-depth guides on how to get the most from the Google Home collection, as well as handy tips and tricks.

Google Cloud to Home

From Google Home to Nest, Google's collection of smart home devices has expanded rapidly over the last year. All these items have one thing in common: they all interact with the power of the Google cloud and its many services.

Behind the pleasingly aesthetic speakers, Nest Wi-Fi, Hubs, Home and Chromecast devices lies the heart of the Google cloud services; in particular, the Google Assistant.

This artificial intelligence-powered virtual assistant was developed by the AI teams at Google and released in 2016. It's written in C++ but utilises Python libraries to help understand the communications between people and the actions that are required of it.

CThe AI side of things, alongside the wealth of information that's incorporated into the Google Assistant, are all held within the labyrinthine corridors of the many Google data centres scattered around the world. Its mission is to "Create a more helpful Google for you", and as such is designed to interact with all of Google's services, as well as third party services and the ever-growing collection of Google's hardware devices.

Since it's not the only AI Assistant on the block any more, Google's slice of the AI market share needs to be as near perfect and as powerful as possible, while still offering the human to digital personal touch that's required of a modern AI Assistant. This of course isn't an easy task to accomplish and there are near continual improvements to the core code, as well as improvements to the background hardware and software interactions with the data centres - which also trickle down to the apps on your devices.

On top of this, Google is also committed to offering its AI services as a separate product for business and users to build their own technology around. The AI and Machine Learning products form a three-tier set of services: AI Hub, AI Building Blocks and AI Platform.

A slice of one of the many Google AI Cloud Data Centres cooling solutions.

The AI Hub is Google's hosted repository of plug and play AI components, providing enterprise-grade sharing capabilities, end to end AI pipelines and out of the box AI algorithms. They enable organisations to privately host AI content.

AI Building Block provides the tools necessary for developers to add sight, language, conversation and structured data to their custom applications within the Google AI cloud. They're separated into two main categories: Vision AI, which is designed to analyse images in the cloud and Video AI, which provide tools to enable quick searching of videos and extraction of metadata.

Finally, the AI Platform is the code-based data science development environment. Where machine learning developers, data scientists and data engineers can deploy their code within the cloud. The many tools available include Deep Learning Containers, Data Labelling Services, AI Platform Predictions, What-If Tools and Cloud Accelerators.

GOOGLE'S AI CLOUD IN ACTION

A recent example of how the power of AI and Google's cloud services are working with developers and data scientists is the analysis of the Coronavirus Pandemic. Through the power of the cloud and data centres, scientists and developers are using Google's AI services to help model and predict the spread of the pandemic, how it will affect certain areas of the globe, what the end result could be in several years' time, and how to contain and lessen the spread of the virus, and future viruses, without the negative effects that we've seen throughout the world in 2020.

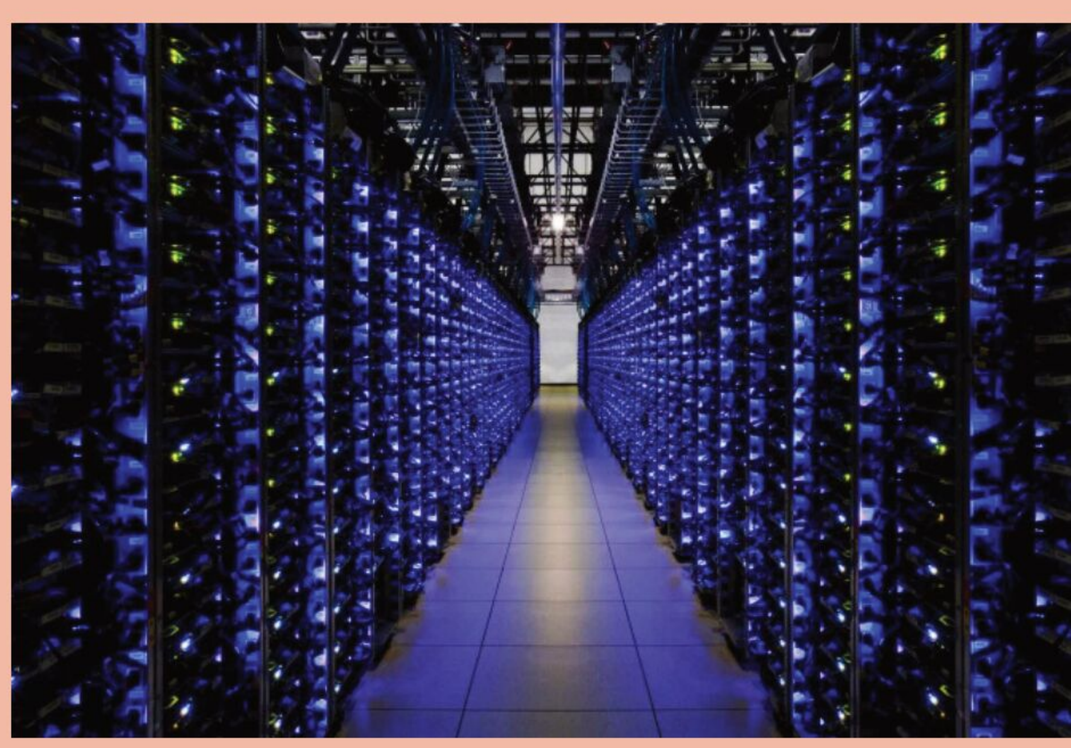
While this is an incredible use of Google's AI and cloud resources, it's also the same basic technology that's behind the Google Home devices. When you power up a Google Home Mini, for example and ask it to play a selection of classical music, the technology that springs into action utilises similar algorithms used to help fight Coronavirus.

CLOUDS IN THE HOME

Essentially, despite its small appearance, the Google Home Mini is a link from you to one of the many Google cloud data centres. This tiny device plugged into your wall is a link to a building that houses petabytes of data, across thousands of individual, powerful servers all working together to help discover the secrets of the universe, fight future pandemics and search Spotify to deliver to you the music you've just asked for.

Stop and think about that for the moment and you'll realise just how quickly the interaction between us and the digital world around has progressed in such a short time.

A Google cloud data centre may seem like a distant thought to many of us, indeed another world to most of us but there's a link to us and the huge power behind a data centre in our house and thanks to Google's drive in AI and cloud-based machine learning it's only going to get better.



Rows upon rows of servers all work together to form the Google AI Cloud.

The Google Home Collection

There are now six different Google Home devices to choose from, including the tiny Home Mini and the new Google Home Hub. The specification and size varies greatly, so if you are not yet sure which Home speaker is best for you, check out all of the details here.

Google Home Max

Key Features: Meet Google Home Max, he helps you to hear every note as the artist intended and feel every beat with heart pounding bass. It's the ultimate speaker, made for your music. The advanced hardware delivers deep bass and crisp treble in stunning stereo sound. It analyses, tunes and updates itself automatically, so all you need to do is listen. The far-field voice control allows Max to hear you across the room, even while the music's playing.

Final Thoughts: The best audio-only based product in the Google Home range.

Dimensions
- Width: 13.2" (336.6 mm)
- Height: 7.4" (190.0 mm)
- Depth: 154.4 mm
- Power cable: 2 m

Weight
- 11.7 lbs (5,300 g)

Colours
- Chalk, Charcoal

Materials
- Acoustically transparent fabric
- Rigid polycarbonate housing
- Silicone base

Supported audio formats
- HE-AAC, LC-AAC, MP3, Vorbis, WAV (LPCM), Opus, FLAC with support for high-resolution streams (24-bit/96 KHz)

Wireless
- Wi-Fi • Bluetooth
- 802.11b/g/n/ac (2.4GHz/5Ghz) Wi-Fi for high-performance streaming
- Chromecast built-in
- Bluetooth® 4.2

Speaker
- Two 114 mm high-excursion (+/- 11 mm), dual voice-coil woofers
- Two 0.7" (18 mm) custom tweeters
- Sealed rigid housing
- Acoustically transparent fabric

Mics
- Far-field voice recognition supports hands-free use
- 6 mic array

Processor
- Quad-core ARM
- 1.5 GHz 64 bit quad-core ARM® Cortex™ A53

Sensors
- Capacitive touch sensor
- Ambient light sensor
- Accelerometer

Power
- AC Power 100-240 V, 50/60 Hz

Ports & Connectors
- USB-C™ • 3.5 mm jack
- USB-C1
- 3.5-mm jack with analogue audio input

AC power
- 1USB Type-C and USB-C are trademarks of USB Implementers Forum.

Operating system
- Android • iOS

Other
- Multi-room audio

Google Home Mini

Key Features: A powerful little helper; Google Home Mini keeps you informed and up to date with instant news, weather and commute updates without lifting a finger. Master the kitchen; Google Home Mini helps with timers, step-by-step recipes, and conversions and substitutes. Start your smart home; it's always improving with seamless connections to the latest compatible smart lights and thermostats.

Final Thoughts: The budget range of Google Home offers a great product for the price.

Dimensions
- Diameter: 98 mm
- Height: 42 mm (1.65")
- Power cable: 1.5 m
-

Weight
- Device: 173 g
- Power adaptor and cable: approximately 75 g

Colours
- Chalk, Charcoal, Coral. Aqua

Materials
- Durable fabric top
- External enclosure made from 20% post-consumer recycled plastic
- Non-skid silicone base

Supported audio formats
- HE-AAC, LC-AAC, MP3, Vorbis, WAV (LPCM), Opus, FLAC with support for high-resolution streams (24-bit/96 KHz)

Wireless
- Wi-Fi • Bluetooth® support
- 802.11b/g/n/ac (2.4 GHz/5 Ghz) Wi-Fi
- Chromecast and Chromecast Audio built-in
- Bluetooth® 4.1 input support

Sensors
- Capacitive touch

Speaker
- 360 sound with 40-mm driver

Mics
- 2-mic array
- Mic switch

Power
- 5 V, 1.8 A

Ports & Connectors
- Micro USB port

Operating system
- Android • iOS

Google Nest Hub

Key Features: See your life in one view and get things done hands-free. Google Nest Hub helps you make the most of moments at home. With Voice Match, get your calendar, commute, reminders and more right on the home screen, for example "Hey Google, show me my calendar." You can even get the news, make a shopping list and place calls to friends, family and local businesses. Voice-control compatible lights, cameras, TVs and more from a single dashboard.

Final Thoughts: Entry-level, video based addition to the collection.

Dimensions
- Depth: 67.3 mm (2.65")
- Width: 178.5 mm (7.02")
- Height: 118 mm (4.65")
- Power cable: 1.5 m

Weight
- 480 g (16.9 oz)

Colours
- Sand, Aqua, Chalk, Charcoal

Display
- 177.8 mm (7") LCD touch screen

Speaker
- Full-range speaker

Microphones
- 2-mic array

Sensors
- Capacitive touch

Connectivity
- Wi-Fi and Bluetooth® support
- 802.11b/g/n/ac (2.4 GHz/5 Ghz) Wi-Fi
- Bluetooth® 5.0 support

Power
- 15 W power adaptor

Ports
- DC power jack

Google Home

Key Features: Simplify your everyday life with the Google Home, a voice-activated speaker powered by the Google Assistant. Use voice commands to enjoy music, get answers from Google and manage everyday tasks. Google Home is compatible with Android and iOS operating systems, and can control compatible smart devices such as Chromecast or Nest.

Final Thoughts: Perfect for the first time user, features a host of abilities.

Dimensions
- Depth: 67.3 mm (2.65")
- Width: 178.5 mm (7.02")
- Height: 118 mm (4.65")
- Power cable: 1.5 m

Weight
- 480 g (16.9 oz)

Colours
- Sand, Aqua, Chalk, Charcoal

Display
- 177.8 mm (7") LCD touch screen

Speaker
- Full-range speaker

Microphones
- 2-mic array

Sensors
- Capacitive touch

Connectivity
- Wi-Fi and Bluetooth® support
- 802.11b/g/n/ac (2.4 GHz/5 Ghz) Wi-Fi
- Bluetooth® 5.0 support

Power
- 15 W power adaptor

Ports
- DC power jack

Operating system
- Android • iOS

Google Nest Mini

Key Features: Meet the second generation Nest Mini, the speaker you control with your voice. To play your favourite music from Spotify, YouTube Music and more, just say "Hey Google". It sounds bigger and richer with 40 percent stronger bass than the original Mini. Ask your Google Assistant for help and get the best of Google – weather, news, or almost anything. Hear your personalised schedule, commute and reminders. Set timers and alarms and even turn on the lights. Nest Mini is compatible with hundreds of smart devices, such as lights, thermostats and TVs.

Final Thoughts: The latest and best version of the Google Home range.

Dimensions
- Diameter: 98 mm (3.85")
- Height: 42 mm (1.65")
- Power cable: 1.5 m

Weight
- Device: 181 g

Colours
- Colours, Chalk, Charcoal, Coral, Sky

Materials
- Durable fabric top made from 100% recycled plastic bottles External enclosure made with at least 35% post-consumer recycled plastic

Connectivity
- Wi-Fi • Bluetooth® support
- 802.11b/g/n/ac (2.4 GHz/5 GHz) Wi-Fi
- Bluetooth® 5.0
- Chromecast built-in

Power and ports
- 15 W power adaptor • DC power jack

Speakers
- Google Assistant built-in
- 360-degree sound with 40 mm driver

Mics
- 3 far-field microphones
- Voice Match technolog

Sensors
- Capacitive touch controls
- 3 far-field microphones

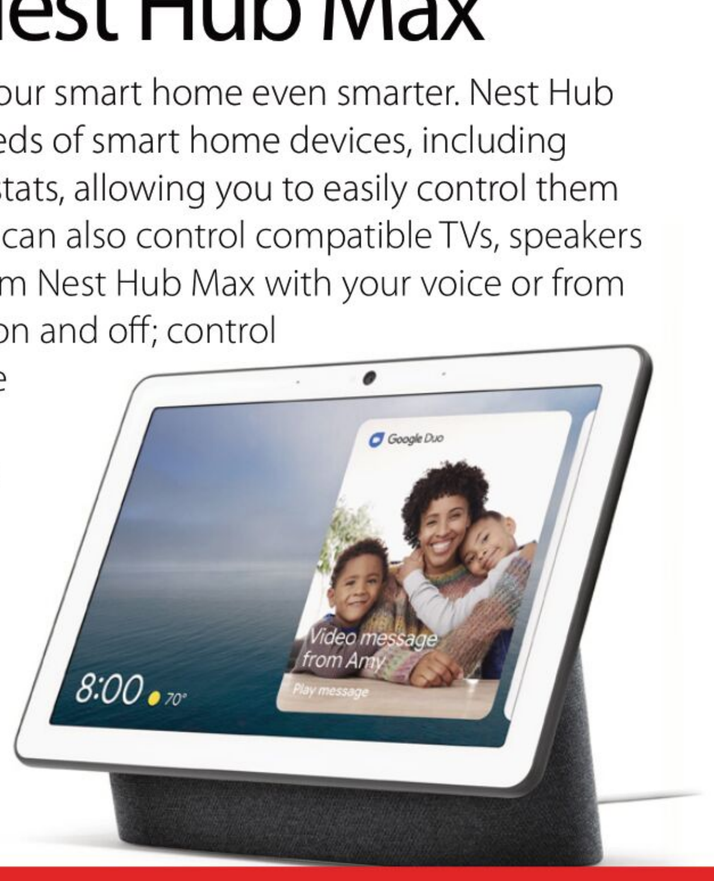
Processor
- Quad-core 64-bit ARM CPU 1.4 GHz
- High-performance ML hardware engine

Operating system
- Android • iOS

Google Nest Hub Max

Key Features: Make your smart home even smarter. Nest Hub Max works with hundreds of smart home devices, including lights, TVs and thermostats, allowing you to easily control them all from one place. You can also control compatible TVs, speakers and game consoles from Nest Hub Max with your voice or from the screen. Turn them on and off; control the volume, play, pause and search.

