

PC & TECH AUTHORITY

TECH ADVICE YOU CAN TRUST

COMPLETE GUIDE & GROUP TEST:

CHROMEBOOKS

CAN A \$399 LAPTOP DO IT ALL?



HOT

- 6-CORE CPUS
- 8-CORE CPUS
- SUPERFAST DDR4

**REVIEWED: EIGHT X99
MOTHERBOARDS**

NEW

PERFORMANCE PC PLATFORM

X99

FASTEST. PC. EVER.

REVIEWS

DELL INSPIRON 15 3000, OPPO
FIND 7, ASUS RT AC87U, QNAP
TURBONAS TS-853 PRO,
AORUS THUNDER 7, ADATA
SP900 SSD AND MORE!



HOW TO:

APPLE TO ANDROID
SWITCH SMOOTHLY

OUTLOOK TIPS PT2
MASTER THE MAILBOX
MONITOR & MANAGE
YOUR PC WITH OUR
FREE FULL APP!

IDENTITY THEFT
HOW THEY GET YOU
AND HOW TO STOP IT

**SURFACE
PRO 3**
FINALLY FANTASTIC

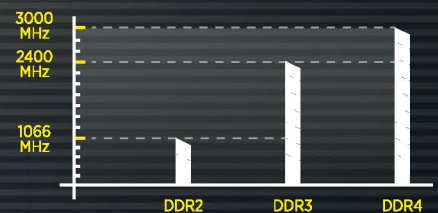


The two reasons you need to upgrade your motherboard.



The DDR4 memory standard for Intel X99 Series motherboards is officially here, and it's officially awesome.

Corsair, the company that invented high-performance enthusiast memory, is taking the lead with all-new DDR4 versions of the legendary Dominator Platinum and Vengeance memory lines. Make the move to DDR4 memory with Corsair and you'll get dramatically faster speeds of over 3000MHz, larger capacities, and less power usage. It's the new memory spec that enthusiasts have been waiting for. So, the question is: what are YOU waiting for?



Learn lots more at corsair.com/DDR4



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MEMORY



POWER SUPPLIES



GAMING KEYBOARDS



SOLID-STATE DRIVES



GAMING MICE



GAMING HEADSETS

Extremes

A tale of two performers

This month's *PC & Tech Authority* is all about extremes. At one end we have the arrival of Intel's new X99 chipset, and with it, a raft of new motherboards and associated bits – like the immense Haswell-E 6- and 8-core CPUs. At the other extreme is the lowly Chromebook. These (mostly) sub-\$400 machines have long struggled for acceptance, largely, I think, due to perception. The fear of having an useable brick if you're offline is unfounded, so if that's what's holding you back do please take a look at our comprehensive examination of this unique subset of mainstream computing, and the many light, powerful (enough to get the job done, at least) and most of all wonderfully cheap laptops (well, except for Google's own bucking of the trend with its \$2000 'ultra-Chromebook').

As is usually the way, the launch motherboards built upon X99 are all, also, very much extreme. In the coming weeks and months this new chipset standard will see the usual faintly ridiculous variety, with dozens of boards, many differentiated only by one or two minor features. The motherboard scene is now dominated by the Big Four (well two Big and two Small

players). Asus, Gigabyte, MSI and Asrock sent two, each, of their new flag bearing X99 boards, and Mark Williams has done an outstanding job of distilling the important aspects of X99 itself, and the pros and cons of the new boards.

And again, as always, too many are overclocking boards. The motherboard makers place far too much importance on this now irrelevant segment of the PC market. Competitive overclocking is now a game of who can secure the best sponsorship support, and with that, exclusive in-house training and even custom equipment. Thankfully though, the majority of the boards in this roundup are of the super-premium variety, letting them showcase the very best of their innovative technology, which is a far better direction to take motherboards in. Today we have eight X99 boards reviewed, is one right for you?



Ben Mansill
Editor

bmansill@nextmedia.com.au

REAL TECH ADVICE YOU CAN TRUST!

- Our tests are performed by experienced reviewers in our Labs in accordance with strict benchtesting procedures
- Our brand new benchmarks have been tailor-made to reflect real-world computing needs
- We put tech through its paces – seriously. From processing power to battery life, from usability to screen brightness, our tests are exhaustive
- We will always offer an honest and unbiased opinion for every review

THE TEAM...



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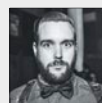
Look! Birds in a flocking thing!



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The world needs Rihanna right now. Badly.



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Above: Tim (not actual size), wearing a clown shirt and bow tie, which is what he goes motorbike riding in.

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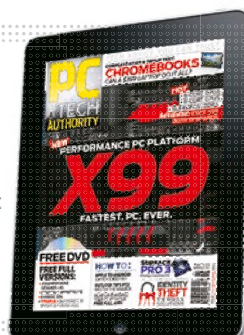


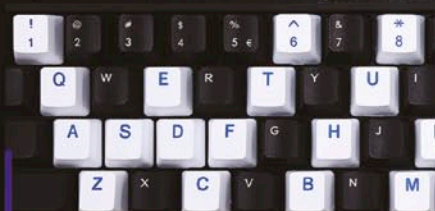
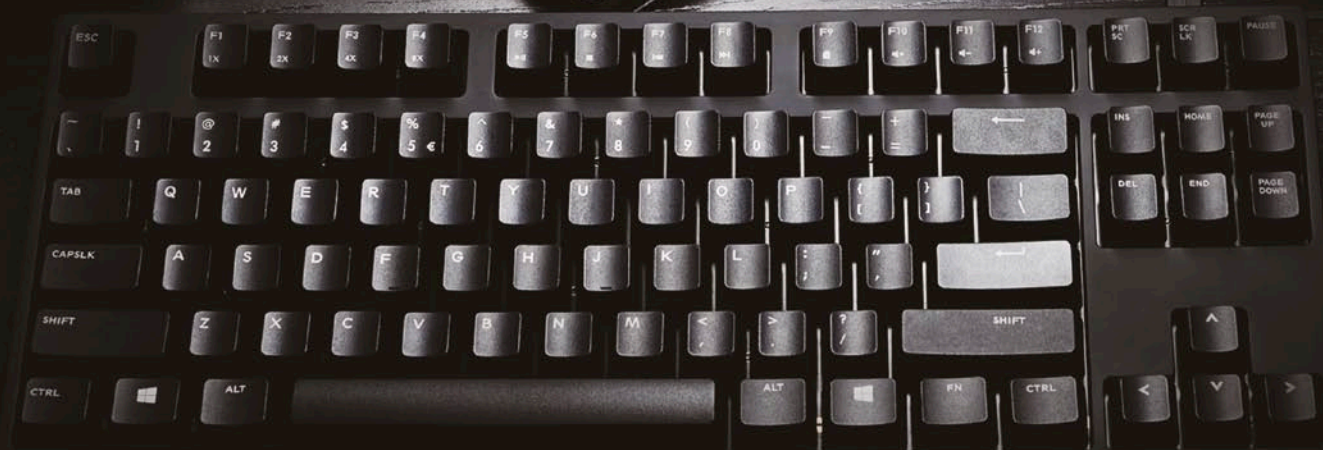
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SWITCH UP YOUR STYLE

Image for reference only,
white keycaps are not included



O-RING SOUND DAMPENERS



HYBRID CAPACITIVE SWITCHES

NOVATOUCH TKL

THE ULTIMATE TYPING EXPERIENCE

Built to impress, the NovaTouch TKL utilizes exclusive Hybrid Capacitive switches which are exceptionally quiet and suitable for heavy-duty typing or gaming. The actuation force is precision-tuned to the strength of your fingers, while an ultra smooth, tactile key process makes NovaTouch the best feeling keyboard on the market.



OCT 31 - NOV 2, SEE US AT

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Inbox

if you have a story or point to make, send it in!
tell us your anecdotes, opinions & tales of woe

LETTER OF THE MONTH

Read your review of the Leica T with some interest and there is much of it that I agree with, especially where you comment on the quality of the results and also on the quality of the engineering that went into the construction of the camera. What I do not agree with is your closing remark suggesting that Leica charge an exorbitant price for the camera "because they can get away with it".

I can't afford a Leica (pensioner), instead I run a D5000. Occasionally I also for convenience use a compact and it is a Panasonic DMC-FS7.

Why? It has a Leica lens. If I could afford it (and if there is such a thing), I would love a digital back for my Leica R5. In fact I think your "because they can get away with it" remark better applied to the

Nikon review that followed. Good as Nikon is, I cannot see that amount of value in it.

Phil Cox

Tim Frawley replies:

The Leica T is a great camera, but when you compare it to something like Fuji X-T1 which is an incredible camera, which for \$4000 you could get the body and two stunning prime lenses. In my personal user testing, the Fuji was a much better camera, and the Leica and the X-T1 bodies are close to the same size as well. The lenses for the Leica T are also some of Leica's new range of lenses which are great, but I feel they have more competition these days to when they did in their earlier days.

GOOD ADVICE

Firstly, I'd like to say how useful and informative I find PC Tech because I'm on a mission to upgrade to a PC tablet and am totally confused by the ads and inconsistent technical information provided on products and between manufacturers in the big name shops all over town. At least I know that you all (at PC Tech) know and test out products within brands before giving them a rating. I find in the stores (not naming any but you will know!!) there

are many young casual workers employed supposedly by the manufacturers to cover specific brands. I find their knowledge very sketchy and sometimes inaccurate. Mind you, now and again I meet a real gem who really understands the brand and product they are promoting. Hence, reference to your magazine gives me some assurance when I ask my questions.

Felicity Simmons

MISSED ONE...

I enjoyed your 8 inch tablet review, but I can't believe you left the Asus VivoTab Note 8 from the list of tablets you covered.

The Asus is a full Windows 8.1 device, available in a 64GB version, which also has the advantage of a micro-SD slot for extra storage, and an extremely versatile stylus. It is vastly faster than my 32GB iPad 3, and is perfectly at home in my work environment, the NSW Education Department, and as a home device.

I got mine for \$549 including freight and a two-year extended warranty. I can't see that any of the other devices you tested could match that.

Paul Hall

Ben Mansill replies:

Thanks, Paul, you are indeed correct, that's a very nice tablet and not including it was an oversight. Your 'mini-review' provides a good outline for anyone considering this device.

RAZER WINNERS

This month's letter of the month as well as best site comment will receive Razer Adaro stereo headphones valued at \$149.95.
www.razerzone.com/au



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Please limit letters to 200 words, where possible. Letters may be edited for style and to a more suitable length.

TOP SITE COMMENTS

Do people still pirate music these days? With the likes of software like Spotify, it's even easier than pirating (AND FREE).

FelixInside on U2's new anti-piracy music format.

Think I might need a new PC for this game. Looks awesome.

codecreeper is just as excited as we are by World of Warships.

Now perhaps Microsoft can come clean with how they are doing. Microsoft tried annual subscription a decade ago and no one wanted it. Now it is the cloud. Still I am betting small business and individuals still do not want it.

Matt Harris thinks Adobe's profit loss is not alone in the industry.

"We have to fire you so we can afford to buy your company!"

Afferbeck supposing what Microsoft was thinking when it cut jobs after buying Minecraft developer Mojang.

Criminal or civil who gives a damn. It's still morally stealing. Coat it any way you want to justify whichever leg you want to stand on.

amcmo has strong feelings about privacy.

Sadly, even though I've owned Ghosts since release, I've never got past the main menu. I want to play the SP at some point, but for the first time ever in the CoD series I may not play any MP.

MasterShrive's feelings for CoD are not strong at all.

Want to read more? Go to www.pcandtechauthority.com.au and join in the conversation. Also check out the Atomic forums: <http://forums.atomicmpc.com.au>



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Tech News

The latest trends and products in the world of technology

IPHONE 6 AND 6 PLUS SPECS, AUSTRALIAN PRICE

THE 4.7IN IPHONE 6 AND 5.5IN IPHONE 6 PLUS HAVE BEEN ANNOUNCED AT A DEDICATED APPLE EVENT HELD IN CUPERTINO, CALIFORNIA.

The new iPhones are bigger than previous Apple smartphones, with the new iPhone 6 boasting a 4.7in display and the iPhone 6 Plus sporting a phablet-like 5.5in screen. The new iPhones are also slimmer than the previous 7.6mm-thick model, with the iPhone 6 and 6 Plus being only 6.6mm and 7.1mm thick respectively.

The iPhone 6 has a 1,334 x 740 pixel screen, which gives it a 326ppi resolution (the same as the iPhone 5s); the iPhone 6 Plus' screen is made up of 1,920 x 1,080 pixels, which translates to a resolution of 401ppi, and is being described by Apple as Retina HD quality.

An iPhone update usually brings with it a boost to the core specs of the smartphone, and this year is no different. Under the hood of both new smartphones is the A8 chip with second-generation 64-bit desktop-class architecture.

Apple claims this chip delivers 50x faster performance than the original iPhone, with graphics performance being 84x better than the 2007 device too.

The A8 chip, along with Metal - a new graphics technology - has led to improved battery performance from the smartphones.

SUPERIOR CAMERA

The camera in the iPhone 6 and 6 Plus has also been upgraded, with autofocus now operating at twice the speed. Video has been boosted, too, with technology allowing for slow-mo to be recorded at up to 240fps at 1080p; the video camera now also features optical image stabilisation, which will compensate for any involuntary hand-shake while recording.

Finally, Apple has given a nod to the power of the selfie, by improving its front-facing FaceTime HD camera. The new features include a larger sensor that lets in 80% more light as well as an increased aperture measurement of f/2.2 for much improved low-light shooting, even in the most challenging conditions.

The most impressive new feature in the iPhone 6-class smartphones is the ability to use the devices for making contactless payments. Apple uses a combination of the new on-board NFC, Touch ID (fingerprint sensor), Passbook and its new Secure Element software to create a feature that it has named Apple Pay. Initially, Apple Pay will work only in the US.

Last but not least, the new iPhones support high-quality voicecalls over LTE networks (VoLTE), plus Apple has also enabled iPhone 6 users to make calls over a Wi-Fi network too.

IPHONE 6 AND IPHONE 6 PLUS PRICE IN AUSTRALIA

The iPhone 6 comes in gold, silver or space grey, with prices starting at \$869 for 16GB, \$999 for the 64GB and \$1129 for the 128GB versions of the device.

The 5.5in iPhone 6 Plus is available in the same colours and storage options with the following prices: \$999 (16GB), \$1129 (64GB) and \$1249 (128GB).



NEWS BITES

IN YOUR HEAD

With health bands like FitBit being all the rage, Intel has a new product on the imminent horizon that may trump them all. The company announced 'smart earbuds' at this year's Intel Developer Forum. They do the same biometric tricks that other wrist-worn products do, but use the earbud's contact with your skin to do the measuring. How sensible!

FOR THE WRIST OF US

Also at IDF, Intel showed off the newest iteration of its MICA wearable technology product. Again, taking a fresh twist on the old wearable category, Intel has partnered with stylists to make a wearable that actually looks like a proper bracelet - of the fashion variety. Pitched at women, MICA is adorned with semi-precious stones and gleams with gold plating. The display is discretely hidden on the underside of the \$1000+ device.



OCULUS A LITTLE CLOSER

Just a few short month after the second Oculus Rift development prototype DK2 was released (and ours is yet to arrive despite ordering it in July), there is another. Codenamed Crescent Bay, the new model has headphones built-in for the first time, and a partnership with audio outfit RealSpace for 3D positional sound). The new Rift features 360 degree head tracking, and a higher resolution screen (the exact res wasn't disclosed at the announcement, but is widely speculated to be 1440p).



ADOBE PROFITS SLIDE BY 46%

PROFITS SLIP SHARPLY AT ADOBE AS CREATIVE CLOUD REVENUES BEGIN TO SLIDE.

Adobe has posted a 46% year-on-year drop in net profits, raising doubts over its strategy of shifting customers to cloud subscriptions.

The company has spent the past couple of years attempting to wean customers off one-off purchases of software and move them on to Creative Cloud subscriptions.

However, this appears to be coming at the expense of profitability, with Adobe blaming higher operating expenses and weaker profit margins for the sharp dip in its profits.

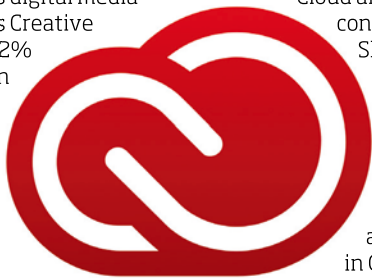
Revenue from Adobe's digital media business, which includes Creative Cloud, fell by more than 2% in the third quarter, even though the company added around half a million subscribers. The company says it has 2.8 million Creative Cloud customers, up from 2.3 million in the

previous quarter.

Some analysts have suggested that while Adobe has enjoyed success converting enterprise customers to Creative Cloud, small businesses and individuals are more reluctant to sign up for rolling subscriptions, and are sticking with older versions of products such as Photoshop and InDesign.

Adobe remains confident in its long-term strategy, pointing out that 63% of its revenue for Q3 was recurring, rather than one-off purchases. "Adoption of Creative Cloud and Adobe Marketing Cloud continues to accelerate," said Shantanu Narayen, the company's CEO.

"We are the leader in both of these high-growth categories and have a rapidly growing pipeline, setting us up for a strong finish to the year in Q4."



DEPTH-SENSING DEVICES INTEL REALSENSE ANNOUNCED

NOW YOUR SMARTPHONE SEES THE WORLD IN STEREO, AS YOU DO, WITH GPS ADDING EXCITING POSSIBILITIES

At this year's Intel Developer Forum, held in San Francisco, Intel unveiled an exciting new technology destined to become common in smartphones and tablets. RealSense comprises two "world facing" cameras (on the front of the device) which are able to detect depth where they're pointed, much like the HTC One M8's cameras. However, RealSense goes a step further, being also able to accurately measure objects, and place their location precisely using the device's already-included GPS.

Examples demonstrated of its utility included scanning a box's dimensions and exact location, then using an app to order a courier. Games are another highlighted area where RealSense can be used, like Xbox Kinect, it detects gestures for controlling the action.

Over time developers will unleash its full potential. Already, according to Intel, several devices will appear before the end of the year featuring the new technology.

Initially mainly premium devices are expected to include RealSense.

HOT... OR NOT

HOT

CORE M

Intel's new Core M series of processors shows just what the chip giant can do when woken from its mobility slumber by the likes of ARM. It's a fanless CPU that operates at a skinny 6.5w, and will enable the production of devices (tablets initially, mostly) much thinner than we're used to and with mega battery life.



NOT

LEFT 4 DEAD 2 RATED

Five long years after Left 4 Dead was initially banned, then cut to an absurd degree to be unbanned by the OFLC, the original game is finally given the tick by the classification board. We're happy inside that the ludicrous decision was overturned, but it's a big fat NOT HOT for this whole situation in the first place.



SANDISK POPS A HALF-TERABYTE CARD IN YOUR CAMERA

WORLD'S HIGHEST CAPACITY SD CARD OFFERS 512GB OF STORAGE.

SanDisk has launched an SD card that offers around half a terabyte of storage space.

The 512GB Extreme Pro Memory Card is the highest capacity SD card on the market, according to SanDisk, and has some pretty startling performance specs to complement all of that storage space. It offers



write speeds of up to 95MB/sec, and like all of the cards in the Extreme Pro range, it is temperature (-25C to 85C), water, shock and airport x-ray proof.

The card is obviously pitched at professionals, primarily those involved in the capture of 4K or Full HD video, who will need gigabytes of storage space

on which to store their footage.

Naturally, it comes at a price that puts it out of the reach of most consumers anyway, with the 512GB version costing \$US800. The Extreme Pro range also includes cheaper 256GB and 128GB capacity cards.

SanDisk launched its first 512MB SD card back in 2003, which means storage has increased a thousand-fold in a little over a decade, in exactly the same form factor. Amazing.

Gaming News

All the news that's fit to print from the gaming world

MICROSOFT BUYS OUT MINECRAFT STUDIO, MOJANG, AND NOTCH LEAVES

MARKUS 'NOTCH' PERSSON IS WALKING AWAY FROM THE COMPANY AND GAME HE CREATED.

Microsoft is US\$2.5 billion out of pocket, following the company's overnight announcement that it has purchased Minecraft developer, Mojang. The deal sees MS own the company, all iterations of Minecraft, as well as other Mojang properties, like Scroll.

Mojang will now become a part of Microsoft Studios.

"Gaming is a top activity spanning devices, from PCs and consoles to tablets and mobile, with billions of hours spent each year," said Satya Nadella, Microsoft's CEO, in a Microsoft blog post. "Minecraft is more than a great game franchise - it is an open world platform, driven by a vibrant community we care deeply about, and rich with new opportunities for that community and for Microsoft."

While the news has been received with mixed emotions by Minecraft fans, the Mojang team are certainly feeling optimistic, pointing out they've been working closely with Microsoft

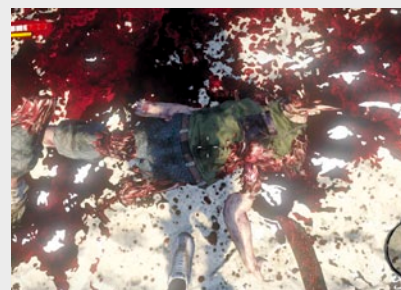
since 2012, and are looking forward to the new arrangement. As company reps say in the announcement from Mojang:

"Minecraft will continue to evolve, just like it has since the start of development. We don't know specific plans for Minecraft's future yet, but we do know that everyone involved wants the community to grow and become even more amazing than it's ever been. Stopping players making cool stuff is not in anyone's interests."

However, it does also signal the departure of the company's three founders, including Minecraft's creator, Markus 'Notch' Persson. In an open letter Notch explains his reasons for leaving his creation behind.

"I've become a symbol. I don't want to be a symbol, responsible for something huge that I don't understand, that I don't want to work on, that keeps coming back to me," he said. "I'm not an entrepreneur. I'm not a CEO. I'm a nerdy computer programmer who likes to have opinions on Twitter."

He also mentions that negative comments from passionate fans have also become too much of a burden.



LEFT 4 DEAD 2 NOW UNCUT, RATED R18, IN AUSTRALIA!

MORE GORE! NO INVISIBLE ZOMBIE CORPSES! SUDDENLY WANT TO PLAY AGAIN!

After having the guts ripped out of out five years ago for Australian audiences, an uncut version of Left 4 Dead 2 has finally received a rating from the Australian Classifications Board.

It's R18, unsurprisingly, but we're still pretty hyped.

The consumer advice that goes with the game is "High impact violence, blood and gore", which seems fair. The game that Australians got on release was free of blood and dismemberment, and featured zombie corpses that were so impermanent they often disappeared before hitting the ground.

In short, it was pretty lame for a game about killing hordes of the undead.

The free update is now available on Steam, and the new rating has seen numbers swell in the old but still popular game, so it could be time to dust off your old zombie gun and get to work.

It's unclear whether it was the local EA office or Steam itself that re-submitted the game for assessment.



GRAND THEFT AUTO V HITTING PC, NEXT-GEN NEXT YEAR

UPDATED VERSION OF GTA V IS ONLY A FEW SHORT MONTHS AWAY... BUT HITTING XBONE AND PS4 FIRST.

If you've been hanging out to enjoy the open vistas and crazy crime of Grand Theft Auto V on PC, you might want to put an important date in your gaming calendar.

The game is hitting PC on January 27, 2015. HAPPY NEW YEAR!

It's hitting PS4 and Xbox in November, of course, but better late than never and all that.

The version we'll be getting will be all kinda shiny and new, too. It will boast better graphics, including higher view distances and resolution, and have new weapons, more wildlife to run over, more traffic, and better damage modelling and effects overall.

In short, it actually feels like it'll be worth the wait.



JETSTREAM 風

GEFORCE® GTX™ 970

The revolutionary Palit JetStream 風 series of graphics cards features advanced innovative cooling and an optimized product design to deliver gamers the ultimate gaming experience. As the latest and the next generation NVIDIA Maxwell architecture features low power consumption, 4K Shadow Play and dynamic super resolution. With the GeForce Experience, the Palit GeForce GTX 970 JetStream guarantees gamers cutting-edge performance and a explosive new gaming experience.

9%

OVERCLOCKING
PERFORMANCE

9dB

EXTREMELY
QUIET

9°C

EXTREMELY
COOL

0-dB
TECH

4K³

0-dB TECH

Keep Silent while you are experiencing the multimedia application and general workload. The operating fans only occurs while working on heavier loading such as gaming that the GPU temperature surpasses 60°C.

4K³

With its three DisplayPort ports, the Palit JetStream provides a flawless, jaw dropping experience at 4K monitors surround.

LED Lighting

Fancy LED lighting on the Palit JetStream's thermal solution provides ambient lighting to further immerse gamers into the gaming world.

Dual Fan

A Dual Fan design offers double the cooling performance, and combined with the 9CM-9CM Smart Fans, heat is effectively drawn away from hot spots.

TurboFan Blade

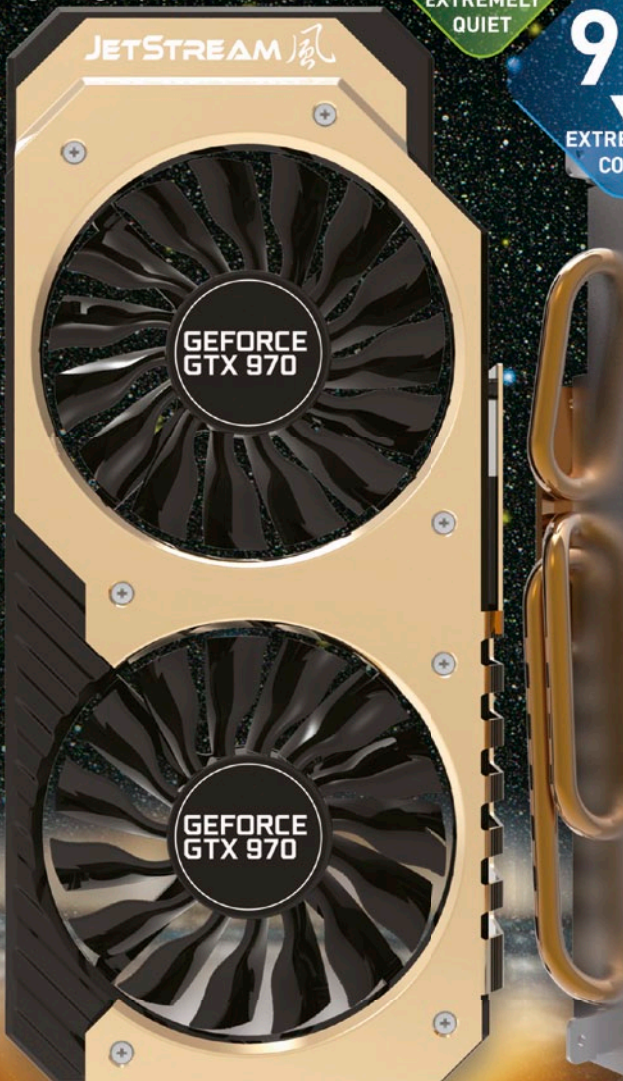
Inspired by the power of jet engines, the TurboFan Blade is designed to improve cooling performance by generating a powerful air stream and air pressure.

DrMOS

DrMOS, originally only available for high-end server GPUs, is now available in all its glory in the next generation of Palit graphics cards. DrMOS offers high current circuits, low noise operation, and effective reduction of heat generating.

Optimized Air Flow

The 9CM-9CM Smart Fan system consists of dual fans with alternating blade rotations. Each adjacent fan rotates in a different direction to reduce airflow conflicts and effectively improve overall cooling performance.



Rock Your Performance

Palit OverClocking Utility: ThunderMaster

ThunderMaster is a utility program for the graphics card under Windows, and provides you to boost performance of the graphics card and to monitor the GPU information, which will only function correctly in conjunction with your new graphics adapter.



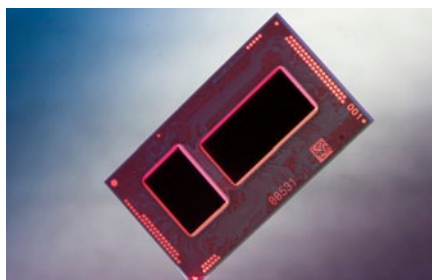
Chip News

AMD admits it has dug itself into a hole with its own Bulldozer, Tonga is already uncompetitive, card prices tumble and a GPU maker exits the market. Sound like a doomsday scenario? Far from it. **Mark Williams** explains.

CPU

AMD ADMITS FAILURE, LOOKS FORWARD

AMD CEO Rory Read has admitted that their Bulldozer architecture wasn't what they'd hoped it would turn out to be at a technology conference recently. "Everyone knows that Bulldozer was not the game changing part when it was introduced three years ago." He then went on to talk about how they're moving forward. "We are building now our next generation graphics and compute technology that customers are very interested in and they'll [the chips] move

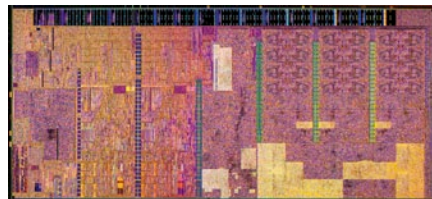


to the next generation node and they'll be ready to go."

During his talk it was revealed that the next x86 architecture they're working on is dubbed 'Zen' not the previously thought K12 (the ARM next gen variant). Read said Zen would be a "big leap forward" and that chips based on it will use FinFETs and that they are aiming to eventually use 14nm and 10nm process nodes with it, but that it will be 2016 before we see those. He also mentioned that AMD would be doing this when they can get "the cost curve and the yield curve at the right place so that it makes sense", meaning they might not jump on these technologies right after their supplying foundries have the desired capabilities, cost is a concern. Understandable considering AMD's recent financial struggles.

SKYLAKE ALREADY WORKING

Even though Intel's Broadwell-Y architecture is barely out (in Intel's new Core M processors) it's already talking about the architecture



that comes after it. Skylake will succeed Broadwell and both may actually coexist in early 2015 as they transition to 14nm. At the recent IDF Intel even showed off a Skylake powered 2-in-1 laptop running 3DMark at a good pace and even playing 4K video. It seems that even this far out from launch Intel is well advanced into its next 'tock' cycle.

Mobile Skylake parts will support both DDR3 and DDR4 to help the industry with the memory technology transition. Skylake will also require a new 100 series chipset connected via a faster DMI 3.0 at 8GT/s and feature a new GT4e graphics processor (succeeding the yet to be launched Broadwell U and H's GT3 and GT3e).

GPU

GTX 980 SENDS SHOCKWAVES THROUGH THE MARKET

The writing was on the wall before Nvidia even launched their new GTX 980 and GTX 970 cards. First Titan Z was reduced in cost, then AMD slashed a massive \$500 off its flagship R9 295X2, followed by reductions to its R9 290/290X lines. The industry was preparing itself for the major shakeup the GTX900 cards bring.

The GTX 900 cards are the fuller realisation of Nvidia's Maxwell architecture first seen in the GTX 750 Ti. This second iteration shows just how impressive Nvidia's new tech is at scale.

Performance wise the GTX 980 is a side step, essentially matching the outgoing GTX 780 and 780 Ti. However to achieve this feat it uses only 5.2 billion transistors (1.9B less) resulting in a die 398mm² in size (163mm² smaller), providing a massive 30%+ reduction in power savings, on the same 28nm process node!

How did they achieve all this? The answer



is in the shader units brought in with Maxwell's design, and further refined in its second iteration. Nvidia claims that their shader processors are now on average 40% faster than those in the aging 780 Ti Kepler design. Which happens to be almost the exact amount the shader count was reduced by, from 2880 to 2048.

What we predicted back when the GTX 750 Ti launched is coming to fruition, Maxwell is an architecture that even the likes of AMD's latest Tonga chips can't compete against. With a GTX 960 apparently

on the way next month and with a lot of thermal and power headroom to expand further, competitively, AMD appears to be in a spot of temporary trouble.

AMD INSIDE MATROX

Matrox, one of the last independent GPU makers with over 35 years' experience has relented to market pressures and announced that its new crop of C400 and C600 series video cards aimed at multi-display enterprise and industrial applications will use AMD's latest GPUs to power them. Instead of using precious internal resources designing subpar GPUs it seems they will now outsource the GPU and driver technologies to AMD, allowing them to focus more on card integration, specialised features, stability and software features of its prized PowerDesk desktop management software.

It's not much market wise, but it marks another company exiting the shrinking GPU designer market.

OC SOCKET

EXTRA PINS FOR EXTRA SATISFACTION!

ASUS OC Socket – what is it good for? Everything! Well, that's a bit of a stretch. But it is excellent for taking advantage of your system's untouched potential. In fact, it will even increase your system's potential performance.

Why leave additional performance untapped? Why put up with running higher voltages than you need to? Why settle for second best? These are some of the questions that drive ASUS research and development engineers to strive for the very best possible outcomes. These outcomes are designed for with you in mind; the end user.

During the research and development phase of the ASUS X99 range of high performance desktop motherboards, the engineers tasked with pushing the boundaries of platform potential and end user focused features and functionality, developed something special. In fact, it has turned out to be something extra special!

The first and most defining feature of the ASUS OC Socket are the extra pins in the socket. These extra pins facilitate system performance gains. These gains include increased CPU performance efficiency under the same system clock parameters as generic X99 products. In a direct comparison between an ROG Rampage V Extreme and a generic unit using the standard LGA2011-v3 socket using industry standard benchmarks, Super Pi 32M and 3DMark11 CPU Test, the ROG Rampage V Extreme with its ASUS OC Socket technology delivered up to 7.5% more performance.

Furthermore, in a scenario comparing a selection of 30 processors for Internal Memory Controller (IMC) performance and scaling potential, the CPUs were tested to see which units would allow for DDR4-

3000+ frequencies and which units would fail. On a motherboard using the standard LGA2011-v3 socket, from the pool of 30 processors only 5 units could achieve DDR4-3000+ memory frequencies. When tested on the ROG Rampage V Extreme, from the same pool of 30 processors, with the help of ASUS OC Socket technology, a stunning 25 units – or 83% – were capable of reaching and exceeding stable DDR4-3000+ operational frequencies.

In addition to helping remove the pitfalls of the “silicon lottery” when it comes to IMC capability, the ASUS OC Socket also helps deliver high performance at lower voltages. Testing on a platform without OC Socket demonstrated a system using 32GB DDR4 (4x 8GB DIMMs) was able to reach DDR4-2800 at 1.60v. This same system, with nothing more than the motherboard replaced with an ASUS X99-Deluxe, was able to deliver DDR4-3200+ RAM frequency and at a fraction of the voltage, using just 1.35v. Not only was a higher RAM frequency delivered by the ASUS OC Socket technology, but it did so at a lower operating voltage too!

The same test was repeated using an even more difficult and punishing memory configuration. This time, using a 32GB DDR4 configuration made up of 8x 4GB DIMMs. In this configuration the standard 2011-v3 socketed motherboard delivered a RAM frequency of DDR4-2666 at 1.6v. Using the

ASUS X99-Deluxe with the patent-pending ASUS OC Socket, the system reached DDR4-3000 operating frequency and again at the low voltage of just 1.35v!

Feeling sceptical? That's cool. The crowd will often find what works best and stick to it. It's no surprise then that the most popular X99 based motherboard used by users of HWBot – the global database of benchmark world records and results – have overwhelmingly chosen ASUS OC Socket based motherboards. In particular, the ROG Rampage V Extreme is the most popular among overclockers. They only want the best. Read more about HWBot X99 results here: <http://bit.ly/1tSUM8G>

With the X99 platform focused towards workstation and enthusiast usage scenarios and representing the very best desktop computing solution money can buy, don't handicap your system by using anything other than the best. Insist on the best. Insist on ASUS.

BENEFITS OF ASUS OC SOCKET

- Increased CPU performance at same system clock vs standard LGA2011-v3
- Higher DRAM overclocking potential with lower voltage required
- Higher CPU overclocking potential with lower voltage required
- Improved voltage supply and regulation
- Available on all ASUS X99 desktop motherboards

ASUS OC SOCKET PERFORMANCE GAINS

Benchmark	5GHz OC with Standard LGA2011-v3	5GHz OC with ASUS OC Socket
Super Pi 32M	6m 22.947s	6m 16.803s
3DMark11 CPU Test	23734	25523

CPU: Intel Core i7-5960X | MB: Rampage V Extreme | DDR4: DDR4-3100 * 4 | GPU: GTX 780 Ti | OS: Windows 7 64-bit



Most Wanted

Electrical things that look interesting but aren't necessarily PCs.

► BEAT IT

Once-credible audio outfit Sennheiser has sunk, deep down, down into the lowest of frequencies. Its new range of Urbanite headphones are designed to capture the cool kids who are predisposed to Beats headphones, a company which, ironically, has itself just moved away from crushing bass, and nothing but, towards something approaching a more useable sound balance.

We jest, of course, about Senny's reputational disarray, but we're not kidding when we tell you that the new 'Urbanite' range is such a radical departure from their normally normalised EQ that its "Pursuit of Perfect Sound" motto should perhaps now be "Marketing-driven trend products where compromise is cheap."

But then again, if you're cooler than us, and everyone is, you might be thinking these look fantastic. We've been wrong before...

www.en-ausennheiser.com



▼ BRINGING BACK THE BLING

The rise of PC modding through the late nineties and early naughties was a glorious, wonderful time, when we beat the beige using nothing but a Dremel hand saw, home-wired LED strings and a first aid kit. Then PC manufacturers got onboard and ruined the party by offering out-of-the-box bling, and black cases which, darn it, looked fantastic. So modding slowed, and so did the desire for blingy glowey bits. Perhaps we were just past that stage anyway...

Enough slumber time has passed for a renewed excitement about such frippery. Meeting that challenge head-on is Thermaltake, which has just announced a comprehensive range of bits that glow.

Now, the actual cooling benefits of water cooling are secondary to having tubular disco lighting. Fans, which were once placed to create helpful airflow, will now be positioned to offer the best view of their dazzling berry flavoured tubular light show.

Will it take off again? Did it ever really die? Are you tempted? Go to the light we say, to the light.

www.thermaltake.com.au



▲ SUPER POWER

You can buy portable battery packs online from places that look suspicious, for peanuts, and they might explode, one day. Or, you can buy reliable but boring packs from reputable brands. But now, you can accentuate your digital lifestyle with a battery pack that says more about your urban attitude than it does about your mobile device usage patterns.

From Monster, the home of the \$400 HDMI cable, comes a wallet-sized and Shaq-endorsed "credit card sized power solution". Plaintalk version: 1650 mAh micro USB battery pack. Thin, small. Choice of colours. Priced reasonably at \$69.95. Now you know.

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NBN shambles

It's your choice for the NBN, except it isn't.

Remember when the NBN was a thing? It was a good thing that people felt passionate about. Many were excited about the prospect of super fast, reliable internet piped right to their premises. The rallying cry of 'build it once, build it with fibre' could be heard from Tony Windsor's parliamentary office to the regional areas with woeful internet.

There was plentiful talk of smart grids, savings with e-health, telecommuting and a big impetus for technology based innovation and growth for Australia. But it was happening all too slowly to get to the point where it couldn't be undone. So the machinations of the Labor Party and its unseemly fight for the top job let a wily politician with a knack for an easy slogan come to power.

Fast forward to 2014 and the NBN is continuing with fixed line installation while it also trials fibre to the node and fibre to the basement, which are part of the "multi-technology mix" favoured by the Coalition.

Sadly the fire seems to have gone out of the fight for the NBN. The petitions and campaign websites have gone quiet and reports and reviews are coming out looking into the future NBN. There are now also other battles like proposed new anti-piracy laws and speculation that new data retention laws will let telcos scoop up and share more of our private information.

Those who are getting the fixed line service as the rollout continues are faced with figuring out what happens to their existing service, such as ADSL and what their options are for actual NBN services.

If you're able to get a fixed line connection to your premises, then you're kind of one of the lucky ones. You may not realise, however, that you can 'choose' to switch to the NBN when your existing service is switched off, but you can't choose your service provider if you're still under contract.

PC & Tech Authority reader Dee faces this situation.

"I'm about halfway through a contract with Telstra and maybe by



ROSALYN PAGE

has been a journalist for over 10 years specialising in the areas of consumer issues, technology and lifestyle. Rosalyn is the 2008 winner of the Best Consumer Technology Journalist at the IT Journalism awards. Her work is published in a range of newspapers and magazines

the end of the year I'll have access to NBN. I spoke to a Telstra sales person about switching to another provider for the NBN. They said that I'd have to pay the remainder of my contract out with them."

Dee wrote to Investigator about her rights and options.

"Just wondering if that is correct? Once NBN comes, it won't be me failing to keep my end of the bargain as far as my contract with Telstra goes. It will be Telstra failing to meet its obligations. The fact that Telstra would want to put me on a new 24-month contract with them for the NBN is off putting."

The NBN Co website has some relevant information. It says that it's your choice to pick your service, the provider and if you connect to the NBN. While your existing service will be switched off, you'll need to cancel the contract. It notes that you may need to pay any fees to end your contract early unless you can move your existing plan to the NBN.

Investigator asked the Australian Competition and Consumer Commission (ACCC) why, if a service is no longer available and a consumer isn't choosing to end a contract, they

"Why shouldn't the consumer be free to choose ... without penalty"

have to suffer the penalty? Why shouldn't the consumer be free to choose service providers without penalty when a new service comes in and an old one terminates? The ACCC suggested asking NBN Co.

Investigator approached NBN Co for a comment, but it referred us to the individual service provider. Telstra said that if a customer would like to exit their current Telstra plan before the end of their contract term, early termination charges would apply.

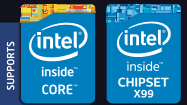
"However, to make the transition to the NBN as smooth as possible, we allow our customers to roll over and continue their current contract or restart a new Telstra contract on the NBN without penalty. Customers moving across can also keep their phone number and Telstra email address."

So it's your choice to connect to an NBN that may not be what it could have been. If you do, the existing service will cease and you'll have to pay any penalties to get out of a contract for a service that is terminating.

**HAD AN ISSUE
AS A CONSUMER?
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IDENTITY THEFT

IF YOU'VE NEVER HAD YOUR IDENTITY COMPROMISED, CONSIDER YOURSELF ONE OF THE LUCKY ONES. **JENNETH ORANTIA** REVEALS THE RISKS.

The latest data from Trend Micro reveals that one in five people have had their bank account or credit card details stolen, amounting to a criminal industry that's worth a whopping \$3 billion a year worldwide, according to the Microsoft Consumer Safety Index Survey.

You could be a victim of identity theft without even knowing it. Sam Bryce-Johnson, technical manager at Kaspersky Lab ANZ, says that it's easy to know if you've been a victim in the real world, as your wallet will have gone walkabout. Recognising you've been a victim in the online world isn't as straightforward, as there's probably no physical evidence that anything awry has happened.

"If it's happened to you online, you've probably not aware that your computer has been breached and your data has been stolen. This data can be used to steal money from you, harvest your contacts, and potentially steal photos and other things from your mobile phone - which could then be used to blackmail you," says Bryce-Johnson.

WHAT IS IDENTITY THEFT?

Identity theft is when someone fraudulently uses your name and personal information - usually for

financial gain. It can be perpetrated through a phishing email pretending to be from your bank, malware that searches through your computer for usernames and passwords saved to your browser, information gathered from social media, and passwords eavesdropped from a public Wi-Fi hotspot connection.

"An experienced criminal will have ways of gathering information away from a potential victim. They use that information to build a profile of the victim, which can then be used to steal information or money from them," says Bryce-Johnson.

Hackers don't need much information to steal your identity. Tim Falinski, director of consumer at Trend Micro, says they're typically after your password, date of birth

▼ Are you inadvertently leaving your personal details visible to all?

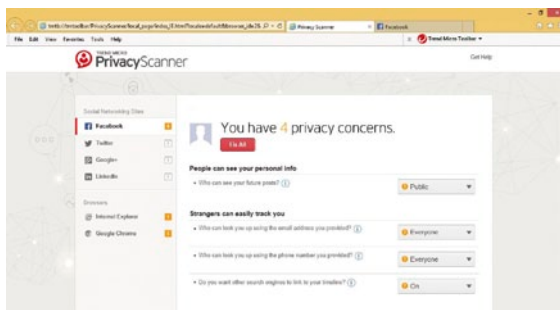
and address. "You can pretend to be anyone if you have their date of birth and address," he says.

Criminals gaining access to your email account may not sound all that alarming, but it's the authentication capability that your email account provides that makes it an attractive target. "The reason they're targeting your Gmail, Yahoo or Hotmail account is that it's usually linked in with your bank. This is where they send password reset links to," says Falinski.

Identity theft can also occur when an e-commerce website is breached, giving criminals access to the site's vast database of usernames and passwords. Earlier this year, criminals were able to hack into eBay by compromising a small number of employee log-in credentials - a tactic that gave them access to eBay's corporate network.

While eBay insisted there was no evidence of unauthorised access to financial or credit card information, Falinski says the main risk was related to hackers using the usernames and passwords to login to other sites.

"On average, people have 26 online accounts but only five passwords. If you get hacked in one place, then you can get hacked in quite a few



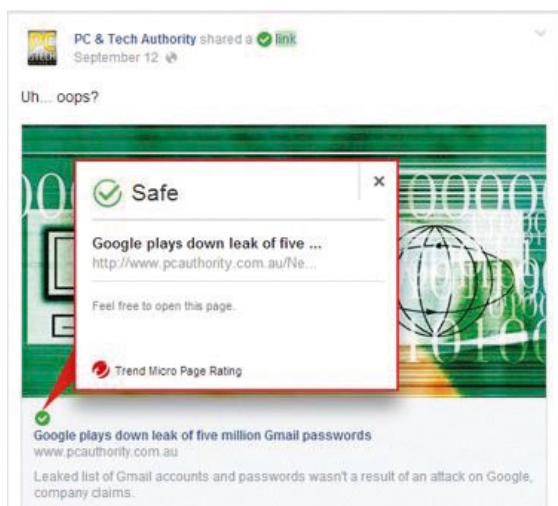


other areas. With the eBay hack, criminals ended up with your email address, username and password. That becomes a problem if that same email address and password is used on other sites," says Falinski.

STAYING SAFE AGAINST IDENTITY THEFT

Since identity theft can occur from multiple sources, there's no silver bullet approach for staying safe. The first step is being mindful of the different ways that identity theft

▼ Even 'trusted giants' like Google can suffer security breaches



can occur and how harmful it can be if your email credentials fall into the wrong hands.

The next step is installing a comprehensive Internet security suite on all of your devices - including your smartphone and tablet. This suite will identify any malware on your machine, prevent you from visiting infected websites designed

Password Manager product available for \$49.95.

One of the best cross-platform password managers is LastPass, The Premium service, which costs US\$12 a year, lets you use the password manager on iOS, Android, Windows Phone, and BlackBerry, in addition to the standard Windows and Mac apps. Given the high percentage of

"If you get hacked in one place, then you can get hacked in quite a few other areas"

to harvest your personal information (such as fake banking and PayPal websites), and scan your social media feeds for anything suspicious.

