



Computer Group

The Big Beasts in Home Computing

Introduction

I offered to produce something that explains the role of the major players in computing. In this article I'll try to explain

- Who the big companies are and what they do
- Where their money comes from

All of this is in the context of home computing, by which I mean anything an average person does on a computer, tablet or smartphone.

Much of the below is, for space and readability, simplified.

Microsoft



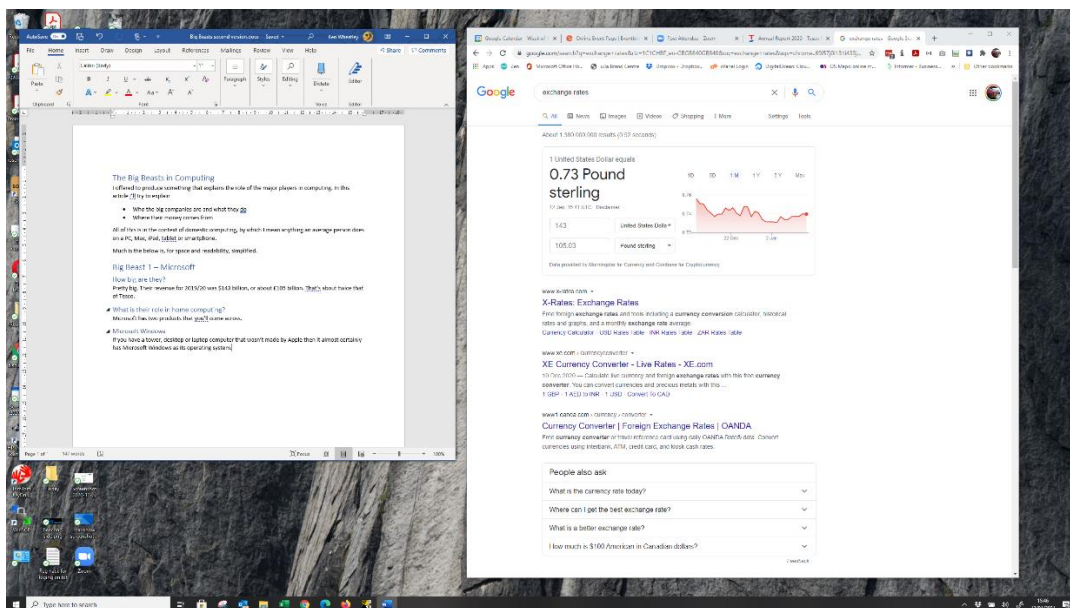
How big are they?

Pretty big. Their revenue for 2019/20 was \$143 billion, or about £105 billion. That's about twice that of Tesco.

What is their role in home computing?

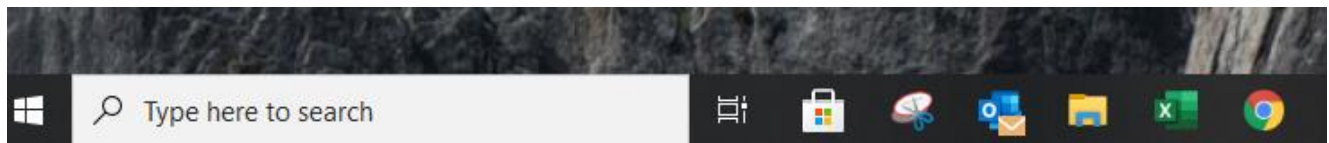
Microsoft Windows

If you have a tower, desktop or laptop computer that wasn't made by Apple then it runs Microsoft Windows as its operating system. The current version of Windows is Windows 10. Here's an example of a Windows 10 desktop.



A Windows desktop

Note the bar along the bottom which allows you to search for things, change to another application, see the time and so on. The off-square image of window panes in the bottom left is a Windows registered symbol.



The Windows task bar

Most home copies of Windows were installed by the computer manufacturer after paying Microsoft a licence fee, so in normal circumstances you do not have to directly pay Microsoft for using Windows.

Microsoft Office

Microsoft are also the publishers of Office, by far the market leader in 'productivity' software: word processing, spreadsheets, email and calendar manager, presentation software and a few other things. Office is not normally included when you buy a computer, although a free trial sometimes is. You need to buy Office and can do so in two ways:

- As a one-off purchase
- As an annual subscription

The subscription is called Microsoft 365 (formerly Office 365) and gets you the latest version of the Office software (Word, Excel, PowerPoint, Publisher, Outlook etc.) as well as online versions of these apps. You also get a huge amount (1TB) of online storage and the ability to install the software on up to five devices (PCs, Macs, tablets or phones).