Final Thoughts: Adds video based features to the Google Home, a must!



Camera
- 6.5 megapixel camera with 127-degree wide field of view and auto-framing
- Face Match technology
- Quick Gestures
- Mic + camera switch

Dimensions
- Depth: 101.23 mm (3.99")
- Width: 250.1 mm (9.85")
- Height: 182.55 mm (7.19")
- Power cable: 1.5 m

Weight
- 1.32 kg (2.91 lb.)

Colours
- Chalk, Charcoal

Display
- 10" HD touchscreen (1280x800)

Speakers and mic
- Stereo speaker system
- Google Assistant built-in
- Stereo speaker system (2 x 18 mm, 10 W tweeters, 1 x 75 mm, 30 W woofer)
- Far-field microphones
- Ultrasound sensing
- Voice Match technology

Sensors
- Ambient EQ light sensor

Connectivity
- Wi-Fi and Bluetooth

Wi-Fi
- 802.11b/g/n/ac (2.4 GHz/5 GHz) Wi-Fi
- Bluetooth® 5.0 support
- Chromecast built-in
- 802.15.4 (at 2.4 GHz) thread support

Power
- 30 W power adaptor

Ports
- DC power jack

Operating system
- Android • iOS

Google Home First Time Setup

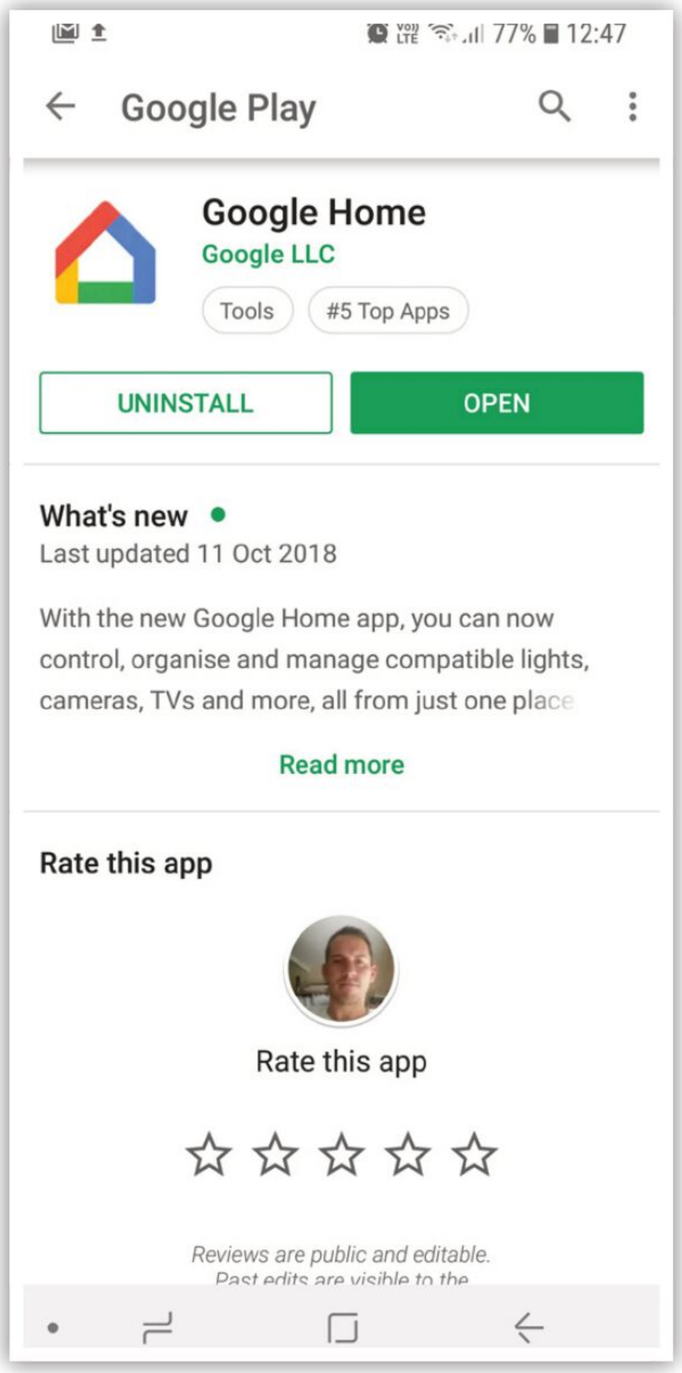
Setting up your Google Home device properly for the first time will make using it much easier, so take the time to get things right. You will need to have the speaker, an Android device, a Google account and a working Wi-Fi connection that both Android and Home devices can connect to.

Setting Up Google Home

All of the setup for your Google Home speaker is done through the Google Home app for Android. Use this app for future access and changes to the settings.

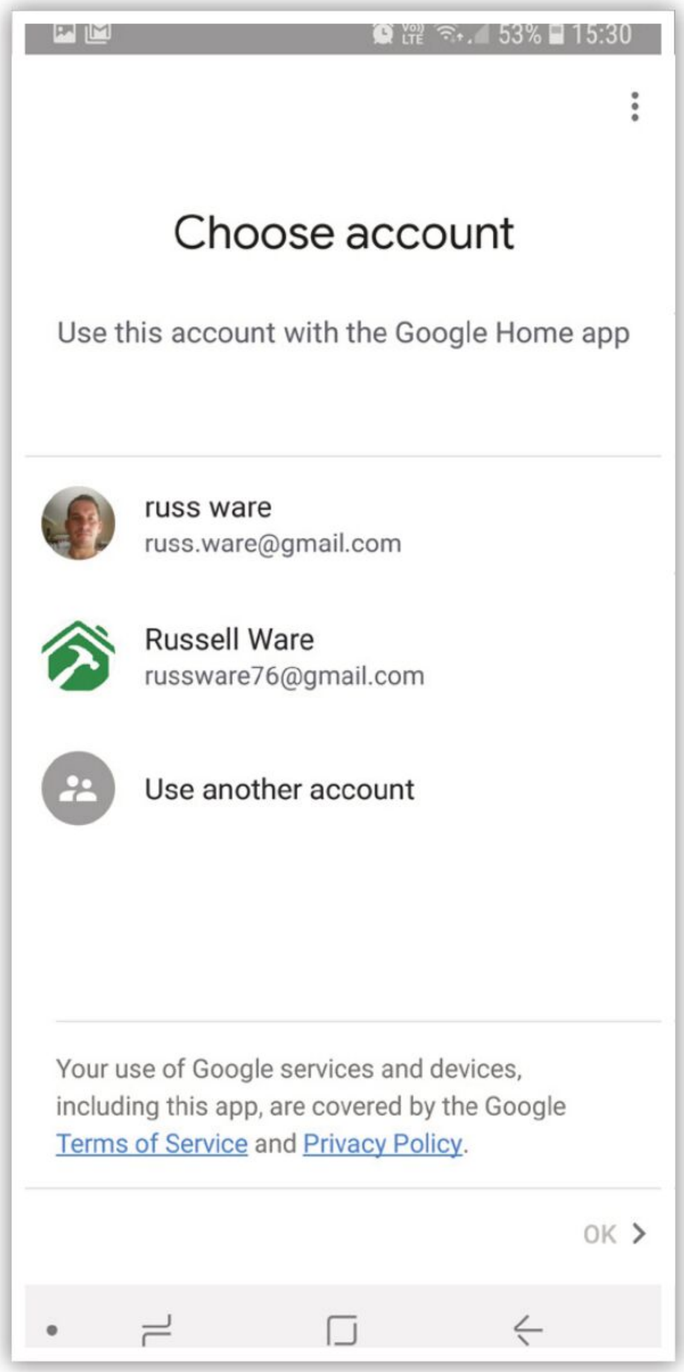
Step 1

Plug in your Google Home device and wait for the audio cue to show it is ready to be set up. Make sure that the switch that controls the microphone is set to "On". If you accidentally turn the microphone off on your speaker, the device will inform you accordingly.



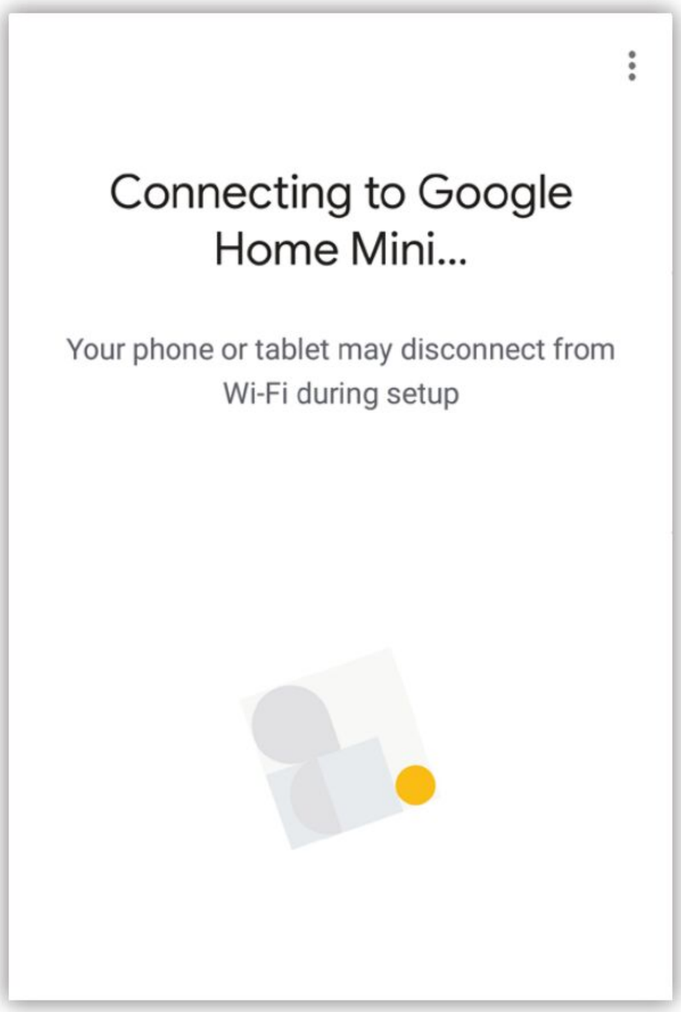
Step 2

Currently, Google Home is only available for Android devices, and most have it pre-installed. If you don't already have it, find the app on the Google Play store, download and install it on your mobile device (phone or tablet). Once installed, open the app.



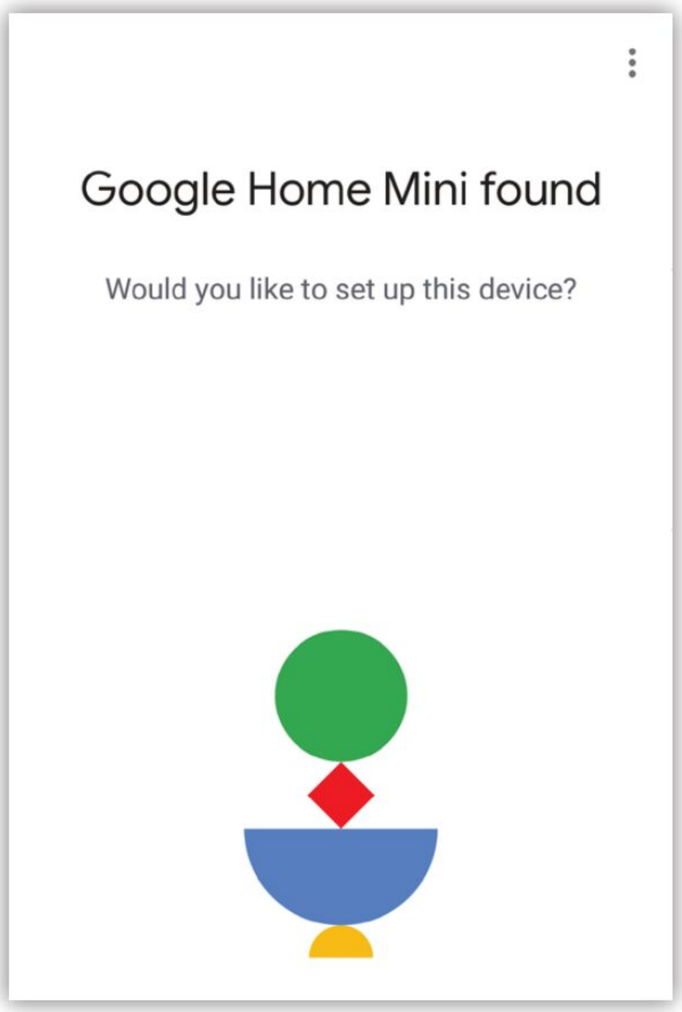
Step 3

You will need to make sure that your mobile device is connected to the same Wi-Fi network you intend to use for the Google Home speaker. It won't work if you are using a 4G network to connect. Once connected, open the Home app and confirm which Google account you will use to log in.



