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## **08** Google Under Fire

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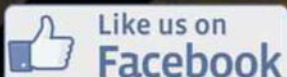
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# GOOGLE UNDER FIRE

Questioned over its search ethics, probed over its rollout of Android and facing strong competition, **David Crookes** examines why Google may be feeling hot under the collar

It's fair to say that Margrethe Vestager is not a household name. But Google her and you will see that she is the 47-year-old former Danish finance minister who took over from Spaniard Joaquín Almunia as the European Union's antitrust enforcer last November.

The search results will put her Wikipedia entry first, her Twitter profile second and her EU profile third. From that point on, though – and with delicious irony – you will see lots and lots of stories about her current mission: an in-depth investigation into Google that is looking for signs it has been anticompetitive.

It has been prompted by fears Google is dominating the web just as Microsoft secured itself a phenomenally large slice of the PC market from the 1980s onwards. With great power comes great responsibility, and Europe is keen to ensure Google has been totally above board in that respect. A household name, Vestager may well become.

Undoubtedly, Google is a huge concern for the EU. Last month,

Vestager filed formal antitrust charges against the company on behalf of the European Commission (EC). It was effectively an indictment, a "statement of objections", as it was called, accusing Google of damaging competing businesses.

At the heart of the matter is Google Shopping, with the EC claiming that the firm promotes its own shopping links ahead of its competitors. By making other product comparison sites less easy to find when shoppers tap in a search query, the EC is looking into whether Google is abusing its position as the web's most popular search engine. If found guilty, Google could face fines of up to 10% of its annual revenues – around \$6.6 billion.

"Our preliminary view in the Statement of Objections is that in its general internet search results, Google artificially favours its own comparison shopping service and that this constitutes an abuse," says Vestager.

"Our investigation so far has shown that when a consumer enters a shopping-related query in Google's search engine, Google's comparison shopping product is systematically displayed prominently at the top of the search results. This display is irrespective of whether it is the most relevant response to the query. Thus, Google's commercial product is not subject to the same algorithms as other comparison shopping services. Google has engaged in this conduct in a broad number of Member States since 2008 and continues to do so."

The EC has been investigating the company since 2010, probing complaints from a wide variety of firms including Expedia, Nokia and Microsoft. Last November, as a proposed settlement collapsed despite three attempts by Almunia to sort it before he left office, the European Parliament approved a motion by 384 votes to 274 that called for tougher regulation of the search engine market. One of the suggestions involved breaking up





▲ *The Android part of the Google business is also being scrutinised*

Google so as to end its European dominance, removing the search business from the other arms of the firm.

While that step is unlikely to take place, the EU is wary of Google's immense market share in general search, which reaches more than 90% in Europe. It is also aware that Google also has many fingers in lots of scrummy pies. So although the EC is only looking at the Shopping service at this stage, it is likely to be merely a taster for other investigations to come. Should the EC find a strong case against Google in Shopping, it will turn its attention to other services such as Maps and Flights.

That's because, like Shopping, they are examples of a vertical search engine – that is, a search engine with a narrow, specific and specialised function. It is within these spaces that Google faces lots of potential competition. Europe feels that the dominance of Google's horizontal, general search engine gives it an unfair advantage if its own vertical results are prominently shown to users.

"We continue to look at the ways in which Google may also favour its other specialised search services," Vestager says. "If an infringement is proven, a case focusing on comparison shopping could potentially establish a broader precedent for enforcing EU competition rules in other instances

of Google favouring its own services over competing services."

**Android Probe**

But Shopping is not the only current investigation taking place into Google's affairs. The European antitrust campaigners have already begun probing the News service and, more specifically, the alleged copying of rivals' web content, a practice known as "scraping". This involves investigating the unauthorised use of content from rival companies such as Yelp. The EC is also looking at Google's supposed placing of undue restrictions on advertisers and alleged advertising exclusivity.

But the big one for Google is the EC's investigation into Android, the OS used in the majority of the world's mobile phones. The investigators are set to study, in-depth, the relationships Google has with the manufacturers of Android devices, and it wants to examine evidence of anticompetitive company practices by looking at how Google bundles its apps with the mobile OS to see if it forces the device makers to give its own apps preferential treatment.

**What Does The European Commission's Statement Of Objections Say?**

The Statement of Objections focuses on two specific services: Google Shopping and its predecessor, Google Product Search. It is looking at these in relation to rival comparison shopping services, accusing Google of artificially diverting traffic from rival comparison shopping services, which it says hinders their ability to compete. There are some specific points, namely:

- Google has, since 2008, been systematically positioning and prominently displaying its comparison shopping service in its general search results pages, irrespective of its merits.
- Google has been applying a system of penalties to other comparison shopping services but not its own. This, the European Commission says, is having the effect of lowering the rank at which the rivals appear within the general search results pages of Google.
- Google's first comparison shopping service, Froogle, was a poor performer and did not benefit from the alleged favourable treatment.
- Google Shopping and Google Product Search have had higher rates of growth, because they have been systematically favoured to the detriment of rivals.
- Consumers are suffering because when they search, they are not seeing the most relevant comparison shopping results. It also says innovation is suffering because rivals believe that their results are not being given the same prominence and so have a lower incentive to push with new ideas.

To resolve the issue, the EC wants to see Google "treat its own comparison shopping service and those of rivals in the same way". It adds: "This would not interfere with either the algorithms Google applies or how it designs its search results pages. It would, however, mean that when Google shows comparison shopping services in response to a user's query, the most relevant service or services would be selected to appear in Google's search results pages."

This means Google is being subjected to a multi-pronged attack, putting the company under great pressure. And yet Google has been here before. Earlier this decade, the Federal Trade Commission (FTC) in the US conducted a wide-

“ **Users do not necessarily see the most relevant results in response to queries** ”

ranging investigation of alleged anticompetitive conduct by Google.

Like the European Commission, it accused Google of unfairly preferring its own content on its search results page, and it looked into allegations that it was selectively demoting its competitors' content. The FTC closed the probe in January 2013, having found that Google was not manipulating its search algorithms to unfairly disadvantage its competitors in the vertical search engine space. It said Google's inclusion of its own content could "plausibly be viewed as an improvement in the overall quality of Google's search product".

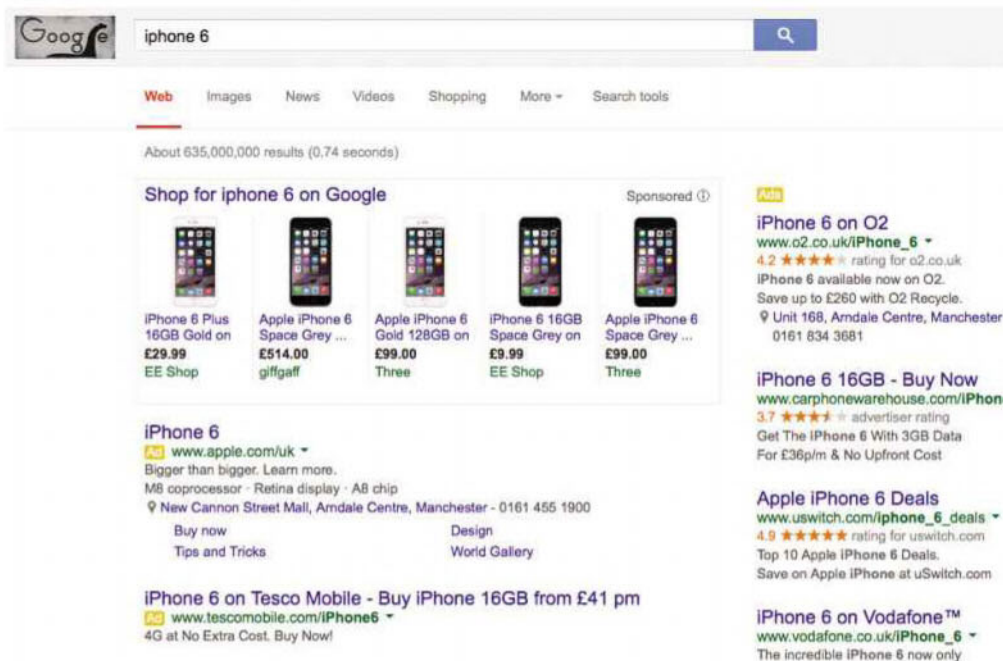
But Ms Vestager believes there is a case to answer. Her complaint expresses concern "that users do not necessarily see the most relevant results in response to queries – to the detriment of consumers and rival comparison shopping services, as well as stifling innovation." She wants to look into the possibility that Google has artificially boosted its presence in the comparison shopping market, denying competitors the commercial opportunities that their innovations deserve. "The commercial importance of appearing prominently in Google's general search results is obvious," she says.

To that end, Google could be found to be breaching Article 101 of the Treaty on the Functioning of the European Union, which prohibits anticompetitive agreements and decisions of associations of undertakings, as well as Article 102, which prohibits the abuse of a dominant position that may affect trade and prevent or restrict competition. Google has until the end of June to formally respond.

## Google's Defence

Not that it's staying quiet in the meantime. Google wrote an internal memo to staff saying it had a "very strong case" to make against the allegations and, in a blog post, Amit Singhal, the senior vice president of Google Search, has pointed out the competition the company faces, saying there is more choice today than ever before.

He mentions rival search engines such as Bing, Yahoo!, Quora,



▲ When a search is made in Google, shopping results are shown across the top of the page

DuckDuckGo and the verbal search assistants, including Microsoft's Cortana and Apple's Siri. He highlights the popular shopping services that attract a lot of traffic and revenue, from Amazon to Idealo to Expedia and eBay, and he also suggests that people are not merely heading for Google when seeking recommendations but are also using Facebook, Twitter and Pinterest.

He even extends his defence to the News service: "Users have many ways to reach their favourite sites," he writes. "For example, Bild gets more than 85% of its traffic from sources other than Google and other search engines."

In a series of graphs, Singhal illustrates how the number of visitors to Google Shopping in Germany, France and the UK is far below that of the competition, and he also states, "Any economist would say that you typically do not see a ton of innovation, new entrants or investment in sectors where competition is stagnating – or dominated by one player."

Android's chief is also adamant that the company has done nothing wrong. Hiroshi Lockheimer, the VP of engineering at Android, says developers have a choice of platforms and that many rival apps are pre-installed on Android devices. He says Google Play allows for the downloading of the Facebook,

## The Questions Android Must Answer

The Commission is set to look at three main issues during its investigation into Google's mobile operating system arm, Android. The EC says it has received complaints about the way the business is run, and it has vowed to the following:

- To look into whether Google has been incentivising or requiring smartphone and tablet manufacturers to exclusively pre-install Google's search engine or any other of its applications or services.
- To look at the alleged bundling together of certain Google products with other apps and services.
- To investigate if Google is hindering the ability of manufacturers of smartphones or tablets, who want to use the Android operating system, from being able to fork Android for their own use and development.

Amazon, Expedia and Microsoft Office apps, and he explains that there are Android devices that do not use Google services at all.

"The European Commission has asked questions about our partner agreements," Lockheimer writes, also highlighting the free, open-source nature of the operating system. "It's important to remember that these are voluntary – again, you can use Android without Google – but provide real benefits to Android users, developers and the broader ecosystem."



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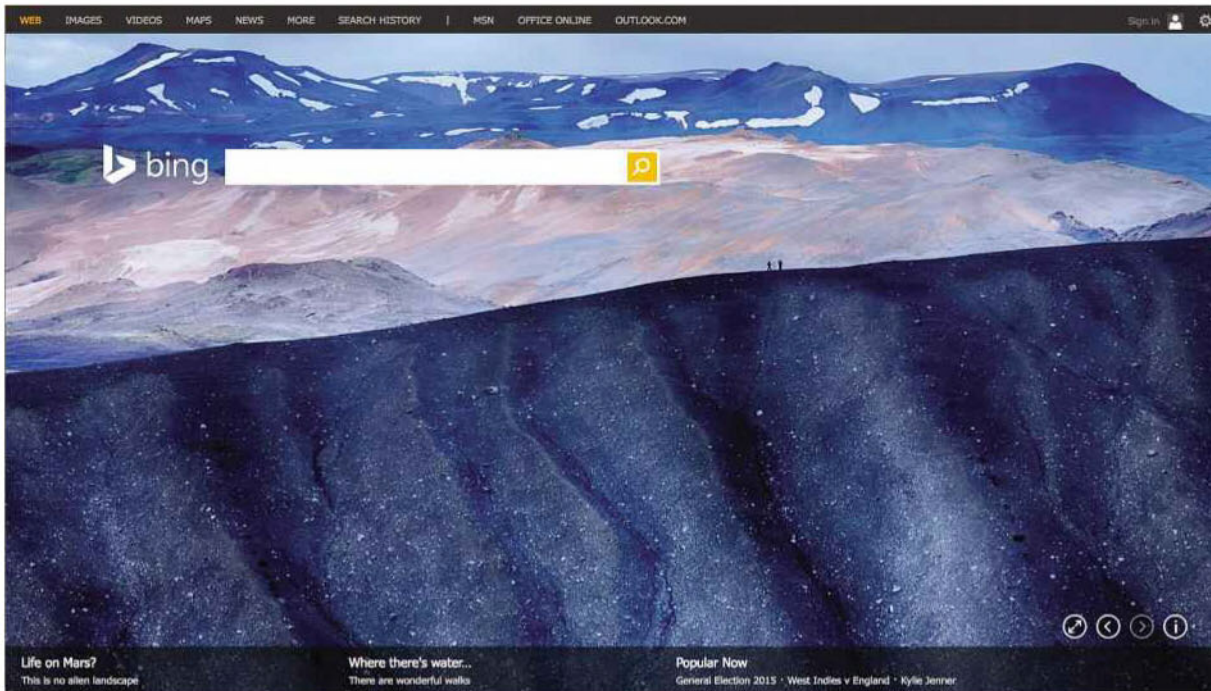
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< Bing has been making major inroads into Google's dominance in the US

## Is There Justification?

It's clear, then, that Google is going to be putting up a fight, but this will be a process that will take years to resolve. If Google loses, it will inevitably appeal, sparking a court process that would take many years to resolve. But even though it's going to be tough for both sides, the EU does, in many regards, have a duty to push ahead.

For while Google has been able to open doors to the public that may otherwise have remained shut, and while it has broadened humanity's horizons by making knowledge accessible in a few key taps, there is a school of thought that the company does need to be carefully monitored.

Google is more than a search engine, so the company's practices, the argument goes, should be held into account. Google, the pro-investigators say, needs to be transparent and open at all times about how its search engine works, and it needs to be honest if some results are given preference over others or if there are results that are omitted entirely.

Google may say that its algorithms are so complex that even its engineers do not fully understand them, but the way the search engine works is of great importance. There has to be a strong element of trust, especially when users are giving up

## Microsoft's Bing now has a market share in excess of 20%

so much about themselves in the process. That's not to say Google is dishonest – far from it – but if there is a feeling that something isn't operating correctly, then an investigation is justified, if only for clarification.

And yet times are changing. Although internet searches represent a large portion of the web's volume of traffic, the increasing use of mobile phones and apps means the first port of call for content and shopping is not necessarily Google. A lot of people will directly launch an app such as eBay and Amazon and conduct their entire purchasing transaction within that rather than type the name of the product into Google in the hope of discovering where it may be bought. The EC investigation would have to take into account changing user habits, as it will no doubt be doing.

### The Rise Of Bing

The EU and the EC also need to consider that Google's power may naturally fall away too, and already we're seeing Google's search service losing ground to Bing. According to comScore, Microsoft's Bing has been

picking up reasonable percentage points, and it now has a market share in excess of 20% for the very first time in the United States.

Much of that is due to Microsoft being very aggressive in pushing Bing, in a bid to overturn its arch rival, and it would appear the efforts are paying off. Key has been the Bing Rewards program, which has proven to be popular in allowing searchers to amass points, which can then be used to obtain gift cards for retailers such as Amazon, Sephora and Starbucks.

Many big names are involved in the scheme, from GameStop to Dominos to Burger King, and it's even possible for users to swap credits for fuel and airline miles. As well as being able to donate credits to local charities and schools, there are also sweepstakes that allow people to win games consoles and tablets. It has been turning many heads since 2010.

As a sign of the confidence Microsoft has in Bing and the Rewards programme, it is separating itself from Facebook. It used to be the case that you had to sign into the Rewards with a Facebook account, a method many prefer,

# cube

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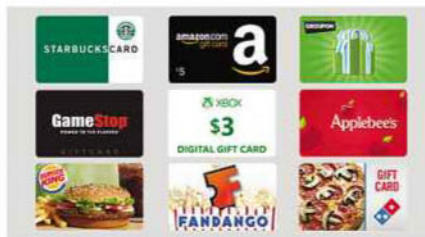
I accept the Bing Rewards Terms of Use and have read the Bing Privacy Statement. When you sign up, you'll get email newsletters, tips, information about Bing Rewards and also the Bing Newsletter. You can unsubscribe at any time.

bing rewards

### What can you get?

As a member of Bing Rewards, you earn credits for the searches you do every day! Then you can redeem your credits to:

- **Go Shopping.** Redeem your credits for airline miles, fuel points, discounts on movies and meals, or get gift cards from Microsoft and retailers including Starbucks, Amazon.com\*, and Sephora.
- **Enter to Win.** Redeem your credits to enter sweepstakes for amazing prizes like Xbox One consoles and games, Surface tablets and high-value gift cards.
- **Give to Charity.** Donate your credits to a local charity or



▲ *The Bing Rewards program allows people who search online to earn credits towards gift cards, food and fuel*

since it's easier than registering from scratch. Yet from 15th February this year, it required a Microsoft account, and this also has the effect of encouraging more people towards other Microsoft services – once logged in, it's easy to push products on people.

But that's not the only breakthrough for Bing. If Bing was a poor search engine, then it wouldn't gain as much traction, no matter how many rewards it gave out. After all, people use a search engine because they want to find something and, in this regard, Microsoft has been slowly but surely improving its service to the point that it has a better image search than Bing (it has pop-up enlargements, a Favourites option and a filter than looks for people's faces), great video searching that displays results in a grid, a desktop widget for easy searching, very detailed search results that appear as you type and a nice picture on the home page.

Bing has also benefitted from a renewal with Yahoo!, which allows it to power the latter's results. It has also been integrating Bing into Office Online, so users can do all their business within the package, building on a captive audience. And while Bing still lags massively behind Google in mobile (NetMarketShare

“ **The increasing use of mobile phones and apps means the first port of call for content and shopping is not necessarily Google** ”

points to a 93% share), with Windows 10 on the way, it may well be spending much more time in the sun, certainly for computer users. Microsoft already has close to a third of all searches in America, and that is set to grow.

What it shows is that nothing can be taken for granted. Yahoo! used to be the number two search engine, but Bing overtook it in December 2011. In Europe, Google still has around 90% of the search engine market, but if Microsoft decides to follow the same path in Europe as it has in America, a chunk of that could easily move into Bing's hands. Google, it would seem, has serious competition.

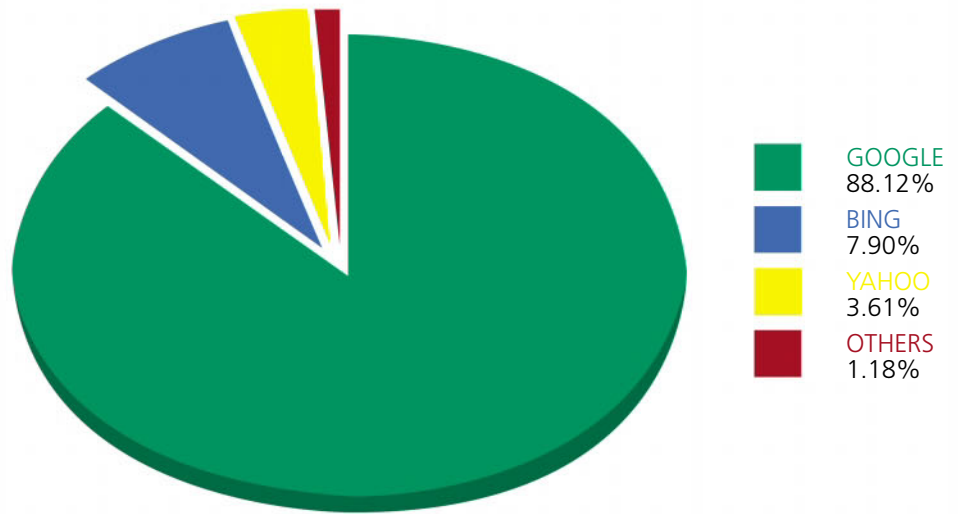
### Hit Its Peak?

All of this begs the question: has Google peaked? It's an interesting query, and one raised in October by the tech analyst Ben Thompson, who writes for the Stratechery



▲ Margrethe Vestager is an MP for the Danish Social Liberal Party and the European Union's commissioner for competition. Credit: Johannes Jansson/norden.org

## UK Search Engine Market Share



Source: [theworld.co.uk](http://theworld.co.uk), for March 2015

blog. He believes Google is coming under attack in the advertising market by social media giants and that its own service, Google+, is in no position to challenge it. It's all down to the emergence of native advertising, which allows services such as Facebook, Twitter and Pinterest to run ads in a news feed, promoted tweets and promoted pins. It allows news websites to run advertorials too, an age-old concept that has always been more valued by advertisers.

"The problem for Google is that there is no obvious reason why they should win this category," he writes. "Yes, they're an ad company, but the key to native advertising on the internet is the capability of producing immersive content within which to place the ad, such as Facebook's newsfeed, Twitter's stream, a Pinterest board or even your typical news site's home page."

Perhaps this is why Google continues to reach into new areas. Maybe it is looking for another route to success and another way of shaking up a marketplace should advertising levels drop. It is certainly casting its net far and wide, looking into robotics, artificial intelligence, self-driving cars and wearables. However, its search advertising business has become stagnant, and it has remained at 20% for some time. As the *New York Times* points out, Google made \$14.4 billion in

profits in 2014 and revenue was up 19% on the previous year, but its stock price has fallen by 8% in recent times.

Of course, no one would dare suggest Google is on its way out – not with its dominance of the search market, the success of Android and the continued popularity of YouTube, Google Maps and all of the other well-produced services. At the same time, though, the market for the text-based ads that run alongside the search results on Google may be worth \$45 billion to the company, around 10% of the entire \$550 billion global advertising market. If Bing makes more inroads and if the EU starts to push at its walls, Google could begin to feel some pressure.

We have, however, been here before, many times over. In 2005, Slate published an article headed 'Has Google Peaked', comparing the company with Mr Big from the James Bond film *Live and Let Die*, whose plan was to flood the streets with free heroin, eliminate the competition and get users hooked, before leveraging control. It's easy to see how the comparison could be made, but things have changed a lot over the past ten years when, Slate claimed, "about 99% of Google's revenue comes from advertising" and that Google was seen to be

relying on AOL "for about 12% of its AdSense revenue." "If AOL terminated its contract, Google would feel some pain, and its stock price could take a significant hit," the journalist noted.

Yet there is some hassle ahead for Google and issues that it must address. The investigation, the EC says, will be fair and balanced, and it will take a lot of work, but it's one that will be slipping from the agenda. Since taking office last November, Vestager says she has given high priority to the Google antitrust investigations. "Dominance is, as such, not a problem under EU competition law," she said in a statement. "However, dominant companies have a responsibility not to abuse their powerful market position by restricting competition, either in the market where they are dominant or in neighbouring markets."

As the investigation continues, Google will be asked some tough questions, and it will have a section of its business analysed to within an inch of its corporate life once again. And just like the investigation that took place in America, there's no way to tell which way it will go. It's even one of those rare issues that a Google search couldn't hope to resolve. One thing's certain: it's set to rumble on for years, and we haven't heard the last of Vestager yet. **mm**





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# Complete Guide To Watercooling

James Hunt lays out the fundamentals of this effective form of PC cooling

For many PC enthusiasts, watercooling is still something of an unexplored frontier. You might be used to playing with extra fans, drilling additional ventilation and positioning hardware to reduce air pockets, but until you've made the switch from air to liquid, you're always running a second-best system. The days of the humble fan are numbered.

Keeping your system as cool as possible isn't just a way to keep your hardware within overclocking tolerances; it also extends the life of components and reduces the amount of noise you have to deal with. For all its simplicity, cooling components with air is inefficient. Fans can get clogged with dust, and air itself isn't that good at conducting heat. Watercooling, by comparison, is so good that it does the work of several fans in a fraction of the space. So why wouldn't you want to give it a go?

If you find watercooling hard to get into, this guide should help you tell your loops from your radiators, show you the difference between the good brands and the bad ones, and give you all the

information you need to know in order to start tinkering with watercooling whether you're interested in making your PC quieter, faster or just more efficient.

## How Does it Work?

Fans cool your components by allowing heat to dissipate into the air and then blowing the warm air away so it can be constantly replaced by new, cooler air. This, as we just mentioned, is an inefficient process. Air accepts heat quite fast, but not as fast as many other materials. This is why heatsinks exist: because metal transfers heat away from the component faster than air can and can dissipate it into a larger volume of air.

In comparison to air, water has both a higher thermal conductivity (so heat is transferred faster) and a higher specific heat

capacity, meaning that if you have the same volume of water and air, the water can hold more heat before it starts to feel hot.

Watercooling systems use liquid tubes to run fluid across components, which absorb the heat within them. The water then passes through a radiator, which acts like a heatsink, transferring heat out of the water and cooling it back down again, a lot like a car radiator.

You can make bespoke watercooling systems or buy them off the shelf, but regardless of which route you take, you'll always find that they're made up of the same components: a pump to move the coolant, a tube ('loop') to contain the coolant, the coolant itself and a radiator that can dissipate the heat. Radiators may be heatsinks, but it's more common for them to contain a fan.

“ Keeping your system as cool as possible isn't just a way to keep your hardware within overclocking tolerance ”



Pumps & Reservoirs



Waterblocks



Although some cooling systems require you to attach the pipes directly to the component with thermal compound, it's also common to find water blocks that are heat-conductive pieces of metal, which contain hollow tubes where water can flow. While heatsinks dissipate water into the air surrounding them, water blocks dissipate the water into the water that flows through them.

Watercooling units can be applied to any heat-generating component, but they're most commonly applied to CPUs or GPUs. You may want to watercool any number of other components, from motherboard northbridges to hard drives and SSDs. Anything that generates heat will benefit from being kept cool. The only question is what sort of expense you're willing to go to in order to make that happen.

It's worth pointing out that watercooling is mostly useful for high-temperature systems where components are being continually stressed, whether that's because you've overclocked them or because you run them at high-capacity for a long time (gaming and video encoding are two tasks where watercooling would definitely benefit the hardware). If you run a low-temperature system, air cooling is probably more than enough to keep the temperature at safe levels – though watercooling can still provide a quieter method of removing heat from components.

Obviously, watercooling carries some small risk. The development of bespoke closed-loop watercoolers means it's highly unlikely that you'll have any spillage accidents, but it's not completely impossible. Similarly, it's wise to test bespoke loops extensively before you run them in an actual system, just in case there's a puncture or loose connection somewhere in the system. The risk is low, but it's worth remembering that a problem with your watercooling can be considerably more disastrous than a failure with air cooling would be, so don't get complacent, and don't put any hardware at risk unless you can, on some level, afford to replace it.

### The Hardware

We touched on this briefly, but watercooling systems come in two forms: homebrew or bespoke self-builds, where the entire loop is constructed out of

individually purchased components, or off-the-shelf prebuilds, where you buy the entire system and simply install it as you would any other cooler.

Prebuilds are sometimes referred to as 'closed loop' systems, because they don't require the user to manually add coolant. It starts with the amount it needs, and because the loop is closed, it shouldn't ever need replenishing.

Buying a prebuild has its advantages, especially for beginners. It's safer, because it's been professionally constructed. It's simpler, because you don't have to check compatibility between multiple components or learn about coolant levels yourself. And it's easier to get hold of, because even high-street computer shops sell watercoolers.

But bespoke systems have their advantages too. You can tailor them to your personal needs, and they're cheaper to construct. It's also easier to apply watercooling to non-standard components. Off-the-shelf systems are largely aimed at CPU cooling, with the possibility of GPU compatibility. Bespoke watercooling can essentially go anywhere you like.

We'll cover individual closed-loop models later in this piece, but if you want to build a bespoke system, here's what you need to look for:

**1 A Waterblock:** Make sure you buy one that is compatible with the hardware you want to cool. CPU waterblocks tend to be universal, but those for GPUs, RAM, and other components require you to look carefully at whether the block fits your specific model of hardware

**2 A Radiator With Fans:** Sold as a single unit, radiators come in multiple sizes and contain differing numbers of fans. More fans means they can dissipate more heat, but it also makes them louder. Two 120mm fans is standard, but you can get radiators accommodating a single fan or up to four. They're usually mounted internally but can also be mounted externally in smaller cases.

**3 A Reservoir:** These allow you to add liquid into the loop, and help you bleed out air bubbles that reduce the efficiency of the cooler. Most of them are mounted inside your case using brackets that are provided, but some can also fit inside existing drive bays.