I consider Microsoft 365 a good buy, especially for a household, but even if you disagree with me you know where you stand: you can buy or subscribe to Office, or you can use an alternative. Whatever you choose the costs are all in the open and up-front.

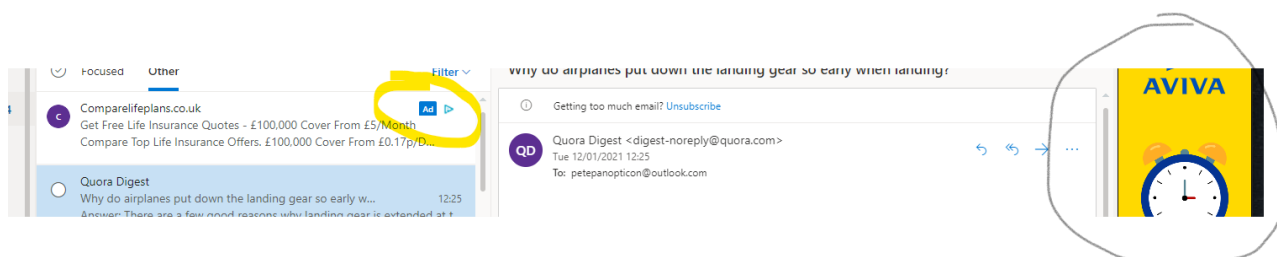
Microsoft Store

Windows computers have a shortcut to the Microsoft Store installed by default. Traditionally apps for Windows have been purchased in a box and taken home, or downloaded from external sources, not all of them reputable. Microsoft has attempted to steer users to their Store, purportedly as a way to raise quality. Naturally, Microsoft take a commission from all sales unless the software is free. But you can still download most apps from elsewhere and I suspect most users make few payments to the online Microsoft Store during the life of their PC.

Email

Microsoft offers free email. If you have a Hotmail, Outlook or Live account then that's Microsoft. You will see adverts alongside your mail and 'promoted' emails will appear at the top of your inbox. These pay for the free email service.

Here's an example of an advert in a free Outlook mailbox. It may look like a mail but it isn't really, it's an advert. It can't be deleted but it will go away when replaced by the next advert that Microsoft decides to show you. The ad is clearly marked as such and the advertising next to the mailbox is quite discreet.



What else does Microsoft do?

Windows computers have preinstalled games. Some carry adverts unless you pay a subscription. Microsoft are also behind the Xbox games console.

Outside the home they are a huge player in corporate IT and in cloud computing. And they own LinkedIn, the business social network, and Github, should you wish to know that.

Microsoft also makes some hardware. Their excursions into smartphones have been a disaster but they make the Surface line of devices, good quality (but expensive) laptops and tablets aimed at business people and creatives.

Apple



How big are they?

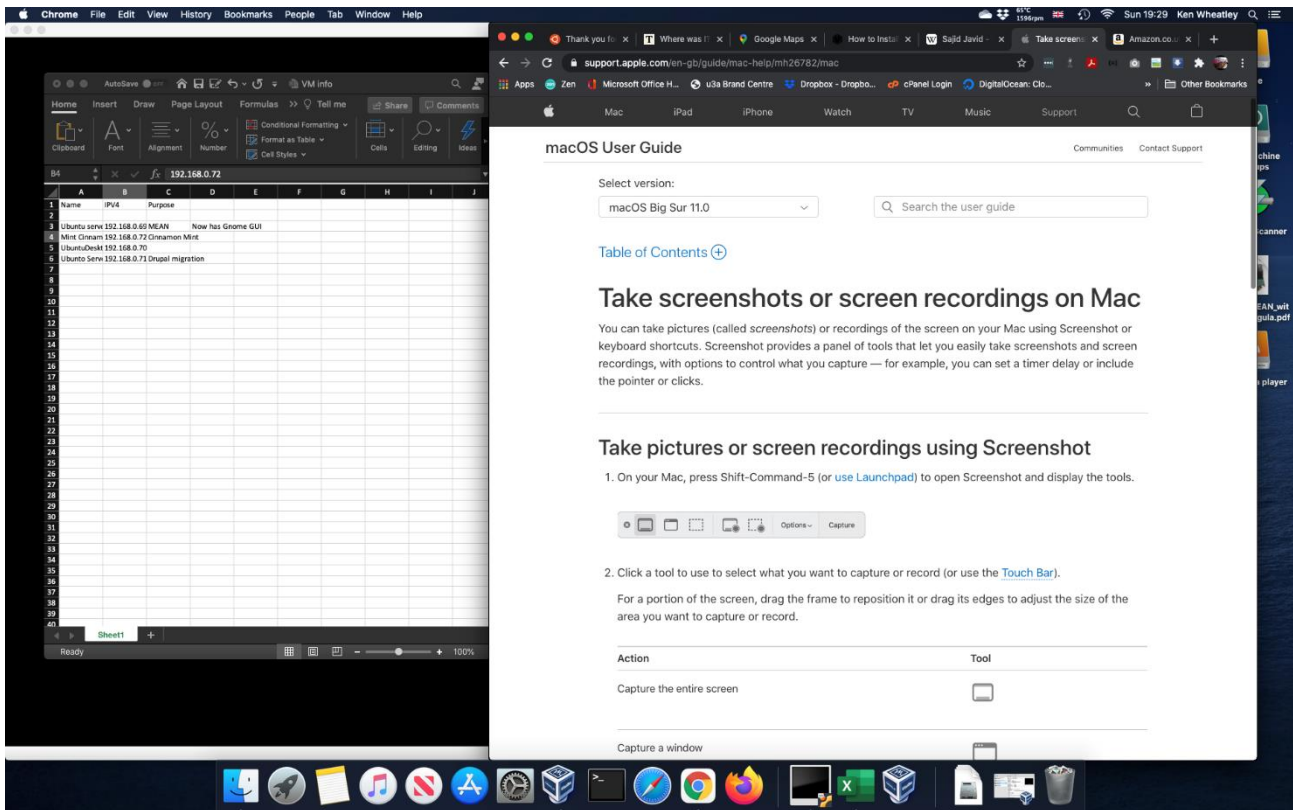
Colossal. Apple's income last year was nearly \$275 billion.