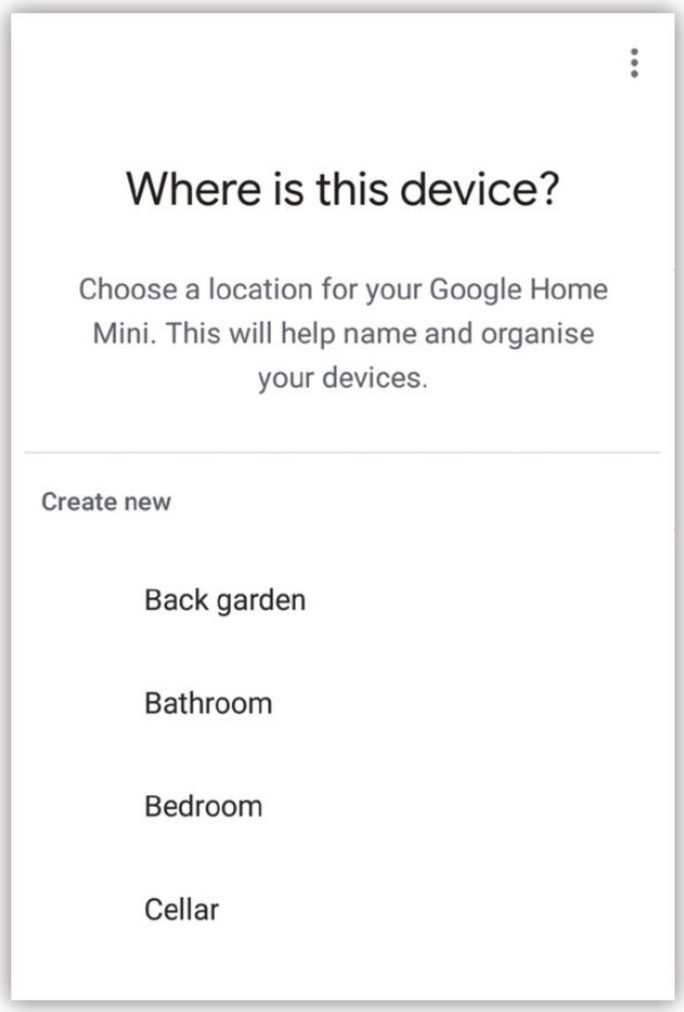
Step 4

The Google Home app scans for nearby devices that are plugged in and ready to set up. If no devices are found, and you're setting up a device, tap Yes. Make sure that you're near the Google Home device that you're setting up and it's plugged into a wall socket. Then tap Next.



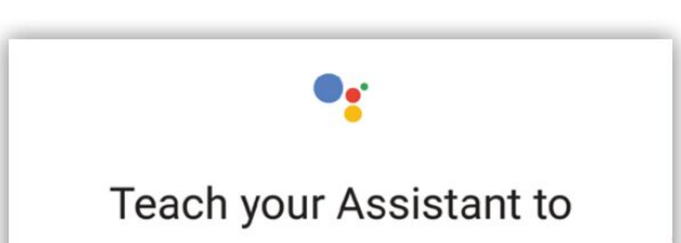
Step 5

Hopefully your device will be found by the app, displayed on screen and you can then tap Next to continue. If you are setting up multiple devices, select the one you want to set up first, and then tap Next. The app will now connect your phone to your new Google Home ready for configuration.



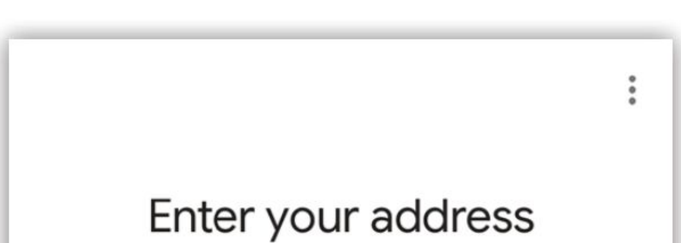
Step 6

You should hear a sound on your speaker to show it is connected. You can now continue the setup by selecting the room it will be in (this is just to identify the speaker), choosing your region, and setting the assistant language you want to use. Once done, you will need to connect to your Wi-Fi network.



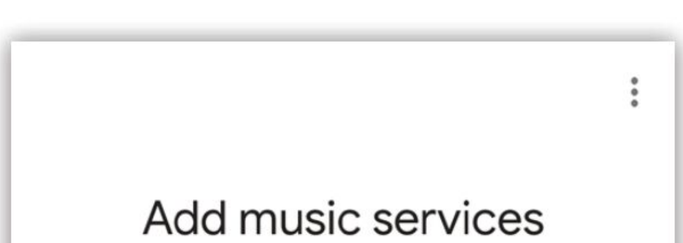
Step 7

Next, to improve your Google Home experience, set up Voice Match. Voice Match allows multiple users to use the same device and get personalised results. Follow the prompts on screen to teach Google to recognise you. You can remove Voice Match settings later if you wish.



Step 8

The Google Home app will ask for access to use your location to pre-fill your address. This is the address where your device is located. If you allow access, your address will be pre-filled; otherwise, you will need to enter it manually. When your address is entered tap Next.



Step 9

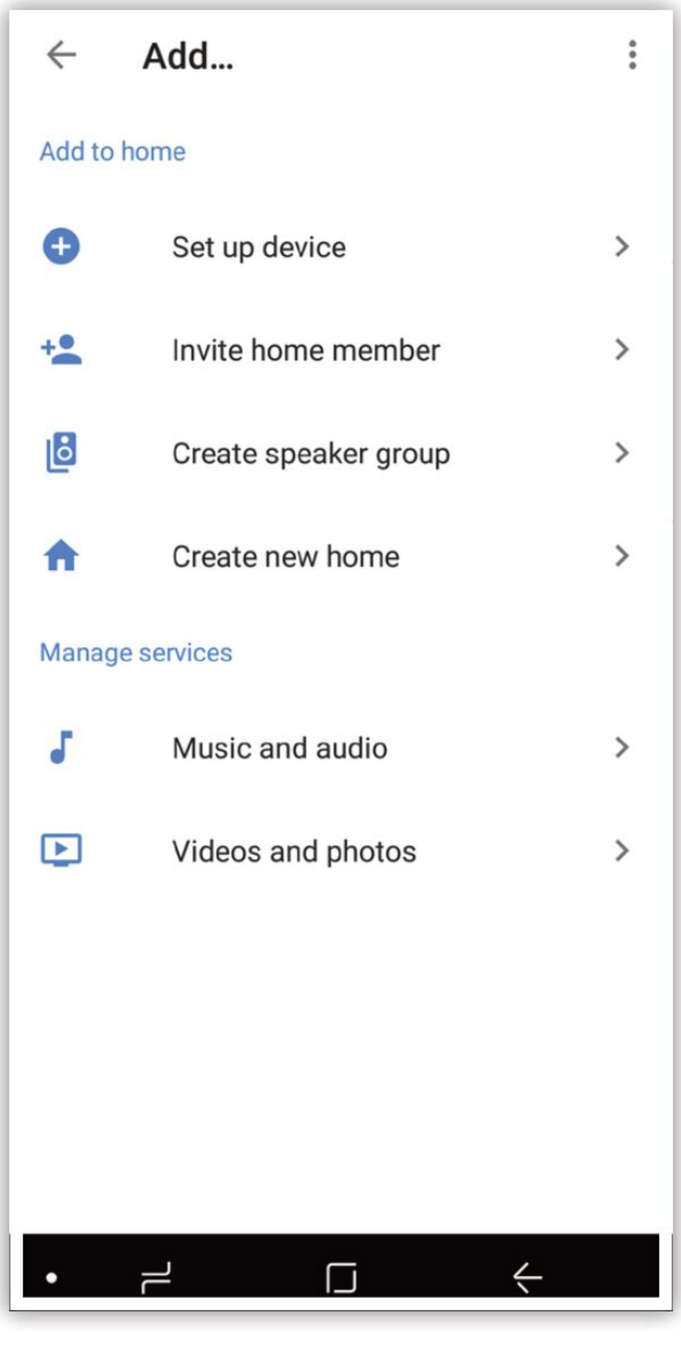
You can now add your favourite services, for example music. Spotify, Google Play Music, YouTube Music and Deezer are just some of those available. If you add more than one, you will need to choose a default music service. Follow the further on-screen prompts to complete the setup.

Play Music on Google Home

Listening to the music you want on Google Home requires you to set up the music services it uses. To do this you need to know how to ask the speaker to play, stop, pause, shuffle and skip the music you want! Let's take a look at just how you listen to music on Google Home.

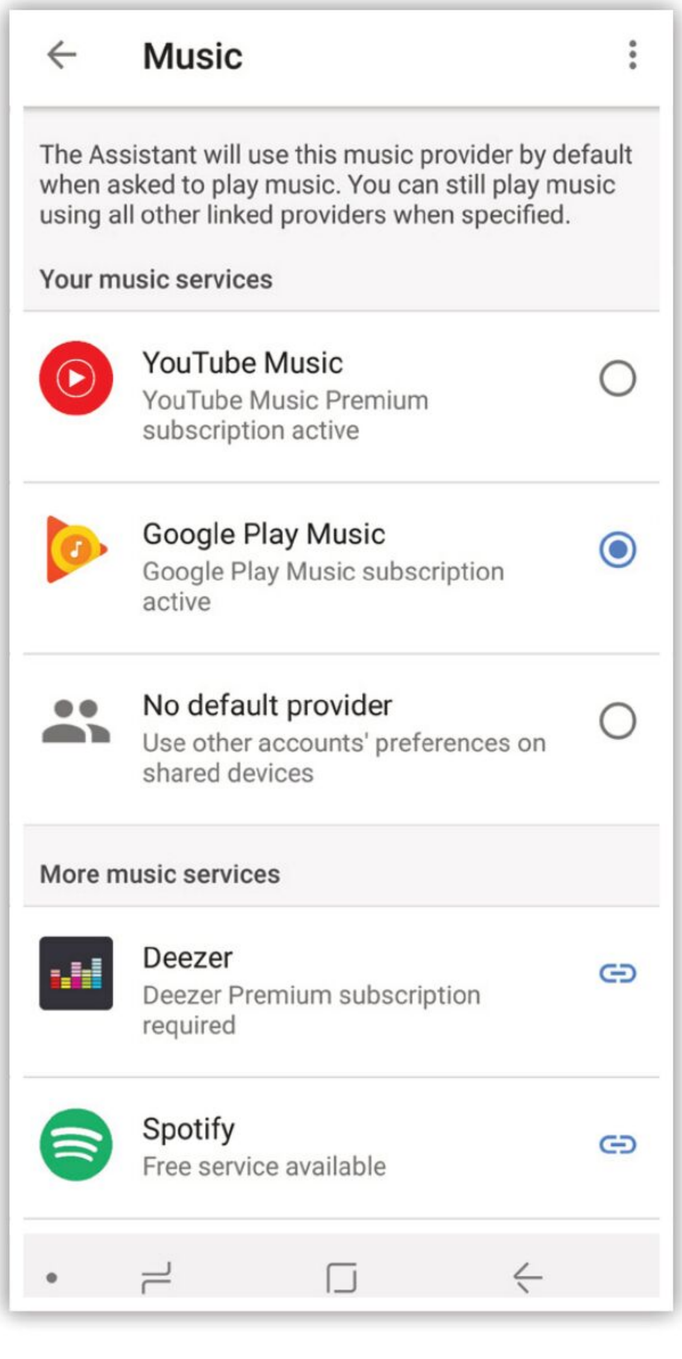
Choosing Music Services

You can connect your speaker to a great variety of different music services, from Google Play Music to Spotify and Deezer, which will give you access to millions of songs.



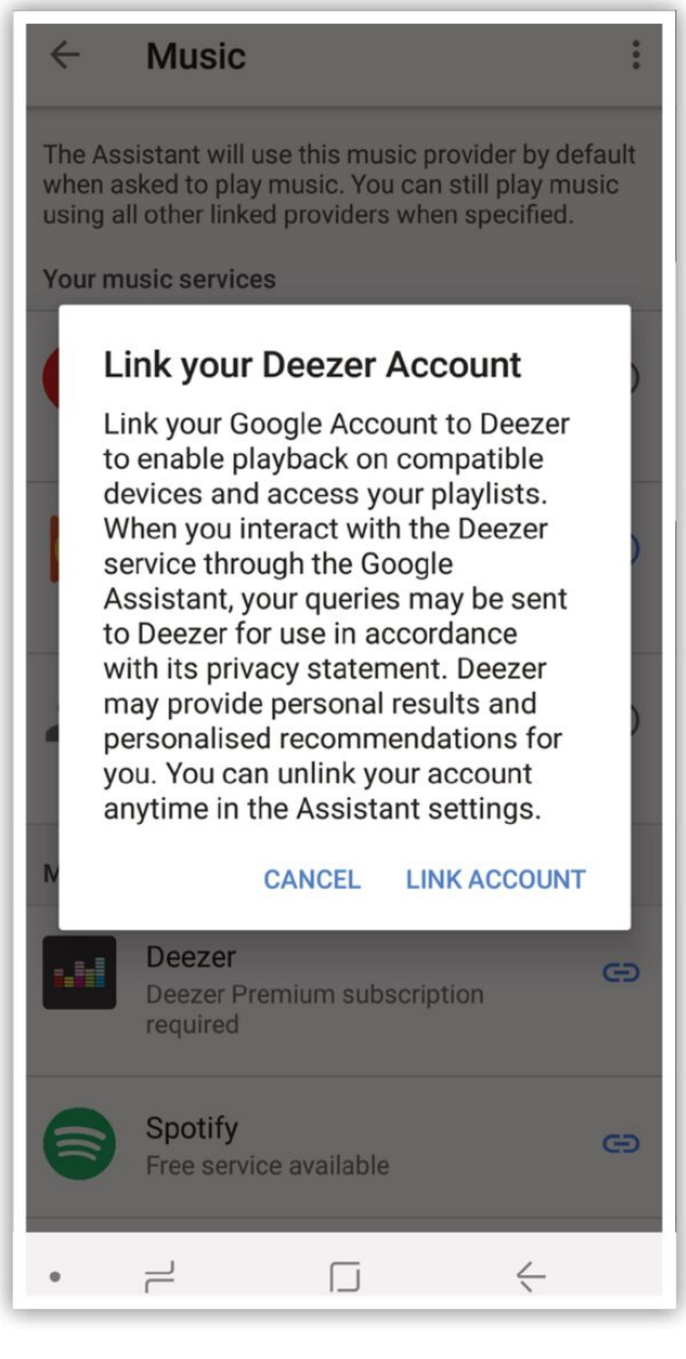
Step 1

You will have been asked to choose a music service during the setup of the Google home speaker, but if you skipped this step, or want to add more, you can add services at any time. Open the Google Home app on your Android device and tap the +Add button on the Home tab. Then tap Music and audio.