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**4 A Pump:** This keeps the water in your cooler moving. Sometimes pumps will come integrated into a reservoir, but it's also possible to buy them separately. If you do buy them separately, make sure the two use a compatible interface.

5



**5 Fittings:** Fittings allow you to connect tubing to components, so you'll need some for every separate component: the pump, the radiator, the waterblock and the separate reservoir if you have one. They come in several different forms. Barb fittings are cheap but effective, while compression fittings are more expensive but look better and are extra-secure. Fittings allow you to connect

6



**6 Tubing:** Once you've chosen the fittings, you also need to find tubing with the same diameter. You can use smaller tubing for a tighter fit, but this also increases the risk of tearing, so we don't recommend it.

In addition to this equipment, you also need coolant. Although 'watercooling' implies just water, the fluid inside your cooling system contains several additives. It doesn't even have to be water, although distilled water (never use tap water!) is about as effective as any other and much more easily available than anything specialist.

As well as water, you may want to add a biocide to prevent any algae or mould from growing inside the equipment, or

alternatively a kill coil, which is a small piece of silver with naturally antibacterial properties. Anti-corrosives are necessary if you have more than one type of metal in your loop (for instance, a copper waterblock and an aluminium radiator), to prevent the metal being eroded or oxidising, which reduces efficiency and may clog the system. You may also want to add a drop of washing up liquid, which help prevent air bubbles forming.

Some enthusiasts also like to put colouring into their mix, but we'd advise against this. Household colourants can affect performance and, depending on the substances involved, may bind with other additives to create lumps inside equipment that could clog it up entirely. If you want a coloured effect, we'd recommend using transparent coloured tubing.

### The Best Prebuilt Coolers

If you want the superior effects of watercooling without the danger of assembling the unit yourself, a prebuilt cooling system is the way to go. There are many different manufacturers who create such hardware, but these are the best we've found.

### Fractal Design Kelvin Coolers

Fractal Design creates a huge variety of cooling products, from cases designed with cooling in mind to low-heat PSUs, so its new watercooling line incorporates expertise from all different areas of desktop heat management. Its first set of all-in-



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one watercoolers contains three different products, all of which incorporate heat blocks and radiators made of pure copper, a low-noise ceramic-bearing 2400rpm pump, and Fractal Design Silent Series fans.

All Kelvin watercoolers are compatible with every major CPU socket out of the box, and although they appear sealed, they can be easily expanded to cool additional components. They feature two-part brass fittings to ensure secure assembly, and they come with all necessary hardware and mountings to get started, making them an excellent choice even if you're just starting out with watercooling.

The Kelvin T12 is the simplest of the three, with a single 120mm fan. Its cooling is superb, but the single-fan design makes it more of a CPU fan replacement than a way to step up your cooling. Like all single-fan designs, it's best purchased if you're more interested in reducing your system's noise more than its operating temperature (for instance, within an HTPC or file server).

The Kelvin S24 has a similar design but comes with a dual-fan radiator instead. A strong all-rounder, the noise levels are good considering the double-fan design, and the cooling it can offer is far greater than a standard CPU fan can provide. Ideal for overclockers, gamers and other heavy-load systems that need their CPUs kept aggressively cool.

Finally, the Kelvin S36 is a three-fan version aimed at heavy-load systems or those who want to cool multiple components with a single radiator. With three fans you can bet it isn't going to be quiet at high loads, but at the same time, its cooling is efficient, robust and far better value than trying to cool multiple devices with several different coolers. A great choice for even the most precise enthusiast.

Prices for Fractal's line start at £74.99, which is higher than entry-level but still good value considering the hardware on offer here.

#### RaiJintek Triton Cooler

Priced around the same amount – you can pick it up for £71.99 from Watercooling UK – the RaiJintek Triton cooler is aimed at gamers who want their cooling system to look as good as a gaming PC should. As well as including an LED illuminated reservoir, the kit comes with four supplied liquids, each a different colour so you can choose the one that works best for your system's interior.

“ If you want the superior effects of watercooling without the danger of assembling the unit yourself, a prebuilt cooling system is the way to go ”

A double heat exchanger and high-performance aluminium radiator is paired with two variable-speed 120mm fans for superb performance even under heavy loads. The loop can be customised with additional components, but its out-of-the-box performance is impressive. It's a mid-level piece of hardware aimed at users who aren't necessarily ready to build their own loop but who want something more flexible than the closed-loop designs of cheaper coolers.

Compatibility extends to all major CPU designs, and the kit itself includes

all necessary components, including mountings and thermal gel. For a first-time cooler it's probably a little complex, but if you're looking for something as versatile as a self-build without the hassle of choosing and sourcing components, it's definitely a strong choice. We'd recommend it for slightly more advanced users who are looking for their second watercooler, as well as first-timers who already have a lot of technical knowledge and don't want to get boxed in by a standard all-in-one loop.



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### Corsair Hydro Coolers

If you'd prefer a cheaper all-in-one cooling unit, the Corsair Hydro line is one of the most reliable and established in the field. Unlike the Fractal Design and Raijintek coolers, they're not modular or customisable, so you can't expand them, but this does mean that they're priced a lot lower. Again, they're compatible with all major CPU types.

The Corsair Hydro H55 is specifically good for small cases, with a single-fan design that should fit into even a cramped system. Like all closed-loop units, it's pre-filled and never requires refilling, so it's good for users who don't want to constantly maintain their system. It needs no more attention than a standard CPU fan does. At £50 it's also a very cheap way to get into watercooling and see if you get on with the technology without having to spend a lot of money and time on the endeavour.

The line also includes larger models, such as the H75 (which has a dual-120mm fan design), the H90 (which has a 140mm fan) and the H110 (with dual-140mm fans), all of which cater for systems with varying

### Further Resources

The topic of watercooling is far too big for us to cover every aspect of it in a single guide, but if you want to research more products, techniques and guides so you can get started, there are some sites where you can do just that.

[www.watercoolinguk.co.uk](http://www.watercoolinguk.co.uk) – A UK-based specialist store and watercooling resource, selling everything from individual cooling components to all-in-one loops. If you can't find what you want here, it probably doesn't exist.

[www.reddit.com/r/watercooling](http://www.reddit.com/r/watercooling) – Reddit's Watercooling subreddit, which is a great place to get advice and help with builds, particularly custom loops. As with all communities, it's a good idea to lurk first rather than blunder in, but you should be able to get very specific help here.

[bit.ly/1k1JTM](http://bit.ly/1k1JTM) – Lifehacker's video guide to watercooling. If you need a step-by-step guide and you missed our recent one, this Lifehacker video gives you an example of how to install a watercooling system from scratch. It may be a little out of date, but it's still one of the better examples.

needs, whether that's greater cooling, lower noise or restricted space inside a case. Each costs a little more than the last, but they're all still good choices for those seeking value components or beginners who want to try watercooling out.

So hopefully that answers the most pertinent questions about what watercooling is, how to get started and what you can do with it. All that's left for you to do is get out there and give it a go! [mm](#)



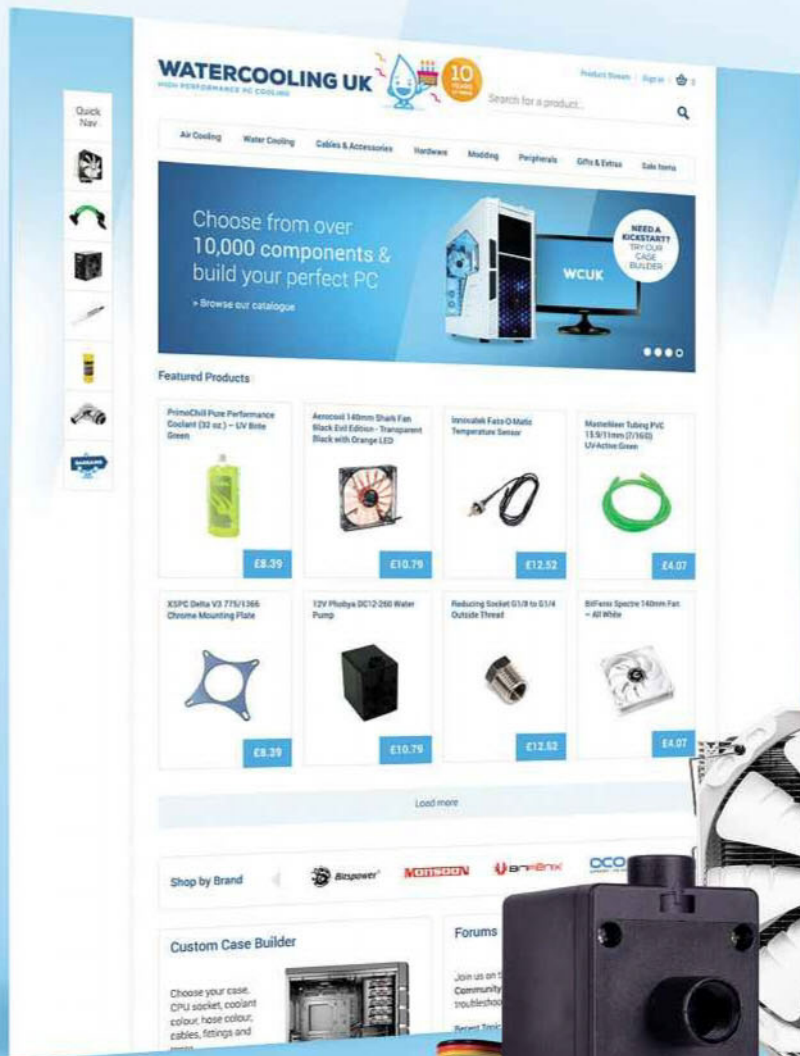
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# MICROSOFT RESEARCH:

## Hardware And Devices

**David Briddock** finds clues to Microsoft's future hardware

Whatever your thoughts on Microsoft, there's no denying it has its fingers in many a pie. And under the stewardship of Satya Nadella, it seems to be making a genuine effort to try new things. For that reason, it's a great time to follow its latest research projects, because there very well could be something among them that we'll all be using when they're released.

Over the next six week's, we'll be uncovering some of the most interesting and innovative technology projects from Microsoft Research lab teams across the globe. This time, the theme is Microsoft's view of the future of hardware and devices.

### .NET Gadgeteer

Maker projects, essentially the construction of electronic gadgets and embedded hardware devices, are fun to build and highly educational. Yet, in practice, it can be difficult to know how to get started. In fact, selecting and sourcing the necessary electronic components is a bit of an art in itself.

Microsoft wants to give a helping hand to novice makers with its .NET Gadgeteer project, which is an open collaboration between Microsoft, hardware manufacturers and the maker community.

How does .NET Gadgeteer help the budding but inexperienced maker? Firstly, it's a complete solution. An open-source toolkit targeted at small electronic device construction, combining the solderless assembly of electronic components with simplified object-oriented programming.

The basic kit includes various useful hardware peripherals. Computer-aided design support aids rapid form-factor construction, and Gadgeteer coding utilises the .NET Micro Framework and Visual Studio (or the free Visual Studio Express) development environment.

This powerful hardware/software combination enables makers to design, build and program an embedded device in just a few hours, rather than taking days or weeks.

### Available Now

So far, there are a number of main board designs plus around 30 Gadgeteer modules: LEDs and buttons, Ethernet and USB ports, cameras and small touchscreen displays, plus battery and SD card holders.

There are also a number of starter kits on offer. And, of course, once acquired, you can reconfigure the kit components over and over again to construct new devices.

Keen to discover more? Well, there's plenty of information on the web. Firstly, Microsoft has an informative Channel 9 video ([goo.gl/ZH52Mk](http://goo.gl/ZH52Mk)) introducing the .NET Gadgeteer project.

The main Gadgeteer codeplex website ([gadgeteer.codeplex.com](http://gadgeteer.codeplex.com)) provides a narrative description of the project's background and aims, plus lots of software and hardware links.

Meanwhile, the .NET Micro Framework website ([netmf.com](http://netmf.com)) offers practical beginner-level guides: how to build micro devices, how to download and use the .NET Micro Framework and libraries, and how to share libraries. And here more experienced developers can discover how to contribute to the open-source .NET Micro Framework software and documentation.

### Circuit Stickers

Another Microsoft Research project aims to do away with traditional electronic components altogether.

The Circuit Stickers project team is drawn from individuals with diverse backgrounds and interests. Collectively, they decided that a fabrication process based on peel-and-stick transfers would open up electronic circuit design to everyone. Circuit stickers can be applied to any sticker-friendly surface, such as paper, cardboard, plastic, ceramics and fabrics.



## “ Circuit Stickers open up electronic circuit design to everyone ”

have a 3D modelled physical form – which brings us neatly to our next Microsoft Research project.

### 3D Printing For Printable Electronics

The goal of this project is to explore how to combine two of today's most thought-provoking technologies, namely 3D printing and printable electronics.

The potential of affordable 3D printing is clear for all to see, yet despite being around for a good few years now, 3D printing technology is still in its infancy, rather like the early days of the personal computer when the very first affordable home PCs appeared. However, we're starting to see a new generation of 3D printers that offer much more flexibility in terms of fabrication and materials. And, as mentioned above, researchers have already created printable electronic devices, including transistors, resistors, capacitors, LEDs, sensors and solar cells.

The 3D Printing For Printable Electronics project team (Alex Butler, Nicolas Villar, James Scott, Steve Hodges and John Sarik from Columbia University) feel the time is right to explore the integration of electric circuitry and 3D modelling.

Specifically, the team want to develop a new kind of 3D printing platform, which seamlessly integrates conductive elements with printed three-dimensional structures, to fabricate fully operational electronic devices.

### Conductive Spray

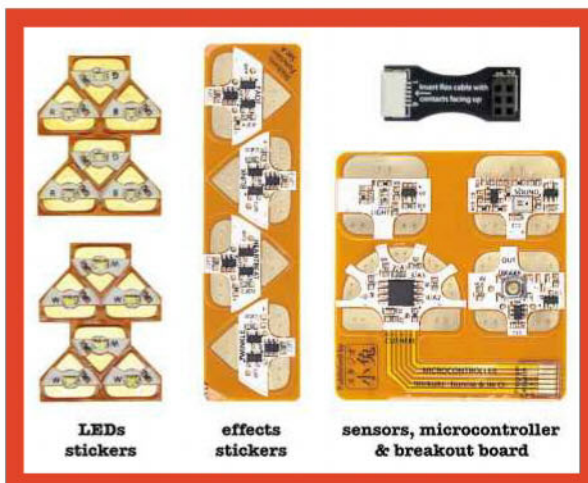
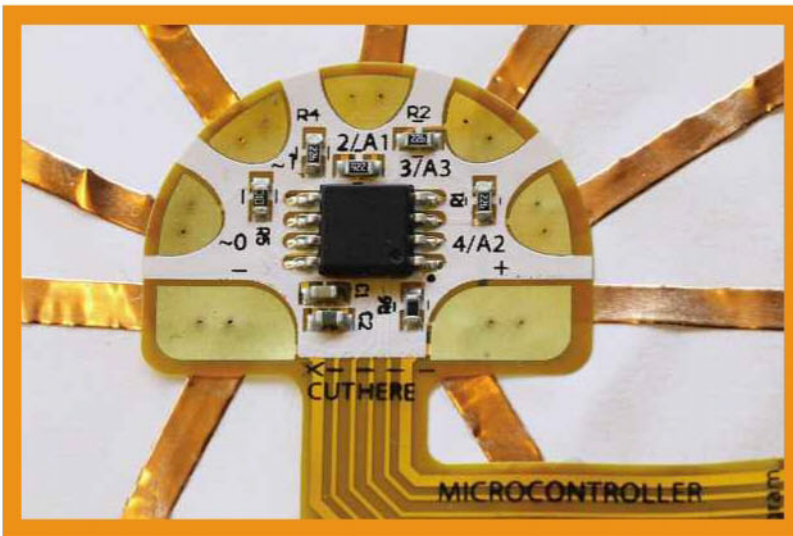
One of the most widely used 3D printing techniques is fused deposition modelling (FDM), which builds objects layer by layer. By replacing the standard thermoplastic material with a conductive substance, the same technique could lay down the fundamental building blocks for a variety of electronic components.

In practice, this approach does have limitations when applied to 3D models, so the team is experimenting with a spray deposition system, based on a commercial airbrush and room temperature air drying conductive inks. With such a spray deposition technique it's fairly easy to deposit material on non-planar, non-uniform surfaces.

The prototype platform combines an off-the-shelf 3DTouch triple-head 3D printer (supplied by Bits From Bytes) with a single-action, gravity-feed airbrush (from Iwata). Mounted vertically, parallel to the extruder heads, the airbrush is triggered by a small servo motor, then custom software takes control of elements like air pressure, spray time and the spray nozzle's distance from the surface.

One of the biggest challenges is sourcing the spray material itself. When applied, it must exhibit high conductivity and good surface adhesion, but it also has to be low cost, non-toxic and not inclined to block up the spray nozzle.

So far, there's no obvious winner. The team quite like CuPro-Cote copper paint, because it's water-based and low cost, but its lower conductivity means it's best suited to large area application. ElectroDag 915 silver paint ink offers much higher conductivity, but unfortunately it's solvent-based.



Many popular electronic components are supported; buttons, multi-colour LEDs and sensors for light, sound and touch. There's even a Attiny85 microcontroller sticker, which can be reprogrammed to deliver customised functionality.

Components are electrically connected using sticky copper tape, and the completed circuit design is be connected to a battery supply for stand-alone operation or hard-wired to a microcontroller board or PC.

Jie Qi at MIT and team member Bunnie Huang have launched sets of stickers and sticker kits ([goo.gl/Ex5Qok](http://goo.gl/Ex5Qok)) to empower designers, artists, engineers, kids, students and teachers to build interactive projects.

The same web page also has links to step-by-step tutorials and printable circuit design templates, including how to control an array of LEDs using the microcontroller sticker ([goo.gl/qv5nC3](http://goo.gl/qv5nC3)).

The team is also researching a technique called instant inkjet printing. Here, the wiring that connects stickers together can be preprinted onto ordinary printer paper using a standard home-based inkjet printer. Combining circuit stickers and instant inkjet printing delivers enhanced flexibility and enables the rapid construction of fully functional device prototypes.

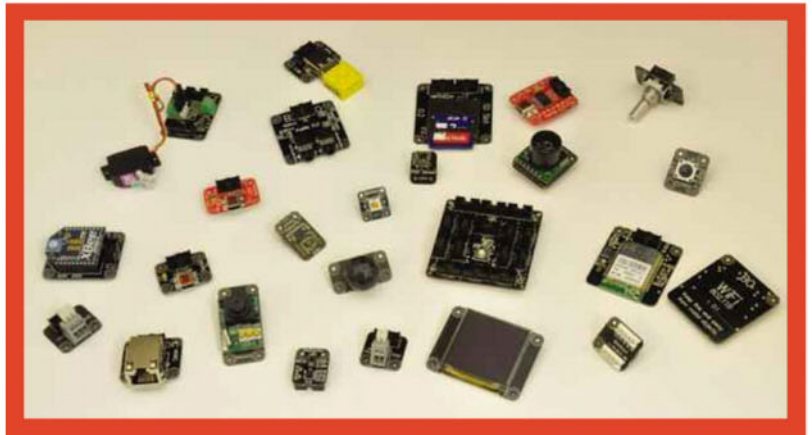
Microsoft's longer-term aim is to eventually combine circuit sticker technology with 3D printed electronics to fabricate custom, fully functional electronic devices that also

## Fabrication Process

A 3D fabrication process can be quite involved. Typically the starting point is a printed circuit board layout model. This model is converted into an import file for a 3D CAD program, such as OpenSCAD. Only after CAD modelling is a 3D printer-friendly STL file generated. Finally, software like Axon from Bitsfrombytes processes the STL file to generate a series of printer commands (called G-codes).

Unfortunately, current 3D printer file formats, like STL, only contain information about geometric structures. In contrast, a printed circuit board layout is defined by a schematic netlist; all the components, the connection, the board layout, the physical location of each component and connection traces. Therefore a new combined file format might be a requirement. There's no doubt there's many problems to overcome, and the team know they've just taken the first steps towards combining 3D printing and printable electronics, but this concept could fundamentally change embedded system rapid prototyping in the future.

“ A 3D printing platform which seamlessly integrates conductive elements with printed three dimensional structures ”



This is a serious problem for large-scale data centres that support the ever increasing demand for cloud-based apps and services. In a modern data centre there are many conflicting processing requirements. High speed computation is essential, but so is the ability to respond quickly to changes in demand, while running a power efficient operation helps keep a cap on costs.

Microsoft understands this dilemma as well as anyone, so it has a team dedicated to delivering a massive increase in the computing capabilities of its Azure data centres.

The system they've come up with is called Catapult.

Catapult offloads some of the advanced processing underlying Microsoft's Bing search engine onto clusters of highly efficient, low-power field-programmable gate array (FPGA) chips. These FPGA chips are physically attached to server processors, typically Intel Xeon chips.

## FPGA Flexibility

An FPGA chip is far more flexible than a classic CPU. Instead of burning the internal circuitry during chip fabrication, they have a soft internal design that can be programmatically customised and tweaked to optimise for specific computational workloads, then re-optimised for a different computational workload.

Microsoft uses FPGA-chip hardware to offload crucial tasks away from the Xeons. FPGAs have become powerful computing devices in recent years, making them particularly suited for use as fine-grained accelerators, and the team believes FPGAs can deliver significant per-server performance improvements.

Peter Lee, head of Microsoft Research, said, "For the first time ever, the quality of Bing's page ranking will be driven not only by great algorithms but also by hardware – incredibly advanced hardware that can be made more highly specialised than anything ever seen before at data centre scale."

A successful Catapult pilot demonstrated the system's ability to run for long periods, while also exceeding throughput goals in all processing pipeline stages. Pilot results revealed FPGA hardware delivered performance improvements as high as 95%, with only a 30% increase in power consumption.

On the strength of this pilot, the team hope to deploy this technology in at least one Bing data centre by the middle of 2015. Catapult means Microsoft's concerns about the imminent end of Moore's Law has been postponed – at least for the time being. [mm](#)



## Catapult and FPGA

Today, we know Moore's Law is grinding to an inevitable halt. Processing speeds have already largely stagnated, and the laws of physics will soon preclude cramming more transistors onto a single silicon chip.



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# Component Watch

## Looking for a watercooling bargain? Take a look at this little lot

If you're thinking of getting into watercooling after reading our feature on the subject elsewhere in this issue, this week's Component Watch is exactly what you need. Here, you'll find the best prices online for the best entry-level, all-in-one watercoolers around. Now there's no excuse for not giving it a try!

### Deal 1: Cooler Master Seidon 120 v2

RRP: £44.99 / Deal Price: £36.17

Compact and low-prices, the Cooler Master Seidon is one of its most basic watercoolers – which means it's still better than almost all fans! Factory-sealed with a specially designed 120mm PWM fan radiator that only operates at the minimum necessary fan speed to keep noise levels down, the fan is a strong first choice. It even has a built-in power indicator LED so you can be sure it's working even if the fan isn't moving.

Where to get it: CCL – bit.ly/1zQ58Xa



### Deal 2: Antec H2O Kuhler 650

RRP: £39.99 / Deal Price: £36.78

Probably the least expensive watercooler on the market right now (at retail) the Antec H2O Kuhler 650 is a self-contained, prefilled cooler unit that require no maintenance. It's quieter and more efficient than a standard cooler but no more expensive than a half-decent replacement fan, so it's ideal for budget buyers and first-timers – especially at a few quid off retail!

Where to get it: Scan – bit.ly/1HqK955



### Deal 3: Alphacool Eisberg 120

RRP: £59.99 / Deal Price: £36.78

If nothing else, the Alphacool Eisberg 120 proves that just because a cooler is inexpensive, it doesn't have to look cheap. If anything, this is a little too over to the top. Clearly aimed at gamers and enthusiasts, it's still priced for beginners if you go for this discount. Unusually for an all-in-one design, the pump is

located on top of the waterblock rather than in the radiator, so that might make it easier to seat inside more cramped systems – but let's face it, this isn't a cooler you'd want to buy for its practicality.

Where to get it:

Ebuyer – bit.ly/1DEm6bl



### Deal 4: RaiJintek Triton

RRP: £74.99 / Deal Price: £71.99

The best value 240mm cooler on the market, the RaiJintek Triton features a double-width radiator with two 120mm fans for superior cooling performance, as well as customisable components and a selection of different coloured coolants that you can use. A great choice for enthusiasts who like style as much as substance – just make sure you have the space for it within your system!

Where to get it:

Watercooling UK – bit.ly/1Hw7aSJ



### Deal 5: Fractal Kelvin Design Hydro T12

RRP: £79.99 / Deal Price: £74.99

The entry-level cooler from the cooling geniuses at Fractal Design, the Hydro T12 might be expensive but it also has enthusiast-grade components and an expandable system so you can incorporate extra components, customising the cooling system to meet your needs. Cheaper than a pure custom build and with a silent ceramic pump, it's worth every penny you pay, especially if you have a high-end system that you want to reduce the noise of.

Where to get it: Ebuyer – bit.ly/1aV4xwM



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# Lenovo Launches Handwriting Package

# Sony Expands 4K Camcorder Line-up

## Most affordable handheld yet

**L**ong gone are the days when home videos meant shaky, blurred footage of your family around the dinner table at your Great Aunt Sheila's birthday party. You've Been Framed has had its day; 4K is the future.

Sony knows this all too well, and has released its most affordable 4K handycam yet. The FDR-AX33 features Balanced Optical SteadyShot image stabilisation for crisp, smooth 4K or Full-HD footage

shooting at 100Mbps high-bit rate, while an in-built projector in the more expensive AXP33 model means owners can even share footage instantly.

A 3" Wide Xtra Fine LCD promises subtle details and tones and the Movie Maker function provides an automatic in-cam movie editing experience, picking key moments and assembling them together into a shot movie that's easily shareable on social media from a smartphone.

If you want to know more, head over to [www.sony.co.uk](http://www.sony.co.uk).



# BlackBerry Leap Now In UK

## Rollout begins in earnest

**B**lackBerry's all-touch Leap mobile is now available to buy in the UK and other markets, adding to the firm's BlackBerry 10 line-up.

Featuring the latest BlackBerry 10.3.1 OS, an edge-to-edge five-inch HD display and over a full day's battery power, the handset comes pre-loaded with built-in malware protection, support for encryption and back-up, plus wipe and restore tools. The company is also keen to

promote its best-in-class touchscreen keyboard that promises to learn as you write, reducing typing mistakes. With features such as the BlackBerry Assistant, which uses voice commands for managing email, contacts, calendar and other native BlackBerry 10 apps, plus dual app storefronts from BlackBerry and Amazon, this has a fair degree of expectation placed on it from BlackBerry's fans.

Let's all just wait and see how it fairs.





## **New software aimed at pen-enabled devices**

**C**unningly named WRITEit, Lenovo's new software application promises to make the handwriting experience on certain pen-enabled devices better. Promising to "transform" pen writing into an actual practical

form of input, WRITEit allows users to write directly into any application "Automagically" (urgh... awful portmanteau alert) and it works across selected Lenovo Windows 8 devices with digitizer, active pen or AnyPen technology, offering users a continuous, faster and more accurate writing experience.

Key features include writing input directly into nearly any

text field that accepts typed input, real-time conversion of handwriting to text characters, and gesture commands for easy editing.

The supported devices include the ThinkPad YOGA, ThinkPad Helix, ThinkPad 10 and the Windows version of YOGA Tablet 2 with AnyPen and users of any of those devices can now download WRITEit for free.



I make no secret of how much I like Google services. Not only are they free, but they often work better than rival solutions that I'd be expected to pay for.

I also appreciate how Google likes to innovate, and its failures often indicate its willingness to try new things.

But like any company, it can only grow so much before you have to start questioning whether its size is doing more harm than good. Its level of influence when it comes to web search is well known to all of us, and we can't ignore the fact that it has the power to potentially make or break other companies – many of which are competitors.

Clearly, it's important to establish whether it has used this power in an underhand way, but even if it hasn't, it's still incredibly important that it is held to account.

Will it destroy Google? I doubt it. Just like Microsoft, it might need taking down a peg or two, but it'll still be around in ten years and maybe it'll be even hungrier than ever.

See you next time...

*Anthony*

Editor

# Apple Updates High-end Video Editing Tools

## **Final Cut Pro, Motion and Compressor all enhanced**

**V**ideo editing users on the Mac should be pleased as Apple has chosen to update its packages with new features and enhancements. Final Cut Pro X, Motion and Compressor have all been given the upgrade treatment

with Final Cut Pro X in particular benefitting from the introduction of some 3D titles, better masking for colour grading and effects, plus native support for more camera formats.

Motion 5.2 extends the power of 3D titles with custom materials

and environments and instant publishing to Final Cut Pro X, while Compressor 4.2 makes it easier to package a movie for the iTunes Store.

The updates are free for existing users so update away if that means you.