"Plenty of people store their passwords and Internet banking details in their web browser, and this information just gets saved in a batch file or text file that's on the computer," says Falinski.

"Viruses that are getting on our computers these days aren't trying to crash them - they're in there searching for text files and sending that information off. You don't see the virus working because it's just trying to steal your identity information and send it back to the host computer. All of a sudden, they've got your list of passwords. With very minimal fuss, these people can actually gather your identity enough to spend money in your name or ransom your life."

Rather than save passwords to your browser or have the same few passwords for all of your online accounts - both of which set you up for an identity theft attack - Falinski recommends installing a password manager that works across all of your regularly used devices.

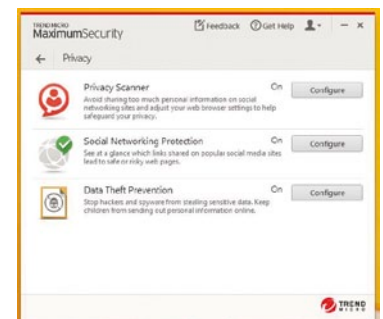
"With a password manager, you remember one master password, and generally every other password is generated by the program itself or saved in there," he says. Having a different password for each account means that even if one of your accounts is compromised, the rest of your accounts are safe.

Some Internet security suites include a built-in password manager, but you may have to upgrade to the premium version to get access to it. In the case of Trend Micro, the standard Internet Security suite doesn't include it, but the Maximum Security suite does. Other vendors sell password managers as a separate product, like Kaspersky with its

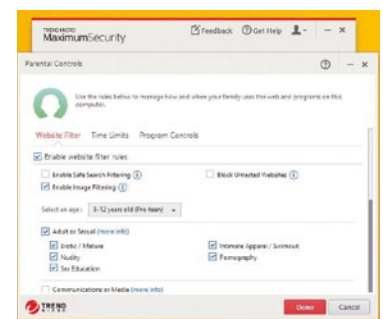
people doing online shopping, social networking and online banking through mobile devices, having a password manager that works across both desktop and mobile is important.

Other ways to stay safe against identity theft include staying on top of privacy settings on social media, checking permissions whenever you install an app from an unknown vendor, and refraining from Internet banking while you're connected to a public Wi-Fi hotspot.

"Above all that, remember that vigilance is important," says Falinski. "Having a security suite that protects all of your devices is essentially like buying an insurance policy from people who are working in the online security business 24/7."



▲ Security software now often includes privacy protection tools



▲ Granular control over settings is expected

THE NEW POWER PC PLATFORM

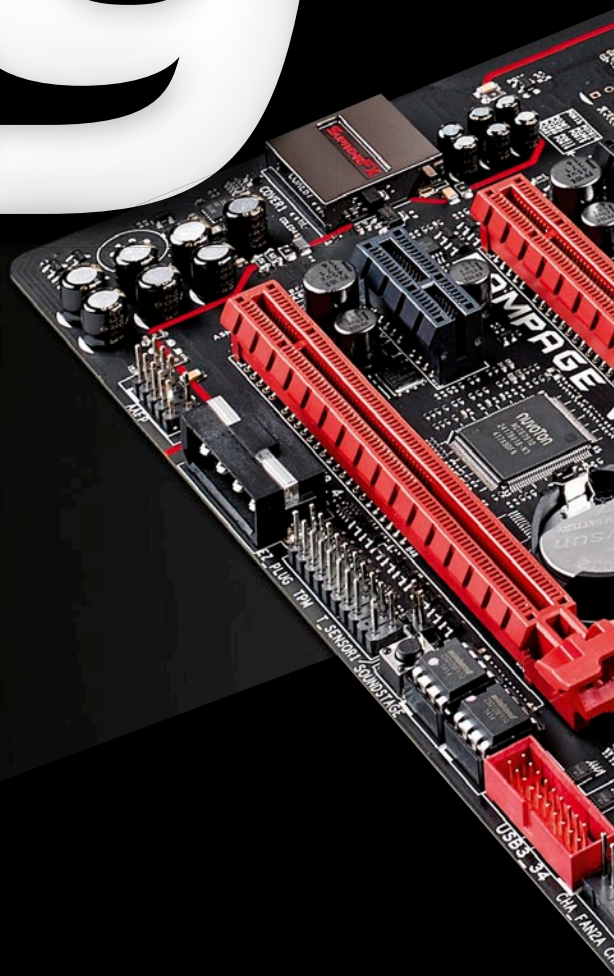
X99

WITH INTEL'S NEW X99 CHIPSET COMES MANY INTERESTING FEATURES, SUPPORT FOR THE NEW DDR4 MEMORY SPECIFICATION, AND, A BONANZA OF NEW MOTHERBOARDS. **MARK WILLIAMS** EXAMINES THE TECH, THE NEW MOTHERBOARDS, AND ITS POTENTIAL

X99 motherboards have landed. As is usually the case, the first products to arrive are geared to the high end, suiting both gamers and overclockers. That makes good sense, given that this is a platform designed for maximum performance. Thus, it isn't for everyone, as there is, initially at least, a price premium for these new boards, not to mention the need to buy new DDR4 memory, and a new CPU. Can X99 deliver for you? Our guide will reveal all...

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X99 ushers in the new king of the desktop

WITH INTEL'S NEW CHIPSET COMES A RAFT OF ASSOCIATED TECHNOLOGIES AND PRODUCTS, PLUS THE ALL-IMPORTANT PERFORMANCE KICK.



Products from Intel that form its High End Desktop (HEDT) platform aimed at the prosumer segment, being the part of the market that bridges the gap between regular consumer and workstation/server level parts, have been in something of a no man's land connectivity-wise for some time now. The X79 chipset was born back in November 2011 to support the then new Sandy Bridge-E CPUs and sported two SATA3 (6Gb/s) and four SATA2 (3Gb/s) ports along with fourteen USB2.0 ports.

Right from its launch, the X79 chipset was already somewhat on the back foot. SATA3 was relatively new and SSDs were still yet to gain wide spread adoption, so having just two of these ports can be forgiven. But no USB3 support when it had been ratified for almost the same amount of time (three years) was a bit of an eyebrow raiser, especially given the long two+ year lifespan the chipset was expected to have.

Fast forward two years to September 2013, when Intel launched the Ivy Bridge-E CPU range. Many were hoping for a new chipset to help satiate their desire for more IO bandwidth for their storage devices, but none came and Intel's premier desktop platform was left as a bit of a laughing stock as the lower consumer grade segment saw the Z77, Z87 and Z97 chipsets launch and pass it by with more and more connectivity options included in each iteration. Motherboard manufacturers had to resort to including third-party chips on their boards to support these extra required features and have kept X79 on life support this way since.

However, all is not lost. Intel has now made something of an apology letter in the form of the X99 chipset.

WHAT'S OLD IS NEW AGAIN

The new X99 Platform Controller Hub (PCH) inherits many things from

its X79 heritage, it's definitely an evolution rather than revolution.

DMI 2.0 at 4GB/s is still there as the interconnect to the CPU along with the same eight PCIe 2.0 lanes. USB2.0 still features, but the native number of ports has been reduced from fourteen down to eight, and SATA



▲ Nothing but SATA3 on X99 boards, perfect for multiple SSDs.

RAID levels 0, 1, 5 & 10 are still fully supported.

So what's new? All of X99's SATA ports are now SATA3 ports, and has raised the port count up to ten. However, it seems the SATA controller portion of the X99 is just a spruced up X79. RAID is only supported on the first six ports (how many X79 had), the final four not only don't support RAID, but also don't support booting from them or AHCI. So it seems a four port SATA hub was attached internally to an uprated X79 SATA design to help beef up the port count. This could also be the reason why SATA Express is not included, but then there aren't many, if any, products on the market to even take advantage of that yet.

▼ Storage is the big winner, again, with speedy USB 3 ports, up to ten of them.

USB3 comes on strong, with six ports supported natively. Adding those to the eight USB2 ports and X99 still sports the same number of USB ports as X79.

Apple's Thunderbolt standard has also made its way into X99. It's unclear how popular Thunderbolt will become, especially as Windows doesn't support the standard too well at the moment, and with it paired to the X99 PCH instead of directly to the CPU (like Apple Macs do), peak performance as a result could be less than desired. The final big hurdle here is that Intel doesn't provide Thunderbolt silicon on the chip, and is leaving it to manufacturers to provide an add-in board to attach to the provided header. Most are simply not including these add-in cards to reduce costs, further hampering adoption.

WHAT DOES IT ALL MEAN?

With all this new found connectivity and bandwidth now integrated into the X99 PCH it frees up the PCIe 2.0 lanes for other value add tasks. Motherboard manufacturers are already putting them to good use by hanging from it even more USB3 ports, M.2 sockets, mini-PCIe sockets for Wi-Fi modules and capture cards, SATA Express ports or just straight up giving you extra PCIe 2.0 slots for even more cards. It's a breath of fresh air that makes the HEDT platform once again worthy of its name. Intel if you're reading this, apology accepted.

Read on to see our reviews of the new high-end X99 motherboards now available.



A TRIO OF DICE

The three new Haswell-E CPUs that have launched with the X99 platform are the Core i7 5820K, i7 5930K and i7 5960X.

These are all enthusiast parts with unlocked multipliers (hence the K or X suffixes) with 140W TDPs and unlike socket 1150 Haswells, these are thoroughbred CPUs with no integrated graphics at all, every square inch is pure CPU muscle. Compared with Ivy Bridge-E, quad channel memory is still used but is now of the faster DDR4 kind, and forty PCIe lanes is still the standard. They require a modified 2011 socket ('2011-3'), which is incompatible with older socket 2011 variants.

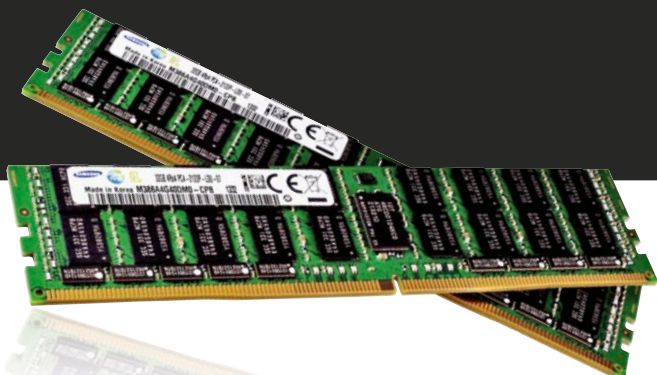
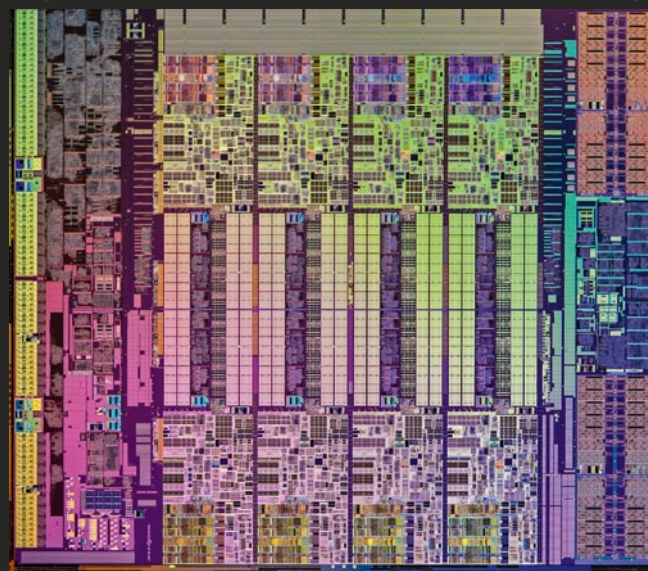
The X suffix of the 5960X denotes the return of the 'Extreme' branded CPU. The 5960X is the poster boy for Haswell-E at the moment and will cost you a pretty penny but you'll get the first monster eight core (sixteen threads) dedicated desktop CPU available from Intel. It comes with a huge 20MB of cache and operates at only a base clock of 3.0GHz with a turbo of 3.5GHz. With eight cores, frequency had to be sacrificed to stay inside the sockets power envelope.

The mid-range i7 5930K is effectively the replacement of the old outgoing i7 4960X. It has the same number of active cores (6), cache (15MB) and PCIe lanes (40) but it runs a bit slower at 3.5GHz with a turbo of 3.7GHz though the more efficient Haswell architecture will easily make up for that deficit. It is, however, 40% cheaper at launch!

The cheapest of the trio is the i7 5820K. Instead of cutting core counts or frequencies (though it is down slightly to 3.3GHz base and 3.6GHz turbo) Intel has chosen the interesting route of disabling the amount of PCIe lanes available, from the normal forty down to twenty-eight. This provides an intriguing middle ground chip that bridges the gap between the 1150 socketed chips with just sixteen lanes and the higher end 2011-3 chips. This should prove enticing enough to overclockers and enthusiasts with just single or dual graphics card setups that want more CPU grunt. Having fewer lanes, however, means that motherboards when using this CPU will disable certain PCIe slots or reduce the speed of them, especially in conjunction with an M.2 device, so be sure to check motherboard manuals before purchasing so you know what to expect.

Despite these new CPUs overclocking on average to around 4.3GHz, for games they're not currently any better than regular socket 1150 chips which offer far better value and will give you essentially the same gaming experience. These are better suited to heavy multithreaded loads like video editing and 3D.

▼ Eight cores! However, many apps are still poorly optimised for multi-threading.



DDR4 – WHAT'S NEW?

DDR3 has been with us for a long while now, seven years if you can believe it, which is an eon in computing terms. Surprisingly DDR4 is even older, at least from concept to commercial product, with it first being proposed before DDR3 even launched back in 2005. The first test samples of DDR4 didn't even arrive until 2011. Standards take time, a long time.

So now that Haswell-E and thus X99 boards demand DDR4 what does it bring to the table? Well, like DDR3 did to DDR2, power savings, higher frequencies and higher densities are the beneficiaries.

FREQUENCIES

DDR4 is generally starting out at 2133MHz but memory makers are already pushing the frequencies way beyond anything DDR3 could ever achieve. For the X99 launch there are already kits out at 2800MHz with 3200MHz soon after. Overclockers are already pushing them past a dizzying 4000MHz! It's still early days for DDR4, expect higher speed as the technology matures.

POWER

In this age of mobile devices and environmental concerns, power was also a big factor. DDR3 initially started out requiring 1.8v and has since worked its way down to 1.5v as manufacturing improved. DDR4 will lower voltages yet again by starting out at an initial 1.2 volts with low voltage variants working on just 1.05 volts. DDR4 also introduces a deep power saving mode which is claimed to offer around 40 to 50% in power savings when idle.

DENSITY

DDR4 also calls for higher density chips to be used. This means we get a jump in capacity per stick of RAM. Expect DDR4 to start out with capacities of 4GB for single rank DIMMs and 8GB for dual rank with up to 64 or 128GB being possible in the server space down the road.

PHYSICAL CHANGES

DDR4 at first glance looks basically the same. Looking closer, DDR4 now has 288 pins instead of DDR3's 240. The notch has also moved so DDR4 can't physically insert into memory slots for other types, but the big difference (which is subtle and easy to miss) is that the centre half of the pins stick out just a fraction more than the pins at either end, creating a slightly bulged look. This allows for easier DIMM insertion as you're only pushing in half the pins at any one time, genius!

GIGABYTE GA-X99-SOC FORCE

If the Lamborghini black and orange colour scheme doesn't make it clear, the Formula car on the box says it all: this board is made for overclocking to extreme speeds.

An OC button on the rear IO panel allows budding overclockers to easily get started on their record breaking journey, but advanced users will be more interested in the other thirteen buttons on board, nine of which are exclusively dedicated to overclocking tasks, meaning on the fly alterations on an open test bench will be a cinch regardless of OS or software.

Beside these buttons is a nine-port strip of multimeter voltage probe points and two temperature sensor ports to help you keep an eye on things under the skin of this board. Eight cables are provided with the

board to allow you to affix your multimeter to the voltage points in a more permanent manner so you don't have to stand there holding probes.

A unique item with the board is the 'OC Brace'. Essentially a metal bracket designed for an open test bed situation to provide physical support to any PCIe cards you might have plugged in.

Unfortunately there's two areas where this board falls short. There's only the secondary 8-pin EPS power connector used for the CPU, while other boards have utilised the tertiary 4-pin EPS power connector for extra power stability while on the edge, and no special back plates are included for LN2 pots or delid die guards. Both are a shame considering what this board is designed for.



VERDICT

As the cheapest of the boards in this round up aimed directly at overclocking this really is a nice quality piece of kit. If your heart burns for an open test bed setup this could be the board for you.

KEY SPECS

13 easy access on-board buttons • sleeved SATA cables • voltage cables • 'OC Brace' • 8x rear USB3 ports • PRICE \$529

PERFORMANCE	★★★★☆
FEATURES&DESIGN	★★★★☆
VALUE FOR MONEY	★★★★☆

OVERALL ★★★★★



GIGABYTE GA-X99-GAMING G1 WIFI

Coming in at the same price as the Gigabyte SOC Force, this board dials down the overclocking features and turns up the gaming focus.

The first gaming feature of note is the Killer E2201 NIC provided alongside a standard Intel NIC. This NIC allows the user to prioritise traffic flowing through it, thus allowing games priority over other less latency sensitive traffic to



reduce lag or to help improve media streaming performance.

The second major focus of this board is its audio features, particularly the effort put into giving you the best experience possible from its Creative Sound Core 3D chip, the only board in our roundup to use this. Left and right audio channels are separated onto separate PCB layers with Bi-Polarized capacitors, upgradeable OP-AMP, gain boost switch, headphone amplifier IC and two power isolated USB ports for Digital-to-Analog converters (DACs) are just some of the inbuilt audio quality features.

As the name suggests the board also has Wi-Fi inbuilt, thanks to an Intel 7260 Wi-Fi AC module. The module and included antennae use a 2x2 setup allowing up to 867Mbps transfer rates.

KEY SPECS

13 easy access on-board buttons • sleeved SATA cables • voltage cables • 'OC Brace' • 8x rear USB3 ports • PRICE \$529

Unlike many of the other boards in this roundup, if an M.2 SSD is installed it won't disable or reduce any of the PCIe lanes, meaning you can run a full 4-way SLI/crossfire setup with an M.2 SSD and not have to worry about bandwidth limits or disabled slots.

As with the SOC Force, all USB3 ports on the rear panel run off just two hubs meaning potential USB bandwidth contention issues when multiple USB3 devices are connected and working at full bandwidth-consuming speed.

VERDICT

This is a board any gamer will be proud to own, especially if you value the audio quality and features included out of the box, so there's no add-in sound card required here.

PERFORMANCE	★★★★☆
FEATURES&DESIGN	★★★★☆
VALUE FOR MONEY	★★★★☆

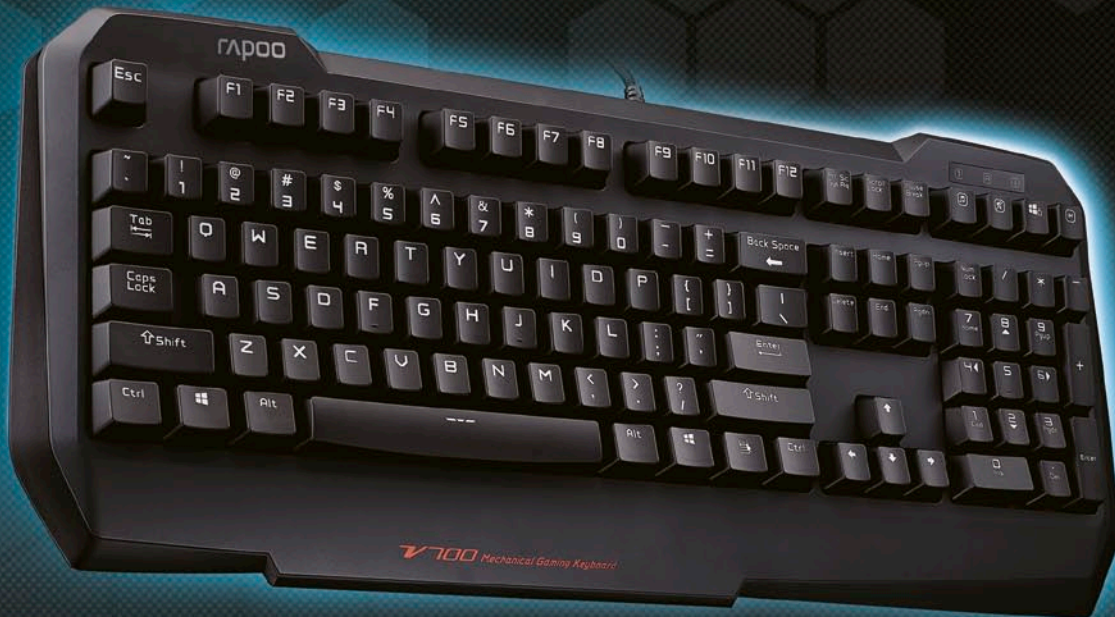
OVERALL ★★★★★





VPRO

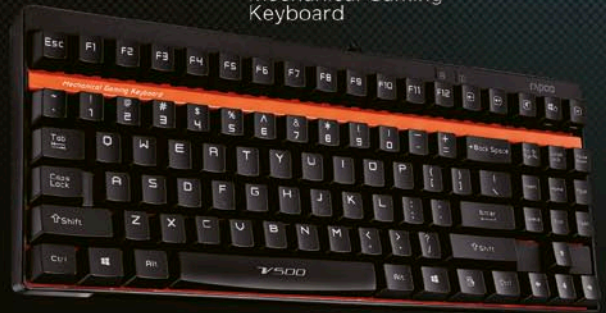
Pro Gaming Peripheral Series



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Keyboard



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Gaming Keyboard



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Mechanical Gaming
Keyboard

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ASROCK X99 WS

From the outset it's obvious this board is aimed at workstations (hence the WS suffix) or even entry level servers.

From the short flat headed screws on the rear and thin CPU back plate to provide compatibility with 1U rack mount chassis to the dual gigabit NICs that support teaming to provide the highest network throughput possible, this board is meant for doing work.

The memory support for both ASRock boards is also the best of those reviewed, supporting features the others (at least currently) don't. Along with a maximum 128GB capacity and XMP support, both ECC and RDIMM memory modules are supported meaning you can get the most stability from any Xeon CPUs you might drop into this board.

Surge and electrostatic protections are also prominent. Motherboard power and LAN ports have anti surge capabilities and the USB, LAN and some MOSFETs sport electrostatic discharge protection, so stability is better than average.



Both ASRock boards also have a 12 phase CPU power design (more than almost all others reviewed) further solidifying the mantra of stability for work horse machines.

One thing that might have been nice is an extra PS/2 port. Why? To support legacy KVM switches that might be in use, which is especially relevant considering where these types of workstation boards might end up being used.

KEY SPECS

128GB non-ECC • ECC & RDIMM memory support • eSATA, HDD saver • dual teamable NICs • 4x rear USB3 ports • **PRICE \$399**

Lastly, a neat feature shared on both ASRock X99 boards reviewed here is the HDD Saver feature. This connects a HDDs power directly to a special motherboard socket, and via software you can power down or up the individual HDDs at will. It's a very convenient drive power saving and security measure, if that is important to you.

VERDICT

Looking to build a workstation, entry level server, rendering box or bitcoin mining rig? The stability and safety features of this board make it an obvious choice.

PERFORMANCE	★★★★☆
FEATURES&DESIGN	★★★★☆
VALUE FOR MONEY	★★★★★

OVERALL ★★★★★



ASROCK EXTREME6

This board is the smaller brother to the X99 WS both physically - being ATX vs EATX - but also in terms of expansion slots.

It drops two PCIe x16 slots and thus the ability to support quad SLI/Crossfire. The PCIe x16 Gen2 slot of the WS was also removed and replaced with two PCIe x1 Gen2 slots. Although less, this unique

arrangement allows it to easily support two triple-slot graphics cards in SLI.

Like the WS, slotting an M.2 SSD in means the 8-laned PCIe slot is disabled. Which on this board is rather bad given the rigid fixed lane configuration, rendering even triple SLI/crossfire out of the question if M.2 is used.

One curious feature is the mini-PCIe port. That, combined with pre-made holes on the provided IO cover plate for Wi-Fi SMA connectors, suggests they've designed this board to be compatible with a mini-PCIe Wi-Fi module, yet no mention is made anywhere about this in the documentation we recieved, nor is any module provided.

One poor design feature is the Molex connector to provide extra

KEY SPECS

128GB non-ECC • ECC & RDIMM memory support • eSATA • HDD saver • dual teamable NICs • 6x rear USB3 ports • only 3-way SLI support • dual triple-slot card support • **PRICE \$359**

power to the PCIe slots when the board is fully loaded up with PCIe cards. It's plonked smack in the middle of the board, above the first PCIe slot next to the left set of RAM banks. There's no amount of cable routing that's going to make that guy, if plugged in, look good.

Where this board does surpass the WS is in the USB department. An extra two USB3 ports are provided on the rear panel as well as internally via an extra header. There's even a USB-A socket for things that won't work with headers.

VERDICT

Being the cheapest in our roundup, if you just want the grunt of Haswell-E(P), maybe light to medium overclocking and will only use one or two PCIe cards, this is the board for you.

PERFORMANCE	★★★★☆
FEATURES&DESIGN	★★★★☆
VALUE FOR MONEY	★★★★★

OVERALL ★★★★★



MSI X99S XPOWER AC

The matt black and yellow colours look fantastic, I think, and reflects the performance potential this board can deliver.

Similar to the Gigabyte SOC Force this board sports a bevy of overclocking focused features. It has ten on board buttons, five of them directly for overclocking adjustments on the fly. Next to those is a bank of nine voltage measurement ports that can be used with the six included voltage check cables for multimeter readings. Below those are some DIP switches that allow you to physically disable PCIe slots, a BCLK increment selector, OC Genie (aggressiveness) switch, and a Slow Mode switch to force a 12x CPU multiplier.

The CPU socket gets some love too. It has ample room around the socket for an LN2 pot plus insulation. MSI also include an alternate back plate specifically for LN2 pot support as well as a delid guard which is compatible with both back plates. This guard gives you some extra safety to prevent crushing

or fracturing the CPU from heavy cooling solutions sitting on an exposed core.

Of particular note, there's an included Overclocking Guide gives some really good in-depth coverage on the new intricacies of overclocking Haswell-E CPUs, with tips and guidelines to get you on your way. It's a satisfying read even for seasoned enthusiasts moving over to X99.



KEY SPECS

10 easy access on-board buttons • delid guard and LN2 backplate, fan stand • 10x rear USB3 ports •
PRICE \$549

The last unique thing included is a fan stand for use in an open test bed situation. It's heavy enough to stand alone, but also includes various screws and stand offs to help you to get air flow directed exactly where it's needed.

Unfortunately this board also has the same mystifying PCIe slot with zero lanes assigned to it as the Gaming 9 AC.

VERDICT

A solid product for overclockers, especially those on the extreme using LN2. But with the delid guard, even those with water cooling should find extra performance where others cannot with this board

PERFORMANCE	★★★★★
FEATURES&DESIGN	★★★★★
VALUE FOR MONEY	★★★★★

OVERALL ★★★★★

MSI X99S GAMING 9 AC

Gunning straight for the enthusiast gamer, the unique selling point of this board is the "Streaming Engine". Pulling out this mini-PCIe card it appears to be an Avermedia C353 capture card with 512MB of on-board LPDDR RAM which supports encoding up to 1080p at 30fps. This is perfect for streaming services like Twitch, allowing you to offload the encoding task from your graphics card or



CPU, thus freeing up resources for the game you're running. To get your online streaming shenanigans started right away, MSI even includes a two year premium license to the Xsplit Broadcaster and Gamecaster services.

Now, if you're playing online multiplayer while streaming it can impact on your lag times, so MSI have thoughtfully also included a Killer E2205 NIC for improved latency and network traffic prioritisation giving you the smoothest possible online gaming experience.

Under the hood, the PCIe lane configuration has a slightly perplexing setup. Despite having five x16 slots only four of them work. The middle slot appears to always be in a disabled state. Even though this slot is in the even expansion slot position and thus would normally go unused

KEY SPECS

Avermedia C353 "Streaming Engine" • Killer E2205 NIC • Wi-Fi AC+BT4 & two antennas • 8x rear USB3 ports •
PRICE \$569

as dual slot GPUs coolers would hang over it, it begs the question why include the slot at all?

The final unique feature with this board is the audio power switch. Attaching the included power adapter and flipping a switch you can have power supplied to the audio chip directly from the power supply instead of via the 24-pin ATX connector on the other side of the board, providing a slightly more stable power source with less noise for your aural pleasure.

VERDICT

Aside from offering solid overclocking and expansion features, if you plan on streaming to the likes of Twitch this board gives you the perfect setup to assist you do that in the smoothest possible fashion.

PERFORMANCE	★★★★★
FEATURES&DESIGN	★★★★★
VALUE FOR MONEY	★★★★★

OVERALL ★★★★★



ASUS X99 DELUXE

This black board with white highlights gives this a nice Star Wars storm trooper vibe. The most prominent piece of white is the plastic cover that runs the entire length of the left side of the board. It can be easily removed if desired however which might be worthwhile to improve thermals as the cover impedes the heat sink underneath it, especially once you install a memory stick alongside closing off around 2/3 of that heat sinks exposure to air. However the plastic cover also contains the Realtek audio chip EMI shielding, so there's benefits to both leaving the cover on or removing it.

Despite being an ATX board it somehow manages to cram in essentially everything that EATX boards usually have. It's so packed that they've thought outside the box for the M.2 slot and made it slot perpendicularly outwards from the board, secured with an included M.2 card bracket. This saves room rather than laying it down horizontally on the board.

Asus even include a PCIe card with another M.2 adapter on it, giving you dual M.2 support out of the box.

Another space saving feature is the way the fan headers function and can be controlled. The Asus X99 Deluxe has six natively which normally should be enough, but via an expansion module you can



plug in a further three fans and thermistors, giving you nine total fan headers that can be controlled via the BIOS directly.

A unique property of both Asus boards reviewed here is the open ended PCIe Gen2 slots, which allows you to slot in up to a x16-wide card, which allows support for an impressive six x16 cards simultaneously.



KEY SPECS

Six PCIe x16 capable slots • dual M.2 ports • Wi-Fi AC+BT4.0 and 3x3 antennae • 2x SATA Express ports • 10x rear USB3 ports • **PRICE \$579**

VERDICT

If you need an ATX board, this has done its best to imitate a Tardis and crammed an impossible amount of features and expansion options into the smaller form factor.

PERFORMANCE	★★★★★
FEATURES&DESIGN	★★★★★
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★★

ASUS RAMPAGE V EXTREME

This board is Extreme! From the price it demands, through to having it actually written on the motherboard itself.

Like the X99 Deluxe, this board features what Asus are calling an 'OC Socket'. What they've done is added more pins to the 2011-3 socket (a rough count with a magnifying glass shows about 62 extra over the SOC Force's socket). This is to exploit undocumented extra contact pads on Haswell-E CPUs, to not only provide more stable overlocking voltages to the CPU but to also improve DDR4 latencies, stability and frequencies. Tricky! However it seems this very feature prevents both boards from supporting Xeon processors.

The big ticket item included in the

box is the 'OC Panel'. Measuring in at 185x85x35mm, although it can stand alone on a desk using the inbuilt kick stand or mount directly into the provided 5.25" bay adapter, it's designed to be held in your hand in an open test bed situation. Along with the inbuilt 2.6" display showing you all manner of voltages, temperatures, ratios, RPMs and more it also provides four extra fan headers, temperature sensor ports, VGA hotwire and SMB headers as well as Slow Mode and Pause switches, all literally at your fingertips enabling you to do just about everything in real time without touching the BIOS or having to load into your OS.

The board also has a lot of LN2 features. From the 'X-socket II' back



KEY SPECS

12 SATA 6Gbps ports • OC Panel • Wi-Fi AC+BT4.0 and 3x3 antennae • 2x SATA Express ports • 10x rear USB3 ports • **PRICE \$699**



plate for better LN2 pot support to the LN2 mode jumper, slow mode switch and ReTry button. It's obvious this board is capable of breaking records, not just your wallet.

VERDICT

If you want the ultimate X99 board for your overlocking adventures and can handle the asking price, this package nails it.

PERFORMANCE	★★★★★
FEATURES&DESIGN	★★★★★
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★★



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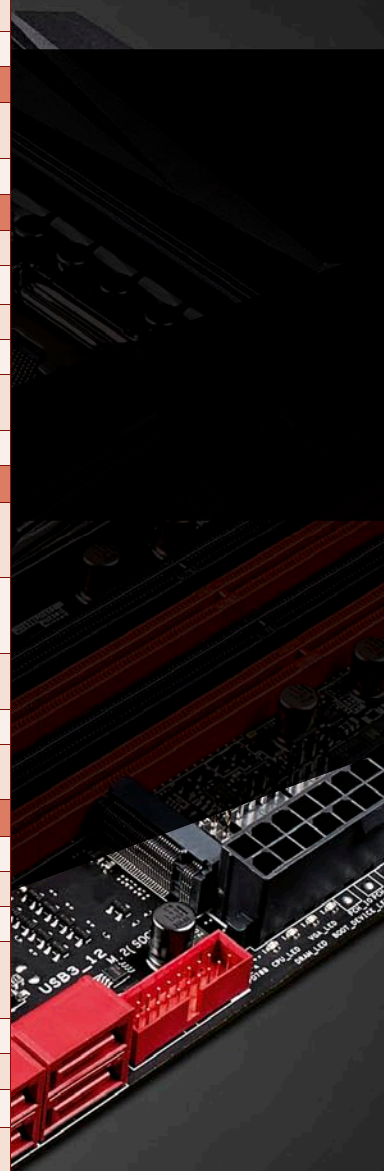
**SUPER
OVER
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**FLEX
DISPLAY**

WINDFORCE

BRAND	GIGABYTE	GIGABYTE	ASROCK	ASROCK	
Model	GA-X99-SOC Force	GA-X99-Gaming G1 Wifi	X99 WS	X99 Extreme 6	
Rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	
Form factor	EATX	EATX	EATX	ATX	
Price	\$529	\$529	\$399	\$359	
MEMORY					
Maximum OC memory speed	3000MHz+ Non-ECC	3000MHz+ Non-ECC	3200MHz+ Non-ECC	3000MHz+ Non-ECC	
Memory slots (Max capacity)	8 (64GB)	8 (64GB)	8 (128GB)	8 (128GB)	
Supports	XMP, RDIMM (Non-ECC)	XMP, RDIMM (Non-ECC)	XMP, ECC, RDIMM	XMP, ECC, RDIMM	
POWER					
Power connectors	1x 24-pin ATX, 1x 8-pin ATX, 1x SATA	1x 24-pin ATX, 1x 8-pin ATX, 1x SATA	1x 24-pin ATX, 1x 8-pin ATX, 2x Molex, 1x HDD Saver	1x 24-pin ATX, 1x 8-pin ATX, 1x Molex, 1x HDD Saver	
CPU phases	8	8	12	12	
EXPANSION SLOTS					
PCIe x16	4x Gen3	4x Gen3	5x Gen3 + 1x Gen2 (4-lanes)	3x Gen3	
PCIe x4	0	0	0	0	
PCIe x1	3x Gen2	3x Gen2	0	2x Gen2	
Multi GPU support	4-way SLI & Crossfire	4-way SLI & Crossfire	4-way SLI & Crossfire	3-way SLI & Crossfire	
Lane config	Gen3 (1x16/2x8), 1x16, 1x8Gen2 3x1	Gen3 (1x16/2x8), 1x16, 1x8Gen2 3x1	Gen3 (1x16/2x8), (1x16/2x8), 1x8 Gen2 1x4	Gen3 2x16, 1x8 Gen2 2x1	
Other	N/A	N/A	N/A	1x mini-PCIe	
REAR PANEL					
Network	1x Gbit RJ-45 via Intel hub	2x Gbit RJ-45 via Qualcomm Atheros Killer E2201 & Intel hub + 2x SMA for Intel 7260 WiFi module	2x Gbit RJ-45 via Intel I217LM & Intel I210AT	2x Gbit RJ-45 via Intel I218V & Qualcomm Atheros AR8171	
Audio (Chipset)	5x jacks, 7.1 surround, Optical S/PDIF out (Realtek ALC-1150)	5x jacks, 5.1 surround, Optical S/PDIF out (Creative Sound Core 3D)	5x jacks, 7.1 surround, Optical S/PDIF out (Realtek ALC-1150 w/DTS Connect)	5x jacks, 7.1 surround, Optical S/PDIF out (Realtek ALC-1150 w/DTS Connect)	
USB ports	8x3.0 via 2x Renesas hubs, 4x2.0	8x3.0 via 2x Renesas hubs, 4x2.0	4x3.0 via X99, 4x2.0	6x3.0 via 3x ASMedia hubs, 2x2.0	
Legacy ports	1x PS/2	1x PS/2	1x PS/2	1x PS/2	
Other	CPU OC, BIOS switch & Clear CMOS buttons	CPU OC, Fast Boot & Clear CMOS buttons	1x eSATA, Clear CMOS button	1x eSATA, Clear CMOS button	
INTERNAL PORTS					
USB headers	1x3.0, 2x2.0	2x3.0, 2x2.0	1x3.0, 2x2.0	2x3.0, 2x2.0, 1x USB 2.0 Type-A	
SATA 3.0 6Gbps	10	10	10	10	
RAID Support	Yes (0, 1, 5, 10)	Yes (0, 1, 5, 10)	Yes (0, 1, 5, 10)	Yes (0, 1, 5, 10)	
M.2 (Socket 3, M key)	1x 2242/2260/2280, PCIe 3.0 x4	1x 2242/2260/2280, SATA 6Gbps	1x Socket 1 for Wifi module"	1x 2230/2242/2260/2280/22110, PCIe 3.0 x4	
SATA Express	1	1	0	0	
Fan headers	5x 4-pin	4x 4-pin	2x 4-pin, 4x 3-pin	2x 4-pin, 4x 3-pin	
Thunderbolt headers	1	1	1	1	
Other ports/headers	1x COM, 9x voltage probe, 2x temperature sensor	9x voltage probe	1x TPM, 2x COM	1x TPM, 1x COM	
EXTRA FEATURES					
Audio	PCB isolated, EMI shielded, L/R channels on independent PCB layers	PCB isolated, EMI shielded, headphone amplifier IC, Bi-Polarized caps, upgradeable OP-AMP, Gain boost switch, L/R channels on independent PCB layers, 2x power isolated USBs for DACs	PCB isolated, EMI shielded, headphone amplifier IC, differential AMP	PCB isolated, EMI shielded, headphone amplifier IC, differential AMP	
Error Code Readout	Yes	Yes	Yes	Yes	
Buttons	Power, Reset, Clear CMOS, Clear Battery, CPU ratio Up & Down, BCLK up & down, "Gear", "OC Ignition", "OC Tag", Settings Lock, Direct to BIOS	Power, Reset, Clear CMOS, Direct to BIOS	Power, Reset, Clear CMOS	Power, Reset	
Other	PCIe slot disable switch, Dual BIOS switch, OC Trigger switch	Dual Band Wifi AC + Bluetooth 4.0 module, BIOS selector switch, Single BIOS switch	Dual BIOS switch	Dual BIOS switch	
Notable included items	OC brace, voltage measurement cables	Wifi 2x2 Antennae, Wifi AC/BT4.0 module	HDD saver cable	HDD saver cable	

	MSI	MSI	ASUS	ASUS
	X99S Xpower AC	X99S Gaming 9 AC	X99 Deluxe	Rampage V Extreme
	★★★★★★	★★★★★☆	★★★★★★	★★★★★★
	EATX	EATX	ATX	EATX
	\$549	\$569	\$579	\$699
	3333MHz+ Non-ECC	3333MHz+ Non-ECC	3200MHz+ Non-ECC	3300MHz+ Non-ECC
	8 (128GB)	8 (128GB)	8 (64GB)	8 (64GB)
	XMP	XMP	XMP	XMP
	1x 24-pin ATX, 1x 8-pin ATX, 1x 4-pin ATX, 1x Molex	1x 24-pin ATX, 1x 8-pin ATX, 1x 4-pin ATX	1x 24-pin ATX, 1x 8-pin ATX	1x 24-pin ATX, 1x 8-pin ATX, 1x 4-pin ATX, 1x Molex
	12	8	8	8
	5x Gen3	5x Gen3	5x Gen3	4x Gen3, 1x Gen2 (4-lanes)
	0	0	1x Gen2 open ended slot	0
	1x Gen2 open ended slot	0	0	1x Gen2 open ended slot
	4-way SLI & Crossfire	4-way SLI & Crossfire	3-way SLI & 4-way Crossfire	4-way SLI & Crossfire
	Gen3 (1x16/2x8), 1x0, 1x16, 1x8 Gen2 1x1	Gen3 (1x16/2x8), 1x0, 1x16, 1x8 Gen2 1x1	Gen3 (1x16/2x8), (1x16/2x8), 1x8 Gen2 1x4	Gen3 1x16, (1x16/2x8), 1x8Gen2 1x4, 1x1
	N/A	1x mini-PCIe w/Avermedia C353	N/A	N/A
	2x Gbit RJ-45 via Intel I218V & I210AT + 2x SMA w/Intel 7260 WiFi module	1x Gbit RJ-45 via Qualcomm Atheros Killer E2205 + 2x SMA for Intel 7260 WiFi module	2x Gbit RJ-45 via Intel I218V & I211AT, 3x SMA for Wifi AC & BT4.0	1x Gbit RJ-45 via Intel I218V, 3x SMA for Wifi AC & BT4.0
	5x jacks, 7.1 surround, Optical S/PDIF out (Realtek ALC-1150)	5x jacks, 5.1 surround, Optical S/PDIF out (Realtek ALC-1150)	5x jacks, 7.1 surround, Optical S/PDIF out (Realtek ALC-1150 w/DTS Connect)	5x jacks, 7.1 surround, Optical S/PDIF out (Realtek ALC-1150 w/DTS Connect)
	10x3.0 via 3x ASMedia hubs, 2x2.0	8x3.0 via X99 & VIA & ASMedia hubs, 2x2.0	10x3.0 via 1x ASMedia Controller & 2x ASMedia hubs, 2x2.0	10x3.0 via 3x ASMedia hubs, 2x2.0
	1x PS/2	1x PS/2	0	1x PS/2
	Clear CMOS button	Clear CMOS button	BIOS flash button	Clear CMOS button, ROG Connect switch
	2x3.0, 3x2.0, 1x USB 2.0 Type-A	2x3.0, 2x2.0	2x3.0, 2x2.0	2x3.0, 2x2.0
	10	10	10	12
	Yes (0, 1, 5, 10)	Yes (0, 1, 5, 10)	Yes (0, 1, 5, 10)	Yes (0, 1, 5, 10)
	1x 2230/2242/2260/2280/22110, PCIe 3.0 x4	1x 2242/2260/2280, PCIe 3.0 x4	1x 2242/2260/2280, PCIe 3.0 x4	1x 2230/2242/2260/2280/22110, PCIe 3.0 x4 + 1x via included PCIe expansion card
	1	1	2 (1 via ASMedia controller)	2 (1 via ASMedia controller)
	7x 4-pin	5x 4-pin	6x 4-pin + 3 via expansion module	8x 4-pin
	0	0	1	1
	1x TPM, 9x voltage probe	1x TPM, 9x voltage probe	1x TPM, 1x S/PDIF	3x temperature sensor, 1x ROG extension, 1x TPM, 9x voltage probe
	PCB isolated, EMI shielded, headphone AMP IC, dual AMPs	PCB isolated, EMI shielded, dual headphone amp ICs	PCB isolated, L/R channels on independent PCB layers, de-pop circuit	PCB isolated, EMI shielded, headphone amplifier IC, Audio profile switcher
	Yes	Yes	Yes	Yes
	Power, Reset, Clear CMOS, Discharge, CPU ratio Up & Down, BCLK up & down, "OC Genie", Direct to BIOS	Power, Reset, "OC Genie"	Power, Rest, Mem_OK, Clear CMOS	Power, Reset, Mem_OK, Retry, BIOS selector, Safe boot, Audio profile, KeyBot
	PCIe slot disable switch, Dual BIOS switch, OC Genie switch, Slow mode switch, Base clock step switch	"Streaming engine" card, Dual BIOS switch, OC Genie switch, Audio power switch, Slow mode switch	TPU switch, EPU switch, 2x-3x SLI/CF switch, EZ XMP switch, CPU over volt jumper, Direct to BIOS jumper	PCIe slot disable switch, Slow mode switch, LN2 mode switch
	Fan stand, 2x Wifi Antennae, CPU delid die guard, IO EMI shield, USB stick w/drivers, voltage measurement cables	Audio direct power adapter, IO EMI shield, 2x Wifi Antennae, voltage measurement cables	Wifi AC 3x3 antennae, M.2 vertical riser bracket, Fan header expansion module, M.2 PCI-E card	1x 3-in-1 Thermistor cable, 3x3 Dual band Wifi AC antennae, OC Panel & kit, X-socket back plate



all talk

voice recognition comes of age

VOICE RECOGNITION HAS FINALLY MATURED ON SMARTPHONES AND WEARABLES, BUT THERE ARE SOME REMARKABLE BREAKTHROUGHS JUST AROUND THE CORNER, DISCOVERS **BARRY COLLINS**

She doesn't know me at all, of course. "She" is Indigo: a virtual, voice-activated assistant on my Android smartphone, who's every bit as convincing as Apple's Siri or Google Now. She doesn't bring me coffee or field my calls - but she's on top of my diary, reads my email and is getting better at understanding my home counties' drawl. I rarely have to repeat any of my mumbled utterances for her - which is more than I can say for most of the humans I know.

Voice recognition has finally cracked it - not for dictating emails and documents to PCs, as Lernout & Hauspie tried to get us to do 15 years ago - but for more specific tasks on our smart devices. This PA-in-your-pocket function is only one way in which voice recognition is now an essential part of our lives. Soon we'll be on speaking terms with our TV, wristwatch, and then domesticated eventually robots...

Your voice will not only help computerised systems know what

you want, but also who you are, through audio biometrics - the physiological sound of your voice and accent - to decide, say, which TV channels you should be offered, or whether you're the bank account holder. The spoken word is helping smart technology find its voice.

BIG DATA, BIG IMPROVEMENT

Voice recognition was pretty much a contradiction in terms when the software first appeared for Windows in the mid- to late-1990s. Many a *PC & Tech Authority* reviews writer was left thumping their desk in despair after spending six hours training the software with endless renditions of "Mary Had A Little Lamb", only to find the transcription was still less accurate than Mystic Meg.

Now, people simply pick up a smartphone, say "directions to Martin Place" or "the name of the actor who played Hitler in *Downfall*", and have every word - well, almost - transcribed

flawlessly within seconds, without any software training whatsoever. How did accuracy improve so miraculously?