Step 2

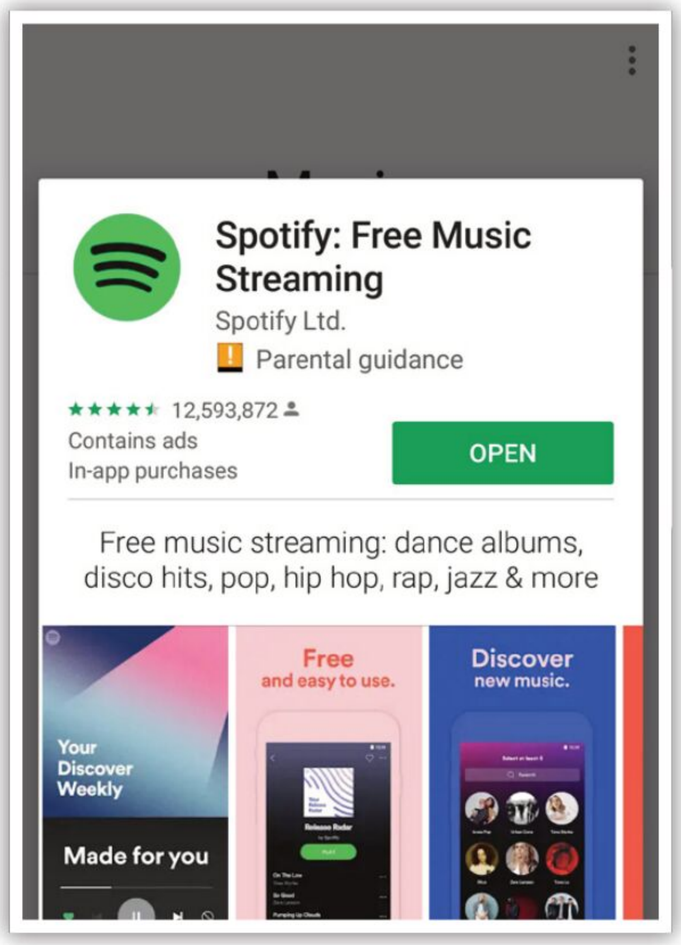
If you have a Google Play Music or YouTube Red account (connected to the current Google account), these services will be linked automatically. To link one of the other music services, tap the small link icon next to each one. Read the information in the box that pops up and then tap Link Account.



Step 3

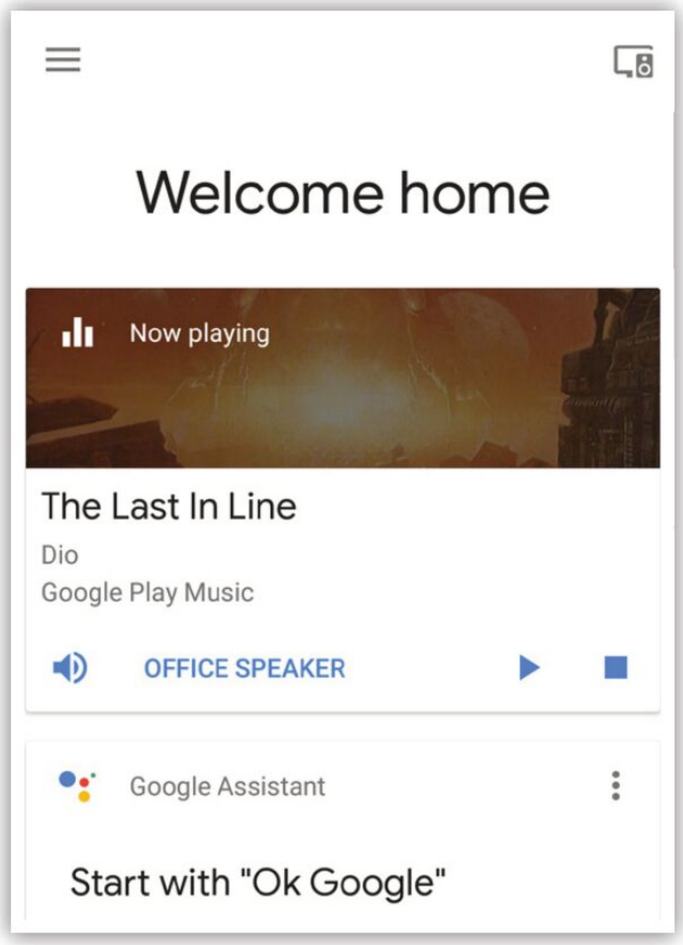
You will now be taken to the music service Login screen, where you will have to log in to your account (or create an account if you don't already have one). Once this is done successfully, you will be returned to the Home app where you will see the music service linked to your Home device.

Playing Music on Google Home



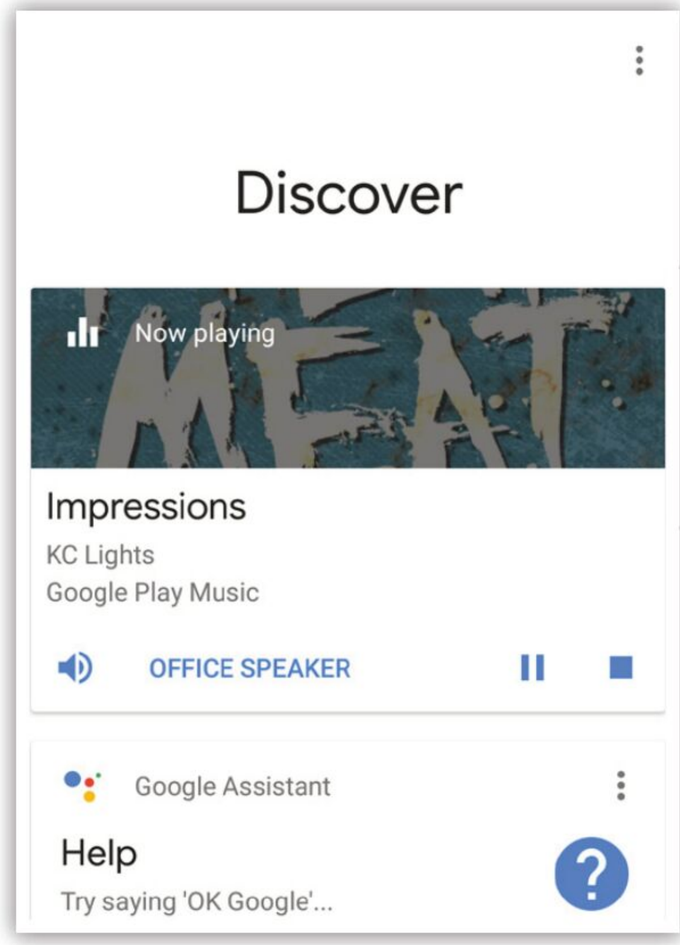
Step 1

Now you have your music services linked to Google Home, you can start listening. Exactly what music you can listen to depends on which service you are using. For example, you may not be able to request certain songs by name if you only have a Spotify Free account.



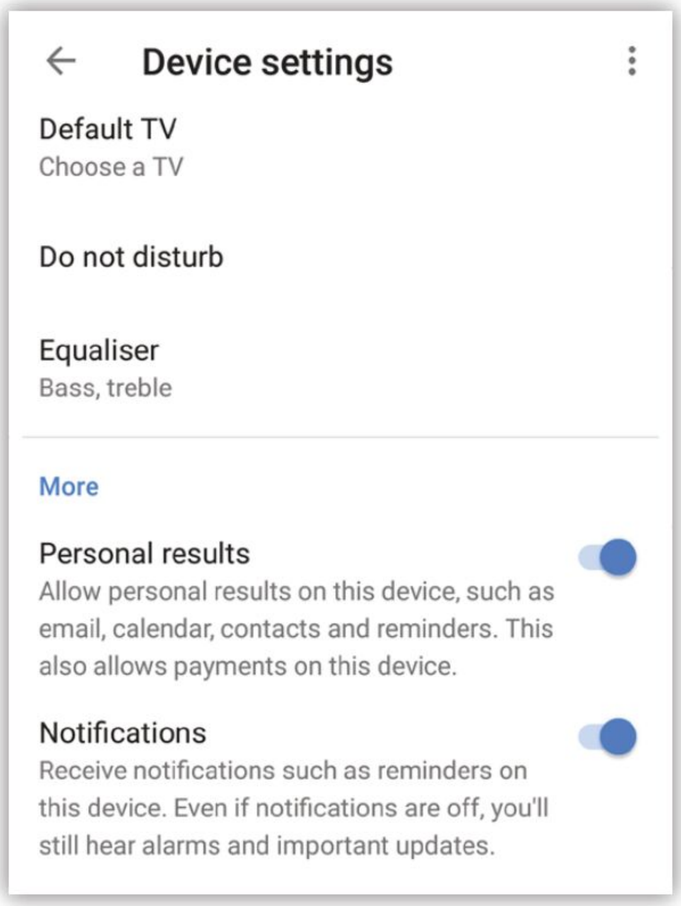
Step 2

To play a specific song, say "Hey Google, play <song name>," "Hey Google, play <song name> by <artist name>," or "…play <song name> on <music service>." Certain music services will also allow you to search for songs by saying, "…play songs like <song name>."



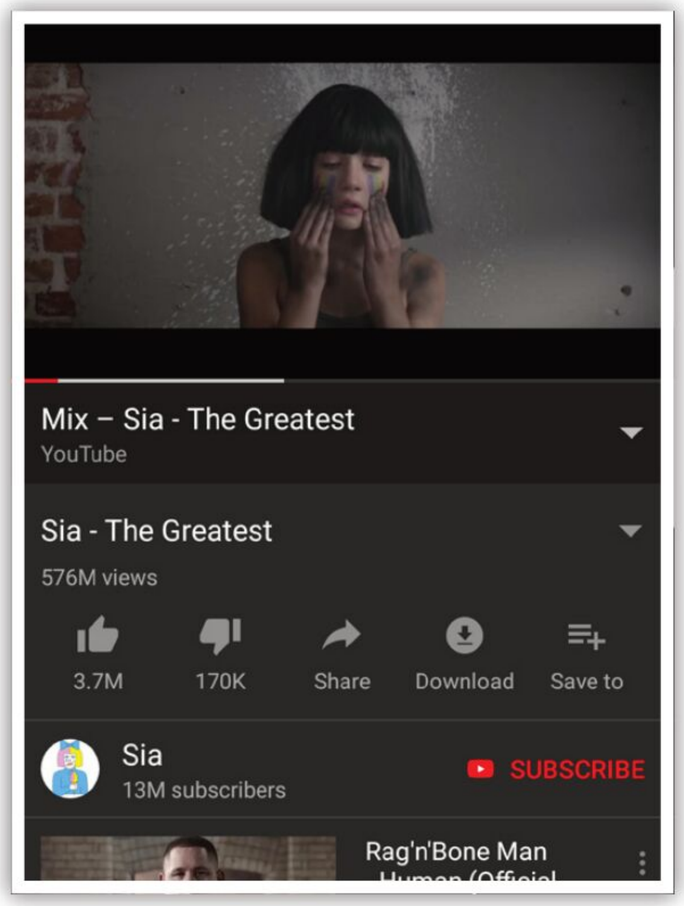
Step 3

There are some specific commands for the different music services, but all of them will react to the general music control commands. These are: "Play," "Shuffle," "Pause," "Resume," "Stop," "Next," "Skip," "What song is playing?" "Volume up/down," or "Set volume to 5."



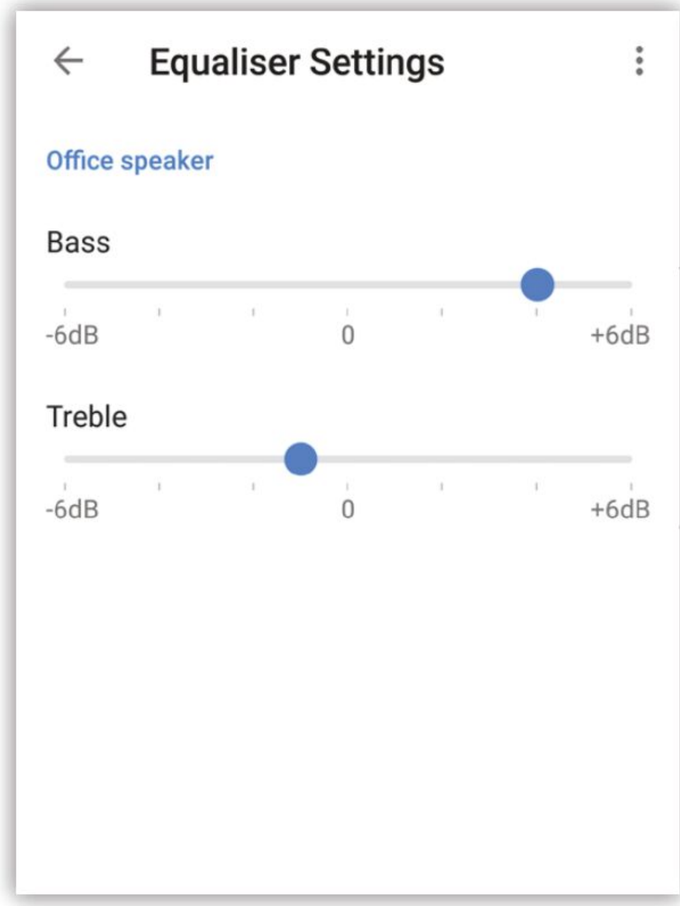
Step 4

Guests and housemates cannot access your library content if you've set up Voice Match. However, you can give them access by uploading your music to their account. If you haven't set up Voice Match, guests and housemates can access music from your library in the same way you can.



Step 5

You can also play music from your desktop Chrome browser on your Google Home speaker (as long as the computer is connected to the same Wi-Fi network). Open the browser and start playing the music. Click the Chrome menu button, select Cast and choose the speaker to play through.



Step 6

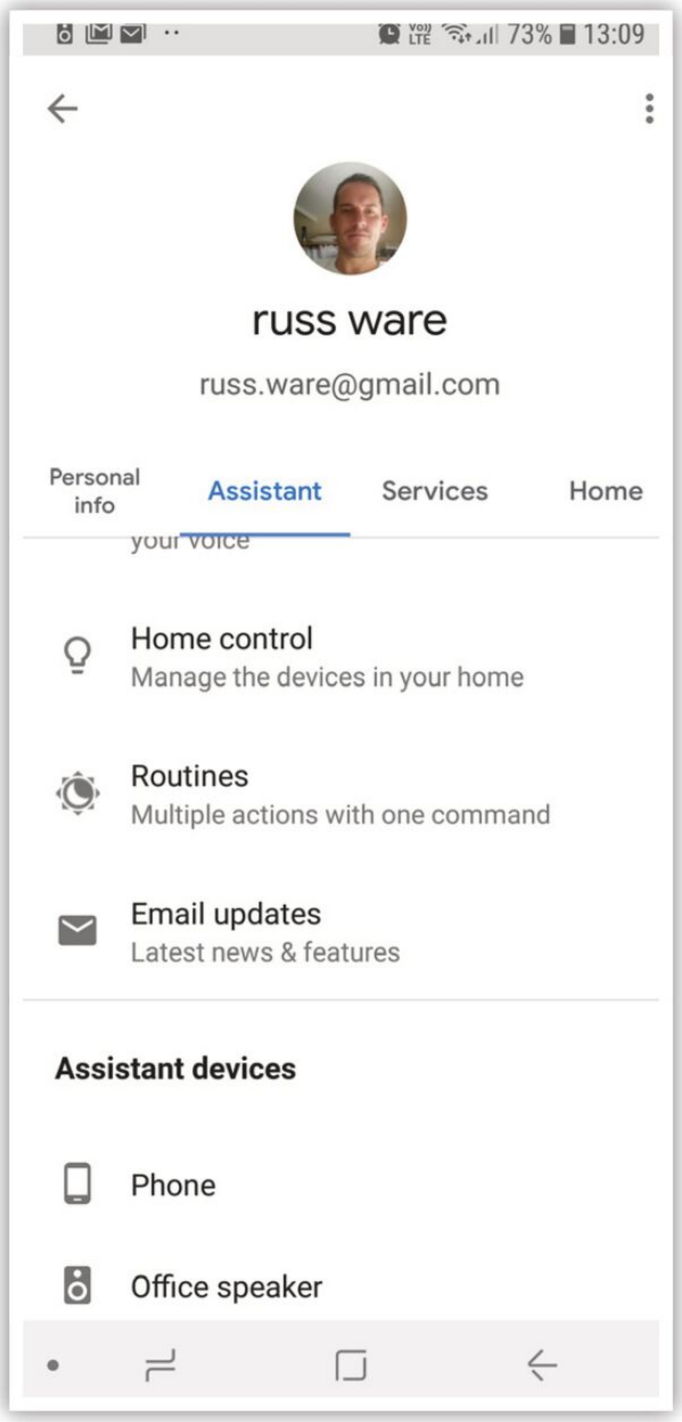
You can use the Home app on your Android device to control the music that is playing on your speaker. Open the app and tap the speaker name on the home tab. Here you will see play and pause controls, along with a volume slider. Tap the Equaliser button to change bass and treble levels.