# Meanwhile... On The Internet...

**W**e've been doing our best to stay as far away from the UK general election as we can on this page – and, we suspect, in the magazine as a whole has – as, frankly, 'there be dragons'. We like to think of *Micro Mart* as a meeting of friends so, as anyone who has ever sat through an awkward dinner party will tell you, there's nothing that can drive a wedge between otherwise convivial company than a good airing of political views ([tinyurl.com/Motl1360a](http://tinyurl.com/Motl1360a)). However, when the election crosses over into the world of the wide web, we'd be remiss not to pass some sort of comment. Which brings us to Grant Shapps and the furore that has emerged regarding some extremely beneficial Wikipedia edits that have been made to delete information on Schapp's other line of business – as an internet marketing guru going by the name of Michael Green ([tinyurl.com/Motl1360b](http://tinyurl.com/Motl1360b)) – by an unknown individual under the name Contribsx ([tinyurl.com/Motl1360c](http://tinyurl.com/Motl1360c)).

The allegations came from an article in the *Guardian* ([tinyurl.com/Motl1360d](http://tinyurl.com/Motl1360d)), and interestingly it's not the first time the *Grauniad* – [tinyurl.com/Motl1360e](http://tinyurl.com/Motl1360e) – has attempted to link Schapps and his employees to flattering Wikipedia edits: [tinyurl.com/Motl1360f](http://tinyurl.com/Motl1360f), following the decision by site admins to block a user by the name of Contribsx for being a 'Sockpuppet' ([tinyurl.com/Motl1360g](http://tinyurl.com/Motl1360g)). Shapps immediately denied all allegations.

However, Richard Symonds, the volunteer administrator who suspended the Contribsx account has stood by his decision in the face of accusations that it was politically motivated (and the revelation of his identity, which prompted him to leave his home temporarily in the face of press attention). While he confirmed that his own investigation was instigated by enquiries from the *Guardian* ([tinyurl.com/Motl1360h](http://tinyurl.com/Motl1360h)), he asserts that his decision was based on experience rather than bias.

"This sort of pattern repeats itself again and again with others..." he told the *Guardian*. "The edits are all there in public history for people to cross-check, and although I should add that there's no undeniable proof it's Shapps, it's clearly someone who has an intimate knowledge of Mr Shapps' day-to-day battles and who supports him completely. I don't know anyone who would match that description who isn't in his inner circle, so I suspect – as would any person who reviews the edits – that it is either him or someone he knows. Like I said, though, there's no smoking gun, just a wealth of other evidence that really points in his general direction."

That is far from a damning indictment, rather than a confluence of circumstances, but his decision has been supported by the site

While Jay-Z's new Tidal service is suffering 99 Problems ([tinyurl.com/Motl1360k](http://tinyurl.com/Motl1360k)) and the barbs of a queue of artists ([tinyurl.com/Motl1360l](http://tinyurl.com/Motl1360l)) keen to question the attitude and need for the service ([tinyurl.com/Motl1360m](http://tinyurl.com/Motl1360m)), Spotify doesn't appear to be losing much sleep over its newest competitor ([tinyurl.com/Motl1360n](http://tinyurl.com/Motl1360n)). Instead it's been crunching some numbers from its massive, established user base ([tinyurl.com/Motl1360o](http://tinyurl.com/Motl1360o)).

Specifically it's been looking at age demographics and the kind of music that we like to listen to at different stages of our lives ([tinyurl.com/Motl1360p](http://tinyurl.com/Motl1360p)). The conclusions are interesting as, apparently, we begin with tastes closer to the mainstream in our teens, before we move away from that rapidly and develop our own musical preferences up until 25, before our experimentation slows down until we eventually diverge most from the mainstream taste in tunes at age 35. After this, we pretty much stay set in our ways until we have what Spotify staffer Eliot Van Berswick labels as a potential "musical midlife crisis" ([tinyurl.com/Motl1360q](http://tinyurl.com/Motl1360q)) at 42, when we err back towards the most popular artists again.

An interesting anomaly to this is that, at every age from 14 upwards, those who are parents listen to less popular music than those don't have kids (or, in terms of Spotify's research, it means they have never "suddenly started to listen to kid's music").

Interestingly, Spotify is keen to point out that its stats differ from general charts in that they are not concerned with what people buy, but what they actually listen to. That, as you'd suspect, could be radically different – and possibly points to Spotify seeking to push its metrics business going forward.

and has passed its own internal checks and balances. Symonds declined to present any hint as to what the site's facility to track the source of updates had revealed, but it's worth noting that he's an experienced Wikipedia volunteer with nearly a decade of experience working on behalf of the site, so he is perhaps in a better position to know what it all adds up to than most. Regardless, his comments, like so much in politics, simply seem to have acted as fuel to the fire of whatever political torch you happen to be carrying. So beyond pointing to it as another case highlighting the importance of exactly who edits Wikipedia and why, we'll leave it there, we think.

## .AVWhy? Videos For Your Eyes... Not Necessarily For Your Brain

While we're admittedly minor league animation geeks, we think that many people will be fascinated to see Ed Wynn and other actors providing the test footage on which Disney based its animation for *Alice In Wonderland*. The syncopation between the performances footage and what would eventually appear on screen is quite wonderful to behold and shows the absolute mastery of the medium by the artists involved ([tinyurl.com/Motl1360r](http://tinyurl.com/Motl1360r)).



**I**f you're anything like us, we're sure you've been driven to borderline homicidal tendencies by an in-compliant PC in the past. We, however, have never been driven as far as Lucas Hinch of Colorado Springs in the US, who unloaded nine bullets into his Dell machine when it produced a BSOD one too many times ([tinyurl.com/Motl1360i](http://tinyurl.com/Motl1360i)). He was reportedly unrepentant about his actions, for which he could face a hefty fine, and happily reported to police that the act was definitely premeditated. "It was glorious, angels sung on high," he allegedly said. We hear you, Lucas...

### Aaaaaaaand Finally...

User-generated content has its pitfalls, as Google found out last week when it came to light that a wag had been using Google Map maker for some, err... interesting (and NSFW) amends ([tinyurl.com/Motl1360j](http://tinyurl.com/Motl1360j)).

## Caption Competition



This chap seems rather pleased with his clock. Let's see what you thought of it all...

- **Ritasueandbobtoo:** "Flash is old school. Now we have splash."
- **EdP:** "Damned Linux penguins. I'm going back to Windows!"
- **Thomas Turnbull:** "My Titanic simulator has crashed into the iceberg again."
- **Thomas Turnbull:** "There appears to be a slight leak in my water cooled PC."
- **Gary Mann:** "Just need a VR towel now."
- **David Wrigley:** "Tip no.1 – if you've got a bad cold turn your webcam off!"
- **David Wrigley:** "The i-sneeze app was not a good idea!"
- **Andrew M Gallagher:** "Grandad was 92 and frail but boy could he sneeze!"
- **Graham Hardy:** "She immediately regretted getting out the old Roy Hattersley *Spitting Image* puppet."
- **Duncan Folger:** "Doing the ice bucket challenge. Why? Because everyone else is doing it!"
- **Jim Peterson:** "Why dip your toe into Linux when you can dive right in?"

Many thanks to everyone who entered this week. This week's winner is doctoryorkie from the forum, who suggested "Extreme water cooling."

To enter this week, head to the 'Other Stuff' section of our forum ([forum.micromart.co.uk](http://forum.micromart.co.uk)) and say something funny (but not too rude) about the picture below or email us via [caption@micromart.co.uk](mailto:caption@micromart.co.uk).

# Google's April Fools' Joke Backfires

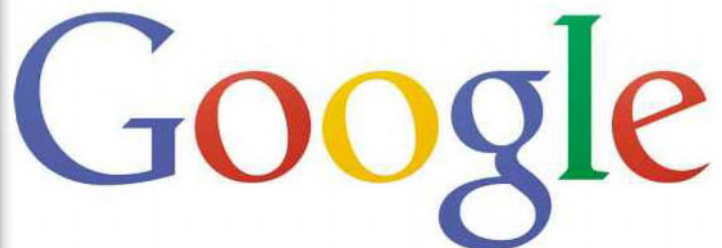
## Vulnerability spotted by Netcraft

**Y**ou may have come across Google's April Fools' Day joke – one of many – in which it used **com.google** domain to display content backwards. Oh, how we laughed...

Anywho, it turns out that – as hilarious as this was – it may have actually brought into play a security vulnerability for the search engine, with web services firm Netcraft claiming that the use of an iframe to display that backwards content effectively allowed a remote

attacker to display the Search Settings page in an iframe on an external domain, thus tricking innocents into changing those settings by mistake. One of the big reasons that's a problem is that is could also mean turning on or off Safe Search and bringing malware into play. Eek!

Anyway, despite finding the flaw, the firm seems to feel nothing disastrous happened... Though Google can consider its virtual knuckles well and truly rapped. Ouch.



# Blood Spilled In iOS-versus-Android Debate

## Actual fisticuffs over which is best

**I**f you needed any further proof that all the best stories come from America, here it is. Two men in Tulsa, Oklahoma ended up in an actual fight when a debate over whether the iPhone was better than Samsung got a bit out of hand. Local TV channel KTUL reported that the roommates were left with "cuts all over their bodies" and were "covered in blood" after the row became rather serious.

Drink was involved, apparently (now, there's a surprise), and after the bottles from which beer was being gleefully drunk were smashed and promptly stabbed into each other's bodies – seriously – one of the nice chaps decided to smash his bottle over the other one's noggin.

Goodness only knows what will happen when they get out of hospital and discuss Betamax vs VHS...



## Snippets!

### Yahoo Widens Search

Microsoft's arrangement with Yahoo to provide its search results has been tweaked so that, while it will continue to do so, it will be to a lesser amount than it does currently. Microsoft has been the exclusive provider of search results for Yahoo since 2009, but that deal has since come to its conclusion. The relationship hasn't been entirely broken, though, which had been predicted by some industry pundits.

### Google Writing App

Google Handwriting Input wins this week's prize for the most literal product title. The handwriting app for Android phones works across 82 languages and 20 different scripts and users can write using a finger or a stylus. Emojis are additionally on offer if that's your thing and the app works with or without a web connection. Buy it from the Play Store if you have a mobile device running Android 4.0.3 or later.

### Sony Hack Database

The drip of information from last year's massive Sony hack shows no signs of abating, as WikiLeaks has taken the trouble of compiling the last year's massive leak of information into a handy searchable database.

Offering what WikiLeaks calls a "rare insight" into the inner working of a "large, secretive multinational corporation", the site seems intent on demonstrating how major firms work to influence the US government. Sony's not happy about Wikileaks' hard work, of course, saying: "we strongly condemn the indexing of stolen employee and other private and privileged information on WikiLeaks". However, apart from indignation, Sony is being hurt in the pocket; the cost of these leaks to Sony to date is reported at \$15m, at least – and that's just the price of "investigation and remediation costs".

# Journalist Posts Tweet; Told He Can't Fly

## American airline makes security stand

**A**n airline has banned a security researcher from flying following his tweet that he could hack a plane's systems. Reported by the BBC, United Airlines is the airline involved and is said to have banned Chris Roberts from a flight bound for San Francisco after he tweeted:

"Find myself on a 737/800, lets see Box-IFE-ICE-SATCOM, ? Shall we start playing with EICAS messages? "PASS OXYGEN ON" Anyone ? :)"

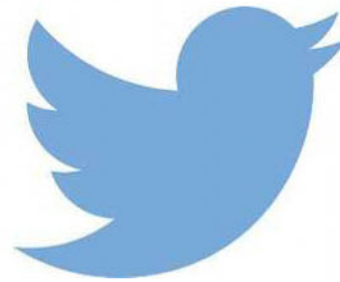
United deny Roberts' claims that he could access their systems, but took action to ban him from taking the flight in "the best interest of our customers and crew members".

# Twitter Tightens Trolling

## Triples monitoring efforts

**T**witter has gone on the attack over the always prescient issue of trolling on the social messaging platform by tripling the number of people monitoring for abusive posts and tightening up internal procedures to respond to such matters.

Its changes were explained by a spokesperson in *The Washington Post*, who said the company wants to be "a place where the expression of diverse viewpoints is encouraged and aired. To do that, we have to keep Twitter safe for the widest possible range of information and opinions to be shared, even when we vehemently disagree with some of them."



Quite right; although we worry that trolling will forever be a problem in sphere that seems to champion the principle of free speech to the point where almost anything has been allowed to pass under that banner in the past. If the name Katie Hopkins means anything to you, you'll know what we mean.

The spokesperson claims that Twitter is dealing with five times as many user complaints, suggesting on the one hand that its tighter controls and monitoring are working. On the other, it also suggests that the likes of Twitter are frankly pretty horrible places to be at times.

# Norway First To Pull Plug On FM

## Digital switchover in 2017

**W**ith Jay-Z's Tidal having launched to great fanfare, the digital world of music continues to push analogue further into its inevitable coffin. So it comes as no major surprise to hear that Norway has decided to switch off its FM radio signal in two years time. With over 20 national digital stations broadcasting and space for a further 20, compared to five national stations still broadcasting in FM, the government feels that there is precious little need to keep the FM signal going.

The impact of such a move is unknown – this is uncharted territory here, people. After all, here in the UK you can still listen to the *Shipping Forecast* and good old *Test Match Special* on long wave stations. The idea that FM will only be around for years rather than decades is an odd one, particularly for drivers who have yet to make the digital switch behind the wheel.

The Norwegian government is sure that it's doing the right thing. It says the cost of transmitting national radio channels through the FM network is eight times higher than with the DAB network.

# SoftMaker Office 2016 Now In Beta

**You're officially invited to start testing**

**S**oftMaker Office has reached the beta stage of its 2016 iteration and you are cordially invited to get testing. The German outfit behind the suite is keen to point out that the new Office is faster and more compatible with Microsoft Office than before, with support for all MS Office formats, and a whole lot of new improvements makes this the alternative to MS Office.

The free download incorporates new versions of the TextMaker word processor, PlanMaker spreadsheet tool and Presentations, while an extended version of Thunderbird and Lightning provides email and calendaring functionality to the package. Enhancements include opening MS Office files faster than Microsoft's own suite actually manages, a more user-friendly

experience, real-time preview of text formats, file preview of docs before opening them, and support for 4K monitors.

We could go on but it's probably far less boring if you download the beta to test all the new features for yourself.

You can do that by paying a visit to [www.softmaker.com](http://www.softmaker.com) and garbbling the Office suite for yourself.



# Dropbox Delivers Bug Bounty Booty

**Find a flaw, get some cash**

**D**ropbox users are being encouraged to find holes in the storage service via the firm's bug bounty incentive. Previously, the service has recognised people who helped out with this task by including them in a wall of fame posted online. Now, as nice as it is to

be recognised for doing something good, it's better to be paid for it too, right? Any bug blasters will be rewarded

and the firm has retroactively paid out over \$10,000 to researchers who have reported critical bugs.

The bounties start at a few hundred dollars but rise to a few thousand and any bug is covered under the initiative. Covering its desktop, iOS and Android apps, plus web versions, this is a wide-reaching scheme so why not help out if you can. There's money in them there hills...



## Dell XPS 13 Laptop With Infinity Display

Papa's got a brand new bag, and Dell has a new XPS 13

### DETAILS

- Price: From £729 ex. VAT and shipping.
- Manufacturer: Dell
- Website: [www.dell.com/uk](http://www.dell.com/uk)

A challenge for all reviewers when a new version of a product comes out is how to compare it to the prior model, given that we no longer have that handy.

For the new Dell XPS 13 that wasn't an issue for me, as I was crazy/smart enough to have bought one, so I could actually sit the products alongside each other.

The first shock was that the new model is at least 1cm narrower, and a few millimetres shorter, yet it has an almost identically sized keyboard and screen.

To achieve this scale reduction, the new 'Infinity' panels have a very small bezel indeed, measuring just 4.5mm to my reckoning.

That might be a problem for Windows 8 gestures, but neither of the two lower-

specified models in the range, including the review hardware, have touchscreens.

The entry-level version has 4GB of RAM and a 128GB SSD, and the review model above that has double the RAM and storage, and an otherwise similar specification.

These machines use the new fifth-generation Core

### Specifications:

- **CPU:** 2.2GHz Intel Core i5-5200 (dual-core, 3MB cache, 2.7GHz Turbo Boost)
- **Graphics:** Intel HD Graphics 5500
- **RAM:** 8GB DDR3 (1,600MHz)
- **Screen:** 1920 x 1080 infinity display (non-touch)
- **Storage:** 230GB SSD
- **Ports:** USB 3.0 (2), mini-DisplayPort (1), 3-in-1 (SD, SDHC, SDXC) reader (1)
- **Connectivity:** 802.11 AC and Bluetooth 4.0
- **Camera:** Widescreen HD (720p)
- **Weight:** 1.27kg
- **Size:** 304mm x 200mm x 15mm (W x D x H)



“ The new 2015 version of the XPS 13 makes a good product even better ”

i5-5200U 2.2GHz (2.7GHz Turbo) processor, have a 13.3" FHD 1080p 'Infinity' display, and come with Windows 8.1 Pro pre-installed.

That's a significant performance boost over the 1.6GHz (2.3GHz Turbo) i5-4200 from the previous generation, yet oddly the battery life seems at least as good, if not better.

The new processor also enhances video performance with the Intel HD 5500, which makes this system more than capable of playing a few games, if you turn the quality and resolution settings down.

Given the opportunity, I created some benchmarks, and the new machine is quantifiably better than the old, occasionally by nearly 50%. In general, there is a 10-20% performance improvement across the board.

A roam around the outside revealed some obvious improvements and a few things I wasn't so convinced by. The 2013 model had an aluminium skin only on top, but this is now also on the bottom too, offering greater protection. The power button has switched sides from left to right, and the mini-DisplayPort

has made the reverse journey. This does take the power button perilously close to the delete key, so you need to be mindful of that when typing fast. Dell has also added an SD card slot, an appreciated addition, and there's no change with the two USB 3.0 ports.

There is however, one alteration I didn't care for and another change it badly needed to make and didn't. The super-thin Infinity screen border hasn't left room at the top for the webcam, unfortunately, and Dell clearly didn't want to move its logo from the bottom centre. Its

solution was to move the camera to the bottom left, placing it at both an odd and annoying angle.

The fix Dell missed was the power connector, which is still the same horrible friction-held jack that it used before. The weight of the cable to the PSU tends to pull this out while you're working, and then you get strange messages from Windows 8 telling you that it can't tell what type of power supply you're using. Dell, please solve this now, as this solution isn't up to the quality of the rest of your lovely device!

That point aside, the new 2015 version of the XPS 13



makes a good product even better in most respects. There's only one real catch here: the price.

The review model with 8GB of RAM, 256GB SSD and the 1080p non-touch display is a painful £958.80 once VAT and carriage has been added. Still, it could be worse. Those who want the top Core i7 model with a 3200 x 1800 touch panel will be taking a whopping £1,318.80 bite out of their bank account.

For business users, less financially constrained and in need of a small but powerful mobile system, the XPS 13 is now even better than before – and it wasn't exactly junk to begin with.

My only concern is what Dell will do when it discovers I sent it my 2013 model and kept this one instead? Wish me luck.

**mm Mark Pickavance**

**A beautifully made and specified Ultrabook**



	Dell XPS 13 9343 (2015)	Dell XPS 13 9333 (2013)
<b>Processor</b>	Core i5 5200	Core i5 4200U
<b>RAM</b>	8GB	4GB
<b>Storage</b>	256GB SSD	128GB SSD
<b>Weight</b>	1.27kg	1.36kg
<b>Benchmarks</b>		
3DMark Fire Strike	742	502
3DMark Sky Diver	2795	2249
3DMark Cloud Gate	5295	4096
3DMark Ice Storm	38982	39799
PCMark 8 Home	2848	2678
PCMark 8 Creative	3359	3021
PCMark 8 Work	3559	3487
CineBench 11.5 CPU	2.85	1.61
CineBench 11.5 OpenGL	25.52 fps	17.2 fps



# TokyoFlash Kisai Satellite X Wood LED Watch

We check out a distinctive timepiece from the Far East

## DETAILS

- Price: £70.44
- Manufacturer: TokyoFlash Japan
- Website: [www.tokyoflash.com](http://www.tokyoflash.com)
- Required spec: A wrist to put it on – preferably with a hand at the end, to stop it falling off

Over the last decade or so, the mobile phone has quickly replaced the humble watch as the most popular form of portable timepiece. But smartwatches could be set to change that, and no doubt there are young people the world over who think the idea of looking at your wrist to tell the time is some radical new idea, invented by their oh-so-innovative generation, along with charity shops and facial hair.

Of course, a huge part of the appeal of smartwatches is based on the extra things they bring to the table on top of just telling the time. Why, then, would someone want to buy a regular, non-smart watch when they already have a phone? Well, one particularly important reason is looks. A watch is more than just a piece of functional hardware; it's a fashion statement. And for watchmaking firm TokyoFlash, it's this sentiment that directs



its entire business. It wants you to want its products simply because they look good.

The Kisai Satellite X Wood is a fine example of this. You can't look at and not be taken aback. Not only is it made out of wood, it features three interlocking LED rings rather than a clockface, which represent the hours and minutes. Does this make it difficult to tell the time? Yes, it does, but in the company's own words, "If you're looking for a watch that simply tells the time, then our watches are probably not for you." If, however, you want something that's going to turn heads

and maybe be a point of conversation at parties, then the Satellite X Wood (and, indeed, the rest of the TokyoFlash range) is sure to fulfil that desire. Anyway, after a day of using this watch, like us you'll probably soon grow accustomed to telling the time using its particular system – which brings us to another key point about the TokyoFlash range. Each watch has its own system and design, so new parts and new programming have to be created every time, which is why the firm's products are all available in relatively limited numbers and, of course, why they seem to cost so much.

Indeed, price is an important matter here. Because of the way it's produced, you couldn't really accuse this watch of being overpriced, but £70 is not a small amount of money, and the functionality is undeniably limited (there's no alarm mode, for example). But the fact is it does look good, and it's built well, from high-quality materials. It also features a rechargeable battery, which you top up using a provided

USB cable, and each charge should last around a month, so it's much less annoying in this regard than a smartwatch.

We've been wearing the Satellite X Wood for a few days now, and we have to say we've grown quite attached to it. It's the kind of thing we (and we imagine many Micro Mart readers) would appreciate as a gift, although we would urge you to check out the rest of the TokyoFlash watches first, because some of them look even more eye-catching than this one.

**mm Anthony Enticknap**

*Suddenly, using a wristwatch doesn't seem so quaint*





# ViewSonic VG2437Smc Monitor

ViewSonic launches a monitor with peripheral ambitions

## DETAILS

- Price: £199
- Manufacturer: ViewSonic
- Website: [www.viewsoniceurope.com/uk](http://www.viewsoniceurope.com/uk)
- Required spec: VGA, DVI or DisplayPort output, USB 2.0 port



**W**ith the advent of innovative devices like the Chromebit computer on a stick, we're likely to see monitors take on a greater part in computing other than just being a dumb display.

The ViewSonic VG2437Smc is one of those monitors that try to be more than a simple adjunct to your computer, though inherently it needs that part too.

To the casual observer the ViewSonic VG2437Smc is a 23.6" widescreen LCD panel with a natural resolution of 1080p and an 'A' grade power rating.

It uses ViewSonic's own SuperClear MVA technology to deliver punchy colours that anyone who has seen IPS displays will recognise. However, that aspect doesn't make it ideal for the high frame-rates that gamers might need.

The standard inputs are VGA, DVI and DisplayPort, and the inclusive stand offers a range of positional adjustments, including full rotation. ViewSonic also gave it 2W speaker, about which we'll talk no more.

ViewSonic alone makes at least ten monitors the same size as this one, and with the exception of the 1ms gaming panels, they're almost all cheaper than this one. Why?

It has a small collection of features that ViewSonic added, with the idea being to sell this as an all-in-one video conferencing

**“ What's included as a distinctive feature here just isn't special enough ”**

solution. To that end, it's given it a 2MP webcam, a microphone jack and a microphone, all plumbed through an on-board USB 2.0 hub.

I was slightly irritated that this wasn't a USB 3.0 one, as that would have made it marginally more useful. But the USB hub is there almost exclusively to service the webcam, which wouldn't be advantaged by the faster technology.

I'll be honest and say directly that I was disappointed at this interpretation of an 'all-in-one video conferencing solution' when it omits to mention that doesn't include a computer or even any pointers to finding some conferencing software. It didn't even put a link to Skype or Hangouts on the driver disc, disturbingly.

The camera, revealed in the 'Devices and Printers' panel is a BisonCam NB Pro, which appeared on many Asus laptops a while back. It's fine as these devices go, but it's not at the bleeding edge of webcam technology.

You can buy a webcam of this quality for less than £20 and attach it to any monitor, and get pretty much the same experience.

So what's good about this screen? The display is a good-quality one, and ViewSonic did include VGA, DVI, USB and audio cables, though no DisplayPort line.

In constructional terms, this is plastic over a metal chassis, but the bezel is nice and thin, and ViewSonic resisted temptation and left the power supply

inside and not in some horrible external box.

My major complaint here is that what's included as a distinctive feature here just isn't special enough and could quite feasibly be added to all ViewSonic's displays at minimal cost. Being a 'VG' series monitor, this design is aimed squarely at business customers, who hopefully won't worry about the cost as much.

**mm Mark Pickavance**

**A high-quality business monitor with a built-in webcam**



# Ashampoo Snap 8

Capture just about any on-screen activity with this latest utility from Ashampoo

## DETAILS

- Price: £24.99
- Manufacturer: Ashampoo
- Website: [www.ashampoo.com](http://www.ashampoo.com)
- Required spec: Windows 7 or later, 64MB GPU, 256MB RAM, 60MB HDD

There are lots of reasons you might need to take a screen shot, from capturing an image that you can't download to saving an article from a website or blog for offline reading. And if that's all you need to do, programs as simple as Windows's built-in Snipping Tool will do the job. If you need something a bit more sophisticated, something to capture web pages, video with sound and picture in picture, this latest release from Ashampoo is well worth a look.

Snap 8 is a new release of a product I'm surprised to say I've never seen before. It does everything I've just mentioned and a whole lot more. For example, it will capture across multi-screen desktops, which very few other capture utilities will do. It also captures whole web pages, even if they extend off the screen; which is quite a clever trick. During the capture, it automatically scrolls to envelope the whole page, then flashes to tell you it's finished.

Naturally, you have all the usual capture options, like fixed region, free region, window, menu object and timed capture. Then there are a few more unusual ones, like multiple window or freestyle region, where you can draw on screen to define the capture area. There's also an option to draw a box around any



on-screen text, immediately converting it to editable text via the built-in OCR engine. This works extremely well and is ideal for compiling information from online sources or lifting text from locked PDFs. I particularly like the idea of being able to adjust the capture area after you've defined it – not something I've seen before.

By default, Snap 8 automatically loads when you launch Windows, yet this, like many of the program's other settings, is optional. Once loaded, you access the program from a drop-down menu bar, which remains hidden until you pass your mouse over a thin blue line at the edge of the screen. The menu icons are fairly representative, if not a little dated; nevertheless you don't need to guess what they're for, because they all have pop-up tooltips.

After making a capture, three new toolbars appear around the edge of the screen offering all sorts of options, from rudimentary editing such as crop, erase, blur, add text, lines or shapes, to dropping a nice range of vector objects or buttons into the image. These

are very effective, well designed, fully scalable and complete with subtle drop shadows. The last menu defines the output options, which basically tells the program where to send or save the capture and in what format.

So that covers static capture, but Snap 8 is capable of video capture as well, and if you have a webcam, you can overlay a live image during the capture, or if you prefer, just use a microphone to include your own commentary. This would be brilliant for creating tutorial videos or getting started on your own YouTube blog. I did quite a few test captures, and for the most part they were very good. The system did not work so well on full-screen video capture, but having said that, it was very economic in terms of file size, so I guess the video compression could be the reason for the slightly lower frame rates (incidentally, that was regardless of the frame-rate I set). However, when capturing smaller areas or mixed media files (animation with sound), I didn't notice any frame dropping, so I'm still happy to recommend the program, because overall I feel



the Snap 8 utilities would be a very useful addition to any designer's toolkit.