BIG DATA

The answer is data, and lots of it. That software of 20 years ago was relying on a comparatively tiny library of speech patterns,

"When you say RAM, the voice-recognition software knows you mean Random Access Memory and not a male sheep"

accents and vocabulary that had to be squeezed onto floppy disks or CD-ROMs. Now, with more than two decades of additional data, and voice-recognition software that taps into huge cloud-based libraries rather than your device - accuracy has improved dramatically.

"This is a data-driven technology,"

says John West, principal solutions architect at Nuance, the company that makes the Dragon range of products, and is rumoured to be behind Apple's Siri (although neither company will confirm it). "Having that data makes the models more robust and therefore removes the requirement to do that training."

INTERPRETER

The ability to create a personalised profile and store it in the cloud – thus making it available to all your devices – is also a massive boon. As well as a regular dictionary, voice-recognition software creates a personalised version, which it builds through learning words and phrases you use regularly. By scanning your social network feeds, documents and emails, and by learning from your speech patterns as you use and correct the service, the software can start to make educated guesses about your intended meaning. It could, for example, know a particular correspondent often uses jargon related to the technology industry, "so when you say RAM, it knows you mean Random Access Memory and not a male sheep," says West. "It knows the context of the word and puts it in capitals."

SMART CHAT

The ability to add and remove "trending" words to the dictionary is another reason why today's software is exciting. "The name of a [World Cup] football stadium in Brazil, for example, is going to trend for a month," says West. "Then it will disappear, so we won't leave it resident in the dictionary, otherwise it would get so large that overall system accuracy would suffer."

Nowadays, it's not only specialist companies such as Nuance that build voice-recognition products, but tech powerhouses such as Google, Apple and Microsoft.

This means accuracy can be improved by leaning on the company's other products. Google's voice search can use the same algorithms that guess what you're looking for when you start typing into its search engine. It knows that Dave from Brisbane – located through his smartphone GPS – is more likely to be searching for the Brisbane Broncos when he says "footy score", than Casey from Balmain,, who's likely after results

"Good morning."

"Hi."

"What am I doing today?"

"You've only got one appointment today. It's at 10am."

She shows me my diary.

"Book a lunch meeting for me between 12 and 1pm with Keith."

"Which Keith? Keith Underwood or Keith Johnson?"

"Keith Underwood."

"Okay, I'll schedule the meeting."

"What are the best restaurants around Fortitude Valley?"

"These restaurants might interest you. Here are the eight highest-rated places." She shows me the list, although a hot-dog stand rather worryingly appears to be top of the pile; perhaps she knows me too well.

for his favourite team.

The adoption of artificial neural networks – machines trained to mimic the neurons in the brain – is also credited with huge advances in voice recognition. The University of Toronto's deep-learning expert Geoffrey Hinton, along with Microsoft, ran a series of experiments in 2009 to see if neural networks could help computers understand speech.

The results were "stunning", according to Microsoft Research head Peter Lee, in a report in *Wired* magazine. "A more than 25% improvement in accuracy... in a field where a 5% improvement is game-changing."

Neural networks have now been adopted by most of the major players, such as Microsoft and Google. It seems the best way to make computers understand human language is to have them "think" as humans do.

THE CHALLENGES

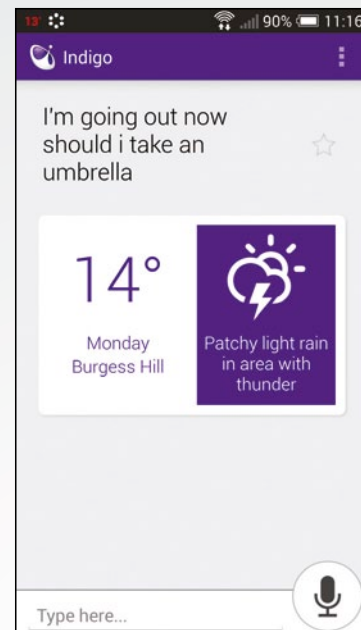
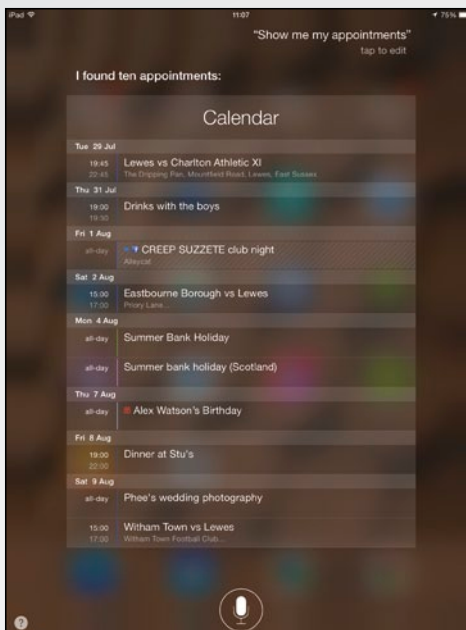
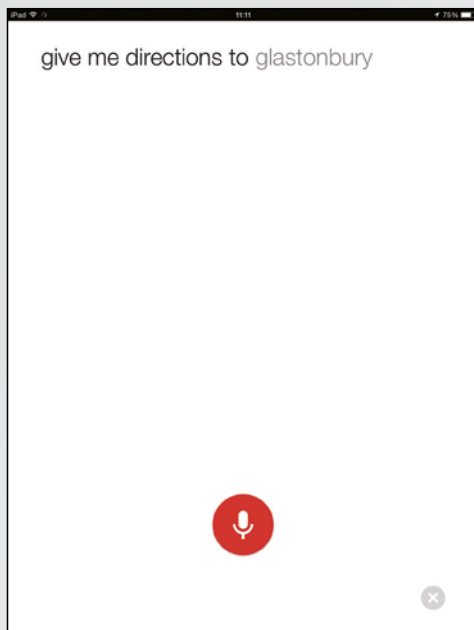
Still, significant problems remain with voice recognition. There still isn't enough data for many minority dialects and languages to receive a satisfactory level of accuracy. Developers at Bangor University recently launched an app to collect voice samples from Welsh speakers

to help them train their software, for example. The erratic speech patterns of children are another challenge to be overcome. Johan Schalkwyk, principal staff engineer on Google's voice-recognition team, recently told *CNET.com* that Google Now is still two years away from recognising kids' speech.

MEET YOUR ASSISTANT

The current trend for voice-recognition products is to turn them into a virtual PA, and once again it's Apple that has changed the course of a technology. "The market seems to be moving towards personal assistants," says Andy Peart, chief marketing officer at Artificial Solutions, which makes the Indigo voice app mentioned earlier. "Siri was really a tipping point. It vastly raised the profile of voice recognition."

These artificial assistants aren't only cropping up on smartphones and search engines, they're also increasingly being used as sales assistants to part you from your cash. For instance, the Ikea website urges customers to pose their questions to "Anna", who can answer natural-language queries such as "I need a TV cabinet" or "How do I return a bed?", albeit in typed text rather than speech. But that is



▲ From Android's Indigo and Apple's Siri through to Google Now, voice-controlled pocket PAs are getting smarter

quickly changing.

The next evolution of Anna will be in-app voice assistants, such as Artificial Solutions' Teneo, according to Peart. These will allow the shopper to complete a purchase without swiping or typing, responding to queries such as "What dresses have you got?", "Have you got it in a size 14?" or "Can you deliver on Wednesday?" You can see the full video demo at <http://vzaar.com/videos/1624325>.

CONVINCING REALISM

The level of interaction between user and voice assistant "will be deeper and more intelligent" for two reasons, says Peart. First, the app-makers want to avoid situations where the user has to change their method of input to complete a transaction: it's not such a problem on a smartphone or tablet, but on the next generation of wearable devices – such as smartwatches or Google Glass – voice input may be the only practical option available.

Second, by making the conversation more "natural", it helps ease people's reticence about talking to a machine, especially when they're in public. Nuance's John West says his company have just helped launch a robot concierge in a Japanese department store. "It will identify you as you come towards it, and say, 'Hi, how can I help you?'. And you'll say, 'I'm looking to buy a new iPhone', and it will say, 'iPhone,

okay', and take you round the store to where the iPhones are. As we develop this conversational user interface, people tend to be more comfortable using robots."

ROBOT ASSISTANTS

Yet, as anyone who has used Siri or its rivals will know, the prompts and responses from automated assistants become a little formulaic after a while. So the companies have been working on making them more varied and expressive: ask Siri to play Elton John and it might reply, "That's a good choice"; ask again and you could hear, "Coming right up".

So if machines act like humans, will this please or patronise users? West says the company is conducting research that's "looking at how tolerant people are to that kind of thing," and that one of the reasons the company doesn't make

robot assistants look like humans is "our expectation of humans is much greater than the capabilities of machines right now".

MACHINE TALK

Industry experts say people don't necessarily want to be engaged in conversation with a machine. "It's cute, but cute gets you only five minutes of interest from the user," says Horace Dediu, a former Nokia

"It seems that the best way to make computers understand human language is to have them 'think' like humans"

executive who now runs his own consultancy firm, Asymco. "Users are pretty smart about knowing it's a gimmick."

TIPPING POINT

It's clear we're approaching, or maybe even already at, a tipping point for voice technology. Owners of Android handsets can now activate voice search simply by saying, "Okay Google" whenever their phone is switched on. The company's desktop web browser has a similar feature, although it's available only to users in the US.

Meanwhile, Apple is improving Siri with every iteration of iOS, and there are rumours it will soon launch





“It’s clear that we’re approaching, or maybe even already at, a tipping point for voice-recognition technology”

a Siri API to allow third-party app developers to take advantage of the software’s voice controls. HomeKit, Apple’s new home-automation API, already allows users to dim the lights, lock doors and windows, and turn the thermostat down with a simple Siri voice command. Games consoles, TV remote controls and even lifts are increasingly being fitted with voice controls.

Voice isn’t used only for interaction – it’s also starting to be used for authentication and security. Barclays is using audio biometrics for its share-dealing platform, matching the customer’s speech against a “voiceprint” they recorded when signing up for the service, instead of entering their PIN or answering any important security questions.

UNIVERSAL TRANSLATOR

Perhaps the most exciting use of voice technology is coming from Microsoft, which earlier this year demonstrated Skype Translator, a service providing real-time translation of conversations between speakers of several different languages. This wasn’t a blue-sky demo: the product is due to ship later this year, raising the very near prospect of multilingual business meetings without the need to hire a translator, as everything is transcribed in text and speech as you speak.

While unveiling the software

at the Re/code conference in America earlier this summer, Microsoft CEO Satya Nadella said that the researchers discovered something extraordinary as they were teaching the computer different languages using the neural networks. “You teach it English and it learns English. Then you teach it Mandarin, and it learns Mandarin, but it becomes better at English. And then you teach it Spanish, and it gets good at Spanish, but it gets great at both Mandarin and English. And quite frankly, none of us knows exactly why. It’s brain-like in the sense of its capabilities.”

SCI-FI NOW

Microsoft’s live demo of a translation between a German and English speaker was genuinely astounding – although the translation might not yet be quite as “great” as Nadella promised, momentarily embarrassing the German speaker by claiming she was visiting America to see her friend’s fiancé instead of her own.

Nevertheless, voice recognition has turned a corner: computers could once barely transcribe speech in the speaker’s native language, but now real-time translation between speakers of many different languages is possible.

Not only is voice recognition letting tech understand us better, it’s letting us understand each other, too.

Everyone gets a voice

One of the greatest benefits of Siri, Google Now and other smartphone voice controls is that they’ve helped level the playing field for those with no or limited vision.

“It makes accessing information more instant,” says Robin Spinks, principal manager for digital accessibility at sight-loss charity RNIB. “It’s quicker to get your phone to open an app instead of looking for it, or to get it to schedule an appointment for you, to send a message or a tweet for you. It’s immensely useful in terms of personal independence, communication, scheduling, navigation and interacting with the world in the broadest sense possible.”

One big advantage is not having to use the screen magnifier to enter text, says Spinks, whether that’s for ordering food in the Ocado app or something more long form, such as an email or tweet. “The physical and visual effort required to type something is removed,” says Spinks, adding that accuracy improves both as the user learns to dictate without pauses, and as the software learns the user’s traits.

It’s not always perfect, mind. “Once in a while it embarrasses you – it comes up with something random,” he admits. “But the rate at which the technology has improved in the past two years is hugely encouraging.”

Spinks says the quality of voice-recognition and accessibility features varies from device to device. On Android, he recommends users go for a “pure Android” handset, such as Google’s Nexus 5 or the Motorola Moto G, because it’s better to use it without skins, “some of which get in the way of the accessibility features”.

He’s also encouraged by the trends towards phablets, such as the Samsung Galaxy Note, as they offer portability and a bigger screen. “The immediate benefit is that extra screen space and the opportunity to view content – even if that’s looking at a movie and holding the device a bit closer – and also pairing it with the wearable stuff that’s coming along.”



▲ This braille keyboard could be written out of history as voice software for those with sight loss grows more sophisticated

IN THE LABS

YOU WON'T FIND
BETTER REVIEWS
ANYWHERE
IN AUSTRALIA!

Microsoft v3.0

BEN MANSILL APPRECIATES THAT PERSEVERENCE GETS THEM THERE, IN THE END.

Hats off to Microsoft for the Surface Pro 3. Not only is it sumptuous industrial design, but it neatly cements in a new category for tablets – that of a genuine productivity device. I say ‘cements’, because of course the Surface 1 and 2 were the same kettle of fish, just less refined, and as such didn’t quite generate enough must-have lust in buyers.

That’s all changed, now. One look at the new Surface 3 and you’ll raise a happy eyebrow, for it’s a fine looking machine. Pick it up, and the surprisingly thin and lightweight body invites use. Just the feel of the lovely magnesium body is a sweet departure from the endless piano gloss plastic tablets that look cheap and common, and slip easily from your hand. The new Type Cover 2 is absolutely as useable as a proper laptop keyboard, and the pop-out kick stand seals the deal.

Now, I hope, perceptions about tablets as a whole will change. I’m sure you’ve heard the much-used term ‘consumption device’ used to describe a tablet’s utility. That’s a perfectly accurate description for the vast majority of tablets, certainly the iPad – and from that initial understanding stemmed a mass assumption that every tablet was for web surfing and a bit of casual gaming.

Microsoft’s been keen to tout the Surface Pro 3 as a laptop replacement. And that, readers, is exactly what it is. That’s why I’m excited. In one, this is a device that’s got the raw sex appeal to draw eyes, it’s light and immensely portable, but sports a proper Core CPU and useable amounts of storage inside. Sure, the first two Surface machines delivered the same set of capabilities, but lacked the refined design to really gain wide adoption. That Microsoft pressed on and finally got it

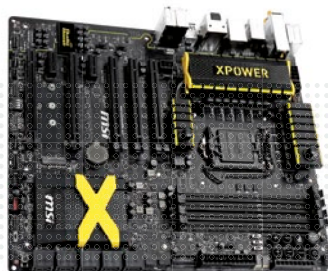
bang-on right shows a true understanding of where ‘content creation’ mobility is heading.

Just a few days ago another editor here at nextmedia asked me to recommend a new laptop for him and his wife, replacing their old clunker. I did the right thing and worked through ultrabook options, had a stab at suggesting a Chromebook, helped out with a few Ebay links for bargain powerhouse laptops, then suggested the Surface Pro 3. “That means I have to use bloody Windows 8”, he said. Fair prejudice, I well understand that. But I loaned him our review unit for the weekend, and he’s sold. Literally. They bought one online on Sunday.

Our review spells out the pros and cons (there are some...). See if it takes your fancy. I suspect we’ll be seeing many more of these in the wild, now.



MICROSOFT SURFACE
PRO 3
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MSI Z97
XPOWER AC
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LINKSYS XAC1200
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EDITORIAL & PRODUCT SUBMISSION: PC & Tech Authority welcomes all information on new and upgraded products and services for possible coverage within the news or reviews pages. However, we respectfully point out that the magazine is not obliged to either review or return unsolicited products. Products not picked up within six months of submission will be used or donated to charity. The Editor is always pleased to receive ideas for articles, preferably sent in outline form, with details of author's background, and – where available – samples of previously published work. We cannot, however, accept responsibility for unsolicited copy and would like to stress that it may take time for a reply to be sent out.

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Our A-List award is reserved for the best products in each category we review. With a winner and an alternative pick in each, that's 92 products you know are first class.



WHAT OUR AWARDS MEAN

PC & Tech Authority's comprehensive Real World testing sorts out the best products from the pack. Any product recommended by PC & Tech Authority is well above average for features, value for money and performance.



WHAT OUR RATINGS MEAN



OUTSTANDING
VERY GOOD
GOOD
ORDINARY
POOR
VERY POOR

HOW WE TEST



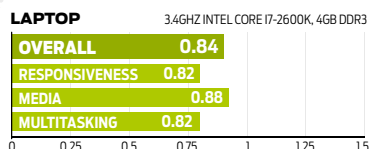
OUR BENCHMARKING TESTS ARE THE BEST IN THE BUSINESS. READ ON TO FIND HOW THEY WORK...

2D TESTS

We test desktop PCs, netbooks and laptops with our own, custom-built, 2011 Real World Benchmarks.

We split the results into three categories: Responsiveness, Media and Multitasking, with the Overall score an average of the three sub-scores.

For instance, responsiveness replicates light browser and productivity workloads. The Media test involves running iTunes for audio conversion, Photoshop CSS to crunch large images and Sony Vegas 10 to edit home video. This then gets run simultaneously alongside Cinebench 11 in order to get a handle on the multitasking ability of the system.



3D TESTS

We use pre-recorded demos in Crysis and DIRT 3 to test gaming performance where relevant. We have three standard test settings, depending on the power of the graphics card: Low, Medium and High.

To test gaming performance, we use our own recorded Crysis benchmark. We use the Low, Medium and High quality settings in 1366 x 768, 1600 x 900 and 1920 x 1080 screen modes respectively. Very high-end systems can also be tested using the ultra-intensive Very High settings, with all detail switched on, and varying levels of anti-aliasing enabled.

3D SPEED GOOD PLAYABLE UNPLAYABLE

HIGH SETTINGS	10FPS
MEDIUM SETTINGS	27FPS
LOW SETTINGS	86FPS

LAPTOP BATTERY LIFE

We subject laptops to two battery tests. In the light-use test, we optimise the system settings for the greatest power efficiency. We then disconnect the mains and run a script scrolling a selection of web pages until the system shuts down, giving you a realistic idea of the surfing time each laptop offers.

For the heavy-use test, we engage Windows' High Performance power profile, set the display brightness to maximum, and allow the taxing Cinebench 3D renderer to push the processor load to the limit. This gives a worst-case figure, revealing how long you can expect the battery to last under the most demanding conditions.



GROUP TEST
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MSI Z97 XPOWER AC

ONE FOR OVERCLOCKING HOBBYISTS, AS WELL AS A FLAG-BEARER FOR MSI'S PERFORMANCE STATUS.

PRICE \$549
SUPPLIER www.msi.com.au

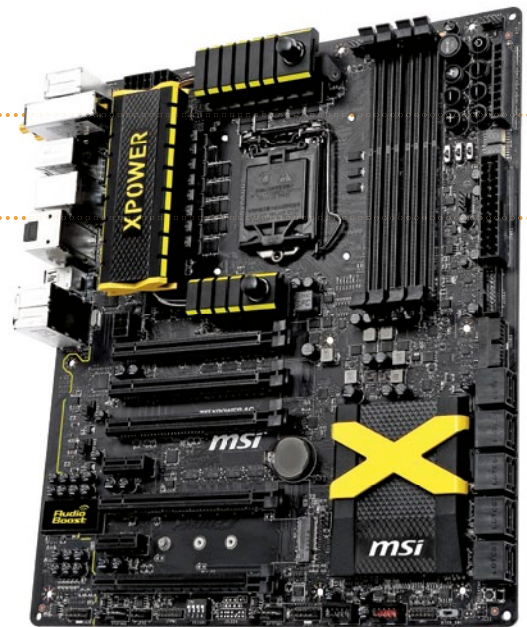
We've been struggling to think of features that this motherboard does not include. It's potentially a gaming board, but is festooned with overclocking features that has seen it place well in the competitive scene, and that's the stated design goal by MSI. It's pricey, at \$549, so you will want to head to MSI's site and inspect the full features list to properly appraise its suitability to your needs.

As is the trend with overclocker boards, an array of hard switches and settings buttons run along one edge of the board. These allow standard OC functions like Slow Mode (for resistance to ultra-low temp LN2 crashes), as well as CMOS clear and push-button overclocking of the Base Clock in 1MHz or .01MHz increments.

Further concession to overclocking includes a special fan mounting bracket that lets you direct air when the motherboard is operated stand-alone (not installed in a case), as well as a delid guard that fits over the CPU socket for protection against CPU damage when using heavy or unstable copper pots, or similar.

Each Xpower motherboard is also run through a 24 hour burn-in test, which is about 23 hours and 45 minutes longer than usual for regular motherboards. For extra strength and stability additional PCB layers are used in manufacturing, as well. Components, like capacitors are higher than usual spec, and MSI also claim (which we haven't tested) better electro-static discharge protection.

But these features all add to the cost. If this were intended for use purely as a record-seeking competitive overclocking platform,



KEY SPECS

Socket 1150 • E-ATX • Z97 chipset • 5 x PCIe x16; 2 x PCIe x2 • 4 x USB 3; 4 x USB 2

all good and well. But we do think that many will purchase this board, and others like it, to run in a standard gaming rig. Save your money and go for a gaming board (MSI's own Gaming range is superb).

Ben Mansill

PERFORMANCE	★★★★★
FEATURES&DESIGN	★★★★★
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★★

**Ranked in
the *top 1%*
of the world's
universities, an
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BROTHER MFC-L8850CDW

BROTHER'S FIRST PRINTER REFRESH IN YEARS INCLUDES THIS 'BABY' OF THE GROUP THAT MIGHT BE RIGHT FOR A SMALL OFFICE.

PRICE \$849

SUPPLIER www.brother.com.au

Brother printers have usually been designed for individual to SOHO uses, but the company has just launched a new range geared towards corporate use. We recently spent some time with the MFC-L8850CDW, which is pitched at organisations with around 20-50 users, and that could include SOHO environments if heavy workloads are commonly expected.

Wi-Fi and cloud is integral to its operation. For example, OCR scans are uploaded to a cloud service (transparently) for text conversion before being returned as a .doc (or file format of your choice) to your own preferred cloud service (or a printout). Brother has released (and continues to release) apps which add or enhance functionality to the printer, and these are downloaded upon release to the

KEY SPECS

Up to 30ppm (colour and monochrome) • 250 sheet lower tray, 50 sheet multipurpose tray, 50 sheet Automatic Document Feeder • 256MB memory (expandable to 512MB) • Ethernet and Wi-Fi

printer, with the OSD informing you of the update next time you log on.

Cloud support includes Picassa, Flickr, Facebook, Google Drive, Evernote, Dropbox, Box and OneDrive. Besides storing a scanned file to any of these, you can also log in via the LCD screen and print any file you have stored online. Several accounts for each cloud service can be stored, and if you like a PIN can be added as an extra security layer beyond your usual cloud service username and password. The printer also supports guest accounts.

Impressively deep permission sets can be set up per user, restricting the number of copies a user can print in colour, for example, as well as access to the cloud and print from USB. The machine will also email the network administrator with regular reports.

No serious editing is possible via the LCD (bucking a trend that started a few years ago when printer manufacturers were looking for selling



points). But you can crop areas of a page by drawing in a red Texta around an area. The machine will scan the image and spit out a page minus the highlighted area/s.

Colour photo prints were surprisingly good, despite this being something the machine was never intended to be used for. We can see it working well in small organisations, and up, but it's certainly overkill for solo operators.

Ben Mansill

PERFORMANCE	★★★★★
FEATURES&DESIGN	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

LINKSYS XAC1200

LINKSYS AIM FOR THE UPPER MID-RANGE WITH THEIR NEW ROUTER, BUT DOES IT HAVE ENOUGH DIFFERENCE TO MAKE A SPLASH?

PRICE \$249.95

SUPPLIER www.linksys.com

It would be simple to write off the Linksys XAC1200 due to the lack of antennae and its very simple and clean build. Unlike a lot of the current AC routers (like Netgear's stealth fighter themes...), this elegant option definitely tones down the style and size, using only one light on the front and no buttons at all. The XAC1200 immediately wins points for its design.

The box's low profile nature means that it's good for users who like something that fades into the background of their decor. The odd trade off for its sleekness and size however is its hefty power supply/modem in which Linksys have moved one half of its operation out of the router and into this cumbersome power box. Though it is far from a design flaw, the box does struggle to fit into a conventional powerboard

meaning the unit can be a struggle to plug in if space around the powerpoint is limited.

Looking past this quirky issue, the XAC1200 has all the expected features of a router in its class, its interface is a little simple but it functions well for what it does. WPS can be found at the back for quick device connecting and there is a USB 3.0 port for HDD connection complete with a DLNA server system to share your files throughout your home. The back end interface is straightforward, yet it lacks the simplicity of some of its competitors. With a bit of flicking through menus most users will find most of the settings they desire.

Speed tests were strong with this unit, the high end 5GHz AC network averaging out at around 68.4 MB/s

KEY SPECS

AC1200 wireless • USB 3.0 port • DLNA • Cloud access



when connected to a AC1200 adapter, which is not the fastest in its range but still powerful and reliable for any task you can throw at it. Its 2.4GHz frequency was a similar experience, running at an average of 31.63 MB/s, a great score for the money.

With good speed, up to date features, and strong and steady connection performance, the Linksys XAC1200 is a great router for those looking for the functionality and performance with strong 802.11ac capability, but who also may want a device that bucks the emerging trend for outrageous styling, and will simply blend seamlessly into the background of their home, office or apartment.

Josh Philpott

PERFORMANCE	★★★★★
FEATURES&DESIGN	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★



ASUS RT-AC87U

POWER AND PERFORMANCE MEETS STYLE AND USER FRIENDLINESS WITH THE NEW HIGH END ASUS ROUTER

PRICE \$330
SUPPLIER www.asus.com

Looking like the front of a sleek sports car, the new Asus RT-AC87U takes its design and shape from the Asus Republic of Gaming G range of laptops. With its angled build, carbon fibre style finish and four giant antennas, the RT-AC87U isn't going to win any awards for subtlety; this design is all about achieving the best performance possible. It can still lower its presence a little by switching off the humming blue glow of the network LEDs leaving it about as low profile as a unit like this can get. Asus knows its market here is hardcore users and makes a great addition to any gamer's or tech enthusiast's network setup, both with design and ability.

The RT-AC87U is aiming to be the best in every way it can. Armed with a decent array of features, this router has both a USB 2.0 and USB 3.0 port for printers (Windows only) or fast access data transfer if users are yet to invest in a NAS drive or network HDD. The four Gigabit LAN ports offer fast wired networking, and for those that are without an ADSL input, the RT-AC87U also offers a USB interface for 3G/4G Modems and Android phones (there is some setup required though). It's good for those instances when your internet is down or you've just moved into a new place.

Under the hood Asus has been hard at work in their testing labs with this router, ramping up the power to an impressive MIMO 4x4 wireless transmission with not only a dual core 1GHz processor for running the router system itself, but also with a separate more powerful 1.2GHz dual core just for running its hardworking

5GHz AC network. It is clear that Asus are trying to squeeze as much grunt as they can at a reasonable price. Its antenna system puts out four separate spatial data streams using AiRadar beamforming that Asus boasts can give out up to 1734 MBits/s on its 5ghz network while still offering up to 600Mbps/sec through QAM (if you have the supported adapters) on its 2.4GHz network, making it one of the fastest routers on the market. Our in-house tests came back with extremely impressive results. The 802.11ac connection gave a blazing 76.98 MB/s when connected to an AC1200 network adapter, with a maximum speed of almost 140 MB/s during its peak transfer times. The 802.11n connection also surprised us, giving an unwavering average of 43.31 MB/s for its transfer rate. In fact, the GUI has built in speed testing

"This design is all about achieving the best performance"

applications to help monitor its output and even insight into the CPU and RAM performance of the router for those users out there that are all about statistics checking.

The onboard GUI is noteworthy as well, the layout is incredibly simple and well organised. Users will find a massive collection of options for functions and features, all laid out in straightforward menus that will make anyone feel at home no matter what your technical knowledge is like. Its URL interface is fast and smooth running, provided apps on both iOS and Android give you access to the same settings, straight from the comfort of your phone, offering all sorts of extra features like photo



KEY SPECS

4x4 MU-MIMO antenna design with AiRadar universal beamforming • Tri-band • 1.2GHz dual-core processor • Inbuilt virus protection

sharing to services such as Facebook, Flickr or Dropbox. Other features include a remote download manager that can be setup to work without a PC, downloading straight to the attached USB drives. Time Machine support is there for Mac users with an iTunes server as well, showing up on any connected Apple device.

Lastly, for the security conscious, Asus has partnered up with Trend Micro to offer an unparalleled level of protection, the RT-AC87U can not only detect and alert users of malicious actions, but also warns you about infected device's scans, scans for weak passwords and gives some of the best parental controls available on the market offering most of the options seen in Trend's standard computer protection software.

Combining the best of all of the features of modern router while adding blisteringly high speed throughout makes the Asus RT-AC87U a contender for one of the top spots in the current networking market. Adding an exceptional interface, custom built programs, good media support and state of the art hardware just contributes to the impressive list of features on offer.

The RT-AC87U continues Asus' impressive run of router technology is a great addition to anyone's tech setup. Well worth the investment. Interestingly, when Asus' local PR representative first contacted us offering this router for review, it was touted at the time as a 'gaming router', while we now understand that's not actually an official title, the sheer performance on offer certainly validates that moniker.

Josh Philpott



PERFORMANCE ★★★★★
FEATURES&DESIGN ★★★★★
VALUE FOR MONEY ★★★★★☆

OVERALL ★★★★★★

QNAP TURBONAS TS-853 PRO

COMMERCIAL GRADE HARDWARE, FAST THROUGHPUT AND INTENSE POWER. QNAP TAKES RELIABLE NAS STORAGE TO ALL NEW LEVELS, FOR A PRICE

PRICE \$1,852.00
SUPPLIER www.estimate.com.au

Well known for NAS storage devices, QNAP's new TurboNAS TS-853 Pro really demonstrates what you can buy if you are willing to invest the money. Taking up about as much room as a small micro ATX case, the TurboNAS has an impressive eight bay system which can take an up to an insane 96TB of raw storage capacity. This hot swappable device is loaded with more ports and connection points than the average computer and works more independently than almost any device in its class. Coming standard with a stocky Intel Celeron 2.0GHz quad-core processor, 2GB of DDR3L RAM and an onboard flash disk for its operating system, this box has the potential to become the central hub of any network owner that can afford the price tag and is perfect for the industrious tech head or a small business.

The TurboNAS TS-853 Pro is easy to manage and thanks to its onboard interface and HDMI input, users can connect a keyboard and mouse through the systems USB ports to it and work entirely without an attached computer. Its specialised Linux operating system QT4 smoothly connects users to the entire inner workings of this stocky little box, giving you all sorts of options for how to utilize its impressive storage capacity.

Setup is a little more complicated than a just plug and play, users

will have to install their own drives, log in to the device manually via a separate web login and then install the interface to be able to run the device independently. This unit honestly feels more like a computer than a NAS drive, there is a lot of setup involved in getting the TS-853 Pro up and running, which will be a bit of a deterrent to the less technically minded users, however once you are inside the operating system (called QT4), everything begins to make a lot more sense.

QT4 can be easily accessed from a web browser, and the interface offers a wide range of possible. It is

“It is easy to see how it can handle so many programs and services simultaneously.”

a secure and scalable system that works on anything including tablets. QT4 comes standard with software for torrent downloading, music and video playback, backup, and much more. Files stored on the device can all be shared in the expected ways, DLNA and iTunes servers are on hand, plus FTP access and website hosting for building your own web platform or a locally run website. Users can then customise their experience with the provided app store, offering anything from extra antivirus software and Airplay support to classic online services like Dropbox and Google Drive. The TS-853 Pro also supports multiple virtual machines (VMs) through its

KEY SPECS

On Board interface ·
HDMI input · Intel®
Celeron® 2.0GHz
quad-core processor ·
Multiple USB inputs



Virtualisation Station, allowing you to run multiple systems at the same time and giving support for VMware, Citrix, and Microsoft Hyper-V. It also has its own software for security surveillance, perfect for small business or home security. Plus, the TurboNAS also comes equipped with powerful 256 bit encryption and comes inbuilt with virus scanning software to make sure your digital life is safe and secure at all times.

The TS-853 Pro supports SMB/CIFS, NFS, and AFP protocols for file sharing across Windows, Mac, Linux/UNIX networks and worked perfectly with several machines accessing information at the same time while also transferring files. In fact, the QNAP's speed is where it excels the most. The test unit we were using was equipped with eight WD Red Pro drives and the testing provided very impressive results. Benchmarking staggering average speeds of almost 116 MB/s for write and 79.95 MB/s for read across a wired network, it is easy to see how it can handle so many programs and services simultaneously.

Though the price tag on the TS-853 Pro is a bit intense, for the incredible possibilities it provides this system is an amazing addition to any network. Although the setup is a bit clunky and some users will find the drive a bit noisy at times if left out in lounge room. This NAS is only really limited by your imagination and once running will instantly become the central hub for everything in your life from file storage, to virtual machines and home security. Its chart-topping write speed and impressive read speed manage to make it worth the money for those with an ample budget and if users are looking for a reliable storage system, with plenty of room for experimenting and later expansion, look no further than the Qnap TS-853 Pro.

Josh Philpott



PERFORMANCE ★★★★★
FEATURES&DESIGN ★★★★★
VALUE FOR MONEY ★★★★★

OVERALL ★★★★★

SAMSUNG SSD 840 EVO

OUTSTANDING EVERYDAY COMPUTING

Transform your PC with a Samsung SSD. They're fast, light and cool. This is evident in Samsung's SSD 840 EVO range.

OUTSTANDING SPEED FUNCTIONALITY

Armed with an 840 EVO drive, users have the potential to unlock exceptional speeds and great flexibility for everyday computing. The SATA 6Gb/s interface (also backwards compatible with SATA 3Gb/s and 1.5Gb/s) can afford incredible speed, with Samsung's TurboWrite technology which boasts Sequential Read and Sequential Write speeds that are up to three times faster than the previous

“The combination of high-quality Samsung hardware and user-friendly software makes the SSD 840 EVO an all-in-one hard-drive solution.”

generation of Samsung SSD 830 models.

Better yet, users can shift the 840 EVO into high gear thanks to the Samsung Real-Time Accelerated Processing of I/O Data (RAPID) Mode. With the included Magician software, witness the speed afforded by this clever technology that utilises the PC's free DRAM memory as a cache boost. RAPID Mode also intuitively monitors data usage and can adjust the I/O accordingly.

In practical terms this provides support to key computing operations. Whether running a virus scan, listening to music, streaming HD video content, gaming or involved in video editing, the 840 EVO can help to keep up across multiple simultaneous processes.

SPEEDY UPGRADE

Thanks to the one-stop Install Navigator

software toolkit included with the Samsung Data Migration software, it can be easy to follow steps to migrate compatible data from old, slow internal storage to a fast 840 EVO drive.

The included Auto Install software guides users through every step of the installation process, while recommending options that can help to optimise the transferred data. The three-step migration process helps to ensure users are up and running as soon as possible, with all essential compatible data from their old hard drive. The Samsung Magician software doesn't stop there in terms of intuitiveness, either. Monitor and manage an SSD 840 EVO with access to meaningful tools that help performance such as operating-system support, benchmarking and disk health status tracking.

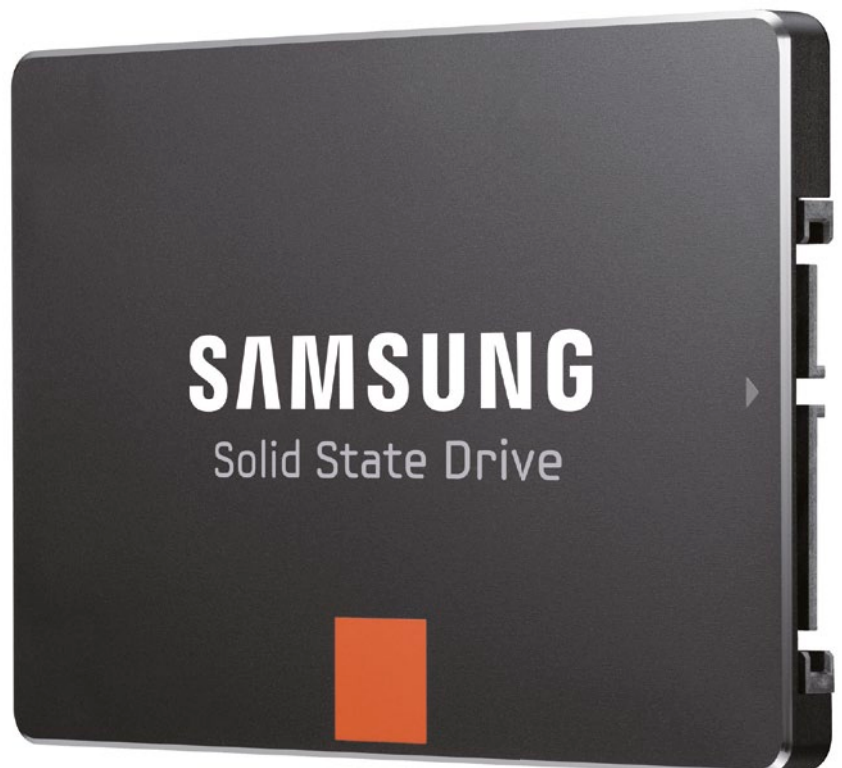
MOBILITY

The combination of high-quality Samsung hardware and user-friendly software makes the SSD 840 EVO an all-in-one hard-drive solution. Self-Encrypting Drive (SED) security technology boasts an AES 256-bit hardware-based encryption engine designed to help keep files safe and secure.

Enjoy the Self-Monitoring Analysis & Reporting Technology (SMART) that helps track the 840 EVO's health status through Samsung's Magician Software.

Available in 120GB, 250GB, 500GB, 750GB and 1TB models, there's a speedy storage solution for almost every PC owner in the Samsung SSD 840 range.

▼ Samsung is leading the SSD charge with its high-performance and well-priced drives. high=performance and well-priced



SAMSUNG

Samsung Super-speed Drive

Samsung SSD 840 PRO



Samsung SSD 840 PRO with RAPID mode technology

Samsung's fastest and most powerful SSD range yet with RAPID mode technology. A distinguished level of Samsung performance available to anyone. Visit www.samsung.com/ssd for more information

HP PROONE 400 AIO

IT'S FAR FROM EXCITING, BUT HPS NEW BUSINESS MACHINE GETS THE JOB DONE.

PRICE \$1299
SUPPLIER www.hp.com.au

To say that HP's ProOne 400 is perfectly unexciting is somewhat of an exaggeration. The hint is in the name - it's a machine for business professionals.

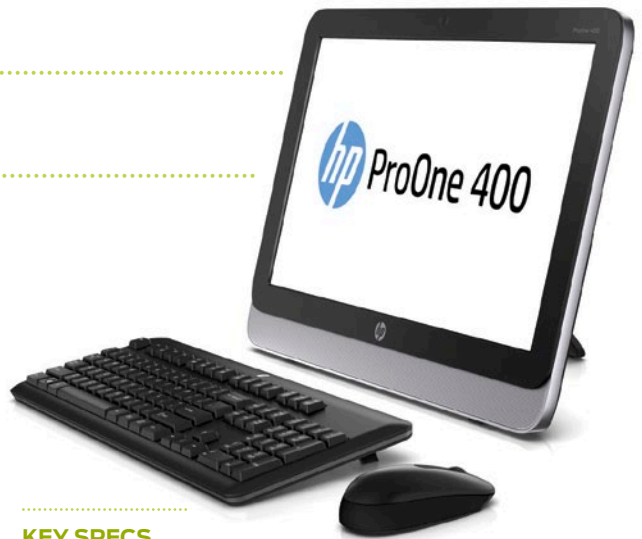
Well, actually, most serious professionals would likely want a machine that's a bit grunter, and possibly even a touch more elegance. A certain degree of expandability might be desirable, too, and on all of those counts the ProOne does disappoint. The 2.9GHz Core i5 processor and 4GB of RAM offer mid-range performance, though they do drive the 21in monitor admirably, along with integrated graphics it's not a machine you want to push too hard. It is, thankfully, very quiet, though, and doesn't run at all hot.

Design-wise it certainly feels

sturdy, if a bit uninspired and over-large - that's because of the ProOne's solution to making its IPS display touch capable, using a large frame with built in optical sensors. And it's very much a closed system, so the spec you purchase will be the spec you're stuck with until you replace the machine entirely.

Given it's bit of a hack, the touch display is actually pretty accurate and responsive, allowing for multi-touch manipulation of files and documents, though the glass panel protecting the display is prone to picking up finger prints (and reflections). There is a good selection of IO options, however, including two USB3 ports on the left side of the panel, and four more USB2 on the rear, along with a DisplayPort for slotting in a second monitor.

It's a breeze to set up, though, and while the included mouse and keyboard are nothing to write home



KEY SPECS

Intel Core i5-4570T Processor • 4GB of RAM • 500GB HDD • Integrated Intel HD Graphics • audio, 2x USB3, 4x USB2, DisplayPort • USB keyboard & mouse

about, they get the job done. That's really the whole point of the ProOne, and if it feels like we're damning with faint praise, it's because the machine itself is content to be a competent office machine. With Windows 7 Pro on board, it does that in spades.

David Hollingworth

PERFORMANCE	★★★★☆
FEATURES&DESIGN	★★★★☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★☆

AORUS THUNDER K7

WHEN DESIGN PERFECTION, BRILLIANT INNOVATION AND LOVELY STYLING ARE LET DOWN BY A SINGLE FATAL FLAW.

PRICE \$169
SUPPLIER www.aorus.com

We review many of the gaming keyboards that come out, not purely because these input devices are terrific for their intended purpose, but also because they're usually excellent as a regular daily-use keyboard. Such is it, that the new Aorus Thunder K7 arrives and with everything shaping up as a product well worth consideration.

It's certainly a good looker, with little in the way of divisive styling, as a result it's a fair bet that most folks will be happy with it on their desk. The keys are Cherry Red (the softer, less clicky switch), which seems to be the way gaming keyboards are heading, instead of offering up the entire Cherry range. The Corsair K70 RGB (page 51) is also Red-only. Key illumination is tasteful blue, with a

rotary dial to adjust intensity, which is a great feature. Beside that is another rotary for volume, and with that, nothing more is needed.

The big innovation is the detachable num-pad (which also serves as a macro set). This is just fantastic, the flexibility it offers, plus desk space management potential is huge. Better yet - it attaches magnetically to either side. Genius. Or, use it sitting unconnected.

But, a fatal flaw exists that renders this keyboard unusable. The two pop-out stands that raise the keyboard have hinges so weak that they barely lock into place, and the end of the stands have grippy rubber soles that resist sliding on a desk (the design intention). So, the merest bump or forward pressure on the keyboard causes it to collapse, on one side or both. We're talking the gentlest of nudges, forceful typing or emotion-charged gaming - anything sufficient



to move it forwards by more than a few mm, and down she goes. It's fantastically annoying and a real tragedy, given the otherwise excellent design across the rest of the product. If only they'd gotten this bit right this otherwise excellent keyboard would get 6 stars.

As it is, unless you have no intention of ever using the raised feet, or are prepared to glue or Blu-tac gob them in place, it's a sad fail. If, down the track, Aorus revise the hinge design then it has our whole hearted endorsement. It breaks our heart to see such flawed perfection, and we just can't recommend this, now.

Ben Mansill

KEY SPECS

Cherry Red illuminated mechanical keyboard • detachable magnetic num-pad • rotary brightness and volume controls • fall-down feet

PERFORMANCE	★★★★☆
FEATURES&DESIGN	★★★★☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★☆



MICROSOFT SURFACE PRO 3

WITH A FANTASTIC SCREEN AND IMPROVED ERGONOMICS, THE NEW SURFACE PRO IS AN IMPRESSIVELY PERSUASIVE HYBRID

PRICE \$979 – \$2279
SUPPLIER www.microsoft.com.au

Evolution is a slow process, but after two generations Microsoft's hybrid tablet is becoming a distinguished creature indeed. The Surface Pro 3 brings a high-DPI display that's swelled to near-A4 size; the magnesium-alloy chassis is thinner and lighter; and numerous design tweaks have improved usability. Microsoft calls it "the tablet that can replace your laptop", and it may not be far off.

DESIGN

The Surface Pro 3 makes a great first impression. Where the all-black exterior of the previous generation conveyed a certain moodiness, the clean design of this version is inviting

and approachable. Light-grey metal reaches all around the back and along the tapered edges, and a slight sparkle shimmers under the matte finish. Although the Surface Pro 3 is wider and taller than the previous model, Microsoft has managed to make it not only thinner but lighter too: the chassis now measures a dainty 9.1mm thick and weighs 800g.

The 12in, 2,160 x 1,440 screen (protected by a glossy panel of Gorilla Glass 3) is a big step up from the 10.6in Full HD panels of previous Pro generations. It isn't only bigger, it's a different shape, forsaking the widescreen 16:9 format in favour of a 3:2 ratio. That may not sound like a major change, but the ergonomic impact is huge. In laptop mode, the extra height makes the Windows desktop feel gloriously spacious;

in tablet mode, your workspace becomes comfortably book-shaped. No matter how you use the Surface Pro 3, it's a more natural fit than previous models.

KICKSTAND AND TYPE COVER

One major shortcoming of the original Surface Pro was its fixed-position kickstand. The Surface Pro 2 partially remedied this with a dual-position stand; now, at last, the Surface Pro 3 brings a properly hinged stand that's smoothly adjustable through 150 solid-feeling degrees. It's such a simple and obvious fix that we wonder why Microsoft didn't do it this way in the first place.

The upgraded stand allows the Surface Pro 3 to work in a variety of positions. With the Type Cover

KEY SPECS

1.9GHz Intel Core i5-4300U • 4GB RAM • 128GB SSD • 12in 2,160 x 1,440 touchscreen • Bluetooth 4 • 802.11ac Wi-Fi • USB 3 • mini-DisplayPort • microSD • 2yr RTB warranty • 292 x 201 x 9.1mm (WDH) • 800g

attached, the Surface Pro 3 can be propped up on your lap or desk, just like a regular laptop. Unclip the keyboard and fold the stand right back, and using the onscreen keyboard – previously an exercise in slip-slide futility – becomes a viable and even comfortable option.