Using Google Home Routines

Routines are a set of actions that your Google Home can perform when activated by a single voice command. You can customise existing preset routines in the Google Home app, or you can create your own routines from scratch, using a wide variety of available actions.

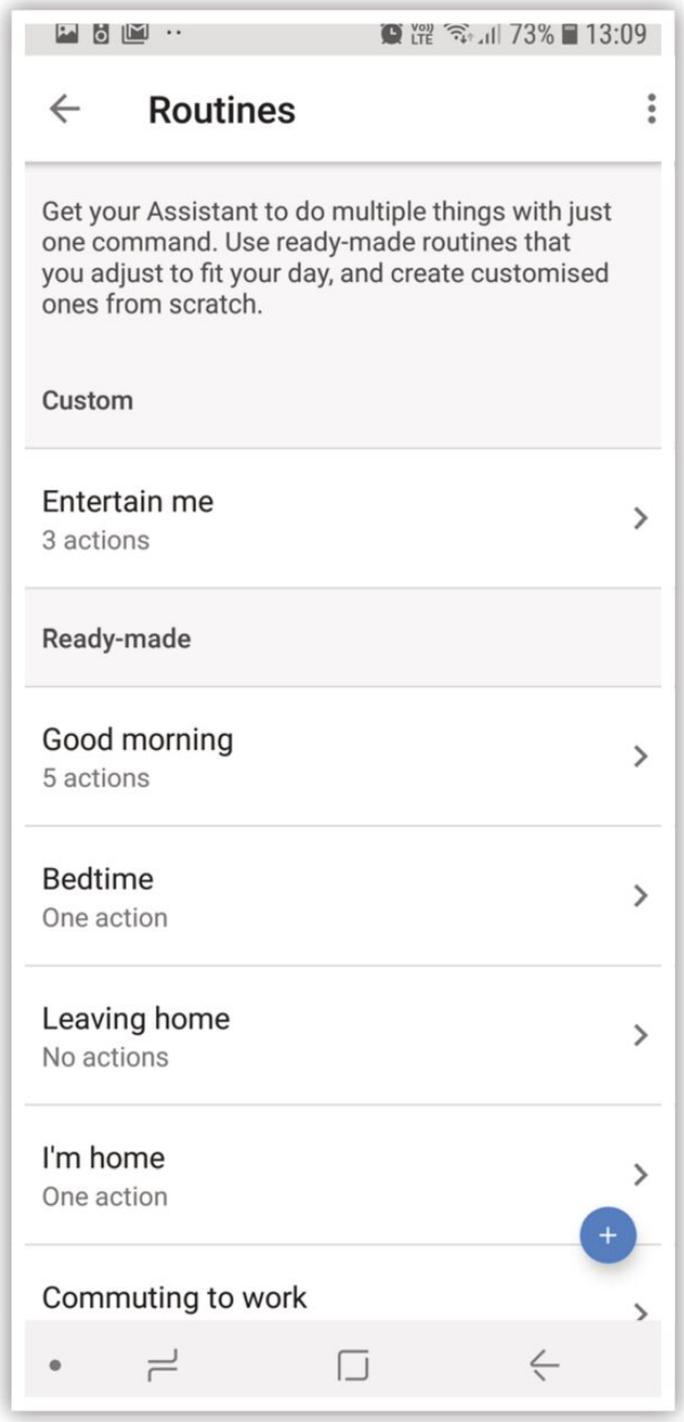
Create and Manage Routines

Learn how to customise, create and use Routines with your Google Home speaker and the Google Home app.



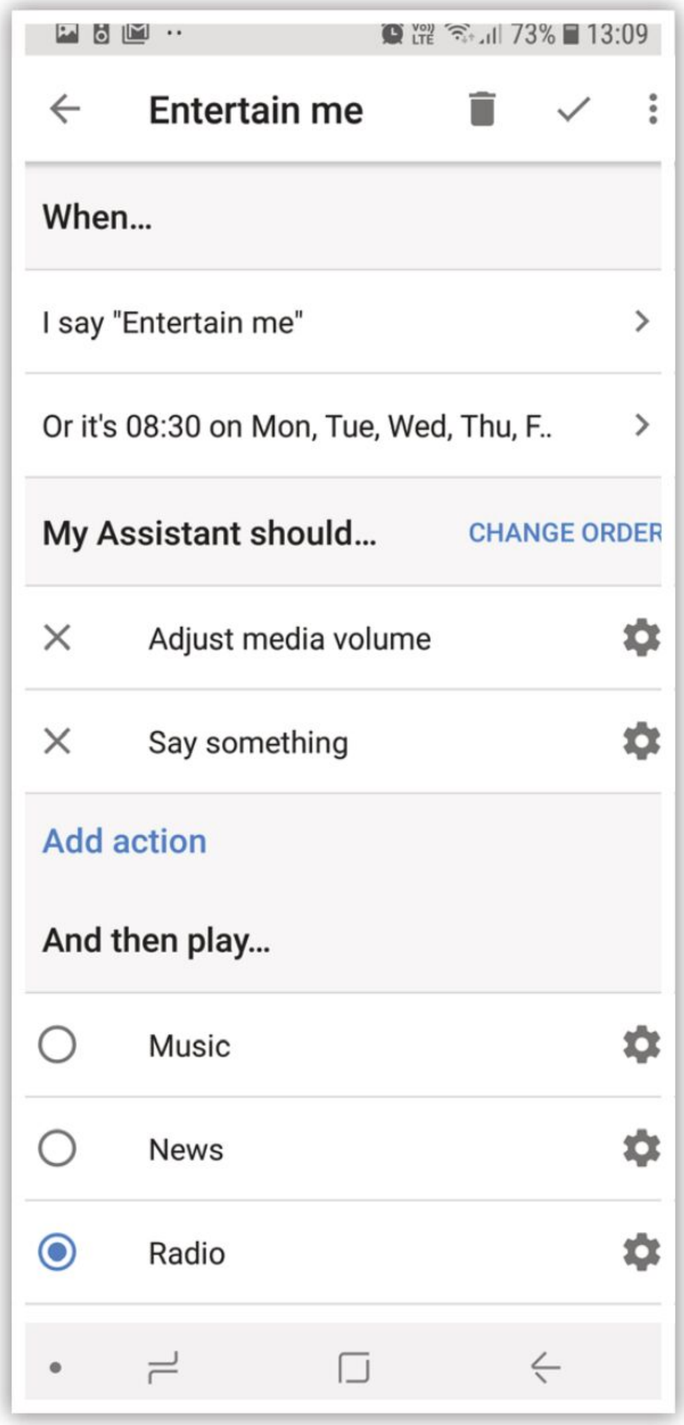
Step 1

Your Google Home app comes with several pre-set routines. To view or edit these, tap the Menu button at the top left, and select "More settings". Scroll down and tap the "Routines" section. Here you will see displayed all of the existing routines, for example "Good morning" or "Bedtime".



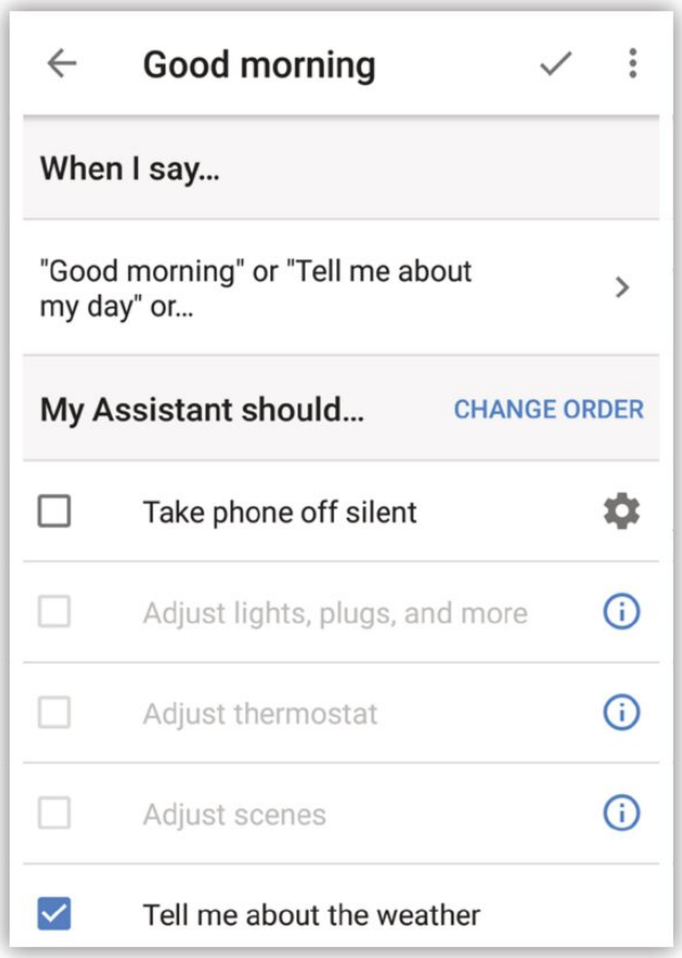
Step 2

Below each routine name, you will see the number of associated actions. Tap a routine to start editing it. While all routines can be edited, you will notice they have differing numbers of actions that can be added. The pre-set routines illustrate this difference.



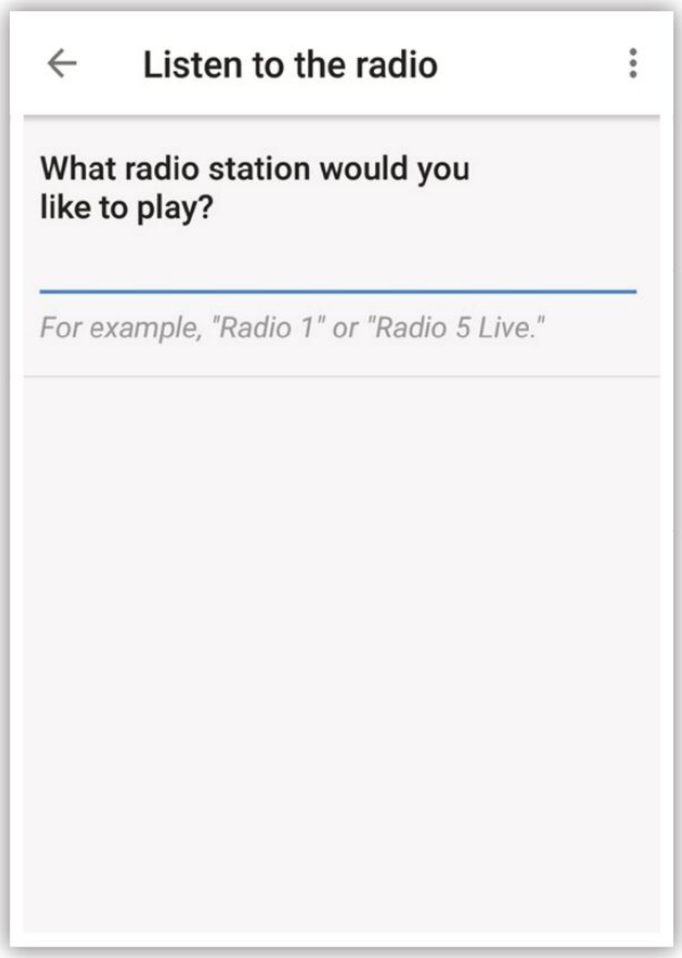
Step 3

Routines are split into sections: "When I say…", (the command) "My assistant should…" (the main actions to perform) followed by "And then play" (additional actions). You can manage and edit each of these sections individually.



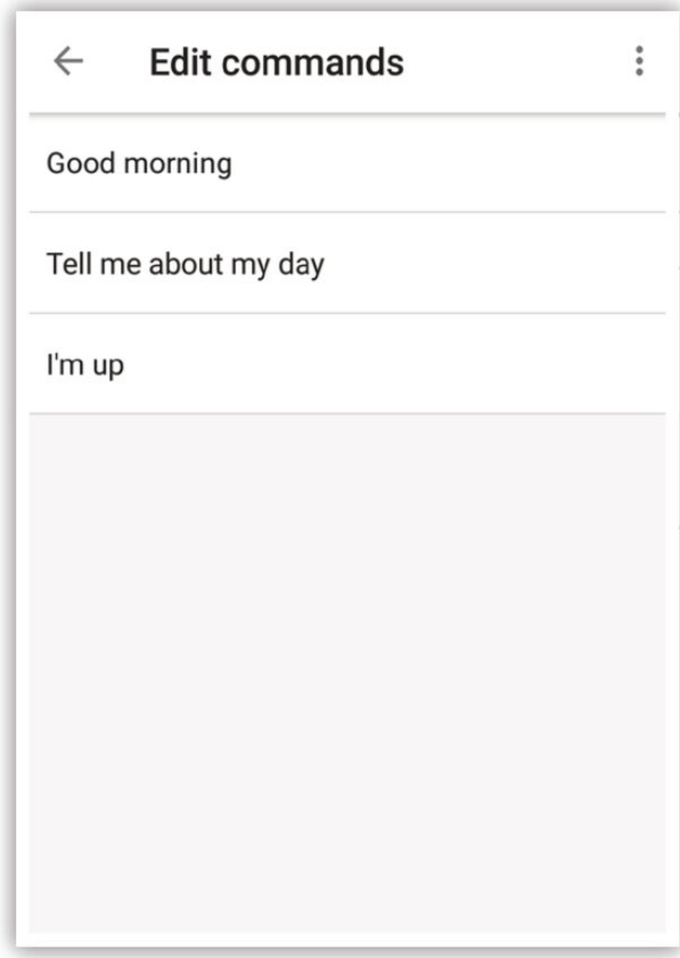
Step 4

For example, the single command "Good morning" could take the phone off silent, tell you the weather alongside your reminders and commute information. It could then give you the news headlines from a variety of sources (BBC, CNN, etc.) before playing your favourite radio station until you tell it to stop.