What is their role in home computing?

iMac and Macbook

Apple makes desktop computers called iMacs (the Mac stood for Macintosh) and laptops called MacBooks. A key difference between a PC and an Apple device is that anybody can build a PC, but only Apple builds iMacs and MacBooks. While the quality and price of PCs varies widely, Apple devices are high quality, but you certainly pay for it.

An Apple computer does not run Microsoft Windows. They have their own operating system called MacOS. As a result an Apple and a PC look and behave very differently. Each has its fans and, trying to be objective, I really do not think one is better than the other.



The Mac screen is quite different: the most obvious thing is that the icons along the bottom are larger. Another distinguishing feature is that the app you're using has its menu bar at the very top of the screen, unlike on Windows where each app has its own menu at the top of its window.

MacOS is installed on all Macs on delivery, and updates to newer versions are free. Once you've paid the rather hefty price of a new Mac there are no ongoing costs (unless you're unlucky enough to need a repair after the warranty expires. Then your eyes will water).

iPhone

The Apple iPhone is the single product that launched the smartphone industry. As such it changed the world and made Apple a global giant. Not only was the iPhone nice to look at and easy to use, it was attractive to app developers. They soon published countless apps making the iPhone, and smartphones in general, more and more attractive to users and app developers alike.

iPad

Smartphones come in all sizes but once it gets too big to use as a phone it becomes a tablet. A big iPhone is called an iPad. Really: size is the only difference. OK, some iPads can't connect to a mobile phone network so they won't let you make traditional voice calls or send texts, but tablets aren't suited for that anyway and they have apps that will do much the same thing.

App Store

iPhone/iPad apps can be downloaded only from Apple's App Store, an online shop accessed from the device. Apple justifies this monopoly by pointing out that they can ensure that everything in the App Store is safe. They have a point. They also take a hefty (normally 30%) commission on all apps that aren't free, and on any further payments you make through those apps. Some software developers think this extortionate.

Apple are greedy, but their approach really is safer than the alternatives. And the fact that a large chunk of anything you pay for an app is handed straight to Apple doesn't directly affect you as an end user; you just pay the price of the app.

iMac and MacBook users also have an App Store but Apple has been less effective in controlling this marketplace. Apps can still be downloaded from elsewhere, such as direct from the publishers, although you will need to jump through hoops as Apple warns you against the perils of downloading software from anywhere other than their curated, profitable, store.

Media

Apple sells music and videos, largely but not exclusively to people who are Mac, iPad or iPhone users. Apple also has a video on demand service, Apple TV.



How Big are They?

Google is a brand name of Alphabet, a vast company with revenues of \$46 billion. That's in just three months, the third quarter of last year.