That Type Cover, incidentally, has grown to match the Surface Pro 3's expanded dimensions. It now weighs 300g and measures 5mm thick. As before, it clips securely to the magnetic strip along the tablet's bottom edge, drawing power via the docking connector, and folds up over the tablet's display to keep it safe from harm when not in use. The keyboard itself is comfortably sized, with a wide, squat touchpad positioned underneath, and backlighting that's adjustable through three brightness settings. One minor addition is a stick-on loop of elasticated fabric, which holds the Surface Pen in place.

The Type Cover's big new trick is a small hinged section, just above the keyboard's function keys, which folds backwards and affixes magnetically to the tablet's lower bezel, raising the rear of the Type Cover by a couple of centimetres. The effect is to angle the keys into a far more comfortable typing position – addressing the major shortcoming of previous Type Cover designs. It also reduces the Type Cover's tendency to rock from side to side when used on a lap, which was one of our biggest irritations with the previous iteration.

It isn't a perfect solution, however. Since there's no support beneath the angled Type Cover, there's inevitably some give beneath your fingers – it feels a bit like typing on a shoebox. And since the raised Type Cover entirely covers the lower bezel, it becomes difficult to accurately press items along the taskbar.

The new design has also necessitated the removal of the capacitive Windows button to the right-hand side of the surround. This makes it easy to press accidentally when performing edge-swipes, or when holding the tablet in landscape orientation.

FEATURES AND CONNECTIVITY

The Surface Pro 3's power connector has been redesigned, from the press-on design of old to a neater, spade-like connector that's less prone to being yanked or knocked out. As a result, the Surface Pen no longer latches into the power socket: instead, hidden

magnets hold it against the tablet's edge when it isn't being charged.

Connectivity, meanwhile, hasn't changed a jot. Despite its expanded frame, the Surface Pro 3 still makes do with a single USB 3 port, mini-DisplayPort video output, a 3.5mm headset jack and a microSD slot. For a device that aspires to replace your laptop, that's a pretty limited selection. The presence of dual-band 802.11ac Wi-Fi and Bluetooth 4 sweeten the deal, but we suspect that the forthcoming docking station will be essential for any serious desk-based use.

Similarly, the pair of 5-megapixel front and rear cameras are no more inspiring than those of the Surface Pro 2: smeary compression artefacts and mediocre detail are the order of the day. The speakers at least are an improvement. These are now positioned at either side of the display and provide crisp, detailed audio. They're also a good deal louder than the meek drivers in the Surface Pro 2, although still not as good as those of the best tablets out there – to our ears, the Apple iPad Air gives a more full-bodied performance.

SURFACE PEN

The Surface Pro stylus has undergone a transformation. The passive Wacom stylus of old has been replaced by an active – that is, battery-powered – model from Wacom's arch-rival, N-trig.

On paper, this may look like a downgrade, since the N-trig stylus recognises only 256 pressure levels, versus the 1,024 levels of the previous stylus. In use, however, it's indisputably an improvement. The thinner stack height of the LCD and N-trig digitiser shortens the distance between the pen nib and display, making for a more natural, paper-like feel – onscreen ink no longer appears to sit a millimetre or so beneath the pen tip. Microsoft also claims to have improved accuracy and reduced latency, and the new Pen did indeed remain accurate around the screen's edges, where the old Wacom model tended to drift out of whack.

It sits more pleasantly in the hand, too. The battery inside lends pleasing heft, and the matte metal finish is grippier than the plastic of the previous iteration. A new button layout sees two mode buttons along the Pen's shaft that provide Erase and Select functions, while a tap of the top button instantly opens OneNote – even if the



▲ The design is more inviting than the old Surface Pro 2

tablet is in standby – and a double-tap activates OneNote's screengrab tool. We didn't enjoy having to spin the original Surface Pro Pen around to erase items, so the new arrangement gets a definite thumbs up.

There are issues, however.

The pressure required for pen strokes to register is a little heavier than we found entirely natural; from time to time we had to stop and rewrite words or repeat strokes. Palm detection isn't perfect either: lifting the pen from the screen, mid-flow, occasionally left unwanted marks. Hopefully such niggles can be addressed swiftly through software updates – or, ideally, a control panel to enable the user to adjust the Pen's sensitivity and button configurations to suit. With that sort of configurability, the Surface Pen would make an exceptional input device.

DISPLAY

The Surface Pro 3's display delivers excellent image quality. Colours are vivid and rich, and while brightness and contrast are a little down on the outgoing models (we measured a maximum brightness of 325cd/m2 and a modest contrast ratio of 789:1), colour accuracy is excellent. With our X-Rite iDisplay Pro colorimeter, we measured an average Delta E of 1.77 – as close to perfect as we've seen from a recent laptop or tablet.

The panel is also able to reproduce an exceptional range of colour: we measured



it as covering 96.2% of the sRGB colour gamut. Sadly, Microsoft's screen calibration is some way off for darker tones, with deep greyscales blending into black.

The Surface Pro 3's 216ppi pixel density isn't visibly sharper than the 208ppi of the original Surface Pro and Surface Pro 2 – the higher resolution comes, after all, with a larger screen. Text is still razor-sharp, though, and photos teem with fine detail. Microsoft ships the Surface Pro 3 with Windows 8.1's scaling settings at 150% by default; you can switch to 100% and gain a bit more space for applications such as Photoshop or Sony Vegas Pro, but be warned that this makes buttons and icons shrink to fiddly proportions.

PRICING, SPECIFICATIONS AND TESTING

The Surface Pro 3 comes in numerous specifications. You can choose from Core i3, Core i5 and Core i7 CPUs, with solid-state drive (SSD) capacities from 64GB right up to 512GB. Pricing varies dramatically as a result, with the entry-level coming in at a very tempting \$979. We'd recommend you avoid this one, however: its Core i3 CPU and 4GB of RAM may do everything you need, but a 64GB SSD is too tiny these days.

A better bet is the \$1209 model, which gets you a Core i5, 4GB of RAM and a 128GB SSD; ideally we'd pick the 256GB model, which also doubles the RAM, at \$1549. For top performance, you'll have to dig deep: both Core i7 models come with 8GB of RAM, with 256GB or 512GB SSD options at \$1829 and \$2279 respectively. Note that these prices don't include the Type Cover 2, which adds another \$149.

We tested the \$1209 model, with a 1.9GHz Core i5-4300U, 4GB of DDR3

RAM and a 128GB Samsung PM851 mSATA SSD. Its score of 0.62 in our benchmarks indicates power enough for everyday applications, but no more than the Surface Pro 2, which scored 0.61 with a 1.6GHz Core i5-4200U CPU at the helm.

The explanation isn't hard to find. Under heavy load, we noted that the Surface Pro 3 quickly grew hot to the touch – causing the CPU to automatically dial back its Turbo Boost frequency from 2.6GHz down to 2GHz. Evidently the Surface Pro 3's tiny fans can't dissipate enough heat to sustain the highest Turbo Boost frequencies for long.

On the upside, the Surface Pro 3's battery life strides past its predecessors. With the screen dimmed to 75cd/m2 and Wi-Fi switched off, our light-use test saw the Surface Pro 3 survive a very creditable 10hrs 33mins. We had no problem getting through a full working day of word processing, accessing email and watching videos on YouTube.

VERDICT

The Surface Pro 3 represents a confident step towards the perfect hybrid device. The new 3:2 display, in combination with the lighter chassis, makes it a far more agreeable tablet than its predecessors, while the new kickstand and Type Cover make it a more convincing alternative to a regular laptop. While it isn't perfect in every scenario, it feels like less of a compromise than previous generations.

Where the Surface Pro 3 stumbles is pricing. Although the low-end models look like great value, we'd hesitate to recommend anything less than a 256GB SSD for serious use – and while it's possible to add extra capacity via



▲ OneNote is a stylus-click away

a microSD card, this is normally excruciatingly slow compared to real SSD storage.

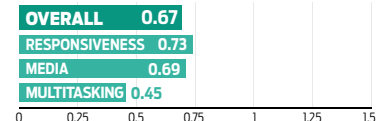
You also need to factor in Microsoft's tight-fisted decision not to include the Type Cover 2 in the base price. Unless you want to miss out on the whole point of most effectively the Surface Pro 3.

At the end of the day, the Surface Pro 3 is a terrific Windows tablet that does a passable impression of a laptop, and if that balance suits your needs, then the cost may be well worth it. But if all you really want is a regular laptop, then, with deference to Microsoft's marketing claims, you should probably save your money and buy a regular laptop. That doesn't mean the Surface Pro 3 is a failure, though: on the contrary, it's a persuasive implementation of the convertible concept.

If things carry on like this, the Surface Pro 4 really could be the tablet that finally consigns our laptops to the scrapheap.

Sasha Muller

BENCHMARKS 3.4GHz Intel Core i7-2600K, 4GB DDR3 = 1



PERFORMANCE
FEATURES&DESIGN
VALUE FOR MONEY



OVERALL



APPS ROUND-UP

JENNETH ORANTIA WITH THE WISE WORD ON THE ESSENTIAL APPS, TOOLS AND UTILITIES WE THINK YOU NEED.

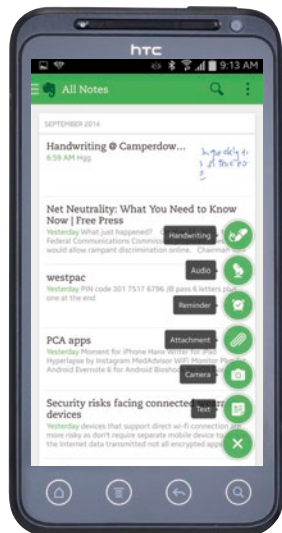
► EVERNOTE

PRICE FREE **DEVELOPER** EVERNOTE **PLATFORM** ANDROID

Everyone's favourite note-taking app has just turned six on the Android platform, and it's full of faster and more powerful ways to save notes. A floating 'New Note' button on the main notes screen makes it quicker to create different types of notes: rather than having to create a new note and then change the type once it's open, you can simply tap the plus button, select the type of note you want to create from the animated pop-up bar (including handwriting, audio, reminder and camera), and you're good to go.

Handwriting support has also improved in the latest update. Creating a new handwriting note opens a full-sized drawing canvas, with easy access to the colour picker, eraser button, and select button. An arrow button at the bottom of the screen lets you jump to the next page, and pressing the arrow at the top left of the screen switches it back to the general notes screen so you can mix handwriting and text in the same note.

Jumping between notes, notebooks and tags is a lot quicker as you can swipe in from the left hand side of the screen to make the navigation menu appear. If you're using a Samsung device and have linked the S-Note app



to Evernote, you'll also see a dedicated section there for accessing S-Notes.

Being able to find a note when you need it is just as important as writing it down initially, and Evernote has made it easier to filter through a large notes database by letting you refine search results by notebook, tag and location. If you use Evernote Business, you can use this interface to easily swap between your personal and business notebooks.

Finally, sharing notebooks has become a lot easier – just tap on the menu button next to the notebook you want to share, tap the 'Share' button, and enter the email addresses of the people you want to share it with. From here, you can also add a message and edit permissions for accessing the notebook.

If you haven't tried Evernote, but it's piqued your curiosity for a while then jump in and take a look, we're of the opinion that there isn't a better note app out there.

EASE OF USE

FEATURES

VALUE FOR MONEY



OVERALL

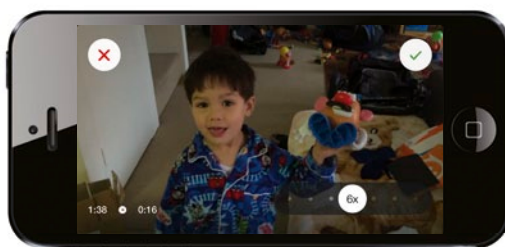


► HYPERLAPSE

PRICE FREE **DEVELOPER** INSTAGRAM **PLATFORM** IPHONE

From the team that made artistic filters and effects in photography a simple one-tap process comes a new app that brings the same simplicity to time lapse videos. You've probably seen a time lapse on TV or in a movie before – it's where a video clip is sped up so that the action happens a lot quicker than it does in real life. Essentially, it's the opposite of a slow motion video, and it can make an otherwise mundane scene like a crowd or an ant crawling along the ground look far more dynamic and interesting.

Creating time lapse videos usually involves skill and expensive camera equipment, but in Hyperlapse, you just have to press the big record button to start the video, and press it again to stop it. Hyperlapse uses the iPhone's internal gyroscope to stabilise the video, so even if it's a bit wobbly while you're filming, it'll look nice and steady in the final clip. By default, the app speeds video up by 6x, but you once you've finished recording, you can use the slider at the bottom of the screen to make the video slower or up to 12x faster. Pressing the tick button at the top right of the screen processes the video at your chosen speed,



and from there it saves to your camera roll and you can share the video on Facebook, Instagram or iCloud Photo Sharing. If you want to share it to other sites, such as YouTube or Vimeo, you can do so from your iPhone's standard Photos app.

Hyperlapse doesn't save an original copy of the video at normal speed. Once you process the video at your selected speed, that's the only copy you'll have access to.

This is relevant if you want to hold onto the audio portion of the video clip – Hyperlapse will only save the audio track in the video if you process it at 1x speed. Recording at regular speed isn't necessarily a waste of time, as you still get the benefit of the steady cam-style video stabilisation.

EASE OF USE

FEATURES

VALUE FOR MONEY



OVERALL



► HANX WRITER

PRICE FREE DEVELOPER HITCENTS
PLATFORM IPAD

Retro fans rejoice: you can now turn your high-tech iPad into a low-tech typewriter. Hanx Writer is the brainchild of actor Tom Hanks (hence the cutsey name of the app), and it reproduces the interface of a typewriter on your iPad's screen. The page moves back and forth as you type on the typewriter-style on-screen keyboard, the keys produce that satisfying clack when you press them, and you even get the 'ding' sound when you hit the Return button. The base app is free, but you can get different types of typewriters with additional features like text alignment, support for multiple documents and ribbon and background colours with in-app purchases. Well done, Tom Hanks, for thinking up something this cool.



OVERALL



► WIFI ANALYSER AND SURVEYOR

PRICE FREE DEVELOPER MANAGEENGINE
PLATFORM ANDROID

WiFi Analyser and Surveyor is a free tool for managing your wireless network. In the standard analyser mode, you can see all of the nearby Wi-Fi networks plotted on a graph to demonstrate signal strength, check each network for co-channel and inter-channel interference, and see the channels that each of the Wi-Fi networks are deployed on. There's also a special surveyor mode designed for doing site surveys with a floor plan – the results can be exported as a Wi-Fi heat map or signal strength report and saved to email, Dropbox or the photo gallery.



OVERALL



► AWESOME NEW TAB PAGE

PRICE FREE DEVELOPER ANTP.CO
PLATFORM CHROME

Turn the 'New Tab' interface in Chrome into a useful dashboard of dynamic widgets and shortcuts with the aptly named 'Awesome New Tab Page' extension. The colourful tiled interface bears a more than passing resemblance to start screen in Windows 8, for better or worse, and it offers similar customisability: you can create different sized tiles and add custom shortcuts to any site on the Internet. The tiles can be personalised with different background colours and icons, and the selection of widgets include real-time stocks, as well as many commonly used applications, social tools or content feeds such as Facebook, RSS and Gmail. To disable the ads on the right hand side, you'll need to fork over US\$5 to the developer, but we think that's a reasonable price for the functionality this app brings to working on a PC desktop.



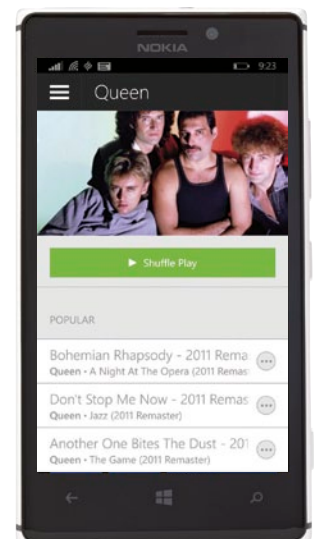
OVERALL



► SPOTIFY

PRICE FREE DEVELOPER SPOTIFY
PLATFORM WINDOWS PHONE

Don't have the scratch for a Spotify Premium account? If you're a Windows Phone user, you can now access Spotify on your phone without having to shell out \$12 a month – just like your iPhone- and Android-toting compatriots. The new ad-supported version lets you shuffle your own and other peoples' playlists, shuffle tracks from a particular artist, and listen to pre-made mood- and activity-based playlists. The Windows Phone client still sports the older Spotify interface, but the developers say that the new look that's already available on iOS and Android devices will be rolled out to Windows Phone in the near future. Now there's no excuse not to at least try out this immensely popular music streaming service if you're on Windows Phone.



OVERALL



LABS BRIEFS

► DELL INSPIRON 15 3000

PRICE \$598 - \$899

WEBSITE www.dell.com.au

At \$598 for the minimum spec model, which is built around a i3-4005 CPU @ 1.7GHz, 4GB of RAM and a 500GB hard drive, the Dell Inspiron 15 3000 is what you'd call a no-frills and solid workhorse. The 15.6inch non-touch screen eschews the shift towards high-DPI with a resolution of 1366x768 – but is perfect fine to use. You can bump the CPU up to an i5-4210U (2.7GHz) or an i7-4510U (3.1GHz). Memory can be upgraded to 8GB and the hard drive to 1TB (there's no SSD option).

We tested a top-spec i7, 8GB and 1TB model, which currently goes for \$899 on the Dell site. Compared to others in this 'luggable' category, it's a relatively slim and classy design, all-black with no bits of questionable trim.

It felt sluggish, though. Testing showed that to be a particular slow hard drive, with 95MB/s read and 87MB/s write speeds. Not devastatingly short of expected performance, but the 5400rpm drives are certainly the weakest link.

Ben Mansill



OVERALL



► OPPO FIND 7

PRICE \$719

WEBSITE www.oppomobile.com.au

When a company launches a new flagship phone it usually try to impress on all fronts, combining gorgeous design with a great screen, impressive camera and powerful innards. With the Find 7, Oppo has met three of these four criteria. The Quad HD screen is gorgeous with only a slight cooling of the whites and a brightness level that sometimes can be a bit of a pain in the harsh Australian sun.

The 13Mp camera takes excellent photos and can record footage at 2160p and the whole thing is powered by a quad core 2.5Ghz Krait 400 backed up with 3Gb RAM, making it more than capable of performing any task you could want.

Unfortunately when it comes to design, Oppo has opted for a mundane black rectangle that as much understated as it is dull, detracting from the otherwise impressive qualities of the handset.

Dan Wilkes



OVERALL



► BELKIN THUNDERBOLT EXPRESS DOCK

PRICE \$299

WEBSITE www.belkin.com.au

Multiply a single Thunderbolt port by many, for just \$300, less a dollar. There's no doubt this is a premium product. It looks it, sheathed in attractive aluminium, and in regular daily use now for several weeks it has behaved flawlessly. Our only niggles mirror those frequently mentioned in online customer reviews – that there is no included Thunderbolt cable, and, that the big and heavy external power brick is a bit of a bother if portability is your goal.

But, after a chat with Belkin it turns out there will be a refreshed version later this year bundling a cable in the box. No change to the power brick, though.

All the ports are on the rear, but there's a channel under the device for you to re-route one cable, to pop out the front. Port-wise, you get: 1x Ethernet, 1x Firewire, 2x Thunderbolt, 2x USB 3 plus mic and headphone ports.

We're increasingly seeing Thunderport add-in cards either packaged with motherboards, or sold separately, making this device's appeal more real-world these days.

Ben Mansill



OVERALL



► CORSAIR VENGEANCE K70 RGB

PRICE \$199

WEBSITE www.corsair.com

We reviewed the original Corsair K70 earlier this year (PC&TA #200, page 40), and, to surmise, felt that it was an excellent gaming keyboard thanks to stick-on raised and curved WASD and number 1-6 keys, as well as placing the function keys unusually closely to the main keys, for easier in-game use without stretching your fingers. On the flipside, the stand didn't raise enough to be a comfortable typing keyboard, and the key illumination was too bright for extended comfortable use.

Well, now there's a version, otherwise identical, that caters even more to gamers, thanks to the new ability to assign a colour (from 16 million choices) to individual keys. The uses are genuine, primarily as setting groups of a particular colour to game-specific functions. In less sensible news, the colours can also be set to colour cycle for a bit of disco on your desktop.

There have been other keyboards that also do this trick, but not based on Cherry switches. Corsair has an exclusive use period for the new RGB switches from Cherry ('Red' only for this model). The price premium is about \$40 over the standard K70.

Ben Mansill



OVERALL



▶ AORUS THUNDER M7 MMO GAMING MOUSE

PRICE \$99

WEBSITE www.aorus.com

New brand on the block Aorus is on a charge. It's the premium gaming brand Gigabyte recently launched, and products are coming in across several categories, including mice.

This dedicated MMO mouse is the first we've had from Aorus, and it's clear from this one that good ergonomics, premium quality materials and funky styling are the goals.

As a desktop and regular gaming mouse it's excellent. Cursor movement is extremely smooth and natural, thanks largely to its 8200DPI laser sensor. Ergonomics are above average, though it's a little smaller than mainstream products from the likes of Microsoft and Logitech. Oddly, the standard Windows back and forward functions (for browsers, Explorer etc) only work some of the time. It loses a star for this, but we expect a driver update may fix this.

It's designed as an MMO device, so has a generous 16 programmable buttons. They're well placed and with enough differentiation in angle and size to minimise accidental clicks. Maximum frippery is included, like a pulsing and colour selectable scroll wheel, and a clear side window showing a pretend plastic V8 (complete with eight exhaust ports), and, it glows.

Ben Mansill



OVERALL



▶ ADATA SP900 SSD

PRICE \$149 (256GB); \$89 (128GB)

WEBSITE www.adata.com

Aformatted SSD will typically yield less than the advertised amount of storage space. The loss is usually in the region of 7-10%, and it's in part due to sector size and use, but mostly because the drive reserves some space for shuffling around data as a scratch space, (known as 'over-provisioning'). SandForce controller-based SSDs have recently been able to override this function, restoring the full capacity for use. The Adata SP900 is one such.

Any SSD, regardless of whether over-provisioning is enabled or not, should be operated with at least 10% left unused, and that should be sufficient to get around loss in capacity given to over-provisioning. Adata is selling the non-over-provisioned SP900 SSDs here, and there are 128GB and 256GB versions available.

The same performance- and reliability-oriented features you expect in any new SSD are included, so, Trim and NCQ and SATA 6Gb/s interface support.

A check of local prices shows this drive (both capacities) to be excellent value compared to competitor products. Now that SSDs are commodity items, price alone should be the driving factor, and with this drive you get the advertised capacity, too.

Ben Mansill



OVERALL



▶ OPPO N1 MINI

PRICE \$539

WEBSITE www.oppomobile.com.au

Oppo has been making and selling smartphones for several years in China, and is only now launching here – though we're first territory outside China to get them. The 'mini' nomenclature is describing this model in relation to the larger 5.5-inch screen Oppo Find 7 model, for at 5 inches it's a big phone. It sports a heavily modified Android 4.3 OS, with most of the tweaking being a styling and tidying of the stock Android interface.

The N1 Mini's screen is 720p, with the larger Find 7 sporting Full HD, nevertheless, it's a very sharp display that holds its brightness in sunlight. 2GB of memory and a quad-core 1.6GHz CPU are plenty quick enough for all tasks, including gaming.

The stand-out feature is the rotating 13 MP camera which will gift you with just about the sharpest selfies going. It can also upsize images to 24MP by taking 6 shots in burst, then combining the "best" pixels for a larger image. It works well and helps save some dollars, we assume. Both Oppo phones are pitched as premium devices, and are priced very competitively. For the Australian launch all Oppo sales will initially be online only, and we'd recommend waiting until you can have some hands-on time at retail (when that happens eventually) to help you decide. As it stands, it's a good phone at a fair price.

Ben Mansill



OVERALL



▶ NAVMAN MIVUE DRIVE LM GPS + RECORDER

PRICE \$299

WEBSITE www.navman.com.au

The golden age GPS makers once enjoyed is long passed, now that most people use a smartphone for in-car navigation, instead of buying a newer model dedicated GPS. To combat this market shrinkage, prices have dropped from around \$500 for a premium model to as low as \$200, but it's this new model from Navman that presents the most compelling argument for dedicated GPS, for now.

It has a built-in 120 degree wide angle HD camera to capture accidents and incidents, the likes of which you've seen on a million Russian YouTube videos. But! The Mivuedrive LM GPS also has a 3-axis impact sensor. So! If someone runs into you the device will record the direction and severity of impact, which, together with the maps and street view function, leave you with very precise and presumably indisputable evidence, should the matter require such for legal or insurance action.

Other than that, the usual premium-model features are included, like landmark navigation and premium driver alerts. At \$300 we think it's innovative, practical and reasonably good value.

Ben Mansill



OVERALL



GROUP TEST: Chromebooks

LOOKING FOR A BUDGET LAPTOP? A CHROMEBOOK
COULD BE ALL YOU NEED. WE PROVIDE THE LOWDOWN
ON CHROME OS AND SEARCH OUT BARGAIN BUYS
FROM ONLY \$379



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Buyer's guide

TEMPTED TO TAKE CHROME OS FOR A SPIN? WE EXPLAIN THE KEY FEATURES TO LOOK FOR IN A CHROMEBOOK

Chromebooks are designed to be affordable, practical mobile computers, focused on web-based services and applications. They may look like laptops – or even bargain-basement Ultrabooks – but you have to think of them a little differently. Chrome OS itself is less reliant on raw computing power, memory and storage than Windows or OS X, and specifications we may sneer at on a regular laptop can work fine on a Chromebook – so costs can be kept low without compromising the overall experience.

That being said, many of the same judgements apply to a Chromebook as to a laptop. Naturally screen size and quality are of importance, as too are a decent keyboard and a responsive trackpad. The look, feel and build quality will impact everyday use, and good connectivity is a must.

SCREENS AND SIZES

Since Chromebooks are designed as low-price systems, many use LED-backlit TN panels with a 1,366 x 768 resolution, of the type you'd find in a budget laptop. If you're using the Chromebook as a cheap, second computer, much like the early

netbooks promised, but didn't really deliver, then this may be sufficient.

However, if you're looking for an everyday workstation, a bigger screen makes it far easier to work and multitask, especially now that Chrome OS supports a multiwindow desktop UI (the first release back in 2011 originally ran entirely in a browser window). A higher-quality screen, such as the vibrant IPS panel in the HP Chromebook 11 or the Full HD 13.3in panel in the Samsung Chromebook 2, will also be more pleasant to work on.

Needless to say, though, a large, high-quality screen will mean trade-offs in overall size, weight and battery life – not to mention cost.

ERGONOMICS

A Scrabble-tile keyboard is standard for a Chromebook, but beyond this things vary considerably. You'll find some models with cramped layouts and a nasty spongy typing action, while others feel much more like upmarket computers.

It's also worth noting that some of the keys on a Chromebook differ from those on a Windows laptop.

The Caps Lock key is replaced by a dedicated Search key, and a series of function keys along the top provide one-touch access to tasks such as switching windows, navigating forward and back and refreshing the current page. Some familiar keys, such as Delete and Page Up and Page Down have gone completely, although you can simulate them if you know the right combination of buttons to press.

Chrome OS also supports a few touchpad gestures, including a two-fingered tap as an alternative to right-clicking, and two-fingered scrolling to move up and down web pages and documents. Touchscreen gestures are supported as well, although only two Chromebooks have suitable screens – the Google-branded Chromebook Pixel and a variant of the Acer C720, the C720P. In our view, this isn't a particularly important feature: apps that support touch are few and far between, so the touchscreen is rarely useful, and you can easily forget it's there at all.

DESIGN AND CONSTRUCTION

Chromebook manufacturers seem to take one of two approaches. Either you get something surprisingly well-built and stylish for the money, such as the HP Chromebook 11 – or you get something that looks like a cut-price plastic Ultrabook, and feels substantially worse.

On the whole, even cheap Chromebooks are fairly robust and will take a bit of mean treatment: almost all use flash storage rather than a mechanical hard disk, so there are very few moving parts.

However, if you want a Chromebook to take on the road, then it's worth looking for more solid build quality.



CONNECTIVITY AND STORAGE

Chromebooks are less reliant than they used to be on an always-on internet connection: increasingly, Google and others have worked to ensure apps remain useful offline. Still, Chrome OS is primarily designed to work with cloud-based services,

“Chromebooks are less reliant on an internet connection than they used to be”

and user files and data are intended to be stored online, typically in the Google Drive cloud storage service. While offline, data is cached locally and synced when a connection is made available.

As a result, a Chromebook doesn't normally need a great quantity of onboard storage: although the 16GB to 32GB of flash storage on your average Chromebook may look rather pathetic, it's perfectly adequate for everyday use. It isn't ideal for storing, managing and processing high-resolution images, however.

When it comes to getting online, all Chromebooks include 802.11n Wi-Fi, and a few have made the jump to the 802.11ac standard; if you opt for one of these models, consider upgrading to a compatible router so you can enjoy the smoothest connection for your new Chromebook.

Most Chromebooks also offer Bluetooth 4, and usually HDMI video output, a headphone socket, an SD card reader and a couple of USB 2 or USB 3 ports. You may not have much need to hook up USB peripherals, but these ports provide the option of accessing files from external memory sticks and hard drives, as well as charging a phone.

CORE COMPONENTS

Some older Chromebook models use lightweight Atom processors, giving them performance similar to an old netbook. Nowadays, a variety of processors are used, ranging from ARM-based Samsung Exynos dual-core, quad-core and octa-core CPUs to Intel Celeron models and

even Haswell Core i5 CPUs. If you only want to run a few apps in a few tabs or windows then the most lightweight processor should be fine, but if you keep on opening tabs and running more tasks, a more powerful processor will show its strength.

Overall, we've observed that ARM-based Chromebooks perform more slowly than Celerons based on Intel's Bay Trail microarchitecture, which in turn perform worse than Haswell-based Celerons. However, Google's frequent, automatic software updates can make the UI and Chrome browser work more efficiently on a specific architecture, or improve all-round operational efficiency.

Most Chromebooks come with 2GB of RAM, but a few have shifted to 4GB. Again, the difference won't be noticeable in everyday use, but if you plan to work with large images or intend to keep a lot of tabs open at once, a 4GB Chromebook may be a sensible choice. While we generally don't recommend using your experiences with a fully kitted out desktop PC, or a typical (non-Chromebook) laptop as a guide, when it comes to memory you'll always do better with more.

HOW WE TEST

Chromebooks don't run Windows apps – or even many apps that run locally on the desktop – so we used a range of browser-based benchmarks to assess performance. These include WebKit's SunSpider, Futuremark's Peacekeeper and Rightware's Browsermark; we ran all of them three times and averaged the final results.

3D PERFORMANCE

We tested 3D performance using two WebGL-based demos: WebGL Cubes by AlteredQualia and WebGL Aquarium by Human Engines and Gregg Tavares. We ran the first demo at its default settings and noted the highest sustainable frame rate. We ran the second with all the graphic options turned on and set to the maximum number of fish on-screen.

MULTITASKING

To push the processors to their limits, we ran Peacekeeper and WebGL Aquarium simultaneously, noting the Peacekeeper score. This provides an indication of how the Chromebook might handle multiple tasks while running processor-intensive applications.

BATTERY LIFE

Batteries were tested using a looping 720p video with Wi-Fi switched off and the screen calibrated to 120cd/m2. This is bright enough for comfortable use under most home and office lighting. Bear in mind, however, that you can expect longer runtimes in lighter use – such as when writing emails – or if you dim the screen.



15 expert features of Chrome OS

DARIEN GRAHAM-SMITH SHARES THE TIPS AND HIDDEN SETTINGS THAT CAN HELP YOU MAKE THE MOST OF YOUR CHROMEBOOK

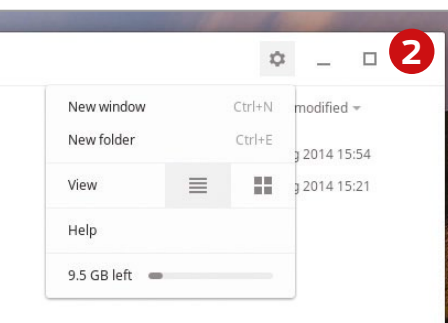
One of the key strengths of Chrome OS is its simplicity – but if you’re a power user who likes to speed up your workflow with shortcuts and productivity tricks, there are plenty to discover. With OS updates rolling out all the time, it may be impossible to produce an authoritative list of advanced features, but here’s a selection of our favourites.

1 TWO-FINGER SCROLL

Navigating around large web pages can be a pain. Happily, in Chrome OS you don’t need to deal with fiddly scroll bars: pan around the active window by simply dragging across the touchpad with two fingers. (A three-finger drag will scroll more slowly for precise positioning.) If you’re used to multi-touch gestures on OS X, you’ll be right at home – except for the fact that the default scroll direction in Chrome OS is the reverse of OS X, so you drag downwards, not upwards, to see the bottom of a page. This can be changed by opening up the main Chrome OS Settings page, hitting the Touchpad Settings button and enabling “Australian scrolling”.

2 HOW MUCH SPACE?

Many Chromebooks come with a bare minimum of storage space, and if you make use of offline capabilities, this can quickly become squeezed. You can see how much storage is available by opening the File Manager – select Files from the Launcher icon, or press Alt+Shift+M – and clicking the Gear icon towards the top right of its window. Alternatively, navigate to `chrome://quota-internals:` at the top, under Summary, you’ll see a measure of available disk space.

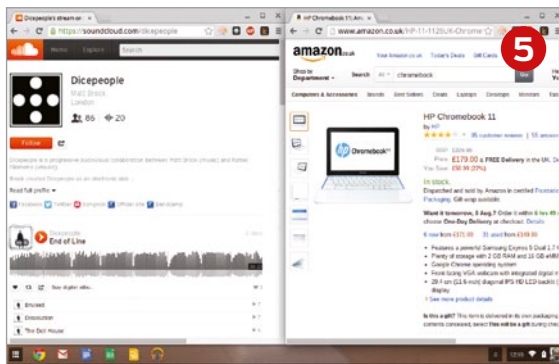


3 HIDE THE SHELF

If you want a web app to use the full height of your screen, right-click (or two-finger click) on the shelf at the bottom to open its view options: from here you can enable autohide – and, if you prefer, move the shelf to the side of the screen. If your Chromebook has a touchscreen, you can also hide and restore the shelf by swiping up from the bottom of the screen.

4 OPEN IN A NEW WINDOW BY DEFAULT

Right-click on an app on the shelf or in the launcher to see opening options. The default is to open apps in a new Chrome tab, but you can set specific apps to open as a pinned tab – that is, one with only an icon and no title at the top – in a window, or maximised. These last two options open the app in a new browser window with no controls, so it looks like a regular desktop application.



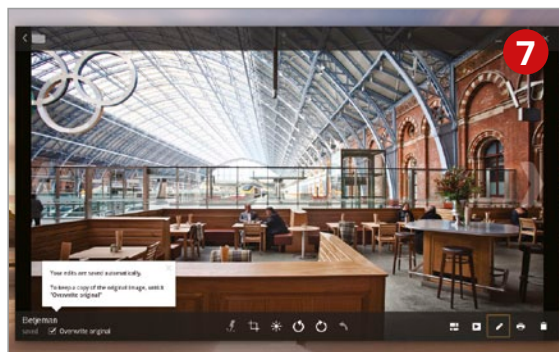
5 VIEW MULTIPLE PAGES AT ONCE

You can drag a tab out of the main Chrome browser to view it in its own window. Windows can be arranged by dragging and resizing with the mouse in the familiar style, and you can also dock browser windows to the left or right of the screen by dragging them to the side. As a shortcut, hold down the mouse button on the maximise icon at the top right of the window: you’ll see the neighbouring icons turn into arrows, which you can select to send the window to the left or right side of

the screen. Or, press Alt+[or Alt+] for instant docking.

6 FACTORY RESET

The factory-reset procedure (“Powerwash”, as Google calls it) can be accessed from the main Settings screen: click “Show advanced settings” then scroll to the bottom. Obviously this is no use if you manage to forget or lose your password. Should this happen, initiate a Powerwash by pressing Alt+Ctrl+Shift+R at the login screen.



7 EDIT IMAGES

Chrome OS includes a simple image editor – it’s no Photoshop, but it will do for cropping and tidying up images before you post to a social network. To access it, double-click on the image you want to edit in the File Manager (it works only on local files), then click the pencil-shaped Edit icon at the bottom right of the window. You can apply automatic correction, crop and rotate images, and manually adjust brightness and contrast.

8 ACCESS THE TERMINAL

If you’re a developer, or an experienced user of Linux (or a similar Unix-like OS), you may from time to time find yourself wanting to break out of Chrome OS’s mouse-based environment and type commands into a familiar shell. Pressing Ctrl+Alt+T will open the Chrome OS developer shell: this is quite limited in its default mode, but if you’ve set your Chromebook to Developer Mode (see 10), you can type “shell” to open a full Bash shell, which lets you nose around inside the device to your heart’s content.

9 CUSTOMISE THE KEYBOARD

On the main Settings page, under Keyboard Settings, you'll find the option to reprogram the Search, Ctrl and Alt keys. The functions of all three can be switched around to suit your tastes, and Search can be made to act as a regular Caps Lock key, or a second Escape button. There's also a tickbox you can select to make the top-row keys act like regular function keys – this isn't useful within the graphical Chrome OS environment, but if you're an advanced user wanting to use the terminal it can be handy.

10 DEVELOPER MODE

Chrome OS is based on Linux, but it's heavily locked down, making it hard for hackers and malware to infiltrate the system. If you want to tinker with the underlying Linux OS, unlock it by switching your Chromebook into Developer Mode. On older models, this is achieved by flicking a physical switch on the chassis; on more recent Chromebooks it's accessed via a series of key presses at startup – check your documentation for precise details for your machine.

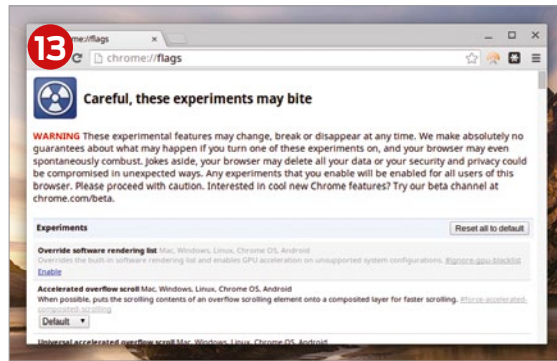
Once you're in Developer Mode, you can download and compile third-party software – although apt-get isn't installed by default, so you may have to jump through a few hoops. You can even install a second operating system on the hardware, dual-booting Ubuntu alongside Chrome OS. Before you start experimenting, however, be warned that switching to Developer Mode will perform a factory reset of the device.

11 GET FREE GOOGLE CLOUD STORAGE

Chrome OS relies on cloud storage, so Google likes to make sure that Chromebook users don't run out. Go to <https://drive.google.com/redeem> on your Chromebook and you'll receive 100GB of complimentary Google Drive storage. Sadly, the extra space lasts for only two years: after that period you'll have to pay to continue using the storage, or buy another Chromebook.

12 GET NEW FEATURES EARLY

Chrome OS upgrades itself whenever a new update is available,



but not everyone receives the same updates. Like many Linux-based systems, Chrome OS is released in multiple channels; by default, Chromebooks are subscribed to the stable channel, so they only receive updates that have been widely tested as stable.

If you prefer, you can switch to the beta channel to try out new features before they hit the mainstream – or to the developer channel that always brings you the very latest code, even if it's known to have bugs. To switch, go to the main Settings page, click Help, then select More Info and click the "Change Channel..." button.

13 TRY EXPERIMENTAL FEATURES

Navigate to "chrome://flags" to access a secret menu of experimental settings. As the page warns, "these experiments may bite" – there's no guarantee they'll work properly for you, but they're fun to play with. At the time of writing, experimental features include autocorrect for spelling, pinch-to-scale on touchscreen Chromebooks, auto-fill predictions for web forms, automatic secure password generation and a whole lot more.

14 DO A BARREL ROLL

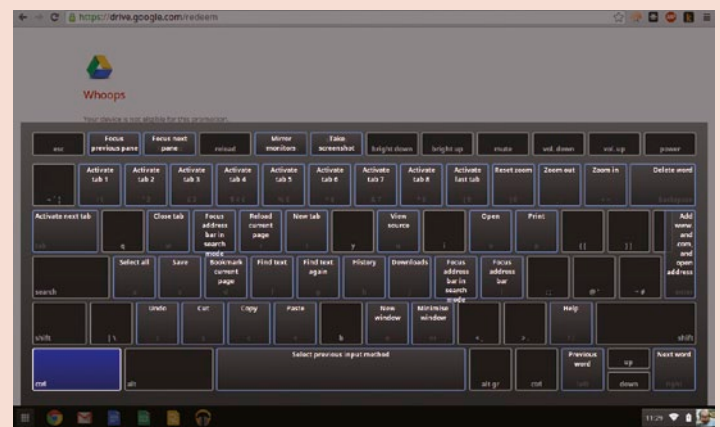
When you hit the Reload button, the Chrome OS browser refreshes the active web page. Hold down Alt+Ctrl+Shift while pressing it, and you'll see a much more entertaining effect – one which, it must be admitted, perfectly reflects the symbol printed on the top of the key. While perhaps not the most useful feature, it's a fun Easter egg.

15. KEY COMMANDS

The Chrome OS keyboard is designed to be simple, but if you're used to a Windows keyboard, you may feel like you're missing several useful keys. The good news is that almost all of them can be simulated in Chrome OS by pressing the right key combinations:

CAPS LOCK	Alt+Search (press again to cancel, or hit Shift)
PAGE UP/DOWN	Alt+Up/Down
HOME/END	Ctrl+Alt+Up/Down
DEL	Alt+Backspace
PRINT SCREEN	Ctrl+Switch Window

You can reconfigure the behaviour of certain keys from the Keyboard Settings dialog, accessible from the main Settings page. There's also a huge number of additional shortcuts available: press Ctrl+Alt+/ within Chrome OS to view a handy visual guide.





	Acer C720 Chromebook	Asus Chromebook C200	Dell Chromebook 11	
OVERALL	★★★★☆	★★★★☆	★★★★☆	
Performance	★★★★☆	★★★★☆	★★★★☆	
Features & Design	★★★★☆	★★★★☆	★★★★☆	
Value for Money	★★★★☆	★★★★☆	★★★★☆	
PRICING				
Price (inc VAT)	\$399	\$379	\$399	
Manufacturer	www.acer.com.au	www.asus.com.au	www.dell.com.au	
Dimensions (WDH)	288 x 202 x 19.1mm	304 x 200 x 30.3mm	295 x 200 x 23mm	
Weight	1.25kg	1.14kg	1.2kg	
SERVICE & SUPPORT				
Warranty	1yr	1yr	1yr	
CORE COMPONENTS				
Processor	1.4GHz Intel Celeron 2955U	2.4GHz Intel Celeron N2830	1.4GHz Intel Celeron 2955U	
RAM fitted	2GB DDR3	2GB DDR3	2GB/4GB DDR3	
GPU	Intel HD Graphics	Intel HD Graphics	Intel HD Graphics	
DISPLAY				
Size	11.6in	11.6in	11.6in	
Resolution	1,366 x 768	1,366 x 768	1,366 x 768	
DRIVES				
SSD capacity	16GB	16GB	16GB	
CONNECTIONS				
Wi-Fi	802.11n	802.11n (802.11ac for retail models)	802.11n	
Bluetooth	Bluetooth 4	Bluetooth 4	Bluetooth 4	
Video	HDMI	HDMI	HDMI	
USB	USB 3; USB 2	USB 3; USB 2	2 x USB 3	
Card reader	SD card	SD card	SD card	
OTHER FEATURES				
Webcam	720p HD	720p HD	720p HD	



		LABS WINNER	
	Google Chromebook Pixel	HP Chromebook 11	Toshiba Chromebook 13.3in
	★★★★☆	★★★★☆	★★★★☆
	★★★★☆	★★★☆☆	★★★★☆
	★★★★☆	★★★★☆	★★★★☆
	★★★★☆	★★★★☆	★★★★☆
	\$1939	\$399	\$449
	www.google.com	www.hp.com.au	www.toshiba.com.au
	298 x 225 x 162mm	297 x 192 x 17.6mm	329 x 227 x 20mm
	1.52kg	1.04kg	1.5kg
	1yr	1yr	1yr
	1.8GHz Intel Core i5-3427U	1.7GHz Samsung Exynos 5 Dual 5250	1.4GHz Intel Celeron 2955U
	4GB DDR3	2GB DDR3	2GB DDR3
	Intel HD Graphics 4000	ARM Mali-T604	Intel HD Graphics
	12.9in	11.6in	13.3in
	2,560 x 1,700	1,366 x 768	1,366 x 768
	32GB	16GB	16GB
	802.11n	802.11n	802.11n
	Bluetooth 3	Bluetooth 4	Bluetooth 4
	mini-DisplayPort	SlimPort video out	HDMI
	2 x USB 2	2 x USB 2	2 x USB 3
	SD card	SD card	SD card
	720p HD	720p HD	720p HD



HP CHROMEBOOK 11

IT ISN'T THE FASTEST NOR THE LONGEST-LASTING CHROMEBOOK, BUT YOU WON'T FIND A MORE USABLE LAPTOP ELSEWHERE AT ANYWHERE NEAR THIS PRICE

PRICE \$399
SUPPLIER www.hp.com.au

There were several strong contenders for the top spot this month. Google's Chromebook Pixel is a fantastic piece of hardware and the Asus Chromebook C200 has incredible battery life. All have their weaknesses, however, be it price, ergonomics or performance. Ask us which Chromebook we'd actually buy

for ourselves and we'd have to pick the HP Chromebook 11.

In some ways, it's an unlikely champion. Take performance: like most Chromebooks, the HP feels perfectly snappy when running Google's office apps or browsing the web, and even ran Full HD video from YouTube and Google Play Movies without a glitch.

Inside, however, there's a lowly 1.7GHz Samsung Exynos 5 Dual

5250 processor, which proved slower in our benchmarks than the Asus Chromebook C200, with its 2.4GHz Bay Trail Celeron processor. If you leave a lot of tabs open while you're surfing, or run more demanding games, it quickly begins to struggle. If you see your self as a power user, then a \$399 Chromebook may not be for you.

It's a similar story with battery life. Away from the mains, the

“Comfortable, lightweight design makes it a joy to use.”

Chromebook 11 was able to play back 5hrs 10mins of looping 720p HD video before giving up; the Asus Chromebook C200 lasted for 9hrs and 17mins.

Connectivity has something of a bare-minimum feel to it. The Chromebook 11 has only two USB 2 ports, with no USB 3, and the only video output is a micro-USB port that doubles as the power socket and a SlimPort output. We like the idea of a laptop that charges via micro-USB – even if the compact charger takes four hours to do it – but doing it this way means you can’t charge the Chromebook 11 and output to a monitor at the same time.