**mm Joe Lavery**

**A useful suite of capture utilities that on the whole work very well**

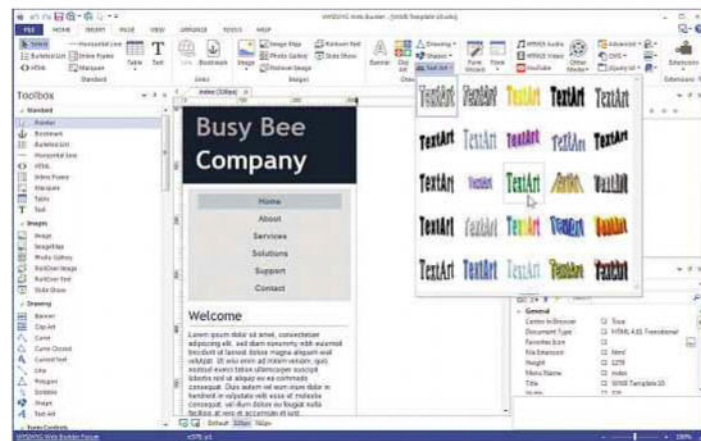
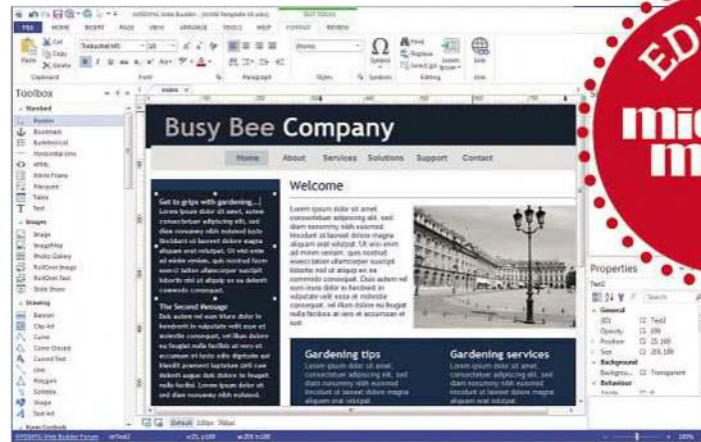


# Wysiwyg Web Builder 10.3.3

Don't be constrained by website templates. Create a site any way you like with this package. Roland Waddilove explores its capabilities

## DETAILS

- Price: £36.85
- Manufacturer: Pablo Software Solutions
- Website: [wysiwygwebbuilder.com](http://wysiwygwebbuilder.com)
- Required spec: Windows XP or later, 1GB RAM, 1GHz processor, 16MB disk space



ensure your site supports them. The software provides several ways to do this, one of which is to design each page size separately. You

copy objects from the desktop page to a mobile page and then size and position them appropriately. Alternatively, you can use floating elements that automatically shuffle around and reposition themselves depending on the screen width.

Whether you'll like Wysiwyg Web Builder depends on whether you're a website designer or content creator. WordPress and other CMSs let you focus on adding content, but this software is better for designers creating custom sites. Another point to bear in mind is that you'll be the sole site admin and page creator, and some technical knowledge is required for certain features, whereas WordPress is great for teams of non-technical writers.

This is an excellent website design package that's packed with features and supports HTML5 and CSS3, but it's not for everyone. **mm Roland Waddilove**

*Design your websites your own way without the constraints of a CMS*



There are three ways to build a website: you can use a content management system such as WordPress, you can create pages by typing in HTML using a code editor, or you can use a web page design tool like Wysiwyg Web Builder. Each method has advantages and disadvantages, and no single method is the best for all situations. A case can be made for all of them, and Wysiwyg Web Builder has its uses.

The ever-popular WordPress is great when you have several users generating lots of content, but every page uses the same template, and the content is inserted into it. You could not have a different size heading in a different font, for example. Wysiwyg Web Builder puts you in control of the design and is infinitely more flexible when it comes to creating unique web pages.

In many ways it's like creating a newsletter or magazine with a desktop publishing package. Unique pages can be created, such as the front page, with content such as headlines and article snippets, images and links to the rest of the pages. You could then create different page designs for various sections of the website and use them as templates to add content. Pages can be cloned

**“ An excellent website design package that's packed with features ”**

and then the text and images replaced to create new pages without much effort.

A master template can be created that contains elements like the site header and footer, sidebar, menus and links to contacts, about, feedback forms and so on. Shapes, lines, curves, banners, text art and other items can be drawn on the page, text boxes can be inserted and styled, tables created and so on. If you've ever used a DTP program, you'll be right at home. However, it

goes further than DTP because of the interactive nature of the web, and text and images can be turned into links, there are rollover images and text, slideshows, forms, menus, PayPal buttons and more.

The list of new features in version 10 of Wysiwyg Web Builder is long, but the one that caught my attention was support for responsive design. Google now penalises websites in search results that do not work well on phones and tablets, and responsive design enables you to

# Grand Theft Auto V

What can Rockstar's latest murder sim do to impress us?

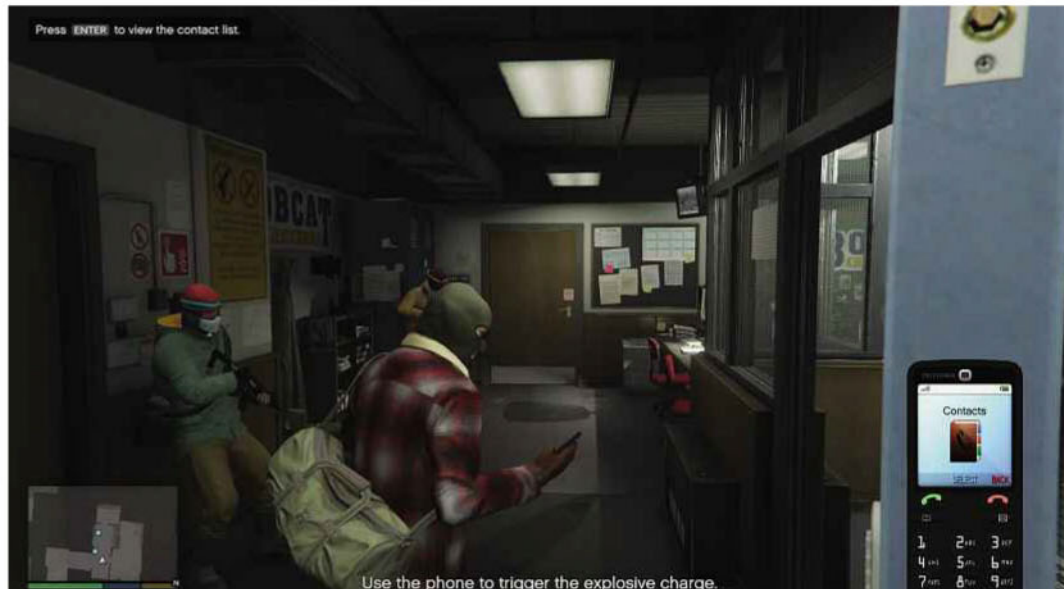
## DETAILS

- Price: £39.99 from Steam
- Manufacturer: Rockstar Games
- Website: [www.rockstargames.com/V](http://www.rockstargames.com/V)
- Required spec: Windows Vista or later (64-bit), 2.4GHz quad-core CPU, 4GB RAM, 65GB disk space, Nvidia 9800 GT / AMD HD 4870

**G**rand Theft Auto V is a bad game. Yes, I did just write that. But before any fanboys recover from this shock and return to bust some caps, let me clarify.

No, I'm not saying that the gameplay isn't entertaining or that the controls don't work. I'm not suggesting that the acting isn't top-notch or that the story isn't well paced. I'm not even putting forward the notion that it's overpriced. What I mean when I say it's bad is that it's morally reprehensible, violent, irresponsible, sexist, vulgar and perpetuates negative racial stereotypes.

So, essentially, it's business as usual for the latest installment of this infamous series from developer Rockstar. It's taken a long time for this game to reach the PC, having been released on consoles in September 2013, but as always, it's all about climbing to the top of the criminal hierarchy, racking up money almost as quickly as you accumulate dead bodies. And, as you'd expect, there are plenty of missions and side missions to complete, but if you'd rather not focus on those, you can simply go on a rampage, running down virtual pedestrians or shooting them as they go about their business. This can be hugely entertaining, but it's still hard to shake off the feeling that there are probably millions of people playing this game who really shouldn't be.



Let's put such worries aside for a moment, though, and focus on the gameplay and what's new this time around.

Undoubtedly, the biggest difference in *GTA V* compared to its predecessors is the multiplayer mode, which has been expanded massively. Running separately from the story mode, it involves creating a custom character, choosing their name, appearance and attire. You then enter the fictional city of Los Santos (in none other than San Andreas), where you can run around randomly, causing the same kind of random chaos you would in any other *GTA* game. The key difference, though, is that there are other players doing exactly the same thing as you, and you can also attack each other.

However, as much fun as that can be, it alone would get dull fairly quickly. Thankfully, *GTA V* offers you the chance to complete 'Jobs', which basically translates as multiplayer modes. There are loads of these, ranging from straightforward races to on-foot deathmatches and co-op missions, and the more you complete, the more money you earn to spend on weapons, cars and so on. More importantly, though, you



earn reputation points, and it's these that enable you to level up your character, unlocking new missions, weapons and non-playable characters along the way.

Of course, this being an online game, if you have voice chat enabled, which it is by default, then before long you'll experience the joy of hearing some random person screaming into his or her microphone, something along the lines of "Fudge you, you fudging muddu funster. Fudge you in your ash grove!", but with infinitely less PG-friendly words, of course. Thankfully, you can turn off voice chat to silence this, because clearly some people have never heard

the expression 'It's only a game'. You can also choose to play the game in Passive Mode, which means you can't kill other players or be killed by them while walking around the city, but you can still take part in the Jobs.

With the game set up like that, it's not difficult to have an absolute blast in the multiplayer, but what about the campaign mode? It is, after all, still the core reason anyone buys these games. They want to ride around town, doing missions, following the latest rags-to-riches narrative created by Rockstar's script writers, and they want to feel like top dog. What they probably



don't want is other players constantly reminding them they suck at videogames. I certainly know I don't.

Naturally, the game's story doesn't stray far from the series' overarching theme of glorifying criminality and gang violence, but it does present things in a refreshing new way. Rather than sticking with one protagonist, *GTA V* offers you three: Michael, Trevor and Franklin. Michael is a retired criminal, living comfortably after making a deal with the FIB (no, that's not a typo); Trevor is his close friend and a man he used to rob banks with, but who now lives in a trailer and

smokes meth amphetamine; while Franklin is a petty criminal, who approaches Michael for work after they meet through unexpected circumstances involving the legal repossession of a car sold by Franklin's boss.

Throughout the game, you'll find missions that involve one, two or all three of them, and for multiple-character missions, you can switch between each of them, with the others being controlled by AI. That means you can focus on the shooting, while your partner in crime drives the getaway vehicle. That said, you'll most likely find that your buddy isn't particularly handy behind the wheel, and you'll end up switching between the two so you can actually complete the missions.

The driving is pretty much the same as every other *GTA* game, and as with the rest of the series, I found it far easier to control the cars with an Xbox controller than a mouse and keyboard. The shooting sections, though, are more enjoyable with a mouse, because it's an extremely frustrating experience trying to aim with a controller. Personally, I found myself switching between the two

systems, which is not ideal, but most players online seem to stick with the mouse and keyboard only, so clearly it's not a problem many other people experience.

Anyway, also new is the inclusion of a first-person mode, which is available for both in-car and on-foot sections. It's an intriguing idea, certainly, and Rockstar very nearly managed to pull it off – but not quite, sadly. Recent titles like *Dying Light* and *Far Cry 4* show how to produce an engaging first-person experience, as well as illustrating the importance of a parkour system to make running and leaping over obstacles fluid and enjoyable. In comparison, *GTA V*'s first-person mode is clunky and ultimately a wasted opportunity.

Nevertheless, *Grand Theft Auto V* offers so much else, it's hard to criticise it. Put aside its violence for a moment and disregard the fact that the F-word and N-word are uttered in its dialogue seemingly every five seconds. We're talking about a game where you can rock up to a tennis court and play a reasonably accomplished simulation of the sport, not far off from *Virtua Tennis*. Not to mention the wealth of extra content to discover, including

genuinely funny material, like fake websites accessed via your in-game smartphone.

Like all *GTA* titles, though, it's also massively overrated, and it's also disappointing that iFruit, the companion app for mobile devices, isn't yet compatible with the PC version – in spite of being referenced numerous times by the game's on-screen tips.

In spite of such problems, though, it's hard to deny that *Grand Theft Auto V* is a well-crafted game, which should offer you many hours of enjoyment – just as long as you can stomach its content.

**mm Anthony Enticknap**

**It's business as usual, but this time bring your friends**



# GROUP TEST

## 27" Monitors

Monitor sizes have increased significantly over the years, as too has the available resolution, and the technology behind the screens has improved as well.

These days, we can expect some amazing things from the humble monitor. And David Hayward has six 27" models to play around with and see which are worth investing in.

## 27" Monitors

### Asus PB278Q

#### DETAILS

- Price: £469.99
- Manufacturer: Asus
- Website: [goo.gl/PK42qB](http://goo.gl/PK42qB)
- Required spec: Every graphics connection supported, OS free

Asus generally has some very good, mid-range monitors available for the average consumer. It's products for professionals, though, step up a gear, with some extremely classy and technically impressive models.

This professional 27" monitor is one of the more expensive on test, but it's also the only one that can handle resolutions above the magical 1080.

The PB278Q offers an excellent screen resolution of 2560 x 1440 with a Samsung PLS panel and W-LED backlight. The static contrast is rated at a 1000:1, but is further supported with an eye-watering dynamic contrast ratio of 80,000,000:1. The brightness is okay at 300 cd/m<sup>2</sup>, and it also has a response time of 5ms and viewing angles of 178° on the both the vertical and the horizontal.

Around the rear of the monitor, you'll find VGA, DVI, HDMI and a DisplayPort, along with speaker inputs, headphone and the power. Unfortunately, there's no USB hub, which is somewhat mean considering the price you're paying. However, an added bonus here is that the cables for each of the display inputs are included in the box, which is always handy.

The design of the PB278Q is fairly standard, in that the rectangular base supports the monitor well enough, with the whole unit finished in a matte-black plastic. It has to be said, it

does feel a little cheap, considering the price, and the OSD buttons, located under the screen, feel like they're ready to break or remain pressed in forever at the slightest touch. However, this is a monitor that supports a full range of ergonomic adjustments, probably due to its professional heritage. The tilt range is -5° to +20°, height is 120 mm, and there's a 90° rotation and a 60° swivel – all of which move easily and fluidly. This is indicative of the professional market this monitor's is aimed at, where ergonomics and health and safety are a major concern, and it's something which the consumer users should really be adopting too.

The image quality is what you generally expect from a monitor of this price, and although it may be leaning toward the more professional market, there's no problem with the screen clarity or range of colours displayed when gaming or watching a film, for example. The colours are superb, and the contrast between the darker and lighter shades is a joy to behold. Text displayed is sharp and clear, so that the white background

used in most office applications looks crisp enough for the worker who has to stare at their screen all day without bringing on an intense headache.

Overall, the Asus PB278Q is a splendid monitor with great connectivity, image quality and of course the great 2560 x 1440 screen resolution. Because of all that, though, it's quite pricey for the average home user, and even the professional user may be deterred by the cost. However, in comparison to other professional-level 27" monitors on offer from the likes of Dell or Samsung, it seems fairly reasonable.

The addition of a USB hub would have been beneficial, but nevertheless, if you can afford the expense, this is a very fine monitor.



# Iiyama ProLite T2735MSC-B1

## DETAILS

- Price: £428
- Manufacturer: Iiyama
- Website: [goo.gl/GSQkCr](http://goo.gl/GSQkCr)
- Required spec: Windows 8.1 for touchscreen support



Iiyama products always carried with them a certain sense of quality. They were the kind of monitors that could draw impressed looks from anyone who saw them. That hasn't changed much over the years, and in fact they may have become even better.

The Iiyama ProLite T2735MSC, for example, doesn't buck that trend. What we have here is one of the first 27" monitors available to support the full ten-point touch on a projective capacitive screen, with AMVA+ LED backlight LCD screen technology. It's getting on a bit now, but it's still capable of standing toe to toe with a modern model.

It's a full 1080 HD resolution, with a contrast ratio of 3,000:1 and a dynamic contrast ratio of 5,000,000:1. The brightness is measured at 260 cd/m<sup>2</sup>, with a response time of 5ms. Around the back of the monitor you'll find VGA, DVI, MHL-compatible HDMI, speaker, headphone and microphone ports and a two-port USB 3.0 hub.

Of course, the main selling point here is the touchscreen,

and it's near as perfect as you would expect from Iiyama. Sweeping around the screen via the Windows 8.1 UI is incredibly responsive, as is gliding through the various Windows 8.1 apps, charms and controls. The ten-point touch feature work perfectly fine, although if you've angled the stand down slightly, there's the temptation to rest your palm on the screen, since you're dealing with a large screen here and not a 10" tablet, which reacts to the touch and launches whatever's in that space. Keeping your palm raised while working with a stylus can be pretty tiring, but there are ways and means to find a more comfortable position.

The image is excellent, with vibrant colours, and good blacks and whites despite the monitor having a fairly low brightness level compared to the other monitors on test. When coupled with the touchscreen, it makes the monitor feel more alive and oddly better quality than if you weren't able to touch it. We think this may be due to the fact that a touchscreen is viewed closer than a normal monitor, to make touching it easier, so you can appreciate the range of colours better.

The build quality is as expected from a monitor of this price, although the kickstand does feel a little stiff to move into position. Indeed, you might

feel as if you're going to snap it off if you try to lower the screen slightly, but the truth is it's fine, and it will help keep this big screen stable and in place even when pawed at by a ham-fisted reviewer.

Obviously in this case you get what you pay for: quality throughout and superb performance. But is it worth nearly £430? Unless you absolutely need a 27" touchscreen, then probably not. The price is dropping rapidly for this kind of technology, so investing this amount on an older model is pointless.



## 27" Monitors

# Acer G276HLA

### DETAILS

- Price: £155
- Manufacturer: Acer
- Website: [goo.gl/Olr7sW](http://goo.gl/Olr7sW)
- Required spec: HDMI, DVI or VGA output

Over the years, Acer has often provided consumers with some exceptional monitors, all within a reasonable price range. True, there have been times when it's dropped the ball and let the quality drop, but on the whole, it does a pretty good job and delivers the goods.

The Acer G276HLA is a 27" TN panel with a decent enough 2ms response time, HDMI, DVI and VGA inputs, along with an impressive dynamic contrast ratio of 100,000,000:1.

Viewing angles are 170° on the horizontal and 160° on the vertical, which aren't up to IPS

standards but are good enough for the average user.

The build quality is good too; there's a half-inch glossy bezel around the screen, with the OSD controls located in the bottom-right corner together with the power. Connectivity around the back of the monitor is easily accessible, and there are the relevant holes for VESA mounting, should you wish – although if you're doing that you'd probably prefer the video inputs to be facing down rather than straight on as they are in this example. Overall, it's certainly sturdy enough to sit on a desk and take a few knocks for the remainder of its lifespan.

The included stand is a four-point cross that slots up into the bracket around the back of the monitor, which is then screwed in place. This makes for a solid foundation but doesn't impede the monitor's adjustable angle in any way. It's

also surprisingly light, weighing in at around 4.5kg with the stand in place, which isn't too bad considering it's not the thinnest panel we've ever come across.

We found the G276HLA to be a bright, clear monitor with decent colour reproduction. The response time is also a benefit for watching video or playing games, but it also means there's very little eye strain when spending long hours in front of a Word document or CAD package.

On paper, it's fairly average, but what really lifts it is the price. At £155, there's plenty of opportunity to have a brace of these for a multi-monitor setup.

However, the addition of a USB hub and a set of speakers wouldn't go amiss. Naturally, this would bump up the price considerably, but it saves you from having to buy an extra USB desktop hub to replace the

handy ports you can have with a USB-enabled monitor. Plus we found the OSD buttons to be a little fiddly and difficult to locate properly, especially when you only have a few seconds to press the correct button before the OSD powers off.

There's no doubt it's a good-quality monitor, with a large screen, enough connectivity for the average user and at a reasonable price to boot. It won't win any awards, but this is a monitor that will do the trick and offer you countless hours of everyday use.





# Philips 272G5DYEB

## DETAILS

- Price: £455
- Manufacturer: Philips
- Website: [goo.gl/U8ApTM](http://goo.gl/U8ApTM)
- Required spec: DisplayPort connection, Nvidia 650GTX+ for G-Sync

**N**vidia G-Sync monitors have been fast gaining ground and support since they started to roll off the production lines. For those of you who aren't familiar with G-Sync, it is essentially a module in a monitor that will synchronise with an Nvidia GPU to eliminate any screen tearing, stuttering or artifacting when playing the latest games or watching fast action movies in higher resolutions.

You'll need an Nvidia 650GTX or higher to take advantage of this communication between the monitor and GPU, and it'll only work via a DisplayPort 1.2 connection. But the benefits of G-Sync are impressive, working better than merely upping the vertical sync option in your games.

The Philips 272G5DYEB is one of the more recently released G-Sync monitors, and should you have the right hardware in place, then you'll be in for some impressive gaming and video visuals. To the rest of us, though, what can we expect from a monitor that nearly tops the £500 mark? As it turns out, quite a lot.

The 27" TN panel features a non-reflective coating with a brightness level of 300cd/m<sup>2</sup>, a maximum resolution of 1920 x 1080, a response time of 5ms,

with a SmartResponse time of 1ms and a typical contrast ratio of 1000:1.

That's not all, though. There's also a 144Hz refresh, Nvidia Ultra Low Motion Blur and it's Nvidia 3D Vision ready (you'll need the glasses, though). The height can be adjusted to 150mm, with a pivot of 90°, swivel from -65° to +65° and tilt from -5° to +20°. Plus the viewing angle is an impressive 170° horizontal and 160° vertical. And if that wasn't enough, there's also a four-port USB 3.0 hub built into one side of the monitor. All in all, there are some pretty enticing specifications listed for the 272G5DYEB.

The SmartResponse feature is a Philips exclusive technology that will automatically adjust the response times for a

specific application, such as gaming. The result is better viewing all round, and we have to say we were impressed with what we saw.

Admittedly, we couldn't tell a huge amount of difference with the anti-blur, SmartResponse and G-Sync features all enabled. The games we tested all looked pretty amazing on the 272G5DYEB regardless of whether these were on or not.

The screen did look quite splendid, though. The colours were bright and vibrant, and everything seemed so much sharper, clearer and more focused than any of the monitors we've so far tested. It really was a treat for the eyes.

The Philips 272G5DYEB is one of the best monitor's we've had the pleasure of

testing. The screen image, the ergonomics and the features all combine to make a splendid choice of monitor for gamers, professionals and video editors.

But (and this is quite a big but) you only get a single DisplayPort connection, so if you have legacy hardware or you need connectivity other than DisplayPort, you're going to need to look elsewhere.



## 27" Monitors

# AOC Q2778VQE

### DETAILS

- Price: £250
- Manufacturer: AOC
- Website: [goo.gl/xlHoX0](http://goo.gl/xlHoX0)
- Required spec: HDMI, DisplayPort, DVI or VGA output

**N**ext up, we have the Q2778VQE, from AOC, another company that has always impressed up with its range of monitors. Not just for the quality and the range of features on offer, but also for the reasonable cost, for products that often incorporate the kind of elements you'd normally find on more expensive models.

The Q2778VQE, with its TN WQHD panel, has a maximum resolution of 2560 x 1440, a brightness level of 350 cd/m<sup>2</sup>, a typical contrast ratio of 1000:1 with a dynamic contrast ratio of 80,000,000:1 and a 1ms response time.

Furthermore, you'll find VGA, DVI, HDMI and DisplayPort



inputs, viewing angles of 170° horizontal and 160° vertical and a tilt of -4° to +21°. There's even a set of VGA, DVI and DisplayPort cables included in the package – a nice touch and something that is often sadly missing from many monitor boxes these days.

The design of the monitor is admittedly fairly basic. There's lots of glossy black plastic and a minimalist look to the Q2778VQE and, if we're being a bit harsh, the stand is a little basic too – offering just a tilt with no swivel or pivot. However, although this is no beauty, AOC has managed to squeeze a great resolution and refresh rate into a 27" panel for just £250, which is pretty impressive by our reckoning.

The visuals on the Q2778VQE are simply stunning. We were quite surprised at how good they actually are, especially since this is 'just' a TN panel.

You could easily be led into thinking you were looking at an IPS monitor.

The colours are bright and bold and the image is sharp. Gaming and videos are a joy to behold, and despite the entertainment emphasis, the worker will certainly appreciate the lack of eye strain, thanks to the screen quality presented here. Everything from standard word documents through to photo viewing stood out with excellent clarity.

There are more expensive monitors available, with more features too, but on the whole if you're after a good, large screen for less than £300, then here is the ideal candidate for you.

Okay, so we classed the design as being basic, but that doesn't necessarily mean the monitor is unworthy of sitting on our desks. In fact, we rather liked the AOC Q2778VQE. Its unassuming looks hide a visually

impressive screen, and for this price you could easily factor in another for some rather glorious multi-screen entertainment. In fact, you could get two of these for just a little less than the price of the Asus monitor.

Bearing all of this in mind, we'd be quite happy recommending the AOC Q2778VQE. It's a splendid and reasonably priced monitor with a great 1440p resolution and super-fast refresh rate.



## BenQ EW2740L

### DETAILS

- Price: £180
- Manufacturer: BenQ
- Website: [goo.gl/Nc5cwm](http://goo.gl/Nc5cwm)
- Required spec: HDMI or VGA output

**M**uch like Iiyama, BenQ is a firm that has a reputation for producing monitors of higher than average quality. But it's not that alone that makes us fond of this company's products; it's also the fact they're more often than not very reasonably priced.

The BenQ EW2740L is a VA LCD, full HD panel with a low blue light rating to help reduce eye strain over long viewing periods. It has a maximum brightness of 300cd/m<sup>2</sup>, a typical contrast ratio of 3000:1 with a dynamic contrast ratio of 20,000,000:1 and a good horizontal and vertical viewing angle of 178°.

Furthermore, you find a 4ms response time, VGA, HDMI and a HDMI MHL support port (which incidentally also charges the phone or tablet that's plugged into it). There's also a pair of 2W speakers, which are okay but won't blow your senses away when in use, and you can tilt the monitor from -5° through to +20°.

As well as the low blue light feature, the EW2740L also uses a flicker-free backlight to display as clear an image as possible on the screen. This makes a huge difference to the overall quality of what's in front of you, especially if you take advantage of the MHL HDMI port and output content from your phone.

BenQ has made an interesting choice by using a VA (vertical alignment) LCD panel with the EW2740L. There's clearly a better quality of image compared to TN panels. As with the AOC model earlier, you could easily be mistaken for thinking you were looking at a far more expensive IPS screen.

We found the colours bright and vibrant, with normal day-to-day text viewing very relaxing and easy to look at. Interestingly, the low blue light feature gives the screen a kind of cold look to it, and it drops the brightness significantly. During the day, this feature feels a little too dim, but in the evening and at night, which is when the blue light feature is calibrated for, it certainly feels a lot better.

The design alone isn't likely to win any awards, but we

did like the matt-black finish throughout. The ports are easy to get to, we liked the way they ran in a strip up the centre of the rear of the screen, and the thin bezel around the screen isn't too much of a distraction either.

While all good, the icing on the cake here is the fact that this particular monitor costs on average around £180. That means for less than the price of half of this week's group entries, you can have a pair of these excellent monitors gracing your computer desk.

This is a budget monitor but one that offers a superior screen, with a few decent extras thrown in, such as the low blue light mode and MHL HDMI port. Naturally, it would be better to have a USB hub, better ergonomics and a higher resolution for a 27" monitor, but because of the

lack of these extras, what you do get is better value for money.

We liked the BenQ EW2740L. It's an excellent screen, with fine connectivity and a great price, making this a superb general purpose monitor that's worth looking into for your next buy.





### AOC Q2778VQE

We really liked the AOC Q2778VQE. It has a great looking screen, plenty of connectivity and is also a reasonably priced monitor considering what you get and for the size of it.

We think it'll serve gamers, film buffs and the workers admirably.



### BenQ EW2740L

The BenQ EW2740L is also another monitor with a superb screen, and the benefit here is that it costs less than £200.

It does lack DVI and DisplayPort connections, but on the whole, it's a perfectly capable and very good 27" monitor.

## How We Tested

Each monitor was hooked up to an Intel Core i7 fitted with an Nvidia GTX970 with 4GB of memory. For testing we used Windows 8.1, Word, Gimp, Excel, PowerPoint, VLC, *Elite: Dangerous*, *Ori and the Blind Forest* and *H1Z1* – a collection we think best represented the average computer user.