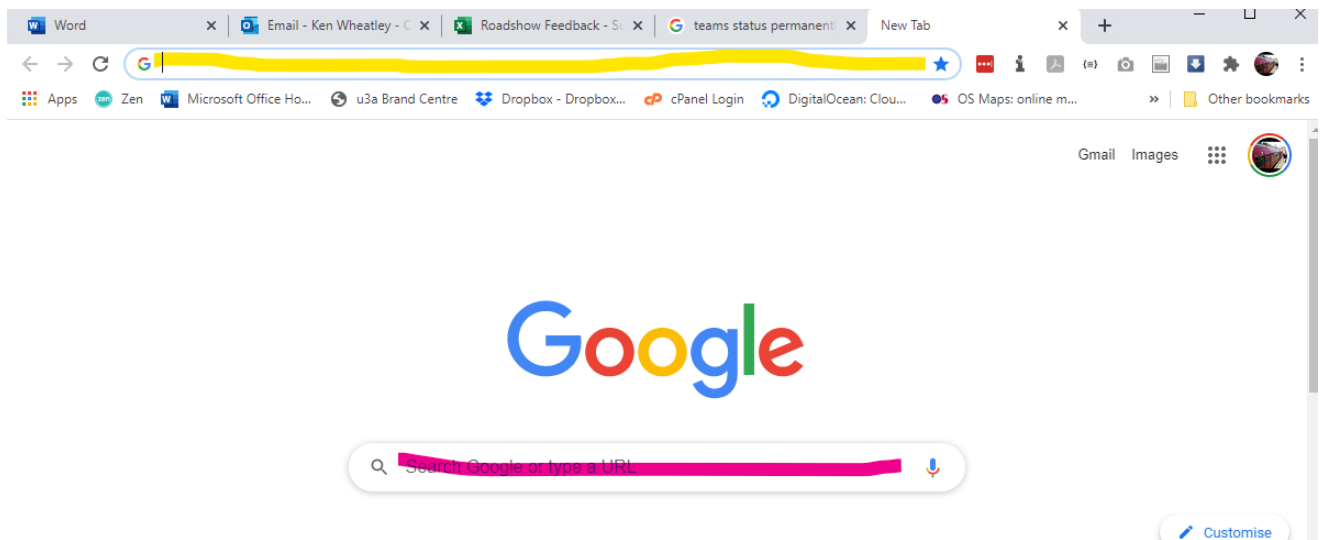
What is their role in home computing?

Google exists to sell advertising, so for the most part they don't take any money directly from phone or computer users. But they've managed to infiltrate so much of our online life that you should know how they operate.

Before we do that, let's make sure that we understand how searching works on the Internet. Suppose you want to look at the [Bishop's Stortford u3a's website](#). This lives somewhere on the Internet and is one of many millions of sites, so how do you get there?

First, you need an app that can retrieve information from websites. There are several that do just that and they're called **web browsers**, or just browsers. The most common one used to be Internet Explorer. That's now gone to the great app store in the sky, so the browsers you'll see most often are Microsoft Edge (on Windows), Safari (on Apple), Chrome and Firefox.

Browsers all behave in a similar way and they look something like this.