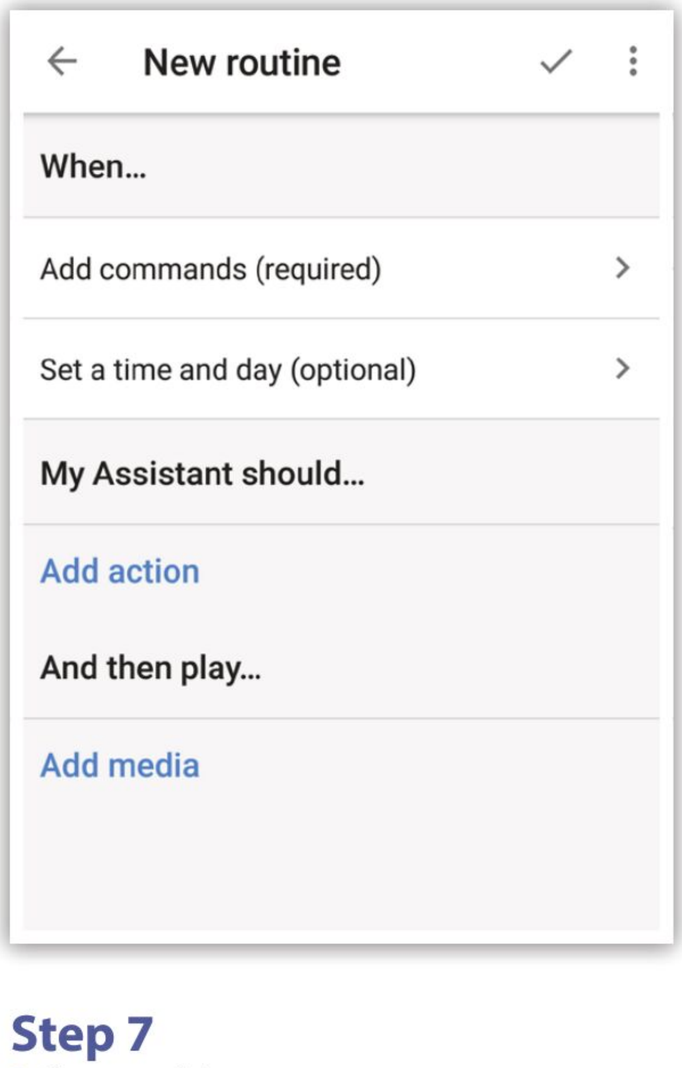
Step 5

Tap the checkbox next to each action to add or remove it from the routine. If the action has a gear icon next to it, you can tap this to see further settings. For example, the Play Radio action allows you to choose the radio station you want to use, and music settings lets you choose the music source.



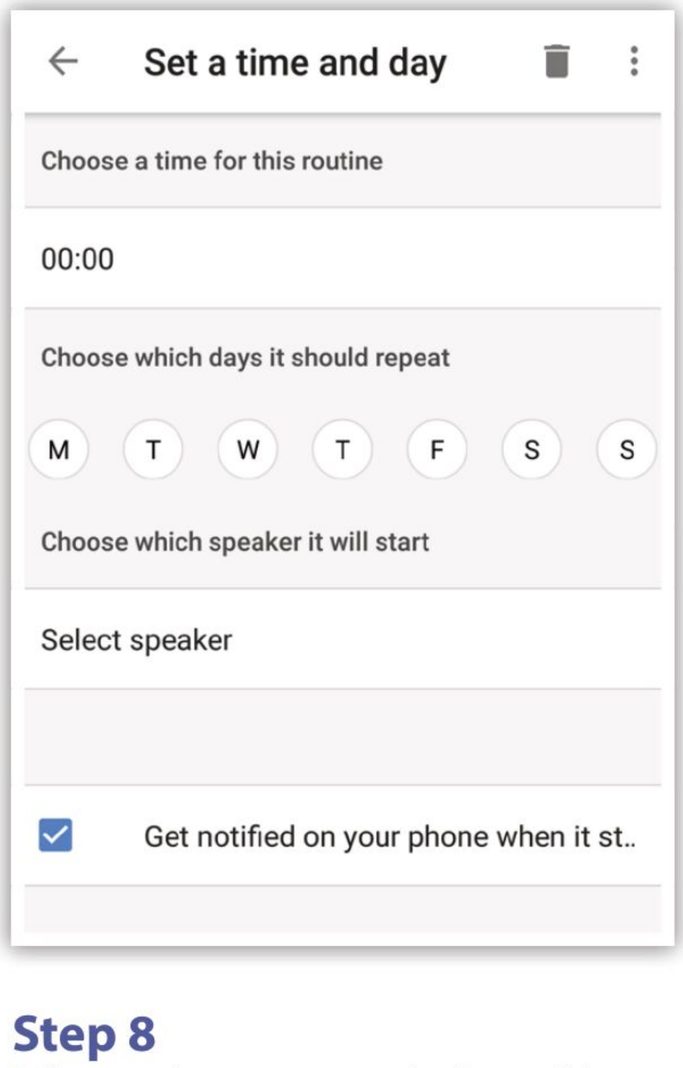
Step 6

You can also change the command that activates the actions (although you will still need to say "Hey/Okay Google" first). Most pre-set routines have a couple of commands already set, but you can add a new one by tapping the top section, then tap + and type your desired command and then press Enter to activate it.



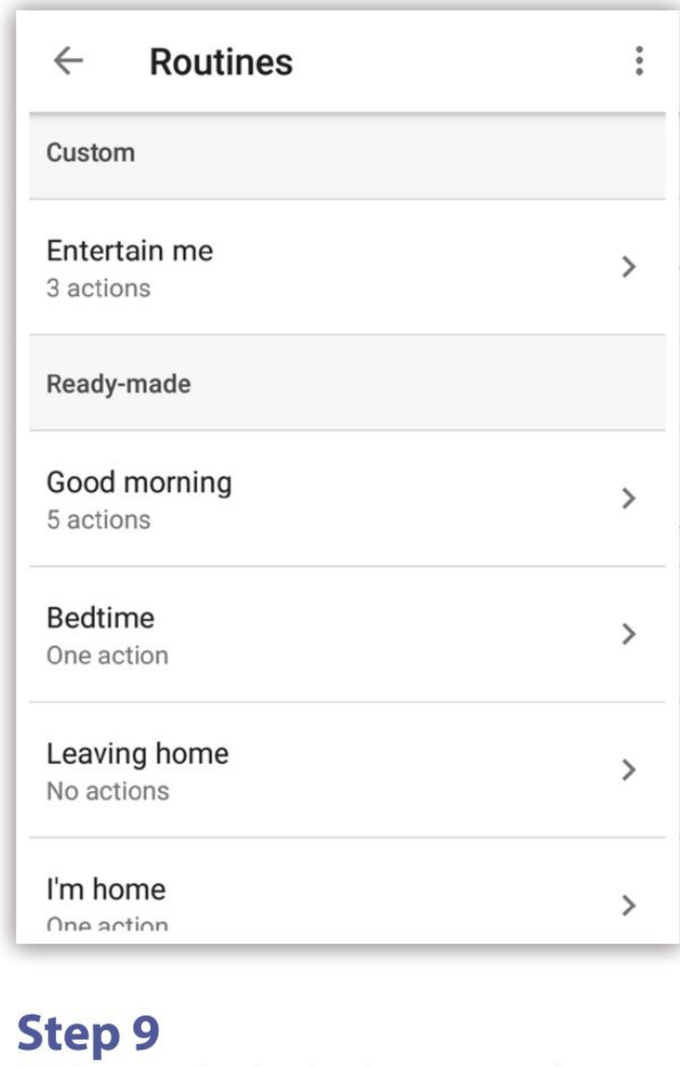
Step 7

If none of the pre-set routines meet your needs, you can create your own from scratch. Open the routines settings in the Google Home app and tap the + button. Start by editing the command you want to use to activate the routine. Simple commands seem to work best, so keep it short!



Step 8

If you wish, you can set a day/time of day when the routine activates automatically although you can still activate the routine at other times with the command. Next, add an action, either by typing the name of a Google Assistant command, or by tapping "Choose popular actions", selecting one and tapping "Add".



Step 9

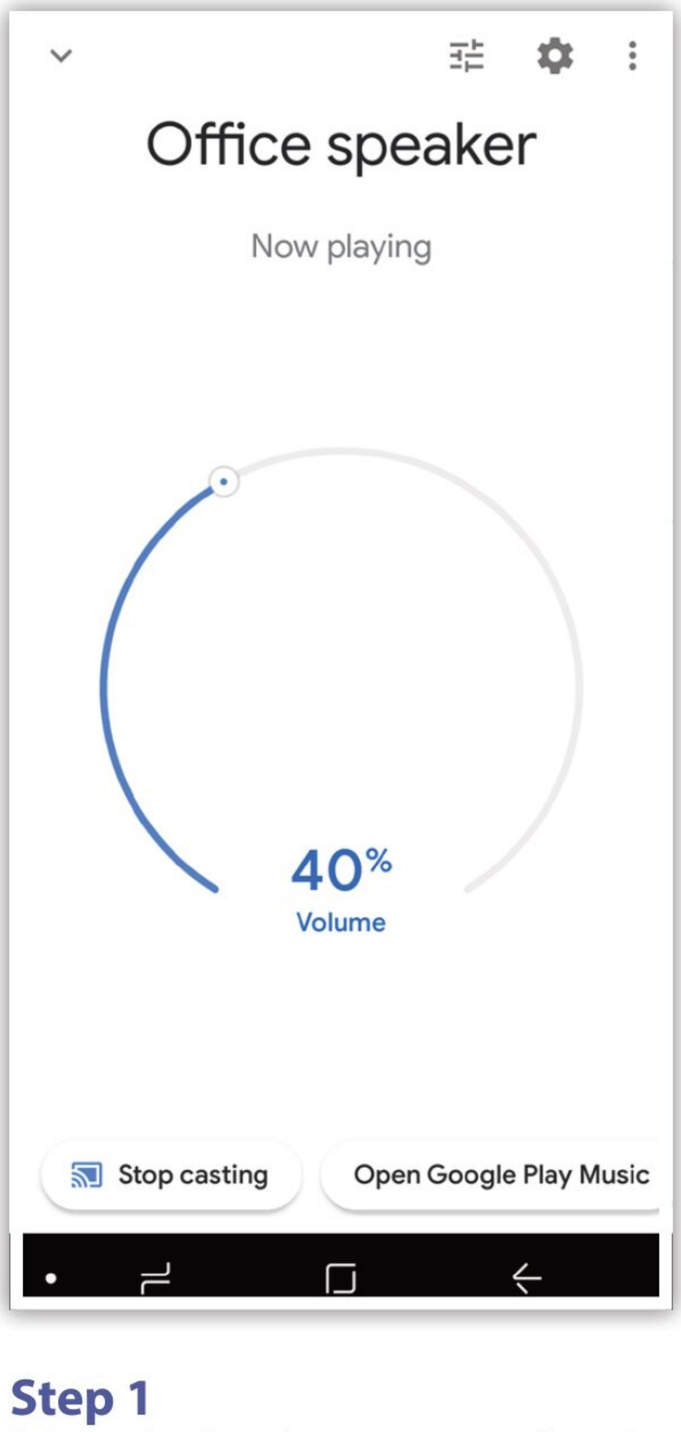
When you've finished setting up the new routine, tap the check mark at the top and the screen will change to display all routines. Your newly created routine will be given the name of the command word you used (e.g. "Entertain me"). Test the routine by speaking the command to your Google Home.

Play Music Using Bluetooth

As well as being connected by Wi-Fi, your Google Home device can also be used as a Bluetooth speaker, playing music that is stored on your phone or tablet or even your laptop. You can also stream music from your Google Home device to a pair of Bluetooth headphones.

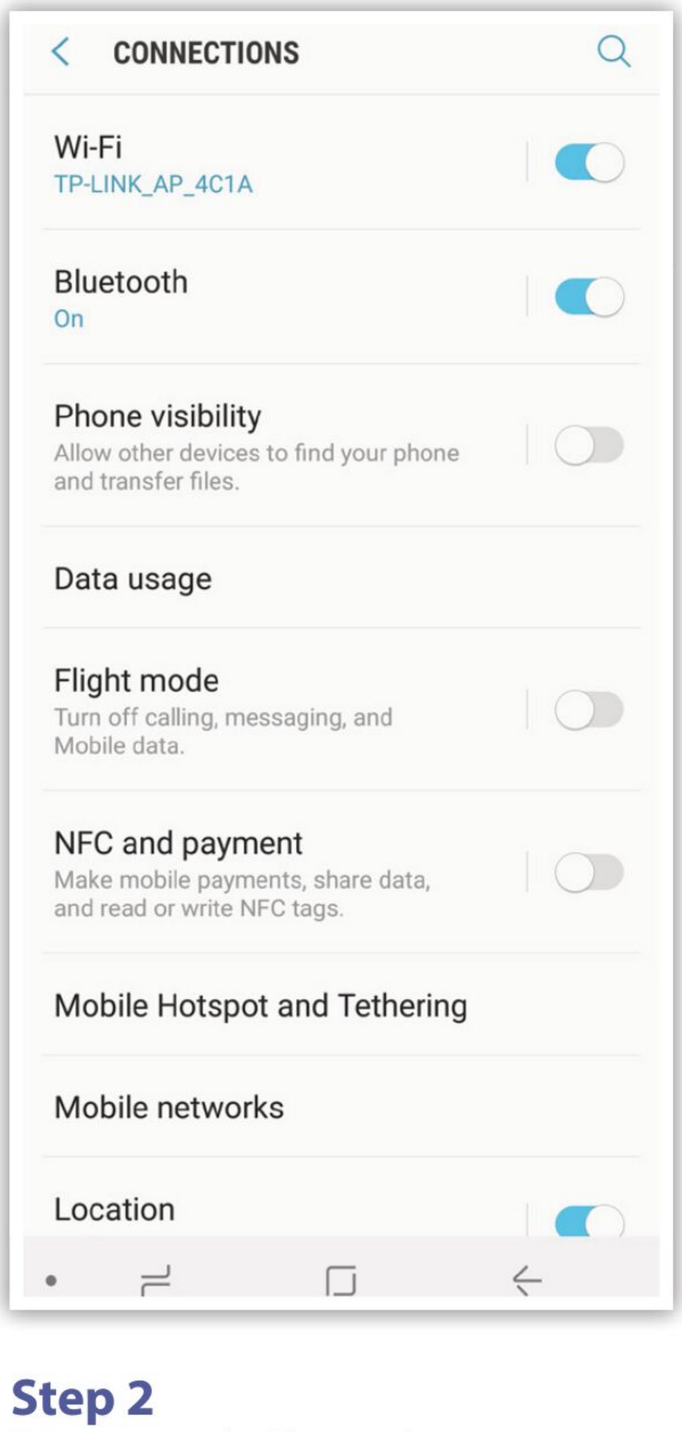
Play Music on the Home Speaker

Being able to play music stored on your phone or tablet through the Google Home speaker is a useful addition to its bag of tricks and opens up a host of new audio possibilities.