BUILD QUALITY

So why does the HP get our vote? A large part of it is down to design: it looks beautiful, and feels it too. At only 1kg it’s incredibly sleek and light, yet the nicely curved polycarbonate chassis feels impressively tough. There isn’t too much flex in the lid, the hinge is smooth and feels robust, and the thick, rubbery pads at the bottom – colour matched to the keyboard – do a great job of stopping the Chromebook 11 from bouncing round on the desk as you type, or slipping off your lap. There are laptops at twice the price that don’t look or feel this good.

The Chromebook 11 also punches well above its weight when it comes to ergonomics. The keyboard stretches most of the way across the Chromebook’s width, presenting large, flat keys in a well-spaced layout: only the cursor and function keys are shrunk to half-height. The typing action is lightweight without being floppy, and the touchpad is unusually wide for an 11.6in laptop; its lightly textured surface is responsive and accurate, making websites easy to navigate and gestures simple to pull off. All told, the Chromebook 11 is one of the sweetest small-screen laptops around, regardless of OS.



THE DISPLAY

The Chromebook 11’s biggest attraction, however, has to be its screen. The resolution is only a bog-standard 1,366 x 768, but in this compact 11.6in form factor that translates to a respectably sharp image. What’s more, it’s an IPS panel, something we wouldn’t normally expect at this price. We measured its maximum brightness at 316cd/m², far in advance of any other Chromebook save for the Google Chromebook Pixel. Photos and videos pack a real punch, with vibrant colour reproduction and wide viewing angles. It’s proof that resolution isn’t the be-all and end-all: given the

▲ Connectivity is limited: there are only two USB 2 ports, but the micro-USB port doubles as both the charger and video output

choice between a drab Full HD screen and this little beauty, we’d take the hit on pixel density every time.

VERDICT

At its launch, the Chromebook 11 was already a bargain at \$399; now you can easily find it for closer to \$300, making it irresistible. To be sure, there are compromises, notably on speed and longevity – we’d love to see a model with a Bay Trail or Haswell processor as an option, or perhaps added later on in this product’s lifecycle. A longer-lasting battery would be another feature that would do well on this machine. But even as it stands, the HP Chromebook 11’s display, keyboard, trackpad and comfortable, lightweight design make it a joy to use. Whether you share it with the family or use it in your business, this is a brilliant Chromebook at an almost unbelievable price.

◀ The Chromebook 11’s snazzy design is matched with great ergonomics – the keyboard and touchpad are superb



PERFORMANCE
FEATURES&DESIGN
VALUE FOR MONEY



OVERALL





ACER C720 CHROMEBOOK

A SLIMLINE CHROMEBOOK WITH GOOD PERFORMANCE, BUT THE MIDDLING DISPLAY AND MEDIOCRE KEYBOARD MEAN THAT IT DOESN'T STAND OUT

PRICE \$399
SUPPLIER www.acer.com.au

Acer's first Chromebooks felt rather characterless, but the C720 is a much more distinctive unit, looking like a slim, lightweight Ultrabook, with the edges almost chamfered towards the front. Start using it and you'll quickly realise that the build is cheaper than it looks (the two-tone grey and gunmetal finish is actually made of plastic); it still feels reasonably robust, however.

The 11.6in screen has the standard 1,366 x 768 resolution, and it isn't in the same league as the IPS display on the HP Chromebook 11. Brightness levels are just about acceptable at 228cd/m², but it doesn't have the HP's excellent contrast or colour reproduction, nor the rich, deep blacks of the Asus Chromebook C200.

Sound is similarly mediocre. The built-in speakers produce no real bass, and music and movie soundtracks sound disappointingly restrained – although things do become clearer when you lift the C720 off your desk or lap.

Ergonomically, Acer has done

its best to make the keyboard feel spacious, but the layout still feels cramped, and the weird merging together of the hash and return keys doesn't help. The typing action isn't soft or spongy, but there isn't much feedback from the lightweight Scrabble-tile keys. The touchpad, meanwhile, is a little too small for comfort: in use, we found it sometimes missed double-fingered tapping and scrolling gestures.

The C720 has the connectivity you'd expect from a recent Chromebook: one USB 3 port, an HDMI output and a mic/headphone socket on the left-hand side, along with a USB 2 port and an SD slot on the right. The left ports are squeezed tightly up against one another, so you may struggle to connect a bulky USB stick and an HDMI cable at the same time.

Inside, the C720 is equipped with a dual-core 1.4GHz Celeron 2955U, a chip that seems almost tailor-made

- 1 It might be plastic, but the C720 looks and feels great
- 2 The light keys and tiny touchpad are disappointing
- 3 There's USB 3, USB 2, HDMI and an SD card reader

for Chromebooks. Like other models equipped with this CPU, the C720 coped well in our benchmarks and multitasking test, and even managed credible results in our WebGL tests – matching the Chromebook Pixel. Even with multiple browser tabs open and applications running, the C720 feels very snappy.

Battery life is acceptable, but not quite on a par with the likes of the Asus C200 or Dell Chromebook 11. Where those Chromebooks burst through the eight- and even nine-hour barrier while continuously playing HD video, the C720 sputtered to a halt after 6hrs 37mins.

Although the C720 may be Acer's most visually striking Chromebook yet, the overall package remains unexceptional. It isn't seriously flawed in any particular area, and the price is certainly easy to swallow – but look elsewhere and you'll find better screens, better ergonomics and better battery life.



PERFORMANCE	★★★★☆
FEATURES&DESIGN	★★★★☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★☆



ASUS CHROMEBOOK C200

IT LACKS THE ULTRABOOK STYLING OF RIVALS, BUT IF BATTERY LIFE MEANS MORE THAN PERFORMANCE, THE C200 HAS STAMINA TO SPARE

PRICE \$379
SUPPLIER www.asus.com.au

Asus is the latest big name to join the Chromebook party, offering not only the 11.6in C200 reviewed here but also a 13.3in C300 variant.

First impressions aren't particularly promising. The silver metallic finish on the chassis around the keyboard and ports has a distinctly bargain-basement feel, and the wedge-shaped profile doesn't disguise the C200's overall bulk: where other Chromebooks do their best to ape the style of Ultrabooks, the C200 feels more like an oversized netbook. Still, while the plastics may not be the thickest or most rugged, build quality feels solid enough.

Indeed, once you start using the C200 you'll find much to like. The proprietary charger is compact and lightweight, and while the large, smooth touchpad may not have a glossy glass surface, it's still accurate and responsive: we didn't have any problems navigating Google Apps spreadsheets and using scrolling and right-click gestures. The keyboard isn't bad

either; the action feels a little stiff, but definite, and the layout is easy to get along with.

The screen is typical of what you'd expect from a budget laptop. A maximum brightness of 232cd/m² isn't incredibly bright, but its glossiness helps it produce better contrast and richer blacks than the Dell or Acer models. Of course, when you're trying to work near a source of light, you may find its reflectivity a distraction.

The sound is bigger and more spacious than you might expect, although the audio response seems largely concentrated in the mid-range, without much in the way of bass or treble.

Physical connectivity is a predictable mix of one USB 3 port, one USB 2 port, an HDMI output for running an external screen, a headphone out and a SD card slot. However, the Asus is one of the few models to offer 802.11ac wireless, although it wasn't yet enabled on our early model.

Asus has also tried something a little different

- 1 Asus' wedge-shaped design looks just as cheap as it is
- 2 We had no complaints about the keyboard and trackpad
- 3 A decent roster of ports is rounded off with 802.11ac

by using one of Intel's new Bay Trail Celeron CPUs, rather than the Haswell-based chips used by other manufacturers. This is an Atom architecture, and that's reflected in the benchmarks, where the Asus struggles to keep up with the Haswell-powered competition. We still didn't encounter much slowdown with multiple tabs open and apps running in everyday use, but leave a couple playing videos and try to get some work done and you'll spot a little lagging and pausing creeping in.

The trade-off is impressive battery life. With the display calibrated to 120cd/m², the C200 managed to play 9hrs 17mins of looping video before giving up; keeping Wi-Fi switched on will reduce that, but you can still expect to get a good day's work out of this machine.

The C200 isn't the best of the bunch in terms of speed or ergonomics, but it's a perfectly agreeable Chromebook that keeps on trucking.



PERFORMANCE	★★★★★☆☆
FEATURES&DESIGN	★★★★★☆☆
VALUE FOR MONEY	★★★★★☆☆
OVERALL	★★★★★☆☆



DELL CHROMEBOOK 11

A TOUGH, HARD-WORKING CHROMEBOOK WITH PLENTY OF POWER AND GREAT BATTERY LIFE, BUT THE PACKAGE IS LET DOWN BY AN UNIMPRESSIVE SCREEN

PRICE \$399

SUPPLIER www.dell.com.au

Chromebooks have been a big hit in education, and the Dell Chromebook 11 is designed with the classroom in mind. The chassis is thicker and tougher than the norm, with a rubber surround around the keyboard that extends to the sides and is mirrored on the rim of the lid. Although this isn't strictly a ruggedised laptop, it feels solid, with a robust hinge and barely any give in the plastic casing.

The Dell isn't noticeably heavier than its 11.6in rivals, however, and its ergonomics are fairly good. The Scrabble-tile keys have a pleasing texture to them and, while not as large as those on the HP Chromebook 11, they're well spaced out. The touchpad is large and responsive too, making the Dell a good all-round machine for getting work done.

This Chromebook's major weakness is its screen. Maximum brightness is a whisker away from 200cd/m² – not an impressive figure at all – and viewing angles are fairly shocking, particularly on the vertical. If you feel the need to turn the brightness down, the

colours quickly become flat and dull as contrast drains away. It probably won't be a showstopper if you're only writing emails and browsing the web, but if you're planning to do anything involving video or photos, this is definitely one to avoid.

On the plus side, the Dell sounds better than a few budget Chromebooks. Audio can be a tad boxy and mid-range heavy, but it's loud in the right places, with a hint of stereo space.

Connectivity is pretty good, too, with two USB 3 ports and HDMI on the left and an SD slot on the right. The charger uses a power connector rather than micro-USB, but the slimline PSU won't be any burden to carry. Wi-Fi is 802.11n-only, however.

The Dell has an Intel Celeron 2955U processor, and is offered in both 2GB and 4GB configurations. We tested the latter, but found the extra memory yielded no detectable benefit in our regular

- 1 The Dell's rubber-edged body feels tougher than most
- 2 Great ergonomics mean that it's easy to get work done
- 3 The chassis sports a comprehensive set of ports

benchmarks, versus the 2GB Acer and Toshiba Chromebooks based on the same CPU. The 4GB Dell did perform slightly better in our heavy-duty multitasking test, however, so the extra RAM may make a difference if you start pushing more demanding workloads on the CPU.

The other reason to consider the Dell is battery life. It managed 8hrs 10mins of looping HD video before warnings appeared and the screen finally went blank; only the incredibly long-lasting Asus managed to run beyond this time.

Overall, it's a real shame that Dell has seen fit to equip its Chromebook 11 with such a poor display. With a better panel, this would be a Chromebook to be reckoned with. As it is, its rugged charms may still be enough to earn a place on your shortlist, but it's hard to recommend when the HP Chromebook 11 looks so much better at the same price.



PERFORMANCE	★★★★☆
FEATURES&DESIGN	★★★★☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★☆

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Scorptec	1300 726 770
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WA

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MSY	08 9344 1002
PLE	08 9309 4771

Chrome OS on a desktop

The Chromebook has established Chrome OS as a credible player in the laptop market: now it's creeping into the desktop space as well. Samsung didn't make much of a mark with its first- and second-generation Chromebase units, but now Asus and HP have revealed new desktop models, and LG has just launched its first Chromebase all-in-one.

To see how the Chrome OS concept translates to the desktop, we tried out Asus' Chromebox M039U, a Celeron-based Chromebox (Core i3 and Core i7 models are also offered) with prices starting from only \$249.

The Chromebox itself is a compact box, outwardly similar to an Intel NUC, measuring roughly 5in along each side and standing just less than 2in high. It's no Apple Mac mini, but it's solidly built and near-silent except for a few moments when the fans spin up as it wakes from sleep.

There's a power button on the front-left corner, with two USB 3 ports just to the right. On the left-hand side there's an SD card reader and a Kensington lock, while the rear holds another two USB 3 ports, an HDMI and DisplayPort outputs, a headphone socket and a Gigabit Ethernet port. That last port is a very sensible addition, in our view: for a portable computer, wireless networking is a foregone conclusion, but a faster and more robust wired connection makes more sense for a desktop system, especially one aiming to appeal to business.

Predictably, the Chromebox offers performance similar to a regular Chromebook. Our model, with a



1.4GHz dual-core CPU and 4GB of RAM, proved faster in Futuremark's Peacekeeper benchmark than the Toshiba or Dell Chromebooks, but came out slightly slower in Rightware's Browsermark; all three were neck and neck in the WebGL 3D tests. Models with 4GB do better on heavy-duty multitasking, but as a

“It's no Apple Mac mini, but it's solidly built and near-silent.”

whole there's no major difference. In several days of use, our Chromebox coped with every task we threw at it, from word processing to HD video streaming, spreadsheets to editing images, without any noticeable hiccups or slowdowns.

We can also report that Chrome OS works surprisingly well as a desktop OS. Since you can take connectivity pretty much for granted, a lot of

our issues with the OS melted away. Printing via Google Cloud Print works perfectly well, and Chrome OS thrives on a big screen, making it easy to keep multiple apps and windows open and work between them - indeed, with a standard PC keyboard, a mouse and a 24in display, it's easier to get serious work done than it is on a regular Chromebook. A Chromebox also makes a handy little media player, with apps for Google Play Movies and Netflix, and the ability to play just about anything that will stream across the web.

In fact, if you pick the right apps and adjust your workflow, you may very quickly stop missing your Windows PC. We only felt the need to switch back when we ran across something involving PivotTables or Macros in Excel, or wanted to carry out advanced image-editing in Photoshop Lightroom.

If you're looking for raw power, the Core i7-4600U model will set you back \$799. That's competing with Mac mini and NUC systems that can do a whole lot more - but for many homes and small businesses, a cheap, low-cost Chromebox might be all the desktop PC you need.



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GOOGLE'S LUXURY CHROMEBOOK IS A STUNNING PIECE OF DESIGN, BUT IT COSTS FAR TOO MUCH AND DOESN'T LAST LONG ENOUGH AWAY FROM THE MAINS

PRICE \$1939
SUPPLIER www.google.com

The Chromebook Pixel isn't merely a computer: it's a statement, created by Google to show that Chrome OS isn't only about cheap screens and plastic cases. Machined from anodised aluminium with an incredibly solid feel, the Pixel embodies the kind of design nous and attention to detail that you'd normally associate with an Apple product. It's not officially on sale here, but can be found in several Australian online stores.

It can feel a little odd to use, thanks to the unusually sized 12.9in screen. Its 3:2 aspect ratio means the Pixel stands taller than most Chromebooks, but it makes for a comfortably shaped workspace, and the machine balances well on the desk or lap.

It has a great screen, too. With a 2,560 x 1,700 resolution, it has a high pixel density of 239ppi, narrowly beating the sharpness of the Retina display found on Apple's 13.3in MacBook Pro. It's also fantastically clear, with deep, rich colours and a maximum brightness of 356cd/m2. It's so gorgeous that you won't want

to put a mark on it – which is a bit of a shame, since it's also a touchscreen. However, support for touch controls in Chrome OS is fairly minimal, so in practice you'll normally be stuck with the trackpad and keyboard anyway.

This is no great hardship, since both are excellent. The backlit keyboard is reminiscent of Apple's MacBook Pro keyboard, with large keys, a spacious layout, a crisp, nicely weighted action and a total lack of bounce in the chassis beneath. The large, clickable glass touchpad, meanwhile, is smooth and sensitive: we found gesture and scroll controls worked without a hitch.

Even the Pixel's sound is premium-quality. Some resonance creeps in on bassy notes at high volume, but at medium levels there's depth, clarity and wide stereo.

So far, so great. Sadly, the Pixel falls down in a few areas. Physical connectivity is limited to a pair of USB 2 ports, with no USB 3. And, although dual Wi-Fi antennas boost speed and reception with

- 1 A stout, all-metal body sets the Pixel apart from its peers
- 2 A huge glass touchpad and superb keyboard join forces
- 3 The Pixel lacks for ports; cheaper models provide more

compliant routers, only 802.11n is supported, rather than the newer, faster 802.11ac standard.

Then there's the processor. The Pixel uses a 1.8GHz Intel Core i5-3427U with 4GB of RAM. This proved noticeably faster than any of the competition when running benchmarks and our heavy-duty multitasking test. It's a chip from 2012, however, and the GPU wasn't as fast in our 3D benchmarks as some of the Celeron 2955U-based laptops.

Battery life is disappointing, too. Several low-cost Chromebooks this month achieved seven hours or more of HD video playback, but the Pixel ran out of juice in 4hrs 5mins, taking a humiliating last place in the battery stakes. For most people, however, the major issue will be the price. The Chromebook concept makes a lot of sense on cheap, lightweight hardware, but at \$1939 the Pixel competes with Ultrabooks and MacBooks, highlighting its limitations.



PERFORMANCE	★★★★★☆☆
FEATURES&DESIGN	★★★★★☆☆
VALUE FOR MONEY	★★★☆☆☆☆
OVERALL	★★★★★☆☆



The best reason to buy an iPad

Your other favourite technology magazine now has an iPad edition featuring everything you love in the magazine plus exclusive extras each month including additional photography and video. Change the way you view your tech. Head to iTunes now to download the app.



TOSHIBA CHROMEBOOK 13.3IN

A SPEEDY CHROMEBOOK WITH A BIG SCREEN, BUT PATCHY BUILD QUALITY AND UNDERWHELMING ERGONOMICS SEE IT DROP BEHIND THE FRONT-RUNNERS

PRICE \$449

SUPPLIER www.toshiba.com.au

Like the last-generation Samsung Chromebook, the Toshiba Chromebook mimics the look of Apple's MacBook Air. It does have a little personality of its own, however, expressed through a shiny silver textured finish on the lid and base. Naturally you don't get a unibody aluminium casing at this price – chunky-feeling plastic is the order of the day – but the overall build quality isn't bad, and it's pleasingly light at 1.5kg. The biggest concern is the amount of flex in that larger 13.3in screen it features.

Ergonomics aren't a strong point: on the desk or a lap, the Toshiba Chromebook feels slightly off balance. With its large keys and spacious layout, the layout looks initially promising, but it's let down by a key action that's spongy and none too crisp, and an assembly that seems to bounce in the middle as you type.

The touchpad is a little better. It's large with a textured surface, but it isn't perfectly responsive: the two-fingered tapping gesture didn't consistently bring us the usual

context-sensitive right-click menu, and we found scrolling also rather hit-and-miss.

The Toshiba's 13.3in screen is a comfortable size for working on documents and presentations, but don't be deceived: its 1,366 x 768 resolution gives you no more actual workspace than the 11.6in displays found on more compact models, so it isn't much help if you want to place two windows side by side. Colours seem rather lacklustre too, and although a maximum brightness of 254cd/m² is pretty good by Chromebook standards, the reflective surface makes it tricky to work in sunlight or bright lighting. Sound is also a mixed bag: there's some volume on offer here, but the tone is muddy and the mid-range heavy.

The Toshiba Chromebook isn't without its strengths. With two USB 3 ports, an HDMI output, an SD slot and a headphone/microphone socket, the Toshiba is one of this month's better-connected contenders, and there's

- 1 Finished all in silver, the Toshiba looks classy
- 2 Spongy keys and an errant touchpad are an annoyance
- 3 Connectivity hits the mark – only 802.11ac is missing

802.11n Wi-Fi and Bluetooth 4 for the web connection and any wireless peripherals.

Performance is fine, too: like all this month's Chromebooks based on the Celeron 2955U processor, the Toshiba did a good job of keeping multiple tabs and apps running at a decent pace in everyday use.

And, although the Toshiba ranked bang in the middle of our battery life table, a total of 7hrs 2mins of uninterrupted HD video looping indicates there's enough power here to get you through a regular working day.

In all, Toshiba's Chromebook offers a persuasive internal specification, which well justifies the slight cost difference over the average \$399 price of most models tested here. The screen isn't as generous as it may appear, though, and the ergonomics aren't great. If you're looking for a 13.3in Chromebook, and performance isn't a top priority, we reckon it's worth a look.



PERFORMANCE	★★★★★
FEATURES&DESIGN	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

Results

It's all about the CPU this month: the ARM-based chips languish at the bottom of the league tables, and the assortment of Intel chips ease ahead. The Acer, Dell and Toshiba models (and the Asus Chromebox) dominate the midfield thanks to nippy Haswell-based CPUs, with the Atom-based chip in the Asus Chromebook close behind. The Chromebook Pixel's last-generation Core i5 tears ahead in some tests, but stamina and 3D power aren't its forte.



VIEW FROM THE LABS

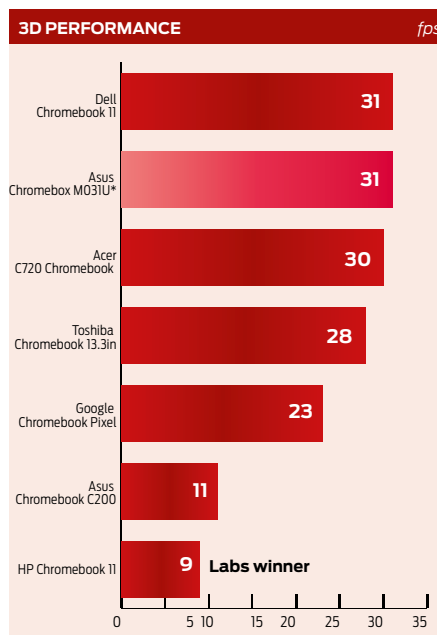
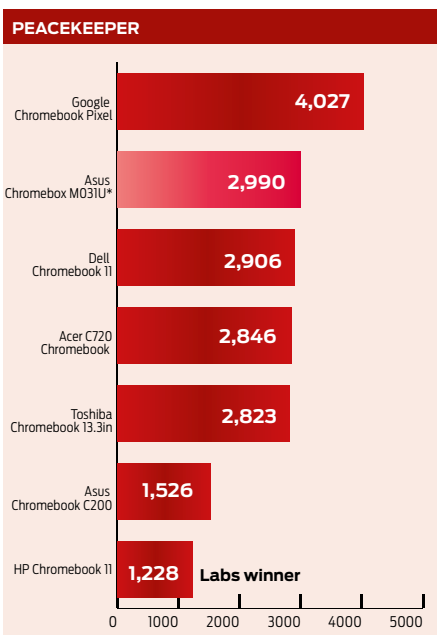
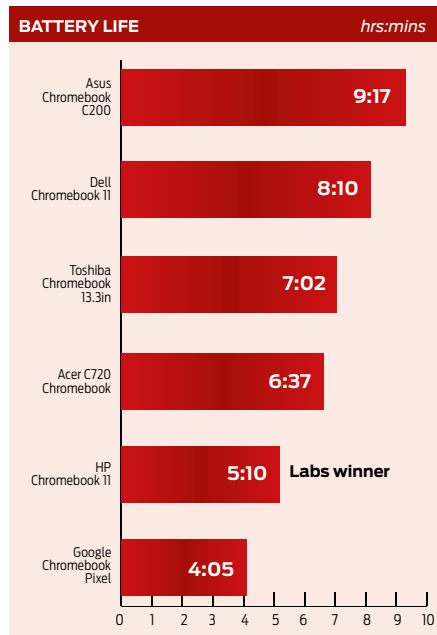
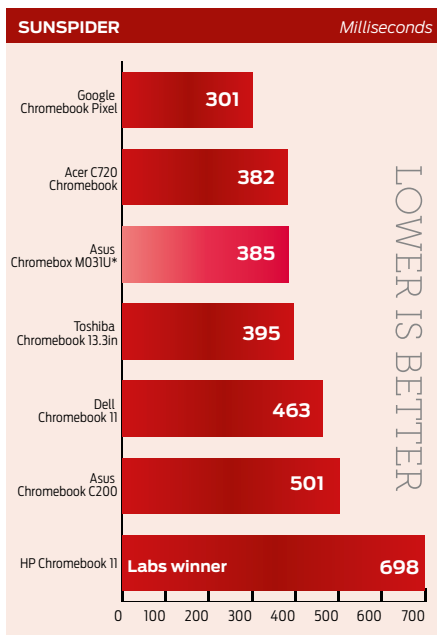
The main appeal of the Chromebook has always been the promise of everyday computing at a bargain price. But it has a hidden strength, too, in the way that the platform as a whole evolves. When Chromebooks launched, the OS was little more than a browser, almost entirely dependent on an internet connection to do anything at all. Only a meagre library of native apps and services supported it, and numerous commentators (*PC & Tech Authority* included) found themselves wondering whether Google had lost the plot.

In the past three years, that's all changed. Chrome OS now looks and feels like a proper operating system, supporting multiple windows, a taskbar, settings and notifications. It's better equipped to handle basic computing needs, and it ties in neatly with all of Google's services.

Perhaps more importantly, those services have themselves evolved. Google Drive in particular delivers the storage infrastructure and offline capabilities Chrome OS was missing. Elsewhere, apps such as Writebox for Chrome OS, Pixlr Touch Up and Keep expand what a Chromebook can do. Even outside of the Chrome family, developments such as Microsoft's OneDrive, Office Web Apps, Outlook.com and Office 365 have all made the Chromebook a more viable platform for work as well as play.

Best of all, the latest hardware is stepping up to the challenge. Here we're not only talking about showcase models such as the Chromebook Pixel, but ordinary, low-cost Chromebooks from Dell, HP and Asus. Compared to the Chromebooks of a year or two ago, they bring better screens, more usable keyboards, stronger designs and impressive battery life, while still keeping prices impressively low.

A Chromebook isn't for everyone: there are still plenty of applications that call for a Windows or OS X machine. Yet the platform has hung on through a difficult first few years, and the winds of change are now blowing in Chrome OS's favour. We haven't found the perfect Chromebook yet, but this month's winner does a terrific job, pointing towards a bright future for the OS.



SID MEIER'S CIVILIZATION: BEYOND EARTH

AT LONG LAST, THE GAME BASED ON WHAT WE IMAGINED CAME AFTER THE CIVILIZATION END-SCREEN IS HERE.

DEVELOPER Firaxis
PUBLISHER 2K Games
WEBSITE www.civilization.com

The last time that Firaxis took the Civilization concept to the Stars was when it released Sid Meier's Alpha Centauri, way back in 1999. Since then it has kept its feet firmly grounded on Earth, with three major releases of Civ and numerous expansions of the theme.

Beyond Earth marks a return to the unanswered questions left when your Civilization breaks the bonds of earth and heads off to colonise space. At heart it is still a Civilization game, made by the same development team and built upon the same basic engine as Civilization V, but it doesn't take too many turns to realise that this is a fundamentally different experience, with only the broadest of concepts carrying over.

After having the good fortune of being able to talk extensively with the lead developers when it was first announced, we recently had our first chance to sit down and just play the

game. 200 turns of interplanetary colonisation later it was apparent just how different the entire experience of the game is, with a raft of new concepts that will take quite some time to master.

This begins with the basic setup for the game, where you choose your colonists sponsor, type of colonists, spacecraft and cargo, each of which conveys certain benefits on your mission, such as bonus units or boosts to resources. After choosing a pre-generated planet, or making the choice random, you land and begin to come to terms with both the Alien environment and the new concepts sprinkled throughout the game.

For Civ veterans this means fighting back the natural urges that occur in the early game. For it is readily apparent that, from the moment you land, you are an interloper on a world teeming with alien life forms. Some of these are hostile from the outset, others are neutral towards you until you go on the offensive, others are just incidentally destructive as they go about their business.

You can go on the offensive, but this will mean committing to a long campaign against the native lifeforms. The occasional skirmish against them is fine, with anger levels of their compatriots subsiding fairly quickly, but really anger them and you'll find yourself on a much more hostile planet than you started on.

That doesn't make aggression a futile pursuit though, for a lot of the fundamental changes made to the Civ formula play into you



PLATFORMS
 PC only

pushing your colony in one of three directions - Supremacy, Harmony or Purity. The path you take is formed by a combination of how you behave, what you research and how you choose virtues (the new system that effectively replaces the Civ V policies). Each path allows you to access unique units and buildings, and molds the way in which you treat the planet, and in turn how the planet treats you.

One of the most lasting impressions from our time with the game is how pervasive freedom of choice is throughout it. Unlike Civ, which is shackled by human history, Beyond Earth allows for many solutions, from the plausible to the outlandish.

This is largely facilitated by the Tech Web, an initially daunting system that underpins how science works in the game. Ultimately it means you have to choose a direction for your colony to head in terms of its research, rather than moving along the same path as everyone else, something that is going to allow for massive replayability.

While we initially worried that Beyond Earth would be a reskinned mod of Civ V, it hasn't taken long at all to realise that it is a fundamentally different experience, one that has us incredibly excited at the prospect of losing days to it. Beyond Earth is both a blast of fresh air for Civ fans, and a compelling experience in its own right.

John Gillooly



atomic

Civ-like, but different enough to provide an all-new midnight one-more-turn hook.

RATING

★★★★☆



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INVISIBLE, INC.

A RETRO LOOK, COMBINED WITH CHALLENGING STEALTH MECHANICS, MAKES FOR A WINNER.

DEVELOPER Klei Entertainment
PUBLISHER Klei Entertainment
WEBSITE www.invisibleincgame.com

Invisible Inc (we're ditching the comma and full stop to maintain our sanity as we type), is one of those rare games that combines a surprising amount of charm with some punishingly brutal gameplay. The art style may be cartoon-like; there may be a hint of steampunk to some of the character designs. But if you miss the overtly noir undertones, you'll miss an important element.

And the game will punish you for it.

Invisible Inc is also in Early Access at the moment, so it is asking for a degree of faith that your investment in an unfinished work-in-progress. That said, the developer, Klei, makes no bones about the nature of Early Access titles, and even includes a timer to the next major content update as part of the game's main menu screen.

But even as the game is, it's still a remarkably refreshing title. The charm comes from the simple but striking art, all bold, but dark colours, and a clever use of sound cues and colour codes to let you know what the environment is doing, and how you can avoid it.

In the game, you're an operator for Invisible Inc, running a team of agents in a race against time against... something. There's a threat out there, and shadowy or not, you have 72 hours to uncover it. You must move your time from target to target, travel

time eating into your intelligence gathering, prisoner-freeing, sneaky loot-stealing goals. It's all so nebulous because the campaign, such as it is, is procedurally generated each time you start it up.

The meat of the game, though, is sneaking around these facilities with your team - two agents at first, but you can find unlock others, all with unique, upgradeable skills. You can also purchase new equipment both between and during missions (if you're lucky, anyway). At the start, your agents basically have tasers, so need to be in contact with a guard to subdue them, but you can eventually get ranged weapons of varying lethality.

But combat is a last resort, and since you can only really knock people out most of the time, not the be all and end all solution. Instead, you need to cleverly take stock of cameras, computers, and mainframes, hacking into what you can to turn them off or unlock them (which uses an entirely different view of each map, and requires Power as a limited resource), and avoiding others.



PLATFORMS
PC only



Turret sentry guns can be taken offline, or even turned against active guards - always fun - but mostly it's about carefully plotting a path, using cover, and being very, very careful.

Because the guards do have guns, and they will kill you.

The challenge in the game is that there are no take-backs. When you start, it's hard to past the second or third mission, without losing every agent, and effectively ending your game. But when you're deeper in, and lose someone, it can be almost as alarming as losing a soldier in XCOM. Guards will actively investigate their environment, and even if you do avoid them, security levels naturally keep rising - and more guards appearing - just by your very presence.

The turn-based nature of the game also makes it more approachable for people without a serious twitch reflex. Movement and actions are based on action points, so you always know what you can and can't do, but you're also always wondering whether it's wiser to, say, move as far as you can each turn, or move less, but find good cover - just in case. It's a game where every action could be potentially disastrous, but that rewards good planning and awareness.

And, even though the game is less than complete, it's still a very polished, rewarding effort.

David Hollingworth



atomic

A lovely art style matched by tricky turn-based strategy reminiscent of classic XCOM gaming.

RATING





NEW

BLACKBOOK® ZERO



- INTEL IRIS PRO GRAPHICS
- FULL VOLTAGE QUAD CORE
INTEL CORE I7 PROCESSOR
- VENOM VISION FHD SCREEN

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THE A-LIST

ONLY THE BEST OF THE BEST MAKE IT TO PC & TECH AUTHORITY'S A-LIST

A tablet... in the PCs and Laptops section? Have you gone mad, PC & Tech Authority?

We have not. Bumping the Lenovo Carbon X1 out is our new Ultra Portable champion, the Microsoft Surface Pro 3. The marketing spiel is true, this really can replace your laptop, and by no half measure. We're seeing these pop up and being used by our colleagues in increasing numbers at launch events, and on the road by many a complete stranger who knows a good thing when they see it, and we use it too, now, instead of an ultra book. We recommend the i5 version with 256GB of storage.

In less exciting, but still important news, we've updated the Back Up champ Acronis True Image to the just-released 2015 version. Nothing does it better, and new cloud backup plus complete system backup make it even more useful.



PCS DESKTOPS ▼

HIGH-END PC&TA EDITOR'S CHOICE

★★★★★

PRICE \$3800

An extreme PC able to deliver perfect gaming performance, but also be equipped to handle the most demanding desktop apps.

SPECIFICATIONS i7 4770K CPU; AMD 295 graphics; Corsair Dominator Platinum DDR3 16GB; ASUS Maximus VI Extreme motherboard; ASUS ROG Front Panel; CoolerMaster Cosmos SE case; CoolerMaster V1000 PSU; Sandisk Extreme 2.240GB SSD; 2 x SanDisk Ultra Plus 256GB SSD; SanDisk Extreme Pro SSD 480GB



MEDIA PC&TA EDITOR'S CHOICE

★★★★★

PRICE \$1159

This versatile media box is also perfectly capable of doing double-duty as a lightweight TV game box. Built to a budget with performance in mind.

SPECIFICATIONS Bitfenix Prodigy; Kaveri A10-7850K APU; - Gigabyte GA-F2A88XN-WiFi; Corsair Dominator 8GB; Thermaltake Water 3.0 Pro; Seagate 4TB SSHD; Corsair RM 650 PSU; Logitech Wireless Touch K400



ALL-IN-ONE APPLE IMAC 27IN

★★★★★

PRICE \$1949 SUPPLIER www.apple.com/au

If you can afford it, the 27in iMac is the finest piece of all-in-one engineering on the market. A truly powerful beast with performance to match its looks.

SPECIFICATIONS 2.7GHz Core i5-2500S; 4GB DDR3 RAM; 1TB Western Digital Caviar Black HDD; DVD writer; AMD Radeon HD 6770M graphics; 27in 2560 x 1440 LCD.



HANDHELDS ▼

SMARTPHONE HTC ONE M8

★★★★★

PRICE From \$820 SUPPLIER www.htc.com.au

A beautiful, highly competent smartphone that's packed with clever features. Right now it's the best Android smartphone you can buy.

SPECIFICATIONS Quad-core 2.3GHz Qualcomm Snapdragon 801 CPU - Adreno 330 GPU - 2GB RAM - 16GB storage - 5in 1,080 x 1,920 display



TABLET APPLE IPAD AIR

★★★★★

PRICE \$539 SUPPLIER store.apple.com/au

The new iPad is pretty much the king of the hill when it comes to tablets, smaller and more powerful than ever before.

SPECIFICATIONS 9.7in 1536x2048 widescreen Multi-Touch display; 1GHz A5X processor, 16, 32 or 64 GB available; 3G and/or Wi-Fi connectivity; max 652g weight.



EBOOK READER KINDLE

★★★★★

PRICE \$109 SUPPLIER www.amazon.com

The new model is quicker, slimmer, lighter and cheaper than before. If all you want to do is read books, its simple design and performance are perfect.

SPECIFICATIONS 6in e-Ink screen, 170g weight, 114 x 87 x 166 mm, 2GB memory, 10-day battery life. WEB ID 279534



Like to save big? We're the way to go.

PCS LAPTOPS ▼

VALUE ASUS TF103C

★★★★★

PRICE \$429 **SUPPLIER** www.asus.com.au

While ostensibly a tablet with a removable keyboard, it also fits tidily into the value portable category thanks to its immense usability and remarkably low price.

SPECIFICATIONS Quad-core 1.86GHz Intel Atom Z3745 • 1GB RAM • 8GB/16GB eMMC storage • 10.1in 1280 x 800 IPS display • dual-band 802.11n Wi-Fi



PERFORMANCE AORUS X7

★★★★★

PRICE \$2999 **SUPPLIER** aorus.com

Super-sleek, light, outrageously powerful and with a spec-list that outclasses many high end desktop systems.

SPECIFICATIONS Q4-3.4GHz i7-4700HQ • 4GB/8GB DDR3L 1600, 4 slots (Max 32GB) • 17.3" Full HD 1920x1080 • NVIDIA® GTX 765M SLI GDDR5 4GB • mSATA 128GB/256GB, 2slot 2.5" HDD 500GB/750GB/1TB 5400rpm



PROFESSIONAL APPLE MAC BOOK RETINA

★★★★★

PRICE \$3199 **SUPPLIER** www.apple.com/au

The machine that does everything right, and looks the part, too. We've chosen the top-end 2.3GHz i7 model with 16GB of RAM and a 512GB SSD plus GT 750M graphics.

SPECIFICATIONS 2.3GHz Intel Core i7; 16GB RAM; 512GB SSD; 15in 2880 x 1800 LCD; 1 x USB 3; 2 x USB 3; 2 x Thunderbolt 2; dual-band 802.11abgn Wi-Fi; Bluetooth 4; 3G



ULTRA PORTABLE MICROSOFT SURFACE PRO 3

★★★★★

PRICE \$1549 **SUPPLIER** www.microsoft.com.au

Attach the Type Cover 2 and it's as good, if not better, than any 'proper' ultra portable laptop. It took three versions, but Microsoft has nailed this format. At least an i5 is recommended.

SPECIFICATIONS Q4-1.9GHz Intel Core i5-4300U; 12in touchscreen (2160 x 1440); 8GB RAM; 256GB SSD; 802.11ac/abgn; Bluetooth 4



PERIPHERALS ▼

WIRELESS ROUTER NETGEAR NIGHTHAWK X6 AC3200

★★★★★

SUPPLIER www.netgear.com.au

Designed to keep pace with high-bandwidth content consumption, it is the router King.

SPECIFICATIONS 1GHz dual core processor with 3 offload processors, 6 High performance antennas, one 2.4GHz band and two 5GHz Wi-Fi bands

DESKTOP STORAGE SEAGATE 2TB BACKUP PLUS DESKTOP

★★★★★

SUPPLIER www.seagate.com

This 2TB external drive still offers good value despite the rise of higher-capacity drives. The USB 3.0 adaptor makes for excellent transfer speeds.

SPECIFICATIONS 2TB external hard disk with NTFS; USB 3.0, with other docks available as optional; 44 x 124 x 158mm 894g.

NAS SYNOLOGY DISKSTATION DS214PLAY

★★★★★

SUPPLIER www.synology.com

The fastest NAS in our group test (PC&TA 197), with excellent media streaming capabilities.

SPECIFICATIONS 2.1GHz Intel Atom; 2GB RAM; 2 x USB 3 + 1 x USB 2; iOS and Android mobile apps; RAID 0, 1, 5, 10; JBOD.

ALL-IN-ONE PRINTER CANON PIXMA MG5460

★★★★★

SUPPLIER www.canon.com.au

The winner of our most recent printer group test, this combines excellent print quality with decent costs and is just as good at printing photos as it is documents.

SPECIFICATIONS 9600 x 2400dpi print; 2400 x 4800dpi scan; USB; 802.11n WLAN; 125-sheet tray; 455 x 369 x 148mm

LASER PRINTER DELL B1160W

★★★★★

SUPPLIER www.dell.com.au

The best all-rounder in our printer group test, with excellent text printing and decent costs.

SPECIFICATIONS 1800 x 600dpi resolution; USB 2; Wi-Fi; 150-sheet input trays; 331 x 215 x 178

SOFTWARE ▼

SECURITY KASPERSKY INTERNET SECURITY 2014

★★★★★

SUPPLIER www.kaspersky.com/au

The winner of this year's security software group test, a big improvement over recent years, and a good solution for beginners and more advanced users. Kaspersky AV software runs well on even low-end machines, and operates relatively seamlessly and with a small memory and OS footprint.

BACK UP ACRONIS TRUE IMAGE 2015

★★★★★

SUPPLIER www.acronis.com.au

Still our go-to solution for backing up, the new 2015 version adds full-system backup and dual backup (local and cloud) and unlimited cloud storage!

NEW

OFFICE SUITE MICROSOFT OFFICE 365 HOME PREMIUM

★★★★★

SUPPLIER www.microsoft.com.au

The easiest to use Office to date.

WEB DEV ADOBE DREAMWEAVER CS5

★★★★★

SUPPLIER www.adobe.com.au

This edition makes PHP and CMS its core focus, which gives it the new lease of life it so desperately needed.

AUDIO CUBASE 7.5

★★★★★

SUPPLIER www.steinberg.net

The addition of better filters solidifies this program's continued place on the A-List.

VIDEO SONY VEGAS MOVIE STUDIO HD PLATINUM 11

★★★★★

SUPPLIER www.sony.com.au

May not have the bells and whistles of other consumer editing packages, but its tools are efficient.

PHOTO ADOBE PHOTOSHOP LIGHTROOM 5

★★★★★

SUPPLIER www.adobe.com.au

An excellent tool for photo management and light editing, as used by the pros and now available at a very reasonable price.



KITLOG

At the outset of this issue of PC & Tech Authority, I fully expected to be updating both the Game Box and Perfect PC with a new X99 motherboard (at least for the Perfect PC), as well as specifying DDR4 RAM. But it's just a sniff too early. DDR4 prices, especially, have yet to find their feet and we also expect to see X99 motherboard street prices (which are always what we use here when we quote prices anywhere in the magazine, wherever possible) to also drop below the relatively high launch prices.

Now, budget has never really driven the Perfect PC, but nor do we automatically drop in a new product the moment it becomes available just because it's a newer version. Furthermore, the initial batch of X99 boards represent either premium or overclocking models, we still need to see a wider range before we dive in and make a recommendation, because as it stands today, basing your purchase on our current pick, which is obviously centered around Z97, will still give an amazingly high performance cutting edge system.

However, all you need to know about the red hot new X99 boards is in our major feature this issue, so if you just can't wait, turn to page 20 and help yourself to some great advice for those.

Of course, Intel also has the exciting new Haswell-E CPUs, and we'll definitely be moving our recommendation over to one of those very soon, but until we can see effective use of the additional cores these CPUs feature, which will come via testing, we're sticking with our current recommendation.

THE GAME BOX

CPU



INTEL CORE I5 4670K

PRICE \$275

Gamers can do without Hyperthreading and save \$100 or more, compared to an i7. The K version is unlocked for easier overclocking.

MOTHERBOARD

ASUS ROG RANGER

PRICE \$259

Fully featured, extremely well engineered. Alternatively, the MSI Gaming 7 or Gigabyte Z97X-UD5H are equally as good at the same price.



MEMORY



KINGSTON HYPERX BEAST 16GB

PRICE \$240

Our roundup award winner, it's well-priced, fast and overclocks very well.

VIDEOCARD

GIGABYTE GTX 760 OC 4GB

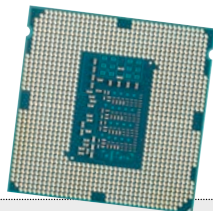
PRICE \$360

An excellent price/performance balance, and with 4GB of memory to handle high resolutions or games with large textures.



THE PERFECT PC

CPU



INTEL CORE I7 4970K

PRICE \$400

Intel's top-of-the-line quad-core i7 delivers huge performance and can overclock easily to around 4.7GHz with the K version.

MOTHERBOARD

ASUS Z97 DELUXE

PRICE \$485

Plenty of cutting-edge technology crammed into this package. It's for those who want it all in a LGA1150 system.



MEMORY



CORSAIR DOMINATOR PLATINUM CMD32GX3M4A2133C9 32GB

PRICE \$619

These memory chips are hand selected and tested, and 32GB of fast RAM will keep things smooth and fast in intensive tasks.

VIDEOCARD

MSI GTX 780TI

PRICE \$800

This single-GPU powerhouse is cool and quiet yet has the power to push through anything effortlessly. Mature drivers and good cooling help.



Like to save big? We're the way to go.

SUBTOTAL: \$2852 RIG ONLY: \$2123
COOLER

COOLERMASTER NEPTON 140XL
PRICE \$140

Easy to install AIO CPU cooling, relative quiet and performance to rival twin-radiator units.

CASE

BITFENIX RONIN
PRICE \$99

Bitfenix continues to deliver great budget cases that look terrific and are easy to build in.

SYSTEMDRIVES
SAMSUNG 840 EVO 250GB
PRICE \$190

Super-fast, cheap and space for the OS and your games.


WD BLACK 2
PRICE \$340

An extra 128GB of SSD storage plus another 1TB of HDD space, all in a tiny 2.5in size.

KEYBOARD
CORSAIR K70
PRICE \$160

The glorious perfection of mechanical keys with well thought-out gamer design.


DISPLAY

LG IPS277L
PRICE \$400

27 inches of IPS glory. The resolution isn't perfect, but the price is. The thin bezel makes this a very attractive screen.

MOUSE

TT SPORTS VOLOS
PRICE \$89

The easy first choice at PC&TA HQ where we play hard and test every mouse. Also superb value.

AUDIO
TT ESPORTS CRONOS
PRICE \$80

Fantastic set of headphones that delivers great 2.1 audio for gaming and music without swamping you with bass.


SOUND BLASTER X-FI XTREME
PRICE \$80

The best positional game audio and pretty good music quality, too.

POWER SUPPLY
CORSAIR CS650M
PRICE \$140

It's quiet, reliable, and at 650W is more than we need for this build, but has the headroom for additional graphics.


SUBTOTAL: \$5511 RIG ONLY: \$4408
COOLER

CORSAIR H105 WATER COOLER
PRICE \$160

Best-of-breed cooling plus nice and quiet equals a happy CPU.

CASE

COOLER MASTER COSMOS II
PRICE \$400

The only case you'll ever need. Premium luxurious bliss.

SYSTEMDRIVES
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PRICE \$340

Supplement the EVO with this hybrid drive and 128GB of SSD + 1TB of HDD space.

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PRICE \$179

The perfect keyboard. Lovely Cherry Red mechanical switches, a slick and attractive aluminium body and customisable backlighting make this The One.


DISPLAY

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PRICE \$799

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RAZER OUROBORUS
PRICE \$125

An excellent performer and highly configurable mouse that suits both left- and right-handers.

AUDIO
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PRICE \$175

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POWER SUPPLY
CORSAIR AX1200
PRICE \$349

Reasonable value for this mighty power unit, delivering stable power and able to handle quad-graphics.