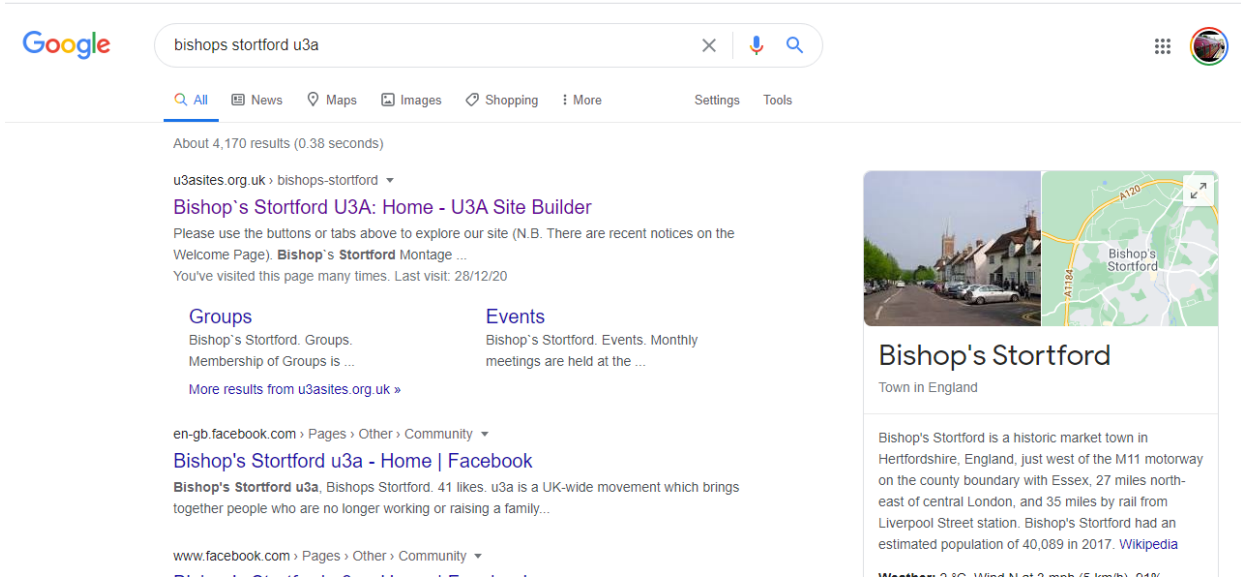


Google home page

At the top there's an address bar, yellow in the above image. This is used to enter the address of the site you want to visit, so to visit BS u3a you'd type <https://www.u3asites.org.uk/bishops-stortford>. But what if you don't know the exact address? Then you need to look it up.

A **search engine** is a web site that allows you to search the Internet for other web sites. In the above image I have opened the website of the Google search engine by typing www.google.co.uk in the address bar of my browser. Actually, I'm not telling the truth. I didn't need to type Google's address because my browser has been set up to automatically open the Google search page when it starts up. Yours probably does the same.

I can now type my search term in the area highlighted in maroon and a page of results is returned.



Search results from Google

Google has returned this page of results because we typed “Bishop’s Stortford u3a” into the Google search page. Google has found what we want as well as several related sites. On the right it’s provided a helpful panel about the town, and at the bottom of the screen (not included in my screen shot) there are a list of ‘Top Sights’ in the area.

So that’s how you use a search engine to find a site, but perhaps you don’t do it that way? For some time now you haven’t needed to go to a search engine’s website to perform a search, because all modern browsers will automatically search if they don’t recognise the address typed in the address bar as a valid internet address.

What I’m saying is that at any time, and whatever website you happen to be on, you can search simply by typing the thing you’re searching for into the address bar. So you never need to go to www.google.co.uk, ever. You might as well configure your browser so that it opens on something useful.

To summarise this detour: the app that allows you to visit web pages is called a (web) browser and when you perform a search (any time you try to go somewhere without typing in the exact destination address) then you’re using a search engine.

Now back to Google’s role in home computing.

Google Search


As we discussed in the last section Google provides a search engine. Not just any search engine, but one that has become a verb meaning 'to search on the Internet'. Google are not the only search engine on the planet so which searches are handled by Google? It turns out to be most of them.


If you open the page at www.google.com and type something into the search box then it will, of course, use Google's search engine. But what if you search from the address bar? Again, that search almost certainly goes to Google unless you've taken steps to reconfigure your browser, and I suspect that you haven't. The one real exception is if you're a Windows user and your search engine is Internet Explorer or Edge in which case the search normally goes to Microsoft's Bing search engine, a relatively minor player.


Google makes a great deal of money from searches. Some of it comes from keywords. This is when advertisers pay Google to display their adverts when certain words are searched for. So if you search for cars you'll see sponsored listings returned for things to do with cars. Here's an example.


About 7,550,000,000 results (0.90 seconds)


Find results on

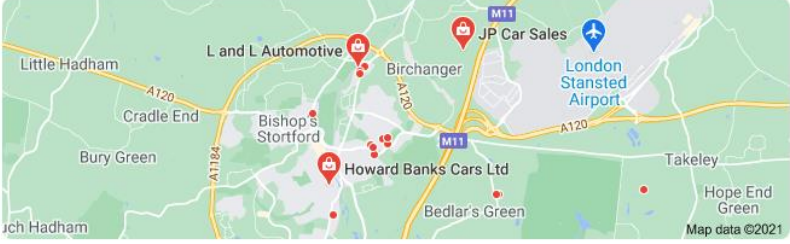
 Yell
J & R Cars, Bishop's Stortford...

 i & R Cars

 Gumtree
Used Cars for sale

 Gumtree

 Ca



Rating ▾ Hours ▾ Visit history ▾

JP Car Sales
5.0 ★★★★★ (2) · Car dealer
Unit 45 M11 Business Link
01279 927047

L and L Automotive
3.4 ★★★★★ (20) · Car dealer
Stansted Rd
Open · Closes 6:30PM · 01279 719300

Howard Banks Cars Ltd
4.5 ★★★★★ (29) · Used car dealer
5 South Rd
Open · Closes 5PM · 01206 913420

[View all](#)

Results returned after a search for the word car

All five results above have appeared because an advertiser paid Google to display their listing. This is fine: Google provides a useful service for free, and this is a way of making some money from it. It's what search engines do.