	Asus PB278Q	Iiyama T2735MSC-B1	Acer G276HLA	Philips 272G5DYEB	AOC Q2778VQE	BenQ EW2740L
Price	£469.99	£428	£155	£455	£250	£180
Resolution	2560 x 1440	1920 x 1080	1920 x 1080	1920 x 1080	2560 x 1440	1920 x 1080
Static Contrast Ratio	1000:1	3000:1	1000:1	1000:1	1000:1	3000:1
Dynamic Contrast Ratio	80,000,000:1	5,000,000:1	100,000,000:1	10,000,000:1	80,000,000:1	20,000,000:1
Response Time	5ms	5ms	2ms	1ms	1ms	4ms
Weight	8.8kg	8.3kg	4.60kg	7.80kg	4.72kg	4.2kg
HDMI	1	1 – MHL supported	1	0	1	2 – 1 MHL supported
VGA	1	1	1	0	1	1
DVI	1	1	1	0	1	0
DisplayPort	1	0	0	1	1	0

# Your Letters

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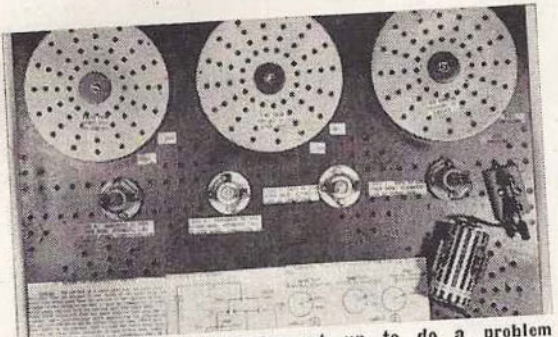
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### Early Computers

Just been catching up on my reading (I'm a bit slow!) and came across this ad in the December 1955 edition of *Popular Science*. What I want

to know is: Can I rig this up to one of the new-fangled 'Colour' television sets I've been hearing about?

Anon



**ELECTRIC BRAIN KIT—**  
*Can you think faster than this Machine?*

Control Panel of GENIAC set up to do a problem in check valve research.

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You will find building and using GENIACS a wonderful experience; one kit user wrote us: "this kit has opened up a new world of thinking to me." You actually see how computing, problem solving, and game play (Tic-tac-toe, nim, etc.) can be analyzed with Boolean Algebra and the algebraic solutions transformed directly into circuit diagrams. You create from over 400 specially designed and manufactured components a machine that solves problems faster than you can express them.

Schools and colleges, teachers of science or math, engineering, philosophy or psychology will find these excellent demonstrators of circuitry, solutions in symbolic logic, theory of numbers, cybernetics, and automation.

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```

~/Desktop/s709win
$ ./runibsys.bat primesII.job primesII.txt
IBM 7094 Simulator 2.0.5
$LIST
$DATE          061805
$JOB            PRIME NUMBERS
$EXECUTE        FORTRAN
                *ID          PRIME
                *XEQ
                *XEQ

BEGIN COMPILATION

77 LINES OUTPUT THIS JOB.

FORTRAN MONITOR RETURNING TO IBSYS
$STOP

PERIPHERAL UNIT POSITIONS AT END OF JOBS
SYSPP1 IS A8 REC. 0000, FILE 00002
SYSOUT IS A4 REC. 00069, FILE 00000
SYSINI IS A3 REC. 00002, FILE 00001
    