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CORE V1

THE SMALL CASE WITHOUT LIMITATIONS

The Thermaltake Core V1 is built for high-end gaming grade components. It comes packed with dual expansion slots for the biggest graphic cards, 140mm of headroom for CPU coolers, support for full sized ATX PSU's and still has room for 80mm of cable management space.

HIGH-END GAMING READY

The Core V1 features mounting points to support DIY/AIO liquid cooling systems and air cooling units. A powerful 200mm fan comes preinstalled and is nestled behind the front panel - along with two optional 80mm turbo fans at the rear that help maximise airflow.

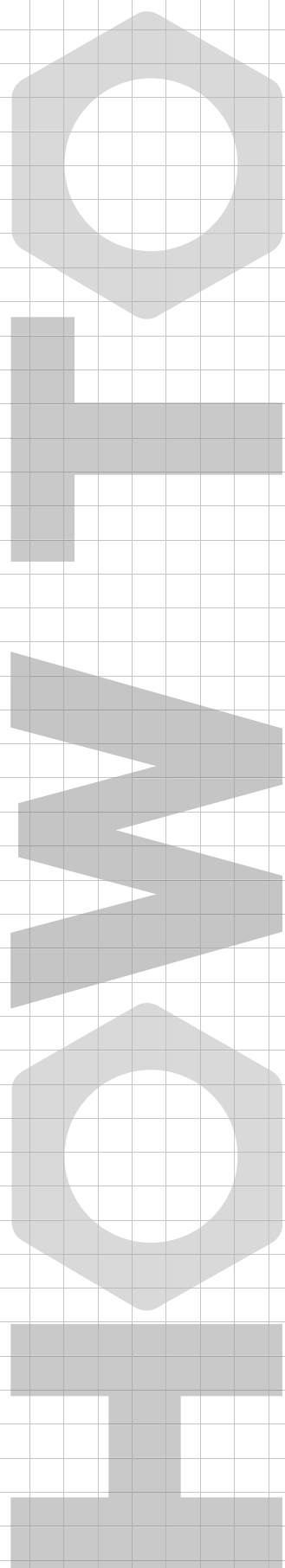
ADVANCED COOLING SUPPORT

SYSTEM DESCRIPTION

Complete with full size graphics card support and modular interchangeable panels, the Thermaltake Core V1 incorporates everything you'd expect in a normal size tower into a mini-ITX structure. Whether you have space limitations or are looking for a portable PC build, the Core V1 will fit all your performance, modding or liquid cooling needs.



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HOW TO

Each month our experts get under the hood to provide you with detailed How To guides on hardware, software and everything in-between.

SYSTEM BUILDER

Living without a DVD drive



84

HOW TO

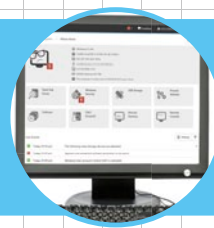
Switch from iOS to Android



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HOW TO

Manage your PC with Syspectr



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HOW TO

Simple tricks for Outlook email



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SYSTEM BUILDER: Going discless

MAKING YOUR WAY IN A DISC-DRIVE-LESS WORLD

It alarms me to say it, but I've seen a long line disc (and let's not forget good old tape) based storage mediums come and go. From floppies to diskettes, various Imation formats and more, even to CD, they've all been edged out by a larger, faster alternative. 2.5in floppy drives stuck around in a lot of PC builds until well passed their use-by date, until Apple made the decision to forcefully eject (pun most definitely intended) the format entirely.

Most PC makers followed suit, some slower than others, but it says a lot about how stuck in the past the PC hardware industry can be when you realise most case designs still include an option for a diskette drive.

It's the CD's bigger cousin, the DVD drive that is the current reigning champion of disc-based storage. Sony had hoped Blu-ray would have more impact on the PC space, but even though many machines do now feature BD drives, most software - when it is still on disc - is stuck on DVD. So too are many consumer's collection of legacy software, from productivity suites to games, even back-ups of essential data. But the truth is even the DVD can be lived without; as a case in point, the last two systems I've built for myself have been without any optical drive.

So how do you get around the lack?

JUST IN CASE

There are quite a few laptop PCs that come without optical drives these days, but since laptops have far shorter lifespans than their desktop brethren, it's not something you're going to miss in the long-term. But the idea of no optical drive in a desktop machine makes a lot of people very nervous.

In fact there are a lot of benefits (see Ditch the Disk, right).

If you're one of those types, but still want to try out a PC without a



DVD drive, there's actually a really simple solution - get an external drive. There are a tonne of options on the market, and while they may

"The idea of no optical drive in a desktop machine makes a lot of people very nervous"

be a little slower depending on the connection, it'll get the job done for essential material.

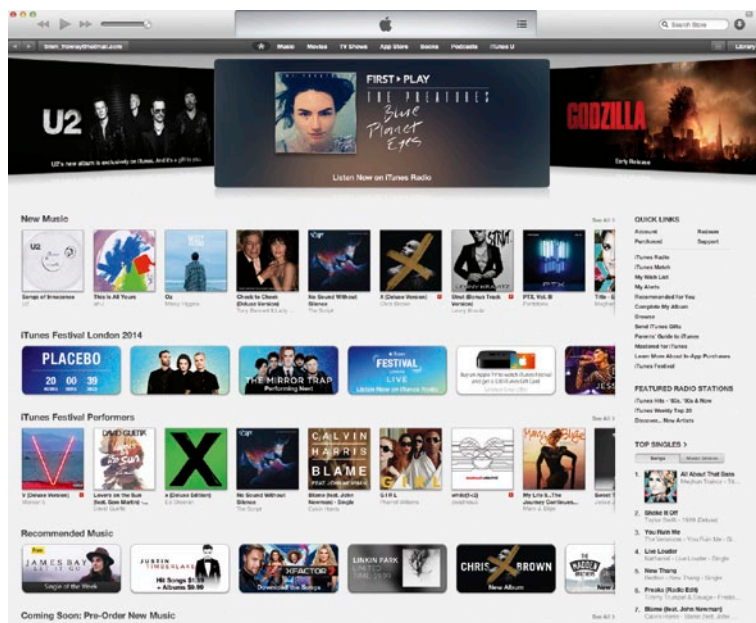
They're also dead cheap - you can pick up an ASUS SDRW-08D2S-U Lite Black External DVD Burner for just \$39 from PC Case Gear.

YOU CAN RIP IT

The other solution to dealing with a large collection of CD/DVD-based material is to rip it into a pure digital format. If you've a large music collection it can take time (I speak from experience here), and can take even longer depending on your method of ripping. However, a lot of folks already have a lot of their music already digitised, via software like iTunes, thanks to the ubiquitousness of iPhones and iPods.

If, like a large portion of the population, you think iTunes is the Devil, there are a tonne of other options for getting your music from

► iTunes, and services like it, allow music lovers to go disc-free.



ThermalTake
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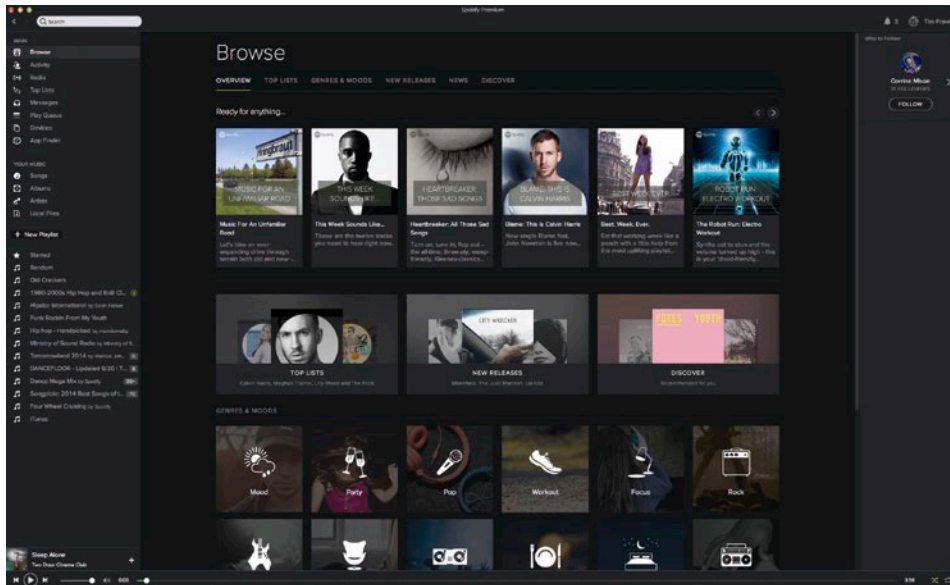
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disc to hard-drive, and a range of lossy and lossless audio formats to rip them in. Again, lossless formats take longer to work through, and can take up a lot more space. Thankfully, storage is pretty cheap these days, and drive sizes are getting bigger and bigger.

Of course, there are also lot of options for completely ditching music disks entirely once you've backed up your legacy collection. There's the iTunes store, of course, and others like it, where you can purchase digital music (and other media) outright, but you can also effectively stream it without owning it at all.

Services like Spotify and Google's Play Music (our personal preference, and a steal at \$10 a month) are bursting with music; they're not complete, by a long shot, but they are improving all the time. The only downside to music streaming is that the quality may disappoint serious audiophiles.

Videos are bit more involved, but programs like DVD Shrink and Handbrake can handle it with a minimum of fuss.

Entertainment media on disc is only part of the problem, though. Some data is easy to push off a DVD - backups of documents and files can easily go onto a NAS or similar, but what about install discs and ISOs?

You can't just copy an ISO over - Windows expects it to run from a disc drive, not your hard drive. But

you can use software like ISODisk to set up the ISO as a virtual drive; Windows will think it's a disc, when really it's just data. Set up your collection of essential ISOs on a network drive or dedicated drive in your machine, copy them across as

▲ Streaming music through Spotify has changed the way many of us enjoy music.

"You can use software like ISODisk to set up the ISO as a virtual drive"

necessary, and you'll be fine.

You can even do the same with your OS install disk, so that the next time you build a machine - without a DVD drive, of course - you can install Windows via USB, with the properly set up ISO.

ALL DIGITAL, ALL THE TIME

Now, you're probably wondering about the future. Well, digital distribution is growing healthily, from game services such as Steam (which also features a lot of non-gaming software these days), to Cloud solutions for productivity suites, or subscriptions to software as a service style outfits, which is what Adobe and Microsoft are both aiming for, though there are of course obvious drawbacks to not actually owning software - the Cloud is useful and all, but when your net connection goes down and you can't access anything... it's less than ideal.

There's even our own dedicated PC & Tech Authority Downloads page, which has as wide range of software: you can check it out at <http://downloads.pcauthority.com.au>.

Even outside of that, many common utilities have been downloadable for years, direct from their various publishers.

Sadly, this does bring us to the major drawback of relying on pure digital distribution - download speeds and quotas. We're well aware that a lot of our readers do not have access to fast internet; I myself have ADSL2+, which is lovely, but I am absolutely in awe of some friends in Canberra and their NBN connections. By the same token, my ADSL connection must seem pure luxury for those in less urban areas.

By the same token, download caps can really cramp your downloading style. To speak personally again, my 200GB per month is rarely dented too much (though big game release months come close), but I know that would be impossible to afford for some of our readers, or possibly not even available.

Your mileage will always vary, especially with Australia's wide range of connectivity (or lack thereof) types.

But don't worry, dear readers - we'll be sticking with our bonus software DVD for some time yet.

David Hollingworth

DITCH THE DISK!

So just what are the benefits?

LESS CABLING

It's only one component, but any time you can remove something like this from your PC, you end up cutting down on internal clutter, which makes cable management - and airflow - that much neater.

LESS NOISE

One of the ugliest sounds in computers is a disc drive spinning up, or the stuttering noise it can make if the read heads are getting a little dodgy. If you're into quite computing, ditching your optical drives will make a huge difference.

LESS HEAT

One less component drawing power, means that much less heat, even at rest. And some older drives can really quite hot during heavy installations.



14cm fan for better cooling



PSU status monitor



Cable management



What the critics say:

The Thermaltake Toughpower XT 875W offers a great combination of features, aesthetics, quality, versatility, and performance. If you're a person that appreciates quality design and construction, then the Toughpower XT 875W will not disappoint you.

- Pure Overclock

HOW TO: Switch from iOS to Android



BARRY COLLINS REVEALS HOW TO MAKE THE JUMP FROM APPLE TO GOOGLE AS PAINLESS AS POSSIBLE – AND GIVES ADVICE ON GOING THE OTHER WAY

Switching mobile operating system is a little like switching bank. The idea of transferring all your contacts, media and apps to another platform may well fill you with the same dread as the idea of transferring your direct debits, standing orders and so on from one bank to another. Apprehension breeds inertia; it seems safest to stick with what you've got.

But with decent Android handsets such as the Motorola Moto G now costing little more than \$200, the incentive to move has never been greater. And, in reality, it's much easier to switch from iOS to Android than you might imagine. A little preparation, and perhaps an hour or two's work when you first get your new phone or tablet, is all you need to ensure a smooth Android transition.

For the most part, the switching process is the same regardless of which Android device you're using, although there are some instances when vendor-specific tools might make life even simpler, as we'll outline below. In the interest of fairness, we'll also offer advice on switching in the opposite direction (see Going the other way: Android to iOS, p88).

CONTACTS

The first thing you'll want to do is ensure that all your carefully curated contacts are moved from iOS to your new Android device. The simplest and cleanest way of doing this is using iCloud and your Google account. You'll need a Google account to sign in to your Android device in the first place; if you haven't got one, sign up at <https://accounts.google.com>.

Now, on your iOS device, go to Settings | iCloud and ensure your Contacts are set to synchronise with the cloud. Next, log in to www.icloud.com on your PC using your regular Apple credentials and select the Contacts icon. Click the Settings cog in the bottom-left corner and choose

Select All. Click the cog again and choose Export vCard; all your contacts will now be downloaded onto a file on your PC.

You can't easily import this file directly onto your device, however; Android gets its contacts from your Gmail account. So, the next step is to open Gmail in your PC's browser, click the little dropdown arrow next to Gmail in the top-left corner and select

“Moving contacts and photos to Android is straightforward; migrating text messages isn't”

Contacts. Click the More button in the top bar, select “Import...” and locate the vCard file you just downloaded from iCloud. All your contacts will now be loaded into your Google account. If you had some contacts in there already, you may find you have duplicates: click More | Find And Merge Duplicates to tidy up the file. These changes will be synced automatically to your Android

device, so there's nothing more to do. Some companies, including HTC and Samsung, supply their own software that aims to simplify the transfer process, but if you already use Gmail this can lead to messy duplication with your Google account contacts. This isn't always easy to resolve, so we suggest you stick to the Google address book to keep things tidy.

PHOTOS AND VIDEOS

There's an enormous number of options for getting your photos from an iPhone or iPad onto an Android device. Dropbox users can make use of a feature that automatically uploads photos on your iPhone to your cloud storage, ready to be synchronised with the Dropbox app on your Android phone; you might qualify for a few extra gigabytes of bonus storage for switching on the feature, too. For those who are yet to be seduced by the charms of Dropbox, the app is free in both the Apple App Store as well as in Google Play.

When it comes to free storage, it's hard to beat Flickr, which offers everyone a free terabyte of storage for their photos. Its free app for iOS and Android also offers automatic photo uploads, and they're kept private unless you choose to share them.

However, our preferred option is the Google+ app, which can back up both photos and videos stored on your iOS device. If you've got lots of videos captured on your iPhone, we suggest you do some housekeeping before the backup starts, since uploading dozens of gigabytes of video can be time-consuming. It also gets through a lot of data: go into the Google+ app settings and make sure it's set to backup via Wi-Fi only, as you don't want to smash through your data cap. You might want to switch off Auto Enhance, too, and Auto Awesome, a feature that automatically applies Instagram-like filters to photos, but fails to live up to its name.

► EverythingMe monitors which apps you use most and puts them on the homescreen



As with Flickr, uploaded photos aren't published publicly unless you actively share them. Google offers 15GB of free storage, so unless you're uploading dozens of videos, you shouldn't have to stump up for any extra. The Google+ app comes preinstalled on most Android phones, so you shouldn't need to do anything more complicated than open the app to view your photos on your new Android handset.

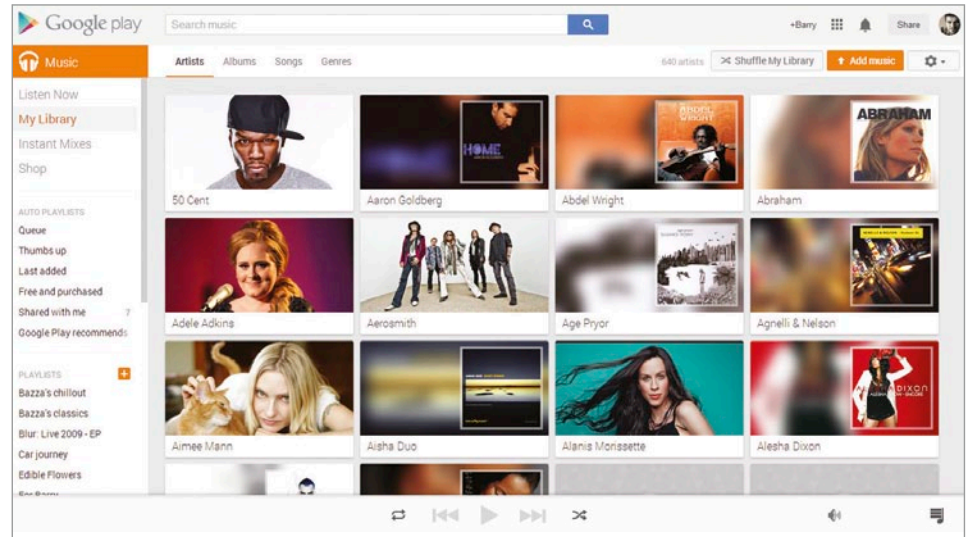
If you want to view the saved images on a PC, go to <https://plus.google.com> and select Photos, then click on the little down arrow in the search bar at the top and select Auto Backup from the list of sources.

SMS AND CALL LOGS

Moving contacts and photos from iOS to Android is fairly straightforward. However, migrating your old text messages and call logs isn't. We suspect most people will choose simply to let go of them, although a quick skim of online advice forums reveals that there are plenty of people who want to hang on to this data, whether for sentimental or professional reasons.

For Samsung users, the solution is a program called Smart Switch. Available for Windows and Mac, this allows you to extract SMS\MMS messages and call logs from an iPhone backup and transfer them to a Samsung handset. To use it, first open iTunes on your PC and back up your iPhone. Don't choose to encrypt the backup, and bear in mind that the process can take a fair while if you haven't done it for a while or if you've never done it before.

Next, download and install Smart Switch and connect your Samsung phone to your PC via USB when prompted. Select the most recent iTunes backup, then select the data you wish to transfer. We



recommend you don't choose contacts (for the reasons given above) or music (for reasons we'll explain in the next section), but make sure messages and call logs are ticked. All being well, your old message threads, including photos, should appear shortly under Messages on your new device, as well as details of past calls.

HTC offers a similar application called Sync Manager, which you can download from the HTC website at <http://www.htc.com/us/htc-transfer/#iphone>. Again, we recommend that you use this software only to transfer messages, which you can pick from a list within the software itself.

If you're using a phone from a different manufacturer that lacks a dedicated transfer tool, all is not lost: across the page, we've outlined a generic process that you can use to extract messages from an iPhone backup and bring them into your Android device. This isn't an officially supported procedure, however.

▲ You can use Google Play Music to upload 20,000 tracks to the cloud for free

The credit for discovering that particular workaround goes to www.hongkiat.com.

MUSIC

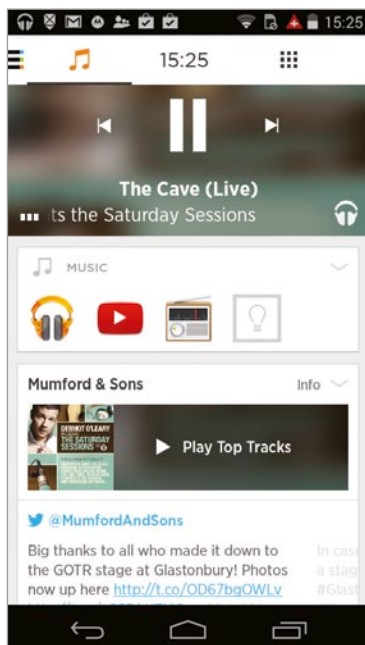
Many of the data-transfer apps provided on new Android handsets will transfer your music collection, lock, stock and barrel, from your old iPhone or iPad onto your new device. However, many handsets offer no way to expand their limited internal storage, so you may not want to fill up that scarce resource with your entire music collection. Thankfully, there's a better way to get it done.

Google Play Music allows you to upload a collection of up to 20,000 digital tracks into the cloud for free. This means that instead of clogging up your phone's storage with eight different U2 albums, you can simply stream them on demand using the Play Music app, which is preinstalled on most new Android handsets and tablets. If you're worried about your data bills, or you're going somewhere without a reliable reception, you can download to your handset as many albums as you choose so you can listen offline; just tap on the little down arrow in the album/playlist view.

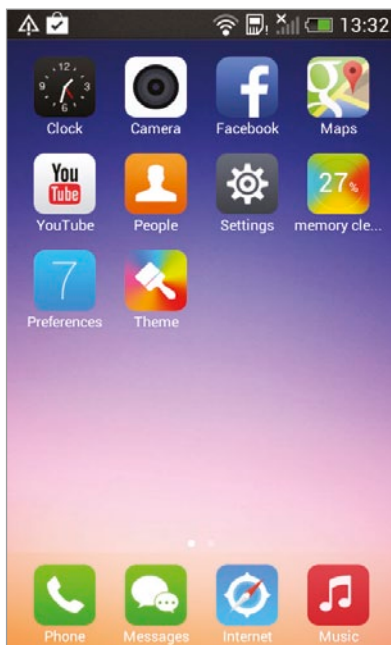
Getting started with Google Play Music means first getting your music collection onto Google's servers. If you're running the Google Chrome browser on your PC you can drag and drop albums by visiting <https://play.google.com> and clicking Add Music. If you have a larger library, you'll probably find it easier to download the Google Music Manager (from the same website) and let it upload your entire iTunes library and any other music folders in one shot. If the album you're attempting to upload is already in Google's library, it won't waste time



◀ Leaving iOS behind doesn't mean sacrificing style or great engineering.



▲ Aviate Launcher responds to your actions; inserting headphones opens the music controls



▲ ACool Launcher iOS 7 flat style replicates the look of iOS with Apple-style icons and folders

re-uploading your files - it will simply add the album to your collection. If your tastes are even moderately mainstream, it should take no time at all to "upload" your collection to Google's cloud.

Albums can be uploaded in a variety of formats, including MP3, AAC, WMA, FLAC and OGG, although the latter two are converted to 320Kbits/sec MP3s upon upload. The only significant limitation is that Google Play Music can't decode DRM-protected AAC files, of the type that Apple sold before it went DRM-free in 2009. To upload files in this format, you'll either need to strip them of their DRM (burning them to CD and re-ripping to MP3 is the simplest way, but rather labour-

intensive) or pay Apple \$34.99 for an iTunes Match subscription, which allows you to convert your DRM-wrapped files into unsullied MP3s. Being forced to pay for the same music twice in this way may make you feel happier about leaving Apple.

The bonus of using Google Play Music is that it's effectively a free backup of your music collection - it can even be downloaded wholesale onto a new PC.

APPS

The quality and range of Android apps still trails behind iOS, particularly when it comes to tablet-optimised software. Most big-name apps are now cross-platform, but you'll find fewer brilliant

little games and utilities from smaller studios. The big boys such as Adobe, Microsoft and EA also tend to focus their efforts on iOS first, even if most apps trickle onto Android later.

"Many apps save their data to the cloud, meaning nothing will be lost when you switch"

Having to rebuy apps after you've switched is another sore point, but once you sort through your list of must-haves you may find there isn't as much to replace as you first feared. In any case, the cost will almost certainly be offset by the saving you'll made on hardware - only the most high-end Android gear is as expensive as an iPhone or iPad.

Sadly, it isn't possible to export app data from iOS to Android, so you won't be able to directly transfer saved games or work. That said, many apps save their data to the cloud these days, in which case nothing will be lost when you switch platform. Your Evernote clippings, Pocket articles, Spotify playlists, Scrabble games and Strava history will all be carried over.

Sometimes, in-app purchases can be carried from one platform to the other, too. For example, while TomTom satnav app users will have to repurchase the app in the Play Store, their traffic and speed camera subscriptions can be carried over from iOS - a consideration you'll appreciate if you're midway through an annual subscription. Newspapers including The Times and The Guardian allow you to access subscriptions on either iOS or Android devices, too. Generally speaking, if your subscription comes directly from the app maker, rather than via iTunes or Google Play, there's a decent chance the app and its data will be transferable. Of course, you should double-check the situation with any apps that are critical to you before making the leap.

OLD OR NEW LOOK?

One of the most jarring experiences when switching from iOS to Android is having to learn a new user interface. However, you can smooth the transition by making your new Android device look and behave as much like iOS as possible.

The clunkily named Cool Launcher iOS 7 flat style (<http://tinyurl.com/pqojhpbz>) does a decent job of "borrowing" the modern Apple look. It

GOING THE OTHER WAY: ANDROID TO IOS

If you're planning to ditch Android for iOS, your best bet for transferring data is to pump as much stuff as you can into Google.

Back up your phone's contacts to Google, save your bookmarks and passwords into Chrome, keep your music in Google Play Music and back up your photos to Google+. Android encourages you to do most of this anyway, so you're probably already halfway there.

Then, when you get your new iPhone or iPad, go to Settings | Mail, Contacts, Calendars | Add Account and insert your Google account details to populate the relevant apps with your data.

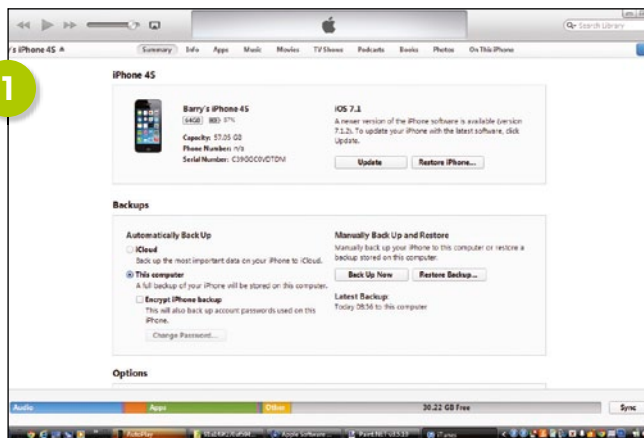
If you use two-factor authentication for Google (and you really should), you'll need to set up an app-specific password for your iOS device, a one-time password that gives

you access to your data on the Apple device. Go to <https://accounts.google.com> on your PC and you'll see the relevant setting.

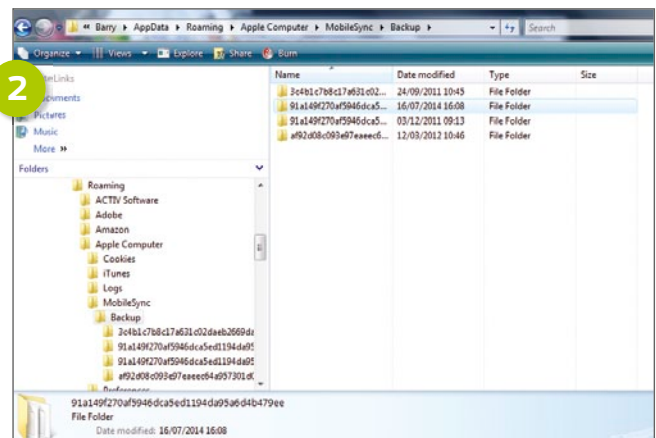
Unlike on Android, you can't replace the default Safari browser with Google Chrome - welcome to Apple's view of the world - but you can install Chrome, drag the icon onto the shortcuts bar at the bottom and relegate Safari to a homescreen icon.

Alternative keyboards are coming to iOS with version 8, due out this autumn, so you'll probably find your favourite Android keyboard in the App Store before too long. Unlike most Android devices, you don't have to wait for your phone manufacturer to validate and push out new releases of the OS, so you should be offered iOS 8 as soon as it's released.

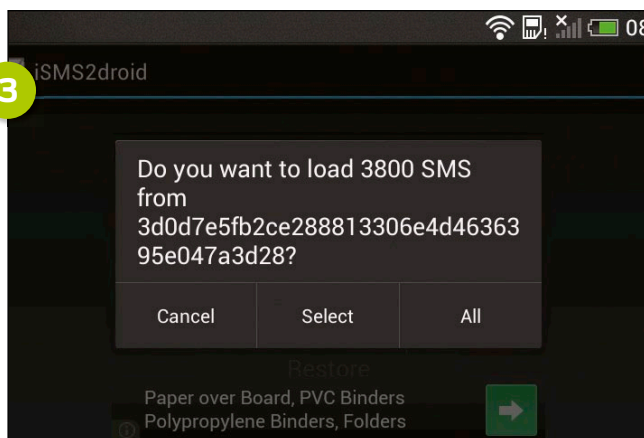
▼ WALKTHROUGH Export SMS messages from iPhone to Android



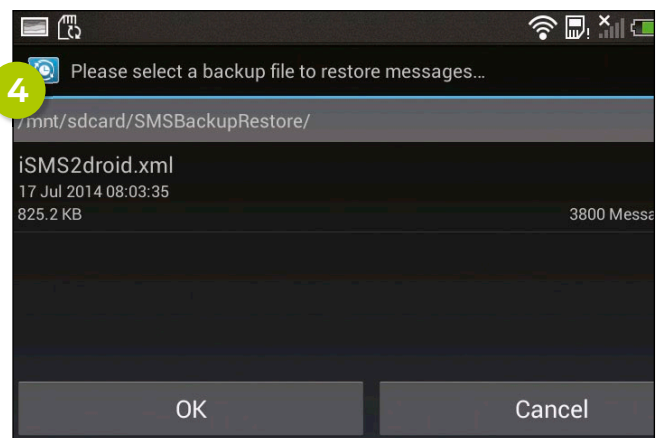
1 If your phone manufacturer doesn't provide software for transferring your iPhone's text messages and multimedia messages to your new handset, you can do it yourself using free software. First, you need to connect your iPhone to your PC and back it up. Don't encrypt the backup.



2 Navigate to the hidden backup folder, usually found at: C://Users/[Username]/AppData/Roaming/Apple Computer/Mobile Sync. Find the most recent backup folder, then open it and find a file named "3d0d7e5fb2ce288813306e4d4636395e047a3d28". Copy this to your phone's SD card or internal storage.



3 Go to Google Play and download an app called iSMS2droid on your phone. Launch the app, then tap on "Select iPhone SMS Database" and navigate to the backup file you just transferred. You can choose to select all of the messages in the backup or pick individual messages.



4 To restore the messages, you need to download a second app called SMS Backup & Restore. Open it, tap Restore, and let it search for the file where the converted messages are stored. It may take a while to restore thousands of messages, but your old texts and picture messages will appear in your phone's Messages app.

has the round-edged icons that wobble when you attempt to move or delete them, as well as the familiar folders, and you can switch on an iOS-style lockscreen with the elegant clock and "slide to unlock". On the downside, it takes a heavy toll on battery life. It also ships with some iffy-looking default apps, and its effect is limited - as soon as you click into an app, the iOS facade disappears and you're disappointingly back in Android land.

If you're pining for the familiarity of the Apple keyboard, the keyword-heavy iPhone 5s Keyboard iOS 7 app does a passable impression of Apple's onscreen tapper. It's a bit superfluous, frankly, but each to their own.

Indeed, if you don't get on with the regular Android front-end, there are

plenty of alternative launchers and keyboards to try that do far more than simply mimic Apple. We're big fans of EverythingMe Launcher, an elegant launcher that sorts all of your apps into folders and places the ones you use most on the foremost homescreen, automatically changing them to reflect your differing habits at various times of the day. The Yahoo-owned Aviate Launcher, originally developed by ThumbsUp Labs, does a similar thing, highlighting traffic reports when you're on your way to work in the morning, for example, and bringing music controls to the fore when you plug in your headphones. Both take a bit of training, though, and third-party launchers can take a hit on battery life. Check how much by clicking on Power

in Settings, then check Usage.

Our favourite keyboard is SwiftKey, which recently became free and is brilliant at guessing what you're going to type next - especially if you give it permission to scan your Twitter feeds and email to learn your vocabulary traits, which we recommend as it really does make a noticeable difference to the way the predictive keyboard functions. You can enter text by swiping across the keys that form the word, or by traditional tapping - or using a combination of the two. There's also a huge library of emoji for people who prefer to talk in icons. The standard Google Keyboard is fast improving, however, and it's well worth trying out both for a few days to see which you rub along with best. ■

HOW TO: Monitor and manage all your PCs with Syspectr

DO YOU LOOK AFTER A DIVERSE COLLECTION OF PCS? **DARIEN GRAHAM-SMITH** INTRODUCES THE WEB-BASED TOOL THAT CAN HELP YOU PRE-EMPT PROBLEMS AND STAY ON TOP OF EVENTS

O&O Syspectr is a handy management tool that's included in this month's bonus software downloads (see p99). It can make your life easier, whether you're an enthusiast whose projects spread across numerous personal desktops and laptops; a generous soul who provides unofficial tech support for friends and family; or an IT manager for a small business, tasked with keeping an office full of client PCs running smoothly.

Managing a wide range of PCs can be challenging. The machines under your watch are likely to be running a variety of applications and operating system versions, and there's a good chance they will be geographically remote. This makes it difficult to stay on top of everything; almost inevitably the job becomes reactive, and any irregularities don't get picked up until they start causing real trouble.

Syspectr is designed, in the publisher's words, to "spot problems before they hurt". It works by installing an agent on each computer you manage, which then reports back a range of system information that you can monitor from anywhere, via a web interface. Concerning developments are automatically flagged, with optional email notifications to alert you instantly to particular issues. The agent also offers remote operations and a basic remote desktop client, so you can not only discover problems but fix them from afar as well.

O&O Syspectr has a few limitations. Since it's web based, you can check reports and even carry out administrative tasks from any device you like; however, at present, only systems running Windows XP or later are supported. There are also some specific limitations for free users: a maximum of ten PCs can be managed, and server and virtualised OSes aren't supported.

Email alerts are limited to five a day, and the built-in remote desktop tool can be used no more than five times a week.

PC & Tech Authority readers needn't worry, however: we've partnered with O&O to provide a

"Syspectr reports on a range of system information that you can monitor from anywhere"

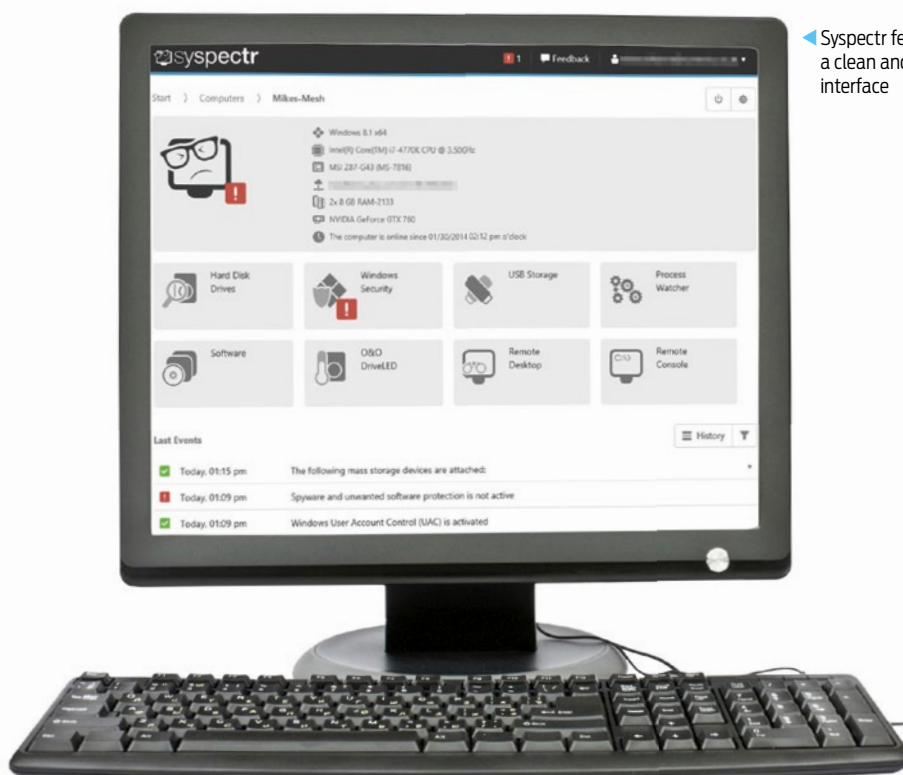
year-long Premium subscription that removes all of those restrictions, and allows multiple logins – so a friend or assistant can share the workload. To register for your free subscription, visit <http://www.oo-software.com/en/special/s231pp>. If you choose to

continue with the Premium service beyond the free subscription period, there's a monthly fee of €1 per client and €5 per server.

GETTING STARTED WITH SYSPECTR

When you first install Syspectr, you'll be asked to create a user account and PIN (this latter code is for extra security when you use remote access functions). Then you'll be taken to the management interface at <https://app.syspectr.com>. Naturally, at first you'll see only the computer you're using listed here, but you may find that Syspectr already has some useful information to impart – as we'll discuss later.

One of the first things you'll want to do is set the clock. O&O is a German company, and defaults to the wrong



◀ Syspectr features a clean and logical interface

time zone. To correct this, go to your account name at the top-right of the screen, then select My Account, and go to System Settings on the page. From here you can use the dropdown to set the correct time zone, as well as tweaking a few other

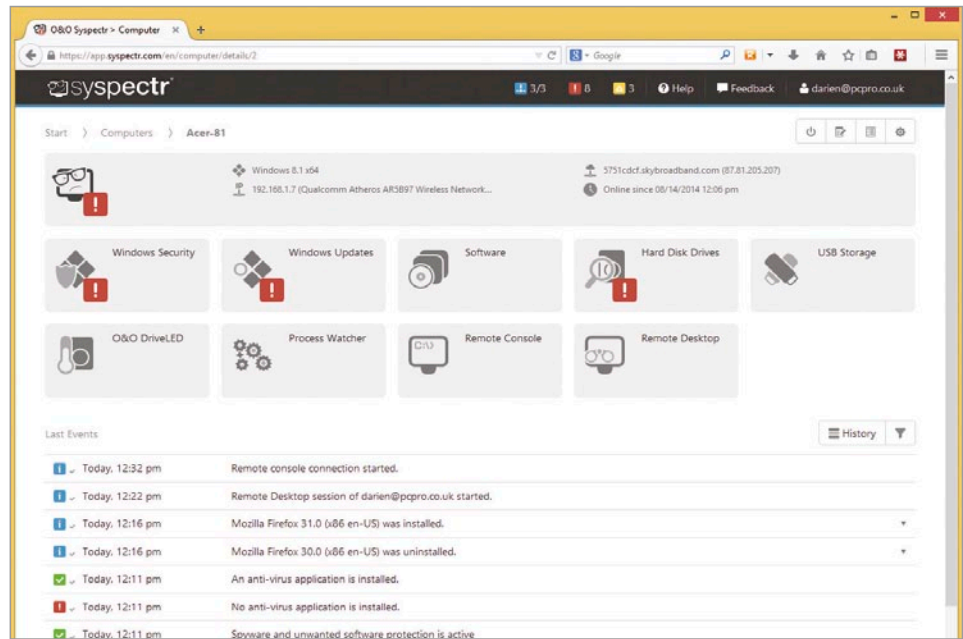
“Syspectr will warn you if any of the volumes on your PCs are more than 90% full”

options and, for Premium users, creating secondary accounts.

Your next task is to install the client software on all the other machines you wish to manage. If these are all connected with an Active Directory, it's possible to push the client out via Group Policy: see <https://www.syspectr.com/en/how-to-deploy-oo-syspectr-using%20group-policies> for a guide. In most cases, though, you'll probably need to install it manually. This is as easy as visiting <https://app.syspectr.com>, providing your login credentials and clicking the “Add computer” button at the top of the screen. The agent software will download, and after you've installed it you should be able to refresh the web page and see your new computer appear immediately. It can take a while for Syspectr to carry out its initial audit of a newly added PC, so don't be surprised if you see a blue hourglass icon for a few minutes. If you're working with a lot of computers, you might find it easy to sort them into groups: to add a computer to a group, click through to its page then select the Settings icon at the top-right of the page. From here you'll see the option to create a new group or add this computer to an existing group.

WARNINGS AND ALERTS

Once you have a few computers set up, the Syspectr homescreen will probably start to fill up with notifications. Along the top you'll see icons with numbers telling you how many of your managed PCs are online, how many problems (the red exclamation mark icon) have been detected, and how many warnings (indicated by a yellow triangle icon) are pending. Below this you'll see the “First steps” panel: you may choose to keep this around for convenience, or close it by clicking at its top-right.



Then you'll see a series of grey icons representing your various computers, with coloured icons (or grey ones if the computer's offline) indicating their status.

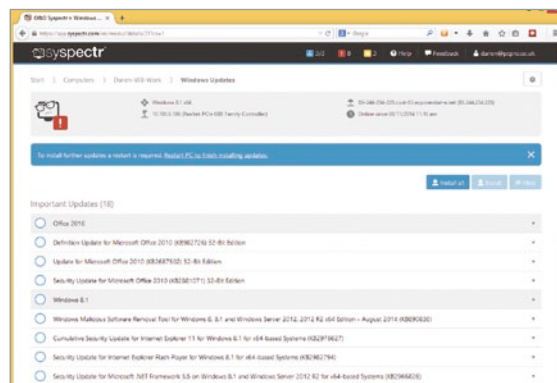
At the bottom of the page is a list of recent events. Some of these may have dropdown arrows to the right, which you can click on to view more detail. Click the History button to access a record of all events from the past 30 days (365 days for Premium users), which you can filter by computer or by type. To help you keep track of what's what, you can also mark problems and warnings as “read” or “resolved” – to do so, simply click on the coloured icon in the event list and select the relevant option from the dropdown menu that appears. You can also click on the name of a computer in this list to jump to its own page.

▲ Syspectr allows you to remotely monitor system information from multiple computers

USING SYSPECTR TO MANAGE SECURITY

When you click on a computer in Syspectr, you'll be taken to a page

▼ You control which updates are installed

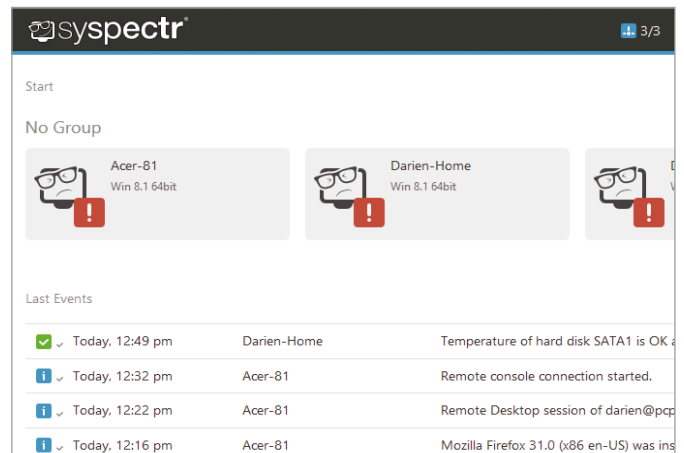
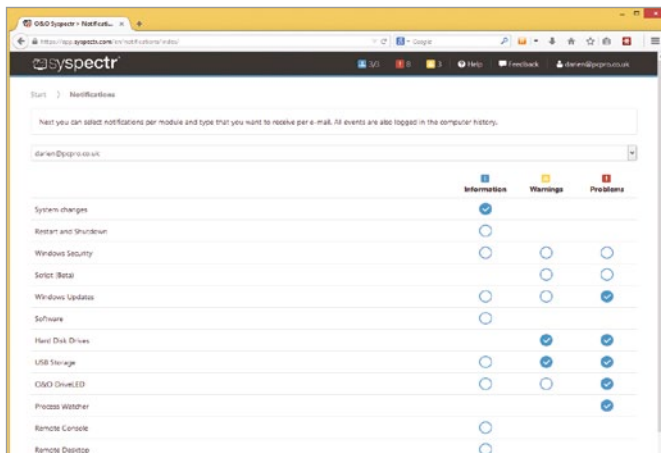


packed with information about it. In the panel at the top you'll see its operating system, local IP address, external IP address and uptime information. Below this you'll see a selection of monitoring and management modules; you can show or hide individual modules by clicking the Settings icon toward the top-right of the page, or optionally hide the whole PC if you prefer from the main Syspectr interface.

Assuming you have all the modules enabled, the first two sections will be labelled Windows Security and Windows Updates. These are fairly self-explanatory: if Windows Security is labelled with an exclamation mark, something about this computer is causing concern to Syspectr. It might be that you've disabled User Account Control (UAC), that there's no password on your Administrator account, or that you don't have any antivirus software installed on your PC.

Most of these issues require direct access to the computer in question to remedy (although this doesn't necessarily mean you have to physically visit it, as we'll discuss below). The exception is the firewall: click on this notification and a toggle will appear allowing you to remotely enable and disable the Windows firewall – useful if you need to run a remote diagnostic tool.

Some of the issues Syspectr reports may be ones you don't want to fix: for example, you'll see a warning if Windows Update isn't set to automatically download and install updates, but you may prefer



▲ LEFT: Once set up, the screen will start to fill up with notifications RIGHT: Problems are flagged with a red exclamation mark

to handle this yourself. Click the Settings icon – the cogwheel icon towards the top-right of the window – to selectively enable and disable each of the program's eight security included monitors.

If Windows Update isn't running automatically, Syspectr's Windows Updates module will bring up a list of available updates, divided into Important and Optional categories. You can click on the dropdown arrow at the far right to toggle a more detailed description of each update: this is the same information you'd ordinarily see in the main Windows Update interface, however, so it isn't always particularly detailed. Most usefully, you can actually install all of these updates from afar. Simply click the "Install all" button at the top of the window to kick off the process – or, if you want to install only specific updates, click to tick the empty circles to the left of the relevant updates, then click the Install button.

MONITORING AND MANAGING STORAGE

An overfull or malfunctioning hard disk can cause all sorts of problems. Syspectr will warn you automatically if any of the volumes on your managed PCs are more than 90% full, and report a critical problem if any passes 95%. You can adjust these thresholds within the Settings page of the Hard Disk Drives module, or disable reporting for an individual volume by toggling the switch in the main Hard Disk Drives selection page.

A warning will also be generated whenever a drive's SMART (Self-Monitoring, Analysis and Reporting Technology) status isn't normal. To dig into the SMART data more deeply,

open the O&O DriveLED module and click the dropdown arrow next to the drive you're interested in to view everything the disk is reporting about itself, including total time powered on, number of detected unstable sectors and measured spin-up speed.