Keyword searches can be predatory. For example, McDonalds could pay Google so that their listing and/or advert appears when somebody searches for KFC or Nandos.

What's slightly dodgier than keywords is Google's use of tracking. Google knows where you go on the web even when you're not using Google's services. That's why adverts follow you around. It may even seem at times that advertisers know what you're thinking. That's because they do, thanks to the way companies, especially Google, track your web activity. This tracking allows advertisers to target you much more specifically, making their adverts more effective. It also helps Google maintain its dominant place in the online advertising market.

Search engines are available that don't track you. I recommend [DuckDuckGo](#).

Google Android

If your phone or tablet wasn't made by Apple then it runs an operating system called Android, developed by Google. Phone manufacturers install Android for free but there are strict conditions¹. Some proprietary parts of Android are only available if the phone/tablet manufacturer signs a licensing agreement with Google and includes certain Google services on the device.

One such service is Google Search. Android phones have a search box on their screen. Guess where the search requests are sent? And guess which search engine is used by the browsers on Android phones and tablets?

When you use a mobile phone, including an Android mobile phone, a great deal of information about you can be learned. Not only your web habits but also where you go: they know what Wifi hotspots you pass near, and they can physically track you with great accuracy using GPS. Have you ever received a message from Google such as 'How was the Shadhona Restaurant', even though all you did was stand outside it for a while? I have received many such messages.

All of this feeds into Google's profiling of you, allowing them to sell their real customers, the advertisers, more and more specific data about you, your likes and your probable purchasing needs.

¹ Android is Open Source, which means that anyone can use it and amend it subject to certain conditions, normally insisting that you cannot restrict anyone from enjoying the freedom you enjoyed. You can install the freely available parts of Android on a phone and that phone will work perfectly well. It will just lack the parts reserved by Google.

Play Store

The Play Store is the Android (Google) equivalent of the App Store. It contains a myriad of apps as well as movies, music and games. Google takes a commission on apps sold through the store but it is thought to be a lower percentage than Apple takes. Apps may not be admitted to the Play Store unless they comply with Google's conditions, but Google's control over the Play Store is nothing like Apple's iron grip on its App Store. And it's not too difficult to obtain apps from places other than the Play Store, but that can be risky.

Gmail

Gmail was originally called GoogleMail in the UK as the name Gmail wasn't available. Gmail was revolutionary: completely free² email with no effective limit on how large your mailbox could become. No wonder millions signed up. The catch? It's Google. They have access to your mail. They know what you're talking about, and it all helps to build their profile of you. Unlike Microsoft, Google DOES read the mails you send and receive. If you're not happy about Google scanning your emails then you'll be even less pleased to know that Google also allows some Android apps to access your email. But don't worry: you need to grant permission to any app wishing to see your mail, and this ability has only been extended to a few hundred developers that Google has vetted. We can all sleep soundly at night.

Google Calendar and Contacts

If you use email or if you make phone calls then you'll need some form of electronic address book. If you have even a moderately busy life then you'll need a calendar. Google has both. Like all Google services the data is stored in the cloud, so is accessible from any device so long as you have an Internet connection.

Google Drive, Docs, Sheets and Related Products

Google Drive is online storage. Anyone with a Google account has 15GB of storage free of charge and even more space if you pay a modest amount. You can have 100GB for £1.99/month. You can put just about any type of file you like into Drive; photos, documents, anything. A common way of working is to always save documents into a folder on your PC that automatically syncs with Google Drive. That way you won't lose anything if your computer dies, and you can access your stuff from any device, anywhere.

² Mail and some other Google products are free for home users. Organisations who need to manage users, use their own domain name and so on pay for these products.

You could store all your Word documents and Excel spreadsheets in Drive, but Google has a better idea.

Google Docs is a replacement for Word. Google Sheets is a replacement for Excel and Google Slides for PowerPoint. They're free, all online, save your documents in Google Drive and allow several authors to work on a document at once.

There's more such as Google Photos and Forms, but you get the idea. As usual these apps are good, easy to use, cost nothing and have the benefits of being in the cloud. You pay by suffering adverts, and by helping Google to further characterise you.

Google Chrome

The dominant web browser today is Google's Chrome. It's fast and has a simple, elegant, design. Chrome is also chock-full of useful tools that make developing web applications and services easy so it's no surprise that software developers love it. But it's another brick in the Google-is-everywhere and Google-knows-everything wall.