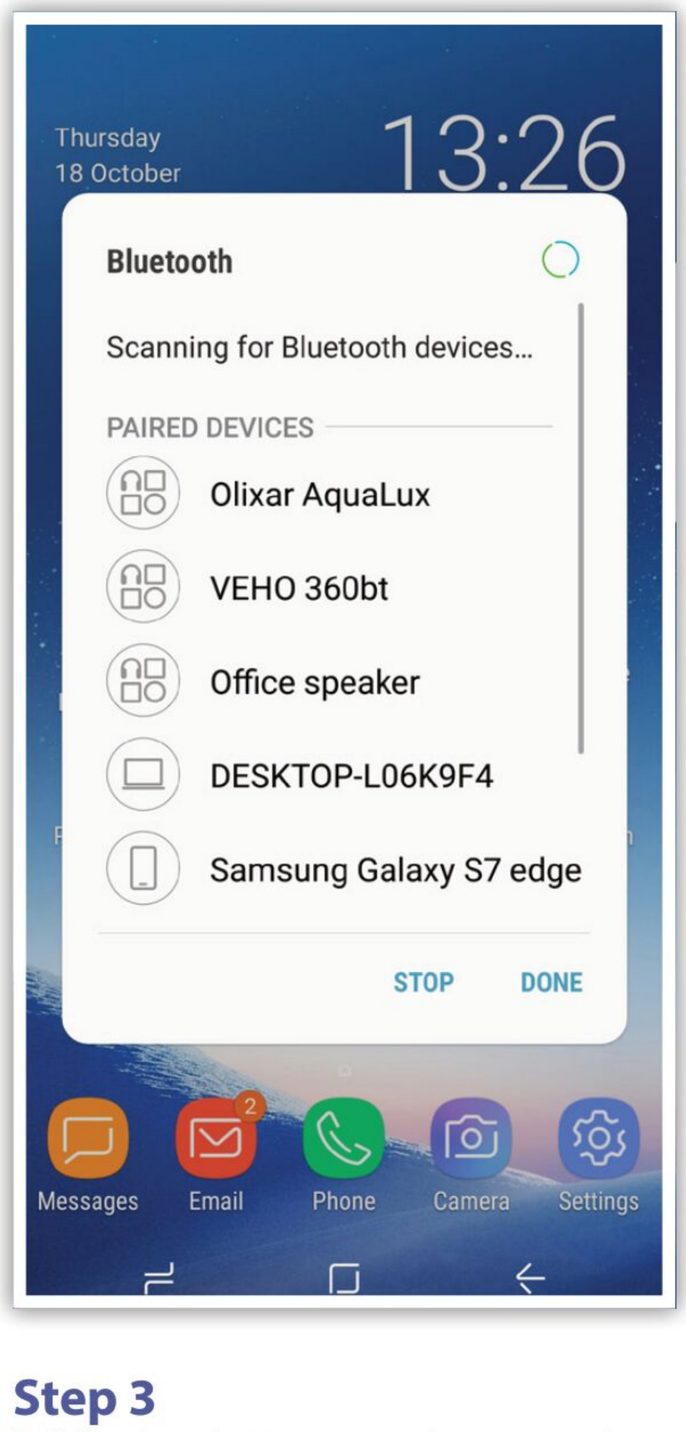
Step 1

Open the Google Home app and tap the name of the device you want to connect with via Bluetooth. In the top right corner of the device info card, tap the device settings menu and then find the Paired Bluetooth devices heading and tap it. In the next screen, tap the Enable Pairing Mode button.



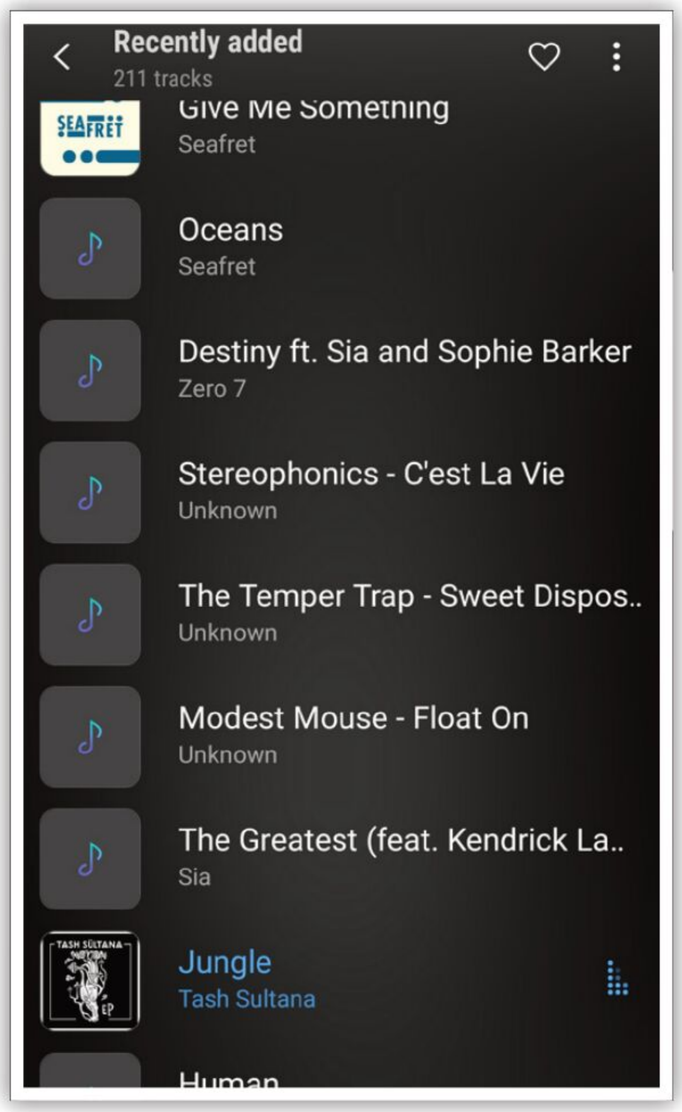
Step 2

Now open the Bluetooth settings on your mobile device and turn Bluetooth on. The device will scan for available connections, and you should see the name you gave your speaker appear in the list of discovered Bluetooth devices. Tap the speaker name to pair the devices using Bluetooth.



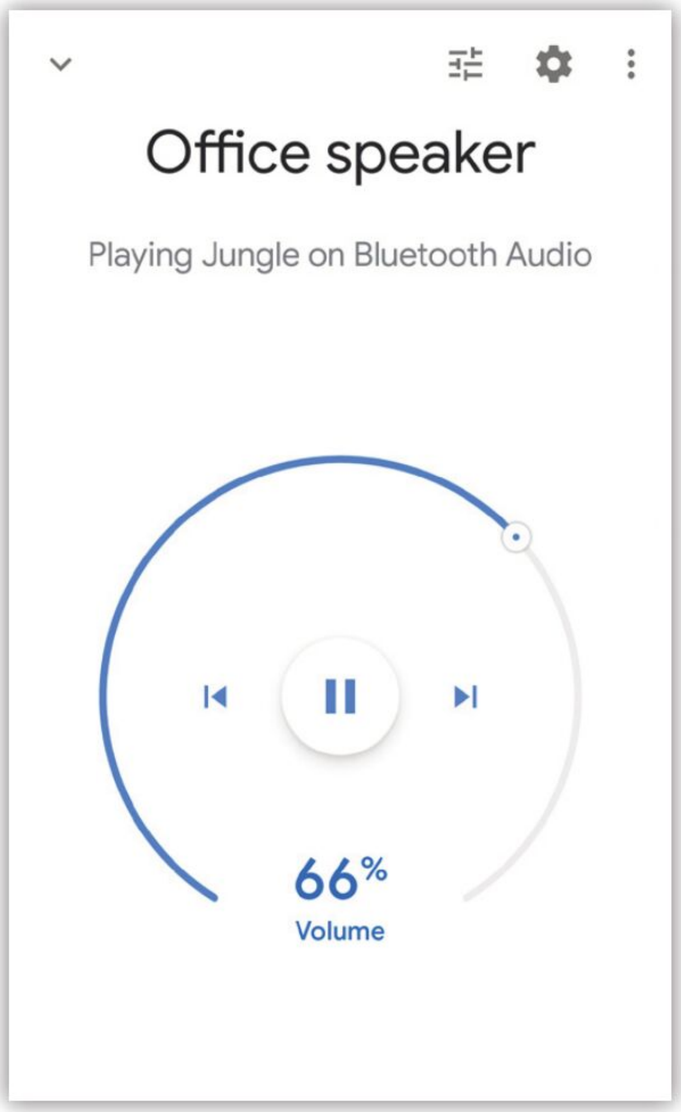
Step 3

If the Google Home speaker is paired with multiple speakers, it will default to the most recently paired device. You can tell Google Home to connect by saying "Hey Google, connect to Bluetooth," or you can change which speaker is paired by opening the Bluetooth settings on your device.



Step 4

To play music through the connected speaker, just use whichever music player you normally use to play your device music. When connected to the speaker using Bluetooth, anything you play (from MP3 files to YouTube videos) will play through the speaker.



Step 5

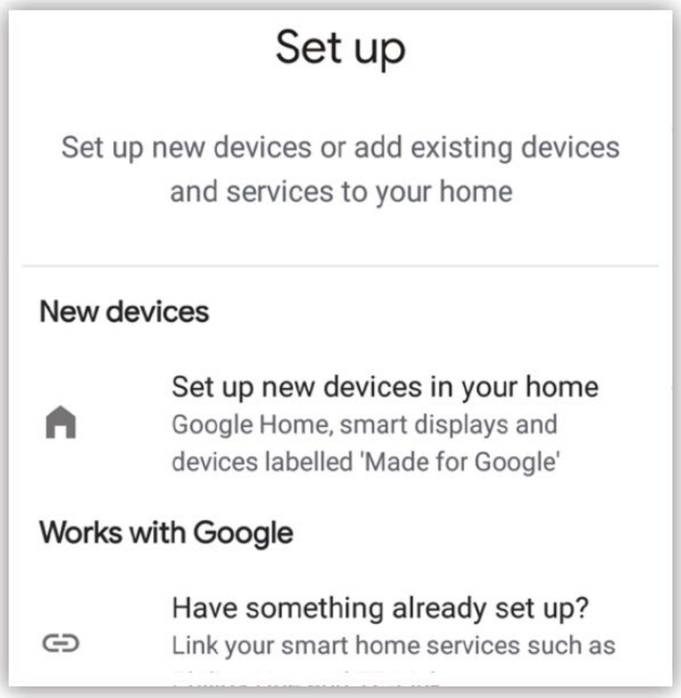
You can also use voice commands to tell your Google Home speaker to play music that is stored on your mobile device. Just say "Hey Google <song name> or <playlist name>." You can use all of the normal music voice commands to pause, stop, skip, change volume, etc.

Step 6

To unpair the devices, open the Google Home app and find the device card for the Google Home that you want to unpair. Open the device settings and then go to Paired Bluetooth devices. Tap the X next to the device that you want to unpair and then tap Unpair.

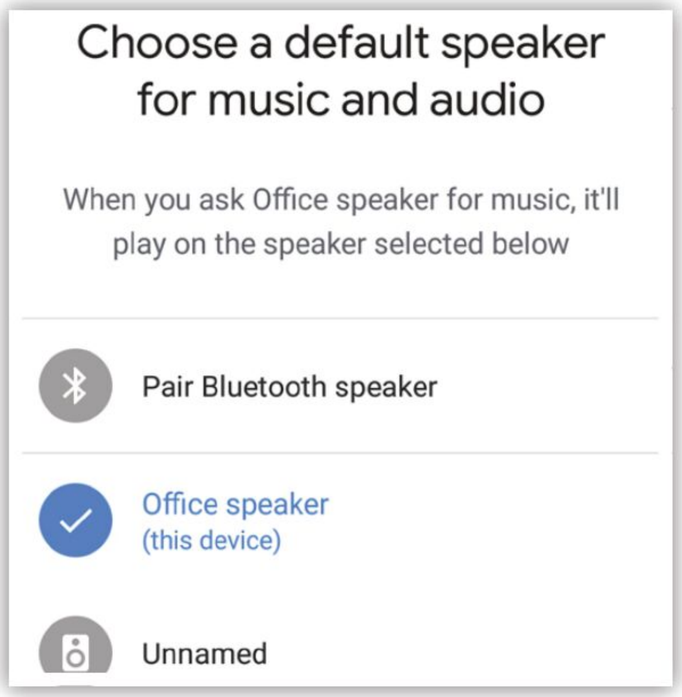
Play Music on Bluetooth Headphones

You can also connect a set of Bluetooth headphones through the Google Home speaker and app.



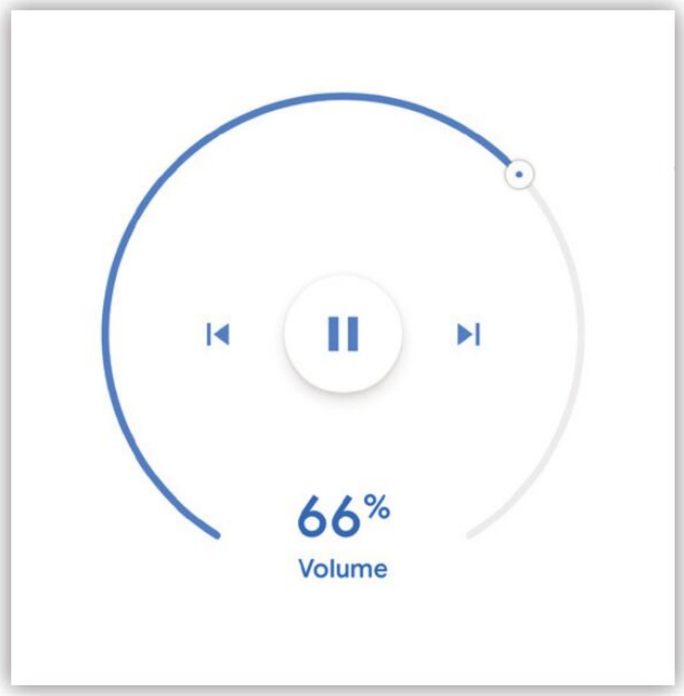
Step 1

Turn on your Bluetooth headphones; placing them in pairing mode; this is normally done by pressing the pairing button on your headphones (a light will usually flash to tell you). Now open the Google Home app on your Android device and select the speaker you want to connect to.