“A warning will be generated whenever a drive's SMART status isn't normal”

One specific warning you might see is an alert that a drive has become too hot. This may be an early warning that you need to replace it, or at least improve the airflow to it before overheating causes it to fail. However, bear in mind that a solid-state drive (SSD) can tolerate higher temperatures than would be normal for a magnetic disk: if a conventional drive hits 60°C, that's definitely cause for concern, but for an SSD it probably isn't a serious problem. If Syspectr keeps complaining unnecessarily about the temperature of an SSD, you can raise

the threshold in the Settings page on a per-computer basis from the DriveLED Settings page. Of course, if possible, it's still preferable to cool down the drive.

Syspectr also enables you to monitor external storage: go to the USB Storage module to see what's currently connected. Under Settings, you'll also find the option to disallow the use of USB devices. In the age of cloud storage this probably doesn't do much to prevent people from installing unwanted software, or making personal copies of sensitive information, but the option is there.

SOFTWARE AND PROCESSES

Syspectr's Software module shows you a list of all installed applications on the target PC. You can click to sort these by name, publisher or installed date – so if a friend or colleague reports that their computer has suddenly started to behave oddly, you can easily see if anything has recently been installed.

There's also a Process Watcher module that lets you keep an eye on

EMAIL NOTIFICATIONS

Syspectr isn't purely a passive monitoring system: it also sends out email alerts when things happen that it thinks you ought to know about right away. By default, that includes Windows Update issues, information about blacklisted or whitelisted processes, and all warnings and problems relating to hard disks and USB storage. If you're managing a large number of PCs, you may find this a bit much – and if you're using the free service, you won't want to waste your daily allowance of five email alerts on irrelevant warnings.

Happily, Syspectr's email alerts are easy to configure: from the dropdown menu under

your account name at the top-right of the page, select Notifications to choose which notifications you want to receive and, if you've set up multiple accounts, where they should then go.

You can choose to see warnings or problems from any of Syspectr's modules, and two tantalising additional ones called Script and Hardware are listed too. Although these are both marked as beta modules, and aren't yet accessible from the main console, they serve as a clear hint that Syspectr is a service that's going to grow and become yet more useful over time.

the programs and processes that are running on a particular client. This isn't a substitute for an antivirus or antispyware utility, since you have to manually type in the names of the processes you want to watch for (done from the Settings page within this module).

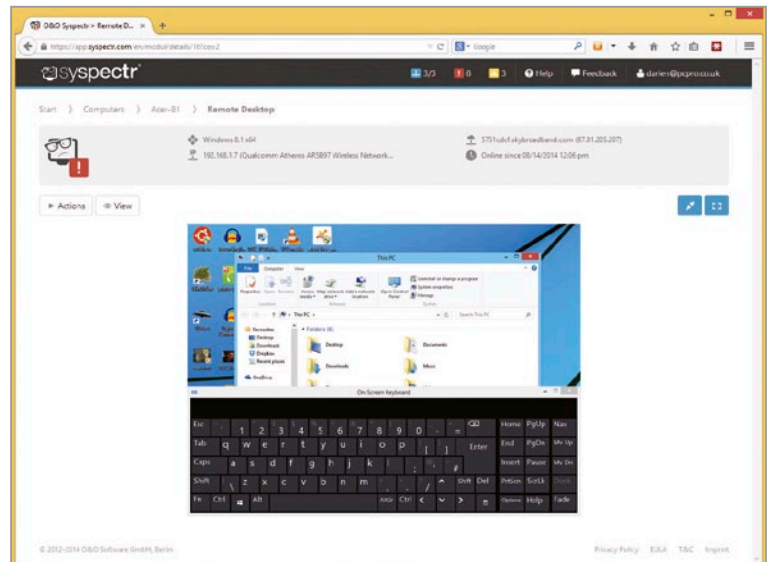
You're invited to specify both processes that shouldn't run and processes that should run, but it's important to realise that blacklisting a program doesn't actually prevent it from running - it simply means you'll receive a warning in the Syspectr console whenever it's launched. Similarly, specifying that a particular program should always run simply generates a warning if it isn't there. If you want to enforce rules such as this, rather than simply monitor them, you'll need to take a lower-level approach, such as setting up a Group Policy.

REMOTE ACCESS

Syspectr's monitoring modules can save you a lot of time and hassle when it comes to diagnosing or anticipating problems. The system's real ace in the hole, however, is its remote access capability, which lets you get hands-on with a remote PC and resolve issues without leaving the comfort of your seat.

Accessing a remote PC is as simple as opening the Remote Desktop module. When you do this, you'll be prompted to enter your PIN for extra security. A window should now appear showing the desktop on the remote PC: this is a live view, so if there are error messages or open

▶ Syspectr's remote capabilities are a major plus-point



“The system's real ace in the hole, however, is its remote access capability”

applications on the user's screen, you'll be able to see and interact with any of them.

By default, the remote view is shrunk to fit the browser window. Click the View dropdown and disable Scale for a larger view - or click the blue “Full screen” icon at the top-right. From the View menu you can also select a high-quality mode - by default, lossy compression is used to provide a more responsive experience, but this can result in nasty artefacting that makes text difficult to read.

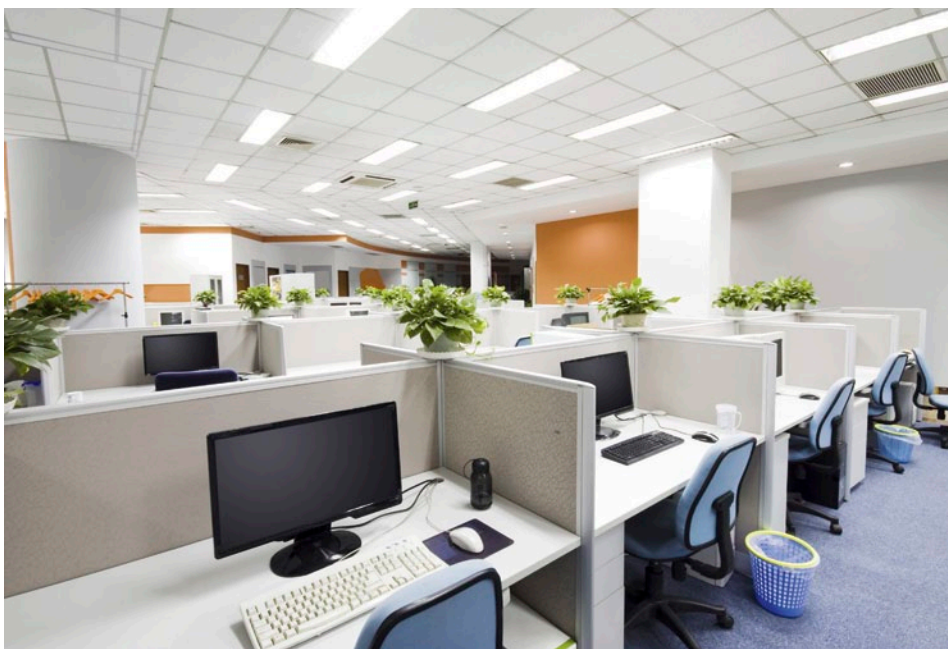
If there's a second monitor attached to the host PC, you can switch to view this instead of the primary PC display.

While the remote view is active, mouse clicks and keypresses are automatically passed through to the host PC. Sophisticated features such as remote sound and printing aren't supported, but you can perform a few basic tasks such as locking the computer and bringing up the onscreen keyboard (useful if you're connecting from a tablet) from the Actions menu. You can also press Ctrl+Alt+Del.

REMOTE CONSOLE

As we've mentioned, free users of Syspectr are limited to five Remote Desktop connections per week. If you've registered for your free year of Premium service then this won't apply to you, but if for any reason a remote desktop connection isn't appropriate, an alternative is available via the Remote Console module. This opens a remote command prompt, from which you can use familiar commands such as `cd`, `dir`, `copy` and `del` to navigate the remote file system, inspect files and make changes.

The interface may seem a little primitive compared to a graphical desktop session, but this is how much of the housekeeping was done back when *PC & Tech Authority* started in 1998, and it's still a useful option today, although we strongly recommend you stay clear of any command prompt activities unless you are absolutely familiar with the ins and outs of using relevant commands, and how they work on your system. ■



HOW TO: Making Outlook work for you, pt II

SIMON JONES RUNS THROUGH A FEW SIMPLE TRICKS IN OUTLOOK THAT CAN HELP YOU KEEP ON TOP OF YOUR DELUGE OF EMAIL



Last month I looked at rationalising and organising Outlook to make it work for you rather than against you, explaining the various panes and tools and how to declutter its user interface. This month I'll be showing you which other tools you can use to get on top of the deluge of email.

A Quick Step is a little collection of actions you can apply to a message with one click, created in the Quick Steps gallery that appears on the Home tab of Outlook's main window, and in the message viewer window. There are several prebuilt Quick Steps, but you can create your own, tailored to your needs. With one Quick Step you can flag, categorise, mark as read, move, and reply to an Outlook message.

I use a Quick Step for non-urgent messages, which moves them out of my inbox into another folder, marks them for follow-up next week, and replies "Thanks for this. I'll look into it when I can". You could set up a Quick Step that replies to a message with a CC to your assistant to keep them in the loop. Think about the common, multi-step sequences you perform every day – move and categorise; copy and flag; reply (CC'd to someone); move and flag; mark as read or done; and move to the Read folder. All of these actions can be easily bundled into a single Quick Step, reducing your workload and making mistakes less likely.

The Quick Steps gallery includes a Create New button, but there's also a New Quick Step menu in the

dropdown that makes it swift to create various actions such as "Flag & Move" or "New Email To...". Each Quick Step has a name, which you should keep as short as possible since there isn't much room in the gallery: "Forward to Mike" is about the maximum in length terms.

There's also an icon that generally matches the first action in the Quick Step, but you can change this – just click on the icon in the Edit Quick Step dialog. You can also assign a shortcut key to the Quick Step, to be one of Ctrl+Shift+1 up to

“With one Quick Step you can flag, categorise, mark as read, move, and reply to a message”

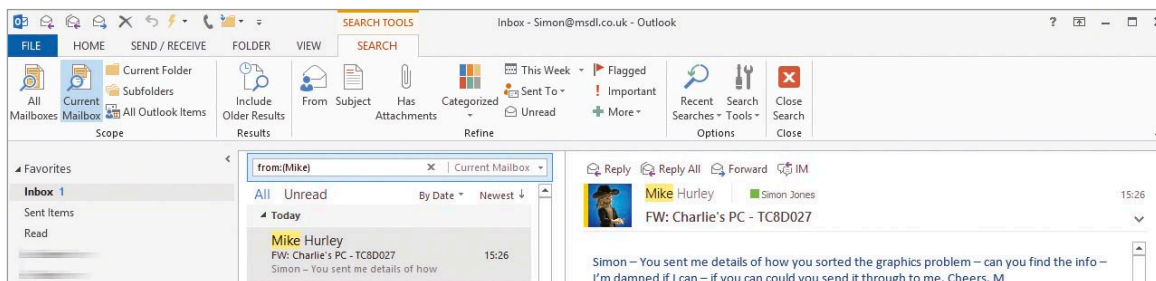
Ctrl+Shift+9, and for some text to be shown as a tooltip whenever you hover the mouse over that Quick Step in the gallery. This is useful for distinguishing between several Quick Steps that look identical, so be sure to fill it in. Right-click in the gallery to delete, edit or duplicate a Quick Step, or choose the Manage Quick Steps option to do all this and to choose which order the Quick Steps are shown in.

The gallery will show one, two or three columns depending on the space available. You can add the whole Quick Steps gallery to the Quick Access Toolbar (QAT) if you want to hide the ribbon, but unfortunately there's no way to add individual Quick Steps to the QAT.

SEARCHING

Hunting for emails can be slow and dispiriting: checking different folders and scrolling to see whether you can spot the sender or subject you think you remember. It's far quicker and easier to use Outlook's built-in search facility: everything in Outlook is indexed, including the body of the messages and any attachments, so you can find anything you're looking for by typing in the right search terms.

The Search box is at the top of the list of emails – click and type there, or press Ctrl+E to jump to the box. Usually, Outlook will search as you type each letter, but in certain circumstances it won't begin searching until you press Enter. Matching text is highlighted in yellow, whether it appears in the message list, the subject or the body. If you can't see any highlight, it may be because the search term appears in an attachment. There's a dropdown to the right of the Search box that lets you select the scope of your search – current folder, all mailboxes and so on – and these options also appear on the Search tab of the ribbon that pops up automatically when you click in the Search box. The Refine group of tools on the Search tab offers quick ways to enter search terms in the standard search syntax. Click Search | Refine | From and the words "From: (Sender Name)" appear in the Search box. Click and substitute a name or part of a name and Outlook will search for messages from that person. This should return fewer results than

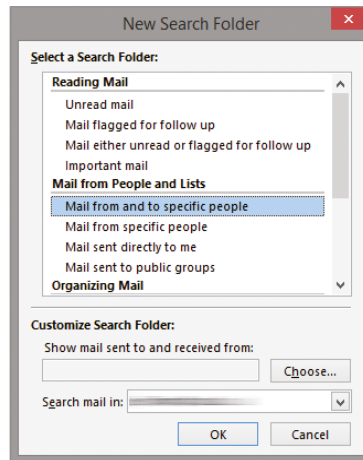


◀ Search tools vary according to the type of items being searched for, but return results faster than hunting manually

typing their name into the Search box since it returns matches only to the "From:" field, not the body, subject or attachments. You don't have to use the From tool of course, and can type a search string if that would be quicker.

Other tools let you refine your search by subject, category, whether it has attachments, who it was sent to and when it was received - try them all to see the syntax they create. You can apply all these refinements together for very sophisticated searches: the More button adds extra fields below the main Search box for other terms such as CC, Send Date and Message Size. You can type into these fields to add their search terms to the main box, and these extra boxes will stay available for searching until you close them by clicking the small "x" to their right. Outlook remembers your previous ten searches, and you can regain access to these results by selecting your previous criteria from Search | Options | Recent Searches.

If you frequently perform a search with particular criteria, and always want to be able to see those results no matter how many searches you've performed since, you may want to create a Search Folder instead. Search Folders appear at the bottom of the list of folders on the left of Outlook's main window, constantly monitoring for messages that match their criteria and showing them all together in the same virtual folder. This isn't the same as filing a message by moving it to a folder, since the message isn't moved and this isn't really a folder - messages may appear in more than one Search Folder if they match their criteria. Right-click on Search Folders



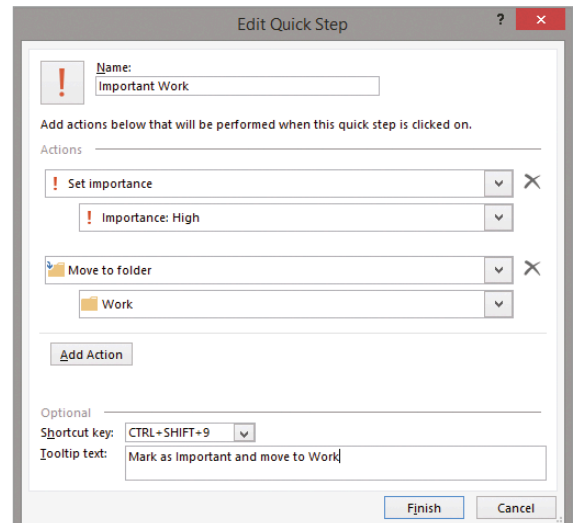
▲ Search Folders are virtual folders, gathering together mail that satisfies a criteria

in the Navigation Pane, choose New Search Folder and you'll be offered a choice of several prebuilt types of Search Folder. Alternatively, choose Custom to start from scratch. For instance, if you wanted a Search Folder for emails from your boss, choose "Mail from specific people" and then select the name from the address book by clicking the

"If you're being plagued by CCs, you can set up a rule to keep them out of your inbox"

"Choose..." button at the bottom. Click OK and the Search Folder will be created and selected. Set the grouping and sorting options for the folder at the top of the list of messages, to the right of the All and Unread options.

Search Folders will show their



▲ Quick Steps let you link several actions together and execute them with one click

unread count, and keep it up to date, provided you visit them regularly - if you haven't accessed a Search Folder for more than a month, it becomes dormant and stops updating its contents in order to save time. Dormant Search Folders are shown in italics in the Navigation Pane, but if you visit them again they'll update and return to keeping themselves up to date.

If you're looking for a particular person's records in your Contacts folder, there are, again, better ways than scrolling up and down hoping to spot them. There are Search People tools on the To-Do Bar, the People Peek on the navigation bar and on the Home tab of the ribbon. Just click in one of these tools and type in the person's name. If you switch to the People view in the navigator, you can also use the Search box at the top of the list of people. This works in much the same way as searching for messages, while offering slightly different options, including the ability to search for people who have a business phone number, or by job title. Search Calendar and Search Tasks both work in a similar way, with their own unique sets of options. One thing I'd like to see in future versions would be calendar search results shown in a Calendar view (Month, Week or Day) rather than just as a list. That would demand the addition of Next Result and Previous Result buttons to move the display, but it would be useful to see the appointments in context, perhaps with other appointments dimmed. You can search all the sections of Outlook (mail, people, calendar, tasks) by selecting Search | Scope | All Outlook Items, whereupon you'll find everything that matches, no matter what type of item it is.

USE KEYBOARD SHORTCUTS

Dealing with email overload can be quicker if you don't have to constantly take your hands off the keyboard. Use these common shortcuts to speed through your work:

CTRL+N	New Item (whatever is appropriate to the current folder)
CTRL+SHIFT+M	New Message
CTRL+SHIFT+A	New Appointment
CTRL+SHIFT+Q	New Meeting
CTRL+SHIFT+C	New Contact
CTRL+SHIFT+K	New Task
CTRL+R	Reply
CTRL+SHIFT+R	Reply All
CTRL+F	Forward
CTRL+E	Search
CTRL+SHIFT+V	Move
INSERT	Flag for follow-up/Done
CTRL+ENTER	Send email
CTRL+1 TO CTRL+7	Switch to corresponding module in the navigator (Mail, Calendar, Tasks and so on)
CTRL+ALT+1 TO CTRL+ALT+7	Switch to corresponding view in calendar (Day, Work Week, Week, Month or Schedule)

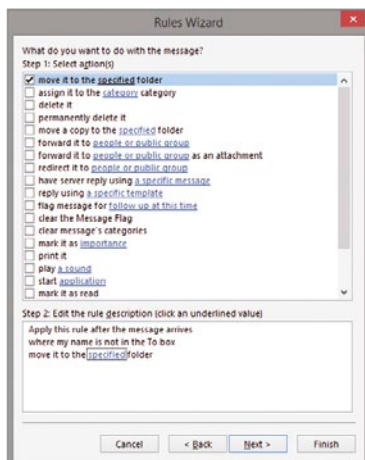
RULES

Rules can be applied to messages sent or received to automatically file them into specified folders, categorise them, flag them for follow-up, mark them as important and so on. Rules are simple to create and very powerful, since the lists of possible conditions and actions are both long and can be combined in many ways. Select a message and click Home | Move | Rules to be offered options to always move messages from (or to) that recipient to a different folder. Click Create Rule or Manage Rules And Alerts to see more options.

Last month I discussed turning off all the “pop-up toast” alerts to reduce the distraction they cause, but if you still need to get such alerts whenever you receive a message, say from your boss or about a particular project, then you can set up a rule to do that. Select a message you’d like to be alerted about and click Home | Move | Rules | Create Rule. In the Create Rule dialog, select “From” or “Subject contains” (edit this to make it more generic if necessary), then select “Display in the New Item Alert window” and click OK. If you want to check other fields apart from From, Subject or To, click the “Advanced Options...” button to get at the full power of Outlook’s rules.

If you’re being plagued by CCs of any and every message - whether or not they’re actually relevant to you - and you can’t persuade people to stop CCing you, you could set up a rule to swallow all their CCs and keep them out of your inbox. Create a new folder, under your inbox or elsewhere, and call it something such as “CC Messages”. Then create a new rule, picking Advanced Options and set its conditions and actions to be “where my name is not in the To box”

▼ The lists of criteria and actions are both extensive – and very powerful



and “move it to the specified folder”. Click the words “Specified Folder” and pick the “CC Messages” folder you’ve just created. Save the rule (and run it on your inbox if you want to move all the CC’d messages you’ve already received).

MORE QUICK TIPS

• CUSTOMISE YOUR VIEWS

You can extensively customise the list of messages, deciding which fields are shown and if/how they’re highlighted. Look at the options in View | Arrangement, where you can change the grouping, sorting and the number of lines of body text to show in the list. Also look at View | Current View, where you can make more radical changes, and View | Current View | Manage Views, where you can do things such as automatically highlighting messages from someone, or about something, using conditional formatting. There are many options to try, but do remember the Reset View button, which allows you to put things back to default if you mess anything up.

• MERGE MULTIPLE CONTACTS

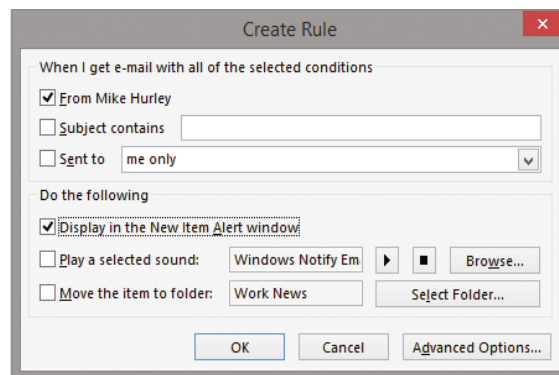
If you have several different contact records for the same person - a common problem if you use social media - you can get Outlook to present them as a single, merged record. Select one of them and click “Link Contacts...” at the top right of that person’s record. Search for or select the contacts you want to link at the bottom of the Link Contacts window and Outlook will then merge them.

• SAVE COMMON MESSAGES AS TEMPLATES

If you often write the same email again and again - reminders of due invoices/tasks or responses to requests for information, for example, why not write it once (without a recipients list) and save it to your desktop or another folder. You can then simply double-click on the MSG file to create a copy of it, address it and send it. Job done.

• USE NATURAL LANGUAGE FOR DATES

Don’t worry about having to know what the date is today to work out what it will be next Tuesday. Just type “next tue” or “thu week” into the date field and Outlook will work it out. It understands many short, natural language phrases such as “3d” for three days hence, or “2w” for two weeks after today. It knows



▲ Rules automate actions you want to happen every time you receive a message

about “last sat” too and “Christmas”. If you don’t specify a year, Outlook will assume you mean within six months either side of today’s date.

• REARRANGE YOUR FOLDERS

You can drag folders up and down in FolderList to rearrange them into an order that makes sense to you. If you want them to be alphabetical, click Folder | Clean Up | Show All Folders A To Z.

• USE OUTLOOK’S JUMP LISTS

If Outlook is on your desktop taskbar, right-click it to see common actions such as New Message, New Appointment, New Meeting, New Contact and New Task. You can perform these actions without having to open the main window. ■

THE NEXT 20 YEARS

Over the past 20 years, office software has become faster, slicker and more sophisticated, but it still does much the same job as it did back then. You have your general-purpose applications such as word processors, spreadsheets and presentations; there are more specialised applications for drawing, accounting and project management; and there are database-type applications, whether off-the-shelf or bespoke, for things such as customer-relationship management and enterprise-resource planning. The current trend shows software manufacturers following hardware builders and pushing to capture the mobile workers, with touch-based interfaces and smaller screens, replacing fully featured applications with numerous less capable “apps” that the user has to juggle to get them to work together. We’re also being slowly forced into changing the way we pay for software. Perpetual licences are becoming more expensive and harder to obtain as we’re pushed into renting - or “subscribing”, as the industry would like to phrase it - or paying for supposedly “free” services by giving away our personal information and privacy. To be honest, I can’t see any game-changing, radical new software on the horizon that will revolutionise office applications in another 20 years. I suspect you’ll no longer be able to buy office software in the traditional way, but most office workers will still have a recognisable screen and keyboard at a desk (and there’ll be a printer in the corner, because we still won’t have achieved a “paperless office”).

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- Support TR-069 for VigorACS SI Central Management

Vigor2860 Series - Quad-WAN Firewall Router with 32 x VPN tunnels



- Quad-WAN Firewall Router with 1 x built-in VDSL2 / ADSL2+ modem, 1 x Gigabit WAN port & 2 x USB ports for 3G / 4G Mobile with Load Balance and Fail-Over
- 6 x Gigabit LAN ports with 50,000 NAT sessions, IPv6, SIP Firewall, Web Content Filter and QoS
- 32x VPN tunnels with VPN load balance and redundancy, Central VPN Management & 16 x SSL VPNs
- 2 x USB ports for 3G / 4G modems, FTP server, network printers & temperature sensor
- IEEE 802.11n Wireless LAN with Central AP Management for Vigor2860n / n-Plus / Vn-Plus
- Concurrent Dual-Band Wi-Fi for Vigor2860n-Plus and Vigor2860Vn-Plus
- SIP VoIP (2 x FXS and 1 x Line port) for Vigor2860Vn-Plus
- Support Smart Monitor Traffic Analyzer (up to 30-nodes)
- Support TR-069 for VigorACS SI Central Management

Broadband Professional Business Firewall Routers

Vigor3900

Multi-WAN Enterprise Firewall Router with 500 VPN tunnels



- 5 x Gigabit WAN ports (4 x Ethernet & 1 x SFP) & 2 x USB ports for 3G / 4G Mobile with Load Balance and Fail-Over
- 3 x Gigabit LAN ports (2 x Ethernet & 1 x SFP) with 120,000 NAT sessions, IPv6, SIP Firewall, Web Content Filter and QoS
- High-Availability (with CARP) ensuring 24/7 system uptime
- 500 x VPN tunnels with VPN load balance and redundancy, Central VPN Management & 20 x SSL VPNs
- 2 x USB ports for 3G / 4G modems & temperature sensor
- Support Smart Monitor Traffic Analyzer (up to 500-nodes)
- Support TR-069 for VigorACS SI Central Management

Vigor2960

Quad-WAN Professional Firewall Router with 200 VPN tunnels



- 2 x Gigabit WAN ports & 2 x USB ports for 3G / 4G Mobile with Load Balance and Fail-Over
- 4 x Gigabit LAN ports with 80,000 NAT sessions, IPv6, SIP Firewall, Web Content Filter and QoS
- 200 x VPN tunnels with VPN load balance and redundancy, Central VPN Management & 20 x SSL VPNs
- 2 x USB ports for 3G / 4G modems & temperature sensor
- Support Smart Monitor Traffic Analyzer (up to 200-nodes)
- Support TR-069 for VigorACS SI Central Management

Vigor2925 Series

Quad-WAN Firewall Router with IPv6 & 50 VPN tunnels



- 2 x Gigabit WAN ports & 2 x USB ports for 3G / 4G Mobile with Load Balance and Fail-Over
- 5 x Gigabit LAN ports with 50,000 NAT sessions, IPv6, SIP Firewall, Web Content Filter and QoS
- 50 x VPN tunnels with VPN load balance and redundancy, Central VPN Management & 25 x SSL VPNs
- 2 x USB ports for 3G / 4G modems, FTP server, network printers & temperature sensor
- IEEE 802.11n Wireless LAN with Central AP Management for Vigor2925n / n-Plus / Vn-Plus
- Concurrent Dual-Band WiFi for Vigor2925n-Plus and Vigor2925Vn-Plus
- SIP VoIP (2 x FXS and 1 x Line port) for Vigor2925Vn-Plus
- Support Smart Monitor Traffic Analyzer (up to 50-nodes)
- Support TR-069 for VigorACS SI Central Management

DVD contents

Apps, essentials, full software, drivers & more!

ON THE DVD:

FEATURE

- + BITDEFENDER INTERNET SECURITY 2015
- + O&O SYSPECTR
- + ASHAMPOO HOME DESIGNER PRO
- + CRAZYTALK ANIMATOR 2 SE
- + EVERDOC 2014

DRIVERS

- + ATI CATALYST
- + NVIDIA FORCEWARE

HELP

- + DISCLAIMER
- + DAMAGED OR FAULTY DVDS
- + USING THIS DVD
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EDITORIAL

- + BURNING AN ISO IMAGE
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TROUBLESHOOTING

- + SERIAL CODES
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- + INSTALLATION ERROR

WINDOWS

- + 7ZIP
- + CCLEANER
- + CUTEPDF
- + DEFRAGGLER
- + FOXIT READER
- + SANDBOXIE
- + VLC MEDIA PLAYER

INTERNET

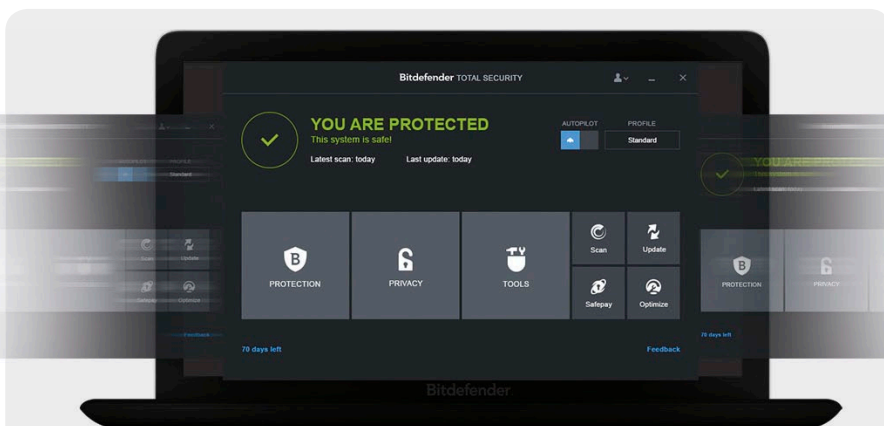
- + VUZE
- + DROPBOX
- + GOOGLE CHROME
- + FILEZILLA
- + MOZILLA FIREFOX
- + MOZILLA THUNDERBIRD
- + SKYPE
- + STEAM

LINUX

- + TAILS LINUX

INSTRUCTIONS: Open Windows Explorer, navigate to your DVD drive and double-click Index.html in the root directory. **DISC PROBLEMS:** To replace faulty DVDs, please send the discs to: PC&Tech Authority DVD Replacements, Level 5, Building A, 207 Pacific Highway, St Leonards NSW 2065

Make sure to include your name and postal address on the back of the package so that we know where to send the replacements. For all other DVD related issues email cd@pcauthority.com.au. As the delivery platform only, PC&TA and Haymarket Media cannot and will not provide support for any of the software or data contained on these discs. Although all discs are virus scanned, Haymarket Media cannot accept any responsibility for any loss, damage or disruption to your data or computer system that may occur while using the discs, the programs or the data on them. There are no explicit or implied warranties for any of the software products on the discs. Use of these discs is strictly at your own risk.



BITDEFENDER INTERNET SECURITY 2015

NOTE: Please be advised that it is recommended that you remove other antivirus solutions, in fact, this installation will prompt you to!

NOTE #2: This installer is a web-installer. This means that you will be required to download additional data to successfully install the latest version of Bitdefender Internet Security 2015.

Bitdefender Internet Security 2015 is the company's mainstream security suite, offering antivirus, firewall, browsing protection, parental controls, antispam, password management and more.

There are plenty of features to explore, but a revamped interface means the most common tasks (Quick Scan, Update, Safepay, Optimize) are now available with a single click, while wider groups of functions are accessible via three main tiles (Protection, Privacy, Tools). Even first-time users will quickly find what they need.

The focus on ease of use continues elsewhere. Bitdefender's Wallet can now automatically fill web forms with user names, passwords, even credit card details, often allowing you to pay online in a single step. And Bitdefender's Vulnerability Scanner not only finds missing patches on your PC, it also provides links to help you download and install them.

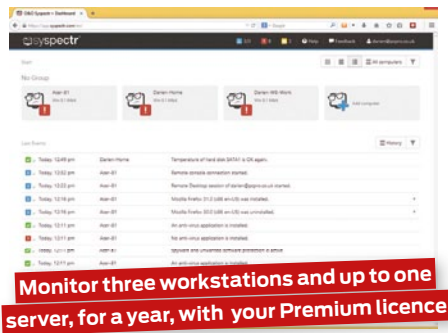
A new Activity Profiles feature sees the suite automatically optimise your

system for different situations. Play a game and BitDefender enables the Game Profile, disabling unnecessary services and working to speed up your PC. The Movie Profile kicks in when you're watching a movie, optimising the suite's settings and enhancing visual effects. And if your battery is running low, the Battery Mode Profile optimises Internet Security and Windows settings to save energy.

If you're still worried about performance, the Tuneup section (Tools > Tuneup) provides six new modules to help: Boot Optimizer, PC Clean-Up, Disk Defragmenter, Registry Cleaner, Registry Recovery and Duplicate Finder. Or, if exploring all those sounds too complicated, the new One-Click Optimizer feature will clean up your PC all on its own.

There are smaller improvements dotted around the suite: better reports, enhanced parental controls, and a more capable desktop widget, while the spam filter is now entirely cloud-based, improving accuracy and making it more responsive to the latest threats.

Bitdefender's real strength comes in the protection it provides, though. The independent labs typically give it very high marks, and as we write, AV-Comparatives' May 2014 Real-World Protection Test found Bitdefender's package blocked 100% of threats. Only Panda, out of 21 other entrants, could match them.



O&O Syspectr - FULL VERSION

O&O Syspectr is a powerful tool for remotely managing PCs and servers from your browser.

Never miss an important event on your Windows systems. As soon as something happens, you will receive a notification and you can react immediately, even when you're on the road.

You have access from everywhere simply over your browser. Manage your systems from your Smartphone, Tablet, Notebook or from your Desktop PC.

Setup takes less than five minutes: register, install it and you're done. And that goes for an unlimited number of PCs, Servers and virtual machines.

Ashampoo Home Designer Pro - FULL VERSION

When you're beginning a major new home improvement project, it's important to spend plenty of time thinking through all your ideas.

Should you knock through that wall? Is there really room for a conservatory? What's the best layout for your garden? Mistakes could be costly, so it's best to consider every possibility in advance.

And if you do have a big home design project in mind, then Ashampoo Home Designer Pro could be a great way to help visualise your plans. Whether you're thinking about reworking the garden, rearranging a room interior or building a complete new house, it has the tools to help you along the way.

You've no design skills? Don't worry, that's not too important. The program comes with sample building projects which you can open with a click, to help you understand how everything works. A simple training video explains the basics, and the built-in Project Wizard will then get you up-to-speed very quickly.

Just choose your room or house shape, enter its dimensions, and the core building will be created for you.

CrazyTalk Animator 2 SE

- FULL VERSION

CrazyTalk is a versatile animation suite with the power to create professional animations, in particular applying 3D motions and effects to 2D characters.

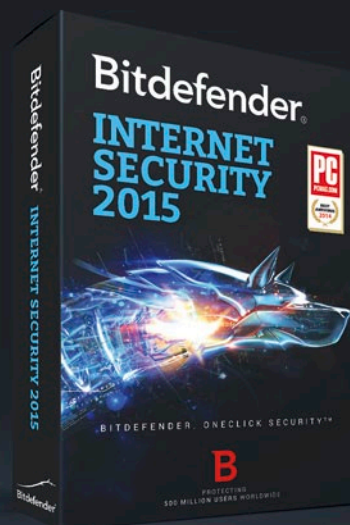
You don't need any artistic skill or animation experience to use the program. It comes with a library of characters and animation actions which you can combine in a few clicks.

Customise a character, place it in your chosen environment - classroom, coffee shop, street, office, park, forest - and make it walk, laugh, sing, applaud, dance, cry or talk: it's just a matter of choosing the options you need from a menu, and adding and updating them as required. It's even possible to take a regular photo of someone, extract their face, and apply it to one of the characters.

They'll move realistically, blink, smile, laugh, talk (with auto lip-sync), just like one of the built-in animations.

If you're working with other CrazyTalk Animator users then you can create and share custom characters, for the best possible results. Or, if it's just you, there's an option to render your masterpiece at any time as a video or series of images.

FREE FULL VERSIONS: Each month, we offer *PC & Tech Authority* readers full registrable versions of some software on the DVD. See the installation instructions in the DVD menu to complete registration, if applicable. **IMPORTANT:** Full product registration closes on 10 November 2014



"supremely simple"

July 2014

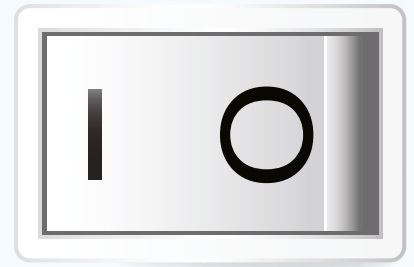
Editor's Choice by PC Mag. Three Years in a Row



Bitdefender

<http://www.bitdefender.com/solutions/total-security.html>

Input Output



DAN RUTTER BRINGS THE ANSWERS TO YOUR QUESTIONS LIKE NO-ONE ELSE CAN

NOT YET TESTED: GEOTHERMAL PROBES, ELECTRIC EELS

I My exciting jet-set lifestyle sees me constantly running out of phone charge. I've got a Nexus 5, which is pretty excellent but eats battery fast.

I've tried little "power bank" chargers from the AA-battery type to the inflated-capacity-number rechargeable lithium type, and been less than thrilled. I've even considered solar panels. But I just noticed that you can get CRANK phone chargers on eBay for, like, two dollars.

It occurs to me that plugging a \$US2.11 charger into my much-more-than-\$2 phone may be a really dumb idea. On a scale of "fairly" to "disastrously", how dangerous are these things?

C. Mahmood

O I hadn't a clue. So to be sure I bought one of those chargers and plugged into it multimeters, and sundry other testing and torture devices.

There's no guarantee that the many externally identical crank chargers on eBay are all the same on the inside. The one you buy may be completely different from the one I got. If mine is representative, though, then I would categorise these devices as unlikely to blow up things you try to charge with them, surprisingly entertaining novelties, unexpectedly educational, and even somewhat useful, possibly.

But not very.

The normal USB charge rate is the old USB powered-port standard, half an amp at five volts. (The modern USB standard allows for charging at much higher current, though normal USB 3 ports can only deliver 0.9 amps.) Cranking my little charger unrealistically fast can wring more than four-tenths of an amp out of it, but 0.2 to 0.25A is a more realistic figure for sustained cranking of the little handle and teeny geartrain.

So however fast you can charge something from a normal USB 2 socket, don't expect the crank



◀ Tell me your secrets, little machine.

charger to charge it more than half as fast. Fully charging high-capacity batteries will take a long time and probably give you some kind of repetitive-strain injury.

On the plus side, an unremarkable cranking speed will light my little dynamo's red LED to full brightness, which indicates an output voltage around 4.9 to 5.1 volts, palatable to most USB-charged devices. The output voltage is also, importantly, limited to no more than about 6.1 volts, no matter how fast you crank the handle. This should be safe for almost anything. But the data wires on the crank charger's USB socket are, of course, not connected to anything, so it won't charge devices that demand those wires be connected to a real USB controller.

(Some devices that seem to not be charging from a "dumb" power-only USB charger actually are charging, though; the battery meter creeps up, but the device doesn't otherwise indicate that it's charging.)

The "educational" part of this thing is that a tiny dynamo charger lets you feel the electrical load. The first couple of turns of the handle are often very easy; then, if you're trying to charge a big-screen phone that turns its screen on when it thinks it's connected via USB, suddenly you're charging and lighting the screen and running the phone's processors, and it's much harder to turn the crank.

So you don't have to keep watching to see if a device is still accepting

charge. If it suddenly gets easier to turn the handle, you ain't charging no more. (This probably happened because you slowed down a bit, and your output voltage dropped too low.)

Really, this thing is just a toy. A two-dollar voltage-limited geared-up dynamo probably doesn't have much of a lifespan, and its output is too low for realistic charging of anything but low-capacity devices like "dumb"-phones and e-book readers. (It charges my Kobo Glo pretty decently!)

It's lightweight and cheap and a conversation starter, though, and seems safe. So I think you should definitely get one!

CARBURETTORS ARE LIKE THIS, TOO

I More than once I have done this, and it mystifies me. A PC is unstable, crashing with errors indicating memory or video problems or just freezing randomly for no reason. And you open up the case and swap out the RAM or video card or whatever for another one. And now it works. To make sure, you swap the old hardware back in again. And it STILL works. Problem now gone.

Why the hell should this be the case? It's like the universe is playing a "have you tried turning it off and on again?" game with me. If anything, handling the hardware should make it LESS reliable from static damage, right?

PP Gardner

O Yes, handling the major components of PCs without taking electrostatic precautions is likely to slowly degrade their reliability. Tiny electrostatic discharges you can neither see, hear nor feel can damage the minuscule transistors, rounding off the nice sharp corners that all of the vital high-speed digital signal waveforms should have.

The peculiar take-it-out-and-put-it-back-in-again fixing technique you describe, though, is a much simpler electromechanical process, called "reseating". Basically, there's gunk on the connecting terminals,

and removing and replacing the component wipes it off. This can work for all kinds of dirty terminals - mains power plugs, audio leads, you name it - but computers are a particularly extreme case.

A modern PCIe x16 slot, for instance, has 164 contacts in it. Many of those are pretty low-current power-supply contacts or interleaved shielding grounds, for which a bit of contact dirt doesn't make much difference. But there are also getting on for *seventy* high-clock-speed digital data contacts, all of which are essential for a video card that uses all 16 PCIe lanes. If a few of them are dirty, every now and then some bits will be dropped on the floor, quite possibly resulting in a hung computer.

If you remove and replace the card, or even if all you do is unscrew it, unclip any mechanical slot-locks, and squish the card up and down in the connector a bit, then you wipe the dirt away.

Reseating can make things *less* reliable as well, mind you. If you remove a slotted component from a dusty PC then plug it straight back in again, you're likely to squish some dust into the contacts, which is bad news. Cack-handed attempts to *remove* dust can also easily contaminate any empty slots. So if your computer only crashes very, very seldom, fiddling with its hardware is unlikely to make things any better.

If the darn thing's hanging all the time, though, especially if you recently installed some new hardware, unplugging that hardware and plugging it back in again can indeed cure the problem.

AS SLICK AS SOCKS ON LINOLEUM

I know how to block popup ads. How do you block "slide in" ads? You know, those things that slide in when you scroll to the bottom of an article, or long before to offer you priceless opportunities to buy products or subscribe to newsletters and annoy you even more than ever?

Phoebe Mansom

O Any modern ad blocker should be able to do this - the popular Adblock Plus definitely does, for instance - but it probably *won't* do it unless you tell it the element you want blocked. Ad-blockers don't default to blocking slide-in stuff, because it's more likely to actually be something the reader wants



▲ Hey, you might as well still *try* reseating it.

to see rather than the classic slab of Flash coming from crapservers7. annoyingads247.com.

Add-ons like Adblock Plus let you just click on any "element" of a page to block it, and refine the block

rule to a filter that will catch, say, everything from whatever server burped up the thing you just clicked. Adblock Plus also has an optional "Element Hiding Helper" that makes it easier to target squirrely envelope-pushing things, like those evasive slide ads.

Sniping ads individually can be tiresome even with helpers like this. One old-school but still effective way of blocking whole ad-serving companies is to edit your hosts file. The hosts file, a simple text file anybody can edit in Notepad with no danger of irreversibly damaging anything, can be used to point the domains used by whoever you don't want to hear from to an IP address where no such nuisance can be actually found.

I've written about this before, in for instance www.dansdata.com/io123.htm#2 and www.dansdata.com/danletters137.htm.

I/O OF THE MONTH

CHROME JUST WANTS TO FEEL PRETTY

I Chrome is pink. I have no damn idea why. It is driving me crazy.

There is nothing wrong with my monitor. Photoshop works fine, including all the colour-management stuff. Likewise MS Office and all the other productivity stuff I use. But when I open Chrome, all of the colours are overlaid with salmon pink, as per the attached screengrab, which I have verified looks just as pink on other computers as well.



I've seen colour-management mistakes that totally foul up the palette so everything's shades of one colour, but why would it affect nothing but Chrome? I'm at my wits' end.

Bill Wilson

O A little further research, involving installing some 3D software (Bill doesn't play 3D games, but Google Earth worked), verified that Bill's problem was that anaglyph 3D had been

turned on. For some reason, if Chrome has Settings -> Advanced -> System -> "Use hardware acceleration..." enabled, it pays attention to that setting and colour-overlays itself, though few to no other 2D programs do.

Anaglyph 3D is the kind that works with glasses with two different colour-filter lenses, usually red and blue. Anaglyph doesn't work terribly well, but you can use it with anything that can display or print a colour image, and fifty-cent cardboard glasses let you view it, so it's been popular for well over a century. Modern 3D-vision graphics-drivers often support anaglyph along with the better kinds of 3D (like LCD shutter-glasses or polarised displays). In the current Nvidia drivers, for instance, you turn it on with Nvidia Control Panel -> Set up stereoscopic 3D -> Enable stereoscopic 3D - Discover glasses. Untick "Enable stereoscopic 3D" and the problem is happily solved.



▲ Anaglyph 3D *usually* has the decency to be obvious.

Is it time to split up Microsoft?

MICROSOFT HAS BECOME SUCH A LUMBERING BEHEMOTH THAT **JON HONEYBALL** FINDS HIMSELF WONDERING IF THE END IS NIGH FOR THE COMPANY

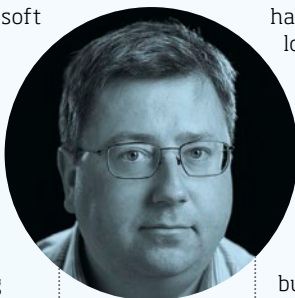
The news that Microsoft is going to have another gut-churning restructure should come as no surprise to anyone. The company has had so many over recent years that you might hope it will settle on one that works. The problem, of course, is that the world keeps changing around it. In the past we had operating systems, back-office database managers such as SQL Server and Exchange Server, Office, and development tools. Along came a few others such as Xbox to add spice to the mix. Then it was decided this wasn't the best way - instead, maybe we should have "platforms". Then we went for "services", with cloudy things thrown in. Then along came Nokia.

The ingestion of Nokia will, in my opinion, be viewed as the last in a long catalogue of Steve Ballmer's great errors. The announcement that a good half of the coming redundancies are from Nokia may be regrettable, but again it's entirely to be expected, and I predicted as much here a few months ago. Moreover, despite these cuts, it should be remembered that Microsoft is still getting bigger - it's begun to take on a truly monstrous aspect that makes it a matter for speculation how and when this corporate Mr Creosote will accept his final and fatal "wafer-thin mint"...

I fear that day is coming. Microsoft continues to burn its boats with just about anyone who it ought to consider on its side. OEM hardware vendors aren't happy with the Surface product family. Corporates know they're paying through the nose for their rolling licence subscriptions, and despite the brouhaha emanating from the Office 365 team, it's far from clear just how many non-US corporations are signing up for large-scale Office 365 deployments. The whole issue of territoriality and the Patriot Act, first raised in this column by yours truly more than half a decade ago, is still causing



Microsoft is still getting bigger - it's begun to take on a truly monstrous aspect



JON HONEYBALL
Computer journalist and consultant specialising in both client/server and office automation applications.