Google Maps

Another fantastic service with a familiar business model. It's an excellent map, integrated with search so you can look for, and get directions to, things like 'Indian Restaurant near me', or to 'Colin Reed' if his address is in your contacts. The navigation provided by Maps is top quality. If you're walking, cycling or driving it will give you turn by turn directions. It will tell you how long the journey will take, allowing for those traffic lights in Spellbrook and that broken down lorry on the M11. If you're using public transport Maps will tell you the times of the trains and buses you need and the fare. It will even tell you how crowded you can expect your bus or train to be. If you'd rather travel by Uber then Maps tells you the fare and how long you'll have to wait for your cab.

With the StreetView feature you can take a virtual walk along almost any street on the planet.

Google Maps is an astonishing product that would have seemed like science fiction not so long ago. And it's completely free.

Maps is profitable for Google because you're shown ads such as local business listings alongside the map. And, naturally, Google can see what you're up to.

Google are also paid plenty of money by companies such as Uber who use Google's mapping technology to support their business.

YouTube and YouTube Music

Google owns YouTube, so they're being paid to show you adverts while you watch old TV programmes, music clips and guides on how to mend your washing machine. As you watch YouTube, Google watch you. But they will stop showing you adverts on YouTube if you subscribe to YouTube Premium and pay £11.99/month.

Nest

Google owns Nest, a home automation company that rivals Amazon's Ring.

Google Assistant

Google has a voice assistant, invoked by saying 'Hey, Google'. You can ask it just about anything and it will answer. It integrates with Nest home automation devices and things like smart speakers, so if you have a Google device nearby (such as your phone or a Google smart speaker) you can say 'Hey, Google. Play some Amy Winehouse in the living room' and it will do just that. It will answer almost any question, it will tell you jokes, it will even talk like a pirate if you ask it to. You can control the temperature of your house, turn lights on and off and so on with the right home automation devices.

Of course, everything you say goes to Google's data centres and is, necessarily, analysed for content, so Google harvests this data about you.

Other Google Services

Google is famous for launching many, many services to see if they work. If they're not that successful they're shut down or off-loaded. Google Earth is a useful survivor.

But the real money-spinner is their Cloud services. Google has put its experience of running huge computing farms to good use by embracing the Cloud: renting processing power, storage and other computing services to a vast number of organisations who don't want the trouble of running their own datacentre, or who have bursty or seasonal computer requirements. Google is not alone in this market. Amazon and Microsoft are their main competitors. The three have literally millions of real, physical, servers in huge datacentres, in some cases under the sea, using the water to help keep them cool.

This doesn't directly affect the home user, but many of the websites you visit are running on computers owned by Google or one of the other two large players in this market.

Other Alphabet Services

Alphabet, Google's parent, has a number of other strings to its bow.

Subsidiary	Business
Calico	Human health (by overcoming aging)
CapitalG	Private equity for growth stage technology companies
DeepMind	Artificial intelligence
Google	Internet services
Google Fiber	Internet access: via fiber
GV	Venture capital for technology companies
Loon	Internet access: via high-altitude balloons
Sidewalk Labs	Urban innovation: infrastructure through technological solutions
Verily	Human Health
X	research and development for "moonshot" technologies
Waymo	autonomous driving
Wing	drone-based delivery of freight

Source: Wikipedia

One Alphabet company is DeepMind. They hit the headlines a few years ago when their supercomputer was able to beat the world champion professional Go player. And Alphabet's Waymo has self-driving cars on the roads in some parts of the USA – with no driver on board.

So, Alphabet is, apart from Google, a collection of research companies. They don't really seem to affect our daily lives – yet.

Update: It was announced on 22nd January that Alphabet has decided to pull out Loon, a subsidiary which was set up to provide Internet access via a network of balloons. This confirms what I said a paragraph or two back about them being quick to bail out if something doesn't seem to be working.

Amazon



How Big are They?

Over \$96 billion in the third quarter of 2020. In the same quarter Ford took \$2.4 billion.

What's their role in home computing?

Shopping

Amazon are perhaps the most straightforward of the companies here. They're an online shop. They do profile you but that's so that they can try to sell you things, and their targeting is, I find, quite good. Amazon are often the first result returned when you perform a search, so a decent chunk of their vast income must go straight to Google.

But they seem straightforward to me: a shop that sells things and who allows others to sell through it. It's just that the price of their success is many other shops going out of business, and I do wish they'd pay a bit more tax in this country.

Kindle

Amazon started as an online bookshop, and books are still important. Amazon has done more than anyone to create the electronic book market. Its Kindle Readers are the only mass-market device for reading eBooks. Kindles are cheap, light, can store thousands of books and use an e-ink technology that is easy to read and has decent battery life. But it's annoying that Amazon sells the Kindle version of books for almost the same price as the paper version.