```

### 1906a Computer Registers

I am very grateful to Richard Stewart for his web page references for further information on the 1900 series computers. I also found some relevant information on Wikipedia. I know that this may not be completely reliable, but on the first page of the web page ([wikipedia.org/wiki/ICT\\_1900\\_series](http://wikipedia.org/wiki/ICT_1900_series)) there is a table of information about ICT 1900 machines.

- Designer:** Ferranti-Packard/ICT/ICL
- Bits:** 24-bit
- Introduced:** 1964
- Design:** CISC
- Type:** Register-Register  
Register-Memory  
Memory-Memory (move)
- Encoding:** Fixed
- Branching:** Comparison, carry, overflow, indexing, counting
- Page Size:** 1024 words (1904A/S, 1906A/S, 1903T)
- Extensions:** extended floating point on 1906/7

### Registers

**General Purpose:** 8 24-bit (3 usable for indexing)  
**Floating Point:** 1 48-bit (96-bit if the extended floating point is present)

According to this, there is one 48-bit register, and under certain circumstances, a 96-bit register. As the company I worked for was an engineering company, I feel sure the computer would have had floating point resources.

I have not written FORTRAN for about 15 years. All the programming I do now is in C. I find this both more powerful and challenging than FORTRAN 77. I try to standardise on one language, but I am also making attempts to learn OPENCL and CUDA, as I have several projects I feel either of these will be ideal for. I am beginning to suspect that the CPU I am using – a Phenom 1 may not support these languages. I shall have to buy another.

**John J Reynolds**

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# C is for CONNECTORS

**Mark Pickavance** explains the new USB Type C connector, and the changes that its arrival will usher in

It's easy to forget that USB had remarkably humble and generally inauspicious beginnings. I remember first getting an adapter and a small collection of USB 1.0 devices; they worked some of the time, but often they'd crash Windows. At that point the remit of this connection technology only really extended as far as mice, keyboards and printers, as it wasn't fast enough for much else. However, what it lacked in speed it made up for in the simplicity of the connection and the thin cables, which were a revelation to anyone familiar with parallel printer connections.

USB 1.1 was much better, and when USB 2.0 appeared the possible uses of this technology blossomed to encompass all manner of external devices. There were still issues when using it for high bandwidth devices, like drives, though – and the amount of power that a device could pull from the computer was limited.

USB 3.0 addressed the bandwidth problem, and also at this time USB 2.0 Micro-B became the connection of choice for all but Apple-made smartphones. Now USB 3.1 is about to add even more bandwidth, we're told – so what is the USB Type-C connector, and how does it fit into the bigger picture?

## USB Over Time

For those interested in the history of USB, there have been no less than eight different connector types up to this point. Part of the reason for this proliferation of plugs is that the host and client have used different designs at their respective ends, as the cables aren't reversible. Also to maintain a degree of compatibility many

of the connectors are variations on their predecessors. So, for example, USB 2.0 Micro-B is a design refinement of of USB 2.0 Mini-B, while USB 3.0 Micro-B adds extra pins to the USB 2.0 Micro-B design. The problem with adding extra bits in this fashion is that it's not fully inclusive, because try as you might, you can't put a USB 3.0 Micro-B cable into a USB 2.0 Micro-B receptacle. Thus, you can't realistically keep simply adding extra elements to a connector.

Therefore, those behind USB decided they'd bite the bullet and introduce a totally new connector that would hopefully banish all the others once it became established. It's to be known as USB 3.1 Type-C, but it's critical to understand that it was developed in isolation to USB 3.1 standard, which can operate on the existing USB 3.0 connectors. What USB Type-C actually does is provide the optimal situation to use USB 3.1; it is also very easy to differentiate the sockets, as they're not just coloured differently but physically incompatible.

Let's look at the new features of USB Type-C and see how they bring USB fully into the 21st century.

## Enhancements

The first thing that you notice about USB Type-C is that the host and client connectors are identical, because the cable is fully reversible. That will make the cables easier and theoretically cheaper to make, and cabling very straightforward.

In addition to being the same at both ends, the connector is also symmetrical and reversible in orientation, so you can force it in the 'wrong' way up! These points alone offer a major improvement over USB in

general, but specifically Micro-B on phones – as it's currently easy to push a Micro-B cable into its receptacle on a Smartphone inverted, and damage either the cable or the phone. Once they are damaged, a perfectly good phone in other respects can't be charged up, until it has a Qi pad power capability.

Beyond this, there are some other great features. With the standardisation of USB Micro-B on phones, the expansion of USB into charging and powering devices has exploded. Now, most phones and tablets – unless their made Apple – charge directly using this connector.

The problem with this usage is that the batteries in these devices are getting larger, and charging them with a potential cap of 9W takes progressively longer. Some companies have tweaked adapters to deliver more power over USB, but there isn't going to be a point where you could use Micro-B to charge a laptop, for example.

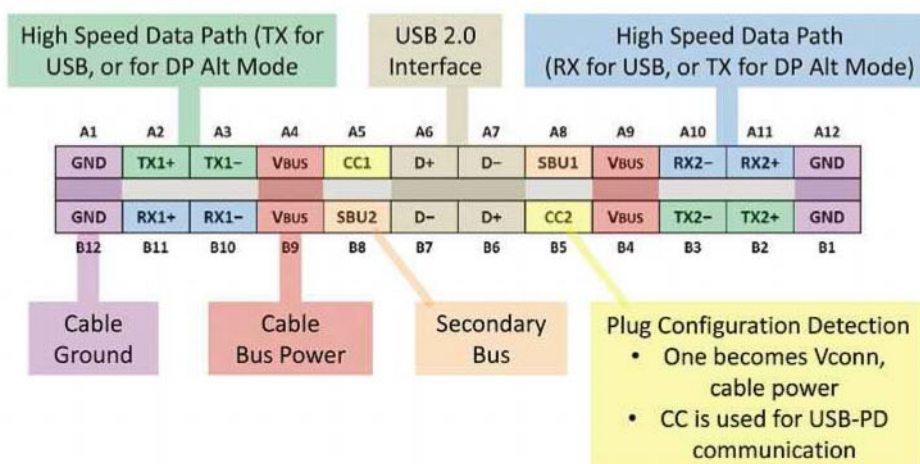
Type-C fixes this with 20V and 5A power provision, allowing up to 100 watts of power over the new connector. That's enough power for most laptops and the foreseeable future requirements of phones and tablets. But, and this is a great ideal, under all the other USB power systems the power would run only from the host to the peripheral, but on this system it runs both ways.

The implications of this are significant. As it turns the charging socket into a USB peripheral socket on any devices that uses it. Also, imagine that you're trying to complete an important message on your phone away from mains power, and it's about to drain out. You could simply hook up your laptop, and charge



## USB Type-C Receptacle Pins

### Pins defined for system or device receptacle



▲ This pin layout demonstrates well how USB Type-C does its dual orientation trick without blowing up either end of the connection. All the positions are mirrored, with the exception of the TX and RX lines, which are differently placed in each orientation directing TX1-TX2 and so on. The function of the CC (Configuration Channel) pins are to detect orientation, telling the USB controller which are the TX1/RX1 and TX2/RX2 lines, at which point data is sent appropriately. The only real danger of this design was the power lines, but as these are reversible and can never be matched, it's not a problem

it, or vice versa. That's useful, and the sort of interchangeability that people generally love, even if they don't have any immediate use for it.

The final must-have feature of USB Type-C is one that it automatically inherits from USB 3.1 – namely, 10Gbps of bandwidth. That's enough to support an external drive at more than a gigabyte per second, or display a 4K image on a monitor through DisplayPort, or handle multiple gigabit LAN connections.

If you thought USB 3.0 was good, then the double performance offered by 3.1 should excite you, and the majority of 3.1 devices should use the Type-C connector.

However, there are always a few caveats that need to be outlined along with all the advantages we've highlighted.

### Not All Good News

The most obvious problem come with the vast collection of existing USB hardware that was dreamt up before long before Type-C was even conceived. That means should Type-C become popular we'll be stuck with using tiny adapter cables so we can plug our old phone or peripheral into our latest kit.

This was highlighted by Apple, which launched one of the first machines to feature USB Type-C. However, it deigned to give its new MacBook just one USB-C port and no legacy connectivity. Most computer

makers aren't that daft/presumptuous, though, and I suspect that we'll see USB Type-A and Type-C living together for some time on most computers.

Thankfully the use of Mini-A and Mini-B has almost died out, and Micro-A wasn't ever that popular. That leaves the adapters you might want as Type-B to Type-C and Type-A to Type-C, and possibly Micro-B to Type-C. If you use USB 3.0 peripherals you also might need those specific converters, under some circumstances.

What is quite clear from the Type-C specifications is that no adapters will be allowed to include a USB Type-C receptacle, only the male connector.

There is also another aspect of Type-C that might not be very desirable, and that's the increased number of wires.

USB 1.x and 2.0 used just four wires, in that it had 5V power, two data lines and a ground line. This expanded to five wires under the mini and micro layouts. USB 3.0 increased that by another five to ten wires by adding four more data lines and another ground line. And, now USB Type-C (USB 3.1) adds a further five wires, to make 15, plus a braid over 24 pins, so that it can toggle cable orientation and to handle power management.

That last aspect is likely to make the cables less cheap, because USB power Delivery 2.0 specification requires that each

cable contain a chip with an ID function making them an active component in the data and power chain. This level of sophistication might well make these cables thicker, less reliable and more prone to damage, but we'll see how that pans out over time and in-the-field use.

As with most things in the world of computing, it might be best to let others test these waters before diving in yourself. This will also mean that early adopters can suffer the expense of the cables, before the prices inevitably rationalise further downstream.

### Success Or Failure?

What's probably the most annoying aspect of USB-C, other than it failing to appear before USB Micro-B became so popular, is that it is almost certainly destined to succeed despite these obvious snags. It will be a generally irritating translation, and one that will inevitably take longer than it reasonably should, but we're pretty confident that eventually we'll simply refer to one kind of USB, and connecting devices will become better because of that.

The new design not only solves the insertion damage issues, but also the increasing use of USB as a power delivery technology. And unless we suddenly decide that 100 watts isn't enough power and 10Gbps is insufficiently fast data transfer, it should suffice for some time to come.

However, if the last 30 or more years of computing has taught us anything, it's that every dog has its day – and Type-C will be replaced with Type-D and Type-E eventually, for whatever technical and commercial reasons. Indeed, there is a fine irony in all the 'future proofing' comments that Apple made about Thunderbolt, only to produce a machine that includes USB Type-C and nothing else within a few short years. It appears the only conclusion to be drawn from this is that the future doesn't exclusively contain only those technologies you've backed, even if you're all-knowing Apple.

What's amazing about USB is that this is a technology that started first to connect low bandwidth peripherals has now encompassed not only external storage, but is now set to be the preferred power distribution and charging technology of the future. There is always a danger that USB will become of the jack of all trades and the master of none, but it has managed to do pretty well so far.

Type-C might annoy some at first, but once we're got through that awkward phase, it could be the connector unification that all PC and mobile device owners will truly appreciate. [mm](#)



# HOW ARE MOBILE DEVICES CHANGING THE WEB?

Now that we can access the internet on our phones as well as computers, Sarah Dobbs looks at how the web has had to evolve

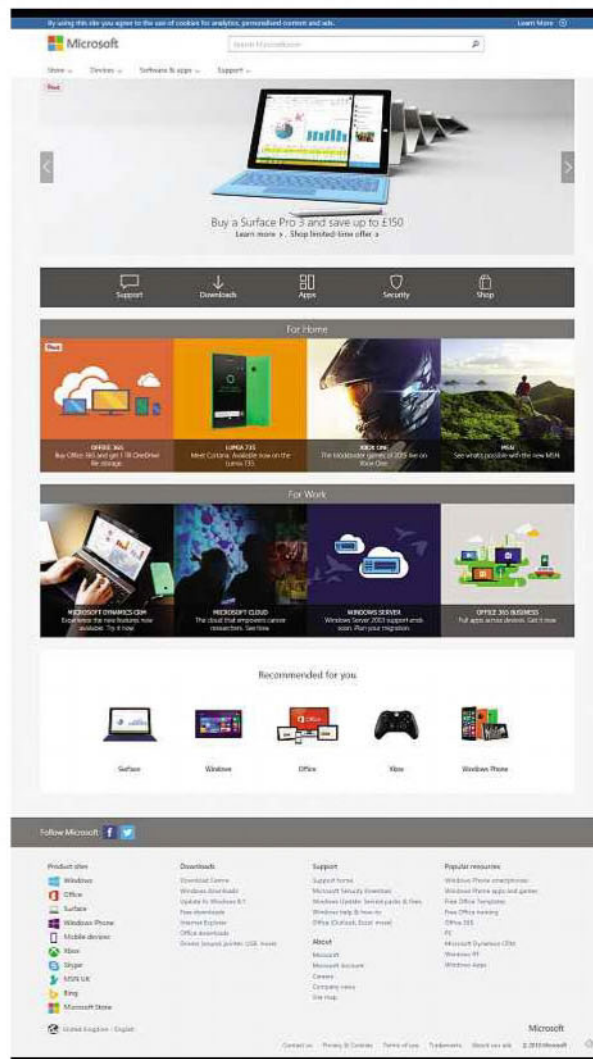
The way we use the internet has changed. Over the past few years, we've stopped heading to our desks to check something online: we just pull out a smartphone or maybe a tablet. Just as laptops came to outnumber desktop PCs, now mobile devices are starting to take over from laptops (at least as far as surfing the web is concerned).

Stats vary depending on who you're talking to, but it looks like approximately a third of traffic to websites now comes from mobile devices – and that number is going up all the time. What does that mean for web developers?

Well, it means their job just got a bit harder. One of the trickiest things to figure out, as a developer, is how to create a website that'll work well on a range of different devices. It was bad enough when you just had to consider an array of different browsers when designing a website – because something that looks great in Firefox might not look as swish in Internet Explorer or Safari, for example – but now that so much traffic is coming from mobile devices, developers have a whole new level of complexity to consider.

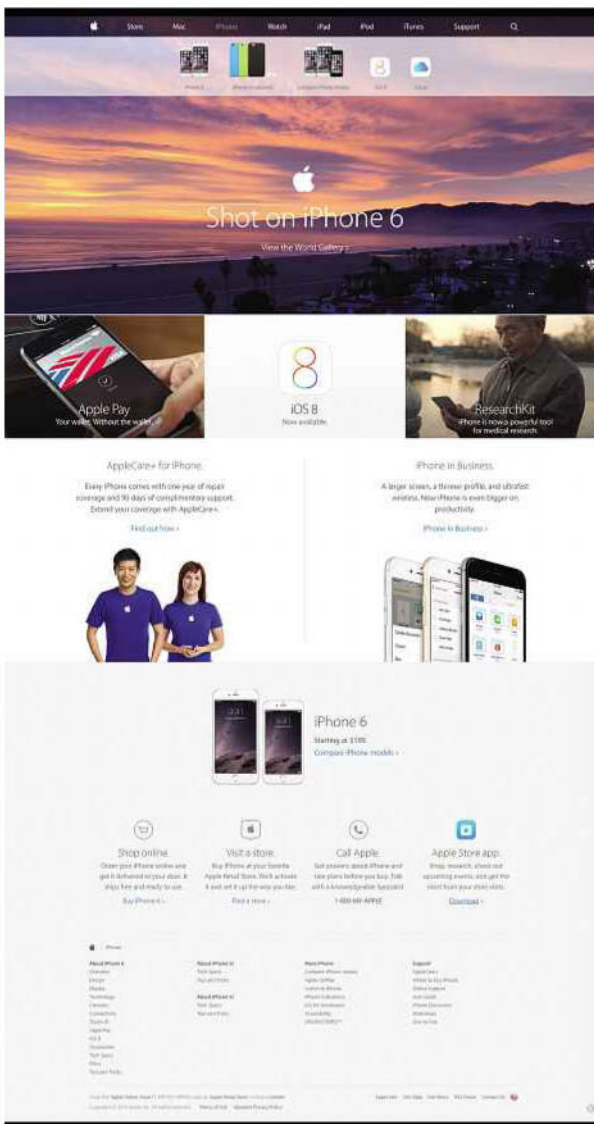
For starters, while laptop and desktop monitors tend to be landscape-oriented, mobile screens are usually held portrait-style. That might be good news, in a way, since sometimes content 'below the fold' (i.e. anything you need to scroll down to see) can be ignored, but on the other hand, sites with wider designs might end up with text that's too small to read. And the definition of 'too small to read' is ever-shifting too, since some people might be looking at your site on a 4.7" HTC One screen, while others are using a 9.7" iPad screen. And things only get trickier from there on in.

But anyone who's decided designing for mobile devices is too tricky to be worth bothering with is about to get a wake-up call, because Google has decided mobile



< This is how Microsoft approaches mobile web design

### ▼ Apple's mobile site



friendliness is an important consideration in web design. It's so important, in fact, that next time Google rejigs its search algorithms, later this month, mobile friendliness is on the list of important criteria. If your site doesn't cater to the mobile design principles Google reckons it should, you're going to find your search ranking plummeting. And since most people don't click past the first page of Google search results (or even scroll past the first three or four results), that could be a serious problem.

Making sure your website is mobile-friendly is pretty important, then. But what does 'mobile-friendly' mean, anyway? And how will this new focus on mobile friendliness affect our experience of surfing the web – from any device?

### Principles Of Mobile Friendliness

If you've tried accessing mobile-unfriendly sites on your phone or tablet, you'll know all too well how annoying they can be. Sites that are perfectly easy to navigate on a big screen with a mouse are suddenly ridiculously fiddly when you're restricted to a smaller screen and your fingertip. Suddenly, many sites seem unreasonably rambling, with vital information tucked away on pages that require three, four or five clicks to get to, when all you

### Google's Mobile Site Design Principles

After hours of research, Google published a white paper on the best principles for mobile website design. Since it includes 25 principles, divided into five sections, we can't print the whole thing here, but here's a summary:

#### • Home Page And Site Navigation

Mobile sites should have short and clear navigation links, with an easy way to get back to the home page, and any important 'calls to action' (i.e. the thing you want people to do on your site, like signing up for an account) should be featured prominently.

#### • Site Search

A search function should be available and placed somewhere obvious, ideally at the top of the home page. And people are even less likely to go through pages of search results on mobile devices than they would be on a desktop, so search results should be relevant.

#### • Commerce And Conversions

This is the most important bit for most websites: you want to make sure it's easy for people to spend their money. Most of us hate signing up for things on our mobiles, so the ability to check out as a guest is useful, as is the ability to use third-party payment systems like PayPal that we've already signed into on our phones. And the ability to save things for later or email them to ourselves to buy when we're back on our main computer is also pretty essential.

#### • Form Entry

Google found people liked it when forms were easy to fill in, so things like number fields that automatically bring up a numerical keypad are handy, as are pop-up calendars for things like date entry. For mobile users, forms should be as simple as possible, asking only for essential info.

#### • Usability And Form Factor

People hate having to use pinch-to-zoom to see details, but at the same time love to be able to see high-res images of things they're considering buying. Also, calling the desktop version the 'full' version confuses people, so call it the desktop or PC version and people are more likely to use the most appropriate version.

(You can download the full thing here: [bit.ly/1BJ6zaE](http://bit.ly/1BJ6zaE); think of this as the cut-out-and-keep version!)

“ Anyone who's decided designing for mobile devices is too tricky to be worth bothering with is about to get a wake-up call ”

wanted to know was the opening times of your local cinema or whether that coat you'd had your eye on is in stock in your nearest store.

Based on our own experiences with badly designed websites, mobile friendliness can be summed up pretty quickly: mobile-friendly sites should be simple, quick to load and easy to navigate.

There's more to it than that, of course. Helpfully, Google has spent lots of time thinking about it, even going so far

as to carry out an extensive study on mobile site design: through 119 hour-long sessions with volunteers, Google came up with 25 design principles that add up to a pretty thorough how-to (see boxout for a summary!).

One particularly interesting thing the Google study turned up was that there are certain things we've come to expect from mobile websites. We've been trained to expect things to work in a certain way, and we're annoyed when they don't work. Here's an example: rather than looking for a 'Home' button to take us back to a website's home page, we tend to tap the logo – which should be in the top left hand corner of every page – and expect it to take us there. That holds true for sites or apps that involve

## “ It's perhaps not surprising that there hasn't been a set of standards universally adopted yet ”

a lot of scrolling down too, like Tumblr or Instagram. If a logo on a web page doesn't return the user to the beginning, Google noticed people got annoyed. And since the last thing most people want is irritated customers, it looks like most sites will end up incorporating this functionality. It's a small thing, maybe, but as mobile devices become even more popular, we're going to see more of these sorts of design defaults popping up.

### What Will This Mean For The Future Of The Web?

At the moment, the mobile web is still a fairly new beast, and some websites deliver content to mobile

devices more effectively than others. There are even sites that end up serving a mixture of mobile and desktop content to users, switching in and out of optimised pages as the user clicks around, which is probably the most annoying experience of them all. But with so many different devices on the market, running different operating systems and different browsers, it's perhaps not surprising that there hasn't been a set of standards universally adopted yet.

It's likely that things will get more cohesive in the future, though, as we've already seen. And although there's no real reason for the design of desktop sites to really change, we're already seeing some of the emerging trends and principles from the mobile web bleed into the existing desktop version of the web.

Take a look at Apple's website, for example. The page elements are laid out in simple, large panels, with clear delineations between them, and short, snappy titles

### How Can You Check Your Site For Mobile Friendliness?

Reckon your website meets all the necessary criteria? You can check how well your site performs with Google's handy mobile-friendly checker, here: [bit.ly/1EVi9R3](http://bit.ly/1EVi9R3).

Just type in your website's URL, and Googlebot will try it out, returning either a verdict of 'awesome' if your site is mobile-friendly, or the less enthusiastic 'not mobile-friendly' if not. If not, it also provides a tick list of things to fix; for example, it might tell you that there are links too close together to be easily navigated by someone using a touchscreen or that your text is too small to be read on a mobile-sized screen.

There's another checker that's worth trying too, and that's Google's PageSpeed Insights, here: [bit.ly/18oQqhi](http://bit.ly/18oQqhi). Again, you just put in your website's address to get a user experience report. This test gives feedback for users accessing your site via a mobile device or a desktop computer, so if there's a huge gulf between the two, you can see exactly what needs sorting out.



Mobile Guide Get Started Documentation Mobile-Friendly Test

## Mobile-Friendly Test

Enter a web page URL

ANALYZE

This test will analyze a URL and report if the page has a mobile-friendly design.

Learn more about the mobile-friendly criteria and how it may affect Google's search results by reading our [blog post](#).

▲ [Google's mobile-friendliness test](#)



▲ The mobile version of WordPress

## “ Some websites deliver content to mobile devices more effectively than others ”

and captions. You can imagine looking at it on a much smaller screen or navigating it on a touchscreen. There are plenty of other examples out there too; the newly designed Spotify website is a good one, as is Microsoft's current website. They all use colour and pictures to draw the visitor through, rather than relying on large blocks of text; they're all easily scalable; they all, if we're honest, kind of remind us of the much-hated Start screen Tiles in Windows 8, which was itself designed to be used on touchscreen devices.

If this is the way the web's going, it's actually pretty good news, not just for those of us who don't enjoy squinting at small screens or getting lost in badly laid out websites. The principles of mobile web design tend to map fairly neatly onto the principles of accessible design, with text

### How Mobiles Took Over: A Timeline

How did we get to the point where we're spending almost as much time staring at the internet on handheld devices as desk-based computers? Here's a potted history:

#### 1996

The first mobile device with internet access was the Nokia 9000 Communicator – if you lived in Finland and were on Sonera or Radiolinja. In the same year, NetHopper, a mobile browser for the Apple Newton PDA was also released.

#### 1999

NTT DoCoMo launched i-mode, a form of mobile internet, in Japan. Meanwhile, Microsoft acquired STNC Ltd, a company working on mobile browsers, and launched Microsoft Mobile Explorer.

#### 2001

Ericsson launched the T68 smartphone, which had a colour display and a basic mobile browser that used WAP to access the internet.

#### 2003

More early smartphones appeared on the market, like the BlackBerry 6210 and the PalmOne Treo.

#### 2005

3G smartphones, including the Nokia 6680 and the HTC Universal, started to appear on the market.

#### 2007

Apple launched the first iPhone and changed the way people thought about using the web on mobiles. No longer clunky and awkward, the first iPhone promised that the web on mobile devices would eventually be slick and intuitive to use.

#### 2009

An early form of 4G became available in Norway and Sweden.

#### 2010

The HTC Evo 4G was the first 4G smartphone to be launched in the US.

#### 2013

Mobile networks started rolling out 4G mobile internet across the UK.

#### 2014

The percentage of people in the UK using mobile phones to access the internet hit 58% – up from 24% in 2010.

at adjustable and easily readable sizes, buttons made big enough and spaced far enough apart that users don't need to be super accurate with their clicks – and straightforward, easily navigable sitemaps. Sounds pretty good to us.

There's one other thing that might end up going the way of the dodo as mobile-friendly design takes over too: downloadable PDFs embedded in websites. No one wants to have to download a PDF ever, but especially not when they're using their smartphone and it's eating up their data allowance. While still retaining a certain amount of scepticism in our cold little hearts, it looks like mobile devices might be a really good thing for the future of web design – for users, at any rate. [mm](#)

# The Best Of Linux App Store

**Keir Thomas** goes fishing for the best catches to be found via the Linux Mint Software Manager ecosystem

Did the open source community invent the app store? Maybe not using that exact terminology but, as with so many things, there's little doubt open source platforms originated the underlying technology and showed big business how things could be done. Debian's package manager, APT, broke fresh ground nearly two decades ago with its unified system designed to get software onto an operating system – including catalogues of software, complete with descriptions that could be searched. Indeed, APT still serves as an example today, and Ubuntu's subsequent rise to Linux desktop dominance couldn't have happened if it wasn't for the ease of installing software via Synaptic, which simply provides a GUI front-end for APT.

In recent years open source software management has evolved yet again and on most popular distributions you'll now find software managers akin to the app stores found on proprietary platforms. These do two things above and beyond mere package manager GUIs of old: they hide the mechanics of installation so the user simply sees little more than a progress bar, and they editorialise apps just like any other app store. You'll find full descriptions of the most popular apps, for example, and even screenshots. This is far better than the single sentence/paragraph that used to accompany apps in the old days, and lets you see what you're getting before clicking the install button.

Below we take a look at eight gems found via the Software Manager app included with Linux Mint, which is arguably the most popular desktop version of Linux in use today. We're interested in GUI apps, rather than command-line, and also in system apps that simply make life easier.

We used the latest version of Mint throughout, specifically 17.1 Rebecca. However, most (if not all) of the software discussed is available via the software/package managers of other distros such as Ubuntu or SUSE, or via earlier releases of Linux Mint.

## FontMatrix

Even just ten years ago the idea of a dedicated font manager app for Linux seemed unlikely, but FontMatrix is just one of a handful of offerings now available. Like similar tools on other operating systems, the app aims to work as both a font manager and sampler, allowing you to add and manage fonts (including grouping them together for ease of installation/removal), and also sample them to see if they're right for the task at hand.

The app opens to a list of installed fonts and double-clicking any opens sample text for viewing. This can be changed to anything of your choosing via the Samples pop-up list at the bottom of the screen. You can also switch to viewing a chart of glyphs or technical information about the font. Clicking the Playground option on the View menu opens a proto-text editor into which you can type to sample the font live, and there's even a print option.

The Activation tab, which is visible when you're viewing a font, lets you turn

the font on or off, and fonts can also be tagged for ease of searching.

Clicking File > Export Font Book will output a font sample PDF, which you can then print out for quick reference. What's more, the inverse option (found on the Service menu), Find a Font Using Raster Sample, lets you identify a font from a scan or screenshot. Now that's a neat feature!

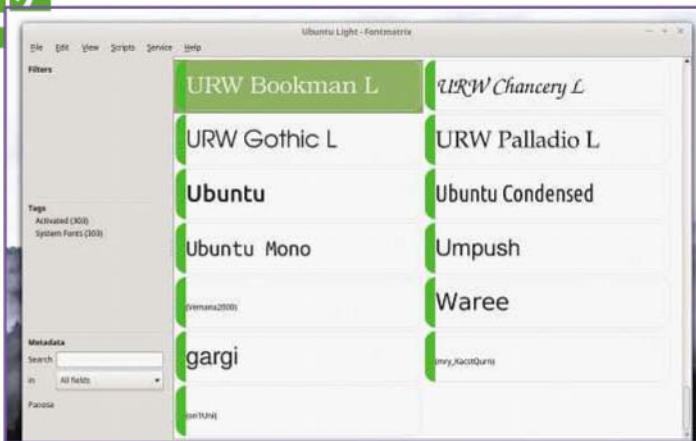
This only scratches the surface of what's on offer in FontMatrix, which is also available for Windows and Mac. It would certainly be pushing it to describe it as an app that's entirely user-friendly, but there's no getting around the fact that the managing of fonts requires some knowledge and is inherently non-trivial.

## WinFF

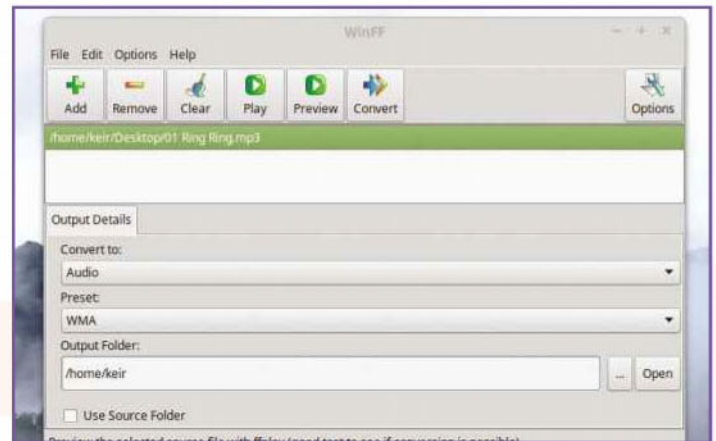
Open source multimedia has come on leaps and bounds thanks in no small part to frameworks like ffmpeg and avconv. However, while offering Swiss Army Knife-like abilities to do just about anything, you still need to understand the technology and also be a wiz at the command line to do just about anything with such tools.

WinFF, however, is a graphical front-end for media conversion via ffmpeg and avconv. Even more usefully, though, it contains presets that (at least according to the developers) aim to hit the 'sweet spot' for each individual codec. In other words,

“ **Open-source software management has evolved, and on most popular distros you'll find software managers akin to the app stores found on proprietary platforms** ”



▲ **FontMatrix** is a powerful font manager and sampling tool that brings full control over typefaces to the Linux desktop



▲ **WinFF** lets you convert just about any audio or video file, using readymade presets that hit a sweet spot of quality and file size

they aim to provide the best quality, while also keeping an eye on file size. Should you want or need to, however, you can click the Options button to tweak things to suit your individual requirements.

First things first, however: to get the most out of the app you'll need to install libavcodec-extra alongside it. This is also offered by Mint Software Manager, though.

Once installed, using the app is a matter of selecting what type of file you want to create via the conversion – everything from basic audio and video are listed, to device-specific output types such as Android (or even BlackBerry) – and then selecting the preset type. Then just drag the file onto the window, click the Preview button to do a dry run to see if the conversion actually works, and then click the Convert button to output the file.

Linux desktop apps have to balance on a knife edge between the simplicity inherent in a non-command-line app, yet also offer the power and range power users demand. Arguably, WinFF ticks all the

necessary boxes and should be considered a mandatory installation.

### Artha

It's often the small apps that make using an operating system so much more productive and Artha is an excellent example. Chiefly it's a dictionary and thesaurus app that contains an offline copy of the excellent WordNet database created at Princeton University. Just type into the Query field the word you're interested in (an approximation usually does the trick if you can't spell it, though) and you'll see a definition of the word at the top of the Artha window and synonyms, derivatives, 'kind of', 'kinds', and other types of thesaurus look-ups below. You can even use regular expressions if you want to look up parts of words – useful when you're stuck doing a crossword, for example – although this also requires the installation of the wordnet-sense-index package.

Handily, Artha quits to the system tray, where it remains ready for use at any

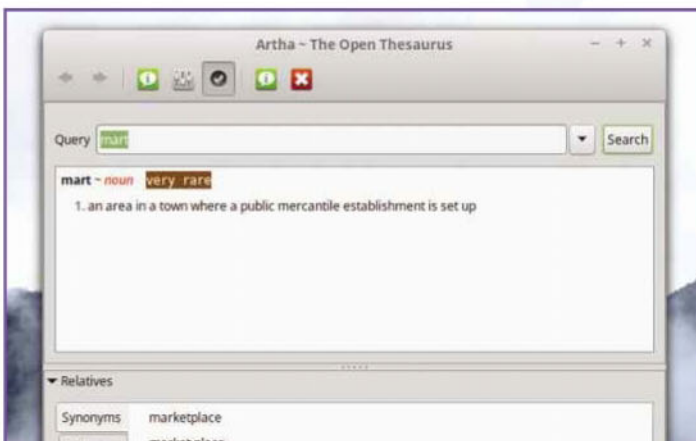
time. This means it's able to be summoned into action by a hotkey combination (the default being Ctrl+Alt+W), which lets you select a word in any other app and tap it in order to automatically activate Artha as a pop-up window, with the definition and thesaurus look-up shown.

Backwards and forwards buttons at the top left of the window let you move through your look-up history, and are the icing on the cake of a very useful and surprisingly powerful app.

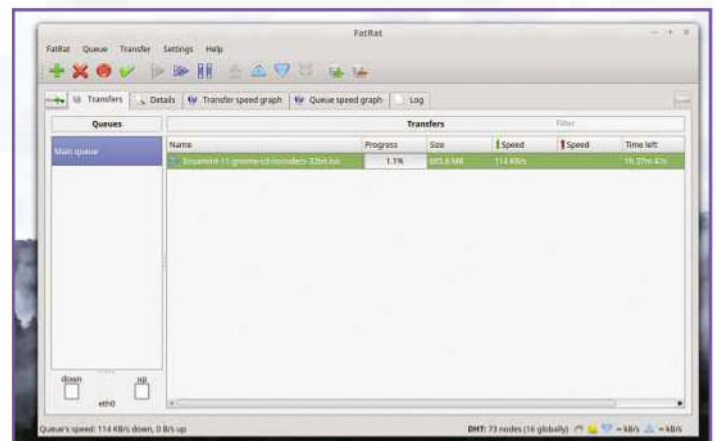
### FatRat

If you're going to use a download manager to optimise online file grabbing then it makes sense to use one that's fully featured, and with FatRat it might be quicker to mention things it can't do rather than what it can. Out of the box it supports HTTP and FTP downloads, along with BitTorrent, but a plugin structure (click Settings > Extensions) expands support to various popular websites like YouTube, DailyMotion and many more.

▼ **Artha** is a combined dictionary and thesaurus app that lets you perform look-ups from just about any other app



▼ **FatRat** is a comprehensive download manager that will grab just about any file from any location online



The app can be used in a variety of ways but arguably the easiest method is to click FatRat > Display the Drop-Box, which adds a floating icon to the desktop onto which file links can be dragged and dropped from browser windows. Leave this in a corner of the screen and FatRat is essentially always accessible. Alternatively, you can open the app and click the Add button to manually add download URLs, or activate the clipboard monitor feature via the Settings menu that will automatically sense any downloadable URLs that you copy to it.

FatRat can also monitor website RSS feeds for links, by which certain websites let you know when new downloads are available to grab.

Like similar apps FatRat offers a number of remote control options, including via a web interface (including HTTPS for security) and via Jabber chat. Download and uploads can be throttled, and also scheduled, again via the Settings app.

There's little doubt that FatRat is all you'll ever need when it comes to downloading. We were a little sad to see that some of the plugins are out of date, but this didn't really detract from the sheer usefulness of the app.

## KeePassX

In our modern security climate password managers are to be considered mandatory rather than optional, and KeePassX ticks most boxes Linux users require: it's open source and uses the same open source database technology as the popular KeePass Password Safe for Windows, so therefore uses 256-bit AES (Rijndael) or Twofish encryption. It also stores your password data locally rather than online.

KeePassX is also mercifully simple to use even if you haven't used similar apps in the past. Upon running the app for the first time the first step is to create a database, which can be done via the File menu. Databases can be protected by passwords/phrases, and/or via a key file that KeePassX will generate for you. You should then click File > Save to write the database to disk, before adding new entries by clicking Entries > Add New Entry. Passwords can be generated from within KeePassX and a very neat feature is that they're obscured by asterisks, meaning that you never see them – useful protection against the risk of root kits or even somebody looking over your shoulder.

Entries can be grouped for ease of organisation too. Alas, there isn't a quick

and easy browser plugin for KeePassX, but the Auto-Type feature is just as good and can autocomplete passwords on a keystroke that you set within the app (more details can be found in the KeePassX handbook, available on the Help menu). Using Auto-Type rather than a browser plugin has the advantage that you can also enter your passwords into apps other than browsers, such as email clients.

KeePassX is an impressive, yet ultimately easy-to-use application, that we – again – think should be considered a mandatory addition to any Linux setup.

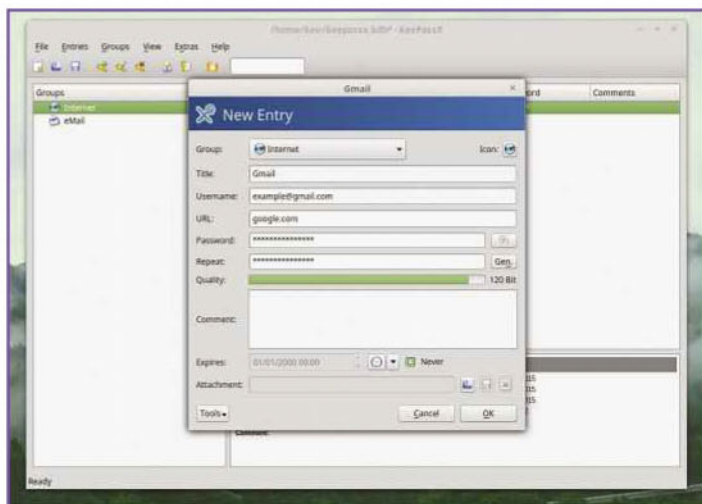
## FSlint

The field of duplicate file detection has been surprisingly fruitful for app developers on other operating system platforms. The promise does seem inviting: by removing identical files you've cloned without realising, such as photos or videos, you can potentially recover gigabytes of disk space. FSlint – short for File System Lint – brings this feature to Linux, along with a handful of other useful file system scanning tools that can help correct errors and generally ensure your system functions without hiccoughs.

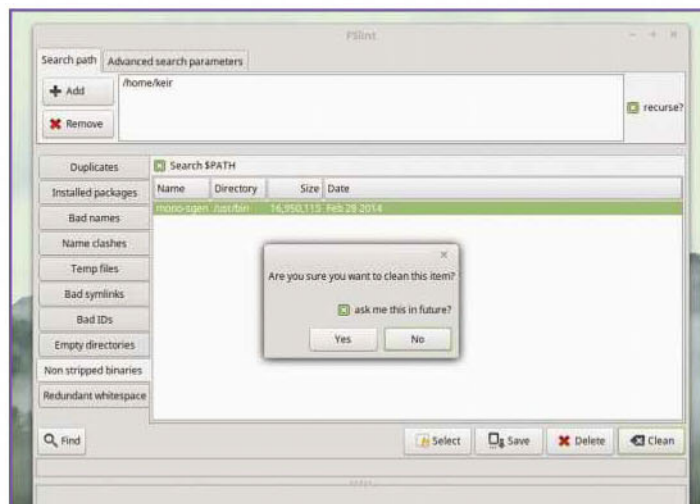
Using the app is simply a matter of selecting the type of scan you want from the tabbed list at the left, and then clicking the Find button underneath. In addition to finding duplicate files, FSlint can also create a list of installed packages (useful for seeing if any space can be freed up by uninstalling), as well as scanning for bad names (those with @ in them, for example), name clashes (files with identical names yet different contents), temp files, bad symlinks (links that point to files that

# “ KeePassX ticks most boxes Linux users require: it's open source and uses the same open source database technology as the popular KeePass Password Safe ”

▼ KeePassX is a strong password manager that manages to be easy to use and provide a core set of useful functions



▼ FSlint can remove file system cruft to free space as well as scan for common errors and problems





have been deleted), bad IDs (files with invalid owner info), empty directories, non-stripped binaries (files that still include debugging info and are therefore larger than needed), and redundant whitespaces (spaces and/or tabs in filenames).

Results are shown in a list in the main app window, and buttons beneath offer a variety of clean-up options, including deleting and making a copy of the file in order to see if it really is possible to remove it without causing damage.

FSlint is powerful and shouldn't be used without forethought, but it's also incredibly and uniquely useful and provides access to functionality formerly off limits to those without serious command line chops.

### UltraCopier

A swap-in replacement for the file manager copy system, UltraCopier aims to provide control over and information about all types of file copy procedure. Although usable as a standalone app, getting the most from UltraCopier involves integrating it with the Nemo file browser, which also means adding in and setting up a third-party script available from [github.com/lestage/Nemo-UltraCopier](#). There you'll also find instructions on using the script, which is pretty simple and only needs to be done once.

Once these steps have been undertaken, copying any files to the clipboard and then attempting to paste them via right-clicking will show an additional option: Paste with UltraCopier. This will then show the UltraCopier monitor and dialogue box with additional features (principally including better error and collision management) – in addition to the usual opportunity to

“ Linux has always been about providing power over your system, but it's terrific to see apps like UltraCopier bring this kind of usefulness to the GUI ”

skip or overwrite existing files, you can choose to rename them, for example, and can even click to have UltraCopier suggest a new name.

UltraCopier claims to be faster than most built-in copying engines too, and offers a settings panel that gives control over just about every aspect – if you've ever wanted to control how much memory is used as a buffer when copying files, well now you can!

Even better is the ability to resume failed copying procedures. So, should you accidentally yank out a USB stick mid-copy (for example), then you can pick up the procedure as soon as you insert it again.

Linux has always been about providing power over your system, but it's terrific to see apps like UltraCopier bring this kind of usefulness to the GUI, rather than just the command line.

### Pingus

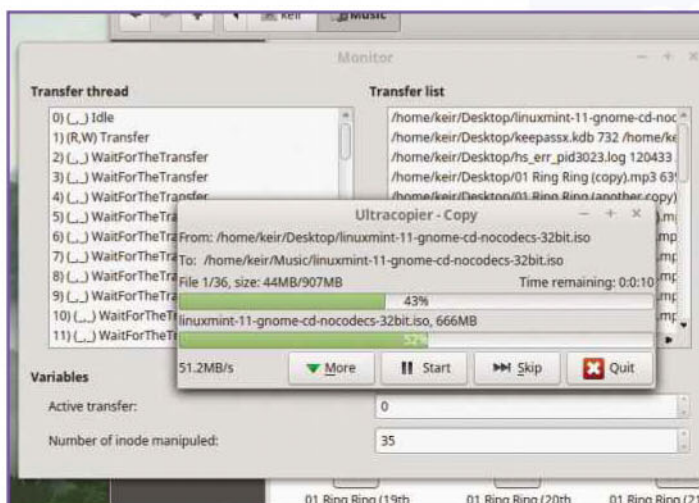
If we could have back the amount of time spent playing *Lemmings* in the early nineties, then we'd probably currently have an extra year or two in hand. We're also fairly sure it's why our grades were so bad at college. *Lemmings* has followed us onto the Linux platform in the form of Pingus. Although the graphics are much

better than the original, the developers have been savvy enough to change little else – meaning that this is essentially a fully functional clone of the time-sapping original, albeit with new and original level designs to challenge the veteran gamer.

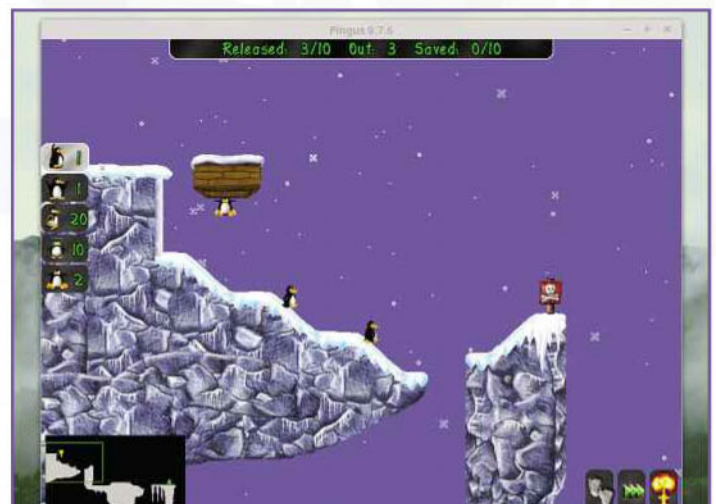
The story, such as it is, concerns global warming forcing the penguins to move their habitat – a process that, wouldn't you know, involves a significant amount of digging, floating, parachuting, and more. The better graphical touches add up to a make it a slightly slightly easier game, inasmuch as you can easily see at glance which of your pingus you've equipped with which gadgets, for example. Nonetheless, there's still the familiar feeling of panic as you try to equip 50 of the little beasts with the right equipment, and still the same sense of glee when you decide to give up and nuke them all. There are lots of levels provided out of the box, with more available online, and you can also design your own levels via a WYSIWYG drag-and-drop editor. The latter is ideal if you want to create a handful of easy levels for younger children to learn the concepts of the game with.

Pingus is a terrific remake of the original, and solid both in terms of the action offered as well as the stability and maturity of the software. [mm](#)

▼ *UltraCopier is a swap-in replacement for the GUI system file copy function, and provides more speed as well as significant additional functionality*



▼ *Pingus brings an authentic Lemmings experience to your PC, just in case you have too much free time*



# Remembering...

## Windows ME

### Not all technology memories are happy ones

**W**indows 8.1 has a lot of users in a flap over its tiles, style and the way it works. It's different, but it does work and it's pretty quick as well.

Windows Vista, the last 'bad' operating system from Microsoft, was met with pretty much the same scorn. But once you apply a service pack or two and a few updates, and if you take a moment to tweak behind the scenes, Vista actually becomes a half-decent OS.

Before 8.1 and Vista, though, was something far worse. An operating system that Microsoft would really want to brush under the rug once and for all and, in the process, wipe everyone's memory of such a thing ever happening. That OS is, of course, the ill-fated Windows ME. But it can't be all that bad, can it?

#### Its History

Windows ME (Millennium Edition – or Mistake Edition) started life on September 14th 2000, as a follow-up to the incredibly good Windows 98 SE.

ME was supposed to be the one OS to finally bridge the gap between consumer editions of Windows and the business stability of the NT kernel. Unfortunately, things didn't go quite to plan, and the connecting project, which would have brought the NT code into the mainstream consumer systems, was eventually dumped. Interestingly, the code that was worked on would eventually be used once more in the Whistler project, which ultimately became Windows XP.

Windows ME, despite being rushed to the shelves, did promise a better overall system than the current consumer edition, Windows 98SE. Microsoft bragged about faster boot times, better support for the emerging USB devices, better support for scanners and printers, better support for online connectivity and collaboration as well as network technologies, improved power management, and far better media resources. What the users got, though, was something rather different.

Windows ME was plagued with problems from the moment you put the disc in the drive. The installation routine was buggy, the initial setup was buggy, the initial login was buggy. If you somehow managed to escape the Blue Screen of Death during the setup, then you would soon discover an operating system that crashed randomly, didn't install the right drivers and somehow managed to wipe and corrupt software that was installed on another drive.



#### Did You Know...

- The project that would bridge the NT and consumer gap was called Neptune, which was dropped but the code eventually used for Whistler.
- An entire consumer help department was launched at the same time as Windows ME, entitled, 'It just works'. According to internet legend, the department's phones were unplugged after just two days of being active due to the volume of complaints.
- ME was Windows version 4.90 built on top of DOS 8.00.
- There was a hack released that allowed you to boot into real DOS mode.

After only a year of being made available, the plug was pulled on ME, and it was quickly replaced by the immensely better Windows XP. Microsoft then did the digital equivalent of taking the failed OS out into the desert and introduced it to the business end of a loaded gun.

#### The Good

Nope, we couldn't think of anything either.

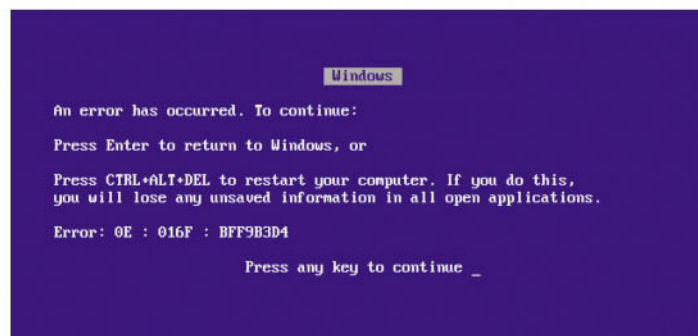
#### The Bad

There really isn't enough room for this section, but we think a quote from the Urban Dictionary says it best: "If someone IMs me, Windows ME crashes. If I open a web page, Windows ME crashes. If the phone rings, Windows ME crashes. If a butterfly lands on a flower in the rainforest, Windows ME crashes."

#### Conclusion

If you're too young to remember Windows ME, and you've been complaining excessively about how different Windows 8.1 is, then I heartily recommend you launch a virtual machine and find a copy of ME to install. You'd be surprised how after just a minute or two of using ME, you'll soon start singing the praises of 8.1.

Windows ME, Microsoft's bad memory. At least you provided us with a laugh for a year or so. **mm**



▲ Due to the number of times Me crashed, this may as well be official desktop wallpaper

< Windows ME: what on earth were you thinking Microsoft?

# The Things That Frustrate Us About... Mice

We've been using them so long they're basically extensions of our right hands, but sometimes we could throw our computer mice out of the window

**D**o you remember the first time you used a computer mouse? How strange it felt to control a moving cursor across a computer screen by moving a piece of plastic around on your desktop? It's weird to think about it now, because mice are so common that, well... you don't have to think about it. It's second nature.

Like everything, though, we sometimes get annoyed when our mice don't do quite what we expect them to do. The cursor skips, or an unintentional click does something we didn't mean to do, and it's just irritating.

Still, we're still not ready to swap over to the infinitely more aggravating trackpads, so for now we're stuck with our mice and all their quirks. Like these irritations...

## Bah! Too Slow!

If you find yourself picking up your mouse and moving it to the other side of the mouse pad so you can scroll further across the screen, you'll know this problem. The cursor just doesn't move far or fast enough and you feel like you need a mousepad the size of a dinner table to get it to respond properly. Luckily, this should be easily fixable.

**Fix it:** This, and the opposite (too much sensitivity making your cursor seem skittery and forcing you to struggle to get it in the right place to click on things), can usually be sorted by tweaking settings. If you're using Windows, go to the Control Panel, then Hardware And Sound, and Mouse. Here you can adjust the speed – it might be worth tweaking the wheel settings, too, if they're not what you want. If that doesn't work, try cleaning the underside of your mouse; dust and fluff can make it pretty unresponsive!

## Ack! Jumping Cursors!

This is the other main issue you're likely to face – a mouse with a mind of its own making the cursor jump around when you're not even touching it, or moving from where you want to click and making everything hard work.

**Fix it:** This might be another cleaning issue, so try that first. If it's still doing it, it might just be too sensitive to the surface you're using it on; try it on a new mouse pad or a clean, slightly textured (but not erratically so) surface and it should calm down.

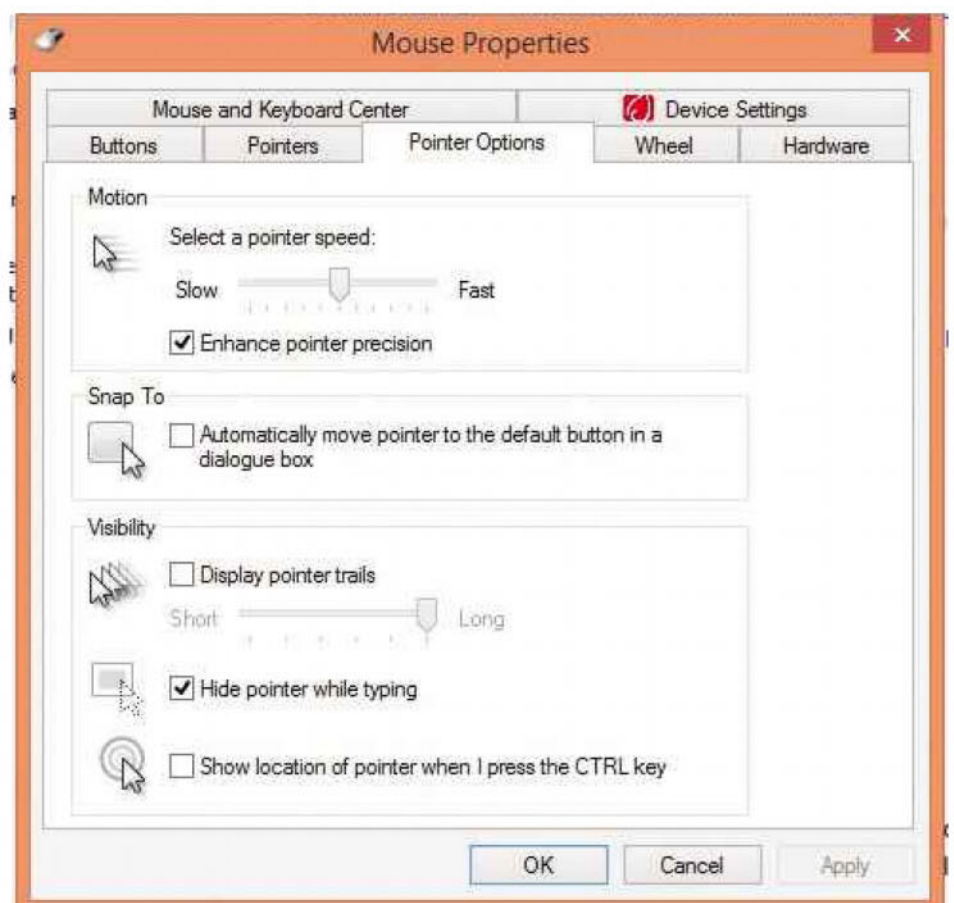
## Nrgh! Not All Mice!

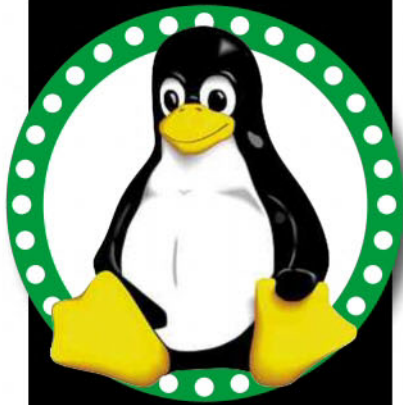
Most of us probably use one mouse on a daily basis, or maybe two, with one at home and one at the office. So we get used to them: how they fit into our hands, where any special buttons are, and how sensitive they are. So there is nothing more frustrating than having to use a different

mouse – suddenly, it's like you've forgotten how to use a computer. The cursor moves more quickly or slowly than you're used to, and your hand won't sit comfortably on the thing, and the temptation to smash the thing into the desk is overwhelming.

The worst case scenario? Going from a PC to a Mac, or vice versa. How do Apple mice even work, and why are they like that? Argh!

**Fix it:** Unfortunately you either have to get used to the new mouse or just wait until you get home and everything works properly again. **mm**





David Hayward has been using Linux since Red Hat 2.0 in schools, businesses and at home, which either makes him very knowledgeable or a glutton for extreme punishment

# Linux

## The Future Of Linux

Where do you see the mighty penguin going in the coming years?

Since I asked "What do you use Linux for?", we've had a number of great replies, and proof that Linux is valued in the homes of countless users, no matter what their skill level and experience with technology. Now though – and because you all kindly took the time to reply – I'd like to pose another question to you kind, and knowledgeable folk. What are your future predictions for Linux over the next five years?

Five years doesn't sound like a lot of time, but when you stop to consider what advanced in technology we've had over the last five years – in particular with Linux, then you begin to wonder just what's around the corner and what other tricks Linux has up its metaphorical sleeves.

For example, do you see Linux moving more into the mobile market? Will there be an all-encompassing tablet version of Linux – and I don't mean Android, I mean a 'true' Linux desktop variant?

Although you can install many distributions on an x86 tablet, and have it work well enough, there are still vast sections of the mobile technology that

doesn't work yet. Could there eventually be a Linux distro that can beat Android?

Also, what about the desktop environment? Do you see it staying more or less the same, visually improving things that are already present, or do you think Gnome, KDE, and so on may eventually start to mimic a Windows 8.1 style interface – again something more tablet driven, as opposed to desktop orientated?

And what of gaming? Will the Valve Steam Machines finally make it to the consumer level in such a way that the console kings start to get a little sweaty in their air-conditioned offices? Will the hardware developers realise that Linux is the next great gaming OS, and focus the latest driver innovations in its direction, perhaps?

Education is a sector that Linux excels in, but where it has so far never really been used to its full potential. Who knows, perhaps the next government will usher in a Linux in schools policy to help drive down costs and improve open source thinking in the next generation? What do you

think? Could a suite full of Linux run PCs help educate more than the current suite of Windows machines, and will Linux ever get a fair shot at proving itself?

And finally, what distros do you think will top the bill of household installations in the years to come? Will Canonical re-focus Ubuntu and make it the best distro for all range of skills and user tastes? Will Mint continue to grow even more in popularity and become the dominant distro of the future, more so than it seems to be now. Or will there be a relatively new distro, one that you may use, that comes to the forefront and takes the lead?

### Questions, Questions, Questions...

Of course, things may well stay the same – but that's never been the Linux philosophy, has it? Linux has evolved over the years to become more than just an OS for the advanced computer user; it has evolved to include more technology than just a standard desktop PC needs too.

This evolution is what makes Linux great, and it's what feeds the enthusiast to discover even greater things, and to accomplish and learn more about what can be done with it. So if you have a moment, please send us in your thoughts as to where you see Linux evolving into over the next five years.

There's a lot of ground for Linux to cover in that period of time, but I think it'll shine given the right opportunities.

< *What does the next five years hold for Linux? Tell us, if you think you know*



# No Time For Excitement

**Craig Grannell's not feeling the thrill of Apple Watch  
– maybe apps will help**

**A**t the time of writing, nearly a week has passed since I pre-ordered an Apple Watch. I was sat in front of my computer at eight on the dot, ready to fire money at Apple's electronic cash pit, knowing full-well how rapidly the company's new device would sell out of its relatively meagre initial supplies. As expected, the Apple website responded much like a sloth on sleeping pills, only eventually rumbling into action when many Apple Watch options were already lumbered with delivery dates stretching well into the summer.

Fortunately, I'd by that point already ordered using the iPhone Apple Store app, subsequently dwelling for a few moments that plenty of people have no idea about this option, before stumbling towards the kitchen for something to keep me awake beyond sheer adrenaline. Truth be told, though, it's not like there was a lot of adrenaline to be had. This was a transaction practically bereft of excitement, and I'm still not overly thrilled about the prospect of Apple Watch. Perhaps when you read this (by which point my order should have arrived), I'll be a convert, but it's still hard to

know precisely how this new device is going to fit into my life.

To be fair, I've been here before. While the iPhone was something of a no-brainer for me (even if I had no idea just how much I'd end up using it), the iPad was something that I bought specifically for work. I'd lined up a couple of big projects that were totally reliant on me either owning Apple's tablet or doing a remarkable amount of lying in print; I went for the option that erred on the side of caution, integrity, and not getting fired. Very quickly, though, the iPad became something I used regularly, for surfing the web, gaming, making music, and more. It eradicated the need for a laptop, and ably filled a tech hole in my life.

With Apple Watch, though, it's hard to see the use-cases. I work from home, and so location-awareness won't much be a thing; I don't care for health-tracking (which is just another thing to get stressed about); notifications can take a running jump and, perhaps the biggest issue of all, I haven't actually worn a watch for well over a decade.

I get the device's appeal for people who are a bit more sporty, significantly more business-like, or

very much more likely to get lost when on their travels. If your life is lived on tight schedules, having notifications on your wrist rather than having to fish about for some other device, will be a boon – and if you're zooming down a mountainside, glancing at a watch will beat trying to get at your stats on a smartphone. However, when it comes to the general populace, right now Apple Watch feels very much like a device looking for a reason to exist.

My suspicion is that it'll live or die on the apps that make use of it; they're what made the iPhone what it was – a phenomenon that impacted on everything else in mobile, from Android through to the iPad. Without third-party apps, Apple Watch is merely a nice trinket with some handy built-in toys from Apple. Once developers actually get their hands on Apple Watch and figure out how to make the most of it, though, we could see some really innovative and essential ideas arrive. This could potentially turn a nice-to-have device into a must-have – and could finally make me excited about owning the thing I've already bought.

▼ *Apple Watch is very shiny, but only apps will make it useful.*



**Craig Grannell is a writer, designer, occasional musician and permanent loudmouth. He's owned Macs since 1996, when Apple was facing certain doom, and is therefore pleasantly surprised by its current success. Find Craig on Twitter at @craiggrannell**

# Mac



Ian is a professional IT analyst, a semi-professional writer and a pretty amateur electronic musician. He likes gadgetry and loves making gadgets do things they were never designed to do

# Mobile

# Crossing The Divide

With Halo's appearance on iOS, Ian McGurren looks at some of the better console to mobile ports

An undoubted jewel in Microsoft's gaming crown, *Halo* is pretty much synonymous with the Xbox brand. A bona fide AAA gaming franchise that has remained exclusive to Microsoft platforms since being tempted away from Apple's Macintosh at the turn of the century. If you wanted to play *Halo*, you had to own something with Microsoft's name on it, be it an Xbox, a Windows PC or even a Windows Phone handset. That is until recently, when (in a full 180° turnabout) *Halo* finally popped up on an Apple platform, albeit in a slightly changed format.

It isn't the only console-based intellectual property that's made the jump to mobile, however; here are a few more of the best.

## Hitman GO

Like many console to mobile games, *Hitman GO* is not a port of a game already in existence, but a new game with the same character or set in the same universe. *Hitman GO* keeps the standard *Hitman* setup – *Agent 47* and stealthy 'hits' – but, like most mobile versions, it tailors the gameplay into bitesize chunks for on-the-go play, and for touchscreen interaction. It's the games that do this

that make the most successful transitions, and *Hitman GO* is certainly one of them. Here, it's by turning the usual *Hitman* ideas into a puzzle game that it proves a success, while keeping the basic premise intact.

## Run Sackboy! Run!

As *Halo* is for Microsoft, *LittleBigPlanet* is one of Sony's more successful PlayStation franchises, and its hero, the loveable Sackboy, is one of gaming's most memorable characters. Each of the *LBP* titles on the various PlayStation platforms has been standard – if very, very well made – platforming fare, but on his move to mobile, Sony has decided to instead transplant the little rag doll hero into a mobile staple – the endless runner. Given how a platformer lives and dies on its controls, and touchscreens aren't known for being platforming friendly, it's a good choice, especially as the end result is pretty decent. Shame about the in-app purchases though...

## Skylanders: Trap Team

If there was to be a title to really push up against the console/mobile boundary, not many would have had *Skylanders* as

their first choice. However, it this title that should cause the console world the most concern, as here we have the previously console-only title transfer lock, stock and hardware barrel onto Android and iOS platforms. The game itself is fine, one of the first to make use of NFC chip-equipped collectable figures to 'enhance' gameplay, but more than that, the game is a clear signal that the gap between mobiles and consoles is shrinking at a very fast rate.

## Need for Speed: Most Wanted

Lastly, it's one of the best racers on mobile platforms, based on one of the best racers on consoles – *Need For Speed – Most Wanted*. Strangely, while the console version is a free roaming driving game, a less powerful mobile platform has presumably limited its incarnation to a straightforward arcade racer. This does work in its favour though, as *NFS:MW* is superb, with well weighted handling, broad courses and great graphics. It's starting to show its age (it was released in 2012), but it is still the closest the platform has come to a *Ridge Racer* rival and doesn't have any in-app purchases ruining it. Frequently appearing for 79p, if you don't have it, it's nearly essential.

For ages, cross-pollination between console and mobile was seen as unlikely as Nintendo going mobile. As time has passed and as the amount of money that the mobile gaming market is worth grows exponentially, it's clear that the two are starting to meld together. With Nintendo seeming to intimate that their next console will be mobile driven, and with Microsoft bringing its jewels, mobile gaming may finally be gaining the respectability it deserves.



# Router Ruminations — Part Two

Andrew Unsworth speaks of the wonderful things a modern router can do

Last week I mentioned that modern routers can do a lot more than get you onto the internet wirelessly. Modern routers let you control access to certain websites and even the internet itself. They can provide guest networks so that your friends can log onto your router to access the internet but not take liberties by logging onto other computers or “borrowing” music from your NAS without permission. You can also attach USB flash drives so that you can share tunes, photos or anything else across your network, or share a local USB printer.

Some manufacturers, such as D-Link, make it easy to access the content of a USB flash drive

attached to the router across the internet. This is handy if you don't want to clog your phone up with photos but still want to be able to bore your mates with your holiday snaps when you turn up at their house unannounced.

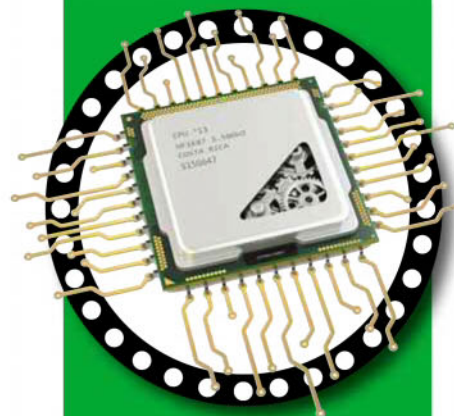
Router manufacturers are pumping their routers full of these features in an attempt to add value, but in the last few years they've also made a real effort to make their routers much easier to use, even for the casual user. Take AVM ([tinyurl.com/pa2ktow](http://tinyurl.com/pa2ktow)), for example. We in the tech press have long liked the web interfaces on AVM's Fritz!Box devices due to their clean, uncluttered layout, meaningful help and handy setup wizards.

They also commonly have special telephony features, and many models also let you use the router as a DECT base station for compatible DECT telephone handsets.

Take the AVM Fritz!Box 3490 for example. It's an ADSL router with four Gigabit Ethernet ports, simultaneous 2.4GHz and 5GHz wi-fi networks and two USB 3.0 ports. The 3490 supports 802.11ac wi-fi, so you'll be able to access faster wi-fi speeds if you connect to the 3490 with a 802.11ac-compatible device. One neat feature is the ability to see which channels are being used by other routers in your immediate vicinity. This information is presented as a graph, and you can then use it to switch to a different, vacant channel to improve the quality of your wi-fi network. It's this neatness and ease of use that makes FritzOs, the name of the web interface used by Fritz!Boxes, so well-loved among those who have used it.

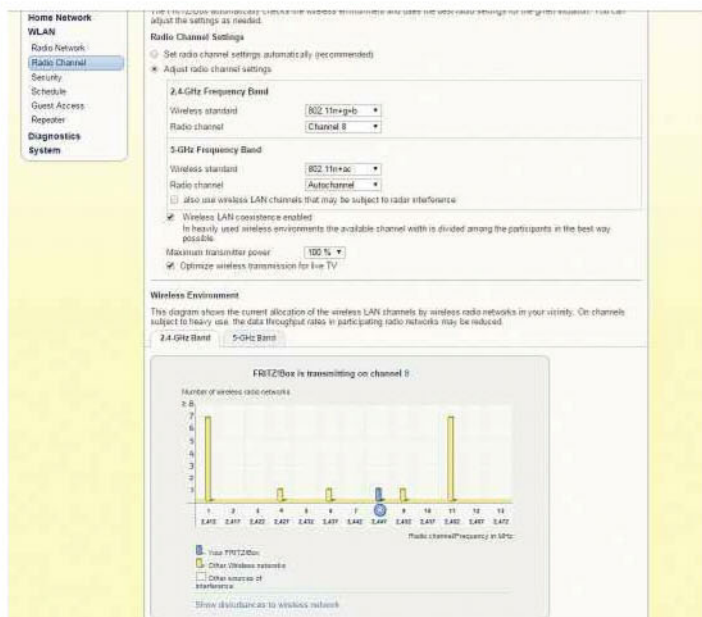
However, even if you have a basic ISP-supplied router, the chances are that there are some high-level features on it. The BT HomeHub 4, for instance, lets you configure Port Forwarding, which lets a computer on your local network communicate with computers outside of the local network. This feature is commonly used by gamers who want to run a gaming server that can be accessed outside of their local network, to give one example. Next week, I'll show you how you can attach a USB Flash drive to a BT HomeHub 4 to use it as network-attached storage.

< Fritz!Box devices offer easy to use GUIs



Andrew Unsworth has been writing about technology for several years, he's handy with a spanner, and his handshaking skills are second to none

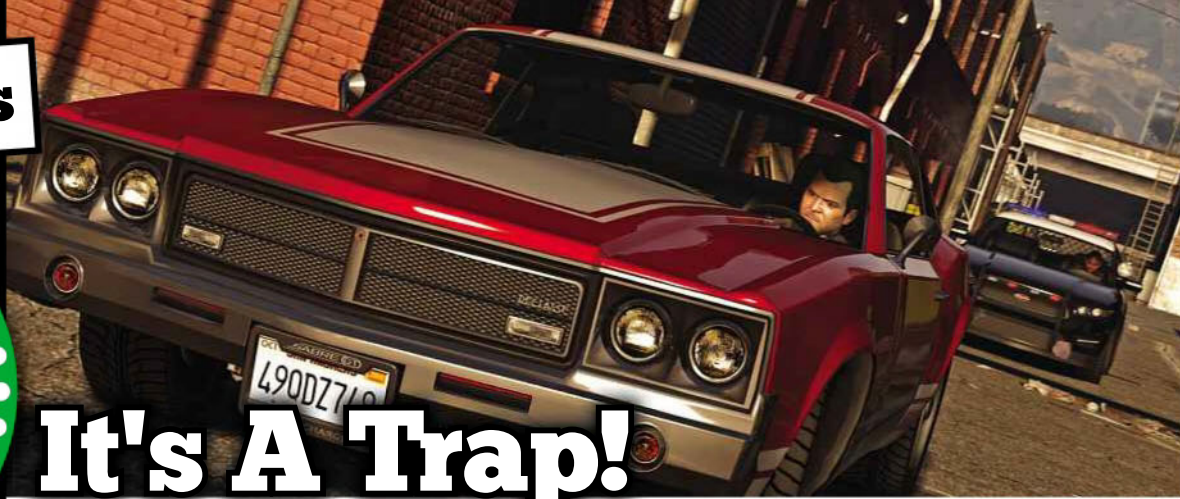
“ Router manufacturers are pumping their devices full of these features ”



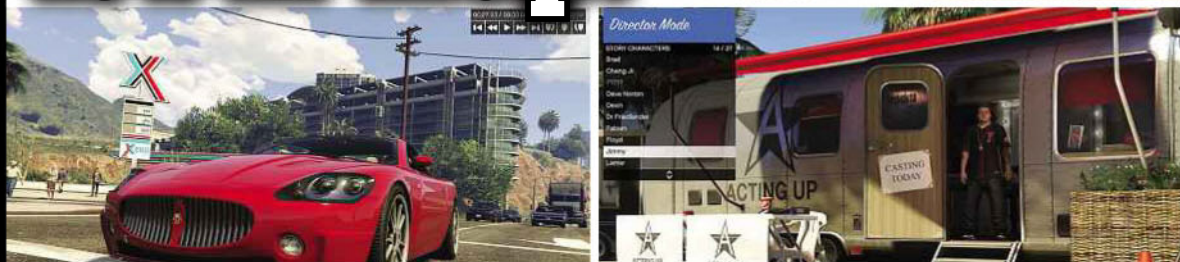
# Hardware



Ryan Lambie has loved videogames since he first stared up in awe at a *Galaxian* arcade cabinet in his local chip shop. 28 years on, Ryan writes about gaming for Micro Mart. He's still addicted to chips and still useless at *Galaxian*



## It's A Trap!



The PC port of *GTA V* is arguably the definitive version, with its improved graphics, exclusive Rockstar Editor and Open IV mod tools

This week, Ryan takes a look at the video editing and mod tools available for *GTA V*, and checks out the first details from EA's *Star Wars: Battlefront*...

### Plug & Play

The *Grand Theft Auto* franchise has long since established itself as the acme of the sandbox action genre, but *GTA V* is giving players more creative possibilities than ever before. As the PC version finally made its debut on 14th April, its publisher unveiled the Rockstar Editor – a set of tools that allows users to make their own movies from footage captured while playing through the game. There's even a Director mode, which lets you import characters and other elements from the main game (including *GTA V*'s large menagerie of animals) and stage your own scenes from scratch. We can pretty much guarantee that we'll be seeing some very odd videos appearing on YouTube over the coming months.

The ways PC users can tinker with *GTA V* don't end there either. While Rockstar hasn't launched a set of official modding tools for *GTA V* (nor did it for *GTA IV*), the coding community that brought us Open IV has provided an update that supports the latest game in the series. Open IV 2.5 is still in its early stages, with archives and textures viewable but not currently alterable, though

later updates will undoubtedly expand the tool's capabilities. Given just how creative some of the mods created for *GTA IV* were (we particularly liked the mod that added characters from the *Adventure Time* TV series), the Open IV support should mean we'll be seeing *GTA V* twisted into all kinds of new and imaginative shapes.

Open IV has already been used to crack *GTA V* open and poke around among its files, resulting in the discovery of a wealth of hidden stuff. References to zombies, horses, weight-lifting mini-games and cleaning teeth have all been found – some being, no doubt, abandoned ideas left as a collection of unused sound effects and other detritus in the final code. But could a later update see *GTA V* get a zombie mode in the near future? Rockstar has form with this kind of thing – *Red Dead Redemption* got the *Undead Nightmare* expansion back in 2010.

Speculation aside, Rockstar's sprawling sandbox game is set to become even bigger thanks to the PC's ingenious modding community.

You can find out more about Open IV 2.5 at [openiv.com](http://openiv.com).

### Online

With *The Force Awakens* out in cinemas this December, 2015 is a banner year for Star Wars fans, as director JJ Abrams brings us the seventh episode in the classic space opera franchise.

Holding up its end of things, EA has the eagerly awaited *Star Wars: Battlefront* coming out this autumn, which will bring the shooting action of the original *Battlefront* games to the current generation.

The reveal trailer gives us a glimpse inside EA Dice's immaculately reproduced sci-fi world, which sees speeder bikes weaving among the harbours on the Forest Moon of Endor, an assault on the frozen wastes of Hoth and an X-wing swooping over a desert planet – possibly Tatooine, or maybe Jakku, the new planet recently unveiled by Abrams.

EA's footage is pure Star Wars fan service: the steady reveal of familiar characters and ships designed to elicit coos of approval. We have to admit we were quite excited to see Nien Nunb (or at least a Sullustan) running around on Endor, and the moment where the first At-At comes striding through the trees is superbly handled. EA Dice





GAMING



EA's Star Wars: Battlefront will be multiplayer only, with up to 40 players in any one match. We're looking forward to stomping around in an At-St...

has used some fancy scanning technology to make exact digital replicas of the movies' props and costumes, and it shows. While the trailer doesn't show us what Battlefront's actual gameplay looks like, it certainly bespeaks a high level of authenticity, from Darth Vader's distinctive helmet to the scratched patina on Boba Fett's armour.

On the topic of gameplay, fans of single-player shooters will be disappointed to learn that a (Han) solo campaign won't be part of the Battlefront package this time. Instead, Dice's shooter will be devoted exclusively to its multiplayer experience, which will support a maximum of 40 players in any one match. On the plus side, the absence of story does allow Battlefront to concentrate solely on what it did so well in the past: simulate the thrill of taking the controls of the franchise's wide range of craft.

"Star Wars Battlefront will allow fans to live out a wide range of heroic moments and intense battle fantasies of their own," EA enthuses, "firing blasters, riding speeder bikes and snow speeders, commanding At-Ats and piloting TIE fighters and the Millennium Falcon."

Unfortunately, we won't be able to take the Millennium Falcon into lightspeed in Battlefront; one of the details that came out in the wake of the trailer was that the game's action will take place exclusively

on the surface of planets, whether it's Hoth, Endor or the newly announced planets Sullust (Nien Numb's home world) or Jakku. In fact, Jakku is likely to be a major draw for the Star Wars faithful: pre-ordering Battlefront will allow players to experience the Battle of Jakku one week before everyone else. This battle, we understand, will lead into the events of The Force Awakens and will explain how the planet we see in the film's trailer has become a graveyard for crashed X-wings and Star Destroyers.

While we'll have to wait and see how the game itself looks and plays (although the first trailer purports to have been made with Battlefront's Frostbite engine, it almost looks too smooth to be true), the early signs are positive for EA's latest Star Wars game. The previous Battlefront games were among the strongest to emerge from the franchise, and with Dice's expertise behind it, Star Wars Battlefront really could prove to be the Lucas-themed shooter we've been looking for.

Star Wars: Battlefront is out on 20th November.

### Incoming

To some of us, it won't seem all that long since EA launched its free-to-play shooter Battlefield Heroes, but five years after launch, the game's servers are to be shut down. Battlefield Heroes is one of four free-to-play

games marked for termination by the publisher; the others are Battlefield Play4Free, Need For Speed World and FIFA Online. "[The games] aren't as popular as they once were," writes EA's executive president Patrick Soderlund. He did, however,

reassure fans that Star Wars: The Old Republic (which went F2P in 2013) will remain open for the foreseeable future. Players can expect some additional stories soon, he says. Battlefield Heroes and the other affected games will shut down on 14th July.



▲ After five years, Battlefield Heroes is coming to an end. Players have until 14th July to spend their in-game currency before the game shuts down for good

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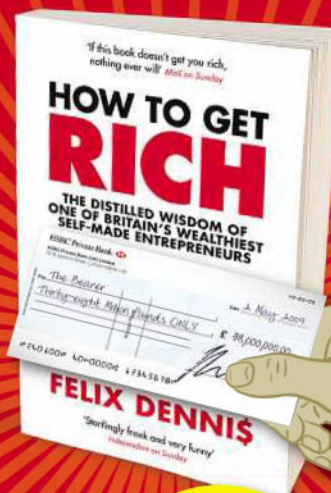
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Please try to keep your queries brief and limit them to just one question per letter, simply so we can squeeze in as many as we can each week. Please include relevant technical information too.

*Aaron*

## Avoid The Scam

My brother-in-law had a call yesterday from someone who called him by his name and said they represented a "Windows repair team", specifically Windows 7, that there was a problem with his computer, and they wanted him to download a file. He asked for their number, and when he rang back, someone with an Indian accent went through the spiel again. Paul told them to wait while he made some inquiries and rang me. Well educated by Micro Mart, I immediately told him it was a scam and to have nothing to do with it.

But he told me something I couldn't explain. The guy asked him to open a command window and type something, and then said his licence number was on the third line from the bottom – and then read it out to him! Then the guy asked Paul to open Event Viewer and tell him if it showed a lot of problems. Paul said there were dozens, and it was at that point the guy asked him to authorise the download of a file from [www.livefixpc.com](http://www.livefixpc.com). Paul has not done that, but was puzzled as to how someone could know his name and licence key. I couldn't tell him, but, I added, "I know a man who can!" So I'm hoping you can explain what seems like a very sophisticated scam.

For the time being, I've simply told him to run a deep malware scan. He later said that McAfee had reported his computer was clean. Thank you.

**James**

*This is an increasingly common, complex and quite alarming scam, and you've been very wise to avoid it and to save your brother-in-law a lot of trouble. It's one of those very clever scams that are tailored to trick the victim, blinding them with science and jargon, but behind it all is a simple handful of tricks, nothing more. Let's step through the call, so we can expose what's going on and hopefully save a lot of other people money and misery while we're at it.*

*First, your brother-in-law got a call, and the person knew his name. This isn't hard to do. It's easy enough to obtain electoral register information, as the unedited version is free to view to anyone, and information sold to sales companies is readily available too. At the most basic level, if you don't opt out of the phone directory, you're easy enough to find.*

*The next part of the call is what I'd call the clincher, and it's the part of the call designed to make the victim fall for the scammer's identity. After all, how could they possibly know the licence key for your machine if they're not from Microsoft? Simple – they don't. The so-called licence key they get to is no such thing, it's simply a CLSID (Class Identifier), which is the same on every PC. The command you're instructed to type is 'assoc', and you're then told that the 'licence key' is at the bottom, which the caller then reads out in order to get you on board. The key they read out is 888DCA60-FC0A-11CF-8F0F-00C04FD7D062.*