Step 2

Tap the Settings button and scroll down to find the Bluetooth options. Tap "Default music speaker" and then tap "Pair Bluetooth speaker". It will then scan for available headphones (or speakers) and allow you to connect by tapping the name in the list of available devices.



Step 3

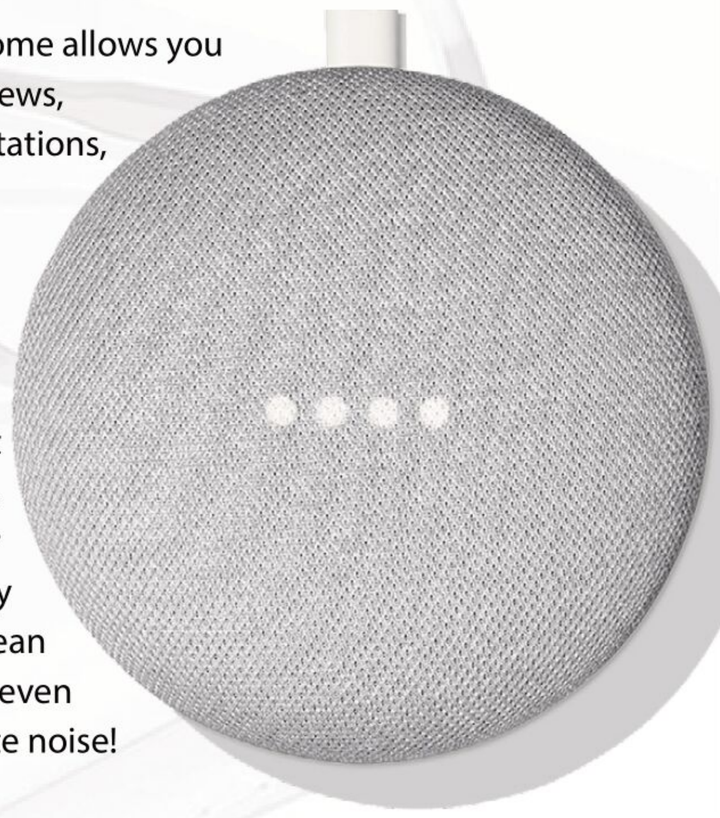
You can only have one connected speaker or headphones to play music through at a time. Once you pair and connect your speaker to a Google Home, it will auto-connect unless the speaker is disconnected. You can use normal Google Assistant commands to play music.

Google Home Tips and Tricks

Your Google Home speaker is great for playing music or listening to the news, but it also allows you to do so much more! From getting general info, reading a recipe and finding your phone, to playing a game or telling you a joke, there are literally 100's of things it can do; here's 10 of the best.

Listen to Audio

Your Google Home allows you listen to music, news, podcasts, radio stations, audio books and more. You can also tell it to play ambient sounds in the background. Just say, "Hey Google, help me relax," or "Hey Google, play forest/nature/ocean sounds." You can even make it play white noise!

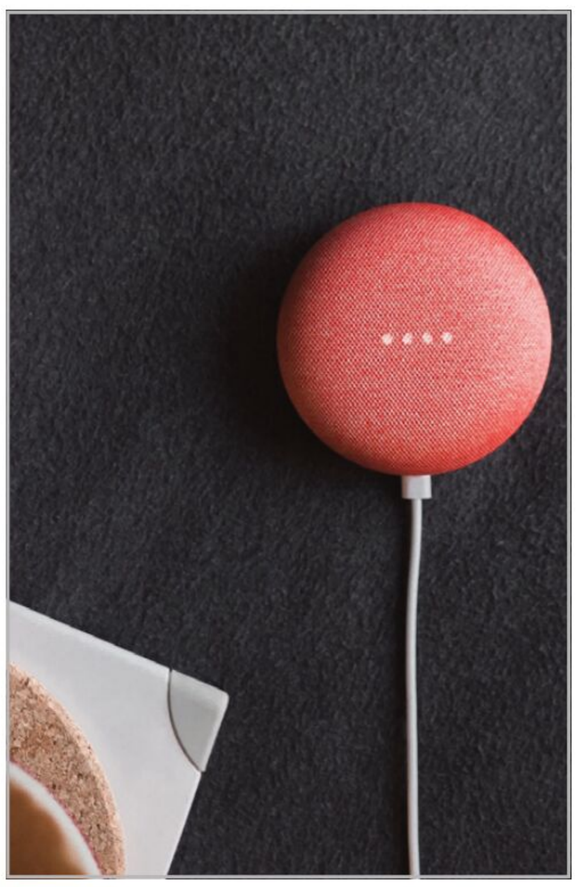


Control Your TV

If you have a Chromecast plugged in (or built in) to your TV, you can easily control it with your Google Home speaker. If your Chromecast is plugged in to a power socket (rather than USB), you can even use the speaker to turn your TV on and off. Just say, "…Turn on the TV," or "…turn my TV off."

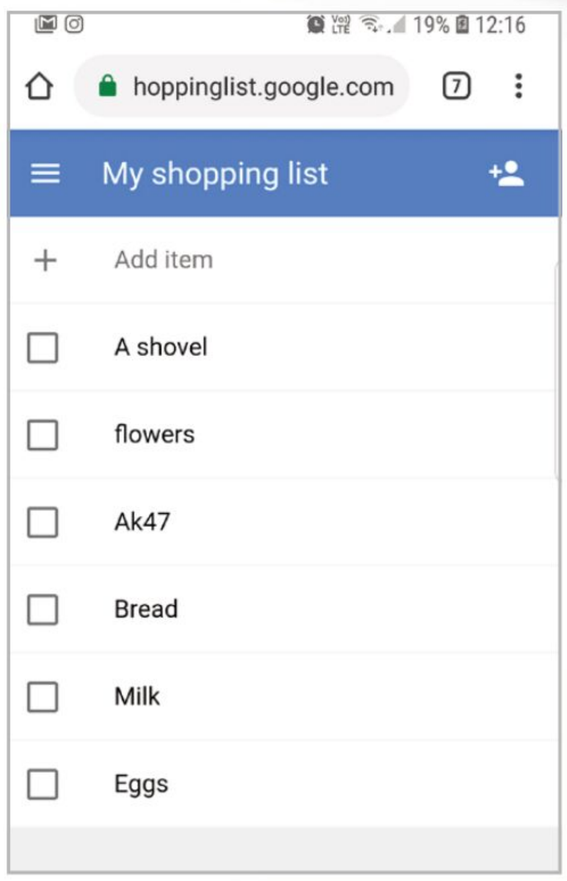
Plan Your Day

Start your day off by saying, "Hey Google, Good morning," to hear traffic, weather and news reports along with a list of your appointments, reminders, and more; you can also ask for these things individually. If you need to find something nearby, just say, "…where is the nearest pharmacy?" for example.



Create Lists

You can create a list in the Google Home app and then add to it using your Home speaker. Once you have a list created, just say, "Hey Google, add orange juice to my shopping list," or "…add paper towels and hand soap to my list." For a reminder at any time just say, "…what's on my shopping list."

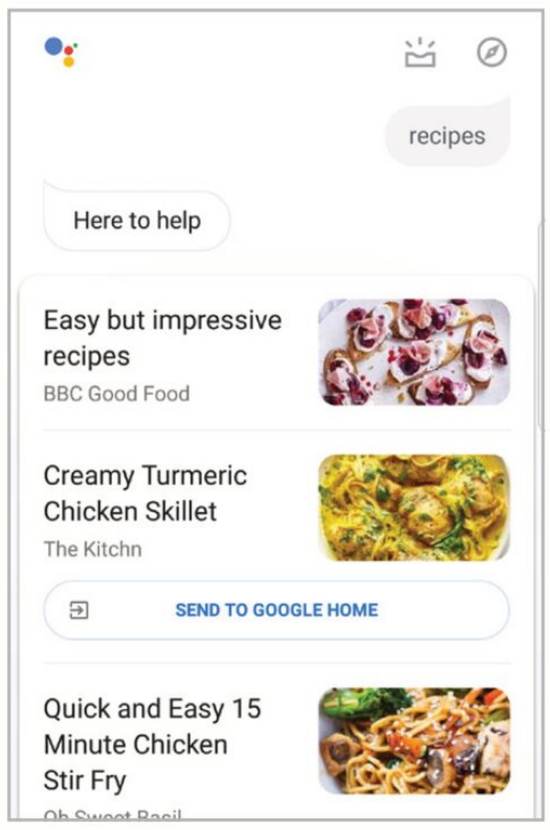


Find Your Phone

Never lose your phone again! Provided Voice Match is set up, you can ask your Google Assistant to ring your phone. To do this say, "Hey Google, find/ring my phone," and your Google Assistant will ring your phone, even if it's set to 'Do Not Disturb' mode.

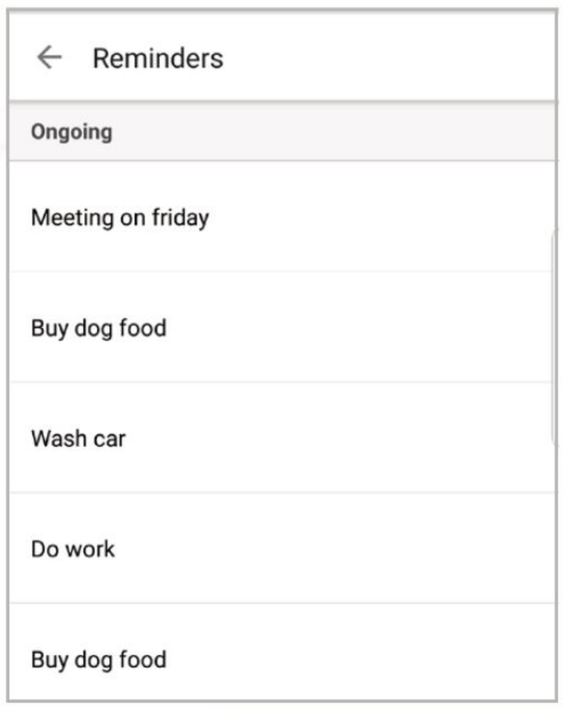
Cook

You can find and make your favourite recipes using step-by-step cooking instructions. For example, just say, "Hey Google, find a recipe for pancakes," you can then say, "…prepare the ingredients," for a list, followed by "…start recipe."



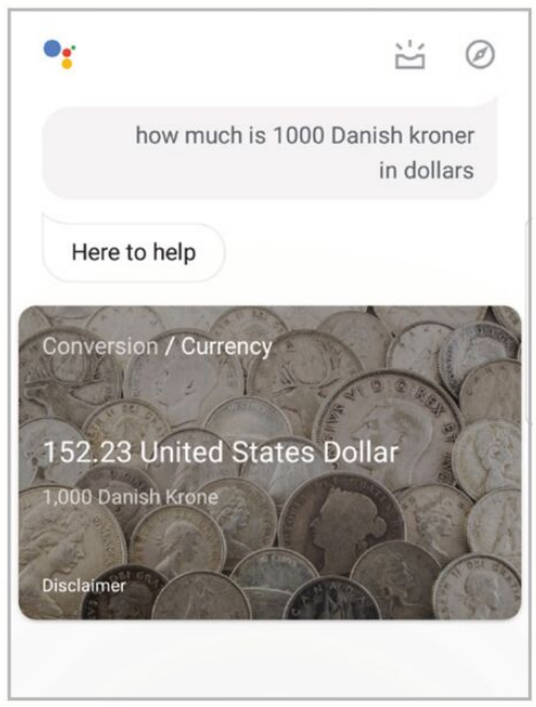
Manage Tasks

You can easily set and ask about reminders by saying, "Hey Google, remind me to…" You can also use it to set timers and alarms by saying, "Hey Google, set a timer for 10 minutes." If you want to check how much time is left just say, "…how much time is left?" You set alarms in the same way.



Get Answers

You can ask your Google Home to give you information about everything from finance to sports, you can ask for calculations, translations and unit conversions, for example, "Hey Google, how much is 1000 Danish Krone in dollars?" You can even ask for the nutritional information on most types of food.

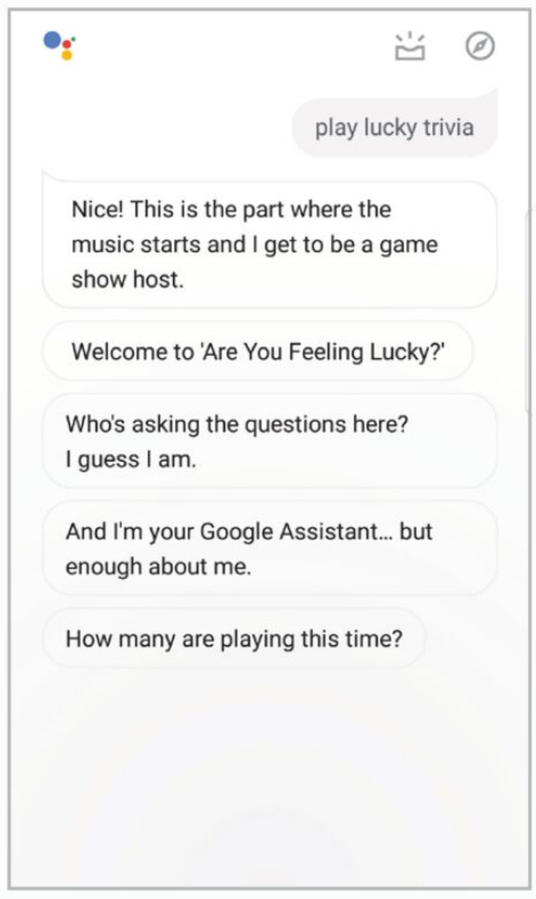


Control Your Home

If you have smart home devices such as smart plugs, a Nest thermostat or security cameras, you can link them to your Google Home and control them using your speaker. You will need to add the devices in the Home app, and follow any instructions to set them up.

Have Fun

Your Google Home speaker lets you play games with it, simply say, "Hey Google, play lucky trivia," (other games include Crystal Ball and Mad Libs). If you don't want to play a game, just tell it to "…entertain me," or say, "...let's have fun." You can even ask it to tell you a joke!



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