▲ It's difficult to see Satya Nadella's vision for Microsoft through the corporate huff and puff

considerable stress, as indeed it should. It's hard to know what to make of the email Satya Nadella sent employees (see www.microsoft.com/en-us/news/press/2014/jul14/07-17announcement1.aspx); it's hard to penetrate all the huff and puff to work out where he's really going to take Microsoft. It did leave me with one overriding thought: it's time to split up the company.

The whole notion that Microsoft's premier offering must remain on the Windows platform is tired, hackneyed and will simply no longer fly. We can no longer accept that the full-fat experience can be had only on Windows Intel, and that successful platforms such as iOS, Mac and Android don't matter. Platform co-leverage has clearly worked in the past - it was that double-whammy addiction of big business to Office-plus-Windows that put Microsoft into the powerful position it still enjoys today - but as is often said in business, "past performance is no guarantee of future performance". Now, splitting Office from Windows is the answer. Coincidentally, it was the answer that was almost imposed by the US

Department of Justice at Microsoft's trial almost 15 years ago, and historians will debate this over endless pints in bars way into the future. I can't help but think that the past decade could have been very different, and better for us all, had Microsoft been split up into several separate companies at this time. All that really matters now, however, is where it goes from here, and its future is far from clear.

MORE HP WOES

Last month I started telling you my tale of woe about the purchase of a large HP LTO-6 tape library for use in my lab. Just about everything that could go wrong did go badly wrong. The library stopped responding after a period of time, and seemed to just disappear off the ATTO Thunderbolt-to-SAS interface box. The Tolis BRU PE backup software quickly showed itself to be - let's be polite here - "challenging" to use. And the HP website indicated that I only had nine months' of support, rather than the 12 I'd expected to receive. As for my reaction, let's just say that a veritable hailstorm of toys were thrown out of various prams. It wasn't only the price tag

of well over five grand that rankled, but the clear evidence that every single component of this "solution" properly sucked...

Let's start with HP itself. Through the good graces of the editorial office, I made contact with a senior HP person who took the matter to heart and investigated - someone senior enough that people started jumping. Quite quickly it became clear that something was amiss with HP's website, or with the registration system for system sales. Perhaps the hamster had stopped turning the wheel - I never did get to the bottom of the problem, and frankly wasn't really that interested. However, my warranty was quickly restored to 12 months, and then extended further to 24 months as a gracious acceptance that this shouldn't have happened in the first place. I'm still unhappy with the HP website, which has redefined the word "opaque". I still have no idea whether or not I'm on the latest firmware, and I boggle at the way HP has managed to take a really simple task such as updating and make it so intergalactically impossible.

Let's move on to ATTO. It quickly became clear that the ATTO box was probably at the root of all my problems. The tech support department was okay to deal with, and even admitted that: "the problem was with Revision 3 boards of this particular product - it's an issue that has an easy fix but has to be done in our lab. Even

slightly newer boxes shouldn't have this problem." So it appears I'd been foolish enough to buy a Rev 3 product: I'd actually bought it from the Apple Online Store, but how was I to know I was getting a Rev 3? Unfortunately, I was then told that I had to ship the box back to the US for them to fix it, and that they'd then send it back to me. More toys were ejected from more prams. Google came to my rescue this time, by providing me with the name of ATTO's PR person. I'll confess my email to them was a touch on the cold side, but I can't fault the speed with which the distributors came around to my way of thinking: maybe sending me a fixed one and then collecting the broken one was a better approach than expecting me to ship a brand-new item back to America for "an easy fix" that "has to be done in our lab". I'm happy to say that the replacement has worked just fine; in fact, I've invested in a second box containing a hard disk RAID controller, to enable me to string some SAS hard disks off the end of the fibre Thunderbolt cable.

Finally, there's BRU PE. Extended exposure to this product has shown me that it's equipped with a user interface and workflow structure that could suck a donkey through a straw. The problem is that it's an old product that's essentially command-line driven, onto which they've clumsily grafted a graphical user interface. Unfortunately, this interface verges on the grotesque, and would be worthy of a leading role in a Hammer House

THE NEXT 20 YEARS

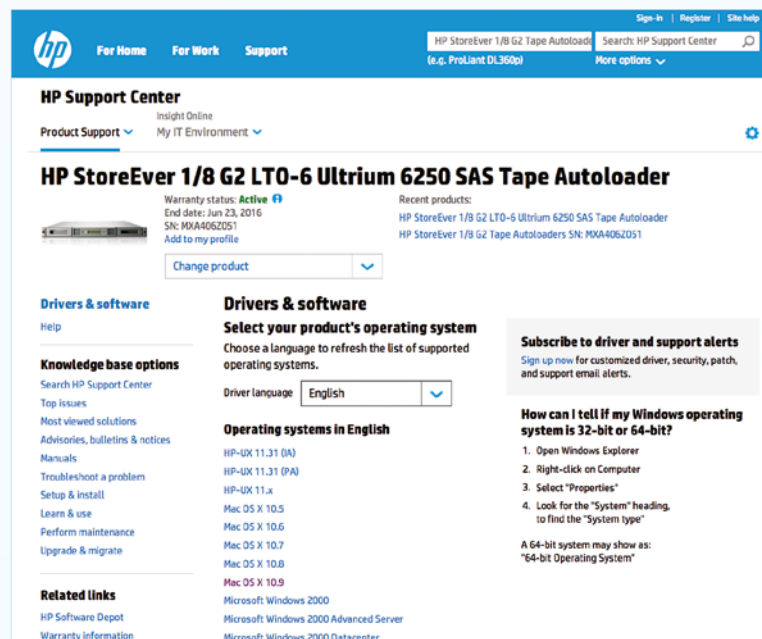
The internet started out as a free space, like a hidden garden that no-one knew about. Then along came the telcos wanting their slice of the pie, and then after them came the government, worried that stuff was being said that they didn't know about. Twenty years from now, everything said and done on the internet will be logged, captured and analysed, and anonymity will have become illegal. Authentication will at first be optional, piggybacked onto services such as Facebook and Twitter, and will then become mandatory for some services. Then the great separation of oil and water will happen, and the unauthenticated internet will split away from the fast, safe, expensive corporate internet, and eventually will be banned altogether. It will go underground, of course, and we will have created a new underworld. The Matrix will have arrived.

Of Horror film. I present you with a screenshot of some of its buttons (see left): none of them line up; there are two different fonts in play; the scheduling applet requires hitting with a virtual hammer to get some of its settings to actually take; and it won't tell you how much space is left on a tape, taking the somewhat pious view that drive compression makes this impossible to do accurately. Maybe that's so, but even an estimated fuel gauge would be an improvement on nothing...

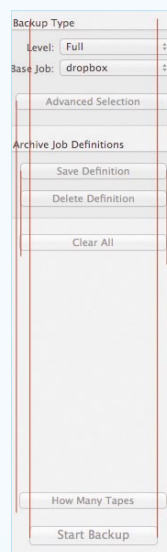
Did I mention that there's no online help? You have to refer to a long and somewhat brain-scrambling PDF file. I can't set the date stamps in the product to be in anything other than US format - "2014-07-24" - which is a pain to read. And no, I have no idea what "#kNull" means as a column heading in the Catalog Search window. I started reporting bugs and issues and was made to feel that this was all my fault. For example, there was a bug in the "time to restore" window that gave the wrong value, but I was told that no-one had noticed it before, or reported it, which made me wonder what their internal product-testing lab had been doing all these years.

What really grates is that this is a \$600 product that carries with it a \$300-per-year support contract. No, that isn't for year two; this is required after 30 days from purchase. That's right, no support after 30 days unless you cough up 50% of the retail price of the software to buy it. Frankly, this is a disgrace: there should be at least one year's support provided with the purchase price. But what really, really grates is that it's actually a very good product. It's reliable, it works, and many people rely upon it.

▼ HP's website has redefined the word "opaque"



▼ Tolis BRU PE is a powerful tool, but its user interface is in need of an overhaul





BRU PE is equipped with a user interface that could suck a donkey through a straw



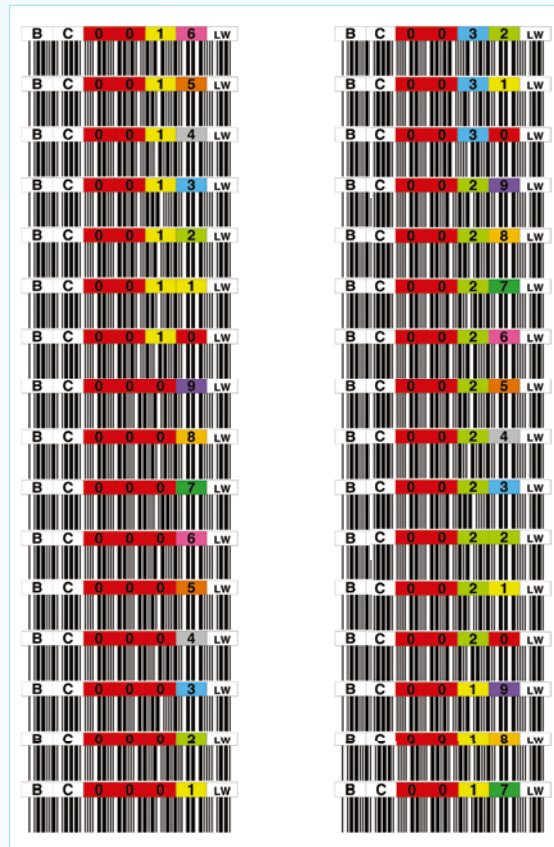
Data backup, recovery and archiving is an extremely important task, but this company is stuck in a time warp and sees absolutely no need to make its product easy to use, logical or even intuitive.

When I questioned why its user interface was laid out so badly, the response was: "You've made it clear that you do not like the layout, but so many of our users find it intuitive and productive. In the case of design, our UI is designed from a user interactivity perspective rather than some nebulous design specification." If they can't be bothered to align the buttons in their user interface, it tends to make me wonder what else they couldn't be bothered to test and check. This is sad because this product could, and should, be world-class in all respects.

HP RDX

While talking to HP, the question was raised about whether I was interested in looking at RDX. RDX is a removable hard disk solution of up to 2TB. Various manufacturers have tried removable hard disk solutions in the past, with some quite radical in approach (as well as remarkably unreliable). RDX takes what appears to be a standard SATA drive and wraps it into a hardened caddy. The drive is an external device that connects to your computer via USB 3, and at 2TB it's quite a useful size – certainly good enough for the task of hauling around a lot of data, especially in rucksacks or motorcycle panniers, as examples.

Getting it up and running was simple: just plug it in and it appears on your desktop as another drive. The disks are formatted as NTFS by default, so that's easy to use too. There was only one fly in the ointment: it comes with some Windows software to do "continuous backup" of the computer, but it's unclear exactly what this does. I suspect it takes a whole backup and then incrementally updates it as



files change, rather like Time Machine on OS X.

Unfortunately, it must have detected my recent bad vibes towards HP products and refused to work for me. Despite inserting an appropriate caddy, the software maintained that it couldn't see one, even though it was mounted just fine on the desktop. Clearly the gods weren't with me, and I'll continue to investigate and report back later. I like the idea of inexpensive removable drives as part of a broader overall backup and archive strategy: not a single-point solution, but a component in a wider vision.

TO TAPE LABELLING

When deploying a robotic tape loader, it's a good idea to barcode the tapes you use: by doing so, the tape loader knows where everything is, and can tell which tape is which. That's why buying tapes with barcodes already printed on them is a fine idea, since it saves you having to worry about doing it. Trying to find single LTO-6 WORM (write once, read many times) tapes proved difficult, but I did manage to find a supplier of single Sony LTO cleaning tapes that said the tapes came with a barcode already provided. Unfortunately, they were lying.

▲ The website www.mytapelabels.com is a valuable resource for printing barcodes

Hence I needed to create barcodes for my various WORM and cleaning tapes. I found an excellent site at www.mytapelabels.com, which lets you generate all sorts of bizarre barcode labels for all sorts of tapes. Enter what you need, press the button, and it spits out a PDF file that you can laser print. The service is costed by the annual number of codes generated, but it's cheap – significantly cheaper than buying labels from the tape manufacturers.

WHEN IS A SIM NOT A SIM?

I was in need of a data SIM for a tablet, and it needed to be the nano size as used by an iPad. This didn't seem too onerous a requirement, so I trundled round to my nearby Tesco, where I purchased two nano-SIMs for the princely sum of 99p each. Back to the office and we tried to register these SIMs via Tesco's website. At this point, everything exploded: the SIM didn't work, it couldn't be registered via the website, and the website didn't work either. Chris, my lab manager, decided to go onto Twitter and engage with the Tesco Mobile support person.

His conversation started off quite silly ("we don't sell that, sir"), then descended further into farce ("please take it back to the shop where they'll give you one that does work"). Finally a grown-up phoned and spoke to Chris, whereupon it appeared that these nano-SIMs shouldn't have been on the shelves at all and that a few had been sent to shops by mistake. Such things happen: anything to do with retail, stock control and shipping is hard, as I know from our <http://wlovemanfood.com> website. Mistakes happen, but it's still amusing to hold a product in your hand that customer service says doesn't exist. Surreal, and rather reminiscent of Monty Python's "dead parrot", sadly. ■

AND FINALLY, CYRIL...

And finally, Esther, I've been looking at laser printers – small ones suitable for a small office – and I'm astonished at just how nasty some of their driver setup routines are. Some won't work on Windows 8.x. Some provide ZIP files that contain gobbledegook and no setup program. Some have a Help file that tries to tell you how to install the driver, but is wrong. Few check online to see whether there's a newer version to automatically download and install for you. How hard can this be?

The youth of today

STEVE CASSIDY IS TAKEN ABACK BY A RARE SERVER FAILURE, AND WORRIES ABOUT THE NEXT GENERATION OF NETWORK ARCHITECTS

How exciting! A server just failed while I was sitting beside it in the server room. This is such a rare occurrence nowadays that I confess, when the piercing beep of the system-health monitor started echoing off the beige walls, I mistook it for a fire alarm or a UPS deprived of incoming current. Loud, high-pitched beeps have a way of seeming omnidirectional in an echoey room, and not every machine accompanies the beep with a matching visible alert, so we spent a while looking carefully around us - until the first of the users hit the server-room door. "Where's the file share gone?" they asked. "Which file share?" we replied. "All of them..."

So used was I to servers being reliable that I headed first for the network switches, but no, it was the main file server all right, and it was blinking a light I'd never encountered before. "System health" said the translations online, and "not good" would summarise the forum threads relating to this little blighter. Diagnosis was slowed down by two factors, one being the usual exorbitant reboot time expected from such a middle-aged, mid-sized server, with two RAID cards and three iSCSI arrays hanging off a selection of varied LAN links.

The other factor was the users, who thought that sending just one guy in to ask about expected uptime was nowhere near enough. Oh no, each department had to come in, be told the bad news, boast of how busy they were, ask whether this might interrupt any plans we had, and then finally go away once these social niceties had been satisfied. This machine, you see, was a bit of a survivor, built so that various applications and databases could be hived off onto other platforms. That left behind a whole lot of files, spread between different internal RAIDs and an external iSCSI store: I couldn't put an exact number to them, but based on inventory surveys done a couple of months ago, I'd say this was a million-file server. A dead million-file server.

▶ The younger generation of networking people can't see any problem with cheap NAS storage



The hardware - an HP ProLiant ML370 G5 - was well supplied both with basic bit-shovelling horsepower and with HP's custom layer of parts that watch each other and the rest of the machine to support remote monitoring and system-health information. Or, in this case, to stop the machine stone dead, turn on that piercing beeper, and then respond to every diagnostic attempt by maxing out the fan speed and beeping even more loudly. Forum advice from Google led us towards the first sign of life - we took out all but one RAM stick and then retried booting. Great: now we had our server back with all its logical drives and files intact, but barely enough memory to get to the

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Great: we had our server back, with barely enough memory to get to the Windows logo

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Windows logo. If we tired to put back any further sticks of RAM, then beeeeeep...

It's at moments such as this that the standard, glib responses about which tactic to adopt to get the users back to work begin to sound a little hollow. All right, let's get all the tapes out and run up that old machine in the corner, restore a million files from the last full backup, then slather in the incrementals over, say, 72 hours of solid system rebuild. Of course, since this particular client employed incremental backup (to keep backups within a short time slot during the week), the files that users wanted most - the ones they were actually working on when the server went down - wouldn't turn up until the very end of this restore. So we thought a bit harder. Perhaps this



was what it looked like, a memory fault? Did we have any memory of the right type that we could try swapping in?

The machine had 12GB, in 1GB sticks, entirely populating the two stand-up RAM carriers typical of this breed of HP server. Going through all the permitted configurations of 12 1GB sticks, with a reboot each time, would take far too long for this business. And while the iSCSI volume could be easily re-presented by attaching to the target via the iSCSI initiator on another server, this wouldn't help the two other logical disks - made up of four and five physical disks each - which of course contained special, separate collections of stuff, with their own drive letters and access groups. Those would be effectively out of reach unless this machine could be revived physically.

Now the nasty icing on this nasty cake: as a domain controller (DC), this machine's relationship with its Ethernet cards was particularly unbreakable. DCs keep track of their network identity, in part, via the MAC address of the Ethernet card that passes all the DC-related traffic, so even a bare-metal restore of the backups onto new hardware would still leave us with that lingering conundrum. It made a lot of sense to seek out some known-good working memory of exactly the right type, then spend a little time moving a complete RAM set into the misbehaving hardware. This may sound bizarre, because if you're used to playing with servers you'll know the memory they require has become increasingly specialised. There's no guarantee that RAM marked as compatible with the server motherboard is also compatible with whatever sub-type of RAM was initially supplied by the manufacturer - which is what made the prospect of a complete matched set of memory so appealing.

That, and the rather important fact that this was a G5 series HP server. At one point, 70% of the world's entire server fleet consisted of one flavour or another of HP G5 series machinery. Admittedly that was a good few years ago, but reinvestment in server hardware has recently been stuck in a long and uneventful doldrum thanks to the deepest recession for a century (an event that was viewed with ambivalence by us server-room nerds, because it briefly made us visibly valuable to the businesses that pay our wages). Super-reliable



◀ This LaCie is one of the slowest NAS devices that I've ever touched

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When I look at the decisions made by this generation, I have to bite my tongue

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kit such as these G5-era HP servers played a major role in our comparative isolation from the cold recessionary winds. Think of them as the Land Rovers of the server room: neither marvellously efficient nor leading edge, but likely to outlast everything else in the room (well, except for this particular model in front of me of course).

Needless to say, this huge population of servers are all (including ours) far beyond the span of their warranties. However, as with a classic Land Rover, the ubiquity of the G5 meant we didn't need to rely on official sources for a quick fix. One of the team zoomed off to purchase a matching set of replacement RAM, while I vaguely remembered a conversation from a couple of years ago and called Jon Honeyball. Jon's server room, you see, isn't far from the site containing this dead server, and I remembered him mentioning that retirement loomed for his G5

series DL380. While not all the parts would be swappable, the important parts - memory, CPUs and voltage regulators - were common. Jon was at home, and as luck would have it, his server was specified with 32GB of RAM and decommissioned, and a pick-up was arranged for the following morning at a mutually acceptable price. It felt like we had two potential solutions in progress, with a high chance that the users would be back online the following morning.

That prospect crumbled to dust at 9pm that evening, when the chap sent to get the first set of RAM tried fitting it, and back came the dreaded beep. It looked as though the problem was actually the motherboard, somewhere deep inside the memory-access architecture. No matter which memory we put in, in whatever combination of empty slots, ranking or total capacity, all we got was the beep. This meant that Jon's old server wasn't likely to provide a fix either. Then we looked at the junk pile at the back of the server room. Way back, beneath a load of VoIP phone boxes and reels of fibre, was another G5 server, decommissioned years ago due to its low-speed CPU and outmoded 3.5in drive cage. In true Land Rover fashion, it had the same generic motherboard, presented in an easily dismantled cage mount. Swapping the motherboard would also sidestep our problem with the DC role for this machine, since everything that defines the machine to itself - its LAN cards, CPUs, RAID controllers and iSCSI - is separate from the basic hardware. An hour after last hearing the dreadful beep, we finally had our server back.

NASTY BUSINESS

Looking ahead, we don't mind having a stab at predicting the state of our speciality area another 20 years hence, in 2034 (see *The next 20 years*, 107). However, I already have a generation-related problem with the state of networking in 2014: I'm starting to perceive a growing gap between my long-standing colleagues and the younger people entering the business, who want to work in a very different way and who bring different skills with them, almost all of which are gathered from the internet. I don't mean that these kids are using cloud-based tutorials to gen up on networking; rather, I mean that they now think in terms best suited to a web-hosting operation when it comes to managing data. The toolbox of the itinerant

iSCSI

Regular readers will notice my frequent mentions of iSCSI. I've found it to be best way to establish whether the NAS you're thinking of buying has a big enough brain, and also to bridge together expensive Microsoft-licensed server hardware with a stack of cheap disks. So my short-term prediction - far sooner than 20 years - is that the response to the exploding data volumes now affecting small to medium businesses will involve getting to grips with iSCSI.



This huge population of servers are all far beyond the span of their warranties



web developer has become their benchmark for performance, capacity and workflow. All of which is my attempt to say politely that they can't see beyond the trackpads of their MacBooks.

Indeed, when I look at the businesses and buying decisions made by this younger generation, schooled in the paltry few kilobytes that make up a beginner's website and toting their Wi-Fi-only, designer-premium personal computing devices, I have to bite my tongue. Know younger readers will be hopping up and down at this curmudgeonly outburst, and probably getting all shouty about how the spread of web standards and web toolboxes is the driving force behind the explosion in computing in the second decade of this millennium. And they're right.

But my point is, having lit the fuse to that explosion, the techniques most commonly understood by the youth of today won't be strong enough to cope with the resulting relentless high-pressure hosepipe of data. This brings me neatly to my gritted-teeth attitude to NAS-based storage: please guys, trust me, there is higher performance to be had than a DSL line or a USB key.

You get it from wired networks, built with the right kit that isn't merely stated to conform to some published standard, but is actually tested to be compatible when the going gets tough. The reason you believe you have nothing to gain by spending more than an absolute minimum with the cheapest vendor is that you've never tried a system built from the right stuff. This is because you haven't had to: web data traffic is comparatively small and intricate, only a few flying chunks of HTML. Corporate and general business traffic – the stuff that has been redefined using web tools – is neither intricate nor small. It's big fat lumps of diagram, legal document and endless boring photo libraries.

Want to see 2,500 high-resolution, mid-winter, wet-day pictures of a bunch of fields in Oberhausen, North Rhine-Westphalia, that might one day become a shopping centre? Step right this way!

Data of this kind has a merciless way with network infrastructure and hardware. Most of the advances that make you think your network is zippy these days depend on lots of little bits of cache memory sprinkled across all the devices that show you things. They make you believe everything is superfast. View one picture from that 2,500 set I just mentioned and you won't see any perceptible delay, whether it's served from a \$500,000 Fibre-Channel-over-Ethernet disk array or a \$200 DIY NAS. But start doing corporate stuff with that same data and watch as the cheap kit is brought completely to its knees. Really.

To take one simple example, I had to move a client from an older, cheap NAS onto a more modern version. Of course, the old one was rather full, and mostly full of duplicates so far as we could tell. DupScout (www.dupscout.com) ran at around 30 files

▼ Are NAS drives over-reaching with over-features?



per second in a single un-contended session to that ancient NAS box. Putting a few gigabytes of folders onto the new NAS looked fairly promising at the outset because it was topping out at more than 80 files per second. However, popping out for doughnuts revealed this to be a cheat: by the time we got back it was down to 40 files per second or so, and falling. In the end, I followed a hunch and reconfigured the NAS device to run in iSCSI with the Windows server (by bringing in a spare Ethernet card and doing a bit of research on how to configure the central LAN switch). We then started to see duplicate file-finding rates up in the 130-files-per-second range, in this case sustained for several hours.

NAS VAGARIES

That original, cheap NAS actually wasn't that cheap back in the day. It was a LaCie, all fluted cast alloy, but it still wouldn't rise above around 17MB/sec, no matter what I attached it to after it was taken out of service. This isn't the first time I've come across a NAS that's sold with all manner of bold claims on the box, and which does barely squeak into acceptable performance in some narrowly defined configuration, but staggers miserably in all others. Everywhere I go nowadays there's a NAS box. Older techies very often hide them away in the cupboard, so ashamed are they of falling for that early publicity. But those younger web-era guys use them as a statement of commercial allegiance, and will probe you about your feelings towards The Great Evil Microsoft, before telling you how late they stay every night in the office waiting for their backups to finish. ■

THE NEXT 20 YEARS

The future of networks should be comparatively easy to predict because this field has historically moved more slowly than the rest of computing. However, that rule is itself in the midst of a coup d'état, as the end of freely allocated IPv4 addresses hasn't produced the smooth transition to IPv6 the standards-setters and regulators imagined. In a way, a 15-year project has failed, since the impenetrability of IPv6 as a platform is a great excuse for networks to become proprietary. The bulk of the world's traffic is already moving around in the dark, with only a thin balloon-like surface of old-school addresses and services poking into the light.

In the future, I fear this means that the divide between home users, business spaces, and the full-speed, full-service internet we've all been used to using will become stronger and deeper, all in the name of making people pay for their use by the minute, or the megabyte, or the identity. Inside businesses, I expect to see wireless connections become ever more prevalent, and for work to move to wireless-friendly service delivery, because the next generation of workers demand and expect it. I also harbour a suspicion that the cloud won't be as all-encompassing as many current service players think, as the cheapness of local processing and storage is rising sharply. Why would you pay for cloud computing once your local server runs off those solar cells on your garage roof?

Anonymous networking

DAVEY WINDER WONDERS IF A SOCIAL NETWORK CAN EVER BE TRULY ANONYMOUS, AND IS HORRIFIED BY FACEBOOK'S LATEST ANNOUNCEMENT

Love it or loathe it, the Portable Document Format (PDF) – developed by Adobe and released to the world in 1993 – is a fact of online life. If you do any kind of internet research, you're sure to find documents in this format, and while most web browsers have built-in PDF viewers, they're typically less well featured than the real Adobe Reader. Regulars to these pages will know that I've been bashing Adobe for the past few years due to various security vulnerabilities in its products, not to mention the seemingly endless torrent of fix patches, but for once I'm putting these security matters aside to concentrate on an altogether different complaint.

Buy any new PC these days and it will almost certainly come stuffed with crapware (sorry, there's really no more pleasant word). You know the kind of stuff – unwanted commercial software trials supposedly bundled to add value to your purchase, but in fact included purely to boost the vendor's profits through partnership deals.

The first thing I do when I'm configuring a new computer is to uninstall as much crapware as possible, and replace it with software I actually want. Most people I know do the same, including technology guru Dick Pountain. He told me recently he'd just bought a new laptop that came with a fairly horrible commercial PDF reader preinstalled, so he went to Google to grab a link to the kosher Adobe Reader download site.

I wasn't too surprised when he told me the first two links returned were both "fakes", by which he meant that although the Adobe Reader XI software was genuine, it came wrapped inside a modified installer that wanted to shovel all sorts of potentially dangerous – and most definitely unwanted – software onto his laptop alongside it.

The URLs included the word "adobe" in order to appear legit and thus entice the unwary into downloading instead of going to the official Adobe site (which lay third in that particular listing). Other links claiming to be Adobe Reader will be adverts, sponsored links or – worse still – malware-ridden scams there and in disguise.



DAVEY WINDER
Award-winning journalist and small-business consultant specialising in privacy and security issues.

The screenshot shows the Cix website with a navigation bar containing links for Read Online, Read Offline, Pricing, Roadmap, Support, and Contact. The main heading is "The Original Social Network" with the tagline "Exchange ideas. Debate views. Ask questions. Find solutions." Below this are five forum categories, each with an icon and a "READ MORE" link:

- Feature Forums**: Follow and take part in the most popular Forums. READ MORE
- Sales Forums**: Sell items and products without commission charges. READ MORE
- Technical Forums**: Seek help or contribute your knowledge here. READ MORE
- Non-Technical Forums**: You can talk about anything you like... READ MORE
- Social Forums**: Meet and interact with friends or business colleagues. READ MORE

▲ Cix, the original social network, and home to many of my fake identities...

Over the years, I've evolved to a point of sponsored-search blindness where I simply don't see such links any more; I always head straight for the organic results. However, as Dick pointed out, not everyone is as cynical as we are. Others may believe that Google's unofficial corporate motto of "Don't be evil" is reflected in the real world, and that all adverts returned in search lists are actually genuine, helpful and harmless.

If you don't mind your computer being clogged up with unwanted software, particularly of the browser toolbar and adware variety, go ahead and ignore my advice. For everyone else, here it is: don't be fooled by the Google AdWords manipulators, and never click on an advert at the top of the results list. Organic search results are easy enough to distinguish if you take the time to look a little closer at the URLs, so always go direct.

This advice applies to a multitude of high-risk online scenarios: an email from your bank asking you to log in via a helpful link, a Facebook post that includes a link to a vendor's special offer, and search results for software.

If you want Adobe Reader, get it direct from Adobe – go to **www.adobe.com/au**, scroll to the bottom and look in the footer for the download link. Alternatively, jump straight to **http://get.adobe.com/reader** for a direct download instead.

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Although we kid ourselves that social networking is a new thing, only the name is new

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This advice also applies to any well-known brand of software: bypass Google search and the dodgy download sites and head straight for the obvious home domain, from where you'll be able to progressively navigate to a download section to ensure that you install the real thing.

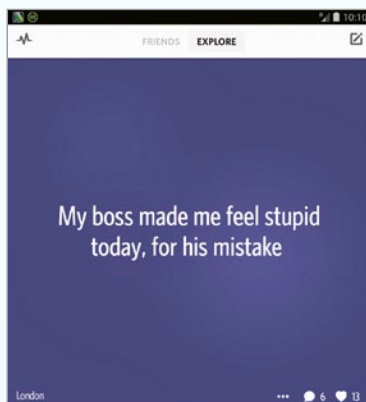
The problem is – and to confuse matters still further – the official Adobe Reader download plays the same game. As you can see from the screenshot below, when you go to Adobe's site and try to download Adobe Reader, it tries to force a "free" copy of McAfee Security Scan Plus on you. I use the terms "tries" and "force" deliberately here, because the checkbox for adding this product to your download package is automatically ticked – you have to opt out, rather than opt in, which is never welcome. I'm not saying the McAfee

product is rubbish, since I haven't tried it. But when I download a PDF reader, I want something to read PDFs, not something to perform a security scan; I already have one of those...

But what if you've already fallen for a fake Adobe Reader - or fake anything - software scam? Hopefully you'll have been protected from any malware installations by the security software you're running (and you are running *something*, aren't you?). Perhaps you have double-whammy protection, such as my default setup these days: Eset Smart Security and Malwarebytes Anti-Malware Premium, which seem to run in perfect harmony and provide a good level of broad threat protection. But even with this added safety net, there's still a chance that when you signed the end-user licence agreement (EULA) you agreed to install lots of unwanted apps.

Search toolbars and assorted adware - some of which may evade your security measures, depending on how you have them configured - are common examples. I have a templated response for anyone who contacts me about an "accidental install", as they're prone to calling them, which has caused their security software to go haywire and throw up warning after warning about blocked installations and quarantined files. (Of course, such warnings are a good thing, since they mean your defences are doing what they should, but they don't guarantee that you haven't been infected by *something*.) This is the type of scenario where my cleanup template comes into play:

- Create a new restore point.
- Download AdwCleaner (www.bleepingcomputer.com/download/adwcleaner/) and run a scan.
- Use AdwCleaner's "clean" function to remove anything it finds.
- Download Junkware Removal Tool



◀ This is as business-like as Secret gets right now, but is there a business angle for anonymous networking?

▶ Of course, as Clueful reveals, the Secret app knows who and where you are



(www.bleepingcomputer.com/download/junkware-removal-tool/).

- After disconnecting physically from the internet by switching off your router, close your security software (to prevent any conflict) and then run a scan.
- Once complete, with any toolbars or search bars removed, restart your security software and reconnect your router.
- Then, download RogueKiller (www.bleepingcomputer.com/download/roguekiller/).
- Remove any external drives (including any USB ones) and start the scan.
- Once the RogueKiller scan has finished, click "delete" and allow it to kill any rogue processes.
- Finally, delete all of the above tools from your computer. You should now hopefully be free of adware, crapware and malware.

I'd also encourage less tech-savvy family members and colleagues of *PC & Tech Authority* readers to install the freeware FileHippo.com Update Checker (www.filehippo.com/updatechecker). This scans for installed software and gets updates when available without pop-ups or the danger of spyware.

PHOOLING THE PHISHERMEN

There's been much coverage online of what's being described as a "dangerously convincing" and "clever and tricky-to-spot" phishing scam involving Google Drive. One tech journalist even said it was "almost impossible" to know it was a fake.

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Are anonymous networks doomed to be the hangout of the drunken philosopher?

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I can only assume that it's the use of a google.com URL and Google SSL encryption that is leading people to describe it in these terms. After all, it starts with an unsolicited email with the subject "Important Google Document" and comes complete with a Google Drive link. I admit that there's always a danger you might get such an email from a friend, work colleague or member of your social networking circle whose account has been hacked, which would add conviction through the old leverage-of-trust issue. Even then, it's still not convincing enough. The message itself says simply: "Please view this document I have uploaded using Google Docs" and goes on to stress that "it is very important" without even trying to explain why.

In the event that you were foolhardy enough to fall for this not-at-all-convincing spiel, that's when things became interesting (I use the past tense because Google removed the fake pages sharpish). The fake login page was actually hosted on Google's servers by using a public folder inside a Google Drive account, to make it appear more genuine, with Drive's preview function enabling the use of a publicly accessible URL for the link. Once you logged in via this fake page, your credentials were scraped off to a compromised server while you viewed the pointless document.

Beyond the obvious advice - don't click links or open attachments from anyone who sends you an unexpected email that says "view this document" - there are two simple tips that can save you from such login scrapers.

First, always deliberately get your login details wrong at the first attempt: have a fake username/email and stupid password ready for every initial login. If the site you're looking at is genuine, it will spit back the credentials and ask you to try again, but most fakes will accept the first thing you enter without question, at which point red flags should be raised and the words "run away" should

be ringing in your ears. You might also like to refer to my “emergency response template” above, just in case of drive-by downloads.

More observant readers will have spotted that I qualified this by saying “most fakes”. Here’s the thing: some login scrapers are clever enough to automatically refuse your first attempt to sidestep such a defence, or – in the case of some man-in-the-middle attacks – buy time by retrying the logins and performing their nefarious activity while you’re attempting to log in over and again. However, I’d say that we’re talking about at least 95% of all fake login sites here, so the ruse is still a very good first line of defence to adopt.

What you then need is a strong second line to shore this up, and



No right-minded user would expect fair use to include this kind of mass experimentation



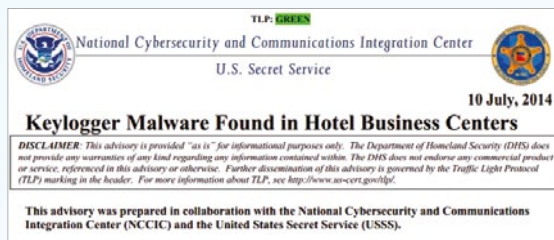
this is where I get back on my two-factor soapbox again, I’m afraid. The use of two-factor authentication (2FA) or verification is growing, and is available on many sites now, including Google. If you had two-factor authentication up and running, then even if you’d fallen for the Google Drive scam and given up your login and password, these would have been worthless to the phishermen. They wouldn’t have been able to access or compromise your account from an unverified device without the passcode that would be texted to your smartphone or generated by your authentication-code app.

Sure, it can be a faff, especially when you first set it up and have to go through the rigmarole of verifying your devices, but once that’s done it really isn’t a huge inconvenience for the superior protection it confers.

In fact, I’d go so far as to say that someone with a poor password and 2FA is better protected than someone with a complex password but no 2FA.

DAINGEROUS ROUTE

Routers, while essential, are pretty dull, so when they’re promoted from



the review pages to news headlines in the tech press, you know that something bad is happening.

The breaking bad here is an ongoing story about backdoors and vulnerabilities in router firmware. The latest twist in the tale is that more than 300,000 wireless routers around the world have fallen under the control of a cybercriminal gang, or gangs, who exploit DNS redirection to point unknowing small-business and home-router users at sites that install drive-by-download malware, or change the adverts being displayed for the referral money. Routers from D-Link, Micronet and TP-Link are among the models being hit, and research suggests that as many as 80% of installed routers in this sector could have critical security vulnerabilities.

This should come as no surprise to anyone who’s had the misfortune to delve into the dark art of router firmware updates. It’s a smelly can of worms, so most folk don’t bother updating. But they should. Indeed, as far as the average user is concerned, “if it ain’t broke...” applies, but these routers are badly, badly broken and need to be fixed.

Educating people that their router needs to be kept patched and up to date as much as their computer or smartphone is proving to be difficult, so I fear that this is an exploit vector that will only grow and grow, especially as the type of DNS redirection that’s come to light is particularly profitable when exploited on a highly organised scale.

Your mum may have her PC secured fairly well these days, but you can bet that her router hasn’t been touched since it came out of the box – it will almost certainly still have its default admin login settings intact. I’m advising anyone who will listen to log on to their router via the admin interface (a quick Google will reveal how to do this if you’re not sure, including bringing up the default admin password for your particular model) and check that its DNS settings are as they should be for your ISP – your ISP’s tech support will be able to provide this information if you

▲ The US Department of Homeland Security took the hotel keylogger threat seriously enough to issue an official advisory

don’t have it to hand. They certainly shouldn’t be 5.45.75.11 or 5.45.76.36, which are being used in the current redirection attack.

While you have your router at your mercy, change your admin login and password. Finally, look for the update settings and check to see if any new firmware update is available.

Many people have been repeating the obvious advice that doing your online banking or checking your email using free public Wi-Fi in a coffee shop or an airport lounge isn’t safe. This is hardly a myth, and it’s easy for someone to eavesdrop on your session using readily available packet-sniffing tools. I’ve used various freely available tools for my laptop and Android tablet that let me sniff out login data – for research purposes only, I hasten to add – and they work remarkably well.

Encrypted sessions are a different matter and can’t be easily circumvented, so it is possible to use public Wi-Fi securely. However, the idea of having a fully encrypted online session is a non-starter. Even using a VPN won’t circumvent the problem of anyone who has the Wi-Fi network password being able to packet-sniff unless WPA2 802.1X enterprise code is being employed, and this ain’t gonna happen in your local coffee shop.

The best advice, then, as far as using free public Wi-Fi goes, is just don’t bother. ■

THE NEXT 20 YEARS

Twenty years ago, one of the founders of the Electronic Frontier Foundation, John Gilmore, famously said: “The net interprets censorship as damage and routes around it,” and on the whole that remains the case. Where things become complicated is when that censorship takes the form of privacy protection. Sun Microsystems founder Scott McNealy was right in 1999 when he claimed: “You have zero privacy already. Get over it.” He was right then, he’s right now, and even with the ongoing Edward Snowden fallout, he’ll be right in 20 years time. The irony is that we get upset when we’re snooped upon, yet happily continue to trade our privacy for free online services.

Nowhere is this more obvious than in the social media realm. With social networking increasingly becoming a mobile pursuit, and geolocating already de rigueur, expect the Facebook (and Twitter) of the future not only to know where you are and where you’ve been, but also where you’re going. Big-data analysis will help with behavioural patterning – the science of guessing who you want to know, what you want to do and, most importantly, what you want to buy and where you want to buy it. Indeed, the biggest change to social media will be a completion of the move away from status update and contact provision to becoming useful social search and commerce platforms.

Change minds — leadership

THE AGE OF THE INTRAPRENEUR

In a society that is constantly changing the idea of leadership, requiring a title is starting to change. The rise in entrepreneurship is providing an opportunity for people with ideas to rise and succeed. This in turn shows that true leadership is not about the title, but about the qualities you possess.

We all have our own definition of leadership and what being a leader means to us; however, how many people have taken the time to think about the skills that they feel are required to be a good leader?

To me the one quality that makes a good leader is authenticity. Being genuine in who you are and what you stand for allows your leadership to be natural and to shine through. A critical component of this is self-awareness. Having a thorough understanding of who you are and what you believe at your core allows you to understand why you may be working in particular way. If it's working, great - but the benefit is during the times that it may not be working and you can then try to adjust how you are working or communicating in order to have a more positive outcome.

Understanding who you are ties into providing meaning, a purpose. Do you know what your purpose is? Have you thought about what about your job makes you the happiest? I was in a course recently and we had to answer the question: "What brings you to life at work?" I encourage you to ask yourself this question. Understanding why you enjoy specific parts of your job can provide you with such insight, especially if you are not enjoying your job as much as you would like. Once you are aware of this and increase the parts of your job that you like then you can start to push yourself to the limit, which will provide you with positive energy and ultimately an increase in happiness. Studies have also suggested that you will have

an increase in productivity, low turn-over and increased loyalty.

Another aspect of strong leadership is being engaging. What I mean by this is engaging with your team. However a bigger part of this is also risk taking. Knowing and trusting your intuition is a key part of leadership, whether you prefer to analyse



“When you think about leadership think of someone you see as a great leader.”



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the risk deeply or just jump in. Knowing that you are making the right decision and sticking by it is critical. The decision, however, does not need to be made alone. Reaching out to trusted advisors will help inform your decision and ensure you are clear in the situation. Clarity will help guide you along the right path and provide you with strength when things may become harder. Nevertheless, don't forget to trust yourself. By being in the situation people around you must believe in you, so take that to help provide

you the confidence you may need to continue on.

The other common aspects I haven't touched on as they are something people talk about more often are communication skills, confidence, commitment as well as creativity etc.

When you think about leadership think of someone you see as a great leader. What qualities make them a great leader and what can you learn from that? You can see the change in leadership benefits not just in company growth but also in sporting teams. What difference has Darren Lehmann made on the Australian Cricket Team by being coach? How did Apple benefit from Steve Jobs as CEO or more so, how did they change when he was no longer in the position for a period of time? Understanding your leadership style and how you want to be remembered as a leader needs to start now, no matter where you are in your career. You may not be in a management position, but that doesn't necessarily mean you are not a leader.

To hear, learn and be inspired by some of Australia's top leaders in the ICT industry, YITCON 14 - the Youth Festival of ICT - a must-attend event. World-class speakers and industry experts will present on leading edge technological change and how to prosper in the digital future. The national event will be held on 9 and 10 October 2014 at The Forum in Melbourne, bringing together more than 1,000 secondary students, university students and young professionals interested in ICT careers. See you there!

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It's time to stick our heads out of the cloud to fix the Internet of Things, says Jon Honeyball

“ Stand aside Web 2.0, cloud computing, big data - the new buzzword on the block is Internet of Things. And it's a great buzzword if you like that stuff: it gets politicians excited, taxpayers' funding flowing, and allows the largely ignorant to appear edgy and on-message.

The truth is that we've had interconnected devices for a long time now, although I'll begrudgingly concede that the spread of devices is wider than ever before. In the past, a laptop might have partnered a desktop computer, and there might have been a networked server or two in there too. In recent history, the arrival of the smartphone and tablet has shifted the centre of power away from the desktop towards truly portable devices that are with you all the time.

Today, that network spans all the way up to 75in 4K "smart TVs" (although I'd contend that most smart TVs are anything but; as a group, they have the most grotesque and incapable interfaces and facilities) and all the way down to the exciting world of tiny devices, which will probably be connected using the new Bluetooth LE interfaces.

So there's undoubtedly the potential for many more devices in this Internet of Things era, although any rational analysis shows it's just reaching out to ever bigger and ever smaller devices across a pre-existing continuum.

The problem, however, is that there's an implicit assumption that the Internet of Things works only because of cloud services. There's a certain logic to this: it's easy to make a device

that can talk to other devices if you can make them all talk to one cloud service. The customer doesn't have to set up a centralised server or worry about protocols. When they buy a shiny new component device, all they have to do is log it in to their cloud account. Then a miracle will occur, and that new device will know about all the other devices the customer owns, and those lovely things can all get down and dirty and start making babies. That's the ideal, but the reality is somewhat muted. For starters, all of this is predicated on good internet connectivity. This might be available. It might not. And if a device is designed to be moved around, it will need a range of connectivity options to keep in contact with the cloud service, whether that be Bluetooth to a smartphone, or a Wi-Fi connection to public infrastructure, or even a built-in GSM/3G/LTE connection.

This isn't the heart of the problem, however. The issue is one of security and authentication. An Internet of Things based on cloud services has a huge weakness. All the security can be held in the cloud, defined in the cloud and implemented in a way that's very easy for customers - but this also means they don't have any real sense of responsibility for the security of their devices. Many assume that some "cloud service thing" that's based "out there" will "look after it for me".

Now the cynic in me says that cloud-based services aren't really a suitable environment for the security of all my private stuff. Especially cloud-based services

based in the USA or run by companies there, even more so after the recent court judgement in New York ruling that any data held in Microsoft's Dublin data centres would be considered available to the American judicial system.

“The cynic in me says that cloud-based services aren't a suitable environment for the security of all my private stuff”

What's the solution here? We need to have our own encryption key-handling system, which is under our control, and which most definitely isn't tied to American IT and cloud providers. I've suggested this before, but the time is ripe to say it again: a chip-and-PIN bank card is an ideal vehicle on which to carry our personal digital keys. There are endless devices that could help us manage such devices - and they're called ATMs. There are organisations that could take on such data storage and security - they're called banks - that look after our money for us, and even offer the analogue equivalent of safety deposit boxes. We managed to implement chip-and-PIN much faster than in the USA, and maybe there's a place here for a push towards banks handling encryption-key data. So, if I decided that I didn't trust my bank any more, I could just take my card and put it into an ATM belonging to a different bank. The solution is staring us right in the face, but will the right people join up the dots and make this happen?



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Printed by: Webstar
Distributed by: Network Services Company, Australia; Netlink, NZ

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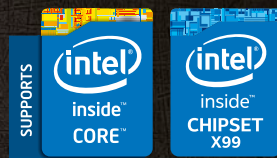
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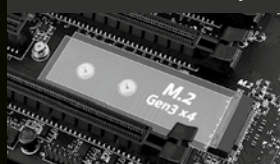


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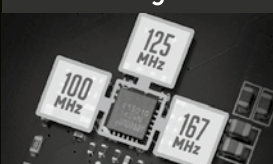
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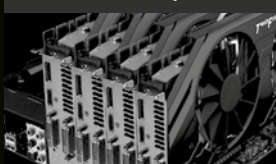
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