```
C:\WINDOWS\system32\cmd.exe
.WMX=WMP11.AssocFile.ASX
.WMZ=WMP11.AssocFile.WMZ
.workspace=Bridge.Workspace
.WPL=WMP11.AssocFile.WPL
.wsc=scriptletfile
.WSF=WSFFile
.WSH=WSHFile
.wsp=ImageReady.Application.Workspace
.wtx=txtfile
.wv=ULC.wv
.WUX=WMP11.AssocFile.WUX
.x3f=Photoshop.CameraRawFileFoveon.9
.xa=ULC.xa
.xaml=Windows.XamlDocument
.xba=office.StarConfigFile.6
.xbap=Windows.Xbap
.xcs=office.StarConfigFile.6
.xcu=office.StarConfigFile.6
.xdl=office.StarConfigFile.6
.xdp=AcroExch.XDPDoc
.xfdf=AcroExch.XFDFDoc
.xht=xhtmlfile
.xhtml=xhtmlfile
.xla=OOBE.Document
.xlam=OOBE.Document
.xlk=OOBE.Document
.xll=OOBE.Document
.xls=OpenOffice.Xls
.xlsb=OpenOffice.Xlsb
.xlsm=OpenOffice.Xlsm
.xlsx=OpenOffice.Xlsx
.xlt=OpenOffice.Xlt
.xltm=OpenOffice.Xltm
.xltx=OpenOffice.Xltx
.xm=ULC.xm
.xml=xmfile
.xmp=Photoshop.XMPFile
.xps=Windows.XPSReachViewer
.xrm-ms=MSSppLicenseFile
.xsl=xslfile
.xspf=ULC.xspf
.ZFSendToTarget=CLSID\{888DCA60-FC0A-11CF-8F0F-00C04FD7D062}
.zip=CompressedFolder