Kindle Fire

Kindle Fire is not to be confused with Kindle. Kindle Fire is an Android tablet in the same way that your Samsung or Sony tablet is. This makes it a much more flexible and powerful device than a Kindle, but no better than other tablets for reading books on. Kindle Fire tablets have low prices and specifications to match. But they are excellent value and do meet a market need.

An Amazon Fire tablet is different from a generic Android tablet as it uses a version of Android has been tailored for Amazon. You don't have the Google Play Store; you must use Amazon's App Store, and not all apps, especially those from Google, are available.

A Kindle Fire is cheap for what you get and that's because it's designed to help you buy things from Amazon. Buy a Kindle Fire, by all means. It's excellent for browsing the web, email, music and video, but be aware that there are limitations. They may not affect you but you should be aware that they exist.

Ring

Ring is Amazon's home automation brand. The best known Ring product is the doorbell that has been presented to the BS u3a Computer Group. Amazon sells smart lightbulbs, mains sockets, curtain openers/closers, thermostats and the usual home automation nonsense gubbins. There's even a smart meat thermometer. To pull it all together seamlessly you need:

Alexa

Amazon's voice assistant, Alexa, is the market leader. You say 'Alexa: please send me more liquorice catherine wheels' and they'll arrive the next day (allegedly) and you can, using the power of voice, control all of your home automation stuff, wherever you are in the world. You can also just ask Alexa questions.

As I said, Alexa is the market leader in voice assistants. It's followed by Google's Assistant, Apple's Siri and Microsoft's Cortana. I'm a bit concerned that as these assistants learn about us, companies like Amazon will follow Google's lead in making us and our data one of the products they sell. I don't think that's happened yet but it must be tempting.

What else does Amazon do?

They stream music, videos, and TV programmes (including those they've produced themselves, such as Top Gear). Much, but not all, is free to Amazon Prime subscribers.

Amazon are also big, in fact the biggest, in the cloud computing stuff I mentioned when discussing Google. Their products in this area are under the umbrella term Amazon Web Services. Netflix, FaceBook and the BBC use computing resources provided by Amazon.

FaceBook



How Big are They?

They're another whopper. Their revenue in 2019 was \$70.7 billion.

What's their role in home computing?

Facebook

Their main product is the familiar social network. It wasn't the first to become popular but it saw off its rivals years ago.

It's free to use but does carry adverts, the source of most of its income. But there are concerns about FaceBook. It tracks users who click the FaceBook 'like' button on other, unrelated, websites, and it allows some third party app developers to obtain information about users. A concern is seemingly innocuous apps asking you for information or to complete polls. The data collected could be used to profile you, or even to facilitate identity theft. Or it might be just a bit of fun. The problem is, you can't always tell what a FaceBook app developer is up to,.

Another thing some people have worried about is the tagging of people in photographs. When a photo is uploaded FaceBook uses face recognition software to try to identify the people in the picture. It then gives you the chance to confirm or reject its identification. This feature now has to be opted in to but some still consider it a step too far towards Big Brother.

The Cambridge Analytica (CA) scandal showed another facet of Facebook. Students were asked to complete a 'psychological survey' for academic purposes only. Once CA had access to the students' Facebook accounts it not only harvested their data but also harvested their friends' data without permission. They then used that information to target content supporting Donald Trump's election campaign.

WhatsApp

FaceBook acquired WhatsApp, the messaging service, in 2014 and has recently announced that it is changing the terms and conditions to allow the data held about you on the two platforms to be pooled. This does not include the actual messages themselves, as they are encrypted, but it may include things such as telephone numbers. These changes do not affect customers in Europe, say WhatsApp. Of course, they mean the EU.

I think it's a storm in a teacup but this controversy is a warning that data privacy is precious and always under attack. It would be less of a problem for FaceBook if it didn't already have a dodgy reputation in matters of privacy.

Summary

These companies are huge. They all pull in vast sums of money but their business models are very different.

Microsoft are a computer company, at least so far as domestic users are concerned. They make Windows 10, Office, Xbox and some posh tablets/laptops. Their excursions into Smartphones have failed, as has their attempt to control their app ecosystem.

Apple are a computer and, especially, smartphone and tablet company. They were the pioneer of the walled garden approach, aggressively forcing (with phones), or coaxing (with Macs) their customers to do everything the Apple way.

Google are the dominant search provider to computer and phone users and the largest seller of online advertising to business. They exemplify the saying: if you don't pay for it, you're the product. But their services really do make our lives better – if you're prepared to put up with intrusive snooping.

Amazon are more than an online shop, but still operate transparently. I think.

FaceBook is, in some ways, a danger to users but the financial side seems clear enough. The advertisers pay.