C:\Users\Aaron>
```

The so-called Windows licence scammers ask for is a CLSID that's the same on every Windows PC

Guess what? I have the same key on every one of my PCs, and so will anyone reading this if you're running Windows 7 (the same value is even present on Windows 8). The line begins 'ZFSendToTarget=CLSID' and is nothing to do with your Windows licence. The 'assoc' command simply runs through the list of Windows file associations, which you'll see if you look through the list presented to you.

Next you'll often be told to check to see if your copy of Windows has a verified licence. You'll be told to type 'verify' into the command prompt. The caller will ask what it says, and if it says 'Verify is off', they'll explain that you have a problem and your licence is not verified. Of course, this isn't true. The verify command simply controls the Windows check that data is written to disk correctly. Typing 'verify on', or 'verify off' will change this function, it has nothing to do with your licence. You can easily check this and any other command you may be asked to type by typing the command followed by '?' This will display the command arguments and switches.

The next step of the call is usually a trip to the Event Viewer. Here the caller will ask you to look for any errors. The uninitiated will obviously be a little worried to see plenty of errors and exclamation marks, and this will further strengthen the scammer's position. The truth here is that every PC has tons of errors and warnings in the Event Viewer – it's normal. Anything that happens is logged, and many problems are nothing to worry about. While you may actually have actual problems to fix, trust me, none of them relate to anything the scammer is talking about, so don't be fooled.

If all goes well for the scammer, at this point you'll be asked to download a file, which will probably be a remote access tool, such as AMMY or something similar. From this point the scammer will go through some more equally pointless and jargon-filled tests designed to blind the victim. Old certificates may be checked, the Event Viewer may be used again, and eventually more files will be downloaded, such as programs like GoToAssist. Eventually you'll be told that your licence is activated and everything is fine.

Then comes the sting. The scammer will open up a PayPal form and tell you that by agreeing to download the software and having the system updated, you need to pay. The amount may vary, but it's often \$200-300. The PayPal accounts are many, often with random web-based email addresses, and you'll notice the distinct lack of Microsoft entries. If the scammer succeeds, which they do a worrying number of times, hence the scam's growing popularity, they've made a tidy sum for nothing and had free access to your PC in the process. Not good.

Now, this is a scam most PC-literate users and those who are on guard will be able to avoid, such as you, James, but it's cleverly designed to fool people who simply don't know any better. It's easy to see why people fall for it. However, the same approach you should use for any scam is your best defence: be vigilant.

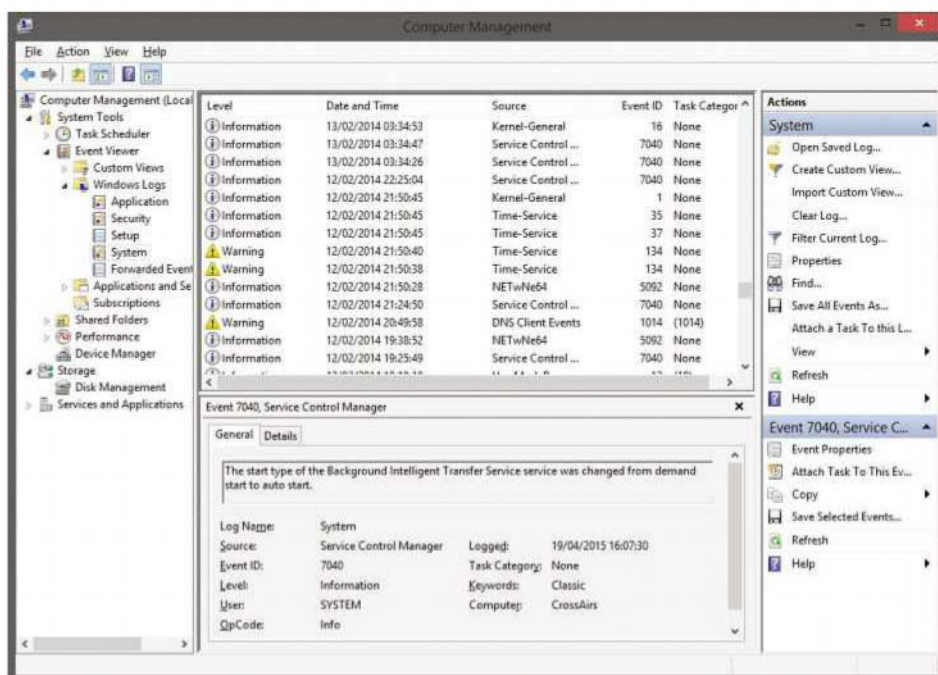
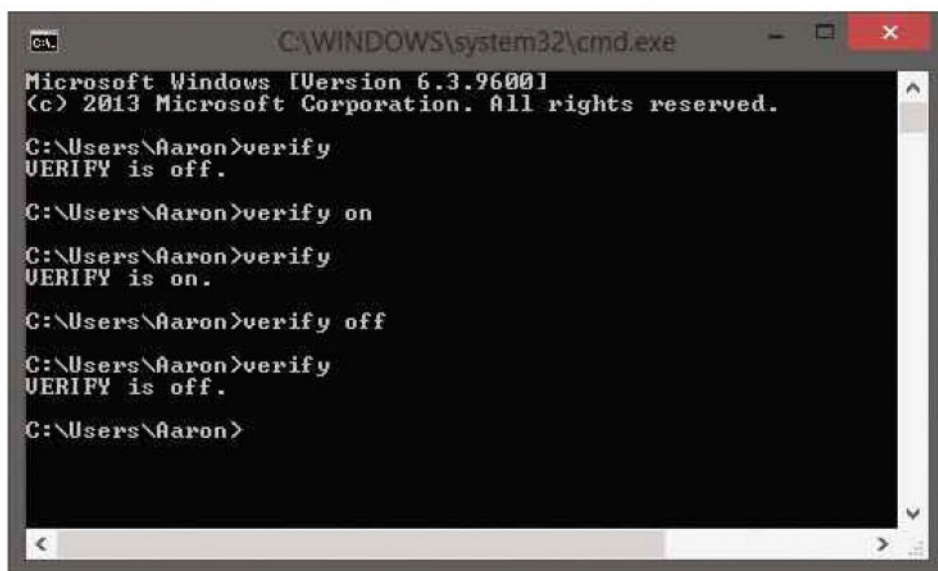
Microsoft's support won't call you out of the blue like this, and even if it did, a real technician certainly wouldn't jump onto your PC, open up PayPal and ask you to pay a random account. If your licence key isn't valid, there are automatic systems in place to help track and deal with that, and the simple fact that you can't update Windows is usually enough.

If you're not sure of the validity of a call, then always say you'll call them back. However

(and this is the important bit), don't get the number from the caller. Instead, use the official number, even a main switchboard option, from the official website, or get the real number from a directory. While you're at it, if you have any recorded information from the call, such as the phone number, emails, PayPal accounts, pass them on to the real company and also to OfCom ([consumers.ofcom.org.uk](http://consumers.ofcom.org.uk)) or your country's equivalent. This will help authorities track the scammers down and save others from potential problems.

▼ **Verify is nothing to do with the state of your Windows licence and can be turned on and off at will**

▼▼ **The Event Viewer on every PC will show all sorts of errors and warnings, but it doesn't mean you have a problem**



# ASK JASON



Meet Jason D'Allison, a veteran of Micro Mart's panel of experts. He's here to help with any technical questions, including anything to do with tablets or smartphones, as well as PCs

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jason@micromart.co.uk

While we try to cover as many questions as we can, we regret that Jason cannot answer your questions personally, but he'll cover as many as he possibly can each week. Please ask one question per letter and remember to include the full specification of your computer, including its operating system.

Jason

## Need For Speed

I'll soon be building a small-form-factor PC. It'll be general-purpose, but I also plan to enjoy some gaming (nothing requiring lots of power). I've decided to use an AMD APU, probably the A8-7600 (3.1GHz, quad-core, 384 shaders, £70) or the A10-7850K (3.7GHz, quad-core, 512 shaders, unlocked, £110). I haven't made up my mind! For the RAM, I've decided on 2 x 4GB, but I think I've read that for the sake of the APU's GPU, this should be fast. Is that right? Will cheap DDR3-1600 be okay, or will I need expensive DDR3-2400 or perhaps even DDR3-2666?

### A Wójcik, Gmail

You're right: RAM speed makes a tremendous difference to the GPU performance of AMD's APUs. Visit [goo.gl/rIQZ12](http://goo.gl/rIQZ12), a blog page on the Corsair site. This super little investigation shows beyond doubt that AMD's APUs are all too often bandwidth-starved. Games

can be crippled to the point of unplayability under DDR3-1333, but under DDR3-2133 the same games might run like butter over a jacket potato.

The memory controller on most desktop APUs is capped at DDR3-2133 (also the fastest speed sanctioned by JEDEC, the standards body). \* However, aided by a decent motherboard, most will overclock to DDR3-2400 and often DDR3-2600+. There's no point, though – performance barely improves.

I used to think that low latency was crucial for these APUs, more so than frequency. But the above investigation shows otherwise. Latency is referenced by those numbers you see on a RAM stick's label – 8-8-8-24, 11-11-11-31, and so on. Lower is better, and the first number is the most important. This is the CAS rating, often abbreviated to CL (CAS latency). The numbers are relative to the frequency, so DDR3-2133 at CL11, for example, actually has a lower latency than DDR3-1333 at CL7. Take a look at [goo.gl/](http://goo.gl/)

**W2xi0w**, on Wikipedia, if you fancy getting your head around all of that.

In short, buy yourself two sticks of DDR3-2133. Don't settle for less. Given the choice, go for CL9 (the lowest you'll find at that frequency), but if funds are tight, CL10 or CL11 will do. The performance drop will be minimal. A pair of CL11 modules should cost about £50, whereas a pair of CL9 modules should cost about £20 more.

PS – Go for the A10-7850K. You'll thank me.

\* I know heat levels have to be kept in check, but I still can't understand why the memory controller on most of AMD's laptop APUs is capped at DDR3-1600. Only the flagship FX-7600P supports DDR3-2133. I think it's bizarre that AMD is knowingly crippling performance.

▼ Is fast, all-singing RAM really necessary to get the best out of AMD's APUs?



## The Great Enabler

I've just bought a Samsung XE303C12 Chromebook (second-hand). The battery life is fabulous – I've not switched the unit off yet and have only had to charge it twice in the three days I've had it. It's taking me a while to get to grips with Chrome OS, however. I'm trying to

install apps from the Web Store, but no matter what I choose I get the following message: 'Installation not enabled.' What does this mean? I've poked about in the settings but can't see anything relevant.

Rex, Gmail

This is a common gotcha, Rex. When you switch a Chromebook on, you're asked to log into your Google account (as I'm sure you know, this is simply your Gmail address and password). Many users, especially when in a rush, skip this and choose 'Browse as Guest'. However, this means apps can't be added, even when you subsequently log into your Google account to access the Web Store. To add apps, you have to be logged into both Chrome OS \*and\* the Web Store (with the same account). I'm pretty sure this is where things have gone awry.

The answer, then, is to log out of Chrome OS as Guest and log back in with your proper credentials. As much as I like Chrome OS – especially as it runs reasonably well even on hardware lifted from a phone (as is the case with the XE303C12) – it reminds me at times of Linux (which of course it's based on). That is, it can be infuriatingly oblique. Why aren't certain settings where they should

be? Why do some core facilities have to be added through apps? An error such as 'Installation not enabled' – meaningless, and with not the merest hint of how to solve the problem – is a perfect example.

▼ Chromebooks such as Samsung's XE303C12 can be bagged second-hand for only about £50, and they're great for web use and basic productivity – so long as you can stomach the quirks and limitations



## Open-And-Shut Case?

In your reply to Cashel in issue 1,357 (regarding the USB 3.0 limitations of Intel's H81 chipset), you recommended Element Gaming's Zinc 200, describing it as a 'super budget gaming case'. Indeed it is. I bought mine from Ebuyer for £19.98 (goo.gl/Dr7pue) and I'm very pleased with it. Perhaps I should have paid more attention to the description, though, as it seems my PSU, a 650W Corsair CS650M, has to be fitted at the bottom. I'm used to PSUs being at the top. Which way should the fan face – into the case or towards the floor?

**Pete Smith, Staffordshire**

Debates still rage over which orientation is best for a base-mounted PSU. There are two options, though not all cases allow for both. Most quality ones do, and some also give the option for top-fitting.

A PSU's fan is an intake, drawing air towards itself, so with the fan facing downwards, towards the floor, you get cool air pulled in from outside and passed over the PSU's internals, stopping undue build-up of heat. This doesn't aid in case-cooling, though – the slightly warmed-up air just gets sent through the PSU's vent and back into the room.

With the fan facing upwards, into the case, you do get some case-cooling

benefit, as the fan draws air out of the case and into the room. However, warm air rises, so the air being drawn out is mostly cool, which isn't much use.

An upward-facing fan is a kind of compromise – it helps to keep air flowing inside the case while also ensuring that the PSU itself doesn't get too warm. It's the approach I prefer and the one I find most logical.

Regardless of what I prefer, though, Pete, the fact that the orientation debate has been raging for years suggests there's no clear answer. From what I've read over the years, so long as the case has other fans creating sufficient airflow, the orientation of a base-mounted PSU makes no measurable difference.

To be honest, my preference is for the PSU to be top-mounted. Here, with the fan facing downwards, the air being drawn out is the hottest in the case. That seems to me to be what it's all about. The downside is that on its journey the warm air passes over the PSU's internals, which could cause overheating unless the PSU's fan runs full tilt. Perhaps this is why top-mounting is generally out of favour these days with enthusiasts. I've never been sure. Answers on a virtual postcode, please, dear readers...



◀ Does the orientation of a base-mounted PSU actually make any difference?

# Crowdfunding Corner

Ever wish people were making games about things more interesting than guns and soldiers? Well, thanks to Kickstarter, with your help these programmers might be able to do just that

## Songbringer

With retro-inspired visuals and gameplay, Songbringer is a Zelda-style action RPG with procedurally generated content, meaning there are over 300 million unique worlds to explore and thousands of items to locate, use and even combine into powerful artifacts. Each new quest is set in an entirely new world based on a six-letter seed, and if you like, you can retain the seed to visit the same world again and again.

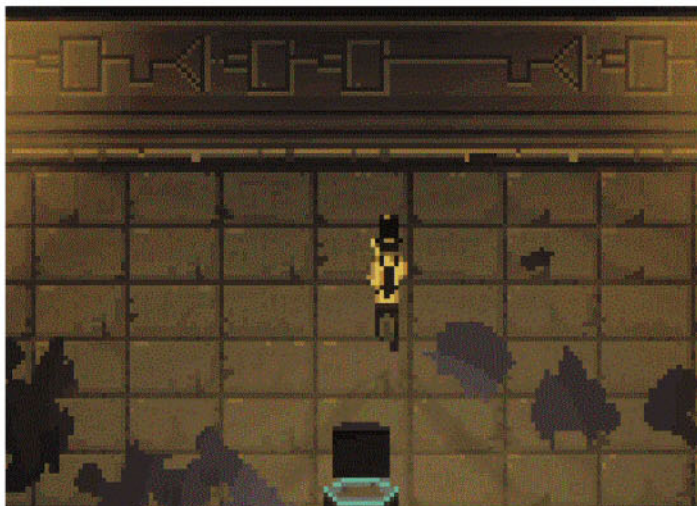
Initially designed for PC sale (through Steam and DRM-free), it'll support Windows, Mac and Linux at release, and iOS/Android ports are potentially available as stretch goals. The developer cites classics such as Crystalis, Sword of Mana and Final Fantasy II as influences.

The game follows accidental hero, Roq Epimetheos, a spacefaring rockstar who accidentally awakens an ancient evil when he frees the nano-sword. With nonlinear, open-world gameplay and no experience grinding, it's a throwback to the times where you can enjoy a game without having to sink tonnes of time into it. The game is already in development and release is expected to happen in December 2015 – though as with all games, take that with a pinch of salt.

A DRM-free copy of the game costs just \$8 (£5.30), with beta access and physical rewards available at higher tiers. The most expensive rewards allow you to actually design your own content, which will be available in all copies of the game! It's currently at 50% of its goal with 20 days to go, so you can be fairly sure this one's happening.

**URL:** [kck.st/1IcGrch](http://kck.st/1IcGrch)

**Funding Ends:** Thursday, 14th May 2015



## Herald

Designed along the lines of Myst and Riven as a combination of point-and-click and visual novel game, Herald is a PC, Mac and Linux game set in the age of sail.

Players assume the identity of Devan Rensburg, a man of mixed heritage assigned to work as a steward aboard the merchant ship HLV Herald. This means interacting with all manner of passengers as you attempt to keep them happy, listening to their stories and solving their dilemmas in a branching narrative that mixes 2D animated portraits with 3D environments.

If you're intrigued by the game, a demo version is already available to play, and the point of the Kickstarter is to finish a full version. Backing for €10 (£7.60) gets you a copy of the game's initial Part 1 release, whereas €15 (£10.70) gets you parts 1 and 2, available as they're released. Higher tiers include digital rewards such as soundtrack and PDF artwork, while the most expensive allow you get your face in the game as a character on board the ship.

The goal is €15,000 and it's already at €4,000 with a month to go. It's not guaranteed, but there's a strong chance it'll make it, with the game due in February 2016 if it does.

**URL:** [kck.st/1G7Dl9o](http://kck.st/1G7Dl9o)

**Funding Ends:** Monday, May 25th 2015



*Disclaimer: Images shown may be prototypes and Micro Mart does not formally endorse or guarantee any of the projects listed. Back them at your own risk!*

# App Of The Week

## Press-ups

### David Hayward spends a lot of time lying on the floor this week

The humble press-up is one of the best core body strength and toning exercises you can do. It doesn't cost anything, it's an easy routine, and it can yield great results in a relatively short amount of time. All you need to do, of course, is put in the effort.

The press-up or push-up may at first look very basic, but there's a lot more you can do with it. For example, if you raise the height of your feet, by resting them on a chair or the side of a bed, then you're placing more emphasis on the upper section of your chest, back and shoulders. Likewise, elevating the upper body places more strain on the lower chest.

You can also work and isolate different muscle groups by simply moving the position of your hands, using a wide arm stance, shorter, lower down the body or level with the head. It's quite fascinating really.

All of this, however, is something we've only just learned, through a collection of Android apps that will hopefully help us build our core body strength and overall fitness. And with summer rapidly approaching, there are bound to be moments when you're exposed on the beach, so let's look at some apps that can help with that.

#### Push Ups

Push Ups from NorthPark.Android is one of a collection of apps (they also do squats, sit ups and pull ups) that will help you create a workout plan without the expensive gym fees and using only what you have at hand and the limited space most of us have at home.

It will count the number of push-ups done, the amount of calories you're burning, and it'll create a training and fitness plan based on what information you enter when you first log in. The training plans are separated by

#### Features At A Glance

- All apps are free.
- Build a safe workout plan over weeks.
- Count reps and calories based on your statistics.
- Help you get fitter, stronger and achieve realistic goals.

levels, and by breaking through a level you'll enter the next, and the training plan will alter and re-evaluate your body status to meet the needs of the workout and to make sure you're getting the best from the app.

#### 100 Push Ups

For just ten minutes, three times a week, you can build yourself up to achieving 100 press ups and a better level of fitness and strength. All thanks to 100 Push Ups from Just Do Inc.

The app will offer workout reminders, set realistic goals, measure the number of press ups you do with each workout and push you towards the selected target. It, like the previous app, also combines a workout routine and will adjust the routine intensity depending on how you've achieved your goals set at the start of the week. Plus there's also a customised rest timer that will make sure you're not pushing your body too far to begin with.

#### 30-Day Push Up Challenge

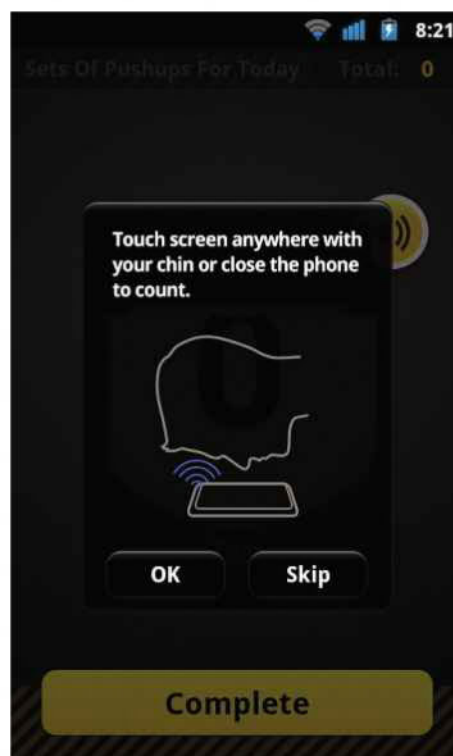
The 30-Day Push Up Challenge from Teer Studios will help you improve your body strength and shape through a selection of daily challenges.

It'll help keep you motivated, offer you video workouts to make sure your form is correct and that you're doing the exercise to its maximum efficiency without injuring yourself or wasting energy.

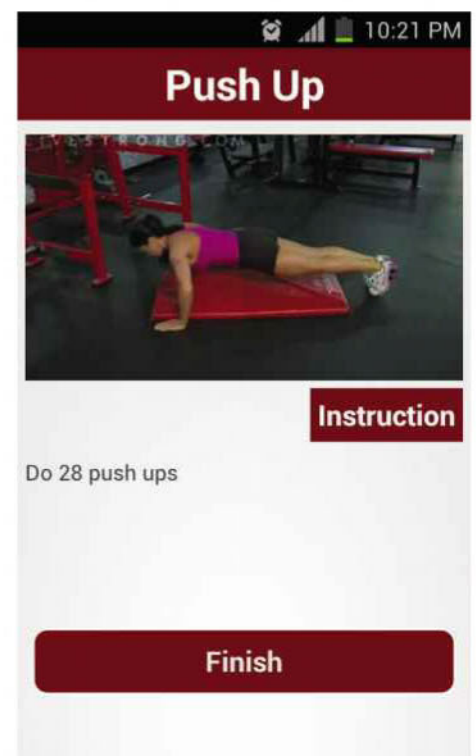
You can set daily reminders, keep track of how well you're doing and share your goals through various social media sites, and everything contained within the app is offline, so you can do it when you're travelling as well.

#### Conclusion

Naturally, there are plenty more press-up related apps to choose from, but for now these are the ones we've been playing around with. For now, the hard floor beckons. [mm](#)



▲ Each app will help you press-up your way to fitness and improved strength



▲ The press-up is good enough for Rocky, so why not us?

# Logging Off

I've seen plenty of damaged USB ports on phones and tablets recently, because the receptacle side is easy to break.

The solution, for those that have this capability, is wireless charging. But not all phones and relatively few tablets have the simple circuitry needed to perform this trick. And, the annoying part, at least five years after this technology first appeared, there's still no dominant standard for implementing it.

The three major players are Powermat with PMA, Rezence and its Alliance for Wireless Power (A4WP) backed tech, and Qi

underpinned by the Wireless Charging Consortium (WCC).

Two of these, PMA and A4WP, have unified their standards enough to work against Qi's WCC, but that is a still a popular technology with a decent uptake.

Surely all these people could come to some arrangement for a combined future, where they all get to survive and we all get our devices charged? At this time, no.

What's always true of these situations is that the division polarises related businesses into deciding which horse they'll back, where the side with most big friends wins.

So far, Powermat can include Starbucks in its charge-me-a-mocha camp, whereas Qi has convinced Ikea that its furniture would be even cooler if it charged using the firm's technology.

But what makes this all even sillier is that one of the biggest players, Apple, has refused to be tempted by any of them. Years of following that company tells me that's because it has its own proprietary charging technology coming that doesn't require you to place the phone anywhere specific to get recharged. Exactly this technology has been demonstrated by a company called Energous, and another called WiTricity has something similar built around the A4WP standards.

Once Apple's first wirelessly chargeable devices arrive, if they ever do, then all bets will be off as to who might dominate. It will probably be an as yet unknown company that has developed the technology Apple likes in secret.

In the meantime, Powermat has to overcome the difficult problem that, having convinced Starbucks to put these chargers in its US coffee shops, many of the customers (99% in California) will be using phones that don't have the feature.

One solution is probably one of the dumbest products I've ever seen, the Duracell Powermat Ring. You plug it into the port of your

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Powerman incompatible phone, thus making it possible to be charged. Really?

In summary, Duracell has avoided the inconvenience of plugging a power cable into at phone or tablet, by instead getting you to insert what looks like a baby pacifier.

How when this was floated as an idea it wasn't shot down in flames, with its inventor having his crayons taken away, I've no idea. But it exists and costs \$54 of real money, for those bonkers enough to consider it.

This wireless charging scenario is indicative of what happens when companies start thinking about their best interests and ignoring what the people who pay for their products actually need and want.

It leads to the dark world, the place where Blu-ray and HDTV fought a mutually damaging turf war, only for HD streaming to make Blu-ray's ultimate victory a mostly hollow one.

Someone in the world of wireless charging needs to get a grip and not partake in what Duracell is drinking.

*Mark Dickavance*

## LAST WEEK'S CROSSWORD

**Across:** 1 Lead, 3 Ambience, 9 Tutoed, 10 Timer, 11 Technostress, 13 Disown, 15 Redeye, 17 Digital Vault, 20 Inept, 21 Kon-Tiki, 22 Contempt, 23 Typo.  
**Down:** 1 Latitude, 2 Antec, 4 Medusa, 5 Interleaving, 6 Namaste, 7 Euro, 8 Frank Whittle, 12 Neutrino, 14 Seize On, 16 Markup, 18 Unity, 19 RISC.

### DISCLAIMER

The views expressed by contributors are not necessarily those of the publishers. Every care is taken to ensure that the contents of the magazine are accurate but the publishers cannot accept responsibility for errors. While reasonable care is taken when accepting advertisements, the publishers cannot accept any responsibility for any resulting unsatisfactory transactions. We got ourselves a Fire TV Stick recently, and we've been using it to rediscover our love of Netflix. No, this isn't an advert for the popular on-demand TV and movie service, but we do appreciate some of the weirder programs it's enabled us to learn about. This week, for example, we

found *Bizarre Foods with Andrew Zimmern*, which, interestingly enough, follows a man called Andrew Zimmern as he travels the world eating the kind of dinners that make you want to regurgitate your own. Of course, you might have already heard of this show, but it was totally new to us. Within three episodes we'd seen him eating ants, scorpions and chicken testicles, among other things. However, our favourite thing (well, the one that made us want to throw up the most) was the fresh octopus. And when we say fresh, we mean it: not only was it raw, it was still moving. Call us fussy if you like, but we'd prefer it if our food didn't try to escape while we're in the process of chewing it.

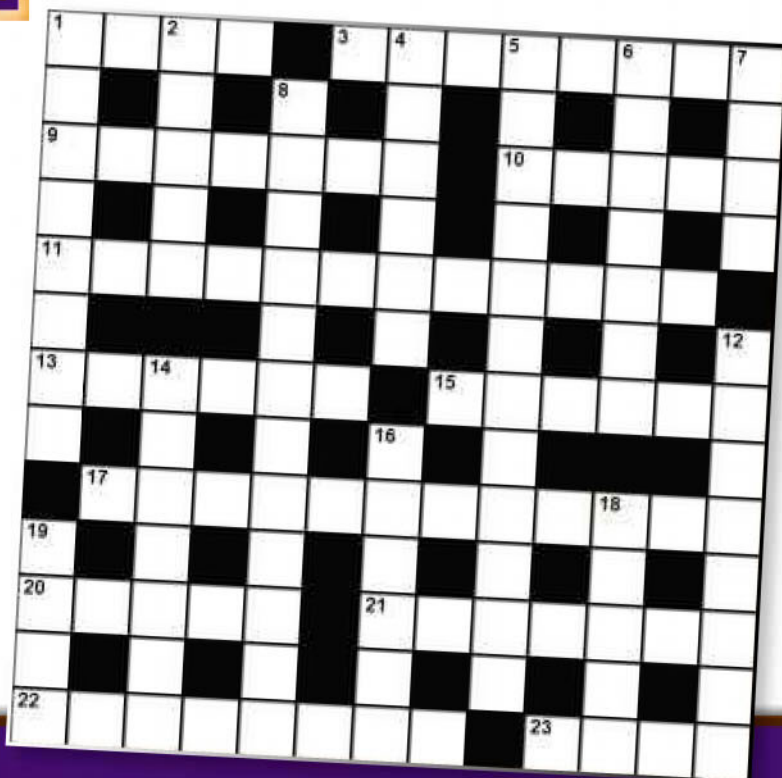
## THIS WEEK'S CROSSWORD

### Across

- 1 Of doubtful quality or legality. (4)
- 3 Having three feet. (8)
- 9 In mathematics or physics, a concise way of expressing information symbolically. (7)
- 10 The limits within which something can be effective. (5)
- 11 This annual talk marks the historic contribution made to public service broadcasting by the BBC's first director-general. (5,7)
- 13 Secrets and information known only to a special group of people. (6)
- 15 Leading UK suppliers of Barcoding and RFID technology. (6)
- 17 Measured from or considered in relation to the centre of the sun. (12)
- 20 .cn TLD. (5)
- 21 A legal document giving official permission to do or use something. (7)
- 22 The quality of being made up of exactly similar parts facing each other or around an axis. (8)
- 23 Young people of a 1960's subculture characterised by a smart stylish appearance, the riding of motor scooters and a liking for soul music. (4)

### Down

- 1 Denoting the grammatical structures and idioms suitable to everyday language rather than to official or purer contexts. (8)
- 2 A metric unit of length equal to one quadrillionth of a metre. (5)
- 4 The RAF's medium altitude long endurance remotely piloted aircraft designed for intelligence, surveillance and reconnaissance. (6)
- 5 The art of making or displaying fireworks. (12)
- 6 The D in LSD (coinage that is!). (7)
- 7 The post or function properly or customarily occupied or served by another. (4)
- 8 Verify one's online identity. (12)
- 12 Big loud kisses or a wad of pound notes. (8)
- 14 A soft silver-white ductile metallic element (liquid at normal temperatures); the most electropositive and alkaline metal. (7)
- 16 A variable quantity that cannot be resolved into components. (6)
- 18 A musical form with a recurring leading theme, often found in the final movement of a sonata or concerto. (5)
- 19 Legal documents codifying the result of deliberations of a committee, society or legislative body (4)



# In Next Week's Micro Mart\*

- Turning a Raspberry Pi into a dedicated web proxy server
- Has home 3D printing already failed?
- The dangers of crowdfunding
- Top tips for Windows phones
- Plus the usual mix of news, reviews and advice



\* May be subject to change

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